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Caution for safety
安全注意事項



- To use Fujicon product correctly and safety, please read "General Information for Application" very carefully.
- The products are designed and manufactured chiefly for general electronic appliances. In case that you are going to apply them for medical equipment, aircraft, space equipment, or the same kind that requires high safety, you are required to confirm application through your own testing and own judgment.
- All design and specifications in this catalogue are for reference only. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.
- 為了正確安全地使用產品，請在使用前仔細閱讀“鋁電解電容器使用注意事項”；
- 本產品目錄中所登載的產品是為一般電子設備用而設計和製造的，如果要用於醫療設備、宇航設備等需要高度安全性的設備，必須事先對適合性做充分的測試；
- 本產品目錄中所提供的設計及特性參數僅供參考。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

SERIES TABLE 產品系列表

■ Conductive Polymer Aluminum Solid Electrolytic Capacitors (Chip Type) 導電性高分子固態鋁電解電容器 (貼片式)

Type 類型	Series 系列	Features 特性	Standard Type 標準型	Low ESR 低阻抗	Long Life 長壽命	High Temperature 高溫	Operating Temperature Range (°C) 使用溫度範圍	Rate Voltage Range (V.D.C.) 額定工作電壓範圍	Capacitance Range (μF) 靜電容量範圍	Load Life (Hours) 負荷壽命 (小時)	Page 頁碼
Chip Type 貼片式	Standard 標準型	MA	Standard, low ESR 標準低阻抗品	●	●		-55~+105	2.5~25	3.3~1500	2000	32
	High Capacitance 大容量型	MB	High capacitance, ultra-low ESR 大容量, 極低阻抗品		●		-55~+105	2.5~18	56~2200	2000	35
	125°C High Temperature 高溫型	MR	125°C high temperature, high reliability 125°C高溫, 高可靠品		●	●	-55~+125	16~50	5.6~390	1500~3000	38
	Long Life 長壽命型	MS	Long life assurance 長壽命品		●	●	-55~+105	4~50	22~560	5000	41
		MX	Ultra long life assurance 超長壽命品		●	●	-55~+105	4~16	22~560	20000	43
	High Voltage/ Long Life 高壓長壽命型	MV	High voltage, long life assurance 高壓長壽命品		●	●	-55~+105	16~125	5.6~680	3000	45

■ Conductive Polymer Aluminum Solid Electrolytic Capacitors (Radial Lead Type) 導電性高分子固態鋁電解電容器 (引線式)

Radial Lead Type 引線式	Standard 標準型	PA	Standard, low ESR 標準低阻抗品	●	●		-55~+105	2.5~25	6.8~1500	2000	48
	High Capacitance 大容量型	PB	High capacitance, ultra-low ESR 大容量, 極低阻抗品		●		-55~+105	2.5~16	270~2200	2000	51
	125°C High Temperature 高溫型	PR	125°C high temperature, high reliability 125°C高溫, 高可靠品		●	●	-55~+125	16~50	22~100	3000	54
	Long Life 長壽命型	PS	Long life assurance 長壽命品		●	●	-55~+105	2.5~16	100~1500	5000	56
		PX	Ultra long life assurance 超長壽命品		●	●	-55~+105	4~16	6.8~2200	20000	58
	High Voltage/ Long Life 高壓長壽命型	PV	High voltage, long life assurance 高壓長壽命品		●	●	-55~+105	16~100	6.8~470	3000	60

■ Conductive Polymer Hybrid Aluminum Electrolytic Capacitors (Chip Type) 導電性高分子混合型鋁電解電容器 (貼片式)

Chip Type 貼片式	Standard 標準型	HMV	105°C standard 105°C標準品	●	●	●	-55~+105	25~80	10~330	10000	64
	125°C High Temperature 高溫型	HMR	125°C high temperature usage 125°C高溫使用		●	●	-55~+125	16~100	22~1800	4000	66
	125°C High Ripple Current 高紋波電流型	HME	125°C high ripple current usage 125°C高紋波電流使用			●	-55~+125	25~63	47~470	4000	69
	135°C High Temperature 高溫型	HMG	135°C high temperature usage 135°C高溫使用			●	-55~+135	25~63	33~560	4000	71
	145°C Ultra-high Temperature 超高溫型	HMY	145°C ultra-high temperature usage 145°C超高溫使用			●	-55~+145	25~63	33~330	2000	73
	150°C Ultra-high Temperature 超高溫型	HMW	150°C ultra-high temperature usage 150°C超高溫使用			●	-55~+150	25~63	33~270	1000	75

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Conductive Polymer Hybrid Aluminum Electrolytic Capacitors (Radial Lead Type) 導電性高分子混合型鋁電解電容器 (引線式)



Type 類型	Series 系列	Features 特性	Standard Type 標準型	Low ESR 低阻抗	Long Life 長壽命	High Temperature 高溫	Operating Temperature Range (°C) 使用溫度範圍	Rate Voltage Range (V.D.C.) 額定工作電壓範圍	Capacitance Range (μF) 靜電容量範圍	Load Life (Hours) 負荷壽命 (小時)	Page 頁碼
Radial Lead Type 引線式	Standard 標準型	HPV	105°C standard 105°C標準品	●	●	●	-55~+105	22~80	22~470	10000	77
	125°C High Temperature 高溫型	HPR	125°C high temperature usage 125°C高溫使用		●	●	-55~+125	16~100	22~1500	4000	79
	135°C High Temperature 高溫型	HPD	135°C high temperature usage 135°C高溫使用			●	-55~+135	25~63	33~560	4000	81
	145°C Ultra-high Temperature 超高溫型	HPT	145°C ultra-high temperature usage 145°C超高溫使用			●	-55~+145	25~63	33~330	2000	83
	150°C Ultra-high Temperature 超高溫型	HPK	150°C ultra-high temperature usage 150°C超高溫使用			●	-55~+150	25~63	33~270	1000	85

Aluminum Electrolytic Capacitors (Chip Type) 鋁電解電容器 (貼片式)



Chip Type 貼片式	General Purpose 普通型	CS	Standard 標準品	●			-55~+105	4~100	0.1~10000	2000	88
							-40~+105	160~400	3.3~100		
							-25~+105	450	3.3~33		
		CK	Standard, wide temperature range 寬溫標準品	●			-55~+105	4~100	0.1~8200	2000	91
							-40~+105	160~400	3.3~100		
							-25~+105	450	3.3~33		
	Low Leakage Current 低漏電流型	SC	Low leakage current 低漏電流品	●			-40~+85	6.3~50	0.1~220	2000	94
	Non-polarized 無極性型	CN	Non-polarized 無極性品	●			-40~+85	6.3~50	0.1~100	1000	96
		KP	Non-polarized, wide temperature range 無極性寬溫品	●			-55~+105	6.3~50	0.1~47	1000	98
	Low Impedance 低阻抗型	LZ	Low impedance 低阻抗品		●		-55~+105	6.3~100	1~4700	1000~2000	100
		KZ	Extra low impedance 極低阻抗品		●		-55~+105	6.3~100	4.7~4700	1000~3000	103
	Long Life 長壽命型	FZ	Long life, extra low impedance 長壽命, 極低阻抗品		●	●	-55~+105	6.3~100	3.3~8200	2000~5000	106
		FS	Miniature, long life, extra low impedance 縮體型, 長壽命, 極低阻抗品		●	●	-55~+105	6.3~50	10~2200	2000~5000	109
		EL	Long life assurance 寬溫長壽命品			●	-55~+105	6.3~50	0.1~3300	2000~3000	111
		KL	5000 hours load life 5000小時長壽命品			●	-55~+105	6.3~100	0.1~3300	3000~5000	113
	125°C High Temperature 高溫型	KH	125°C high temperature, high reliability 125°C高溫, 高可靠品			●	-40~+125	10~450	3.3~4700	1000~5000	116
	High Voltage/ Long Life 高壓長壽命型	CP	High voltage, 3000 hours load life 3000小時, 高壓長壽命品			●	-40~+85	160~450	3.3~100	3000	119
		CH	High voltage, 3000 hours load life 3000小時, 高壓長壽命品			●	-40~+105	160~450	3.3~100	3000	121
		HU	High voltage, 5000 hours load life 5000小時, 高壓長壽命品			●	-40~+105	160~450	3.3~47	5000	123

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Aluminum Electrolytic Capacitors (Radial Lead Type) 鋁電解電容器(引線式)

Type 類型	Series 系列	Features 特性	Standard Type 標準型	Miniature 超小型	Low Impedance 低阻抗	Long Life 長壽命	Operating Temperature Range (°C) 使用溫度範圍	Rate Voltage Range (V.D.C.) 額定工作電壓範圍	Capacitance Range (μF) 靜電容量範圍	Load Life (Hours) 負荷壽命(小時)	Page 頁碼
Radial Lead Type 引線式	General Purpose 普通型	RA	●				-40~+85	6.3~100	0.1~22000	2000	126
							-25~+85	160~450	0.47~680		
		RK	●				-40~+105	6.3~100	0.47~15000	2000	128
							-25~+105	160~450	0.47~330		
		KT	●				-55~+105	4~100	0.1~8200	2000	130
							-40~+105	160~400	3.3~100		
							-25~+105	450	3.3~33		
		RE	●			●	-40~+105	6.3~100	0.47~15000	3000	133
							-25~+105	160~450	1~470		
		RM		●			-40~+105	4~63	0.1~1000	1000	135
		RS		●			-40~+105	4~63	0.1~470	1000	137
	Low Leakage Current 低漏電流型	LA	●				-40~+85	10~100	1~4700	2000	139
		LK	●				-40~+105	10~50	0.47~330	1000	141
		LM		●			-40~+105	6.3~63	0.1~220	1000	143
		LS		●			-40~+105	4~50	0.1~100	1000	145
Radial Lead Type 引線式	Non-polarized 無極性型	NP	●				-40~+85	6.3~250	0.47~10000	2000	147
		NK	●				-40~+105	6.3~100	0.1~10000	1000	149
		NM		●			-40~+105	6.3~63	0.1~220	1000	151
		NS		●			-40~+105	6.3~50	0.1~47	1000	153
		BP	●				-40~+85	25~50	2.2~10	1000	155
		BH	●				-40~+105	25~50	2.2~10	1000	156
	Low Impedance 低阻抗型	TM	●		●	●	-40~+105	6.3~100	1~15000	2000~3000	157
							-25~+105	160~450	22~330		
		TN			●	●	-40~+105	6.3~100	1~15000	2000~5000	161
							-25~+105	160~450	22~330		
		RZ			●	●	-55~+105	6.3~100	3.3~8200	2000~5000	164
		TL					-40~+105	6.3~100	0.47~18000	4000~10000	167
	125°C High Temperature 高溫型	TW			●		-40~+125	6.3~250	0.47~15000	2000	170
	High Reliability 高可靠型	TY			●	●	-40~+105	6.3~50	47~18000	2000~7000	173
		TB				●	-25~+105	160~450	2.2~100	2000~5000	175

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■ Aluminum Electrolytic Capacitors (Radial Lead Type) 鋁電解電容器(引線式)

Type 類型	Series 系列	Features 特性	Standard Type 標準型	Miniature 超小型	Low Impedance 低阻抗	Long Life 長壽命	Operating Temperature Range (°C) 使用溫度範圍	Rate Voltage Range (V.D.C.) 額定工作電壓範圍	Capacitance Range (μF) 靜電容量範圍	Load Life (Hours) 負荷壽命(小時)	Page 頁碼
Radial Lead Type 引線式	High Reliability 高可靠型	TX Long life, for electronic ballast, power supply & LED lighting 長壽命，電子鎮流器、電源和LED照明專用品				●	-25~+105	160~450	2.2~330	5000~10000	177
		PL High ripple current, for SMPS 高紋波電流，開關式電源專用品				●	-25~+105	400	33~150	5000	179
							-40~+105	450	33~150		

■ Aluminum Electrolytic Capacitors (Snap-in Terminal Type) 鋁電解電容器(導箔式)

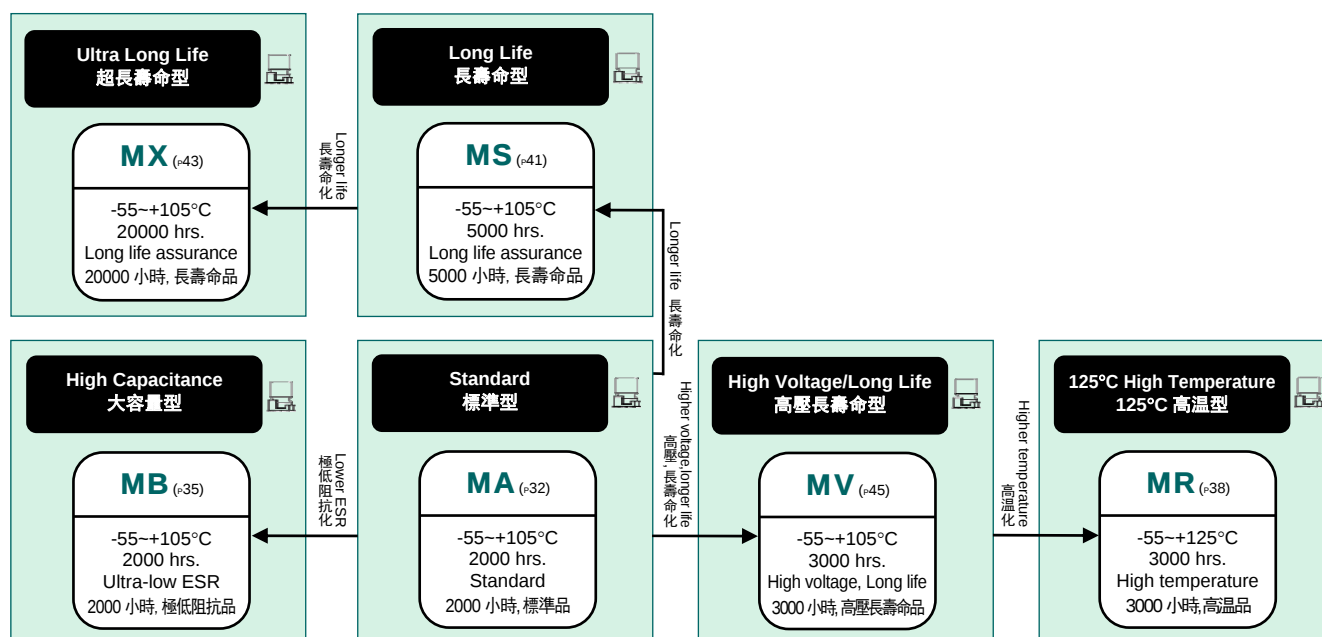
Snap-in Terminal Type 導箔式	General Purpose 普通型	SM Snap-in terminal, standard 導箔型，標準品	●				-40~+85	6.3~350	82~10000	2000	182
							-25~+85	400~450	68~560		
		SK Snap-in terminal, wide temperature range 導箔型，寬溫品	●				-40~+105	6.3~350	68~68000	2000	185
							-25~+105	400~450	56~470		
	High Reliability 高可靠型	SP Snap-in terminal, long life 導箔型，長壽命品				●	-40~+85	16~350	82~68000	3000	188
							-25~+85	400~450	56~560		
		SH Snap-in terminal, wide temperature range, long life 導箔型，寬溫，長壽命品				●	-40~+105	16~350	100~22000	3000	192
							-25~+105	400~450	100~680		
	Low Impedance 低阻抗型	ST Snap-in terminal, low impedance, long life 導箔型，低阻抗，長壽命品				●	-40~+105	16~100	220~22000	3000~5000	195
							-25~+105	160~450	68~4700		

● Note: Please read "General Information for Application" very carefully before using these products.
● 注：在使用這些產品前請仔細閱讀“鋁電解電容器使用注意事項”。

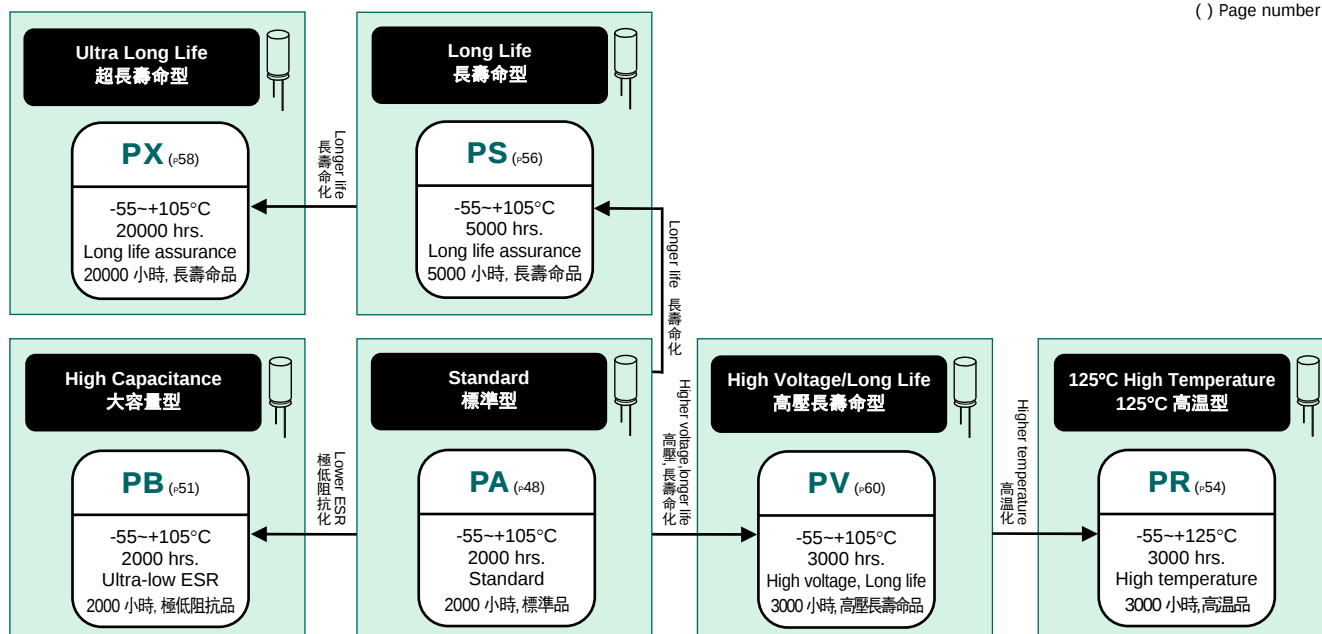
SERIES CHART 產品體系圖

■ Conductive Polymer Aluminum Solid Electrolytic Capacitors (Chip Type) 導電性高分子固態鋁電解電容器 (貼片式) For SMD
表面貼裝專用

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■ Conductive Polymer Aluminum Solid Electrolytic Capacitors (Radial Lead Type) 導電性高分子固態鋁電解電容器 (插件式)

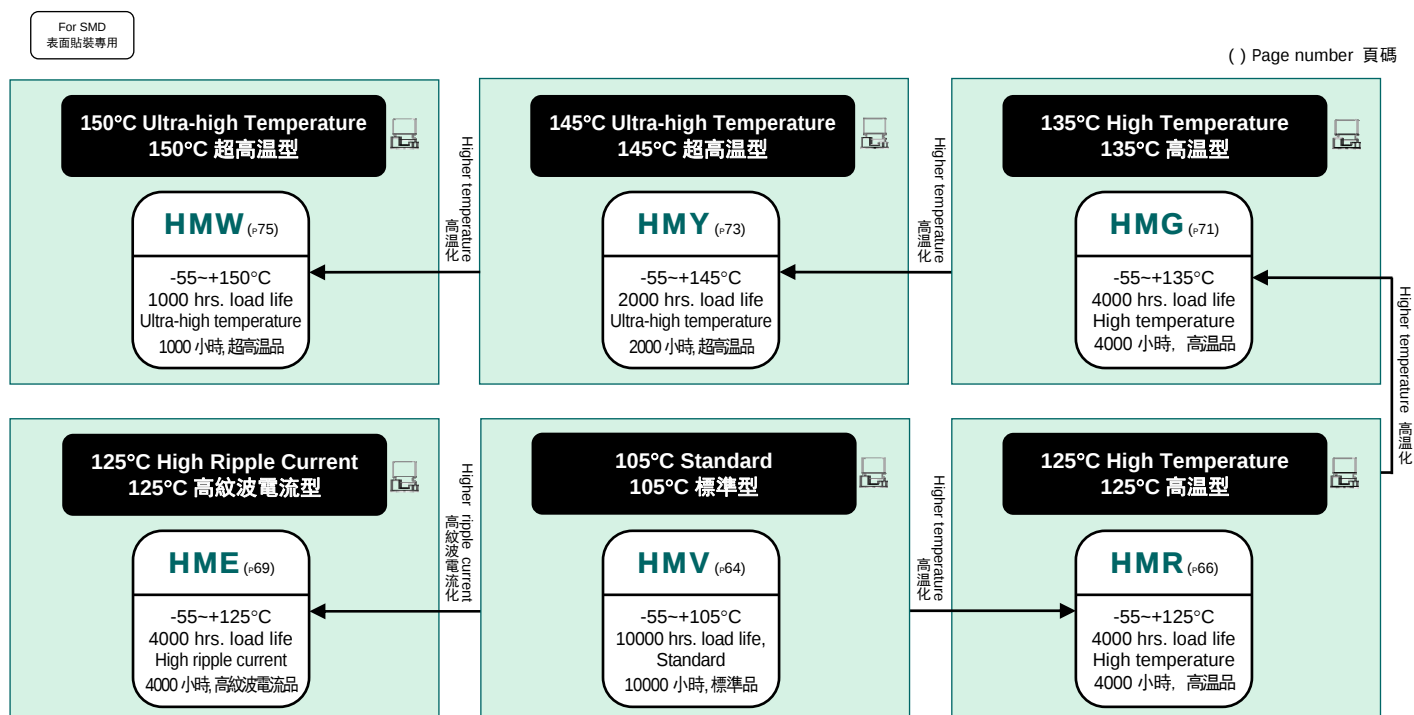
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- Note: Please read "General Information for Application" very carefully before using these products.
- 注: 在使用這些產品前請仔細閱讀“鋁電解電容器使用注意事項”。

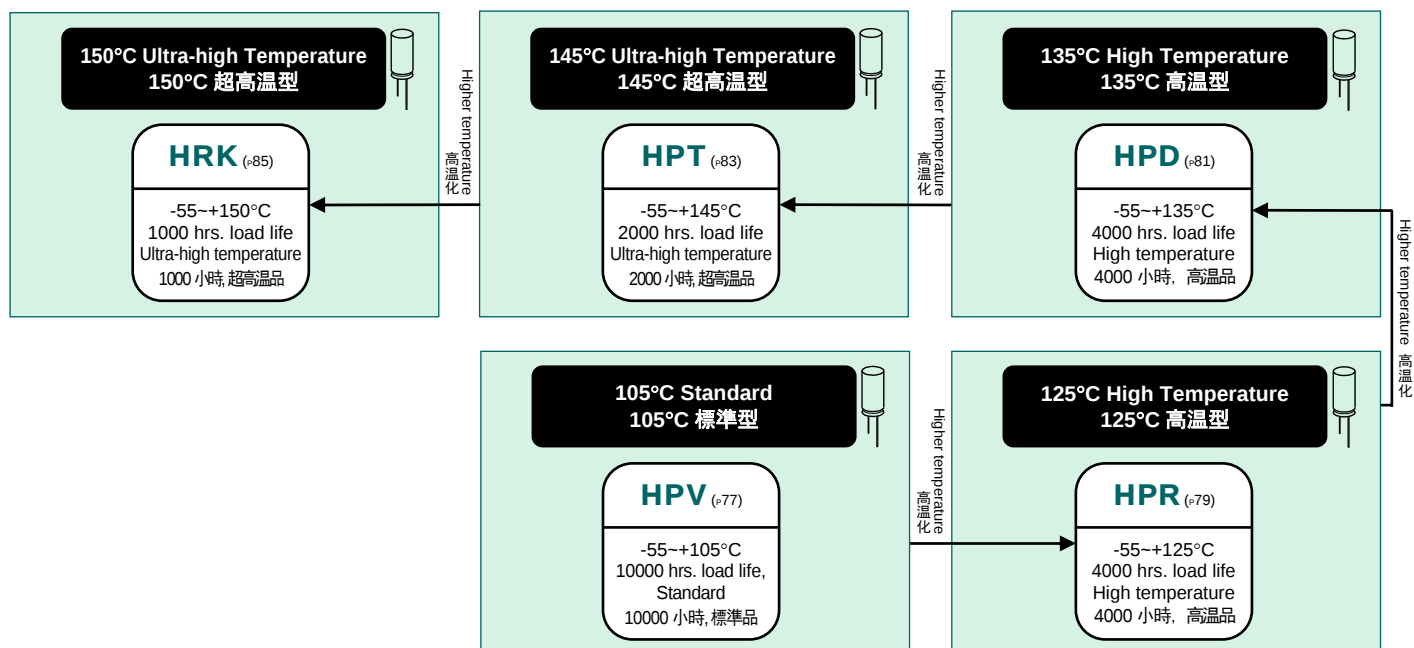
■ Conductive Polymer Hybrid Electrolytic Capacitors (Chip Type) 導電性高分子混合型鋁電解電容器(貼片式)

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■ Conductive Polymer Hybrid Electrolytic Capacitors (Radial Lead Type) 導電性高分子混合型鋁電解電容器 (插件式)

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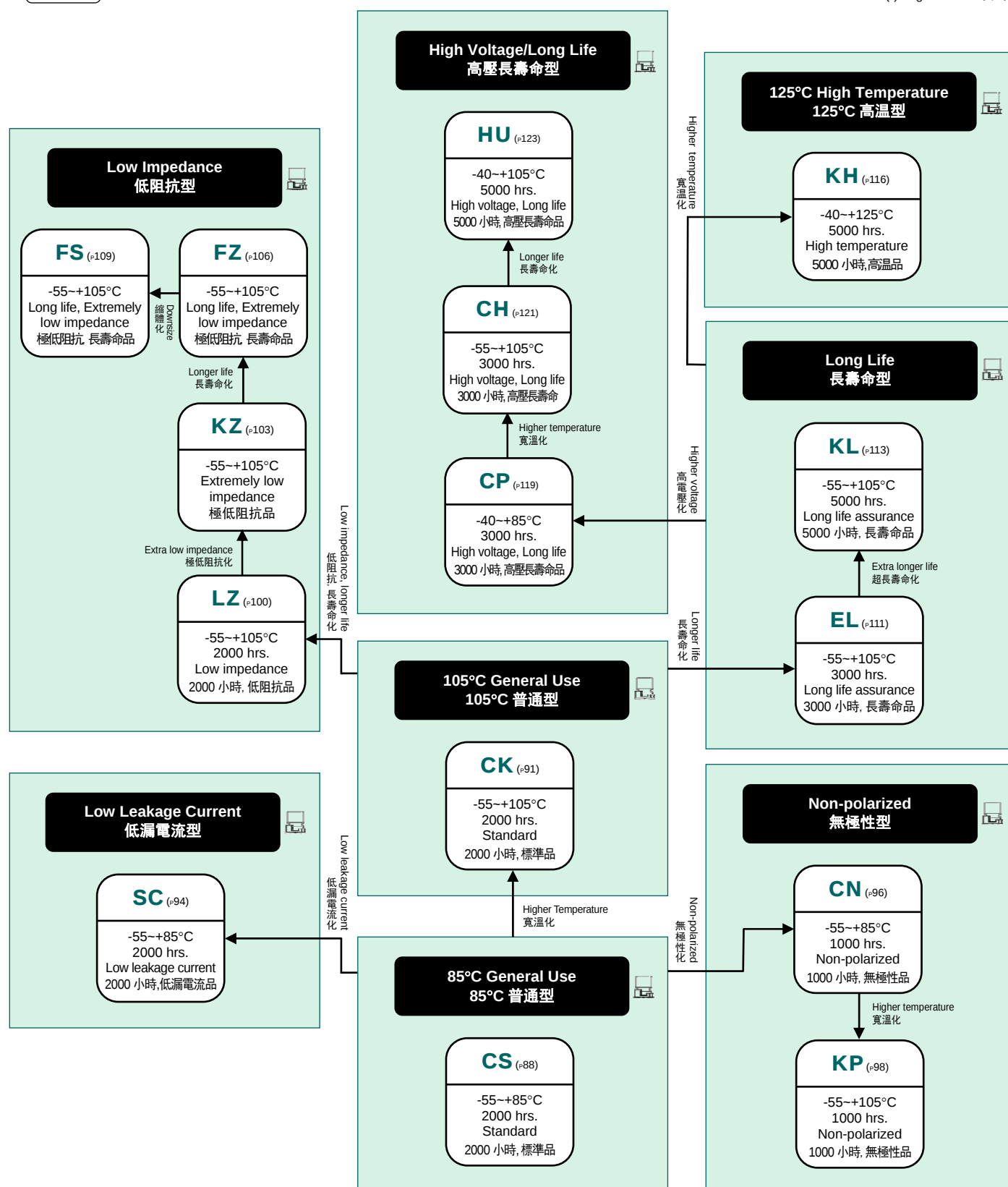


- Note: Please read "General Information for Application" very carefully before using these products.
● 注：在使用這些產品前請仔細閱讀“鋁電解電容器使用注意事項”。

SERIES CHART 產品體系圖

■ Aluminum Electrolytic Capacitors (Chip Type) 鋁電解電容器 (貼片式)

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For SMD
表面貼裝專用

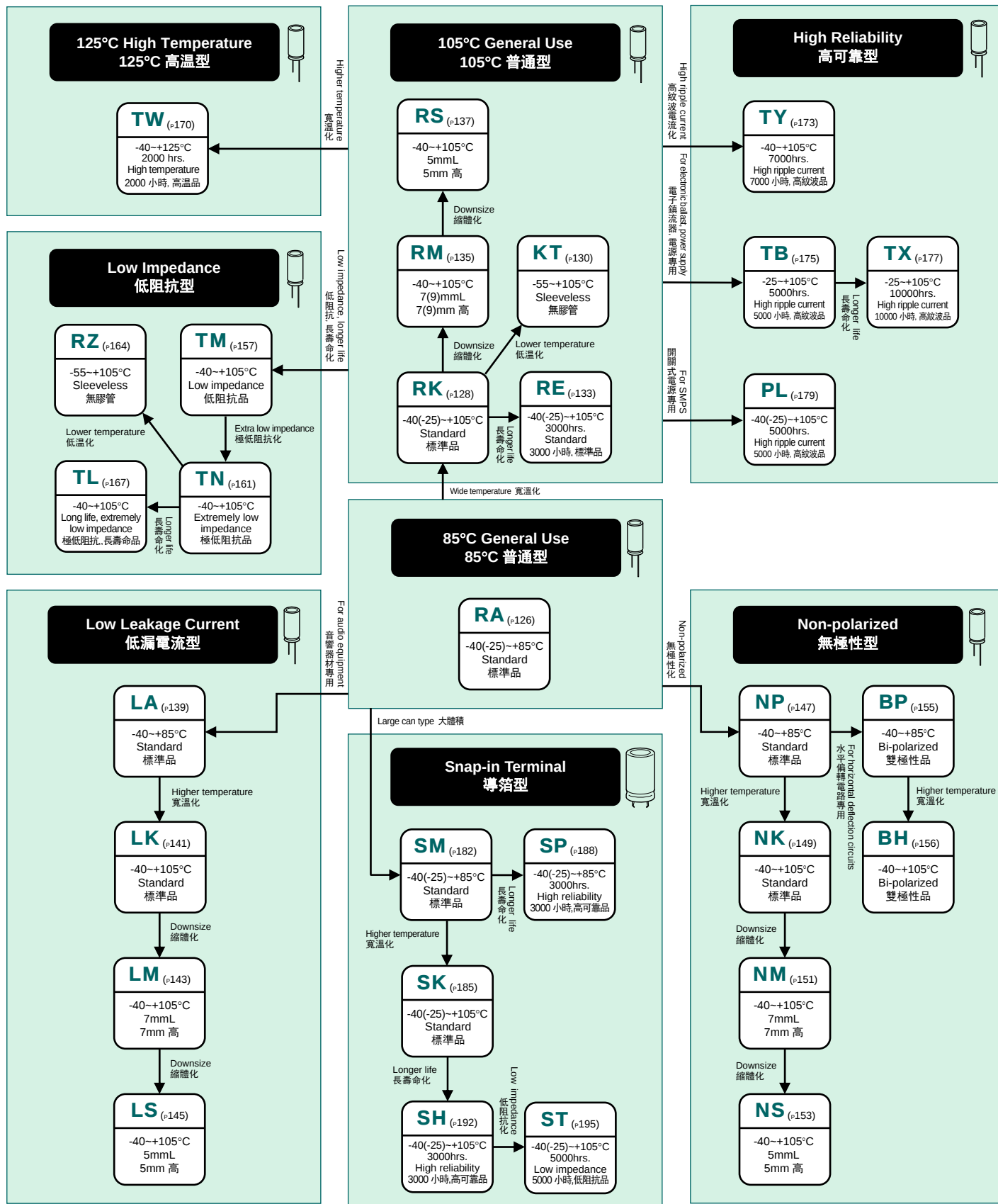
● Note: Please read "General Information for Application" very carefully before using these products.
 ●注: 在使用這些產品前請仔細閱讀“鋁電解電容器使用注意事項”。

SERIES CHART 產品體系圖

■ Aluminum Electrolytic Capacitors (Radial Lead & Snap-in Terminal Type) 鋁電解電容器 (引線式及導箔式)



() Page number 頁碼



● Note: Please read "General Information for Application" very carefully before using these products.
 ●注: 在使用這些產品前請仔細閱讀“鋁電解電容器使用注意事項”。

GENERAL INFORMATION FOR APPLICATION

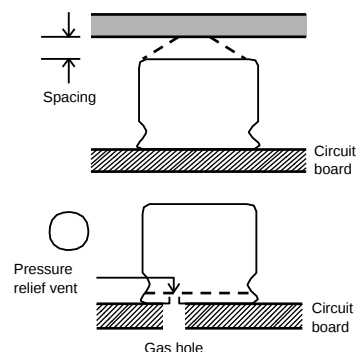
The following precautions must be observed when using electrolytic capacitors.

1. Circuit Design

- 1) Please make sure that the environmental and mounting conditions to which the capacitor to be exposed are within the conditions specified in this catalogue.
- 2) Operating temperature and applied ripple must be within the specifications.
 - ① The capacitor shall not be used in an ambient temperature which exceeds the operating temperature specified in the specification.
 - ② Do not apply excessive current which exceeds the allowable ripple current.
- 3) Appropriate capacitors which comply with the life requirement of the products, should be selected when designing the circuit.
- 4) Aluminum electrolytic capacitors are polarized. Make sure that no reserve voltage or AC voltage is applied to the capacitors. Please use non-polarized capacitors for a circuit that can possibly see reserved polarity.
 Note: Even non-polarizes capacitors cannot be used for AC voltage application.
- 5) For a circuit that repeats rapid charging/discharging of electricity, an appropriate capacitor that is capable of enduring such a condition must be used. Welding machines and photo flash are a few examples of products that contain such a circuit. In addition, rapid charging/discharging may be repeated in control circuits for servomotors, In which the circuit voltage fluctuates substantially.
 For appropriate choice of capacitors for circuit that repeat rapid charging/discharging, please consult us. If excess a rush current due to drastic charge/dis-charge was applied to conductive polymer aluminum solid electrolytic capacitors, and conductive polymer hybrid aluminum electrolytic capacitors, it may cause a short circuit or an increase in leakage current. Therefore, Please do not apply a rush current that is larger than 10A.
- 6) Make sure that no excess voltage (that is higher than the rated voltage) is applied to the capacitor.
 - ① Pleased pay attention so that the peak voltage, which is DC voltage overlapped by ripple current, should not exceed the rated voltage.
 - ② In the case where more than two aluminum electrolytic capacitors are used in series, please make sure that applied voltage should be lower than rated voltage should be applied to each capacitor equally using a balancing resistor in parallel with the capacitor.
 Please do not use conductive polymer aluminum solid electrolytic capacitors, and conductive polymer hybrid aluminum electrolytic capacitors for the application listed below, since the solid organic polymer aluminum electrolytic capacitors cannot reach it's maximum performance.
 - a) Coupling circuits.
 - b) R-C timing circuit.
 - c) High impedance voltage retention circuit.
 - d) Circuits, which extremely low voltage in compared to the rated voltage is only applied.
 - e) Circuits, which are greatly affected by leakage currents for special use such as multiple parts used in a series, please contact us for recommendations.
- 7) Outer sleeved of the capacitor is not guarantee as an electrical insulator. Do not use standard sleeve on a capacitor in applications that require electrical insulation. When the application requires special insulation, please contact our sales office for details.
- 8) Capacitors may fail if they are used under the following conditions:
 - ① Environmental (climatic) conditions
 - a) Being exposed to water, high temperature & high humidity atmosphere, or condensation of moisture.
 - b) Being exposed to oil or an atmosphere that is filled with particles of oil.
 - c) Being exposed to salty water or an atmosphere that is filled with particles of salt.
 - d) In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, bromine, methyl bromide, ammonia, etc.).
 - e) Being exposed to direct sunlight, ozone, ultraviolet ray, or radiation.
 - f) Being exposed to acidic or alkaline solutions.
 - ② Severe vibration and physical shock conditions that exceed our specification.
 Vibration test condition:
 Vibration frequency range: 10~55~10Hz
 Sweet rate: 10~55~10Hz per minute
 Sweet method: logarithmic
 Amplitude or acceleration: 1.5mm (maximum acceleration is 10G)
 Direction of vibration: X, Y, Z direction
 Testing time: 2 hours per each direction
 Shock is not applicable normally.
 If a particular condition is required, please contact our sales office.
- 9) When designing a circuit board, please pay attention to the following:
 - ① Have the hole spacing on the P.C. board match the lead spacing of the capacitor.
 - ② There should not be any circuit pattern or circuit wire above the capacitor safety vent.
 - ③ Unless otherwise specified, following clearance should be made above the pressure relief vent.

Case Diameter	Clearance Required
Ø6.3 to 16	2mm or more
Ø18 to 35	3mm or more
Ø40 or more	5mm or more

 - ④ In case the vent side is placed toward P.C. board (such as end seal vented parts), make a corresponding hole on the P.C. board to release the gas when vent is operated. The hole should be made to match the capacitor vent position.
- 10) The main chemical solution of the electrolyte and the separator paper used in the capacitors are combustible. The electrolyte is conductive. When it comes in contact with the P.C. board, there is a possibility of pattern corrosion or short circuit between the circuit



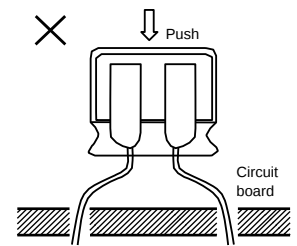
pattern which could result in smoking or catching fire. Do not locate any circuit pattern beneath the capacitor end seal.

- 11) Do not design a circuit board so that heat generating components are placed near an aluminum electrolytic capacitor or reserve side of P.C. board (under the capacitor).
- 12) Please refer to the recommended land size in this catalogue when you design in surface mount capacitors.
- 13) Electrical characteristics may vary depending on changes in temperature and frequency. Please consider the variation when you design circuits.
- 14) When you install more than 2 capacitors in parallel, consider the balance of current flowing through the capacitors. Especially, When a solid conductive polymer aluminum electrolytic capacitors, conductive polymer hybrid aluminum electrolytic capacitors and a standard aluminum electrolytic capacitors are connected in parallel, special consideration must be given.
- 15) While mounting capacitors on double side P.C. board, the capacitors should be away from those unnecessary base plate holes and connection holes.

2. Mounting

- 1) Once a capacitor has been assembled in the set and power applied, do not attempt to re-use the capacitor in other circuits or application.
- 2) Electric potential between positive and negative terminal may exist as a result of returned electromotive force, so please discharge the capacitor using 1KΩ resistor.
- 3) Leakage current of the parts that have stored for more than 2 years may increase. When leakage current has increased, please perform a voltage treatment using a 1KΩ resistor.
- 4) Please confirm rating and polarity before installing capacitor on the P.C. board.
- 5) Do not drop the capacitors on the floor, nor use a capacitors that was dropped.
- 6) Be careful not to deform the capacitor during installation.
- 7) Please confirm that the lead spacing of the capacitor matches the pad spacing of the P.C. board prior to installation.
- 8) Please pay attention that the clinch force is not too strong when capacitors are placed and fixed by an automatic insertion machine.
- 9) Please pay attention to the mechanical shock to the capacitor by suction nozzle of the automatic insertion machine or automatic mounted, or by product checker, or by centering mechanism.
- 10) Hand soldering (soldering iron):
 - ① When soldering aluminum electrolytic capacitors with a soldering iron the exposure should be limited to 260°C for 10 seconds or 350°C for 3 seconds.
 - ② At no time should the soldering iron come in contact with the capacitor body. Contact with the body can cause the sleeving to crack or melt.
 - ③ If you need to remove parts which were soldered, please melt the solder enough so that stress is not applied to lead.
- 11) Flow soldering (wave solder):
 - ① Aluminum electrolytic capacitors are not to be immersed into the solder bath at anytime. To do so would result in the internal pressure within the capacitor to rise, damaging the capacitor would result.
 - ② Aluminum electrolytic capacitors are only to be mounted to the topside of the circuit board.
 - ③ The capacitor should be to a maximum solder bath temperature of 260°C for 10 seconds.
 - ④ Preheat temperature should be limited to 125°C for 30 seconds.
 - ⑤ Please avoid contact between other components and the aluminum electrolytic capacitors. This will prevent heat from these components being transmitted to the capacitors sleeve and damaging the sleeve.
- 12) Reflow soldering (SMD only):
 - ① Please follow "Soldering Conditions" in this catalogue.
 - ② When an infrared heater is used, please pay attention to the extent of heating since the absorption rate of infrared, will vary due to difference in the color and size of the capacitor.
- 13) Do not tilt lay down or twist the capacitor body after the capacitor are soldered to the P.C. board.
- 14) Do not carry the P.C. board by grasping the soldered capacitor.
- 15) Please do not allow anytime to touch the capacitor after soldering. If P.C. board are stored in stack, please make sure P.C. board or the other components do not touch the capacitor. The capacitors shall not be effected by any radiated heat from the soldered P.C. board or other components after soldering.
- 16) Cleaning:
 - ① Do not clean capacitors with halogenated cleaning agent. However, if it is necessary to clean with halogenated cleaning agent, please contact our sales office.
 - ② Recommended cleaning method:
Applicable: Any type, any ratings.
Cleaning agents:
Based alcohol solvent cleaning agent: Isopropyl Alcohol
Based water solvent cleaning agent:
Premium alcohol solvent type: Pine Alpha ST-100S, Techno Care FRW14~17, Sanelek B-12
Surfactant type: cleaning through 750H/750L/710M
Alkaline saponification agent: Aqua Cleaner 210SEP

Cleaning conditions:
Total cleaning time shall be no greater than 5 minutes by immersion, ultrasonic or other method. (Temperature of the cleaning agent shall be 60°C maximum). For SMD and super miniature type, within 2 minutes total cleaning time (Temperature of agent: 40°C or below).
After the board cleaning has been completed, the capacitors should be dried using hot air for a minimum of 10 minutes. If the cleaning solution is infiltrated between the case and the sleeve, the sleeve might soften and swell when hot air temperature is too high. Therefore, hot air temperature should not exceed softening temperature (80°C) of the sleeve. Insufficient dries after water rinse may cause appearance problems, such as sleeve shrinking, bottom-plate bulging. In addition, a monitoring of the contamination of cleaning agents (electric conductivity, pH, specific gravity, water content, etc.) must be implemented.



After the cleaning, do not keep the capacitors in an atmosphere containing the cleaning agent or in an air tight container. In addition regarding jet washing, please use caution since the sleeve may expand cause of the angle and/or the strength of the water jet. Depending on the cleaning method, the marking on a capacitor may be erased or blurred. Consult us before using a cleaning method or a cleaning agent other than those recommended.

- ③ Avoid using ozone destructive substance for cleaning agents to concern about global environment.

17) Fixing Material and Coating Material:

- ① Do not use any affixing or coating materials, which contain halide substance.
- ② Remove flux and any contamination, which remains in the gap between the end seal and P.C. board.
- ③ Please dry the cleaning agent on the P.C. board before using affixing or coating materials.
- ④ Please do not apply any material all around the end seal when using affixing or coating materials.

There are variations of cleaning agents, fixing and coating materials, so please contact those manufacture or our sales office to make sure that the material would not cause any problems.

18) Other

Wooden package material may be subjected to fumigation by a halogen (e.g. methyl bromide) before they are exported in order to protect them against pests. If devices with aluminum electrolytic capacitors or capacitors themselves are directly fumigated or packed with the pallet that is fumigated, the capacitors may internally corrode due to the halogen contents of fumigation agents.

3. In The Equipment

- 1) Do not directly touch terminal by hand.
- 2) Do not short between terminal by conductor, nor spill conductible liquid such as alkaline or acidic solution on or near the capacitor.
- 3) Please make sure that the ambient conditions where the set is installed not have any of the following conditions:
 - ① Where capacitors are exposed to water, high temperature & high humidity atmosphere, or condensation of moisture.
 - ② Where capacitors are exposed to oil or an atmosphere that is filled with particles of oil.
 - ③ Where capacitors are exposed to salty water, high temperature & high humidity atmosphere, or condensation of moisture.
 - ④ The atmosphere is filled with toxic acid gasses (e.g. hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, bromine, methyl bromide, etc.).
 - ⑤ The atmosphere is filled with toxic alkaline gasses (e.g. ammonia).
 - ⑥ Where capacitors are exposed to acidic or alkaline solutions.
 - ⑦ Since shrinkage, bulging and/or crack could be seen on outer sleeve of capacitor when capacitors are used in atmosphere where condensation of moisture occurs, please confirm their adaptation before the use. The condensation of moisture could occur when temperature cycling test/rapid change of temperature test is performed, in this case, aforementioned sleeve problem could be seen.

4. Maintenance and Inspection

Please periodically inspect the aluminum capacitors that are installed in industrial equipment. The following Items should be checked:

- 1) Appearance: Remarkable abnormality such as vent operation, leaking electrolyte etc.
- 2) Electrical characteristic: Capacitance, dielectric loss tangent, leakage current etc., which are specified in this catalogue.

5. In an Emergency

- 1) If you see smoke due to operation of safety vent, turn off the main switch or pull out the plug from the outlet.
- 2) Do not draw your face to the safety vent since gas over 100°C will be emitted when the safety vent operates. If the gas has entered your eyes, please flush your eyes immediately in pure water. If you breathed the gas immediately wash out your mouth and throat with water.
- 3) Do not ingest electrolyte. If your skin is exposed to electrolyte, please wash it away using soap and water.

6. Storage

- 1) Do not keep capacitor in high temperature and high humidity.
Storage conditions should be:
Temperature: +5°C ~ +35°C
Humidity: Lower than 75%
Place: Indoor
- 2) Avoid ambient conditions where capacitors can be covered with water, brine or oil.
- 3) Avoid ambient conditions where capacitors are exposed to poisonous gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonium etc.
- 4) Do not keep capacitor in conditions that expose the capacitor to ozone, ultraviolet ray or radiation.
- 5) Store capacitors in a packed condition as much as possible.
- 6) In order to maintain a good solderability of the parts, shelf life of parts should not exceed 1 year.

7. Disposal

- 1) Please dispose capacitors in either of the following ways:
 - ① Incinerate (at a temperature of 800°C or higher) capacitors after crushing parts or making a hole on the capacitor body.
 - ② If incineration is not applicable, hand them over to a waste disposal agent and have them buried in a landfill.
- 2) When removing a capacitor from the circuit board or when disposing of capacitor please ensure that the capacitor is properly discharged.

For further details, please refer to the following industrial standards:

IEC 60384-4 - Fixed capacitors for use in electronic equipment – Part 4: Sectional specification – Fixed aluminum electrolytic capacitors with solid (MnO₂) and non-solid electrolyte (Edition 5.0, 2016-08)

JEITARCR-2367D - Safety application guide for fixed aluminum electrolytic capacitors for use in electronic equipment (Established in March 1995, Revised in October 2017)

⚠ 鋁電解電容器使用注意事項

使用鋁電解電容器需留意事項：

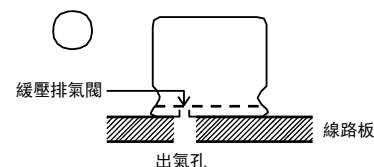
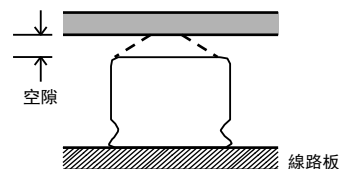
1. 電路設計

- 1) 確保電容器使用和安裝條件在本產品目錄的規定範圍內。
- 2) 工作溫度和施加的紋波電流應在本產品目錄的規定範圍內。
 - ① 不可在超出最高使用溫度的溫度下使用。
 - ② 不可接通超過最大允許的額定紋波電流。
- 3) 在設計電路時，應選擇符合壽命要求的產品。
- 4) 鋁電解電容器分正負極，不應加反向電壓或交流電壓。對可能出現反向電壓的電路，應選擇無極性電容器。注意：即使無極性電容器，也不能直接用於交流電路。
- 5) 對需要快速充放電的電路，請選用與使用條件相符的鋁電解電容器。作為快速充放電電路的產品有電焊機、相機閃光燈等。此外，電路電壓變動較大，伺服馬達等旋轉設備的控制電路中也會出現反復快速充放電的情況。對於選擇使用於快速充放電電路的鋁電解電容器，可以向我們諮詢。
導電性高分子固態鋁電解電容器及導電性高分子混合型鋁電解電容器中流過因快速充放電所產生的過大衝擊電流時會導致短路或大幅的漏電流，請確保衝擊電流不超過 10A。
- 6) 請確認不要有超載電壓（超過額定電壓的電壓）通過電容器。
 - ① 直流電壓和紋波電流疊加後的峰值電壓不應超過額定工作電壓。
 - ② 若兩個以上電容器串聯，應確保施加電壓低於額定值，而且要並聯一個平衡電阻，以使每個電容器所加電壓相等。
導電性高分子固態鋁電解電容器及導電性高分子混合型鋁電解電容器請勿在以下電路中使用，因有可能會無法充分發揮功能或出現故障：
 - a) 耦合電路
 - b) 時間常數電路
 - c) 高阻抗電壓保持電路
 - d) 相對於額定電壓，只施加極低電壓的電路
 - e) 會受到漏電流極大影響的電路，如串聯多個電容器和特殊用途的，請向我們諮詢。
- 7) 電容器的膠管不能保證絕緣，不能將電容器上的膠管當絕緣用途。若有絕緣要求，請與我們銷售部門聯繫。
- 8) 如果在以下環境中使用，可能會導致電容器故障：
 - ① 周圍環境（耐氣候性）條件：
 - a) 直與水接觸、高溫高濕或結露的環境；
 - b) 直與油接觸或充滿油霧的環境。
 - c) 直接與鹽水接觸或充滿鹽分的環境。
 - d) 充滿有毒氣體（如硫化氫、亞硫酸、氯氣、溴氣、溴甲烷、氨氣等）的環境。
 - e) 置於日照、臭氣、紫外線或放射線照射的環境。
 - f) 直接與酸性或鹼性溶劑接觸的環境。
 - ② 嚴重的振動及機械衝擊超過本產品目錄的規定範圍。
振動的測試條件如下：

振動頻率範圍：10~55~10Hz
振動環境頻率：10~55~10Hz/分鐘
振動迴圈頻率：對數
振幅或加速度：1.5mm（最大加速度為 10G）
振動方向：X, Y, Z 方向
測試時間：每個方向 2 小時

衝擊一般不適用。
如有特殊要求，請與我們銷售部門聯繫。
- 9) 設計線路板時，應注意下列事項：
 - ① 確保 PC 板上的焊點間距與電容器引線間距相符。
 - ② 電容器的防爆閥上端儘量避免配線及安裝其他元件。
 - ③ 除非另有說明，電容器的防爆閥上端應留有如下的間距：

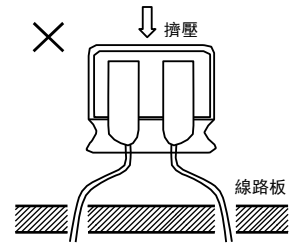
鋁殼直徑	留出空隙
Ø6.3 ~ 16	2mm 或以上
Ø18 ~ 35	3mm 或以上
Ø40 或以上	5mm 或以上
 - ④ 當排氣閥對著 PC 板時（如膠蓋的排氣閥），應在 PC 板上與電容器排氣閥相對應的位置開一小孔，以釋放當排氣閥打開之後所流出的氣體。
- 10) 電解液主要化學溶劑及電解紙為易燃物，且電解液導電。當電解液與 PC 板接觸時，可能會腐蝕 PC 板上的電路，或造成短路，以致生煙或着火。因此在電容器封口下端不應有任何的線路。



- 11) 設計線路板向背應確保發熱元器件不靠近鋁電解電容器或 PC 板的另一面（電容器下端）。
- 12) 當使用貼片式電容器進行設計時，請參考本產品目錄中的推薦安裝尺寸。
- 13) 設計線路板時應考慮到電性能隨溫度和頻率變化而變化。
- 14) 當兩個以上電容器並聯時，應考慮到通過這些電容器的電流平衡。特別是並聯導電性高分子固態鋁電解電容器、導電性高分子混合型鋁電解電容器和普通鋁電解電容器時，更需要考慮。
- 15) 在雙面線路板上安裝電容器時，電容器的安裝位置應避開多餘的基板孔和過孔。

2. 安裝

- 1) 一旦電容器經過安裝及加載，不要再試圖用於其他線路板或其他用途。
- 2) 當電容器產生再生電壓時，需通過 1KΩ 左右的電阻進行放電。
- 3) 對儲存較長時間（超過 2 年）的電容器，其漏電流可能會增大。若漏電流增大，請使用 1KΩ 左右的電阻做充電處理。
- 4) 將電容器安裝在 PC 板上之前，請確認其規格（靜電容量及額定電壓等）與極性。
- 5) 請不要將電容器掉在地上，或不要使用掉在地上的電容器。
- 6) 安裝時請不要損傷電容器。
- 7) 安裝前，請確認電容器引線與 PC 板上的孔距相吻合。
- 8) 請留意自動插入機的機械手力量不宜過大。
- 9) 請確認貼片機的吸頭、產品檢測夾具或對中裝置對電容器的機械衝擊。
- 10) 手工焊接：
 - ① 當使用手工焊接鋁電解電容器時，不可超過 260°C 10 秒或 350°C 3 秒。
 - ② 絕對不要將烙鐵接觸到電容器的本體，接觸本體將會導致膠管破裂或熔化。
 - ③ 如果要卸下焊接好的電容器，請將焊劑充分溶化後再拆卸，以免電容器的端子受到拉力。



- 11) 波峰焊：
 - ① 任何時候不要將鋁電解電容器浸入到焊錫溶液中，那樣會導致電容器內部氣壓上升，造成電容器損壞。
 - ② 鋁電解電容器只能安裝在線路版的上層。
 - ③ 電容器的最高焊接溫度為 260°C 10 秒。
 - ④ 預熱溫度不可超過 125°C 30 秒
 - ⑤ 焊接時不要讓其他元器件接觸到電容器，那樣可防止其他元器件的高溫傳到電容器上而損壞膠管。
- 12) 回流焊（只適用於表面貼裝）：
 - ① 請遵守本產品目錄中的“焊接條件”。
 - ② 當使用紅外線加熱時，請注意加熱程度，因為紅外線吸收率會隨著電容器顏色和大小的不同而改變。
- 13) 電容器焊接在 PC 板後，不要傾斜或扭動電容器。
- 14) 不要抓住焊接後的電容器搬動 PC 板。
- 15) 請在焊接後不要讓任何物品與電容器接觸。如 PC 板堆放儲存，請確保 PC 板或其他零部件不與電容器接觸。焊接後的電容器不應受到任何已焊接 PC 板或其他零件熱輻射的影響。
- 16) 清洗
 - ① 不要用鹵化物清洗劑清洗電容器。
 - ② 推薦清洗方法：

使用範圍：任何類型及規格

清洗劑：

乙醇類清洗劑：Isopropyl Alcohol（異丙醇）

水性清洗劑：

高級乙醇類：Pine Alpha ST-100S, Techno Care FRW14~17, Sanelek B-12

介面活性劑類：cleaning through 750H/750L/710M

鹼性皂化類：Aqua Cleaner 210SEP

清洗條件：使用浸泡、超聲波等方法，總清洗時間不可超過 5 分鐘（清洗劑溫度應在 60°C 或以下）。貼片型和超小型產品的總清洗時間應在 2 分鐘以內（清洗劑溫度應在 40°C 或以下）。

清洗後，請將電容器和安裝完畢的電路板一起用熱風吹至少 10 分鐘至吹乾。當洗滌液落入了外殼和膠管時，如果熱風的溫度過高，會導致膠管變軟和膨脹，所以熱風的溫度不要超過膠管變軟的溫度（80°C）。

水洗後若不充分吹乾，可能會導致膠管二次收縮、座板膨脹等外觀不良。此外，請充分做好清洗劑的污染管理（電導率、pH 值、比重、含水量等）。清洗後，請勿將電容器保存在清洗液的環境中或密封容器內。另外，在進行噴射清洗時，由於噴射的角度和強度不同，有可能會造成膠管膨脹。在不同程度的情況下，膠管上的絲印標識也會變得模糊或脫落。

在使用不同於以上的推薦清洗方法和清洗劑之前，請諮詢我們。
 - ③ 避免使用破壞臭氧層的清洗劑以保護環境。
- 17) 固定劑、塗層劑
 - ① 請勿使用任何含有鹵素的固定劑或塗層劑。
 - ② 線路板和電容器封口膠之間，不可留有焊劑殘渣及污垢。
 - ③ 在使用固定劑或塗層劑之前，盡可能不殘留洗淨成份，進行乾燥處理，使印刷孔不堵塞。

④ 在使用固定劑或塗層劑時，請勿將之塗滿整個電容器的封口膠部分。

固定劑和塗層劑的種類很多，為避免發生問題，可向相關材料廠家或聯繫我們的銷售部門諮詢詳情。

18) 薰蒸處理

作為出口時的防蟲措施，有時會使用鹵化物（如甲基溴）進行薰蒸處理。將鋁電解電容器及裝配有鋁電解電容器的電子產品直接薰蒸或將進行薰蒸處理的木材用於托架時，由於薰蒸劑中含有鹵素，可能會導致電容器的內部引起腐蝕反應。

3. 安裝後

- 1) 不要直接用手接觸電容器正負極。
- 2) 不要在正負極之間用導體短接，也不要將電容器上或附近濺撒導電液體，如鹼性溶液等。
- 3) 請確認所安裝的電容器不要處於以下環境：
 - ① 直接與水接觸、高溫高濕或易結露的環境。
 - ② 直接與油接觸及充滿油霧的環境。
 - ③ 直接與鹽水接觸、高溫高濕或易結露的環境。
 - ④ 充滿鹽酸有機氣體（如硫化氫及亞硫酸、亞硝酸、氯氣、溴氣、溴甲烷等）的環境。
 - ⑤ 充滿有毒的鹼性氣體（如氨氣等）的環境。
 - ⑥ 直接與酸性或鹼性接觸的環境。
 - ⑦ 結露環境有可能導致膠管發生收縮、膨脹、破裂，因此在使用時請充分進行確認。此外，因溫度劇烈變化，高溫高濕試驗等而結露時，也可能導致同樣的膠管異常。

4. 維護和檢驗

請定期檢驗安裝在工業設備上的電容器，檢驗項目如下：

- 1) 外觀：明顯缺陷，如防爆閥裂開、漏液等。
- 2) 電性能：電容量、損耗角正切、漏電流等，具體請查閱本產品目錄中的詳細規格資料。

5. 緊急情況

- 1) 如看到防爆閥開啟冒煙，要立即關掉總開關或拔掉插頭。
- 2) 不要將臉朝向防爆閥，因當防爆閥開啟時，將有超過 100°C 的氣體泄出。若氣體進入眼中，應立即用清水沖洗眼睛。若吸入氣體，應立即用水清洗口腔和喉嚨。
- 3) 不要吞食電解液。若皮膚沾上電解液，請用肥皂和水清洗乾淨。

6. 儲存

- 1) 不要將電容器儲存在高溫和濕度高的地方。儲存環境應為：
溫度：+5°C ~ +35°C
相對濕度：低於 75%
儲存場所：室內
- 2) 避免儲存在有水、鹽水或油的環境中。
- 3) 避免儲存在有毒氣體（如硫化氫、亞硫酸、亞硝酸、氯及氨等）的環境中。
- 4) 避免電容器接觸氧層、紫外線或輻射。
- 5) 盡可能的把電容器保存在原來的封裝袋裏。
- 6) 為確保良好的焊接性，請將電容器的保存期限控制在 1 年以內。

7. 棄置

- 1) 請用下列任何一種方法棄置電容器：
 - ① 在電容器的殼體上開孔後或完全解體破開後置於火中焚毀（用 800°C 或更高的溫度）。
 - ② 電容器不作焚毀時，交給工業垃圾處理機構進行填埋處理。
- 2) 當廢棄電容器或從電路板上卸下時，請確認電容器已經放電。

欲知更多詳情，請參閱以下行業標準：

IEC 60384-4 - Fixed capacitors for use in electronic equipment – Part 4: Sectional specification – Fixed aluminum electrolytic capacitors with solid (MnO₂) and non-solid electrolyte (Edition 5.0, 2016-08)

JEITA RCR-2367D - Safety application guide for fixed aluminum electrolytic capacitors for use in electronic equipment (Established in March 1995, Revised in October 2017)

EXPLANATION OF PART NUMBERS 產品編碼規則

For Conductive Polymer Aluminum Solid Electrolytic Capacitors 適用於導電性高分子固態鋁電解電容器

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

Series Name
系列名

Rate Voltage
額定電壓

Capacitance
靜電容量

Cap. Tol.
容量允差

Dash
破折號

Type
類型

Lead Configuration
引線結構

Dia.
直徑

Length
高度

Marking Colour
印字顏色

Rubber Seal
膠塞

Lead Process
引線加工

(1, 2)

Series 系列
MA
MB
MR
MS
MX
MV
PA
PB
PR
PS
PX
PV

(3, 4)

Voltage (W.V.) 電壓	Code 代碼
2.5	0E
4	0G
6.3	0J
6.8	0B
7.5	0T
10	1A
12	1R
14	1F
16	1C
18	1Z
20	1D
25	1E
30	1U
35	1V
40	1G
50	1H
63	1J
75	1T
80	1K
85	1R
100	2A
125	2B

(5~7)

Capacitance (μF) 靜電容量	Code 代碼
3.3	3R3
4.7	4R7
6.8	6R8
10	100
15	150
22	220
33	330
39	390
47	470
56	560
68	680
82	820
100	101
150	151
220	221
270	271
330	331
390	391
470	471
680	681
820	821
1000	102
1200	122
1500	152
1800	182
2200	222
2700	272

(8)

Cap. Tolerance (%) 容量允差	Code 代碼
±10	K
±20	M

(10)

Type 類型	Code 代碼
Chip 貼片	C
Radial 引線	R
Radial Taping 引線編帶	T

(11)

Type 類型	Lead Configuration 引線結構	Code 代碼
Chip 貼片	Taping & Reel 編帶與卷盤	R
	Taping & Plastic Reel 編帶與塑料卷盤	T
Radial 引線	Bulk 散裝	B
	Taping (Straight) 編帶 (直腳)	S
	Lead Cutting 剪腳	C

(12)

Diameter (Φ) 直徑	Code 代碼
4	C
4.5	W
5	D
5.5	Y
6.3	E
6.5	B
8	F
8.2	A
10	G
12	H

(13, 14)

Length (mm) 高度	Code 代碼
4.2	42
5.5	55
5.7	57
5.8	58
6	06
6.5	65
6.7	67
7	07
7.7	77
8	08
9	09
10	10
10.2	1S
10.5	1D
11	11
12	12
12.5	1B
12.7	1T
13	13
13.5	1C
16	16
20	20
21	21

(15)

Marking Colour 印字顏色	Code 代碼
Black print on the case top 鋁殼頂部黑字印刷	S
Navy Blue print on the case top 鋁殼頂部深藍字印刷	B
Red print on the case top 鋁殼頂部紅字印刷	R

(16)

Rubber Seal 膠塞	Code 代碼
Flat 平台	P
Stand-off 凸台	T

(17, 18)

Lead Process 引線加工	Code 代碼
Standard 標準	00
Lead length after cut is 3mm 剪腳腳長 3mm	30
Lead length after cut is 4.5mm 剪腳腳長 4.5mm	45
Lead length after cut is 5mm 剪腳腳長 5mm	50
Lead length after cut is 7.5mm 剪腳腳長 7.5mm	75
Lead length after cut is 10mm 剪腳腳長 10mm	1A
Lead length after cut is 12mm 剪腳腳長 12mm	1B
Lead length after cut is 13mm 剪腳腳長 13mm	1C
Lead length after cut is 15mm 剪腳腳長 15mm	1D

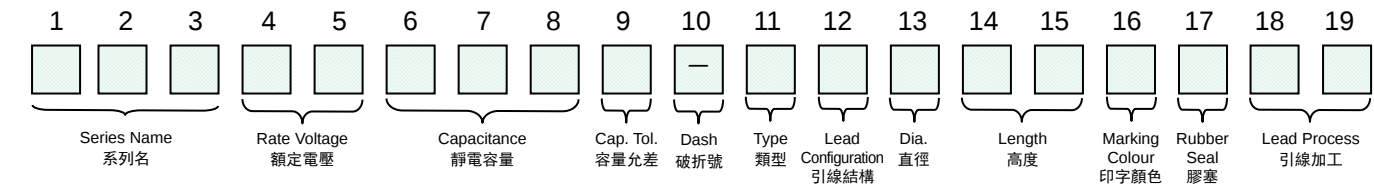
● Note: The part number of Chip Type Conductive Polymer Aluminum Solid Electrolytic Capacitors is indicated with 1~14 digits.
●注：貼片式導電性高分子固態鋁電解電容器的產品編碼只需使用 1~14 位代碼。

CAT.2024/V1.3

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EXPLANATION OF PART NUMBERS 產品編碼規則

For Conductive Polymer Hybrid Aluminum Electrolytic Capacitors 適用於導電性高分子混合型鋁電解電容器



(1~3)			(4, 5)		(6~8)		(9)		(11)		(13)		(14, 15)	
Series 系列	Voltage (W.V.) 電壓	Code 代碼	Capacitance (μF) 靜電容量	Code 代碼	Cap. Tolerance (%) 容量允差	Code 代碼	Type 類型	Code 代碼	Diameter (∅) 直徑	Code 代碼	Length (mm) 高度	Code 代碼		
HMV	16	1C	22	220	+20	M	Chip 貼片	C	6.3	E	6	06		
HMR	20	1D	33	330	-20		Radial 引線	R	8	F	6.7	67		
HME	25	1E	39	390			Radial Taping 引線編帶	T	10	G	7	07		
HMG	35	1V	47	470							7.7	77		
HMY	40	1G	56	560							8	08		
HMW	50	1H	68	680							9	09		
HPV	63	1J	82	820							10	10		
HPR	75	1T	100	101							10.2	1S		
HPD	80	1K	150	151							10.5	1D		
HPT	85	1R	220	221							11	11		
HPK	100	2A	270	271							12	12		
			330	331							12.5	1B		
			390	391							12.8	1G		
			470	471							16.5	1E		
			680	681										
			820	821										
			1000	102										
			1200	122										
			1500	152										

(12)		
Type 類型	Lead Configuration 引線結構	Code 代碼
Chip 貼片	Taping & Reel 編帶與卷盤	R
Radial 引線	Bulk 散裝	B
	Taping (Straight) 編帶（直腳）	S
	Lead Cutting 剪腳	C

(16)		(17)		(18, 19)	
Marking Colour 印字顏色	Code 代碼	Rubber Seal 膠塞	Code 代碼	Lead Process 引線加工	Code 代碼
Black print on the case top 鋁殼頂部黑字印刷	S	Flat 平台	P	Standard 標準	00
Navy Blue print on the case top 鋁殼頂部深藍字印刷	B	Stand-off 凸台	T	Lead length after cut is 3mm 剪腳腳長 3mm	30
Red print on the case top 鋁殼頂部紅字印刷	R			Lead length after cut is 4.5mm 剪腳腳長 4.5mm	45
				Lead length after cut is 5mm 剪腳腳長 5mm	50
				Lead length after cut is 7.5mm 剪腳腳長 7.5mm	75
				Lead length after cut is 10mm 剪腳腳長 10mm	1A
				Lead length after cut is 12mm 剪腳腳長 12mm	1B
				Lead length after cut is 13mm 剪腳腳長 13mm	1C
				Lead length after cut is 15mm 剪腳腳長 15mm	1D

● Note: The part number of Chip Type Conductive Polymer Hybrid Aluminum Electrolytic Capacitors is indicated with 1~15 digits.
● 注：貼片式導電性高分子混合型鋁電解電容器的產品編碼只需使用 1~15 位代碼。

EXPLANATION OF PART NUMBERS 產品編碼規則

For Aluminum Electrolytic Capacitors 適用於鋁電解電容器

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

Series Name
系列名

Rate Voltage
額定電壓

Capacitance
靜電容量

Cap. Tol.
容量允差

Dash
破折號

Type
類型

Lead Configuration
引線結構

Dia.
直徑

Length
高度

Sleeve
膠管

Rubber Seal
膠塞

Lead Process
引線加工

(1, 2)

Series 系列
CS
CK
SC
CN
KP
LZ
KZ
FZ
FS
EL
KL
KH
CP
CH
HU
RA
RK
KT
RE
RM
RS
LA
LK
LM
LS
NP
NK
NM
NS
BP
BH
TM
TN
RZ
TL
TW
TY
TB
TX
PL
SM
SK
SP
SH
ST

(3, 4)

Voltage (W.V.) 電壓	Code 代碼
4	0G
6.3	0J
10	1A
16	1C
25	1E
35	1V
40	1G
50	1H
63	1J
75	1T
80	1K
85	1R
100	2A
120	2O
125	2B
160	2C
180	2Z
200	2D
220	2N
250	2E
315	2F
330	2U
350	2V
360	2X
400	2G
420	2M
450	2W
500	2H

(5-7)

Capacitance (μF) 靜電容量	Code 代碼
0.1	0R1
0.22	R22
0.33	R33
0.47	R47
1	010
2.2	2R2
3.3	3R3
4.7	4R7
6.8	6R8
10	100
15	150
22	220
33	330
47	470
68	680
100	101
150	151
220	221
270	271
330	331
470	471
680	681
1000	102
1200	122
1500	152
1800	182
2200	222
2700	272
3300	332
4700	472
5600	562
6800	682
10000	103
12000	123
15000	153
18000	183
22000	223

(8)

Cap. Tolerance (%) 容量允差	Code 代碼
±10	K
±15	L
±20	M
+20 -10	V
+20 0	R

(10)

Type 類型	Code 代碼
Chip 貼片	C
Radial 引線	R
Radial Taping 引線編帶	T
Snap-in 導箔	S

(11)

Type 類型	Lead Configuration 引線結構	Code 代碼
Chip 貼片	Taping & Reel 編帶與卷盤	R
	Taping & Plastic Reel 編帶與塑料卷盤	T
	Bulk 散裝	B
	Taping (Forming) 編帶 (成型)	A
	Taping (Straight) 編帶 (直腳)	S
	Taping (Straight P=2.0mm) 編帶 (直腳 P=2.0mm)	E
	Lead Cutting 剪腳	C
	Lead Cutting (Straight P=2.0mm) 剪腳 (直腳 P=2.0mm)	D
	Lead Forming Cut 成型剪腳	F
	Lead Forming Only 引線成型	M
	Kinked Forming Cut 彎曲成型剪腳	K
	Kinked Straight Cut 彎曲直腳剪腳	Y
	Cutting & Bending (Left) 左向臥式成型剪腳	L
	Cutting & Bending (Right) 右向臥式成型剪腳	R
Snap-in 導箔	Lead Snap-in 導箔線	W

(12)

Diameter (φ) 直徑	Code 代碼
3	S
4	C
5	D
6.3	E
8	F
10	G
12	H
12.5	I
13	J
13.5	V
14.5	A
16	K
18	L
20	M
22	N
25	O
30	P
35	Q
40	R

(13, 14)

Length (mm) 高度	Code 代碼
5	05
5.4	54
5.8	58
6.2	62
7	07
7.7	77
9	09
10	10
10.5	1D
11	11
11.5	1A
12	12
12.5	1B
13	13
13.5	1C
14	14
16	16
16.5	1E
20	20
21	21
25	25
26	26
31	31
31.5	3A
35	35
35.5	3E
36	36
40	40
45	45
50	50
55	55
60	60
65	65
70	70

(15)

Sleeve (Material/Colour) 膠管 (材質/顏色)	Code 代碼
PVC sleeve (White printing) PVC 膠管 (白字)	W
PVC sleeve (Black printing) PVC 膠管 (黑字)	B
PVC sleeve (Golden printing) PVC 膠管 (金字)	G
PVC sleeve (Silver printing) PVC 膠管 (銀字)	A
PVC sleeve (Green colour/white printing) PVC 膠管 (綠色白字)	V
PVC sleeve (Purple colour/white printing) PVC 膠管 (紫色白字)	Z
PVC sleeve (Brown colour/white printing) PVC 膠管 (咖啡色白字)	K
PET sleeve (Green colour/white printing) PET 膠管 (綠色白字)	1
PET sleeve (Purple blue colour/white printing) PET 膠管 (藍紫色白字)	2
PET sleeve (Yellow colour/black printing) PET 膠管 (黃色黑字)	3
PET sleeve (Black colour/white printing) PET 膠管 (黑色白字)	4
PET sleeve (Brown colour/white printing) PET 膠管 (褐色白字)	5
PET sleeve (Light purple colour/white printing) PET 膠管 (淺紫色白字)	6
Sleeveless (Black print on the case top) 無膠管 (鋁殼頂部黑字印刷)	S

(16)

Rubber Seal 膠塞	Code 代碼
Flat 平台	P
Stand-off 凸台	T

(17, 18)

Lead Process 引線加工	Code 代碼
Standard 標準	00
Non-standard 非標準	01
Lead length after cut is 3mm 剪腳腳長 3mm	30
Lead length after cut is 4.5mm 剪腳腳長 4.5mm	45
Lead length after cut is 5mm 剪腳腳長 5mm	50
Lead length after cut is 7.5mm 剪腳腳長 7.5mm	75
Lead length after cut is 10mm 剪腳腳長 10mm	1A
Lead length after cut is 11mm 剪腳腳長 11mm	1N
Lead length after cut is 12mm 剪腳腳長 12mm	1B
Lead length after cut is 12.5mm 剪腳腳長 12.5mm	1M
Lead length after cut is 13mm 剪腳腳長 13mm	1C
Lead length after cut is 13.5mm 剪腳腳長 13.5mm	1L
Lead length after cut is 14mm 剪腳腳長 14mm	1H
Lead length after cut is 15mm 剪腳腳長 15mm	1D
Lead length after cut is 16mm 剪腳腳長 16mm	1E
Lead length after cut is 17mm 剪腳腳長 17mm	1J
Lead length after cut is 17.5mm 剪腳腳長 17.5mm	1G
Lead length after cut is 18mm 剪腳腳長 18mm	1K
Lead length after cut is 20mm 剪腳腳長 20mm	1F

● Note: The part number of Chip Type Aluminum Electrolytic Capacitors is indicated with 1~14 digits.
● 注：貼片式鋁電解電容器的產品編碼只需使用 1~14 位代碼。

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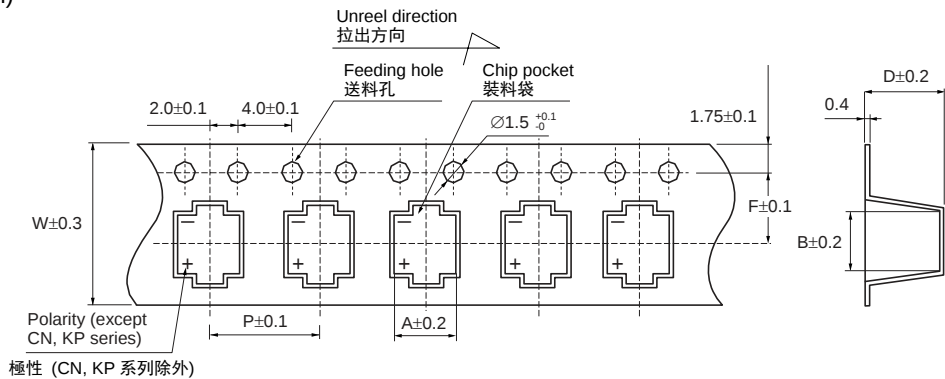
18

TAPING & PACKAGING SPECIFICATIONS 編帶與包裝標準

For Chip Type Capacitors 適用於貼片式電容器

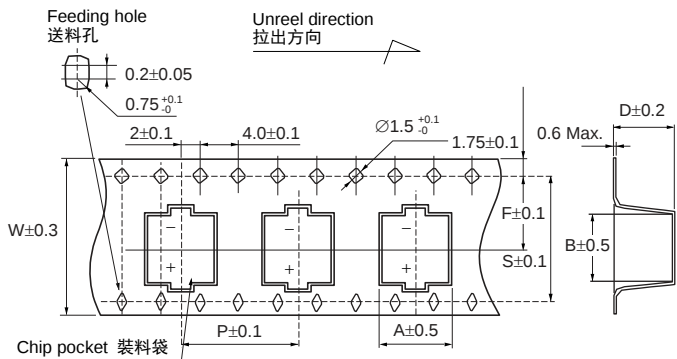
Carrier Tape Dimensions 載帶尺寸

Ø4 ~ Ø10 (mm)



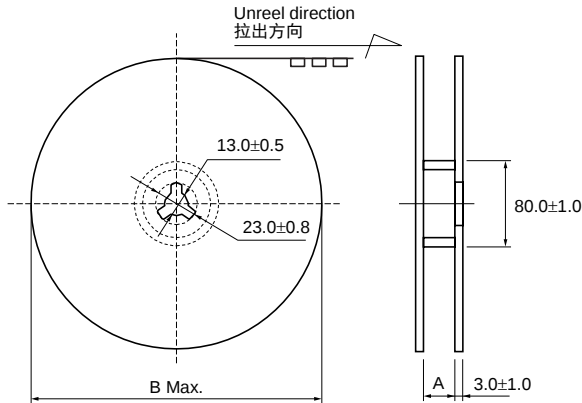
Dimension 尺寸表	(Unit: mm)									
ØD × L	4×5.4/5.8	5×5/5.4/8/9	6.3×5.4/6.5	6.3×7.7/9	6.3×10.5/11.5	8×6/6.7/7	8×7.7/8/9	8×10.5/12/12.5	10×8/10/10.5	10×12.5/13.5
W	12.0	12.0	16.0	16.0	16.0	24.0	24.0	24.0	24.0	24.0
P	8.0	12.0	12.0	12.0	12.0	12.0	16.0	16.0	16.0	16.0
F	5.5	5.5	7.5	7.5	7.5	11.5	11.5	11.5	11.5	11.5
A	5.0	6.0	7.0	7.0	7.0	8.7	8.7	8.7	10.7	10.7
B	5.0	6.0	7.0	7.0	7.0	8.7	8.7	8.7	10.7	10.7
D	5.9/5.9	5.9/5.9/8.1/9.2	5.9/6.9	8.2/9.9	11.0/12.5	6.8/6.8/7.5	8.2/8.2/9.9	11.0/12.5/13.0	8.4/11.0/11.0	13.0/14.0

Ø12.5 ~ Ø18 (mm)



Dimension 尺寸表	(Unit: mm)			
ØD × L	12.5×13.5	12.5×16	16×16.5	18×16.5/18.5
W	32.0	32.0	44.0	44.0
P	24.0	24.0	28.0	32.0
F	14.2	14.2	20.2	20.2
A	14.0	14.0	17.5	19.5
B	14.0	14.0	17.5	19.5
D	14.0	17.5	17.5	17.5/20.5
S	28.4	28.4	40.4	40.4

Reel Dimensions 卷盤尺寸



(Unit: mm)					
ØD	Ø4, Ø5	Ø6.3	Ø8, Ø10	Ø12.5	Ø16, Ø18
A±1.0	14	17	25.5	34.5	44
B (Max.)	382	382	382	382	382

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.
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■ Packaging Quantity 包裝數量

□ For Chip Type Aluminum Electrolytic Capacitors 適用於貼片式鋁電解電容器

Case Size ØD × L (mm) 尺寸	Quantity/Reel (pcs) 數量/卷 (個)	Reels/Box 卷盤/箱	Quantity/Carton (pcs) 數量/外箱 (個)	Carton Box Size 外箱尺寸 L × H × W (mm)
4 × 5.4, 5.8	2,000*	12	24,000	400 × 390 × 245
5 × 5.4, 5.8	1,000*	12	12,000	
6.3 × 5.4, 5.8, 7.7	1,000*	10	10,000	
6.3 × 10.5	750*	10	7,500	
6.3 × 11.5	500*	10	5,000	
8 × 6.2	1,000*	10	10,000	
8 × 10.5, 12.5	500*	7	3,500	
10 × 10.5, 12.5, 13.5	500*	7	3,500	
12.5 × 13.5	250*	6	1,500	
12.5 × 16	200*	6	1,200	
16 × 16.5	150*	4	600	
18 × 16.5, 18.5	125*	4	500	

□ For Chip Type Conductive Polymer Aluminum Solid Electrolytic Capacitors & Chip Type Conductive Polymer Hybrid Aluminum Electrolytic Capacitors
適用於貼片式導電性高分子固態鋁電解電容器及貼片式導電性高分子混合型鋁電解電容器

Case Size ØD × L (mm) 尺寸	Quantity/Reel (pcs) 數量/卷 (個)	Reels/Box 卷盤/箱	Quantity/Carton (pcs) 數量/外箱 (個)	Carton Box Size 外箱尺寸 L × H × W (mm)
4 × 5.5	2,000*	12	24,000	400 × 390 × 245
5 × 5.5~8	1,000*	12	12,000	
5 × 9	750*	12	9,000	
6.3 × 5.5~8	1,000*	10	10,000	
6.3 × 9~9.5	750*	10	7,500	
6.3 × 12	500*	10	5,000	
8 × 6.7~7.7	750*	8	6,000	
8 × 8~12.5	500*	8	4,000	
10 × 8~10.5	500*	8	4,000	
10 × 12.5, 12.8, 13.5	450*	8	3,600	
10 × 16.5	300*	8	2,400	

* Minimum package quantity *最小包裝數量

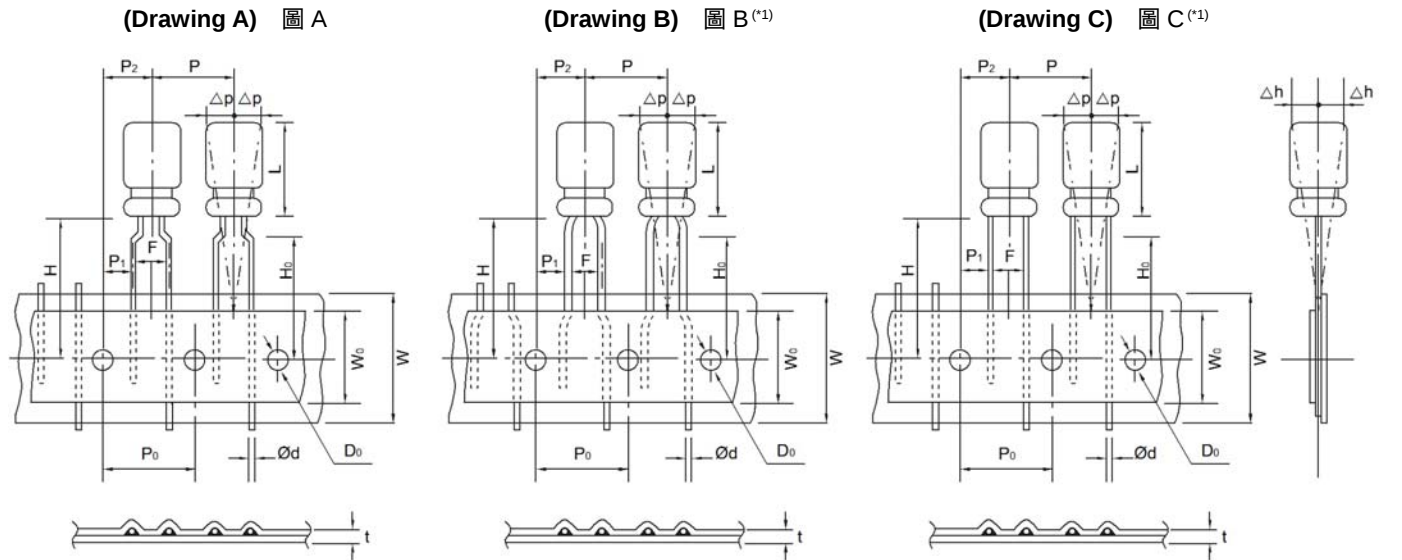
- There are some differences between actual package quantity and above list. Please confirm before you order.
- Please order by minimum package quantity.
- 以上包裝標準可能會與實際的包裝數量有所不同，請在訂購前確認。
- 請以最小包裝數量訂購。

TAPING SPECIFICATIONS 編帶標準

□ For Automatic Insertion (Radial Lead Type Capacitors) 自動插件用 (適用於引線式電容器)



■ Drawing (Unit: mm) 外形圖



■ Dimensions (Unit: mm) 尺寸表

Application to Drawing 對應外形圖			B ^(*)				C ^(*)							A							C ^(*)			
Descriptions 內容	Symbol 符號	Tolerance 允差	Ø3	Ø4	Ø5		Ø5		Ø6.3		Ø8			Ø4	Ø5		Ø6.3		Ø8			Ø10	Ø13	Ø16,Ø18
Case Height 鋁殼高度	L	Note ^(*)	5	5,7	5,7	11	5,7	11	5,7	11.5	5	7~14	16~20	5,7	5,7	11	5,7	11.5	5	7~14	16~20	20 (Max.)	25 (Max.)	35,40 (Max.)
Lead Wire Diameter 引線直徑	Ød	±0.05	0.45	0.45	0.45	0.5	0.45	0.5	0.45	0.5	0.45	0.5	0.6	0.45	0.45	0.5	0.45	0.5	0.45	0.5	0.6	0.6	0.6	0.8
Body Pitch 電容器本體間距	P	±1.0	12.7				12.7		12.7		12.7			12.7				12.7		12.7		12.7	15.0	30.0
Feeding Hole Pitch 運送孔間距	P ₀	±0.2	12.7				12.7		12.7		12.7			12.7				12.7		12.7		12.7	15.0	15.0
Feeding Hole Center to Lead 運送孔至引線寬度	P ₁	±0.7	5.1				5.1		5.1		5.1			3.85				3.85		3.85		3.85	5.0	3.75
Feeding Hole Alignment 運送孔至電容器本體寬度	P ₂	±1.0	6.35				6.35		6.35		6.35			6.35				6.35		6.35		6.35	7.5	7.5
Lead Center Spacing 引線間距	F	+0.8 -0.2	2.5				2.0		2.5		3.5			5.0				5.0		5.0		5.0	5.0	7.5
Tape Width 紙帶寬度	W	±0.5	18.0				18.0		18.0		18.0			18.0				18.0		18.0		18.0	18.0	18.0
Adhesive Tape Width 熱熔膠帶寬度	W ₀	Min.	10.0				10.0		10.0		12.0			10.0				12.0		12.0		12.0	12.0	12.0
Length from Seating Plane 電容器本體至紙帶中心高度	H	±0.75	17.5 (11L=18.5)				17.5	18.5	17.5		18.5			18.5 (5,7L=17.5)				18.5	18.5	20.0	18.5	18.5	18.5	
Lead Clinch Height 引線彎曲至運送孔高度	H ₀	±0.5	17.0				17.0		—		—			16.0				16.0		16.0		—	—	—
Feeding Hole Diameter 運送孔直徑	ØD ₀	±0.2	4.0				4.0		4.0		4.0			4.0				4.0		4.0		4.0	4.0	4.0
Total Tape Thickness 紙帶與膠帶的總厚度	t	±0.3	0.7				0.7		0.7		0.7			0.7				0.7		0.7		0.7	0.7	0.7
Body Inclination 電容器本體傾斜度	△h	Max.	1.0				1.0		1.0		1.0			1.0				1.0		1.0		1.0	1.0	1.0
Body Inclination 電容器本體傾斜度	△p	Max.	1.0				1.0		1.0		1.0			1.0				1.0		1.0		1.0	1.0	1.0
Taping Code 編帶代碼			TS				TE		TS		TS			TA				TA		TA		TS	TS	TS

(*) For Radial Lead Type Conductive Polymer Aluminum Solid Capacitors & Radial Lead Type Conductive Polymer Hybrid Aluminum Capacitors only. Please consult with us before you order.
僅適用於引線式導電性高分子固態鋁電解電容器及引線式導電性高分子混合型鋁電解電容器。請在訂購前向我們諮詢。
(*) Please refer to the drawing of each series for tolerance. 請查閱相應系列外形圖的允許誤差。

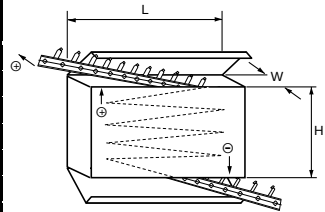
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PACKAGING SPECIFICATIONS 包裝標準

Taping Type (Ammo pack) 編帶品（折疊式包裝）

For Aluminum Electrolytic Capacitors 適用於鋁電解電容器

Type 類型	Diameter (mm) 直徑	In-box Size 內盒尺寸	Quantity/In-box (pcs) 數量/內盒 (個)	Quantity/ Carton (pcs) 數量/箱 (個)
		L × H × W (mm)		
Radial Lead Type 直立式	Ø3	337 × 234 × 50	2,500*	25,000
	Ø4	337 × 234 × 50	2,500*	25,000
	Ø5	337 × 234 × 50	2,000*	20,000
	Ø6.3	325 × 290 × 55	2,000*	10,000
	Ø8	327 × 234 × 50	1,000*	10,000
	Ø10	327 × 182 × 60	500*	4,000
	Ø13	340 × 305 × 65	500*	2,000
	Ø16 (25L)	340 × 320 × 65	300*	1,200
	Ø18 (25L)	340 × 320 × 65	250*	1,000



For Conductive Polymer Aluminum Solid Electrolytic Capacitors & Conductive Polymer Hybrid Aluminum Electrolytic Capacitors
適用於導電性高分子固態鋁電解電容器及導電性高分子混合型鋁電解電容器

Radial Lead Type 直立式	Ø4	337 × 235 × 50	2,500*	25,000
	Ø5	337 × 235 × 50	2,000*	20,000
	Ø6.3	325 × 290 × 55	2,000*	10,000
	Ø8	337 × 235 × 50	1,000*	10,000
	Ø10	327 × 182 × 60	500*	4,000

Bulk Type 散裝品

For Aluminum Electrolytic Capacitors 適用於鋁電解電容器

Type 類別	Case Size ØD×L (mm) 尺寸	Vinyl Bag Quantity 膠袋數量		Small Box Quantity 內箱數量				Carton Box Quantity 外箱數量		Small Box Size 內箱尺寸	Carton Box Size 外箱尺寸	
		pcs/Bag 個/膠袋		Vinyl Bag/Small Box 膠袋/內箱		pcs/Small Box 個/內箱		Small Box/ Carton Box 內箱/外箱	pcs/Carton Box 個/外箱		L × H × W (mm)	L × H × W (mm)
		Long Lead 長腳	Lead Cutting/Forming 剪腳/成型	Long Lead 長腳	Lead Cutting/Forming 剪腳/成型	Long Lead 長腳	Lead Cutting/Forming 剪腳/成型		Long Lead 長腳	Lead Cutting/Forming 剪腳/成型		
Radial Lead Type 直立式	3 × 5	1,000*		50		50,000		2	100,000		300 × 290 × 220	470 × 310 × 310
	4 × 5, 7	1,000*		25		25,000			50,000			
	5 × 5, 7	1,000*		25		25,000			50,000			
	5 × 11	1,000*		20		20,000			40,000			
	6.3 × 5	1,000*		25		25,000			50,000			
	6.3 × 7	1,000*		20		20,000			40,000			
	6.3 × 11.5	500*		30		15,000			30,000			
	8 × 5~11.5	500*		20		10,000			20,000			
	8 × 13~16	250*		30		7,500			15,000			
	8 × 20	250*		24		6,000			12,000			
	10 × 12~17	200*		25		5,000			10,000			
	10 × 20	200*		20		4,000			8,000			
	10 × 25~30	100*		25		2,500		5,000				
	13 × 17~25	100*		10		1,000		4	4,000	300 × 145 × 220		
	13 × 30, 35	50*		30		1,500		2	3,000	300 × 290 × 220		
	16 × 20~35	—		—		300*		4	1,200	340 × 65 × 305	360 × 280 × 320	
18 × 20~31	—		—		250*		4	1,000	340 × 65 × 305	360 × 280 × 320		
18 × 35~40	—		—		250*			1,000	340 × 87 × 305	360 × 370 × 320		
22 × 25~40	—		—		180*			720				
25 × 25~40	—		—		143*			572				
22 × 25~40	—		—		156*			4	624	340 × 65 × 305	360 × 280 × 320	
25 × 25~40	—		—		132*		528					
30 × 25~40	—		—		90*		360					
35 × 25~40	—		—		72*		288					
22 × 45~75	—		—		156*		3	468	340 × 87 × 305			
25 × 45~75	—		—		132*			396				
30 × 45~75	—		—		90*			270				
35 × 45~75	—		—		72*			216				

For Conductive Polymer Aluminum Solid Electrolytic Capacitors & Conductive Polymer Hybrid Aluminum Electrolytic Capacitors 適用於導電性高分子固態鋁電解電容器及導電性高分子混合型鋁電解電容器

Radial Lead Type 直立式	5 × 7-12	1,000*	1,000*	8	16	8,000	16,000	4	32,000	64,000	305 × 140 × 200	420 × 310 × 320
	6.3 × 6-9	1,000*	1,000*	8	8	8,000	10,000		32,000	40,000		
	6.3 × 10.5-12	500*	1,000*	8	8	4,000	8,000		16,000	32,000		
	8 × 7-9	500*	1,000*	8	8	4,000	8,000		16,000	32,000		
	8 × 11-16	500*	500*	8	8	4,000	4,000		16,000	16,000		
	10 × 8-13	250*	500*	8	8	2,000	4,000		8,000	16,000		
	10 × 16-21	200*	400*	8	8	1,600	3,200		6,400	12,800		

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- 請以最小包裝數量訂購。

* Minimum package quantity *最小包裝數量

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CAT.2024/V1.3

LEAD FORMING & CUTTING 引線成型及剪腳

For Radial Lead Type Capacitors 適用於引線式電容器



(Unit: mm)

Configurations 結構類型	Code ^(*) 代碼 ^(*)	Case dia. 直徑	Shape 外形圖	Configurations 結構類型	Code ^(*) 代碼 ^(*)	Case dia. 直徑	Shape 外形圖
Forming Cut 成型剪腳 (Forming Only 成型不剪腳)	F (M)	Ø4~Ø8		Kinked Forming Cut 彎曲成型剪腳	K	Ø4~Ø8	
Straight Cut 直腳剪腳	C	Ø4~Ø22		Kinked Straight Cut 彎曲直腳剪腳	Y	Ø10~Ø22	
Bending Cut (Left) 左向臥式 成型剪腳	L	Ø4~Ø22		Bending Cut (Right) 右向臥式 成型剪腳	R	Ø4~Ø22	
Kinked Bending Cut (Left) 左向臥式 結剪腳	G	Ø10~Ø22		Kinked Bending Cut (Right) 右向臥式 結剪腳	H	Ø10~Ø22	

● Lead diameter (Ød) and lead pitch (P) are subject to capacitor specifications. ● 引線的直徑(Ød)和腳距(P)請查閱各系列的詳細規格。

^(*) The 11th digit of the part number. 產品編碼的第 11 位代碼。

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CAT.2024/V1.3

SOLDERING CONDITIONS 焊接條件

□ For Chip Type Conductive Polymer Aluminum Solid Electrolytic Capacitors & Chip Type Conductive Polymer Hybrid Aluminum Electrolytic Capacitors 適用於貼片式導電性高分子固態鋁電解電容器及貼片式導電性高分子混合型鋁電解電容器

Recommended Conditions for Reflow Soldering 推薦回流焊條件

● Conductive Polymer Aluminum Solid Electrolytic Capacitors 貼片式導電性高分子固態鋁電解電容器

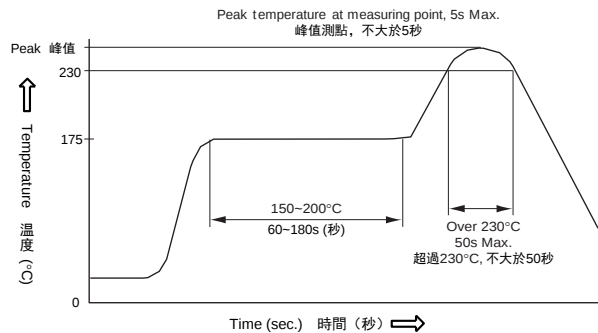
- (1) Preheating shall be done at +150°C to 200°C and for 60 to 180 seconds.
預熱應在+150°C~200°C 及 60~180 秒內完成。
- (2) The duration for over +230°C temperature at capacitor surface shall not exceed 60 seconds.
電容器表面溫度超過+230°C 的持續時間不得超過 60 秒。
- (3) The standard temperature profile differs by every reflow method.
溫度曲線圖的溫度標準會因回流焊方式的不同而不同。
- (4) Peak temperature +260°C or below: Reflow shall be done 1 cycle only.
峰值溫度在+260°C 或以下：回流焊次數只能是 1 次。
- (5) Peak temperature +250°C or below: Reflow shall be done within 2 cycles.
峰值溫度在+250°C 或以下：回流焊次數最多是 2 次。
- (6) Please make sure that the parts have enough cooling time between the first and second soldering process.
請確保在第 1 次和第 2 次之間的產品有足夠的冷卻時間。
- (7) The temperature at capacitor top shall not exceed the peak temperature.
電容器表面的溫度不得超過峰值溫度。
- (8) Please contact us if your condition is over the maximum.
如使用條件超出最大值，請與我們聯繫。

● Conductive Polymer Hybrid Aluminum Electrolytic Capacitors 貼片式導電性高分子混合型鋁電解電容器

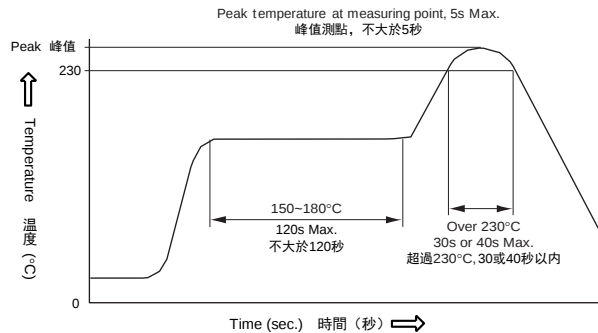
- (1) Preheating shall be done at +150°C to 180°C and for 120 seconds.
預熱應在+150°C~180°C 及 120 秒內完成。
- (2) Peak temperature +260°C or below: Reflow shall be done 1 cycle only.
峰值溫度在+260°C 或以下：回流焊次數只能是 1 次。
- (3) Peak temperature +250°C or below: Reflow shall be done within 2 cycles.
峰值溫度在+250°C 或以下：回流焊次數最多是 2 次。
- (4) Please make sure that the parts have enough cooling time between the first and second soldering process.
請確保在第 1 次和第 2 次之間的產品有足夠的冷卻時間。
- (5) Please contact us if your condition is over the maximum.
如使用條件超出最大值，請與我們聯繫。

Classification Reflow Profile 回流焊曲線圖

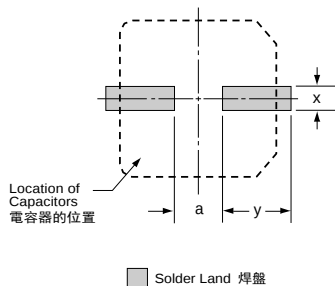
● Conductive Polymer Aluminum Solid Electrolytic Capacitors 貼片式導電性高分子固態鋁電解電容器



● Conductive Polymer Hybrid Aluminum Electrolytic Capacitors 貼片式導電性高分子混合型鋁電解電容器



Recommended Solder Land Size on PC Board 推薦安裝尺寸 (Unit: mm)



Size 尺寸	a	y	x
Ø4	1.0	2.6	1.6
Ø5	1.4	3.0	1.6
Ø6.3	2.1	3.5	1.6
Ø8 × 6.7~9	2.1	4.0	1.6
Ø8 × 10~12	3.0	3.5	2.5
Ø10	4.0	4.0	2.5
Ø12/12.5	4.0	6.0	3.2
Ø13/13.5	4.0	6.0	3.2

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CAT.2024/V1.3

SOLDERING CONDITIONS 焊接條件

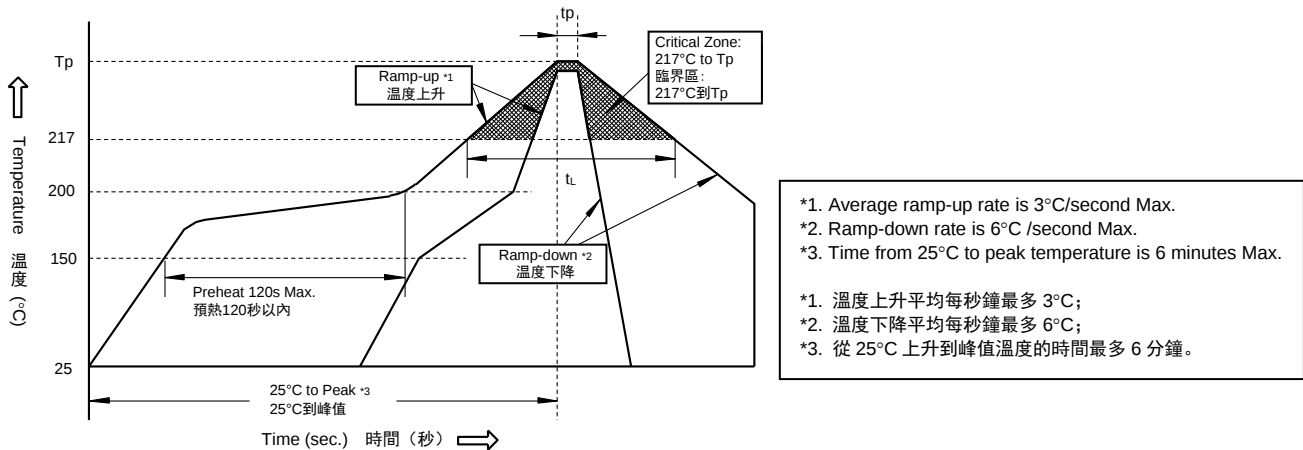
For Chip Type Aluminum Electrolytic Capacitors 適用於貼片式鋁電解電容器

- Radial lead type and snap-in terminal type aluminum electrolytic capacitors please see titled "Mounting" in "General Information for Application".
- 插件式和導箔式鋁電解電容器請查閱“鋁電解電容器使用注意事項”裡的“安裝”說明。

Recommended Conditions for Reflow Soldering 推薦回流焊條件

- A thermal condition system such as infrared radiation (IR) or hot blast should be adopted, and vapor heat transfer systems (VPS) are not recommended.
應採用紅外線或熱風回流焊接，而不宜採用汽相加熱回流焊接。
- Reflow soldering should be within 2 cycles. Please make sure that the parts have enough cooling time between the first and second soldering process.
回流焊次數最多 2 次，請確保在第 1 次和第 2 次之間產品有足夠的冷卻時間。
- The time of preheating from 150°C to 180°C shall be within maximum 120 seconds;
從 150°C 到 180°C 的預熱時間應在 120 秒以內；
 - The time of soldering temperature at 217°C measured on capacitors' top shall not exceed t_L (second);
電容器頂部溫度超過 217°C 的焊接時間不得超過 t_L (秒)；
 - The peak temperature on capacitors' top shall not exceed T_p (°C), and the time within 5°C of actual peak temperature shall not exceed t_p (second).
電容器頂部的峰值溫度不得超過 T_p (°C)，在 5°C 範圍內的實際峰值溫度時間不得超過 t_p (秒)。

Classification Reflow Profile 回流焊曲線圖

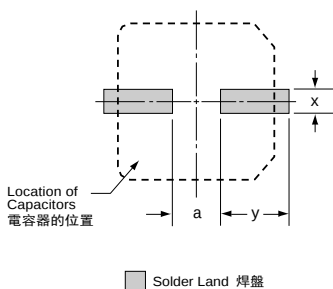


Classified at Temperature and Time 溫度和時間分類

Size 尺寸	Preheat 預熱	T_p (°C)	t_L (second 秒)	t_p (second 秒)	Reflow number 回流焊次數
Ø4~Ø6.3, Ø8×6.2	150~180°C 120s Max. (120 秒以內)	255	60	5	2 times or less 最多 2 次
Ø8×10.5		250	60	5	
Ø10		245	60	5	
Ø12.5, Ø16, Ø18		240	40	5	

- Please contact us if your condition is over the maximum.
- 如使用條件超出最大值，請與我們聯繫。

Recommended Solder Land Size on PC Board 推薦安裝尺寸 (Unit: mm)



Size 尺寸	a	y	x
Ø4	1.0	2.6	1.6
Ø5	1.4	3.0	1.6
Ø6.3	1.9	3.5	1.6
Ø8 × 6.2	2.1	4.0	1.6
Ø8 × 10.5	3.0	3.5	2.5
Ø10	4.0	4.0	2.5
Ø12.5	4.0	6.0	3.2
Ø16	6.0	7.0	3.2
Ø18	6.0	8.0	3.2

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LIFE TIME ESTIMATION OF CAPACITORS 电容器的壽命時間推算

The life of aluminum electrolytic capacitors is mainly dependent on environmental conditions (e.g. ambient temperature, humidity etc.) and electrical factors (e.g. operating temperature, ripple current etc.). Generally, the wear-out mechanism of aluminum electrolytic capacitors is based on evaporation of electrolyte through the rubber seal. Consequently, the factor of temperature (ambient temperature and internal heating due to ripple current) is the most critical to electrolytic capacitors life. The effect of voltage on capacitor life is negligible, especially for low voltage electrolytic capacitors. The lifetime of aluminum electrolytic capacitors can be expressed as following equations:

鋁電解電容器的壽命主要依賴於其適用的環境條件（如環境溫度，濕度等）和電負荷情況（如工作電壓，紋波電流等）。通常而言，鋁電解電容器的失效機理被認為是電解液通過膠塞逐漸揮發所導致。因此，溫度因素（環境溫度和由於紋波電流所引致的內熱）對電容器壽命的影響最大，而電壓對電容器壽命的影響可以忽略，尤其對低電壓鋁電解電容器更是如此。鋁電解電容器的壽命可用下列公式來估算：

$$L_e = L_o \cdot K_t \cdot K_r$$

Where: 其中：

L_e = Expected life at operating temperature T_e (h) 在工作溫度 T_e (h) 下的預期壽命

L_o = Specified life at temperature operating temperature T_o (h) 在最大工作溫度 T_o (h) 下的壽命

K_t = Ambient temperature acceleration term 環境溫度影響因子

K_r = Ripple current acceleration term 紋波電流影響因子

$$K_t = L_o \cdot A^{(T_o - T_e)/10}$$

Where: 其中：

T_o = Maximum rated operating temperature (°C) 最大額定工作電壓(°C)

T_e = Actual ambient temperature (°C) 實際環境適用溫度(°C)

A = Acceleration coefficient (for the range from 35°C to the maximum operating temperature, $A \approx 2$)
加速系數（對於從 35°C 到最高工作溫度的範圍， $A \approx 2$ ）

$$K_r = 2^{(-\Delta T/5)}$$

Where: 其中：

ΔT = An increase in core temperature by internal heating due to ripple current 由於紋波電流引起的內熱造成電容器芯子的升溫
(ΔT = core temperature – ambient temperature) (ΔT = 芯子溫度 – 環境溫度)

ΔT can be estimated as follows: ΔT 可用以下公式估算：

$$\Delta T = (I^2 \cdot R) / (\beta \cdot S)$$

Where: 其中：

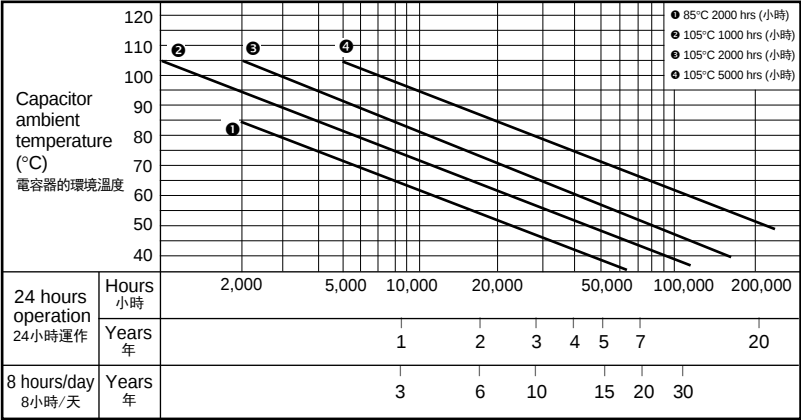
I = Ripple current of the capacitor (A rms) 通過電容器的紋波電流(A rms)

R = Equivalent series resistance of the capacitor (Ω) 電容器的等效串聯電阻(Ω)

β = Heat radiation coefficient of the aluminum can ($W/^\circ C \cdot cm^2$) 鋁殼的熱輻射系數($W/^\circ C \cdot cm^2$)

S = Surface area of the capacitor (cm^2) 電容器的表面積(cm^2)

In neglecting ripple current effect, the expected life of the capacitors at lower temperature is shown in the following chart.
當忽略紋波電流影響時，電容器在較低溫下的預期壽命可參考以下圖表。



● Quick Reference Guide of the Expected Life 預期壽命快速參考圖

Example 1: When a 2000 hours/105°C guaranteed product is used continuously at 60°C, it can be expected to have a life of 5 years.
例 1：對於 105°C 2000 小時的產品，如果在 60°C 環境中連續使用，它的預期壽命約 5 年。

Example 2: 例 2:

Conductive Polymer Aluminum Solid Electrolytic Capacitors 導電性高分子固態鋁電解電容器	Aluminum Electrolytic Capacitors 鋁電解電容器
105°C ≥ 2,000 hours 小時	105°C ≥ 2,000 hours 小時
95°C ≥ 6,324 hours 小時	95°C ≥ 4,000 hours 小時
85°C ≥ 20,000 hours 小時	85°C ≥ 8,000 hours 小時
75°C ≥ 63,245 hours 小時	75°C ≥ 16,000 hours 小時

- Please note that:
- a) The maximum estimated life is 15 years.
 - b) Ripple current in application should be less than or equal to ripple current specified in this catalogue.
- 請留意：
- a) 最大壽命時間約為 15 年。
 - b) 施加的紋波電流值應較本目錄所列的紋波值小或等同。

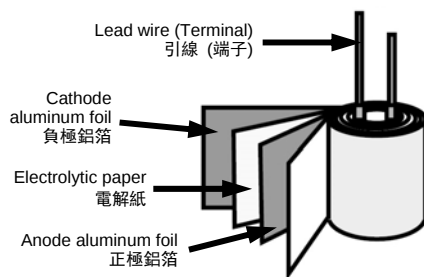
BASIC CONSTRUCTION OF ALUMINUM ELECTROLYTIC CAPACITORS

鋁電解電容器的基本結構

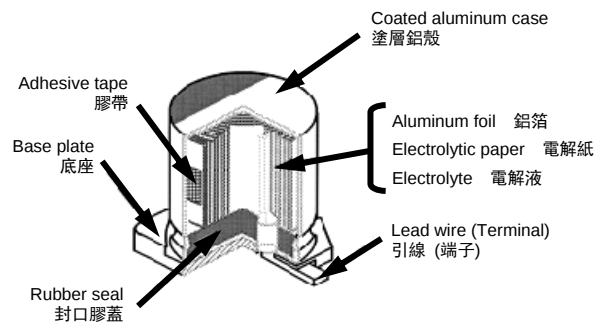
The aluminum electrolytic capacitors contains an internal element of an anode foil, a cathode foil and electrolytic paper rolled together, impregnated with an electrolyte, then attached to external terminals connecting the tabs with the anode or the cathode foils, and sealed in a can case.

鋁電解電容器是由正極與負極鋁箔鉚上正極與負極端子，再和電解紙一起捲繞成芯子，浸漬電解液後用鋁殼封裝而成。

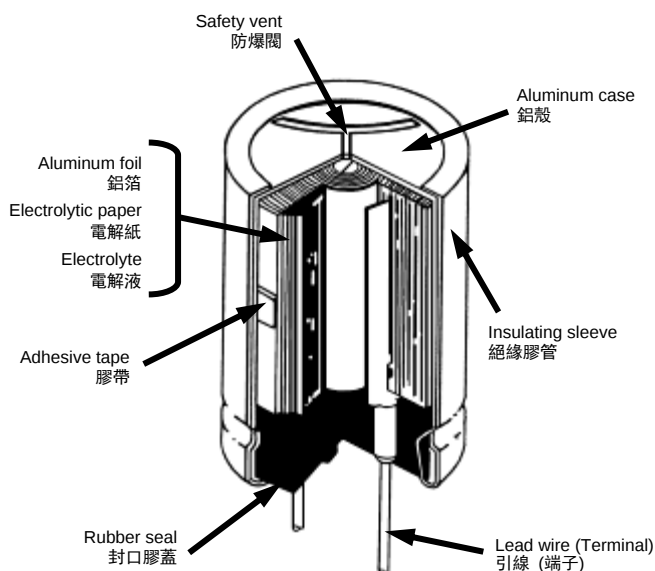
Internal Structure 內部結構



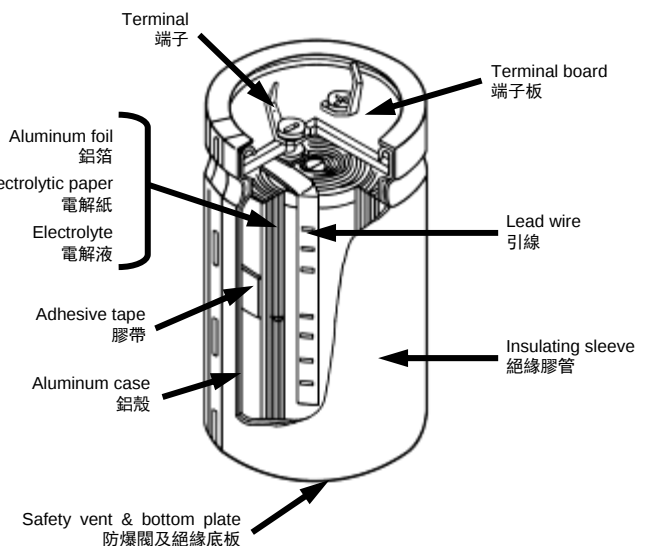
(Basic model of element 芯子基本結構)



(Chip type 貼片式)



(Radial lead type 引線式)



(Snap-in terminal type 導箔式)

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CAT.2024/V1.3

CORRESPONDING TO RoHS DIRECTIVE 對應RoHS指令

(EU RoHS Directive 2011/65/EU)

Product Name 產品名稱		Conductive Polymer Aluminum Solid Electrolytic Capacitors 導電式高分子固態鋁電解電容器		Conductive Polymer Hybrid Aluminum Electrolytic Capacitors 導電式高分子混合型鋁電解電容器	
Type 類型		Chip type 貼片式	Radial lead type 引線式	Chip type 貼片式	Radial lead type 引線式
RoHS compliant RoHS符合性		Yes 符合	Yes 符合	Yes 符合	Yes 符合
RoHS restricted Substances 限制有害物質	The portion of the components 產品的部分特性	Sn plating 鍍錫引線		Sn plating 鍍錫引線	
	Plating on terminals 引線鍍層				
Lead (Pb) 鉛	Construction of terminals 引線結構	Fe/Cu/Sn 鍍錫銅包鐵線		Fe/Cu/Sn 鍍錫銅包鐵線	
	Resistance to soldering heat 耐焊接熱	Please refer to page 22 "Soldering Conditions" 請查閱第22頁的“焊接條件”	Correspondence to 265°C wave soldering condition 對應265°C的波峰焊接條件	Please refer to page 22 "Soldering Conditions" 請查閱第22頁的“焊接條件”	Correspondence to 265°C wave soldering condition 對應265°C的波峰焊接條件
	Solderability 可焊性	No difference with Sn-Pb 與鉛錫線相同		No difference with Sn-Pb 與鉛錫線相同	
	Tensile strength 抗拉強度	No difference with Sn-Pb 與鉛錫線相同		No difference with Sn-Pb 與鉛錫線相同	
Hexavalent chromium (Cr VI) 六價鉻		Not detected 未檢出		Not detected 未檢出	
Mercury (Hg) 汞					
Cadmium (Cd) 鎘					
PBBs 多溴聯苯					
PBDEs 多溴二苯醚					
HBDD 六溴環十二烷					
DBP 鄰苯二甲酸二丁酯					
BBP 鄰苯二甲酸丁苄酯					
DEHP 鄰苯二甲酸雙（2-乙基己）酯					
Identification for RoHS compliance products RoHS符合性產品的識別		Added "Pb free" and "RoHS" symbol on inner and outer carton label 外箱和內箱上印有"Pb free"和"RoHS"符號標識		Added "Pb free" and "RoHS" symbol on inner and outer carton label 外箱和內箱上印有"Pb free"和"RoHS"符號標識	
MSL Level 濕度敏感水平 (IPC/JEDEC J-STD-020C)		Not applicable 不適用		Not applicable 不適用	

Aluminum Electrolytic Capacitors 鋁電解電容器		Chip type 貼片式	Radial lead type 引線式	Snap-in terminal type 導箔式	
RoHS compliant RoHS符合性		Yes 符合	Yes 符合	Yes 符合	
RoHS restricted substances 限制有害物質	The portion of the components 產品的部分特性	Change plating from Sn-Pb to Sn 將鍍鉛錫合金變更為鍍錫			
Lead (Pb) 鉛	Plating on terminals 引線鍍層				
	Construction of terminals 引線結構	Fe/Cu/Sn 鍍錫銅包鐵線			
		• Plating thickness 12μm • Plating type matte • No heat treatment after plating • 鍍錫層厚度12μm • 鍍錫層類型不光滑 • 鍍錫後無熱處理 • Plating thickness 10μm • Plating type matte • No heat treatment after plating • 鍍錫層厚度10μm • 鍍錫層類型不光滑 • 鍍錫後無熱處理			
		Insulating sleeve 膠管	No used 不使用	Replace PVC with PET (where customer designated) 將PVC更換為PET（若客戶指定）	
	Resistance to soldering heat 耐焊接熱	Please refer to page 23 "Soldering Conditions" 請查閱第23頁的“焊接條件”		Correspondence to 260°C wave soldering condition 對應260°C的波峰焊接條件	
	Solderability 可焊性	No difference with Sn-Pb 與鉛錫線相同			
	Tensile strength 抗拉強度	No difference with Sn-Pb 與鉛錫線相同			
Hexavalent chromium (Cr VI) 六價鉻		Not detected 未檢出			
Mercury (Hg) 汞					
Cadmium (Cd) 鎘					
PBBs 多溴聯苯					
PBDEs 多溴二苯醚					
HBDD 六溴環十二烷					
DBP 鄰苯二甲酸二丁酯					
BBP 鄰苯二甲酸丁苄酯					
DEHP 鄰苯二甲酸雙（2-乙基己）酯					
Identification for RoHS compliance products RoHS符合性產品的識別					Added "Pb free" and "RoHS" symbol on inner and outer carton label 外箱和內箱上印有"Pb free"和"RoHS"符號標識
MSL Level 濕度敏感水平 (IPC/JEDEC J-STD-020C)		Not applicable 不適用			

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ECO-FRIENDLY PRODUCTS 親環境產品

All our aluminum electrolytic capacitors are Lead-free and RoHS compliant. We can also provide Halogen-free products for your requirement. 所有的鋁電解電容器產品屬於無鉛及符合歐盟 RoHS 指令，我們也可按您的要求提供無鹵產品。

■ Non-PVC and Sleeveless Products 不含PVC及無膠管產品

Product Type 產品類型	Sleeve Material 膠管材質
Chip type 貼片式	Sleeveless (Coating case) 無膠管 (鍍層鋁殼)
Radial lead type (≤Ø18mm)* 引線式 (≤Ø18mm)*	Sleeveless (Coating case)* 無膠管 (鍍層鋁殼)*
Radial lead type 引線式	PET (Polyethylene Terephthalate) PET (聚對苯二甲酸乙二酯)
Snap-in terminal type 導箔式	PET (Polyethylene Terephthalate) PET (聚對苯二甲酸乙二酯)

*Please consult with our sales office when you need "Sleeveless Parts".

*如有需要“無膠管產品”，請與我們業務部門聯繫。

- The colour of PET sleeve are Green, Purple Blue, Yellow, Black, Light Purple and Brown (for radial lead and snap-in terminal type).
- Identification of eco-friendly parts is given by a supplement code (15th digit) of the part number (for radial lead and snap-in terminal type).
- For detail, please refer to "Explanation of Part Numbers" for each type.
- PET 膠管的顏色為綠色、藍紫色、黃色、黑色、淺紫色和褐色（適用於引線式及導箔式）。
- 親環境產品的識別是通過產品編碼的第 15 位代碼來區分（適用於引線式及導箔式）。
- 詳細說明請查閱“產品編碼規則”。

COMPLIANCE FOR EU REACH REGULATION 遵循歐盟REACH法規

[EU REACH Regulation (EC) 1907/2006]

- 1) Registration of Substance:
According to the content of REACH handbook (Guidance on requirements of substances in articles which is published on May 2008), our products are "articles without any intended release". Therefore they are not applicable for "Registration" for EU REACH Regulation Article 7(1).
 - 2) Correspondence with SVHC (Substances of Very High Concern):
Per the candidate list of SVHC-235 (Substances of Very High Concern) published 14 June 2023, we have reviewed these substances and certify all Fujicon products are not intentionally used, no exposure of this material to humans.
- For any questions or comments regarding REACH, please contact our sales office.

- 1) 物質的註冊：
根據 REACH 法規手冊內容（2008 年 5 月公佈的物品中物質的要求），我們的產品是“沒有任何有意釋放的物品”。因此，我們的產品不適用於歐盟 REACH 法規的第 7(1) 條的“註冊”。
 - 2) 對應 SVHC（高度關注物質）：
對於 2023 年 6 月 14 日公佈的 SVHC-235（高關注物質）的候選清單，我們已審閱這些物質並證明我們的產品並無使用，以及此材料不暴露於人體。
- 如對 REACH 有任何問題和意見，請與我們業務部門聯繫。

Contact our sales office for the following additional information: ● RoHS test reports ● REACH test reports ● PAHS/Halogen test reports ● Phthalates content test reports ● Material Safety Data Sheets (MSDS)	如有需要，請聯繫我們業務部門獲取以下附加訊息： ● RoHS 測試報告 ● REACH 測試報告 ● PAHS/鹵素測試報告 ● 鄰苯二甲酸鹽測試報告 ● 物質安全資料表 (MSDS)
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CASE SIZES AND WEIGHT RANGE 產品尺寸與重量

■ Chip Type Aluminum Electrolytic Capacitors 貼片式鋁電解電容器

Diameter × L (mm) 直徑 × 高度	Approx. Weight (g) 大約重量	Diameter × L (mm) 直徑 × 高度	Approx. Weight (g) 大約重量
4 × 5.4/5.8	0.23	10 × 13.5	1.85
5 × 5.4/5.8	0.37	12.5 × 13.5	2.49
6.3 × 5.4/5.8	0.49	12.5 × 16	2.87
6.3 × 7.7	0.59	16 × 16.5	5.50
8 × 10.5	1.37	18 × 16.5	8.00
10 × 10.5	1.70	18 × 18.5	9.10

■ Radial Lead Type Aluminum Electrolytic Capacitors 引線式鋁電解電容器

Diameter × L (mm) 直徑 × 高度	Approx. Weight (g) 大約重量	Diameter × L (mm) 直徑 × 高度	Approx. Weight (g) 大約重量	Diameter × L (mm) 直徑 × 高度	Approx. Weight (g) 大約重量
3 × 5	0.12	6.3 × 15	0.82	16 × 25	7.50
4 × 5	0.19	8 × 11.5	1.08	16 × 31	7.80
5 × 5	0.25	8 × 16	1.36	16 × 35	9.20
6.3 × 5	0.35	8 × 20	1.77	16 × 40	10.80
8 × 5	0.53	10 × 12	1.61	18 × 20	8.00
4 × 7	0.23	10 × 16	2.10	18 × 25	9.00
5 × 7	0.32	10 × 20	2.56	18 × 31	11.00
6.3 × 7	0.46	10 × 25	2.98	18 × 35	13.00
8 × 7	0.65	10 × 30	3.78	18 × 40	16.00
8 × 9	0.75	13 × 21	3.93	22 × 35	22.50
5 × 11	0.44	13 × 25	4.90	22 × 40	24.00
5 × 15	0.54	13 × 30	5.83	25 × 40	30.00
6.3 × 11.5	0.65	16 × 20	6.50		

■ Snap-in Terminal Type Aluminum Electrolytic Capacitors 導箔式鋁電解電容器

Diameter × L (mm) 直徑 × 高度	Approx. Weight (g) 大約重量	Diameter × L (mm) 直徑 × 高度	Approx. Weight (g) 大約重量	Diameter × L (mm) 直徑 × 高度	Approx. Weight (g) 大約重量
22 × 25	9	25 × 45	25	30 × 60	79
22 × 30	12	25 × 50	29	35 × 20	19
22 × 35	15	25 × 55	32	35 × 25	22
22 × 40	18	30 × 20	14	35 × 30	29
22 × 45	20	30 × 25	17	35 × 35	36
22 × 50	24	30 × 30	23	35 × 40	41
25 × 25	13	30 × 35	29	35 × 45	56
25 × 30	17	30 × 40	36	35 × 50	70
25 × 35	19	30 × 45	41	35 × 55	81
25 × 40	22	30 × 50	46	35 × 60	92

- There are some differences between actual weight, above information is for reference only.
- 以上的重量信息與實際重量會有差異，僅供參考。

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CAT.2024/V1.3

Conductive Polymer Aluminum Solid Electrolytic Capacitors (Chip & Radial Lead Type)
導電性高分子固態鋁電解電容器 (貼片式及引線式)

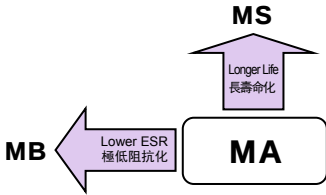


MA Series

CHIP TYPE, STANDARD

貼片式，標準品

- Operating with wide temperature range -55~+105°C
適用於 -55~+105°C 的寬溫範圍
- Low ESR, high ripple current
低阻抗，高紋波電流
- Endurance 2000 hours
耐久性 2000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH，無鹵

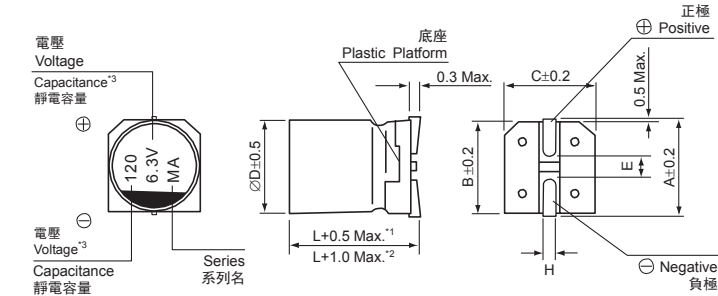


SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性														
Category Temperature Range 工作溫度範圍	-55 ~ +105°C														
Voltage Range 額定工作電壓範圍	2.5 ~ 25V														
Capacitance Range 靜電容量範圍	3.3 ~ 1500μF														
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C														
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值（在 20°C 環境中施加額定工作電壓 2 分鐘後）。														
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值（在 20°C 120Hz 環境下）。														
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值（在 20°C 100KHz 環境下）。														
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz <table><tr><td>Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td>Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)</td><td>≤1.25 ≤1.25</td></tr></table>			Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25									
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25													
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Endurance 耐久性	When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
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Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 22 for soldering conditions) (焊接條件請查閱第 22 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±10% of initial value 初始值的±10%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)		Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%		ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)														
Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%														
ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。														

- (*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定，在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。
- (*2) Should be measured at both of the terminal ends closest where the terminals protrude through the plastic platform.
測試應為靠近突出底座的兩個端子的末端。
- (*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



- *1. Applicable to Ø4~Ø8
*2. Applicable to Ø10 and above
*3. Capacitance ≥1000µF

Dimension table in next page.
尺寸表見下一頁。

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MA Series

DIMENSIONS 尺寸表 (Unit: mm)

∅D × L	4 × 5.5	5 × 6	6.3 × 5.5/6/6.5	8 × 7	8 × 12	10 × 8/10	10 × 12.7
A	5.0	6.0	7.3	9.0	9.0	11.0	11.0
B	4.3	5.3	6.6	8.3	8.3	10.3	10.3
C	4.3	5.3	6.6	8.3	8.3	10.3	10.3
E	1.0	1.6	2.1	3.2	3.2	4.6	4.6
L	5.5	6.0	5.5/6.0/6.5	7.0	12.0	8.0/10.0	12.7
H	0.5~0.8	0.5~0.8	0.5~0.8	0.8~1.1	0.8~1.1	0.8~1.1	0.8~1.1

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V)		2.5 (0E)					4 (0G)				
Cap. 容量 (μF)	Parameter 參數	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
33	330						4 × 5.5	0.12	26.4	200	700
100	101	6.3 × 6	0.12	50	22	2600	6.3 × 5.5 (6.3 × 6)	0.12 (0.12)	80 (80)	22 (22)	2600 (2600)
150	151						6.3 × 5.5 (5 × 6) (6.3 × 6)	0.12 (0.12) (0.12)	120 (120) (120)	22 (30) (22)	2800 (2000) (2800)
220	221	6.3 × 5.5 (6.3 × 6)	0.12 (0.12)	110 (110)	20 (20)	2800 (2800)	8 × 7	0.12	176	21	3200
330	331						8 × 7	0.12	264	21	3400
470	471	8 × 7	0.12	235	20	3300	10 × 8	0.12	376	17	4200
560	561						8 × 12	0.12	448	13	4520
680	681						10 × 8	0.12	544	17	4400
820	821	10 × 8	0.12	410	17	4400	10 × 10	0.12	656	13	4800
1200	122						10 × 12.7	0.12	960	10	5500
1500	152	10 × 10 (10 × 12.7)	0.12 (0.12)	750 (750)	13 (12)	4700 (5440)					

WV (V)		6.3 (0J)					10 (1A)				
Cap. 容量 (μF)	Parameter 參數	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
4.7	4R7						4 × 5.5	0.12	9.4	240	670
6.8	6R8						4 × 5.5	0.12	13.6	240	670
10	100						4 × 5.5	0.12	30	220	700
15	150						4 × 5.5	0.12	44	200	700
22	220	4 × 5.5	0.12	27.72	200	700					
33	330						5 × 6	0.12	66	35	1500
47	470	5 × 6	0.12	59.22	35	1600	5 × 6 (6.3 × 6)	0.12 (0.12)	94 (94)	26 (26)	2600 (2600)
56	560						6.3 × 5.5 (6.3 × 6)	0.12 (0.12)	112 (112)	25 (25)	2500 (2500)
82	820	6.3 × 5.5 (6.3 × 6)	0.12 (0.12)	103 (103)	23 (23)	2600 (2600)					
100	101	6.3 × 5.5 (5 × 6) (6.3 × 6)	0.12 (0.12) (0.12)	126 (126) (126)	23 (25) (23)	2800 (2200) (2800)					
120	121	6.3 × 6	0.12	151	23	3000	8 × 7	0.12	240	23	3000
150	151	8 × 7	0.12	189	22	3200	8 × 7 (10 × 8)	0.12 (0.12)	300 (300)	23 (21)	3200 (3300)
220	221	6.3 × 6.5 (8 × 7)	0.12 (0.12)	277 (277)	22 (22)	3200 (3400)					
270	271						8 × 12 (10 × 8)	0.12 (0.12)	540 (540)	13 (20)	4500 (3600)
330	331	10 × 8	0.12	416	18	4200	8 × 12 (10 × 8)	0.12 (0.12)	660 (660)	14 (20)	4000 (3700)
470	471	8 × 12 (10 × 8) (10 × 10)	0.12 (0.12) (0.12)	592 (592) (592)	12 (18) (16)	5300 (4300) (4600)	10 × 10 (10 × 12.7)	0.12 (0.12)	940 (940)	16 (12)	4600 (5300)
560	561						10 × 10 (10 × 12.7)	0.12 (0.12)	1120 (1120)	15 (13)	4800 (5230)
680	681	10 × 10 (10 × 12.7)	0.12 (0.12)	857 (857)	14 (10)	5000 (5500)					
820	821	10 × 12.7	0.12	1033	10	5800	10 × 10	0.12	1640	15	5300

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MA Series

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V)		16 (1C)					20 (1D)				
Cap. 容量 (μF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
3.3	3R3	4 × 5.5	0.12	10.56	260	660					
10	100						4 × 5.5	0.12	40	120	900
22	220	5 × 6	0.12	70.4	45	1210	6.3 × 5.5 (6.3 × 6)	0.12 (0.12)	88 (88)	50 (50)	1700 (1700)
33	330	6.3 × 6	0.12	106	31	2400					
39	390	6.3 × 5.5 (6.3 × 6)	0.12 (0.12)	125 (125)	31 (31)	2400 (2400)	8 × 7	0.12	156	45	2000
47	470						8 × 7	0.12	188	45	2000
56	560	8 × 7	0.12	179	30	2900	10 × 8	0.12	224	40	2400
68	680						10 × 8	0.12	272	40	2600
82	820	8 × 7	0.12	262	28	3200	10 × 8	0.12	328	40	2600
100	101	10 × 8	0.12	320	27	3300	8 × 12	0.12	400	22	3200
120	121						10 × 10	0.12	480	35	2800
150	151	10 × 8 (6.3 × 6.5)	0.12 (0.12)	480 (480)	25 (30)	3500 (2900)	10 × 12.7	0.12	600	20	4320
180	181	8 × 12 (10 × 8)	0.12 (0.12)	576 (576)	16 (25)	4400 (3600)					
220	221	10 × 10 (10 × 12.7)	0.12 (0.12)	704 (704)	20 (14)	3900 (5050)					
330	331	10 × 12.7	0.12	1056	14	5000					

WV (V)		25 (1E)				
Cap. 容量 (μF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
6.8	6R8	6.3 × 6	0.12	34	80	1200
10	100	8 × 7	0.12	50	60	1600
22	220	10 × 8	0.12	110	50	2200
33	330	8 × 12	0.12	165	30	2800
47	470	6.3 × 6 (8 × 12)	0.12 (0.12)	235 (235)	50 (30)	2000 (3000)
56	560	10 × 12.7	0.12	280	28	3800
100	101	8 × 7	0.12	500	25	3000

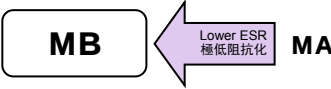
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 16 for the Part Number System. 產品編碼規則請查閱第 16 頁。

MB Series

CHIP TYPE, HIGHER CAPACITANCE

貼片式，大容量品

- Operating with wide temperature range -55~+105°C
適用於 -55~+105°C 的寬溫範圍
- Higher capacitance, ultra-low ESR, high ripple current
更大容量，極低阻抗，高紋波電流
- Endurance 2000 hours
耐久性 2000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH，無鹵

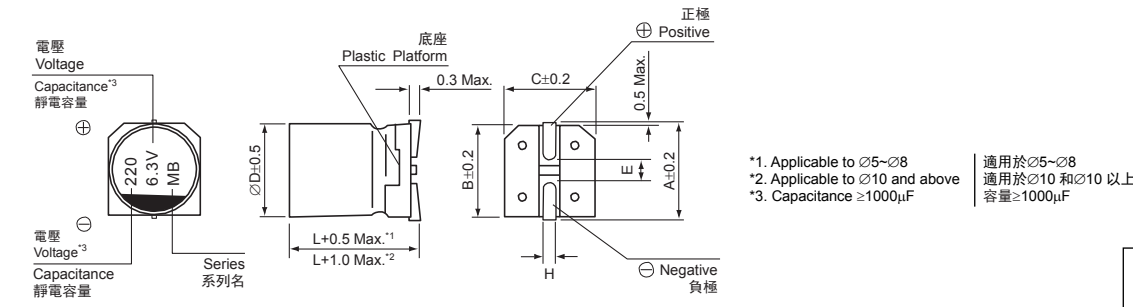


SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性														
Category Temperature Range 工作溫度範圍	-55 ~ +105°C														
Voltage Range 額定工作電壓範圍	2.5 ~ 18V														
Capacitance Range 靜電容量範圍	56 ~ 2200µF														
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C														
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值 (在 20°C 環境中施加額定工作電壓 2 分鐘後)。														
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。														
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。														
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz <table><tr><td>Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td>Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)</td><td>≤1.25 ≤1.25</td></tr></table>			Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25									
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25													
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
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Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Endurance 耐久性	When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 22 for soldering conditions) (焊接條件請查閱第 22 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±10% of initial value 初始值的±10%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)		Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%		ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)														
Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%														
ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。														

- (*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定，在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。
- (*2) Should be measured at both of the terminal ends closest where the terminals protrude through the plastic platform.
測試應為靠近突出底座的兩個端子的末端。
- (*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



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注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

MB Series

DIMENSIONS 尺寸表 (Unit: mm)

ØD × L	5 × 5.5/5.7/5.8	5 × 8/9	6.3 × 4.2/5/5.8	6.3/6 × 6/6.5/6.7	6.3/6 × 7/7.7/8/9	8 × 6.7/7/7.7/9	10 × 10	10 × 12/12.5/13/13.5	12 × 13.5
A	6.0	6.0	7.3	7.3	7.3	9.0	11.0	11.0	11.0
B	5.3	5.3	6.6	6.6	6.6	8.3	10.3	10.3	10.3
C	5.3	5.3	6.6	6.6	6.6	8.3	10.3	10.3	10.3
E	1.6	1.6	2.1	2.1	2.1	3.2	4.6	4.6	4.6
L	5.5/5.7/5.8	8.0/9.0	4.2/5.0/5.8	6.0/6.5/6.7	7.0/7.7/8.0/9.0	6.7/7.0/7.7/9.0	10.0	12.0/12.5/13.0/13.5	13.5
H	0.5~0.8	0.5~0.8	0.5~0.8	0.5~0.8	0.5~0.8	0.8~1.2	0.8~1.2	0.8~1.2	0.8~1.2

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V)		2.5 (0E)					4 (0G)				
Cap. 容量 (µF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
150	151						5 × 5.8	0.12	120	12	3500
220	221						5 × 5.8 (6.3 × 5.8)	0.12 (0.12)	176 (176)	12 (10)	3500 (3900)
270	271						6.3 × 7.7	0.12	216	9	4200
330	331	5 × 5.8	0.12	165	10	3900	6.3 × 5.8 (6.3 × 7) (6.3 × 7.7)	0.12 (0.12) (0.12)	264 (264) (264)	10 (10) (9)	3900 (4500) (4200)
390	391	5 × 5.8 (6.3 × 5.8)	0.12 (0.12)	195 (195)	10 (10)	3900 (3900)	6.3 × 7	0.12	312	10	4500
470	471	6.3 × 7.7	0.12	235	9	4200	6 × 6.7 (8 × 7.7)	0.12 (0.12)	376 (376)	10 (9)	4500 (4500)
560	561	6.3 × 6 (6.3 × 5.8) (6.3 × 7.7)	1.12 (0.12) (0.12)	280 (280) (280)	10 (9) (10)	3900 (4200) (4500)	6 × 6.7 (8 × 7.7)	0.12 (0.12)	448 (448)	10 (9)	4500 (4500)
680	681	6.3 × 7	0.12	340	10	4500	8 × 7.7	0.12	544	9	4500
1000	102	8 × 7.7	0.12	500	9	4500					
2200	222						10 × 12.5	0.12	1760	13	4600

WV (V)		6.3 (0J)					10 (1A)				
Cap. 容量 (µF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
56	560						6.3 × 6	0.12	112	28	2550
68	680						5 × 5.7	0.12	136	27	2000
100	101	5 × 5.5	0.12	126	25	2200	6.3 × 5.5	0.12	200	25	2600
120	121						6.3 × 5.8 (5 × 5.8)	0.12 (0.12)	240 (240)	25 (22)	2600 (2600)
150	151						6.3 × 6.5	0.12	300	20	2800
220	221	5 × 5.8 (6.3 × 4.2) (6.3 × 5) (6.3 × 5.7) (6.3 × 6)	0.12 (0.12) (0.12) (0.12) (0.12)	277 (277) (277) (277) (277)	16 (18) (16) (18) (16)	3400 (3200) (3400) (3400) (3400)	6.3 × 6 (6.3 × 6.5) (6.3 × 7.7)	0.12 (0.12) (0.12)	440 (440) (440)	20 (20) (20)	2900 (2900) (2800)
270	271	5 × 8 (5 × 9)	0.12 (0.12)	340 (340)	16 (16)	3000 (3000)	6.3 × 5.8	0.12	540	20	2800
330	331	6.3 × 6.5	0.12	416	12	3950	8 × 7.7	0.12	660	17	3390
390	391	8 × 6.7	0.12	491	14	3950					
470	471	6.3 × 7.7 (6.3 × 9) (8 × 7)	0.12 (0.12) (0.12)	592 (592) (592)	12 (12) (9)	3950 (3450) (4500)	8 × 9	0.12	940	18	3200
560	561	6.3 × 6 (6.3 × 9)	0.12 (0.12)	706 (706)	10 (10)	4500 (4500)					
1000	102	8 × 12	0.12	1260	10	5100					
1500	152	10 × 10	0.12	1890	9	5600					
2200	222	10 × 13	0.12	2772	10	6100					

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MB Series

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

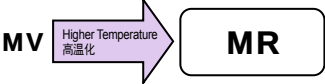
WV (V)		16 (1C)					18 (1Z)				
Cap. 容量 (μF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
100	101	6.3 × 5.7 (6.3 × 6) (6.3 × 6.5) (6.3 × 8)	0.12 (0.12) (0.12) (0.12)	320 (320) (320) (320)	24 (24) (24) (22)	2500 (2500) (2500) (2500)					
180	181	6.3 × 5.8	0.12	576	22	3300					
220	221	6.3 × 7.7 (6.3 × 9) (8 × 9)	0.12 (0.12) (0.12)	704 (704) (704)	22 (20) (16)	3300 (3500) (3800)					
270	271	8 × 6.7 (8 × 9)	0.12 (0.12)	864 (864)	22 (20)	3300 (3800)					
330	331	8 × 7.7	0.12	1056	21	3400					
470	471	10 × 12	0.12	1504	11	5200					
1000	102	10 × 12	0.12	3200	10	5800	10 × 12.5	0.08	3600	9	5500
1500	152						10 × 13.5	0.08	5400	9	5800
2200	222						12 × 13.5	0.08	7920	9	8200

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 16 for the Part Number System. 產品編碼規則請查閱第 16 頁。

MR Series

CHIP TYPE, 125°C HIGH TEMPERATURE
貼片式, 125°C 高溫品

- Operating with wide temperature range -55~+125°C
適用於 -55~+125°C 的寬溫範圍
- High reliability, low ESR, high ripple current
高可靠, 低阻抗, 高紋波電流
- Endurance 1500~3000 hours
耐久性 1500~3000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH, 無鹵



SPECIFICATIONS 特性表

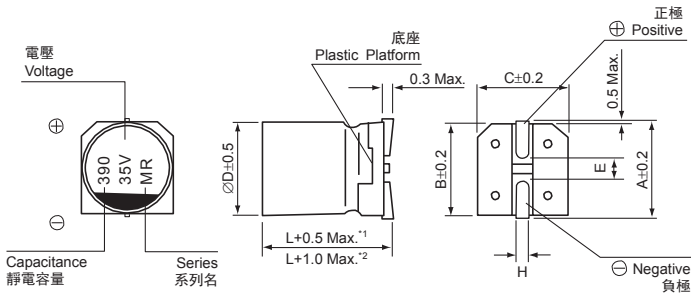
Items 項目	Characteristics 主要特性		
Category Temperature Range 工作溫度範圍	-55 ~ +125°C		
Voltage Range 額定工作電壓範圍	16 ~ 50V		
Capacitance Range 靜電容量範圍	5.6 ~ 470µF		
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C		
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值（在 20°C 環境中施加額定工作電壓 2 分鐘後）。		
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值（在 20°C 120Hz 環境下）。		
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值（在 20°C 100KHz 環境下）。		
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz		
	Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+125°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。		
	Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)	
	Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%	
	ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%	
	Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Endurance 耐久性	When the capacitors are restored to 20°C after 3000 hours (1500 hours for Ø6.3) application of the rated voltage at 125°C, they meet the characteristics listed below. 在 125°C 環境中施加額定工作電壓 3000 小時（Ø6.3 為 1500 小時）後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。		
	Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)	
	Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%	
	ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%	
	Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 22 for soldering conditions) (焊接條件請查閱第 22 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。		
	Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)	
	Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%	
	ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%	
	Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。		

(*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定, 在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。

(*2) Should be measured at both of the terminal ends closest where the terminals protrude through the plastic platform.
測試應為靠近突出底座的兩個端子的末端。

(*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



*1. Applicable to Ø6.3 and Ø8 適用於Ø6.3和Ø8
*2. Applicable to Ø10 and above 適用於Ø10和Ø10以上

Dimension table in next page.
尺寸表見下一頁。

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MR Series

DIMENSIONS 尺寸表 (Unit: mm)

ØD × L	6.3 × 6/7.7/8/9	8 × 7/7.5	8 × 10/10.5	8 × 12/12.5	10 × 8/10/10.5	10 × 12/12.5/12.7
A	7.3	9.0	9.0	9.0	11.0	11.0
B	6.6	8.3	8.3	8.3	10.3	10.3
C	6.6	8.3	8.3	8.3	10.3	10.3
E	2.1	3.2	3.2	3.2	4.6	4.6
L	6.0/7.7/8.0/9.0	7.0/7.5	10.0/10.5	12.0/12.5	8.0/10.0/10.5	12.0/12.5/12.7
H	0.5~0.8	0.8~1.2	0.8~1.2	0.8~1.2	0.8~1.2	0.8~1.2

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

Cap. 容量 (μF)		WV (V) Parameter 參數		16 (1C)				20 (1D)							
				Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 紋波電流	
								≤105°C (3)	105°C≤125°C (3)					≤105°C (3)	105°C≤125°C (3)
33	330							6.3 × 6	0.12	132	60	900	380		
47	470	6.3 × 6	0.12	150	55	1000	390								
56	560							8 × 7 (8 × 7.5)	0.12 (0.12)	224 (224)	50 (50)	1300 (1300)	500 (500)		
68	680							6.3 × 8	0.12	272	34	1450	470		
82	820	8 × 7 (8 × 7.5)	0.12 (0.12)	262 (262)	45 (45)	1300 (1300)	530 (530)								
100	101	6.3 × 6 (6.3 × 8)	0.12 (0.12)	320 (320)	33 (33)	1500 (1500)	460 (460)								
120	121							8 × 10 (8 × 10.5) (10 × 8)	0.12 (0.12) (0.12)	480 (480) (480)	29 (29) (35)	1900 (1900) (1800)	770 (770) (810)		
150	151	8 × 10 (10 × 8)	0.12 (0.12)	480 (480)	28 (33)	2000 (1900)	780 (830)	8 × 12	0.12	600	28	2200	860		
180	181							10 × 10 (10 × 10.5)	0.12 (0.12)	720 (720)	28 (28)	2300 (2300)	800 (800)		
220	221	8 × 12	0.12	704	27	2300	870								
270	271	10 × 10 (10 × 10.5)	0.12 (0.12)	864 (864)	27 (27)	2300 (2300)	830 (830)	10 × 12.7	0.12	1080	27	2700	1020		
390	391	10 × 12.7	0.12	1248	26	2700	1040								

Cap. 容量 (μF)		Parameter 参数	WV (V)		25 (1E)						35 (1V)					
			Case size ØDxL (mm) 尺寸	Dissipation factor (tan δ) 损耗角正切	Leakage current (μA) 漏电流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 纹波电流		Case size ØDxL (mm) 尺寸	Dissipation factor (tan δ) 损耗角正切	Leakage current (μA) 漏电流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 纹波电流			
							≤105°C (3)	105°C≤125°C (3)					≤105°C (3)	105°C≤125°C (3)		
10	100								6.3 × 6	0.12	70	85	800	310		
18	180								8 × 7 (8 × 7.5)	0.12 (0.12)	126 (126)	60 (60)	1100 (1100)	450 (450)		
22	220		6.3 × 6	0.12	110	65	900	360								
27	270								6.3 × 8	0.12	189	45	1300	450		
39	390		8 × 7 (8 × 7.5)	0.12 (0.12)	195 (195)	55 (55)	1200 (1200)	480 (480)	8 × 10 (8 × 10.5) (10 × 8)	0.12 (0.12) (0.12)	273 (273) (273)	35 (35) (41)	1800 (1800) (1700)	700 (700) (750)		
56	560		6.3 × 8	0.12	280	35	1400	450	8 × 12	0.12	392	33	2000	780		
68	680								10 × 10 (10 × 10.5)	0.12 (0.12)	476 (476)	30 (30)	2200 (2200)	740 (740)		
82	820		8 × 10 (8 × 10.5) (10 × 8)	0.12 (0.12) (0.12)	410 (410) (410)	30 (30) (36)	1900 (1900) (1800)	760 (760) (800)								
100	101		6.3 × 7.7	0.12	500	32	1800	800	6.3 × 7.7	0.12	700	30	1800	700		
120	121		8 × 12 (10 × 10.5)	0.12 (0.12)	600 (600)	29 (29)	2200 (2200)	850 (850)								
180	181		10 × 12.7	0.12	900	28	2600	1010								
220	221		6.3 × 9	0.12	1100	40	2800	1150	8 × 12.5	0.12	1540	24	4500	2000		
470	471		10 × 12	0.12	2350	28	4300	1680								

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MR Series

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

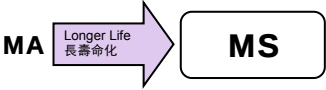
WV (V)		50 (1H)					
Cap. 容量 (μF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 紋波電流	
						≤105°C (3)	105°C≤125°C (3)
5.6	5R6	6.3 × 6	0.12	56	105	700	280
10	100	8 × 7 (8 × 7.5)	0.12 (0.12)	100 (100)	75 (75)	1000 (1000)	410 (410)
12	120	6.3 × 8	0.12	120	65	1100	380
22	220	8 × 10 (8 × 10.5) (10 × 8)	0.12 (0.12) (0.12)	220 (220) (220)	37 (37) (56)	1700 (1700) (1400)	680 (680) (730)
27	270	8 × 12	0.12	270	35	2000	760
33	330	10 × 10 (10 × 10.5)	0.12 (0.12)	330 (330)	31 (31)	2200 (2200)	630 (630)
47	470	10 × 12.7	0.12	470	30	2500	970
220	221	10 × 12.5	0.12	2200	44	4200	1620

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 16 for the Part Number System. 產品編碼規則請查閱第 16 頁。

MS Series

CHIP TYPE, LONG LIFE
貼片式，長壽命品

- Operating with wide temperature range -55~+105°C
適用於 -55~+105°C 的寬溫範圍
- Long life assurance
長壽命
- Endurance 5000 hours
耐久性 5000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

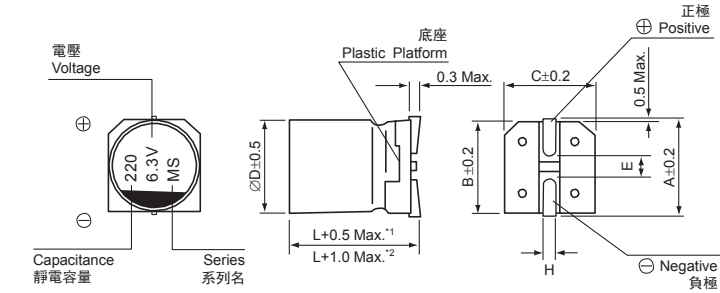
Items 項目	Characteristics 主要特性														
Category Temperature Range 工作溫度範圍	-55 ~ +105°C														
Voltage Range 額定工作電壓範圍	4 ~ 50V														
Capacitance Range 靜電容量範圍	22 ~ 560μF														
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C														
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值（在 20°C 環境中施加額定工作電壓 2 分鐘後）。														
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值（在 20°C 120Hz 環境下）。														
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值（在 20°C 100KHz 環境下）。														
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz <table><tr><td>Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td>Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)</td><td>≤1.25 ≤1.25</td></tr></table>			Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25									
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25													
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Endurance 耐久性	When the capacitors are restored to 20°C after 5000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 5000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 22 for soldering conditions) (焊接條件請查閱第 22 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±10% of initial value 初始值的±10%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)		Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%		ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)														
Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%														
ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。														

(*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定，在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。

(*2) Should be measured at both of the terminal ends closest where the terminals protrude through the plastic platform.
測試應為靠近突出底座的兩個端子的末端。

(*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



*1. Applicable to Ø5~Ø8 適用於Ø5~Ø8
*2. Applicable to Ø10 and above 適用於Ø10 和Ø10 以上

Dimension table in next page.
尺寸表見下一頁。

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MS Series

DIMENSIONS 尺寸表 (Unit: mm)

∅D × L	5 × 6	6.3 × 6/6.5	6.3 × 7/7.7	6.3 × 9.5	8 × 7	8 × 12	10 × 12
A	6.0	7.3	7.3	7.3	9.0	9.0	10.0
B	5.3	6.6	6.6	6.6	8.3	8.3	10.3
C	5.3	6.6	6.6	6.6	8.3	8.3	10.3
E	1.6	2.1	2.1	2.1	3.2	3.2	4.6
L	6.0	6.0/6.5	7.0/7.7	9.5	7.0	12.0	12.0
H	0.5~0.8	0.5~0.8	0.5~0.8	0.5~0.8	0.8~1.1	0.8~1.2	0.8~1.2

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V)		4 (0G)					6.3 (0J)				
Cap. 容量 (μF)	Parameter 參數	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
47	470						5 × 6	0.12	59.22	35	1600
100	101						5 × 6 (6.3 × 6)	0.12 (0.12)	126 (126)	25 (22)	2400 (2800)
120	121						6.3 × 6	0.12	151	22	2800
150	151	5 × 6	0.12	120	25	2200					
220	221						6.3 × 6 (8 × 7)	0.12 (0.12)	277 (277)	20 (22)	2800 (3200)
330	331	6.3 × 6 (8 × 7)	0.12 (0.12)	264 (264)	20 (22)	2800 (3200)	6.3 × 6.5	0.12	416	20	3000
390	391						8 × 7	0.12	491	22	3200
470	471						6.3 × 9.5	0.12	592	18	3200
560	561	8 × 7	0.12	448	18	3600					

WV (V)		10 (1A)					16 (1C)				
Cap. 容量 (μF)	Parameter 參數	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
22	220						5 × 6	0.12	70.4	45	1100
33	330	5 × 6	0.12	66	40	1300					
39	390						5 × 6 (6.3 × 6)	0.12 (0.12)	125 (125)	35 (30)	2000 (2200)
56	560	6.3 × 6	0.12	112	27	2300					
68	680	5 × 6	0.12	136	30	2100	6.3 × 6	0.12	218	30	2200
82	820						8 × 7	0.12	262	28	2800
120	121	6.3 × 6	0.12	240	27	2300	8 × 7	0.12	384	28	2800
150	151	8 × 7	0.12	300	30	2600					
220	221	6.3 × 7	0.12	440	22	2800	6.3 × 7.7	0.12	704	30	2800
270	271	6.3 × 7.7 (8 × 7)	0.12 (0.12)	540 (540)	22 (22)	3000 (3200)					

WV (V)		25 (1E)					35 (1V)				
Cap. 容量 (μF)	Parameter 參數	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
22	220						6.3 × 5.9	0.12	154	35	2600
82	820						8 × 12	0.12	574	29	2200
100	101	6.3 × 7.7 (6.3 × 9.5)	0.12 (0.12)	500 (500)	32 (32)	2600 (2900)					
150	151						8 × 12 (10 × 12)	0.12 (0.12)	1050 (1050)	28 (28)	2500 (2600)
180	181	8 × 12	0.12	900	16	4650					

WV (V)		50 (1H)				
Cap. 容量 (μF)	Parameter 參數	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
39	390	8 × 12	0.12	390	25	3800
68	680	10 × 12	0.12	680	20	4300

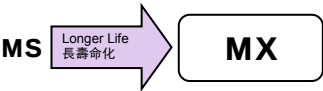
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
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MX Series

CHIP TYPE, ULTRA LONG LIFE
貼片式，超長壽命品

- Operating with wide temperature range -55~+105°C
適用於 -55~+105°C 的寬溫範圍
- Ultra-low ESR, High Ripple Current
超低阻抗，高紋波電流
- Endurance 20000 hours
耐久性 20000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

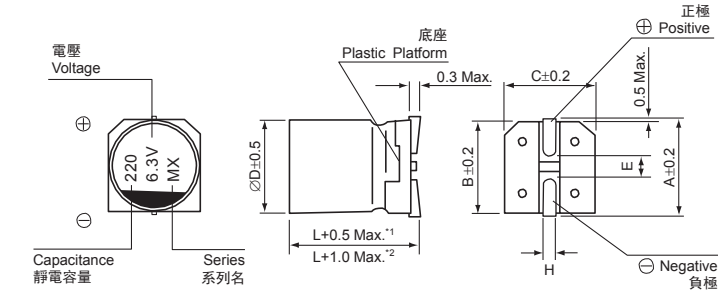
Items 項目	Characteristics 主要特性														
Category Temperature Range 工作溫度範圍	-55 ~ +105°C														
Voltage Range 額定工作電壓範圍	4 ~ 20V														
Capacitance Range 靜電容量範圍	22 ~ 560μF														
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C														
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值（在 20°C 環境中施加額定工作電壓 2 分鐘後）。														
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值（在 20°C 120Hz 環境下）。														
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值（在 20°C 100KHz 環境下）。														
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz <table><tr><td>Impedance Ratio 阻抗比</td><td>Z(+105°C)/Z(20°C)</td><td>≤1.25</td></tr><tr><td>ZT/Z20 (max.)</td><td>Z(-55°C)/Z(20°C)</td><td>≤1.25</td></tr></table>			Impedance Ratio 阻抗比	Z(+105°C)/Z(20°C)	≤1.25	ZT/Z20 (max.)	Z(-55°C)/Z(20°C)	≤1.25						
Impedance Ratio 阻抗比	Z(+105°C)/Z(20°C)	≤1.25													
ZT/Z20 (max.)	Z(-55°C)/Z(20°C)	≤1.25													
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Endurance 耐久性	When the capacitors are restored to 20°C after 20000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 20000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 22 for soldering conditions) (焊接條件請查閱第 22 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±10% of initial value 初始值的±10%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)		Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%		ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)														
Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%														
ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。														

(*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定，在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。

(*2) Should be measured at both of the terminal ends closest where the terminals protrude through the plastic platform.
測試應為靠近突出底座的兩個端子的末端。

(*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



*1. Applicable to Ø5~Ø8 適用於 Ø5~Ø8
*2. Applicable to Ø10 and above 適用於 Ø10 和 Ø10 以上

Dimension table in next page.
尺寸表見下一頁。

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MX Series

DIMENSIONS 尺寸表 (Unit: mm)

ØD × L	5 × 6	6.3 × 6/7.7	8 × 7/8	8 × 12
A	6.0	7.3	9.0	9.0
B	5.3	6.6	8.3	8.3
C	5.3	6.6	8.3	8.3
E	1.6	2.1	3.2	3.2
L	6.0	6.0/7.7	7.0/8.0	12.0
H	0.5~0.8	0.5~0.8	0.8~1.2	0.8~1.2

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V)		4 (0G)					6.3 (0J)				
Cap. 容量 (µF)		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
47	470						5 × 6	0.12	59.22	35	1600
100	101						5 × 6 (6.3 × 6)	0.12 (0.12)	126 (126)	25 (22)	2400 (2800)
120	121										
150	151	5 × 6	0.12	120	25	2200	6.3 × 6	0.12	189	22	2800
220	221						6.3 × 6 (8 × 7)	0.12 (0.12)	277 (277)	20 (22)	2800 (3200)
330	331	6.3 × 6 (8 × 7)	0.12 (0.12)	264 (264)	20 (22)	2800 (3200)	6.3 × 7.7	0.12	416	22	3200
390	391						8 × 7	0.12	491	22	3200
560	561	8 × 7	0.12	448	18	3600					

WV (V)		10 (1A)					16 (1C)				
Cap. 容量 (µF)		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
22	220						5 × 6	0.12	70.4	45	1100
33	330	5 × 6	0.12	66	40	1300					
39	390						5 × 6 (6.3 × 6)	0.12 (0.12)	125 (125)	35 (30)	2000 (2200)
56	560	6.3 × 6	0.12	112	27	2300					
68	680	5 × 6	0.12	136	30	2100	6.3 × 6	0.12	218	30	2200
82	820						8 × 7	0.12	262	28	2800
120	121	5 × 5.8 (6.3 × 6)	0.12 (0.12)	240 (240)	27 (27)	2300 (2300)	8 × 7	0.12	384	28	2800
150	151	8 × 7	0.12	300	30	2600					
220	221						8 × 8	0.12	704	28	3000
270	271	8 × 7	0.12	540	22	3200					

WV (V)		20 (1D)				
Cap. 容量 (µF)		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
390	391	8 × 12	0.12	1560	14	4950
560	561	10 × 10	0.12	2240	18	4100

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 16 for the Part Number System. 產品編碼規則請查閱第 16 頁。

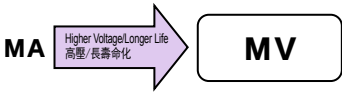
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MV Series

CHIP TYPE, HIGH VOLTAGE/LONG LIFE

貼片式，高壓長壽命品

- Operating with wide temperature range -55~+105°C
適用於 -55~+105°C 的寬溫範圍
- High voltage, low ESR, high ripple current
高電壓，低阻抗，高紋波電流
- Endurance 3000 hours
耐久性 3000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

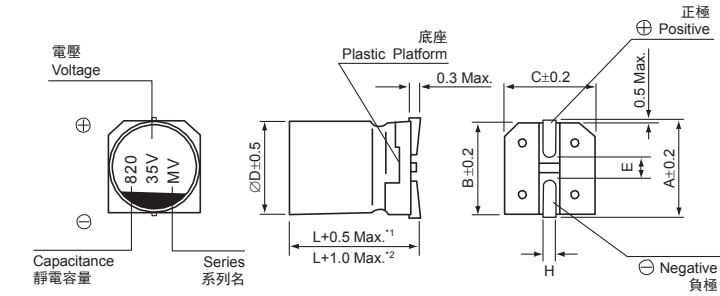
Items 項目	Characteristics 主要特性														
Category Temperature Range 工作溫度範圍	-55 ~ +105°C														
Voltage Range 額定工作電壓範圍	16 ~ 125V														
Capacitance Range 靜電容量範圍	5.6 ~ 680μF														
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C														
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值 (20°C 環境中施加額定工作電壓 2 分鐘後)。														
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。														
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。														
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz <table><tr><td>Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td>Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)</td><td>≤1.25 ≤1.25</td></tr></table>			Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25									
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25													
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Endurance 耐久性	When the capacitors are restored to 20°C after 3000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 3000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 22 for soldering conditions) (焊接條件請查閱第 22 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±10% of initial value 初始值的±10%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)		Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%		ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)														
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ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。														

(*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定，在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。

(*2) Should be measured at both of the terminal ends closest where the terminals protrude through the plastic platform.
測試應為靠近突出底座的兩個端子的末端。

(*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



*1. Applicable to Ø6.3 and Ø8 適用於Ø6.3和Ø8
*2. Applicable to Ø10 and above 適用於Ø10和Ø10以上

Dimension table in next page.
尺寸表見下一頁。

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MV Series

DIMENSIONS 尺寸表 (Unit: mm)

ØD × L	6.3 × 4/4.2	6.3 × 6/6.5	6.3 × 7.7/9	8 × 7/9/10	8 × 12/12.5	10 × 8/10/10.5	10 × 12.5/13
A	7.3	7.3	7.3	9.0	9.0	11.0	11.0
B	6.6	6.6	6.6	8.3	8.3	10.3	10.3
C	6.6	6.6	6.6	8.3	8.3	10.3	10.3
E	2.1	2.1	2.1	3.2	3.2	4.6	4.6
L	4.0/4.2	6.0/6.5	7.7/9.0	7.0/9.0/10.0	12.0/12.5	8.0/10.0/10.5	12.5/13.0
H	0.5~0.8	0.5~0.8	0.5~0.8	0.8~1.2	0.8~1.2	0.8~1.2	0.8~1.2

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V) Parameter 參數 Cap. 容量 (µF)		16 (1C)					20 (1D)				
		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
47	470						6.3 × 6	0.12	188	55	1000
56	560	6.3 × 6	0.12	179	50	1000	6.3 × 6	0.12	224	48	1300
68	680						8 × 7	0.12	272	45	1300
82	820	6.3 × 6	0.12	262	47	1300					
100	101	8 × 7	0.12	320	36	1500	8 × 7	0.12	400	42	1400
150	151	8 × 7	0.12	480	34	1700	8 × 10 (10 × 8)	0.12 (0.12)	600 (600)	28 (33)	2000 (1900)
180	181						10 × 8	0.12	720	25	3100
220	221	8 × 10 (10 × 8)	0.12 (0.12)	704 (704)	27 (31)	2000 (2000)	8 × 10 (8 × 12)	0.12 (0.12)	880 (880)	22 (27)	3700 (2300)
270	271	8 × 10 (8 × 12) (10 × 8)	0.12 (0.12) (0.12)	864 (864) (864)	21 (26) (24)	3800 (2300) (3200)	8 × 12 (10 × 10)	0.12 (0.12)	1080 (1080)	21 (27)	4000 (2300)
330	331	10 × 10	0.12	1056	26	2400	10 × 10 (10 × 12.5)	0.12 (0.12)	1320 (1320)	22 (26)	3800 (2700)
390	391	8 × 12	0.12	1248	20	4100					
470	471	10 × 10 (8 × 12)	0.12 (0.12)	1504 (1504)	21 (25)	3900 (2800)	10 × 12.5	0.12	1880	20	4300
680	681	10 × 12.5	0.12	2176	19	4400					

WV (V) Parameter 參數 Cap. 容量 (µF)		25 (1E)					35 (1V)				
		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
18	180						6.3 × 6	0.12	126	64	900
22	220						6.3 × 4.2 (6.3 × 6) (6.3 × 9)	0.12 (0.12) (0.12)	154 (154) (154)	60 (50) (50)	1100 (1300) (1200)
27	270						8 × 7	0.12	189	55	1200
33	330	6.3 × 6	0.12	165	60	1000					
39	390						8 × 7	0.12	273	52	1400
47	470	6.3 × 4 (6.3 × 6)	0.12 (0.12)	235 (235)	58 (49)	1200 (1300)	6.3 × 6.5 (6.3 × 9)	0.12 (0.12)	329 (329)	50 (49)	1500 (1600)
56	560	6.3 × 6.5 (8 × 7)	0.12 (0.12)	280 (280)	70 (50)	1700 (1300)	6.3 × 6.5 (8 × 10)	0.12 (0.12)	392 (392)	49 (31)	1600 (1900)
68	680						10 × 8	0.12	476	37	1800
82	820	8 × 7	0.12	410	47	1400	8 × 10 (8 × 12) (10 × 8)	0.12 (0.12) (0.12)	574 (574) (574)	24 (29) (27)	3600 (2200) (3000)
100	101	6.3 × 4 (6.3 × 5.7) (6.3 × 6.5) (6.3 × 7.7) (8 × 9)	0.12 (0.12) (0.12) (0.12) (0.12)	500 (500) (500) (500) (500)	35 (35) (35) (35) (29)	1400 (1400) (1400) (1400) (1900)	6.3 × 7.7 (6.3 × 9) (6.3 × 12) (8 × 9)	0.12 (0.12) (0.12) (0.12)	700 (700) (700) (700)	35 (35) (29) (27)	1450 (1450) (2850) (3600)
120	121	8 × 9 (8 × 10) (10 × 8)	0.12 (0.12) (0.12)	600 (600) (600)	29 (35) (35)	1900 (1900) (1800)	8 × 12 (10 × 10)	0.12 (0.12)	840 (840)	23 (24)	3800 (3700)
150	151	8 × 10 (8 × 12) (10 × 8)	0.12 (0.12) (0.12)	750 (750) (750)	23 (28) (26)	3600 (2200) (3000)	8 × 9 (10 × 12.5)	0.12 (0.12)	1050 (1050)	23 (28)	2400 (2600)
180	181	10 × 10	0.12	900	28	2300	10 × 12.5	0.12	1260	22	4100
220	221	6.3 × 9 (6.3 × 6.5) (8 × 12)	0.12 (0.12) (0.12)	1100 (1100) (1100)	26 (22) (22)	3000 (3800) (3800)	8 × 9 (8 × 12) (10 × 12.5)	0.12 (0.12) (0.12)	1540 (1540) (1540)	30 (22) (20)	2800 (2800) (4500)
270	271	10 × 10 (10 × 12.5)	0.12 (0.12)	1350 (1350)	23 (27)	3700 (2700)	10 × 10.5	0.12	1890	20	4500
330	331	8 × 12 (10 × 10.5) (10 × 12.5)	0.12 (0.12) (0.12)	1650 (1650) (1650)	26 (25) (25)	4800 (5000) (5000)	8 × 12 (10 × 10.5)	0.12 (0.12)	1540 (1540)	22 (20)	4100 (4500)
390	391	10 × 12.5	0.12	1950	21	4200					
470	471	8 × 12 (10 × 13)	0.12 (0.12)	2350 (2350)	20 (9)	4100 (6100)	10 × 12.5	0.12	3290	20	5900
560	561	10 × 10.5	0.12	2800	21	4500					
680	681	8 × 12.5 (10 × 12.5)	0.12 (0.12)	3400 (3400)	16 (16)	5600 (5600)					

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注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

MV Series

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V)		50 (1H)					63 (1J)				
Cap. 容量 (μF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
5.6	5R6						6.3 × 6	0.12	71	105	700
8.2	8R2	6.3 × 6	0.12	82	81	800	6.3 × 6	0.12	103	56	1200
10	100	6.3 × 4.2	0.12	100	75	1100	8 × 7	0.12	126	75	1000
12	120	6.3 × 6	0.12	120	55	1200	8 × 7	0.12	151	70	1100
15	150	8 × 7	0.12	150	63	1100					
22	220	8 × 7	0.12	220	60	1300	8 × 10 (10 × 8)	0.12 (0.12)	277 (277)	37 (56)	1700 (1400)
27	270						8 × 10 (8 × 12) (10 × 8)	0.12 (0.12) (0.12)	340 (340) (340)	30 (35) (38)	3200 (2000) (2500)
33	330	8 × 10 (10 × 8)	0.12 (0.12)	330 (330)	36 (49)	1700 (1500)	10 × 10	0.12	416	31	2200
39	390	8 × 12	0.12	390	34	2000	8 × 12	0.12	491	29	3400
47	470	8 × 9 (8 × 10) (10 × 8)	0.12 (0.12) (0.12)	470 (470) (470)	29 (29) (37)	3300 (3300) (2600)	8 × 12 (10 × 10) (10 × 12.5)	0.12 (0.12) (0.12)	592 (592) (592)	27 (30) (30)	3800 (3300) (2500)
56	560	8 × 12	0.12	560	28	3400	10 × 12.5	0.12	706	28	3400
68	680	10 × 10 (10 × 12.5)	0.12 (0.12)	680 (680)	29 (29)	3400 (2600)					
100	101	8 × 9 (10 × 12.5)	0.12 (0.12)	1000 (1000)	28 (27)	3300 (3600)	10 × 12.5	0.12	1260	28	3800
220	221	10 × 12.5	0.12	2200	26	3800					

WV (V)		80 (1K)					100 (2A)				
Cap. 容量 (μF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
6.8	6R8						8 × 10	0.12	136	48	1500
10	100	8 × 10	0.12	160	43	1600	8 × 12	0.12	200	45	1700
12	120	8 × 12	0.12	192	41	1800	10 × 10	0.12	240	42	1900
15	150	10 × 10	0.12	240	39	1900					
18	180						10 × 12.5	0.12	360	41	2100
22	220	10 × 12.5	0.12	352	38	2200					
47	470	10 × 10.5	0.12	752	40	2500					

WV (V)		125 (2B)				
Cap. 容量 (μF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
6.8	6R8	8 × 10	0.12	170	93	1100
8.2	8R2	8 × 12	0.12	205	84	1300
12	120	10 × 10	0.12	300	69	1400
15	150	10 × 12.5	0.12	375	48	2000

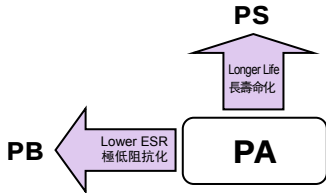
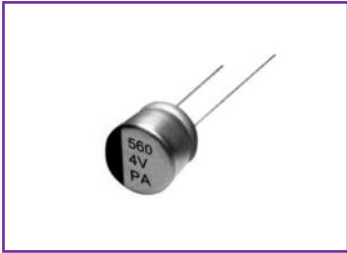
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 16 for the Part Number System. 產品編碼規則請查閱第 16 頁。

PA Series

RADIAL LEAD TYPE, STANDARD

插件式，標準品

- Operating with wide temperature range -55~+105°C
適用於 -55~+105°C 的寬溫範圍
- Low ESR, high ripple current
低阻抗，高紋波電流
- Endurance 2000 hours
耐久性 2000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

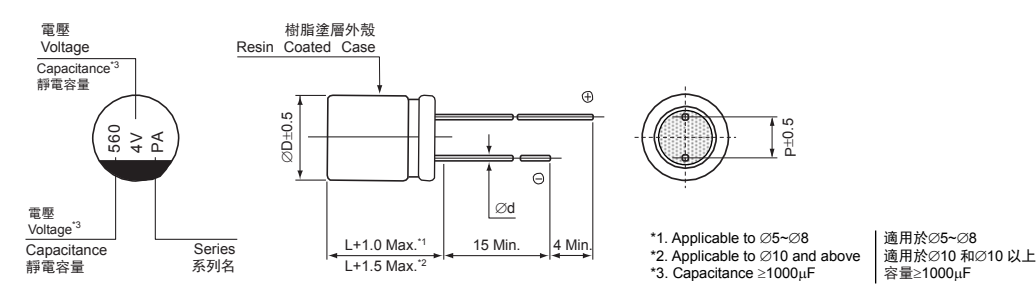
Items 項目	Characteristics 主要特性														
Category Temperature Range 工作溫度範圍	-55 ~ +105°C														
Voltage Range 額定工作電壓範圍	2.5 ~ 25V														
Capacitance Range 靜電容量範圍	6.8 ~ 1500μF														
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C														
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值（在 20°C 環境中施加額定工作電壓 2 分鐘後）。														
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值（在 20°C 120Hz 環境下）。														
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值（在 20°C 100KHz 環境下）。														
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz <table><tr><td>Impedance Ratio 阻抗比</td><td>Z(+105°C)/Z(20°C)</td><td>≤1.25</td></tr><tr><td>ZT/Z20 (max.)</td><td>Z(-55°C)/Z(20°C)</td><td>≤1.25</td></tr></table>			Impedance Ratio 阻抗比	Z(+105°C)/Z(20°C)	≤1.25	ZT/Z20 (max.)	Z(-55°C)/Z(20°C)	≤1.25						
Impedance Ratio 阻抗比	Z(+105°C)/Z(20°C)	≤1.25													
ZT/Z20 (max.)	Z(-55°C)/Z(20°C)	≤1.25													
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Endurance 耐久性	When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 9 for soldering conditions) (焊接條件請查閱第 12 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±10% of initial value 初始值的±10%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)		Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%		ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)														
Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%														
ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。														

(*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定，在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。

(*2) Should be measured at both of the terminal ends closest to the capacitor body.
測試應為靠近兩個端子的末端。

(*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



Dimension table in next page.
尺寸表見下一頁。

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PA Series

DIMENSIONS 尺寸表 (Unit: mm)

ØD × L	5 × 7/9/11	6.3 × 6/7	6.3 × 8/9	6.3 × 10.5/11/12	8 × 7/8/9	8 × 11/12	10 × 8/10/13
P	2.0	2.5	2.5	2.5	3.5	3.5	5.0
Ød	0.5	0.5	0.6	0.6	0.6	0.6	0.6
L	7.0/9.0/11.0	6.0/7.0	8.0/9.0	10.5/11.0/12.0	7.0/8.0/9.0	11.0/12.0	8.0/10.0/13.0

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V)		2.5 (0E)					4 (0G)				
Cap. 容量 (µF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
270	271						6.3 × 9 (6.3 × 10.5)	0.08 (0.08)	216 (216)	7 (20)	5600 (3200)
330	331	6.3 × 9	0.08	165	7	5600					
390	391	6.3 × 10.5	0.08	195	20	3200	6.3 × 10.5	0.08	312	24	3300
560	561	6.3 × 9	0.08	280	7	5600	8 × 9 (8 × 12)	0.08 (0.08)	448 (448)	7 (7)	5200 (5500)
680	681	8 × 9	0.08	340	7	4800	8 × 12	0.08	544	6	6200
820	821	6.3 × 9	0.08	410	7	5600	10 × 13	0.08	656	6	6500
1000	102	10 × 13	0.08	500	6	6500	10 × 13	0.08	800	6	6640
1200	122	10 × 13	0.08	600	8	5300	10 × 13	0.08	960	8	5600
1500	152	8 × 12	0.08	750	7	6100					

WV (V)		6.3 (0J)					10 (1A)				
Cap. 容量 (µF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
47	470						6.3 × 10.5	0.08	94	25	2900
68	680						6.3 × 10.5	0.08	136	25	2900
100	101						6.3 × 8 (6.3 × 10.5)	0.08 (0.08)	200 (200)	25 (25)	2900 (2900)
150	151						6.3 × 10.5	0.08	300	25	2900
220	221	5 × 7 (6.3 × 10.5)	0.08 (0.08)	277 (277)	20 (20)	3000 (3200)	6.3 × 7	0.08	440	12	3150
270	271						8 × 12	0.08	540	8	4900
330	331	6.3×10.5	0.08	416	24	3300					
470	471	8 × 9 (8 × 12)	0.08 (0.08)	592 (592)	7 (7)	5200 (5500)	5 × 11 (8 × 8) (10 × 13)	0.08 (0.08) (0.08)	940 (940) (940)	16 (12) (7)	3000 (5300) (5700)
560	561						10 × 13	0.08	1120	7	5900
680	681	10 × 13	0.08	857	6	6300	10 × 13	0.08	1360	7	6100

WV (V)		16 (1C)					20 (1D)				
Cap. 容量 (µF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
22	220						6.3 × 6	0.12	88	50	1700
39	390						8 × 7	0.12	156	45	2000
47	470						8 × 7	0.12	188	45	2000
56	560						10 × 8	0.12	224	40	2400
68	680						10 × 8	0.12	272	40	2600
82	820						10 × 8	0.12	328	40	2600
100	101	5 × 8 (6.3 × 7) (6.3 × 10.5)	0.08 (0.08) (0.08)	320 (320) (320)	25 (25) (24)	2350 (2600) (2900)	8 × 12	0.12	400	22	3320
120	121						10 × 10	0.12	480	35	2800
150	151						10 × 13	0.12	600	20	4320
180	181	5 × 9 (8 × 8) (8 × 12)	0.08 (0.08) (0.08)	576 (576) (576)	12 (10) (9)	2750 (4200) (5000)					
220	221	6.3 × 8 (6.3 × 12)	0.08 (0.08)	704 (704)	12 (12)	3800 (4400)					
270	271	8 × 8 (8 × 12)	0.08 (0.08)	864 (864)	10 (9)	4600 (5100)					
330	331	10 × 13	0.08	1056	9	6100					
470	471	10 × 13	0.08	1504	9	6100					

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注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

PA Series

□ DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

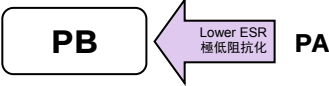
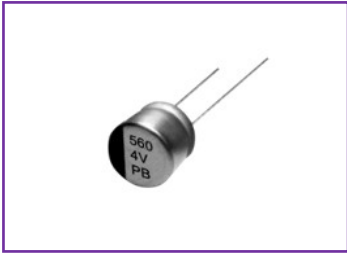
WV (V)		25 (1E)				
Cap. 容量 (μF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
6.8	6R8	6.3 × 6	0.12	34	80	1200
10	100	6.3 × 6	0.12	50	65	1500
22	220	8 × 7	0.12	110	60	1500
33	330	8 × 7	0.12	165	50	1800
47	470	6.3 × 7 (10 × 13)	0.12 (0.12)	235 (235)	49 (30)	1300 (3000)
56	560	10 × 13	0.12	280	28	3800
100	101	5 × 11 (6.3 × 8) (6.3 × 11)	0.12 (0.12) (0.12)	500 (500) (500)	30 (30) (30)	2500 (2500) (3000)
220	221	6.3 × 12 (8 × 11)	0.12 (0.12)	1100 (1100)	20 (18)	4000 (4300)

- Please refer to page 21 and page 23 about the taped or cutting product spec. 編帶與剪腳標準請查閱第 21 頁和 23 頁。
- Please refer to page 22 for the minimum package quantity. 最小包裝數量請查閱第 22 頁。
- Please refer to page 16 for the Part Number System. 產品編碼規則請查閱第 16 頁。

PB Series

RADIAL LEAD TYPE, HIGHER CAPACITANCE
插件式，大容量品

- Operating with wide temperature range -55~+105°C
適用於 -55~+105°C 的寬溫範圍
- Higher capacitance, ultra-low ESR, high ripple current
更大容量，極低阻抗，高紋波電流
- Endurance 2000 hours
耐久性 2000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

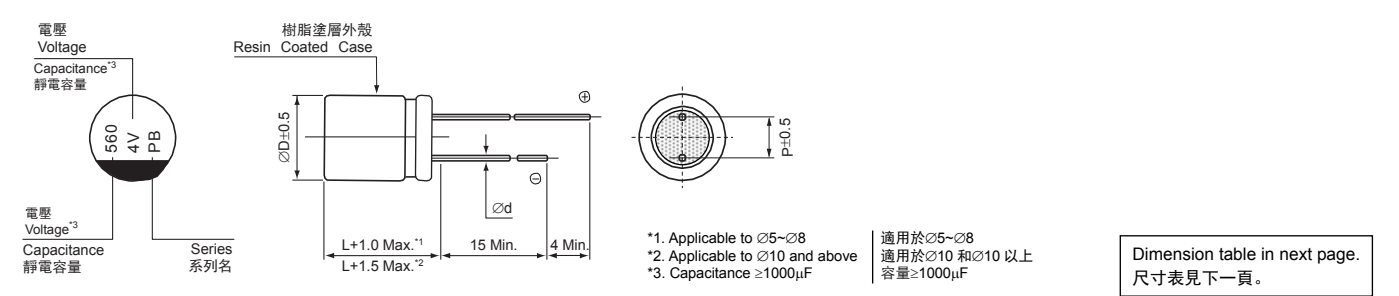
Items 項目	Characteristics 主要特性		
Category Temperature Range 工作溫度範圍	-55 ~ +105°C		
Voltage Range 額定工作電壓範圍	2.5 ~ 16V		
Capacitance Range 靜電容量範圍	100 ~ 2200μF		
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C		
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值 (在 20°C 環境中施加額定工作電壓 2 分鐘後)。		
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。		
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。		
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz		
	Impedance Ratio 阻抗比	Z(+105°C)/Z(20°C)	≤1.25
	ZT/Z20 (max.)	Z(-55°C)/Z(20°C)	≤1.25
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。		
	Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)	
	Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%	
	ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%	
	Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Endurance 耐久性	When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。		
	Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)	
	Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%	
	ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%	
	Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 9 for soldering conditions) (焊接條件請查閱第 12 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。		
	Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)	
	Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%	
	ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%	
	Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。		

(*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定，在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。

(*2) Should be measured at both of the terminal ends closest to the capacitor body.
測試應為靠近兩個端子的末端。

(*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



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PB Series

DIMENSIONS 尺寸表 (Unit: mm)

ØD × L	5 × 8/9	5 × 10/12	5.5 × 9/10	6.3 × 7	6.3 × 8/9	6.3 × 11/12/14	8 × 8/9/11/12	10 × 12/16
P	2.0	2.0	2.0	2.5	2.5	2.5	3.5	5.0
Ød	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6
L	8.0/9.0	10.0/12.0	9.0/10	7.0	8.0/9.0	11.0/12.0/14.0	8.0/9.0/11.0/12.0	12.0/16.0

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V) Parameter 參數 Cap. 容量 (µF)		2.5 (0E)					4 (0G)				
		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
560	561	6.3 × 8	0.08	280	7	5900	6.3 × 8	0.08	448	9	5900
680	681						6.3 × 8	0.08	544	9	5900
820	821	6.3 × 8 (8 × 8)	0.08 (0.08)	410 (410)	7 (7)	5900 (5900)	6.3 × 11	0.08	656	7	6150
1000	102	6.3 × 8	0.08	500	7	5900					
1200	122						6.3 × 11	0.08	960	7	6150
1500	152	8 × 8	0.08	750	7	6100					

WV (V) Parameter 參數 Cap. 容量 (µF)		6.3 (0J)					10 (1A)				
		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
270	271	5 × 8 (6.3 × 7)	0.08 (0.08)	340 (340)	10 (10)	3200 (4100)	6.3 × 8	0.08	540	10	4100
330	331	5 × 8 (6.3 × 5) (6.3 × 6) (6.3 × 8)	0.08 (0.08) (0.08) (0.08)	415 (415) (415) (415)	10 (9) (9) (9)	3200 (4800) (4800) (5000)	6.3 × 8 (8 × 8)	0.08 (0.08)	660 (660)	12 (12)	4500 (4620)
390	391	5 × 8 (6.3 × 8) (8 × 8)	0.08 (0.08) (0.08)	491 (491) (491)	12 (12) (12)	3100 (3100) (3300)					
470	471	5 × 9 (6.3 × 8) (8 × 8)	0.08 (0.08) (0.08)	592 (592) (592)	12 (9) (9)	3600 (5900) (5900)	6.3 × 8 (8 × 8)	0.08 (0.08)	940 (940)	9 (10)	5400 (5600)
560	561	5 × 9 (6.3 × 8) (8 × 8)	0.08 (0.08) (0.08)	705 (705) (705)	12 (9) (8)	3600 (5900) (5900)	8 × 8	0.08	1120	9	5600
680	681	5 × 12 (6.3 × 8)	0.08 (0.08)	857 (857)	15 (9)	5500 (5900)	6.3 × 11 (8 × 8) (8 × 11)	0.08 (0.08) (0.08)	1360 (1360) (1360)	13 (9) (9)	3650 (5600) (6100)
820	821	6.3 × 9 (6.3 × 11) (8 × 8) (8 × 11)	0.08 (0.08) (0.08) (0.08)	1033 (1033) (1033) (1033)	9 (7) (9) (9)	5900 (6150) (5900) (6150)	8 × 11	0.08	1640	9	6100
1000	102	6.3 × 11 (8 × 8) (8 × 11)	0.08 (0.08) (0.08)	1260 (1260) (1260)	12 (10) (9)	6150 (6000) (6150)	8 × 11	0.08	2000	9	6200
1200	122	6.3 × 12 (8 × 12)	0.08 (0.08)	1512 (1512)	9 (9)	6100 (6150)					
1500	152	6.3 × 14 (8 × 12) (10 × 12)	0.08 (0.08) (0.08)	1890 (1890) (1890)	10 (9) (9)	5400 (6150) (6200)	8 × 12 (10 × 12)	0.08 (0.08)	3000 (3000)	10 (9)	5700 (6100)
2200	222	10 × 12	0.08	2772	9	6200	10 × 12	0.08	4400	9	6500

WV (V) Parameter 參數 Cap. 容量 (µF)		7.5 (0T)					12 (1R)				
		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
330	331						5 × 9 (5.5 × 9) (5 × 10) (6.3 × 8)	0.08 (0.08) (0.08) (0.08)	792 (792) (792) (792)	14 (14) (14) (12)	3800 (3800) (3800) (2690)
500	501	5 × 9 (6.3 × 9)	0.08 (0.08)	750 (750)	11 (9)	3800 (5900)					
560	561	5 × 9 (6.3 × 9)	0.08 (0.08)	840 (840)	11 (9)	4000 (5900)					
680	681	6.3 × 9 (6.3 × 11)	0.08 (0.08)	1020 (1020)	9 (9)	5900 (5900)					
820	821	6.3 × 9	0.08	1230	9	5900					

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PB Series

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

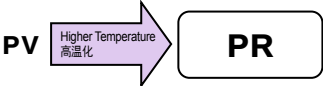
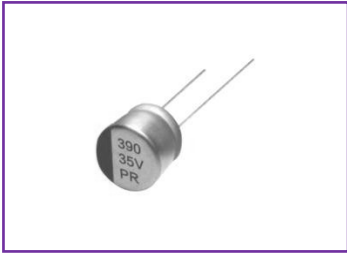
WV (V)		16 (1C)				
Cap. 容量 (μF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
100	101	6.3 × 7	0.08	320	16	3250
220	221	6.3 × 8	0.08	704	14	4100
270	271	6.3 × 8 (8 × 8) (8 × 11)	0.08 (0.08) (0.08)	864 (864) (864)	10 (10) (10)	4100 (5000) (5000)
330	331	6.3 × 9 (6.3 × 11) (8 × 8) (10 × 12)	0.08 (0.08) (0.08) (0.08)	1056 (1056) (1056) (1056)	12 (12) (10) (9)	4500 (4300) (5000) (6100)
390	391	8 × 8	0.08	1248	10	5000
470	471	6.3 × 11 (6.3 × 12) (8 × 8) (8 × 11) (10 × 12)	0.08 (0.08) (0.08) (0.08) (0.08)	1504 (1504) (1504) (1504) (1504)	12 (10) (13) (10) (9)	4100 (5200) (5000) (5400) (5800)
560	561	6.3 × 12 (8 × 9) (8 × 11)	0.08 (0.08) (0.08)	1792 (1792) (1792)	12 (12) (10)	5200 (5200) (5400)
680	681	8 × 11 (10 × 12)	0.08 (0.08)	2176 (2176)	10 (10)	5400 (5500)
820	821	8 × 12 (10 × 12)	0.08 (0.08)	2624 (2624)	10 (10)	5700 (5800)
1000	102	8 × 12 (10 × 12)	0.08 (0.08)	3200 (3200)	10 (9)	6000 (6500)
1200	122	10 × 12	0.08	3840	9	6500
1500	152	10 × 12 (10 × 16)	0.08 (0.08)	4800 (4800)	9 (9)	6500 (6500)
2200	222	10 × 16	0.08	7040	10	6500

- Please refer to page 21 and page 23 about the taped or cutting product spec. 編帶與剪腳標準請查閱第 21 頁和 23 頁。
- Please refer to page 22 for the minimum package quantity. 最小包裝數量請查閱第 22 頁。
- Please refer to page 16 for the Part Number System. 產品編碼規則請查閱第 16 頁。

PR Series

RADIAL LEAD TYPE, 125°C HIGH TEMPERATURE
插件式, 125°C 高溫品

- Operating with wide temperature range -55~+125°C
適用於 -55~+125°C 的寬溫範圍
- High reliability, low ESR, high ripple current
高可靠, 低阻抗, 高紋波電流
- Endurance 3000 hours
耐久性 3000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH, 無鹵



SPECIFICATIONS 特性表

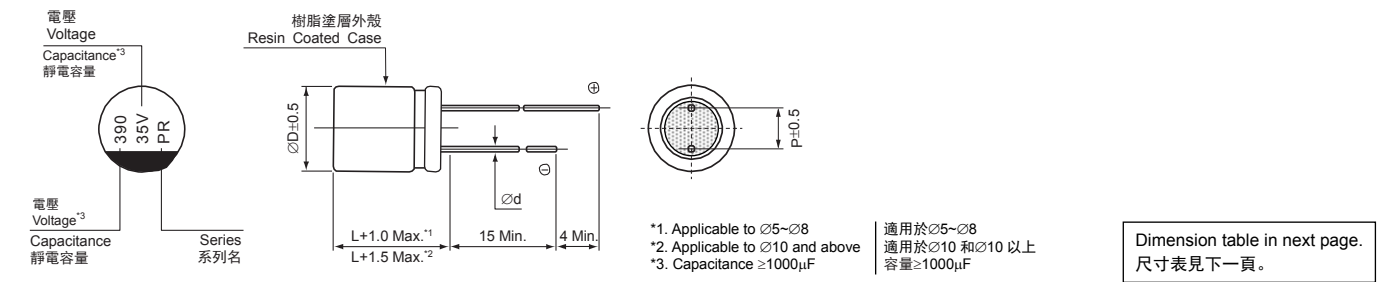
Items 項目	Characteristics 主要特性														
Category Temperature Range 工作溫度範圍	-55 ~ +125°C														
Voltage Range 額定工作電壓範圍	6.3 ~ 50V														
Capacitance Range 靜電容量範圍	22 ~ 2200μF														
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C														
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值（在 20°C 環境中施加額定工作電壓 2 分鐘後）。														
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值（在 20°C 120Hz 環境下）。														
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值（在 20°C 100KHz 環境下）。														
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz <table><tr><td>Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td>Z(+125°C)/Z(20°C) Z(-55°C)/Z(20°C)</td><td>≤1.25 ≤1.25</td></tr></table>			Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+125°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25									
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+125°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25													
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Endurance 耐久性	When the capacitors are restored to 20°C after 3000 hours application of the rated voltage at 125°C, they meet the characteristics listed below. 在 125°C 環境中施加額定工作電壓 3000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 9 for soldering conditions) (焊接條件請查閱第 12 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±10% of initial value 初始值的±10%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)		Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%		ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)														
Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%														
ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。														

(*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定, 在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。

(*2) Should be measured at both of the terminal ends closest to the capacitor body.
測試應為靠近兩個端子的末端。

(*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



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PR Series

DIMENSIONS 尺寸表 (Unit: mm)

ØD × L	5 × 8/11	6.3 × 8/9/12	8 × 8/9	8 × 11/12/16	10 × 12/13/16	10 × 21
P	2.0	2.5	3.5	3.5	5.0	5.0
Ød	0.5	0.6	0.6	0.6	0.6	0.6
L	8.0/11.0	8.0/9.0/12.0	8.0/9.0	11.0/12.0/16.0	12.0/13.0/16.0	21.0

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

Cap. 容量 (µF) Parameter 參數 WV (V)		6.3 (0J)						16 (1C)					
		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 紋波電流	
						≤105°C ⁽³⁾	105°C≤125°C ⁽³⁾					≤105°C ⁽³⁾	105°C≤125°C ⁽³⁾
100	101	5 × 8	0.12	126	18	1900	730	5 × 8	0.12	320	13	2000	770
150	151							8 × 9	0.12	480	26	2100	810
220	221	5 × 8	0.12	277	20	2050	950	8 × 12	0.12	704	25	2400	930
330	331	5 × 8	0.12	415	14	2300	880	8 × 8	0.12	1056	13	4700	1570
390	391							10 × 13	0.12	1248	23	2900	1130
1000	102							10 × 13	0.12	3200	12	4500	1730
1500	152	8 × 12	0.12	1890	12	4000	1535						
2200	222	10 × 12	0.12	2772	10	5600	2150						

Cap. 容量 (µF) Parameter 參數 WV (V)		20 (1D)						25 (1E)					
		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 紋波電流	
						≤105°C ⁽³⁾	105°C≤125°C ⁽³⁾					≤105°C ⁽³⁾	105°C≤125°C ⁽³⁾
47	470							6.3 × 8	0.12	235	48	2300	890
82	820							8 × 9	0.12	410	28	2000	780
120	121	8 × 9	0.12	480	27	2000	800	8 × 12	0.12	600	27	2300	890
150	151	8 × 12	0.12	600	26	2300	910						
180	181							10 × 13	0.12	900	25	2800	1080
220	221							5 × 11	0.12	1100	30	2500	1000
270	271	10 × 13	0.12	1080	24	2800	1110						
470	471							8 × 12 (10 × 12)	0.12 (0.12)	2350 (2350)	28 (25)	4250 (4300)	1700 (1720)
560	561							8 × 12	0.12	2800	20	4250	1700
680	681							8 × 12	0.12	2350	20	2800	1080
1000	102							8 × 16 (10 × 16)	0.12 (0.12)	5000 (5000)	25 (14)	4500 (5000)	1730 (2000)
1500	152							10 × 16	0.12	7500	14	5000	2000

Cap. 容量 (µF) Parameter 參數 WV (V)		35 (1V)						50 (1H)					
		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 紋波電流	
						≤105°C ⁽³⁾	105°C≤125°C ⁽³⁾					≤105°C ⁽³⁾	105°C≤125°C ⁽³⁾
22	220							8 × 9	0.12	220	35	1800	700
27	270							8 × 12	0.12	270	33	2000	810
39	390	8 × 9	0.12	273	33	1800	720						
47	470							10 × 13	0.12	470	29	2600	1020
56	560	8 × 12	0.12	392	31	2100	830						
100	101	10 × 13	0.12	700	28	2700	1040	8 × 8	0.12	1000	32	2250	900
120	121							8 × 11 (10 × 12)	0.12 (0.12)	1200 (1200)	32 (20)	2250 (4300)	900 (1350)
220	221	8 × 11	0.12	1540	24	3400	2000	10 × 12	0.12	2200	28	2620	1040
470	471	10 × 12	0.12	3290	28	5000	1920	10 × 21	0.12	4700	28	4900	2000

- Please refer to page 21 and page 23 about the taped or cutting product spec. 編帶與剪腳標準請查閱第 21 頁和 23 頁。
- Please refer to page 22 for the minimum package quantity. 最小包裝數量請查閱第 22 頁。
- Please refer to page 16 for the Part Number System. 產品編碼規則請查閱第 16 頁。

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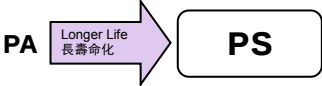
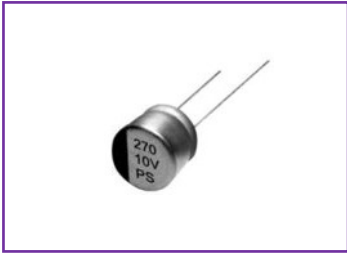
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PS Series

RADIAL LEAD TYPE, LONG LIFE

插件式，長壽命品

- Operating with wide temperature range -55~+105°C
適用於 -55~+105°C 的寬溫範圍
- Long life assurance
長壽命
- Endurance 5000 hours
耐久性 5000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

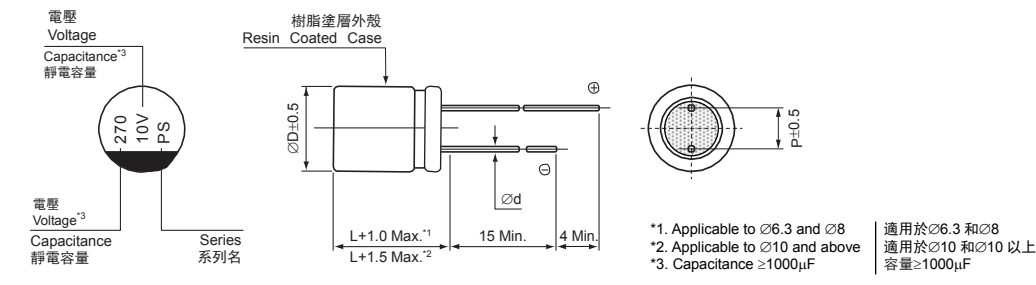
Items 項目	Characteristics 主要特性														
Category Temperature Range 工作溫度範圍	-55 ~ +105°C														
Voltage Range 額定工作電壓範圍	2.5 ~ 25V														
Capacitance Range 靜電容量範圍	100 ~ 1500μF														
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C														
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值（在 20°C 環境中施加額定工作電壓 2 分鐘後）。														
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值（在 20°C 120Hz 環境下）。														
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值（在 20°C 100KHz 環境下）。														
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz <table><tr><td>Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td>Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)</td><td>≤1.25 ≤1.25</td></tr></table>			Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25									
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25													
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Endurance 耐久性	When the capacitors are restored to 20°C after 5000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 5000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 9 for soldering conditions) (焊接條件請查閱第 12 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±10% of initial value 初始值的±10%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)		Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%		ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
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Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。														

(*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定，在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。

(*2) Should be measured at both of the terminal ends closest to the capacitor body.
測試應為靠近兩個端子的末端。

(*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



Dimension table in next page.
尺寸表見下一頁。

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PS Series

DIMENSIONS 尺寸表 (Unit: mm)

ØD × L	6.3 × 6/6.5	6.3 × 9/10.5	8 × 7	8 × 9	8 × 11/12	10 × 13/21
P	2.5	2.5	3.5	3.5	3.5	5.0
Ød	0.5	0.6	0.6	0.6	0.6	0.6
L	6.0/6.5	9.0/10.5	7.0	9.0	11.0/12.0	13.0/21.0

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V)		2.5 (0E)					4 (0G)				
Cap. 容量 (µF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
270	271						6.3 × 9	0.08	216	8	4800
330	331	6.3 × 9	0.08	165	8	4800					
560	561	6.3 × 6.5	0.08	280	10	3900	8 × 7 (8 × 9)	0.08 (0.08)	448 (448)	15 (7)	3900 (5200)
680	681	8 × 7	0.08	340	15	3900	8 × 12	0.08	544	7	5800
820	821	6.3 × 9 (8 × 9) (8 × 12)	0.08 (0.08) (0.08)	410 (410) (410)	8 (7) (7)	4800 (5200) (5800)					
1200	122						10 × 13	0.08	960	8	5500
1500	152	10 × 13	0.08	750	8	5500					

WV (V)		6.3 (0J)					10 (1A)				
Cap. 容量 (µF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
100	101						6.3 × 6	0.08	200	30	2300
150	151						6.3 × 10.5	0.08	300	20	3000
270	271						8 × 12	0.08	540	8	4900
330	331	6.3 × 10.5	0.08	416	20	3000					
390	391	8 × 7	0.08	491	15	3900					
470	471	8 × 12	0.08	592	7	5500	10 × 13	0.08	940	8	5500
560	561	6.3 × 9 (8 × 9)	0.08 (0.08)	706 (706)	9 (8)	4300 (5000)					
820	821	10 × 13	0.08	1033	8	5500					

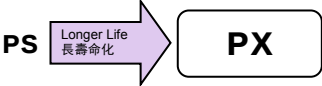
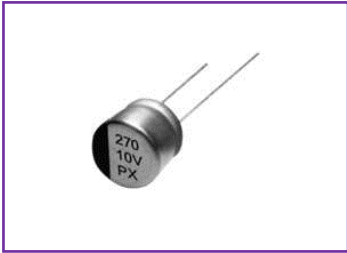
WV (V)		16 (1C)					25 (1E)				
Cap. 容量 (µF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
100	101	6.3 × 10.5	0.08	320	24	2800					
270	271	8 × 12	0.08	864	9	4500					
330	331	10 × 13	0.08	1056	9	4700	8 × 11	0.08	1650	18	4500
470	471	10 × 13	0.08	1504	9	4700	8 × 12	0.08	2350	16	5000
1000	102						10 × 21	0.08	7000	22	3300

- Please refer to page 21 and page 23 about the taped or cutting product spec. 編帶與剪腳標準請查閱第 21 頁和 23 頁。
- Please refer to page 22 for the minimum package quantity. 最小包裝數量請查閱第 22 頁。
- Please refer to page 16 for the Part Number System. 產品編碼規則請查閱第 16 頁。

PX Series

RADIAL LEAD TYPE, ULTRA LONG LIFE
插件式，超長壽命品

- Operating with wide temperature range -55~+105°C
適用於 -55~+105°C 的寬溫範圍
- Ultra-low ESR, High Ripple Current
超低阻抗，高紋波電流
- Endurance 20000 hours
耐久性 20000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

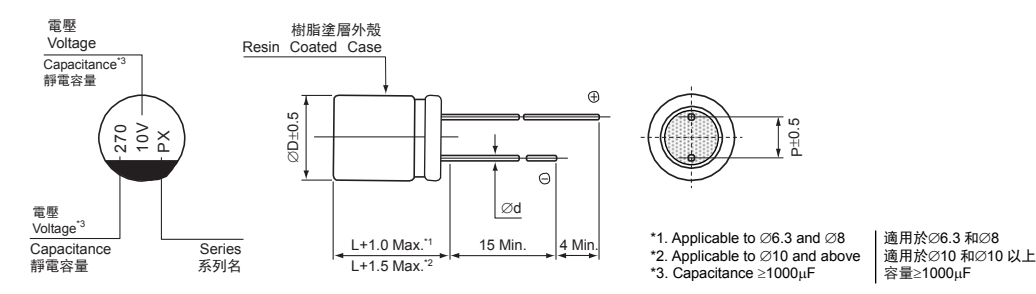
Items 項目	Characteristics 主要特性														
Category Temperature Range 工作溫度範圍	-55 ~ +105°C														
Voltage Range 額定工作電壓範圍	4 ~ 16V														
Capacitance Range 靜電容量範圍	100 ~ 1200μF														
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C														
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值（在 20°C 環境中施加額定工作電壓 2 分鐘後）。														
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值（在 20°C 120Hz 環境下）。														
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值（在 20°C 100KHz 環境下）。														
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz <table><tr><td>Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td>Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)</td><td>≤1.25 ≤1.25</td></tr></table>			Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25									
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(+105°C)/Z(20°C) Z(-55°C)/Z(20°C)	≤1.25 ≤1.25													
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Endurance 耐久性	When the capacitors are restored to 20°C after 20000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 20000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)														
Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 9 for soldering conditions) (焊接條件請查閱第 12 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±10% of initial value 初始值的±10%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)		Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%		ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)														
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Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。														

(*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定，在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。

(*2) Should be measured at both of the terminal ends closest to the capacitor body.
測試應為靠近兩個端子的末端。

(*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



Dimension table in next page.
尺寸表見下一頁。

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

PX Series

DIMENSIONS 尺寸表 (Unit: mm)

∅D × L	6.3 × 9	6.3 × 10.5	8 × 7	8 × 9	8 × 12	10 × 13
P	2.5	2.5	3.5	3.5	3.5	5.0
∅d	0.6	0.6	0.6	0.6	0.6	0.6
L	9.0	10.5	7.0	9.0	12.0	13.0

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V)		4 (0G)					6.3 (0J)				
Cap. 容量 (μF)	Parameter 參數	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
270	271	6.3 × 9	0.08	216	8	4800					
330	331						6.3 × 10.5	0.08	416	20	3000
390	391						8 × 7	0.08	491	15	3900
470	471						8 × 12	0.08	592	7	5500
560	561	8 × 7 (8 × 9)	0.08 (0.08)	448 (448)	15 (7)	3900 (5200)	6 × 9 (8 × 9)	0.08 (0.08)	706 (706)	9 (8)	4300 (5000)
680	681	8 × 12	0.08	544	7	5500					
820	821						10 × 13	0.08	1033	8	5500
1200	122	10 × 13	0.08	960	8	5800					

WV (V)		10 (1A)					16 (1C)				
Cap. 容量 (μF)	Parameter 參數	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ∅D×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
100	101						6.3 × 10.5	0.08	320	24	2800
150	151	6.3 × 10.5	0.08	300	20	3000					
270	271	8 × 12	0.08	540	8	4900	8 × 12	0.08	864	9	4500
330	331						10 × 13	0.08	1056	9	4700
470	471	10 × 13	0.08	940	8	5500	10 × 13	0.08	1504	9	4700

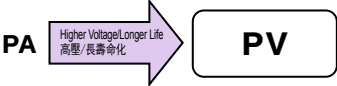
- Please refer to page 21 and page 23 about the taped or cutting product spec. 編帶與剪腳標準請查閱第 21 頁和 23 頁。
- Please refer to page 22 for the minimum package quantity. 最小包裝數量請查閱第 22 頁。
- Please refer to page 16 for the Part Number System. 產品編碼規則請查閱第 16 頁。

PV Series

RADIAL LEAD TYPE, HIGH VOLTAGE/LONG LIFE

插件式，高壓長壽命品

- Operating with wide temperature range -55~+105°C
適用於 -55~+105°C 的寬溫範圍
- High voltage, low ESR, high ripple current
高電壓，低阻抗，高紋波電流
- Endurance 3000 hours
耐久性 3000 小時
- RoHS & REACH compliant, Halogen-free
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

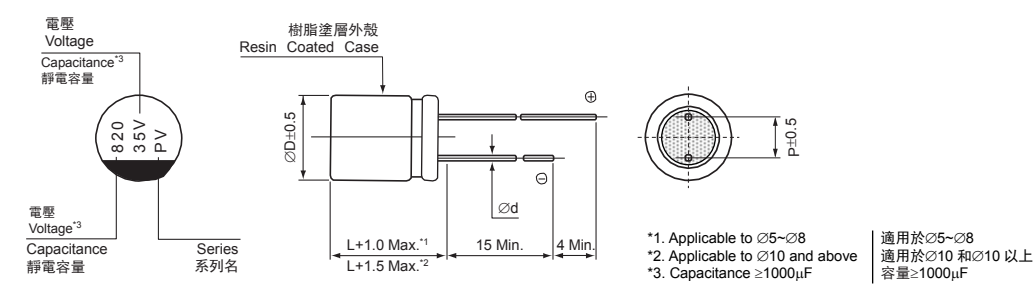
Items 項目	Characteristics 主要特性														
Category Temperature Range 工作溫度範圍	-55 ~ +105°C														
Voltage Range 額定工作電壓範圍	16 ~ 100V														
Capacitance Range 靜電容量範圍	6.8 ~ 2700µF														
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C														
Leakage Current 漏電流 (*1)	≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值（在 20°C 環境中施加額定工作電壓 2 分鐘後）。														
Dissipation Factor (tan δ) 損耗角正切	≤Specified value at 120Hz, 20°C. ≤規範值（在 20°C 120Hz 環境下）。														
ESR 阻抗值 (*2)	≤Specified value at 100KHz, 20°C. ≤規範值（在 20°C 100KHz 環境下）。														
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 100KHz <table><tr><td>Impedance Ratio 阻抗比</td><td>Z(+105°C)/Z(20°C)</td><td>≤1.25</td></tr><tr><td>ZT/Z20 (max.)</td><td>Z(-55°C)/Z(20°C)</td><td>≤1.25</td></tr></table>			Impedance Ratio 阻抗比	Z(+105°C)/Z(20°C)	≤1.25	ZT/Z20 (max.)	Z(-55°C)/Z(20°C)	≤1.25						
Impedance Ratio 阻抗比	Z(+105°C)/Z(20°C)	≤1.25													
ZT/Z20 (max.)	Z(-55°C)/Z(20°C)	≤1.25													
Damp Heat (Steady State) 穩態濕熱	When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below. 在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並恢復至 20°C 後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
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ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Endurance 耐久性	When the capacitors are restored to 20°C after 3000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 3000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 為初始值的±20%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">150% or less of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±20% of initial value 為初始值的±20%以內 (*3)		Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%		ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
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Dissipation Factor 損耗角正切	150% or less of initial specified value 不大於規範值的 150%														
ESR 阻抗值 (*2)	150% or less of initial specified value 不大於規範值的 150%														
Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Resistance to Soldering Heat 耐焊接熱特性 (Please refer page 9 for soldering conditions) (焊接條件請查閱第 12 頁)	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±10% of initial value 初始值的±10%以內 (*3)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>ESR 阻抗值 (*2)</td><td colspan="2">130% or less of initial specified value 不大於規範值的 130%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">Initial specified value or less 不大於規範值</td></tr></table>			Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內 (*3)		Dissipation Factor 損耗角正切	130% or less of initial specified value 不大於規範值的 130%		ESR 阻抗值 (*2)	130% or less of initial specified value 不大於規範值的 130%		Leakage Current 漏電流	Initial specified value or less 不大於規範值	
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Leakage Current 漏電流	Initial specified value or less 不大於規範值														
Marking 標識	Red print on the case top. 鋁殼頂部紅色字體印刷。														

(*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
如未能確定，在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。

(*2) Should be measured at both of the terminal ends closest to the capacitor body.
測試應為靠近兩個端子的末端。

(*3) The value before test of examination of resistance to soldering.
焊接測試前的值。

DRAWING 外形圖 (Unit: mm)



Dimension table in next page.
尺寸表見下一頁。

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注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

PV Series

DIMENSIONS 尺寸表 (Unit: mm)

ØD × L	5 × 6/8/11/12	6.3 × 6	6.3 × 8/9/11/12	8 × 8/9	8 × 11/12	10 × 10/12/13	10 × 16/21
P	2.0	2.5	2.5	3.5	3.5	5.0	5.0
Ød	0.5	0.5	0.6	0.6	0.6	0.6	0.6
L	6.0/8.0/11/12	6.0	8.0/9.0/11.0/12.0	8.0/9.0	11.0/12.0	10.0/12.0/13.0	16.0/21.0

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

Cap. 容量 (µF)		Parameter 參數		16 (1C)						20 (1D)					
				Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	
150	151			8 × 8	0.12	1050	26	2600		8 × 9	0.12	600	27	2000	
220	221			8 × 9	0.12	704	26	2100		8 × 12	0.12	880	25	2400	
270	271			8 × 12	0.12	864	24	2500		8 × 12	0.12	1080	25	2400	
330	331									10 × 13	0.12	1320	24	2800	
470	471			10 × 13	0.12	1504	23	2900							
680	681			10 × 13	0.12	2176	23	2900							
2200	222			10 × 21	0.12	7040	14	4800							

Cap. 容量 (µF)		Parameter 參數		25 (1E)						35 (1V)					
				Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流		Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (µA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	
10	100			5 × 6	0.12	50	70	1500		5 × 8	0.12	70	65	1000	
22	220			5 × 6	0.12	110	60	1500		5 × 8	0.12	154	60	1500	
47	470			5 × 8 (6.3 × 6)	0.12 (0.12)	235 (235)	49 (44)	1500 (1850)		5 × 8 (6.3 × 6)	0.12 (0.12)	329 (329)	55 (35)	1700 (1800)	
56	560			5 × 8 (6.3 × 6)	0.12 (0.12)	280 (280)	44 (44)	1850 (1850)		8 × 9	0.12	392	29	1900	
68	681									5 × 9	0.12	476	48	1800	
82	820			6.3 × 8	0.12	410	35	1900		8 × 12	0.12	574	27	2300	
100	101			4 × 11 (5 × 8) (6.3 × 8) (8 × 8)	0.12 (0.12) (0.12) (0.12)	500 (500) (500) (500)	85 (35) (23) (23)	950 (2800) (3300) (3500)		6.3 × 8 (8 × 8)	0.12 (0.12)	700 (700)	28 (28)	2500 (2500)	
120	121			8 × 9	0.12	600	28	2000		5 × 12 (6.3 × 9)	0.12 (0.12)	840 (840)	40 (40)	2500 (2500)	
150	151			6.3 × 9 (8 × 12)	0.12 (0.12)	750 (750)	23 (26)	3300 (2400)		8 × 8 (10 × 13)	0.12 (0.12)	1050 (1050)	26 (26)	2700 (2700)	
220	221			5 × 11 (6.3 × 8) (8 × 8) (8 × 11)	0.12 (0.12) (0.12) (0.12)	1100 (1100) (1100) (1100)	28 (27) (22) (22)	2200 (2300) (2400) (2600)		6.3 × 12 (8 × 8) (8 × 11) (8 × 12)	0.12 (0.12) (0.12) (0.12)	1540 (1540) (1540) (1540)	16 (16) (16) (16)	2800 (2800) (2800) (2800)	
270	271			5 × 11 (6.3 × 12) (10 × 13)	0.12 (0.12) (0.12)	1350 (1350) (1350)	29 (27) (25)	2300 (2300) (2800)		8 × 12	0.12	1890	16	3300	
330	331			6.3 × 9 (6.3 × 12) (8 × 11) (10 × 10) (10 × 12)	0.12 (0.12) (0.12) (0.12) (0.12)	1650 (1650) (1650) (1650) (1650)	27 (27) (22) (22) (22)	2300 (2300) (3100) (3100) (3300)		8 × 12 (10 × 12)	0.12 (0.12)	2310 (2310)	20 (20)	3300 (3600)	
470	471			6.3 × 12 (8 × 12)	0.12 (0.12)	2350 (2350)	25 (20)	3000 (3300)		8 × 16 (10 × 10) (10 × 12)	0.12 (0.12) (0.12)	3290 (3290) (3290)	20 (20) (20)	3600 (3600) (3600)	
560	561			6.3 × 16 (8 × 12)	0.12 (0.12)	2800 (2800)	20 (15)	3100 (3400)		10 × 12	0.12	3920	20	3600	
680	681			6.3 × 14 (8 × 12) (8 × 16) (10 × 12)	0.12 (0.12) (0.12) (0.12)	3400 (3400) (3400) (3400)	18 (15) (15) (15)	3500 (3700) (3900) (3900)		10 × 12 (10 × 16)	0.12 (0.12)	4760 (4760)	20 (16)	3600 (4200)	
820	821			6.5 × 18	0.12	4100	16	4500							
1000	102			6.3 × 18 (8 × 12) (8 × 16) (10 × 12)	0.12 (0.12) (0.12) (0.12)	4100 (4100) (4100) (4100)	20 (25) (25) (25)	4000 (4000) (4000) (4000)		10 × 16	0.12	5740	16	4500	
1500	152			8 × 16 (10 × 12) (10 × 16)	0.12 (0.12) (0.12)	5000 (5000) (5000)	25 (25) (25)	4500 (4500) (4500)		10 × 21	0.12	7000	16	4700	
2200	222			10 × 16	0.12	7500	25	4800							
2700	272			10 × 21	0.12	11000	18	5400							

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

PV Series

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV (V)		50 (1H)					63 (1J)				
Cap. 容量 (μF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
10	100	6.3 × 8	0.12	100	35	1850	6.3 × 8	0.12	126	38	1600
22	220	6.3 × 8	0.12	220	35	1900	6.3 × 8 (8 × 9)	0.12 (0.12)	277 (277)	38 (35)	1600 (1800)
27	270	6.3 × 8	0.12	270	35	2100	8 × 12	0.12	340	33	2100
33	330	8 × 9	0.12	330	32	1900	6.3 × 8	0.12	416	30	1700
39	390	8 × 12	0.12	390	29	2200	6.3 × 8	0.12	491	30	1750
47	470	6.3 × 8 (8 × 8)	0.12 (0.12)	470 (470)	35 (32)	2000 (2100)	10 × 13	0.12	592	29	2600
56	560	6.3 × 11	0.12	560	35	2100	10 × 12	0.12	705	29	2600
68	680	6.3 × 12	0.12	680	32	2250	8 × 12	0.12	857	30	2400
100	101	8 × 12	0.12	1000	28	2600	8 × 12 (10 × 12)	0.12 (0.12)	1260 (1260)	32 (28)	2400 (3000)
180	181	10 × 12	0.12	1800	26	3200	10 × 12	0.12	2268	27	3400
220	221	10 × 12	0.12	2200	22	3500	10 × 16	0.12	2772	22	3800
330	331	10 × 16	0.12	3300	20	4200	10 × 21	0.12	4158	20	4600
470	471	10 × 21	0.12	400	28	4200					

WV (V)		80 (1K)					100 (2A)				
Cap. 容量 (μF)	Parameter 參數	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Dissipation factor (tan δ) 損耗角正切	Leakage current (μA) 漏電流	ESR (mΩ) max. 20°C, 100KHz 阻抗值	Ripple current (mA rms) 105°C, 100KHz 紋波電流
6.8	6R8	6.3 × 8	0.12	109	60	1550	8 × 9	0.12	136	45	1600
10	100	8 × 9	0.12	160	40	1700	6.3 × 11 (8 × 12)	0.12 (0.12)	200 (200)	50 (42)	1500 (1800)
12	120	8 × 12	0.12	192	38	1900					
15	150						8 × 12	0.12	300	42	1900
18	180						10 × 13	0.12	360	38	2200
22	220	10 × 13	0.12	352	35	2300	8 × 12	0.12	440	42	2100
47	470						10 × 16	0.12	940	35	2000
100	101						10 × 21	0.12	2000	32	3800

- Please refer to page 21 and page 23 about the taped or cutting product spec. 編帶與剪腳標準請查閱第 21 頁和 23 頁。
- Please refer to page 22 for the minimum package quantity. 最小包裝數量請查閱第 22 頁。
- Please refer to page 16 for the Part Number System. 產品編碼規則請查閱第 16 頁。

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors (Chip & Radial Lead Type)
導電性高分子混合型鋁電解電容器 (貼片式及引線式)



貼片式，105°C 標準品

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graph LR
 A[HMV] -- "Higher Temperature
高温化" --> B[HMR]

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| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------|--------------------------|------------------------------------------------------|---------------------|------------------------------------------------------|---------------------|----------------------------------------|---------------|-----------------------------|
| Operation Temperature Range 使用溫度範圍                                                                            | -55 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Voltage Range 額定工作電壓範圍                                                                                        | 25 ~ 80V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Capacitance Range 靜電容量範圍                                                                                      | 10 ~ 330μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                           | Leakage current ≤0.01CV (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | ≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                       | ≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 100KHz<br><table border="1"> <tr> <td>Impedance Ratio 阻抗比<br/>ZT/Z20 (max.)</td><td>Z(-25°C)/Z(20°C)<br/>Z(-55°C)/Z(20°C)</td><td>≤2.0<br/>≤2.5</td></tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Impedance Ratio 阻抗比<br>ZT/Z20 (max.) | Z(-25°C)/Z(20°C)<br>Z(-55°C)/Z(20°C)     | ≤2.0<br>≤2.5             |                                                      |                     |                                                      |                     |                                        |               |                             |
| Impedance Ratio 阻抗比<br>ZT/Z20 (max.)                                                                          | Z(-25°C)/Z(20°C)<br>Z(-55°C)/Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ≤2.0<br>≤2.5                         |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Bias Humidity Test 耐濕負荷特性                                                                                     | When the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, 85% RH, they meet the characteristics listed below.<br>在 85°C 和相對濕度 85%環境下施加額定工作電壓 2000 小時並恢復至 20°C 後，電容器的特性符合下表要求。<br><table border="1"> <tr> <td>Capacitance Change 靜電容量變化率</td><td>Within ±30% of initial value 為初始值的±30%以內</td></tr> <tr> <td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr> <tr> <td>ESR 阻抗值</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr> <tr> <td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr> <tr> <td>Appearance 外觀</td><td>No significant damage 無明顯異常</td></tr> </table> | Capacitance Change 靜電容量變化率           | Within ±30% of initial value 為初始值的±30%以內 | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% | ESR 阻抗值             | 200% or less of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | Initial specified value or less 不大於規範值 | Appearance 外觀 | No significant damage 無明顯異常 |
| Capacitance Change 靜電容量變化率                                                                                    | Within ±30% of initial value 為初始值的±30%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                      | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                       | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                           | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Appearance 外觀                                                                                                 | No significant damage 無明顯異常                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Endurance 耐久性                                                                                                 | When the capacitors are restored to 20°C after 10000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 10000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。<br><table border="1"> <tr> <td>Capacitance Change 靜電容量變化率</td><td>Within ±30% of initial value 為初始值的±30%以內</td></tr> <tr> <td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr> <tr> <td>ESR 阻抗值</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr> <tr> <td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr> </table>                                                                          | Capacitance Change 靜電容量變化率           | Within ±30% of initial value 為初始值的±30%以內 | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% | ESR 阻抗值             | 200% or less of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | Initial specified value or less 不大於規範值 |               |                             |
| Capacitance Change 靜電容量變化率                                                                                    | Within ±30% of initial value 為初始值的±30%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                      | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                       | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                           | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Shelf Life 高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 22 for soldering conditions)<br>(焊接條件請查閱第 22 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。<br><table border="1"> <tr> <td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr> <tr> <td>Dissipation Factor 損耗角正切</td><td>Initial specified value or less 不大於規範值</td></tr> <tr> <td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr> </table>                                                                                                                                                                                                                                                                  | Capacitance Change 靜電容量變化率           | Within ±10% of initial value 初始值的±10%以內  | Dissipation Factor 損耗角正切 | Initial specified value or less 不大於規範值               | Leakage Current 漏電流 | Initial specified value or less 不大於規範值               |                     |                                        |               |                             |
| Capacitance Change 靜電容量變化率                                                                                    | Within ±10% of initial value 初始值的±10%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                      | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                           | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑色字體印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |

Capacitance  
靜電容量

電壓  
Voltage

Series  
系列名

底座  
Plastic Platform

正極  
Positive

負極  
Negative

Dimensions and Tolerances:

- Top View:  $\varnothing D \pm 0.5$ ,  $22.0$ ,  $25.0$
- Side View:  $0.3 \text{ Max.}$ ,  $0.5$
- End View:  $B \pm 0.2$ ,  $A \pm 0.2$ ,  $E$ ,  $C \pm 0.2$ ,  $0.5 \text{ Max.}$
- Base Dimensions:  $L + 0.5 \text{ Max.}^{*1}$ ,  $L + 1.0 \text{ Max.}^{*2}$

|                                 |                |
|---------------------------------|----------------|
| *1. Applicable to Ø6.3 and Ø8   | 適用於Ø6.3 和Ø8    |
| *2. Applicable to Ø10 and above | 適用於Ø10 和Ø10 以上 |

Dimension table in next page.  
尺寸表見下一頁。

注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CAT.2024/V1.3

HMV Series

DIMENSIONS 尺寸表 (Unit: mm)

| ØD × L | 6.3 × 6 | 6.3 × 7.7 | 8 × 10  | 10 × 10.5 |
|--------|---------|-----------|---------|-----------|
| A      | 7.3     | 7.3       | 9.0     | 11.0      |
| B      | 6.6     | 6.6       | 8.3     | 10.3      |
| C      | 6.6     | 6.6       | 8.3     | 10.3      |
| E      | 1.9     | 1.9       | 3.1     | 4.7       |
| L      | 6.0     | 7.7       | 10      | 10.5      |
| H      | 0.5~0.8 | 0.5~0.8   | 0.8~1.1 | 0.8~1.1   |

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| WV (V)             |                 | 25 (1E)                      |                                           |                                   |                                         |                                                        | 35 (1V)                      |                                           |                                   |                                         |                                                        |
|--------------------|-----------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|
| Cap.<br>容量<br>(μF) | Parameter<br>參數 | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>105°C,<br>100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>105°C,<br>100KHz<br>紋波電流 |
| 27                 | 270             |                              |                                           |                                   |                                         |                                                        | 6.3 × 6                      | 0.12                                      | 9.45                              | 60                                      | 1250                                                   |
| 33                 | 330             |                              |                                           |                                   |                                         |                                                        | 6.3 × 6                      | 0.12                                      | 11.55                             | 60                                      | 1250                                                   |
| 47                 | 470             | 6.3 × 6                      | 0.14                                      | 11.75                             | 48                                      | 1350                                                   | 6.3 × 6                      | 0.12                                      | 16.45                             | 60                                      | 1250                                                   |
| 56                 | 560             | 6.3 × 6                      | 0.14                                      | 14                                | 48                                      | 1350                                                   |                              |                                           |                                   |                                         |                                                        |
| 68                 | 680             | 6.3 × 7.7                    | 0.14                                      | 17                                | 29                                      | 2100                                                   | 6.3 × 7.7                    | 0.12                                      | 23.8                              | 35                                      | 2000                                                   |
| 100                | 101             | 6.3 × 7.7                    | 0.14                                      | 25                                | 29                                      | 2100                                                   | 8 × 10                       | 0.12                                      | 35                                | 26                                      | 2400                                                   |
| 150                | 151             | 8 × 10                       | 0.14                                      | 37.5                              | 26                                      | 2400                                                   | 8 × 10                       | 0.12                                      | 52.5                              | 26                                      | 2400                                                   |
| 220                | 221             | 8 × 10                       | 0.14                                      | 55                                | 26                                      | 2400                                                   | 10 × 10.5                    | 0.12                                      | 77                                | 20                                      | 2500                                                   |
| 270                | 270             |                              |                                           |                                   |                                         |                                                        | 10 × 10.5                    | 0.12                                      | 94.5                              | 20                                      | 2500                                                   |
| 330                | 331             | 10 × 10.5                    | 0.14                                      | 82.5                              | 20                                      | 2500                                                   |                              |                                           |                                   |                                         |                                                        |

| WV (V)             |                 | 50 (1H)                      |                                           |                                   |                                         |                                                        | 63 (1J)                      |                                           |                                   |                                         |                                                        |
|--------------------|-----------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|
| Cap.<br>容量<br>(μF) | Parameter<br>參數 | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>105°C,<br>100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>105°C,<br>100KHz<br>紋波電流 |
| 10                 | 100             | 6.3 × 6                      | 0.10                                      | 5                                 | 12                                      | 720                                                    | 6.3 × 6                      | 0.08                                      | 6.3                               | 120                                     | 1000                                                   |
| 22                 | 220             | 6.3 × 6                      | 0.10                                      | 11                                | 75                                      | 1100                                                   | 6.3 × 7.7                    | 0.08                                      | 13.86                             | 75                                      | 1550                                                   |
| 33                 | 330             | 6.3 × 7.7                    | 0.10                                      | 16.5                              | 40                                      | 1600                                                   | 8 × 10                       | 0.08                                      | 20.79                             | 38                                      | 1750                                                   |
| 47                 | 470             | 8 × 10                       | 0.10                                      | 23.5                              | 28                                      | 1850                                                   | 8 × 10                       | 0.08                                      | 29.61                             | 38                                      | 1750                                                   |
| 56                 | 560             |                              |                                           |                                   |                                         |                                                        | 10 × 10.5                    | 0.08                                      | 35.28                             | 29                                      | 1820                                                   |
| 68                 | 680             | 8 × 10                       | 0.10                                      | 34                                | 28                                      | 1850                                                   | 10 × 10.5                    | 0.08                                      | 42.84                             | 29                                      | 1820                                                   |
| 82                 | 820             |                              |                                           |                                   |                                         |                                                        | 10 × 10.5                    | 0.08                                      | 54.66                             | 29                                      | 1820                                                   |
| 100                | 101             | 10 × 10.5                    | 0.10                                      | 50                                | 26                                      | 2000                                                   |                              |                                           |                                   |                                         |                                                        |

| WV (V)             |                 | 80 (1K)                      |                                           |                                   |                                         |                                                        |
|--------------------|-----------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|
| Cap.<br>容量<br>(μF) | Parameter<br>參數 | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>105°C,<br>100KHz<br>紋波電流 |
| 22                 | 220             | 8 × 10                       | 0.08                                      | 17.6                              | 43                                      | 1500                                                   |
| 33                 | 330             | 10 × 10.5                    | 0.08                                      | 26.73                             | 35                                      | 1700                                                   |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 120KHz ≤ f ≤ 1KHz | 1KHz ≤ f ≤ 10KHz | 10KHz ≤ f ≤ 100KHz | 100KHz ≤ f ≤ 300KHz |
|----------------|-------------------|------------------|--------------------|---------------------|
| Coefficient 系數 | 0.10              | 0.40             | 0.70               | 1.00                |

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 17 for the Part Number System. 產品編碼規則請查閱第 17 頁。

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.

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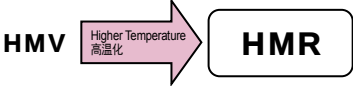
CAT.2024/V1.3

HMR Series

CHIP TYPE, 125°C HIGH TEMPERATURE

貼片式, 125°C 高溫品

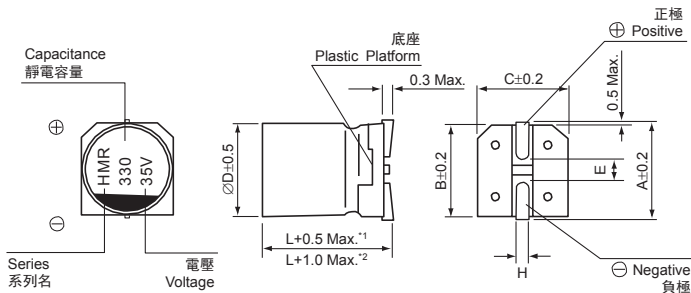
- Operating with wide temperature range -55~+125°C  
適用於 -55~+125°C 的寬溫範圍
- High reliability & high voltage are realized by hybrid electrolyte  
通過混合型電解質, 提升可靠性和高電壓化
- Load life of 4000 hours  
負荷壽命 4000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵
- AEC-Q200 compliant (Please contact us for details)  
符合 AEC-Q200 (請與我們聯繫瞭解詳細信息)



SPECIFICATIONS 特性表

| Items 項目                                                                                                  | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operation Temperature Range 使用溫度範圍                                                                        | -55 ~ +125°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Voltage Range 額定工作電壓範圍                                                                                    | 16 ~ 100V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Capacitance Range 靜電容量範圍                                                                                  | 22 ~ 1800µF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Capacitance Tolerance 靜電容量允許偏差                                                                            | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Leakage Current 漏電流                                                                                       | Leakage current ≤0.01CV (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                   |
| Dissipation Factor (tan δ) 損耗角正切                                                                          | ≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ESR 阻抗值                                                                                                   | ≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Stability at Low Temperature 低溫特性                                                                         | Measurement frequency 測試頻率: 100KHz<br>Impedance Ratio 阻抗比<br>Z(-25°C)/Z(20°C) ≤2.0<br>ZT/Z20 (max.) Z(-55°C)/Z(20°C) ≤2.5                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Bias Humidity Test 耐濕負荷特性                                                                                 | When the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, 85% RH, they meet the characteristics listed below.<br>在 85°C 和相對濕度 85%環境下施加額定工作電壓 2000 小時並恢復至 20°C 後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值<br>Appearance 外觀 No significant damage 無明顯異常 |
| Endurance 耐久性                                                                                             | When the capacitors are restored to 20°C after 4000 hours application of the rated voltage at 125°C, they meet the characteristics listed below.<br>在 125°C 環境中施加額定工作電壓 4000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                   |
| Shelf Life 高溫貯存特性                                                                                         | When the capacitors are restored to 20°C after leaving under no load at 125°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 125°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                             |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 22 for soldering conditions)<br>(焊接條件請查閱第 22 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±10% of initial value 初始值的±10%以內<br>Dissipation Factor 損耗角正切 Initial specified value or less 不大於規範值<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                                                                                                                                                                                  |
| Marking 標識                                                                                                | Black print on the case top. 鋁殼頂部黑色字體印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

DRAWING 外形圖 (Unit: mm)



\*1. Applicable to Ø6.3 and Ø8 適用於Ø6.3和Ø8  
\*2. Applicable to Ø10 and above 適用於Ø10和Ø10以上

Dimension table in next page.  
尺寸表見下一頁。

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HMR Series

DIMENSIONS 尺寸表 (Unit: mm)

| ∅D × L | 6.3 × 6 | 6.3 × 7.7 | 8 × 10  | 8 × 12.5 | 10 × 10.5 | 10 × 12.8 | 10 × 16.5 |
|--------|---------|-----------|---------|----------|-----------|-----------|-----------|
| A      | 7.3     | 7.3       | 9.0     | 9.0      | 11.0      | 11.0      | 11.0      |
| B      | 6.6     | 6.6       | 8.3     | 8.3      | 10.3      | 10.3      | 10.3      |
| C      | 6.6     | 6.6       | 8.3     | 8.3      | 10.3      | 10.3      | 10.3      |
| E      | 1.9     | 1.9       | 3.1     | 3.1      | 4.7       | 4.7       | 4.7       |
| L      | 6.0     | 7.7       | 10      | 12.5     | 10.5      | 12.8      | 16.5      |
| H      | 0.5~0.8 | 0.5~0.8   | 0.8~1.1 | 0.8~1.1  | 0.8~1.1   | 0.8~1.1   | 0.8~1.1   |

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| WV (V)<br>Parameter<br>參數<br>Cap. 容量 (μF) |     | 16 (1C)                      |                                        |                                |                                         |                                                        | 25 (1E)                      |                                        |                                |                                         |                                                        |
|-------------------------------------------|-----|------------------------------|----------------------------------------|--------------------------------|-----------------------------------------|--------------------------------------------------------|------------------------------|----------------------------------------|--------------------------------|-----------------------------------------|--------------------------------------------------------|
|                                           |     | Case size<br>∅D×L (mm)<br>尺寸 | Dissipation<br>factor (tan δ)<br>損耗角正切 | Leakage<br>current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C,<br>100KHz<br>紋波電流 | Case size<br>∅D×L (mm)<br>尺寸 | Dissipation<br>factor (tan δ)<br>損耗角正切 | Leakage<br>current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C,<br>100KHz<br>紋波電流 |
|                                           |     |                              |                                        |                                |                                         |                                                        |                              |                                        |                                |                                         |                                                        |
| 68                                        | 680 |                              |                                        |                                |                                         |                                                        | 6.3 × 6                      | 0.14                                   | 17                             | 50                                      | 900                                                    |
| 100                                       | 101 | 6.3 × 6                      | 0.16                                   | 16                             | 45                                      | 950                                                    | 6.3 × 7.7                    | 0.14                                   | 25                             | 30                                      | 1400                                                   |
| 150                                       | 151 |                              |                                        |                                |                                         |                                                        | 6.3 × 7.7                    | 0.14                                   | 37.5                           | 30                                      | 1400                                                   |
| 220                                       | 221 | 6.3 × 7.7                    | 0.16                                   | 35.2                           | 27                                      | 1450                                                   | 8 × 10                       | 0.14                                   | 67.5                           | 27                                      | 1600                                                   |
| 270                                       | 271 | 8 × 10                       | 0.16                                   | 43.2                           | 22                                      | 1700                                                   |                              |                                        |                                |                                         |                                                        |
| 330                                       | 331 |                              |                                        |                                |                                         |                                                        | 8 × 10<br>(10 × 10.5)        | 0.14<br>(0.14)                         | 82.5<br>(82.5)                 | 27<br>(20)                              | 1600<br>(2000)                                         |
| 470                                       | 471 | 8 × 10<br>(10 × 10.5)        | 0.16<br>(0.16)                         | 75.2<br>(75.2)                 | 22<br>(18)                              | 1700<br>(2100)                                         | 8 × 12.5<br>(10 × 10.5)      | 0.14<br>(0.14)                         | 117.5<br>(117.5)               | 23<br>(20)                              | 1900<br>(2000)                                         |
| 680                                       | 681 |                              |                                        |                                |                                         |                                                        | 10 × 12.8                    | 0.14                                   | 170                            | 15                                      | 2700                                                   |
| 820                                       | 821 | 8 × 12.5<br>(10 × 10.5)      | 0.16<br>(0.16)                         | 131.2<br>(131.2)               | 20<br>(18)                              | 1850<br>(2100)                                         |                              |                                        |                                |                                         |                                                        |
| 1000                                      | 102 |                              |                                        |                                |                                         |                                                        | 10 × 16.5                    | 0.14                                   | 250                            | 11                                      | 4000                                                   |
| 1500                                      | 152 | 10 × 12.8                    | 0.16                                   | 240                            | 14                                      | 3000                                                   |                              |                                        |                                |                                         |                                                        |
| 1800                                      | 182 | 10 × 16.5                    | 0.16                                   | 288                            | 12                                      | 3400                                                   |                              |                                        |                                |                                         |                                                        |

| WV (V)<br>Parameter<br>參數<br>Cap. 容量 (μF) |     | 35 (1V)                      |                                        |                                |                                         |                                                        | 50 (1H)                      |                                        |                                |                                         |                                                        |
|-------------------------------------------|-----|------------------------------|----------------------------------------|--------------------------------|-----------------------------------------|--------------------------------------------------------|------------------------------|----------------------------------------|--------------------------------|-----------------------------------------|--------------------------------------------------------|
|                                           |     | Case size<br>∅D×L (mm)<br>尺寸 | Dissipation<br>factor (tan δ)<br>損耗角正切 | Leakage<br>current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C,<br>100KHz<br>紋波電流 | Case size<br>∅D×L (mm)<br>尺寸 | Dissipation<br>factor (tan δ)<br>損耗角正切 | Leakage<br>current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C,<br>100KHz<br>紋波電流 |
|                                           |     |                              |                                        |                                |                                         |                                                        |                              |                                        |                                |                                         |                                                        |
| 22                                        | 220 |                              |                                        |                                |                                         |                                                        | 6.3 × 6                      | 0.10                                   | 11                             | 80                                      | 750                                                    |
| 27                                        | 270 |                              |                                        |                                |                                         |                                                        | 6.3 × 6                      | 0.10                                   | 13.5                           | 80                                      | 750                                                    |
| 33                                        | 330 |                              |                                        |                                |                                         |                                                        | 6.3 × 7.7                    | 0.10                                   | 16.5                           | 40                                      | 1100                                                   |
| 47                                        | 470 | 6.3 × 6                      | 0.12                                   | 16.45                          | 60                                      | 900                                                    |                              |                                        |                                |                                         |                                                        |
| 68                                        | 680 | 6.3 × 7.7                    | 0.12                                   | 23.8                           | 35                                      | 1400                                                   | 8 × 10                       | 0.10                                   | 34                             | 30                                      | 1250                                                   |
| 100                                       | 101 | 6.3 × 7.7                    | 0.12                                   | 35                             | 35                                      | 1400                                                   | 8 × 10<br>(10 × 10.5)        | 0.10<br>(0.10)                         | 50<br>(50)                     | 30<br>(25)                              | 1250<br>(1600)                                         |
| 120                                       | 121 |                              |                                        |                                |                                         |                                                        | 8 × 12.5                     | 0.10                                   | 60                             | 28                                      | 1400                                                   |
| 150                                       | 151 | 8 × 10                       | 0.12                                   | 52.5                           | 27                                      | 1600                                                   | 10 × 10.5                    | 0.10                                   | 75                             | 25                                      | 1600                                                   |
| 180                                       | 181 | 8 × 10                       | 0.12                                   | 63                             | 27                                      | 1600                                                   |                              |                                        |                                |                                         |                                                        |
| 220                                       | 221 | 8 × 12.5                     | 0.12                                   | 77                             | 24                                      | 1800                                                   | 10 × 12.8                    | 0.10                                   | 110                            | 23                                      | 1800                                                   |
| 270                                       | 271 | 10 × 10.5                    | 0.12                                   | 94.5                           | 20                                      | 2000                                                   | 10 × 16.5                    | 0.10                                   | 135                            | 13                                      | 3700                                                   |
| 330                                       | 331 | 10 × 10.5                    | 0.12                                   | 115.5                          | 20                                      | 2000                                                   |                              |                                        |                                |                                         |                                                        |
| 470                                       | 471 | 10 × 12.8                    | 0.12                                   | 164.5                          | 16                                      | 2600                                                   |                              |                                        |                                |                                         |                                                        |
| 680                                       | 680 | 10 × 16.5                    | 0.12                                   | 238                            | 11                                      | 4000                                                   |                              |                                        |                                |                                         |                                                        |

| WV (V)<br>Parameter<br>參數<br>Cap. 容量 (μF) |     | 63 (1J)                      |                                        |                                |                                         |                                                        | 80 (1K)                      |                                        |                                |                                         |                                                        |
|-------------------------------------------|-----|------------------------------|----------------------------------------|--------------------------------|-----------------------------------------|--------------------------------------------------------|------------------------------|----------------------------------------|--------------------------------|-----------------------------------------|--------------------------------------------------------|
|                                           |     | Case size<br>∅D×L (mm)<br>尺寸 | Dissipation<br>factor (tan δ)<br>損耗角正切 | Leakage<br>current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C,<br>100KHz<br>紋波電流 | Case size<br>∅D×L (mm)<br>尺寸 | Dissipation<br>factor (tan δ)<br>損耗角正切 | Leakage<br>current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C,<br>100KHz<br>紋波電流 |
|                                           |     |                              |                                        |                                |                                         |                                                        |                              |                                        |                                |                                         |                                                        |
| 22                                        | 220 | 6.3 × 7.7                    | 0.08                                   | 13.86                          | 80                                      | 900                                                    | 8 × 10                       | 0.08                                   | 17.6                           | 45                                      | 1050                                                   |
| 33                                        | 330 | 8 × 10                       | 0.08                                   | 20.79                          | 40                                      | 1100                                                   | 8 × 10                       | 0.08                                   | 26.4                           | 45                                      | 1050                                                   |
| 47                                        | 470 | 8 × 10                       | 0.08                                   | 29.61                          | 40                                      | 1100                                                   | 8 × 12.5<br>(10 × 10.5)      | 0.08<br>(0.08)                         | 37.6<br>(37.6)                 | 42<br>(36)                              | 1200<br>(1200)                                         |
| 56                                        | 560 | 10 × 10.5                    | 0.08                                   | 35.28                          | 30                                      | 1400                                                   | 10 × 10.5                    | 0.08                                   | 44.8                           | 36                                      | 1200                                                   |
| 82                                        | 820 |                              |                                        |                                |                                         |                                                        | 10 × 12.8                    | 0.08                                   | 65.6                           | 33                                      | 1350                                                   |
| 100                                       | 101 | 8 × 12.5<br>(10 × 10.5)      | 0.08<br>(0.08)                         | 63<br>(63)                     | 36<br>(30)                              | 1300<br>(1400)                                         | 10 × 16.5                    | 0.08                                   | 80                             | 20                                      | 2200                                                   |
| 150                                       | 151 | 10 × 12.8                    | 0.08                                   | 94.5                           | 26                                      | 1600                                                   |                              |                                        |                                |                                         |                                                        |
| 180                                       | 181 | 10 × 16.5                    | 0.08                                   | 113.4                          | 15                                      | 3500                                                   |                              |                                        |                                |                                         |                                                        |

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HMR Series

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| WV (V)       |              | 100 (2A)               |                                  |                          |                                |                                            |
|--------------|--------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|
| Cap. 容量 (μF) | Parameter 參數 | Case size ØD×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (μA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 125°C, 100KHz 紋波電流 |
| 33           | 330          | 10 × 10.5              | 0.08                             | 33                       | 80                             | 850                                        |
| 47           | 470          | 10 × 12.8              | 0.08                             | 47                       | 60                             | 1050                                       |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 120Hz ≤ f ≤ 1KHz | 1KHz ≤ f ≤ 10KHz | 10KHz ≤ f ≤ 100KHz | 100KHz ≤ f ≤ 300KHz |
|----------------|------------------|------------------|--------------------|---------------------|
| Coefficient 系數 | 0.10             | 0.40             | 0.70               | 1.00                |

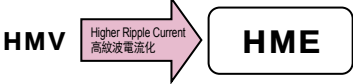
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 17 for the Part Number System. 產品編碼規則請查閱第 17 頁。

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HME Series

CHIP TYPE, 125°C HIGH RIPPLE CURRENT  
貼片式, 125°C 高紋波電流品

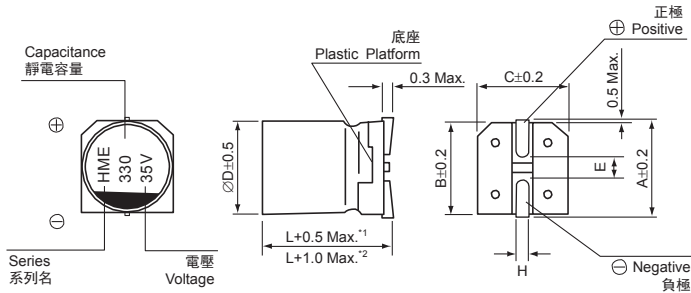
- Operating with wide temperature range -55~+125°C  
適用於 -55~+125°C 的寬溫範圍
- High reliability & high voltage are realized by hybrid electrolyte  
通過混合型電解質, 提升高可靠性和高電壓化
- Load life of 4000 hours  
負荷壽命 4000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵
- AEC-Q200 compliant (Please contact us for details)  
符合 AEC-Q200 (請與我們聯繫瞭解詳細信息)



SPECIFICATIONS 特性表

| Items 項目                                                                                                  | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operation Temperature Range 使用溫度範圍                                                                        | -55 ~ +125°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Voltage Range 額定工作電壓範圍                                                                                    | 25 ~ 63V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Capacitance Range 靜電容量範圍                                                                                  | 47 ~ 470μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Capacitance Tolerance 靜電容量允許偏差                                                                            | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Leakage Current 漏電流                                                                                       | Leakage current ≤0.01CV (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                   |
| Dissipation Factor (tan δ) 損耗角正切                                                                          | ≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ESR 阻抗值                                                                                                   | ≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Stability at Low Temperature 低溫特性                                                                         | Measurement frequency 測試頻率: 100KHz<br>Impedance Ratio 阻抗比<br>Z(-25°C)/Z(20°C) ≤2.0<br>Z(-55°C)/Z(20°C) ≤2.5                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Bias Humidity Test 耐濕負荷特性                                                                                 | When the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, 85% RH, they meet the characteristics listed below.<br>在 85°C 和相對濕度 85%環境下施加額定工作電壓 2000 小時並恢復至 20°C 後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值<br>Appearance 外觀 No significant damage 無明顯異常 |
| Endurance 耐久性                                                                                             | When the capacitors are restored to 20°C after 4000 hours application of the rated voltage at 125°C, they meet the characteristics listed below.<br>在 125°C 環境中施加額定工作電壓 4000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                   |
| Shelf Life 高溫貯存特性                                                                                         | When the capacitors are restored to 20°C after leaving under no load at 125°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 125°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                             |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 22 for soldering conditions)<br>(焊接條件請查閱第 22 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±10% of initial value 初始值的±10%以內<br>Dissipation Factor 損耗角正切 Initial specified value or less 不大於規範值<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                                                                                                                                                                                  |
| Marking 標識                                                                                                | Black print on the case top. 鋁殼頂部黑色字體印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

DRAWING 外形圖 (Unit: mm)



Dimension table in next page.  
尺寸表見下一頁。

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HME Series

DIMENSIONS 尺寸表 (Unit: mm)

| ∅D × L | 6.3 × 6 | 6.3 × 7.7 | 8 × 10  | 10 × 10.5 | 10 × 12.8 |
|--------|---------|-----------|---------|-----------|-----------|
| A      | 7.3     | 7.3       | 9.0     | 11.0      | 11.0      |
| B      | 6.6     | 6.6       | 8.3     | 10.3      | 10.3      |
| C      | 6.6     | 6.6       | 8.3     | 10.3      | 10.3      |
| E      | 1.9     | 1.9       | 3.1     | 4.7       | 4.7       |
| L      | 6.0     | 7.7       | 10      | 10.5      | 12.8      |
| H      | 0.5~0.8 | 0.5~0.8   | 0.8~1.1 | 0.8~1.1   | 0.8~1.1   |

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| Cap. 容量 (μF)<br>Parameter 參數<br>WV (V) |     | 25 (1E)                   |                                     |                             |                                         |                                                     | 35 (1V)                   |                                     |                             |                                         |                                                     |
|----------------------------------------|-----|---------------------------|-------------------------------------|-----------------------------|-----------------------------------------|-----------------------------------------------------|---------------------------|-------------------------------------|-----------------------------|-----------------------------------------|-----------------------------------------------------|
|                                        |     | Case size ∅D×L (mm)<br>尺寸 | Dissipation factor (tan δ)<br>損耗角正切 | Leakage current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>125°C,<br>100KHz<br>紋波電流 | Case size ∅D×L (mm)<br>尺寸 | Dissipation factor (tan δ)<br>損耗角正切 | Leakage current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>125°C,<br>100KHz<br>紋波電流 |
|                                        |     | 56                        | 560                                 |                             |                                         |                                                     | 6.3 × 6                   | 0.12                                | 19.6                        | 60                                      | 1200                                                |
| 82                                     | 820 | 6.3 × 6                   | 0.14                                | 20.5                        | 50                                      | 1300                                                |                           |                                     |                             |                                         |                                                     |
| 100                                    | 101 |                           |                                     |                             |                                         |                                                     | 6.3 × 7.7                 | 0.12                                | 35                          | 35                                      | 1700                                                |
| 150                                    | 151 | 6.3 × 7.7                 | 0.14                                | 37.5                        | 30                                      | 1800                                                | 8 × 10                    | 0.12                                | 52.5                        | 22                                      | 2900                                                |
| 220                                    | 221 | 8 × 10                    | 0.14                                | 55                          | 22                                      | 2900                                                | 10 × 10.5                 | 0.12                                | 77                          | 20                                      | 3400                                                |
| 270                                    | 271 |                           |                                     |                             |                                         |                                                     | 10 × 12.8                 | 0.12                                | 94.5                        | 16                                      | 3800                                                |
| 330                                    | 331 | 10 × 10.5                 | 0.14                                | 82.5                        | 16                                      | 3500                                                |                           |                                     |                             |                                         |                                                     |
| 470                                    | 471 | 10 × 12.8                 | 0.14                                | 117.5                       | 14                                      | 4000                                                |                           |                                     |                             |                                         |                                                     |

| Cap. 容量 (μF)<br>Parameter 參數<br>WV (V) |     | 50 (1H)                   |                                     |                             |                                         |                                                     | 63 (1J)                   |                                     |                             |                                         |                                                     |
|----------------------------------------|-----|---------------------------|-------------------------------------|-----------------------------|-----------------------------------------|-----------------------------------------------------|---------------------------|-------------------------------------|-----------------------------|-----------------------------------------|-----------------------------------------------------|
|                                        |     | Case size ∅D×L (mm)<br>尺寸 | Dissipation factor (tan δ)<br>損耗角正切 | Leakage current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>125°C,<br>100KHz<br>紋波電流 | Case size ∅D×L (mm)<br>尺寸 | Dissipation factor (tan δ)<br>損耗角正切 | Leakage current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>125°C,<br>100KHz<br>紋波電流 |
| 47                                     | 470 |                           |                                     |                             |                                         |                                                     | 8 × 10                    | 0.08                                | 29.61                       | 32                                      | 2400                                                |
| 68                                     | 680 | 8 × 10                    | 0.10                                | 34                          | 25                                      | 2700                                                |                           |                                     |                             |                                         |                                                     |
| 82                                     | 820 |                           |                                     |                             |                                         |                                                     | 10 × 10.5                 | 0.08                                | 51.66                       | 25                                      | 2800                                                |
| 100                                    | 101 |                           |                                     |                             |                                         |                                                     | 10 × 12.8                 | 0.08                                | 63                          | 19                                      | 3200                                                |
| 120                                    | 121 | 10 × 10.5                 | 0.10                                | 60                          | 23                                      | 2900                                                |                           |                                     |                             |                                         |                                                     |
| 150                                    | 151 | 10 × 12.8                 | 0.10                                | 75                          | 17                                      | 3500                                                |                           |                                     |                             |                                         |                                                     |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 120Hz ≤ f ≤ 1KHz | 1KHz ≤ f ≤ 10KHz | 10KHz ≤ f ≤ 100KHz | 100KHz ≤ f ≤ 300KHz |
|----------------|------------------|------------------|--------------------|---------------------|
| Coefficient 系數 | 0.10             | 0.40             | 0.70               | 1.00                |

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 17 for the Part Number System. 產品編碼規則請查閱第 17 頁。

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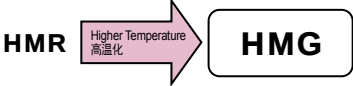
CAT.2024/V1.3

HMG Series

CHIP TYPE, 135°C HIGH TEMPERATURE

貼片式, 135°C 高溫品

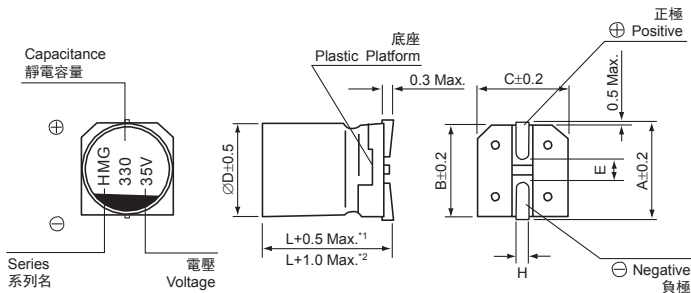
- Operating with wide temperature range -55~+135°C  
適用於 -55~+135°C 的寬溫範圍
- High reliability & high voltage are realized by hybrid electrolyte  
通過混合型電解質, 提升可靠性和高電壓化
- Load life of 4000 hours  
負荷壽命 4000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵
- AEC-Q200 compliant (Please contact us for details)  
符合 AEC-Q200 (請與我們聯繫瞭解詳細信息)



SPECIFICATIONS 特性表

| Items 項目                                                                                                  | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operation Temperature Range 使用溫度範圍                                                                        | -55 ~ +135°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Voltage Range 額定工作電壓範圍                                                                                    | 25 ~ 63V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Capacitance Range 靜電容量範圍                                                                                  | 33 ~ 560μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Capacitance Tolerance 靜電容量允許偏差                                                                            | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Leakage Current 漏電流                                                                                       | Leakage current ≤0.01CV (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                   |
| Dissipation Factor (tan δ) 損耗角正切                                                                          | ≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ESR 阻抗值                                                                                                   | ≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Stability at Low Temperature 低溫特性                                                                         | Measurement frequency 測試頻率: 100KHz<br>Impedance Ratio 阻抗比<br>Z(-25°C)/Z(20°C) ≤2.0<br>ZT/Z20 (max.) Z(-55°C)/Z(20°C) ≤2.5                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Bias Humidity Test 耐濕負荷特性                                                                                 | When the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, 85% RH, they meet the characteristics listed below.<br>在 85°C 和相對濕度 85%環境下施加額定工作電壓 2000 小時並恢復至 20°C 後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值<br>Appearance 外觀 No significant damage 無明顯異常 |
| Endurance 耐久性                                                                                             | When the capacitors are restored to 20°C after 4000 hours application of the rated voltage at 135°C, they meet the characteristics listed below.<br>在 135°C 環境中施加額定工作電壓 4000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                   |
| Shelf Life 高溫貯存特性                                                                                         | When the capacitors are restored to 20°C after leaving under no load at 135°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 135°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                             |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 22 for soldering conditions)<br>(焊接條件請查閱第 22 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±10% of initial value 初始值的±10%以內<br>Dissipation Factor 損耗角正切 Initial specified value or less 不大於規範值<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                                                                                                                                                                                  |
| Marking 標識                                                                                                | Black print on the case top. 鋁殼頂部黑色字體印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

DRAWING 外形圖 (Unit: mm)



\*1. Applicable to Ø6.3 and Ø8 適用於Ø6.3和Ø8  
\*2. Applicable to Ø10 and above 適用於Ø10和Ø10以上

Dimension table in next page.  
尺寸表見下一頁。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注:** 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

HMG Series

DIMENSIONS 尺寸表 (Unit: mm)

| ∅D × L | 8 × 10  | 10 × 10.5 | 10 × 12.8 | 10 × 16.5 |
|--------|---------|-----------|-----------|-----------|
| A      | 9.0     | 11.0      | 11.0      | 11.0      |
| B      | 8.3     | 10.3      | 10.3      | 10.3      |
| C      | 8.3     | 10.3      | 10.3      | 10.3      |
| E      | 3.1     | 4.7       | 4.7       | 4.7       |
| L      | 10      | 10.5      | 12.8      | 16.5      |
| H      | 0.8~1.1 | 0.8~1.1   | 0.8~1.1   | 0.8~1.1   |

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| Cap. 容量 (μF)<br>Parameter 參數<br>WV (V) |     | 25 (1E)                   |                                     |                             |                                         |                                           |        | 35 (1V)                   |                                     |                             |                                         |                                           |        |
|----------------------------------------|-----|---------------------------|-------------------------------------|-----------------------------|-----------------------------------------|-------------------------------------------|--------|---------------------------|-------------------------------------|-----------------------------|-----------------------------------------|-------------------------------------------|--------|
|                                        |     | Case size ∅D×L (mm)<br>尺寸 | Dissipation factor (tan δ)<br>損耗角正切 | Leakage current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>100KHz<br>紋波電流 |        | Case size ∅D×L (mm)<br>尺寸 | Dissipation factor (tan δ)<br>損耗角正切 | Leakage current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>100KHz<br>紋波電流 |        |
|                                        |     |                           |                                     |                             |                                         | ≤125°C                                    | ≤135°C |                           |                                     |                             |                                         | ≤125°C                                    | ≤135°C |
| 100                                    | 101 |                           |                                     |                             |                                         |                                           |        | 8 × 10                    | 0.12                                | 35                          | 27                                      | 2900                                      | 1600   |
| 150                                    | 151 | 8 × 10                    | 0.14                                | 37.5                        | 27                                      | 2900                                      | 1600   | 8 × 10                    | 0.12                                | 52.5                        | 27                                      | 2900                                      | 1600   |
| 220                                    | 221 | 8 × 10                    | 0.14                                | 55                          | 27                                      | 2900                                      | 1600   |                           |                                     |                             |                                         |                                           |        |
| 270                                    | 271 | 8 × 10                    | 0.14                                | 67.5                        | 23                                      | 3300                                      | 2000   | 10 × 10.5                 | 0.12                                | 94.5                        | 20                                      | 3300                                      | 2000   |
| 330                                    | 331 | 10 × 10.5                 | 0.14                                | 82.5                        | 20                                      | 3400                                      | 2100   | 10 × 12.8                 | 0.12                                | 115.5                       | 16                                      | 3500                                      | 2300   |
| 470                                    | 471 | 10 × 12.8                 | 0.14                                | 117.5                       | 16                                      | 3500                                      | 2300   | 10 × 16.5                 | 0.12                                | 164.5                       | 11                                      | 4000                                      | 2900   |
| 560                                    | 561 | 10 × 16.5                 | 0.14                                | 140                         | 11                                      | 4000                                      | 2900   |                           |                                     |                             |                                         |                                           |        |

| Cap. 容量 (μF)<br>Parameter 參數<br>WV (V) |     | 50 (1H)                   |                                     |                             |                                         |                                           |        | 63 (1J)                   |                                     |                             |                                         |                                           |        |
|----------------------------------------|-----|---------------------------|-------------------------------------|-----------------------------|-----------------------------------------|-------------------------------------------|--------|---------------------------|-------------------------------------|-----------------------------|-----------------------------------------|-------------------------------------------|--------|
|                                        |     | Case size ∅D×L (mm)<br>尺寸 | Dissipation factor (tan δ)<br>損耗角正切 | Leakage current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>100KHz<br>紋波電流 |        | Case size ∅D×L (mm)<br>尺寸 | Dissipation factor (tan δ)<br>損耗角正切 | Leakage current (μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>100KHz<br>紋波電流 |        |
|                                        |     |                           |                                     |                             |                                         | ≤125°C                                    | ≤135°C |                           |                                     |                             |                                         | ≤125°C                                    | ≤135°C |
| 33                                     | 330 |                           |                                     |                             |                                         |                                           |        | 8 × 10                    | 0.08                                | 20.79                       | 40                                      | 1900                                      | 1100   |
| 47                                     | 470 | 8 × 10                    | 0.10                                | 23.5                        | 30                                      | 2200                                      | 1250   | 8 × 10                    | 0.08                                | 29.61                       | 40                                      | 1900                                      | 1100   |
| 56                                     | 560 | 8 × 10                    | 0.10                                | 28                          | 30                                      | 2200                                      | 1250   | 10 × 10.5                 | 0.08                                | 35.28                       | 30                                      | 2300                                      | 1400   |
| 68                                     | 680 |                           |                                     |                             |                                         |                                           |        | 10 × 10.5                 | 0.08                                | 42.84                       | 30                                      | 2300                                      | 1400   |
| 82                                     | 820 |                           |                                     |                             |                                         |                                           |        | 10 × 10.5                 | 0.08                                | 51.66                       | 30                                      | 2300                                      | 1400   |
| 100                                    | 101 |                           |                                     |                             |                                         |                                           |        | 10 × 12.8                 | 0.08                                | 63                          | 20                                      | 3000                                      | 1900   |
| 120                                    | 121 | 10 × 10.5                 | 0.10                                | 60                          | 28                                      | 2600                                      | 1600   |                           |                                     |                             |                                         |                                           |        |
| 150                                    | 151 | 10 × 12.8                 | 0.10                                | 75                          | 18                                      | 3200                                      | 2000   | 10 × 16.5                 |                                     | 94.5                        | 15                                      | 3500                                      | 2400   |
| 220                                    | 221 | 10 × 16.5                 | 0.10                                | 110                         | 13                                      | 3700                                      | 2600   |                           |                                     |                             |                                         |                                           |        |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

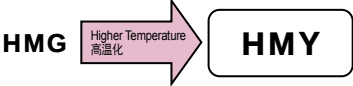
| Frequency 頻率   | 120Hz ≤ f ≤ 1KHz | 1KHz ≤ f ≤ 10KHz | 10KHz ≤ f ≤ 100KHz | 100KHz ≤ f ≤ 300KHz |
|----------------|------------------|------------------|--------------------|---------------------|
| Coefficient 系數 | 0.20             | 0.40             | 0.70               | 1.00                |

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 17 for the Part Number System. 產品編碼規則請查閱第 17 頁。

HMV Series

CHIP TYPE, 145°C ULTRA-HIGH TEMPERATURE  
貼片式, 145°C 超高溫品

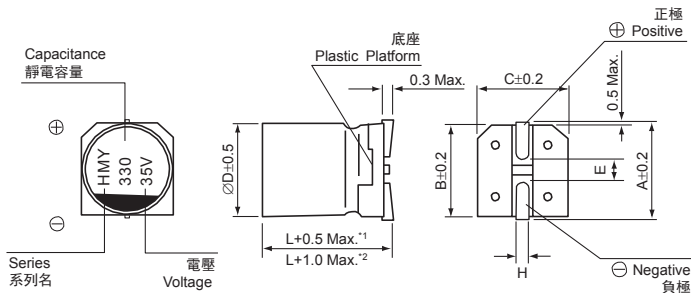
- Operating with wide temperature range -55~+145°C  
適用於 -55~+145°C 的寬溫範圍
- High reliability & high voltage are realized by hybrid electrolyte  
通過混合型電解質, 提升可靠性和高電壓化
- Load life of 2000 hours  
負荷壽命 2000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵
- AEC-Q200 compliant (Please contact us for details)  
符合 AEC-Q200 (請與我們聯繫瞭解詳細信息)



SPECIFICATIONS 特性表

| Items 項目                                                                                                  | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------|--------------------------|------------------------------------------------------|---------------------|------------------------------------------------------|---------------------|----------------------------------------|---------------|-----------------------------|
| Operation Temperature Range 使用溫度範圍                                                                        | -55 ~ +145°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Voltage Range 額定工作電壓範圍                                                                                    | 25 ~ 63V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Capacitance Range 靜電容量範圍                                                                                  | 33 ~ 330μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Capacitance Tolerance 靜電容量允許偏差                                                                            | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                       | Leakage current ≤0.01CV (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor (tan δ) 損耗角正切                                                                          | ≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                   | ≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Stability at Low Temperature 低溫特性                                                                         | Measurement frequency 測試頻率: 100KHz<br>Impedance Ratio 阻抗比<br>ZT/Z20 (max.) <table><tr><td>Z(-25°C)/Z(20°C)</td><td>≤2.0</td></tr><tr><td>Z(-55°C)/Z(20°C)</td><td>≤2.5</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Z(-25°C)/Z(20°C)           | ≤2.0                                     | Z(-55°C)/Z(20°C)         | ≤2.5                                                 |                     |                                                      |                     |                                        |               |                             |
| Z(-25°C)/Z(20°C)                                                                                          | ≤2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Z(-55°C)/Z(20°C)                                                                                          | ≤2.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Bias Humidity Test 耐濕負荷特性                                                                                 | When the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, 85% RH, they meet the characteristics listed below.<br>在 85°C 和相對濕度 85%環境下施加額定工作電壓 2000 小時並恢復至 20°C 後, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±30% of initial value 為初始值的±30%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>ESR 阻抗值</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr><tr><td>Appearance 外觀</td><td>No significant damage 無明顯異常</td></tr></table> | Capacitance Change 靜電容量變化率 | Within ±30% of initial value 為初始值的±30%以內 | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% | ESR 阻抗值             | 200% or less of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | Initial specified value or less 不大於規範值 | Appearance 外觀 | No significant damage 無明顯異常 |
| Capacitance Change 靜電容量變化率                                                                                | Within ±30% of initial value 為初始值的±30%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                  | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                   | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                       | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Appearance 外觀                                                                                             | No significant damage 無明顯異常                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Endurance 耐久性                                                                                             | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 145°C, they meet the characteristics listed below.<br>在 145°C 環境中施加額定工作電壓 2000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±30% of initial value 為初始值的±30%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>ESR 阻抗值</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr></table>                                                                         | Capacitance Change 靜電容量變化率 | Within ±30% of initial value 為初始值的±30%以內 | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% | ESR 阻抗值             | 200% or less of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | Initial specified value or less 不大於規範值 |               |                             |
| Capacitance Change 靜電容量變化率                                                                                | Within ±30% of initial value 為初始值的±30%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                  | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                   | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                       | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Shelf Life 高溫貯存特性                                                                                         | When the capacitors are restored to 20°C after leaving under no load at 145°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 145°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 22 for soldering conditions)<br>(焊接條件請查閱第 22 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>Initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr></table>                                                                                                                                                                                                                                                              | Capacitance Change 靜電容量變化率 | Within ±10% of initial value 初始值的±10%以內  | Dissipation Factor 損耗角正切 | Initial specified value or less 不大於規範值               | Leakage Current 漏電流 | Initial specified value or less 不大於規範值               |                     |                                        |               |                             |
| Capacitance Change 靜電容量變化率                                                                                | Within ±10% of initial value 初始值的±10%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                  | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                       | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Marking 標識                                                                                                | Black print on the case top. 鋁殼頂部黑色字體印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |

DRAWING 外形圖 (Unit: mm)



\*1. Applicable to Ø6.3 and Ø8 適用於Ø6.3和Ø8  
\*2. Applicable to Ø10 and above 適用於Ø10和Ø10以上

Dimension table in next page.  
尺寸表見下一頁。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注:** 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

HMV Series

DIMENSIONS 尺寸表 (Unit: mm)

| ØD × L | 8 × 10  | 10 × 10.5 |
|--------|---------|-----------|
| A      | 9.0     | 11.0      |
| B      | 8.3     | 10.3      |
| C      | 8.3     | 10.3      |
| E      | 3.1     | 4.7       |
| L      | 10      | 10.5      |
| H      | 0.8~1.1 | 0.8~1.1   |

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| Cap. 容量 (µF)<br>Parameter 參數<br>WV (V) |     | 25 (1E)                      |                                           |                                   |                                         |                                              |        | 35 (1V)                      |                                           |                                   |                                         |                                              |        |
|----------------------------------------|-----|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|
|                                        |     | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        |
|                                        |     |                              |                                           |                                   |                                         | ≤135°C                                       | ≤145°C |                              |                                           |                                   |                                         | ≤135°C                                       | ≤145°C |
| 150                                    | 151 |                              |                                           |                                   |                                         |                                              |        | 8 × 10                       | 0.12                                      | 52.5                              | 27                                      | 1600                                         | 700    |
| 220                                    | 221 | 8 × 10                       | 0.14                                      | 55                                | 27                                      | 1600                                         | 700    | 10 × 10.5                    | 0.12                                      | 77                                | 20                                      | 200                                          | 900    |
| 270                                    | 271 | 10 × 10.5                    | 0.14                                      | 67.5                              | 20                                      | 200                                          | 900    | 10 × 10.5                    | 0.12                                      | 94.5                              | 20                                      | 200                                          | 900    |
| 330                                    | 331 | 10 × 10.5                    | 0.14                                      | 82.5                              | 20                                      | 200                                          | 900    |                              |                                           |                                   |                                         |                                              |        |

| Cap. 容量 (µF)<br>Parameter 參數<br>WV (V) |     | 50 (1H)                      |                                           |                                   |                                         |                                              |        | 63 (1J)                      |                                           |                                   |                                         |                                              |        |
|----------------------------------------|-----|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|
|                                        |     | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        |
|                                        |     |                              |                                           |                                   |                                         | ≤135°C                                       | ≤145°C |                              |                                           |                                   |                                         | ≤135°C                                       | ≤145°C |
| 33                                     | 330 |                              |                                           |                                   |                                         |                                              |        | 8 × 10                       | 0.08                                      | 20.79                             | 40                                      | 1100                                         | 600    |
| 56                                     | 560 |                              |                                           |                                   |                                         |                                              |        | 10 × 10.5                    | 0.08                                      | 35.28                             | 30                                      | 1400                                         | 800    |
| 68                                     | 680 | 8 × 10                       | 0.10                                      | 34                                | 30                                      | 1250                                         | 600    | 10 × 10.5                    | 0.08                                      | 42.84                             | 30                                      | 1400                                         | 800    |
| 82                                     | 820 | 10 × 10.5                    | 0.10                                      | 41                                | 28                                      | 1600                                         | 800    | 10 × 10.5                    | 0.08                                      | 51.66                             | 30                                      | 1400                                         | 800    |
| 100                                    | 101 | 10 × 10.5                    | 0.10                                      | 50                                | 28                                      | 1600                                         | 800    |                              |                                           |                                   |                                         |                                              |        |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

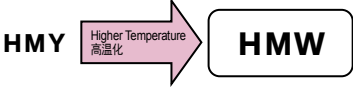
| Frequency 頻率   | 120Hz ≤ f ≤ 1KHz | 1KHz ≤ f ≤ 10KHz | 10KHz ≤ f ≤ 100KHz | 100KHz ≤ f ≤ 300KHz |
|----------------|------------------|------------------|--------------------|---------------------|
| Coefficient 系數 | 0.10             | 0.40             | 0.70               | 1.00                |

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 17 for the Part Number System. 產品編碼規則請查閱第 17 頁。

HMW Series

CHIP TYPE, 150°C ULTRA-HIGH TEMPERATURE  
貼片式, 150°C 超高溫品

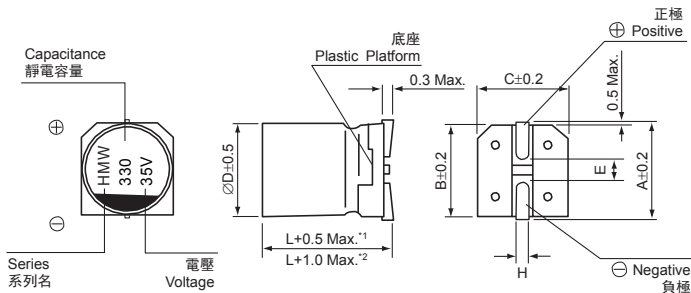
- Operating with wide temperature range -55~+150°C  
適用於 -55~+150°C 的寬溫範圍
- High reliability & high voltage are realized by hybrid electrolyte  
通過混合型電解質, 提升可靠性和高電壓化
- Load life of 1000 hours  
負荷壽命 1000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵
- AEC-Q200 compliant (Please contact us for details)  
符合 AEC-Q200 (請與我們聯繫瞭解詳細信息)



SPECIFICATIONS 特性表

| Items 項目                                                                                                  | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------|--------------------------|------------------------------------------------------|---------------------|------------------------------------------------------|---------------------|----------------------------------------|---------------|-----------------------------|
| Operation Temperature Range 使用溫度範圍                                                                        | -55 ~ +150°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Voltage Range 額定工作電壓範圍                                                                                    | 25 ~ 63V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Capacitance Range 靜電容量範圍                                                                                  | 33 ~ 270μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Capacitance Tolerance 靜電容量允許偏差                                                                            | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                       | Leakage current ≤0.01CV (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor (tan δ) 損耗角正切                                                                          | ≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                   | ≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Stability at Low Temperature 低溫特性                                                                         | Measurement frequency 測試頻率: 100KHz<br>Impedance Ratio 阻抗比<br>ZT/Z20 (max.) <table><tr><td>Z(-25°C)/Z(20°C)</td><td>≤2.0</td></tr><tr><td>Z(-55°C)/Z(20°C)</td><td>≤2.5</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Z(-25°C)/Z(20°C)           | ≤2.0                                     | Z(-55°C)/Z(20°C)         | ≤2.5                                                 |                     |                                                      |                     |                                        |               |                             |
| Z(-25°C)/Z(20°C)                                                                                          | ≤2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Z(-55°C)/Z(20°C)                                                                                          | ≤2.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Bias Humidity Test 耐濕負荷特性                                                                                 | When the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, 85% RH, they meet the characteristics listed below.<br>在 85°C 和相對濕度 85%環境下施加額定工作電壓 2000 小時並恢復至 20°C 後, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±30% of initial value 為初始值的±30%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>ESR 阻抗值</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr><tr><td>Appearance 外觀</td><td>No significant damage 無明顯異常</td></tr></table> | Capacitance Change 靜電容量變化率 | Within ±30% of initial value 為初始值的±30%以內 | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% | ESR 阻抗值             | 200% or less of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | Initial specified value or less 不大於規範值 | Appearance 外觀 | No significant damage 無明顯異常 |
| Capacitance Change 靜電容量變化率                                                                                | Within ±30% of initial value 為初始值的±30%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                  | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                   | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                       | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Appearance 外觀                                                                                             | No significant damage 無明顯異常                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Endurance 耐久性                                                                                             | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 150°C, they meet the characteristics listed below.<br>在 150°C 環境中施加額定工作電壓 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±30% of initial value 為初始值的±30%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>ESR 阻抗值</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr></table>                                                                         | Capacitance Change 靜電容量變化率 | Within ±30% of initial value 為初始值的±30%以內 | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% | ESR 阻抗值             | 200% or less of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | Initial specified value or less 不大於規範值 |               |                             |
| Capacitance Change 靜電容量變化率                                                                                | Within ±30% of initial value 為初始值的±30%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                  | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                   | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                       | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Shelf Life 高溫貯存特性                                                                                         | When the capacitors are restored to 20°C after leaving under no load at 150°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 150°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 22 for soldering conditions)<br>(焊接條件請查閱第 22 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>Initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr></table>                                                                                                                                                                                                                                                              | Capacitance Change 靜電容量變化率 | Within ±10% of initial value 初始值的±10%以內  | Dissipation Factor 損耗角正切 | Initial specified value or less 不大於規範值               | Leakage Current 漏電流 | Initial specified value or less 不大於規範值               |                     |                                        |               |                             |
| Capacitance Change 靜電容量變化率                                                                                | Within ±10% of initial value 初始值的±10%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                  | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                       | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Marking 標識                                                                                                | Black print on the case top. 鋁殼頂部黑色字體印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |

DRAWING 外形圖 (Unit: mm)



\*1. Applicable to Ø6.3 and Ø8 適用於Ø6.3和Ø8  
\*2. Applicable to Ø10 and above 適用於Ø10和Ø10以上

Dimension table in next page.  
尺寸表見下一頁。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注:** 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

HMW Series

DIMENSIONS 尺寸表 (Unit: mm)

| ØD × L | 8 × 10  | 10 × 10.5 |
|--------|---------|-----------|
| A      | 9.0     | 11.0      |
| B      | 8.3     | 10.3      |
| C      | 8.3     | 10.3      |
| E      | 3.1     | 4.7       |
| L      | 10      | 10.5      |
| H      | 0.8~1.1 | 0.8~1.1   |

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| WV (V)             |                 | 25 (1E)                      |                                           |                                   |                                         |                                                        | 35 (1V)                      |                                           |                                   |                                         |                                                        |
|--------------------|-----------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|
| Cap.<br>容量<br>(µF) | Parameter<br>參數 | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>150°C,<br>100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>150°C,<br>100KHz<br>紋波電流 |
| 100                | 101             |                              |                                           |                                   |                                         |                                                        | 8 × 10                       | 0.12                                      | 35                                | 30                                      | 1050                                                   |
| 150                | 151             | 8 × 10                       | 0.14                                      | 37.5                              | 27                                      | 1100                                                   | 10 × 10.5                    | 0.12                                      | 52.5                              | 23                                      | 1250                                                   |
| 270                | 271             | 10 × 10.5                    | 0.14                                      | 55                                | 20                                      | 1300                                                   |                              |                                           |                                   |                                         |                                                        |

| WV (V)             |                 | 50 (1H)                      |                                           |                                   |                                         |                                                        | 63 (1J)                      |                                           |                                   |                                         |                                                        |
|--------------------|-----------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|
| Cap.<br>容量<br>(µF) | Parameter<br>參數 | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>150°C,<br>100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>150°C,<br>100KHz<br>紋波電流 |
| 33                 | 330             |                              |                                           |                                   |                                         |                                                        | 8 × 10                       | 0.08                                      | 20.79                             | 40                                      | 720                                                    |
| 56                 | 560             | 8 × 10                       | 0.10                                      | 28                                | 35                                      | 950                                                    | 10 × 10.5                    | 0.08                                      | 35.28                             | 30                                      | 950                                                    |
| 100                | 101             | 10 × 10.5                    | 0.10                                      | 50                                | 28                                      | 1100                                                   |                              |                                           |                                   |                                         |                                                        |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 120Hz ≤ f ≤ 1KHz | 1KHz ≤ f ≤ 10KHz | 10KHz ≤ f ≤ 100KHz | 100KHz ≤ f ≤ 300KHz |
|----------------|------------------|------------------|--------------------|---------------------|
| Coefficient 系數 | 0.10             | 0.40             | 0.70               | 1.00                |

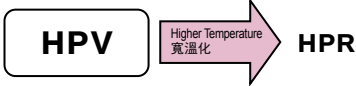
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 24. 焊接條件及推薦安裝尺寸請查閱第 24 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 17 for the Part Number System. 產品編碼規則請查閱第 17 頁。

HPV Series

RADIAL LEAD TYPE, 105°C STANDARD

插件式, 105°C 標準品

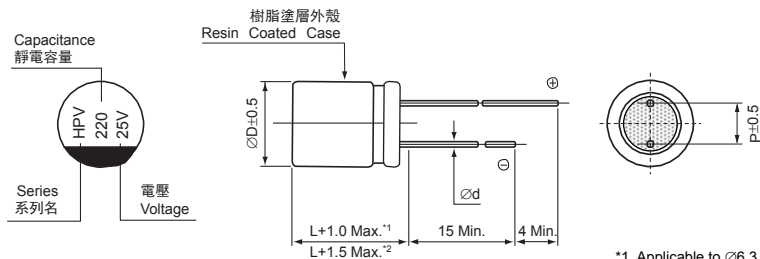
- Operating with wide temperature range -55~+105°C  
適用於 -55~+105°C 的寬溫範圍
- High reliability & high voltage are realized by hybrid electrolyte  
通過混合型電解質, 提升高可靠性和高電壓化
- Endurance 10000 hours  
耐久性 10000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵



SPECIFICATIONS 特性表

| Items 項目                                                                                                 | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------|--------------------------|------------------------------------------------------|---------------------|------------------------------------------------------|---------------------|----------------------------------------|---------------|-----------------------------|
| Category Temperature Range 工作溫度範圍                                                                        | -55 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Voltage Range 額定工作電壓範圍                                                                                   | 16 ~ 80V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Capacitance Range 靜電容量範圍                                                                                 | 22 ~ 270μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Capacitance Tolerance 靜電容量允許偏差                                                                           | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                      | Leakage current ≤0.01CV (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor (tan δ) 損耗角正切                                                                         | ≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                  | ≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Stability at Low Temperature 低溫特性                                                                        | Measurement frequency 測試頻率: 100KHz<br>Impedance Ratio 阻抗比<br>ZT/Z20 (max.) <table><tr><td>Z(-25°C)/Z(20°C)</td><td>≤2.0</td></tr><tr><td>Z(-55°C)/Z(20°C)</td><td>≤2.5</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Z(-25°C)/Z(20°C)           | ≤2.0                                     | Z(-55°C)/Z(20°C)         | ≤2.5                                                 |                     |                                                      |                     |                                        |               |                             |
| Z(-25°C)/Z(20°C)                                                                                         | ≤2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Z(-55°C)/Z(20°C)                                                                                         | ≤2.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Bias Humidity Test 耐濕負荷特性                                                                                | When the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, 85% RH, they meet the characteristics listed below.<br>在 85°C 和相對濕度 85%環境下施加額定工作電壓 2000 小時並恢復至 20°C 後, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±30% of initial value 為初始值的±30%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>ESR 阻抗值</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr><tr><td>Appearance 外觀</td><td>No significant damage 無明顯異常</td></tr></table> | Capacitance Change 靜電容量變化率 | Within ±30% of initial value 為初始值的±30%以內 | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% | ESR 阻抗值             | 200% or less of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | Initial specified value or less 不大於規範值 | Appearance 外觀 | No significant damage 無明顯異常 |
| Capacitance Change 靜電容量變化率                                                                               | Within ±30% of initial value 為初始值的±30%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                 | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                  | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                      | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Appearance 外觀                                                                                            | No significant damage 無明顯異常                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Endurance 耐久性                                                                                            | When the capacitors are restored to 20°C after 10000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 10000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±30% of initial value 為初始值的±30%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>ESR 阻抗值</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr></table>                                                                       | Capacitance Change 靜電容量變化率 | Within ±30% of initial value 為初始值的±30%以內 | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% | ESR 阻抗值             | 200% or less of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | Initial specified value or less 不大於規範值 |               |                             |
| Capacitance Change 靜電容量變化率                                                                               | Within ±30% of initial value 為初始值的±30%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                 | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| ESR 阻抗值                                                                                                  | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                      | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Shelf Life 高溫貯存特性                                                                                        | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 9 for soldering conditions)<br>(焊接條件請查閱第 12 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>Initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>Initial specified value or less 不大於規範值</td></tr></table>                                                                                                                                                                                                                                                              | Capacitance Change 靜電容量變化率 | Within ±10% of initial value 初始值的±10%以內  | Dissipation Factor 損耗角正切 | Initial specified value or less 不大於規範值               | Leakage Current 漏電流 | Initial specified value or less 不大於規範值               |                     |                                        |               |                             |
| Capacitance Change 靜電容量變化率                                                                               | Within ±10% of initial value 初始值的±10%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Dissipation Factor 損耗角正切                                                                                 | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Leakage Current 漏電流                                                                                      | Initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |
| Marking 標識                                                                                               | Black print on the case top. 鋁殼頂部黑色字體印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                          |                          |                                                      |                     |                                                      |                     |                                        |               |                             |

DRAWING 外形圖 (Unit: mm)



\*1. Applicable to Ø6.3 and Ø8 適用於Ø6.3和Ø8  
\*2. Applicable to Ø10 and above 適用於Ø10和Ø10以上

Dimension table in next page.  
尺寸表見下一頁。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注:** 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

HPV Series

DIMENSIONS 尺寸表 (Unit: mm)

| ØD × L | 8 × 9 | 8 × 12 | 10 × 10 | 10 × 12 |
|--------|-------|--------|---------|---------|
| P      | 3.5   | 3.5    | 5.0     | 5.0     |
| Ød     | 0.6   | 0.6    | 0.6     | 0.6     |
| L      | 9.0   | 12.0   | 10.0    | 12.0    |

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| WV (V)<br>Parameter<br>參數<br>Cap. 容量<br>(µF) |     | 25 (1E)                      |                                           |                                   |                                         |                                                        | 35 (1V)                      |                                           |                                   |                                         |                                                        |
|----------------------------------------------|-----|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|
|                                              |     | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>105°C,<br>100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>105°C,<br>100KHz<br>紋波電流 |
| 100                                          | 101 |                              |                                           |                                   |                                         |                                                        | 8 × 9                        | 0.12                                      | 35                                | 27                                      | 2300                                                   |
| 150                                          | 151 | 8 × 9                        | 0.14                                      | 37.5                              | 27                                      | 2300                                                   | 8 × 9                        | 0.12                                      | 52.5                              | 27                                      | 2300                                                   |
| 220                                          | 221 | 8 × 9                        | 0.14                                      | 55                                | 27                                      | 2300                                                   | 8 × 12<br>(10 × 10)          | 0.12<br>(0.12)                            | 77<br>(77)                        | 20<br>(20)                              | 2500<br>(2500)                                         |
| 270                                          | 271 |                              |                                           |                                   |                                         |                                                        | 10 × 10                      | 0.12                                      | 94.5                              | 20                                      | 2500                                                   |
| 330                                          | 331 | 8 × 12<br>(10 × 10)          | 0.14<br>(0.14)                            | 82.5<br>(82.5)                    | 20<br>(20)                              | 2500<br>(2500)                                         | 10 × 12                      | 0.12                                      | 115.5                             | 18                                      | 2800                                                   |
| 470                                          | 471 | 10 × 12                      | 0.14                                      | 117.5                             | 18                                      | 2800                                                   |                              |                                           |                                   |                                         |                                                        |

| WV (V)<br>Parameter<br>參數<br>Cap. 容量<br>(µF) |     | 50 (1H)                      |                                           |                                   |                                         |                                                        | 63 (1J)                      |                                           |                                   |                                         |                                                        |
|----------------------------------------------|-----|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|
|                                              |     | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>105°C,<br>100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>105°C,<br>100KHz<br>紋波電流 |
| 33                                           | 330 |                              |                                           |                                   |                                         |                                                        | 8 × 9                        | 0.08                                      | 20.79                             | 40                                      | 1700                                                   |
| 47                                           | 470 | 8 × 9                        | 0.10                                      | 23.5                              | 30                                      | 1800                                                   | 8 × 9                        | 0.08                                      | 29.61                             | 40                                      | 1700                                                   |
| 56                                           | 561 |                              |                                           |                                   |                                         |                                                        | 8 × 12<br>(10 × 10)          | 0.08<br>(0.08)                            | 35.28<br>(35.28)                  | 30<br>(30)                              | 1800<br>(1800)                                         |
| 68                                           | 680 | 8 × 9                        | 0.10                                      | 34                                | 30                                      | 1800                                                   | 10 × 10                      | 0.08                                      | 42.84                             | 30                                      | 1800                                                   |
| 82                                           | 820 |                              |                                           |                                   |                                         |                                                        | 10 × 10                      | 0.08                                      | 51.66                             | 30                                      | 1800                                                   |
| 100                                          | 101 | 8 × 12<br>(10 × 10)          | 0.10<br>(0.10)                            | 50<br>(50)                        | 28<br>(28)                              | 2000<br>(2000)                                         | 10 × 12                      | 0.08                                      | 63                                | 27                                      | 2000                                                   |
| 120                                          | 121 | 10 × 12                      | 0.10                                      | 60                                | 25                                      | 2300                                                   |                              |                                           |                                   |                                         |                                                        |

| WV (V)<br>Parameter<br>參數<br>Cap. 容量<br>(µF) |     | 80 (1K)                      |                                           |                                   |                                         |                                                        |
|----------------------------------------------|-----|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|
|                                              |     | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>105°C,<br>100KHz<br>紋波電流 |
| 22                                           | 220 | 8 × 9                        | 0.08                                      | 17.6                              | 45                                      | 1550                                                   |
| 33                                           | 330 | 8 × 12<br>(10 × 10)          | 0.08<br>(0.08)                            | 26.4<br>(26.4)                    | 36<br>(36)                              | 1700<br>(1700)                                         |
| 47                                           | 470 | 10 × 10                      | 0.08                                      | 37.6                              | 36                                      | 1700                                                   |
| 56                                           | 560 | 10 × 12                      | 0.08                                      | 44.8                              | 29                                      | 1900                                                   |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 120KHz ≤ f ≤ 1KHz | 1KHz ≤ f ≤ 10KHz | 10KHz ≤ f ≤ 100KHz | 100KHz ≤ f ≤ 300KHz |
|----------------|-------------------|------------------|--------------------|---------------------|
| Coefficient 系數 | 0.10              | 0.40             | 0.70               | 1.00                |

- Please refer to page 21 and page 23 about the taped or cutting product spec. 編帶與剪腳標準請查閱第 21 頁和 23 頁。
- Please refer to page 22 for the minimum package quantity. 最小包裝數量請查閱第 22 頁。
- Please refer to page 17 for the Part Number System. 產品編碼規則請查閱第 17 頁。

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注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

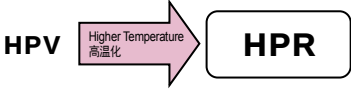
CAT.2024/V1.3

HPR Series

RADIAL LEAD TYPE, 125°C HIGH TEMPERATURE

插件式, 125°C 高溫品

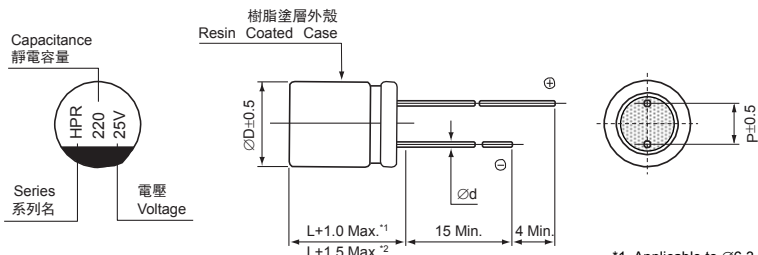
- Operating with wide temperature range -55~+125°C  
適用於 -55~+125°C 的寬溫範圍
- High reliability & high voltage are realized by hybrid electrolyte  
通過混合型電解質, 提升可靠性和高電壓化
- Endurance 4000 hours  
耐久性 4000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵



SPECIFICATIONS 特性表

| Items 項目                                                                                                 | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category Temperature Range 工作溫度範圍                                                                        | -55 ~ +125°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Voltage Range 額定工作電壓範圍                                                                                   | 16 ~ 80V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Capacitance Range 靜電容量範圍                                                                                 | 22 ~ 1000µF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Capacitance Tolerance 靜電容量允許偏差                                                                           | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Leakage Current 漏電流                                                                                      | Leakage current ≤0.01CV (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                   |
| Dissipation Factor (tan δ) 損耗角正切                                                                         | ≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ESR 阻抗值                                                                                                  | ≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Stability at Low Temperature 低溫特性                                                                        | Measurement frequency 測試頻率: 100KHz<br>Impedance Ratio 阻抗比<br>Z(-25°C)/Z(20°C) ≤2.0<br>Z(-55°C)/Z(20°C) ≤2.5                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Bias Humidity Test 耐濕負荷特性                                                                                | When the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, 85% RH, they meet the characteristics listed below.<br>在 85°C 和相對濕度 85%環境下施加額定工作電壓 2000 小時並恢復至 20°C 後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值<br>Appearance 外觀 No significant damage 無明顯異常 |
| Endurance 耐久性                                                                                            | When the capacitors are restored to 20°C after 4000 hours application of the rated voltage at 125°C, they meet the characteristics listed below.<br>在 125°C 環境中施加額定工作電壓 4000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                   |
| Shelf Life 高溫貯存特性                                                                                        | When the capacitors are restored to 20°C after leaving under no load at 125°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 125°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                             |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 9 for soldering conditions)<br>(焊接條件請查閱第 12 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±10% of initial value 初始值的±10%以內<br>Dissipation Factor 損耗角正切 Initial specified value or less 不大於規範值<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                                                                                                                                                                                  |
| Marking 標識                                                                                               | Black print on the case top. 鋁殼頂部黑色字體印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

DRAWING 外形圖 (Unit: mm)



\*1. Applicable to Ø6.3 and Ø8 適用於Ø6.3和Ø8  
\*2. Applicable to Ø10 and above 適用於Ø10和Ø10以上

Dimension table in next page.  
尺寸表見下一頁。

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CAT.2024/V1.3

HPR Series

DIMENSIONS 尺寸表 (Unit: mm)

| ∅D × L | 8 × 9 | 8 × 12 | 10 × 10 | 10 × 12 | 10 × 16 |
|--------|-------|--------|---------|---------|---------|
| P      | 3.5   | 3.5    | 5.0     | 5.0     | 5.0     |
| ∅d     | 0.6   | 0.6    | 0.6     | 0.6     | 0.6     |
| L      | 9.0   | 12.0   | 10.0    | 12.0    | 16.0    |

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| WV (V)             |                 | 25 (1E)                      |                                           |                                   |                                         |                                                        | 35 (1V)                      |                                           |                                   |                                         |                                                        |
|--------------------|-----------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|
| Cap.<br>容量<br>(μF) | Parameter<br>參數 | Case size<br>∅D×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C,<br>100KHz<br>紋波電流 | Case size<br>∅D×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C,<br>100KHz<br>紋波電流 |
| 220                | 221             |                              |                                           |                                   |                                         |                                                        | 8 × 9                        | 0.12                                      | 77                                | 27                                      | 2700                                                   |
| 270                | 271             |                              |                                           |                                   |                                         |                                                        | 8 × 12                       | 0.12                                      | 94.5                              | 20                                      | 3200                                                   |
| 330                | 331             | 8 × 9                        | 0.14                                      | 82.5                              | 27                                      | 2900                                                   | 10 × 10                      | 0.12                                      | 115.5                             | 20                                      | 3200                                                   |
| 470                | 471             | 8 × 12                       | 0.14                                      | 117.5                             | 20                                      | 3400                                                   | 10 × 12                      | 0.12                                      | 164.5                             | 14                                      | 3700                                                   |
| 560                | 561             | 10 × 10                      | 0.14                                      | 140                               | 20                                      | 3400                                                   |                              |                                           |                                   |                                         |                                                        |
| 680                | 681             | 10 × 12                      | 0.14                                      | 170                               | 18                                      | 3900                                                   | 10 × 16                      | 0.12                                      | 238                               | 11                                      | 4200                                                   |
| 1000               | 102             | 10 × 16                      | 0.14                                      | 250                               | 11                                      | 4500                                                   |                              |                                           |                                   |                                         |                                                        |

| WV (V)             |                 | 50 (1H)                      |                                           |                                   |                                         |                                                        | 63 (1J)                      |                                           |                                   |                                         |                                                        |
|--------------------|-----------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|
| Cap.<br>容量<br>(μF) | Parameter<br>參數 | Case size<br>∅D×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C,<br>100KHz<br>紋波電流 | Case size<br>∅D×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C,<br>100KHz<br>紋波電流 |
| 47                 | 470             |                              |                                           |                                   |                                         |                                                        | 8 × 9                        | 0.08                                      | 29.61                             | 32                                      | 2400                                                   |
| 68                 | 680             | 8 × 9                        | 0.10                                      | 34                                | 30                                      | 1800                                                   |                              |                                           |                                   |                                         |                                                        |
| 100                | 101             |                              |                                           |                                   |                                         |                                                        | 8 × 12<br>(10 × 10)          | 0.08<br>(0.08)                            | 63<br>(63)                        | 25<br>(25)                              | 2700<br>(2700)                                         |
| 120                | 121             | 8 × 12                       | 0.10                                      | 60                                | 28                                      | 2800                                                   |                              |                                           |                                   |                                         |                                                        |
| 150                | 151             | 10 × 10                      | 0.10                                      | 75                                | 28                                      | 2800                                                   |                              |                                           |                                   |                                         |                                                        |
| 180                | 181             |                              |                                           |                                   |                                         |                                                        | 10 × 12                      | 0.08                                      | 113.4                             | 20                                      | 2900                                                   |
| 220                | 221             | 10 × 12                      | 0.10                                      | 110                               | 17                                      | 3200                                                   | 10 × 16                      | 0.08                                      | 138.6                             | 15                                      | 3500                                                   |
| 270                | 271             | 10 × 16                      | 0.10                                      | 135                               | 13                                      | 3500                                                   |                              |                                           |                                   |                                         |                                                        |

| WV (V)             |                 | 80 (1K)                      |                                           |                                   |                                         |                                                        |
|--------------------|-----------------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------------|
| Cap.<br>容量<br>(μF) | Parameter<br>參數 | Case size<br>∅D×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(μA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C,<br>100KHz<br>紋波電流 |
| 22                 | 220             | 8 × 9                        | 0.08                                      | 17.6                              | 45                                      | 1050                                                   |
| 47                 | 470             | 8 × 12<br>(10 × 10)          | 0.08<br>(0.08)                            | 26.4<br>(26.4)                    | 36<br>(36)                              | 1360<br>(1360)                                         |
| 82                 | 820             | 10 × 12                      | 0.08                                      | 65.6                              | 32                                      | 1550                                                   |
| 100                | 101             | 10 × 16                      | 0.08                                      | 80                                | 28                                      | 1800                                                   |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 120KHz ≤ f ≤ 1KHz | 1KHz ≤ f ≤ 10KHz | 10KHz ≤ f ≤ 100KHz | 100KHz ≤ f ≤ 300KHz |
|----------------|-------------------|------------------|--------------------|---------------------|
| Coefficient 系數 | 0.10              | 0.40             | 0.70               | 1.00                |

- Please refer to page 21 and page 23 about the taped or cutting product spec. 編帶與剪腳標準請查閱第 21 頁和 23 頁。
- Please refer to page 22 for the minimum package quantity. 最小包裝數量請查閱第 22 頁。
- Please refer to page 17 for the Part Number System. 產品編碼規則請查閱第 17 頁。

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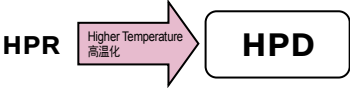
CAT.2024/V1.3

HPD Series

RADIAL LEAD TYPE, 135°C HIGH TEMPERATURE

插件式, 135°C 高溫品

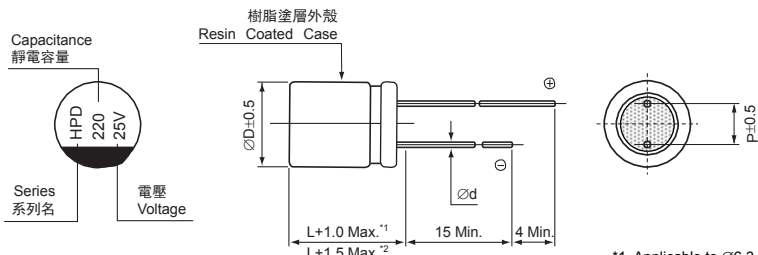
- Operating with wide temperature range -55~+135°C  
適用於 -55~+135°C 的寬溫範圍
- High reliability & high voltage are realized by hybrid electrolyte  
通過混合型電解質, 提升可靠性和高電壓化
- Endurance 4000 hours  
耐久性 4000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵



SPECIFICATIONS 特性表

| Items 項目                                                                                                 | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category Temperature Range 工作溫度範圍                                                                        | -55 ~ +135°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Voltage Range 額定工作電壓範圍                                                                                   | 25 ~ 63V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Capacitance Range 靜電容量範圍                                                                                 | 33 ~ 560μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Capacitance Tolerance 靜電容量允許偏差                                                                           | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Leakage Current 漏電流                                                                                      | Leakage current ≤0.01CV (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                   |
| Dissipation Factor (tan δ) 損耗角正切                                                                         | ≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ESR 阻抗值                                                                                                  | ≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Stability at Low Temperature 低溫特性                                                                        | Measurement frequency 測試頻率: 100KHz<br>Impedance Ratio 阻抗比<br>Z(-25°C)/Z(20°C) ≤2.0<br>Z(-55°C)/Z(20°C) ≤2.2                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Bias Humidity Test 耐濕負荷特性                                                                                | When the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, 85% RH, they meet the characteristics listed below.<br>在 85°C 和相對濕度 85%環境下施加額定工作電壓 2000 小時並恢復至 20°C 後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值<br>Appearance 外觀 No significant damage 無明顯異常 |
| Endurance 耐久性                                                                                            | When the capacitors are restored to 20°C after 4000 hours application of the rated voltage at 135°C, they meet the characteristics listed below.<br>在 135°C 環境中施加額定工作電壓 4000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                   |
| Shelf Life 高溫貯存特性                                                                                        | When the capacitors are restored to 20°C after leaving under no load at 135°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 135°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                             |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 9 for soldering conditions)<br>(焊接條件請查閱第 12 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±10% of initial value 初始值的±10%以內<br>Dissipation Factor 損耗角正切 Initial specified value or less 不大於規範值<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                                                                                                                                                                                  |
| Marking 標識                                                                                               | Black print on the case top. 鋁殼頂部黑色字體印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

DRAWING 外形圖 (Unit: mm)



\*1. Applicable to Ø6.3 and Ø8 適用於Ø6.3和Ø8  
\*2. Applicable to Ø10 and above 適用於Ø10和Ø10以上

Dimension table in next page.  
尺寸表見下一頁。

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CAT.2024/V1.3

HPD Series

DIMENSIONS 尺寸表 (Unit: mm)

| ØD × L | 8 × 9 | 10 × 10 | 10 × 12 | 10 × 16 |
|--------|-------|---------|---------|---------|
| P      | 3.5   | 5.0     | 5.0     | 5.0     |
| Ød     | 0.6   | 0.6     | 0.6     | 0.6     |
| L      | 9.0   | 10.0    | 12.0    | 16.0    |

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| WV (V)<br>Parameter<br>參數<br>Cap. 容量 (µF) |     | 25 (1E)                      |                                           |                                   |                                         |                                              |        | 35 (1V)                      |                                           |                                   |                                         |                                              |        |
|-------------------------------------------|-----|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|
|                                           |     | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        |
|                                           |     |                              |                                           |                                   |                                         | ≤125°C                                       | ≤135°C |                              |                                           |                                   |                                         | ≤125°C                                       | ≤135°C |
| 100                                       | 101 |                              |                                           |                                   |                                         |                                              |        | 8 × 9                        | 0.12                                      | 35                                | 27                                      | 2900                                         | 1600   |
| 150                                       | 151 |                              |                                           |                                   |                                         |                                              |        | 8 × 9                        | 0.12                                      | 52.5                              | 27                                      | 2900                                         | 1600   |
| 220                                       | 221 | 8 × 9                        | 0.14                                      | 55                                | 23                                      | 3300                                         | 2000   |                              |                                           |                                   |                                         |                                              |        |
| 270                                       | 271 | 8 × 9                        | 0.14                                      | 67.5                              | 23                                      | 3300                                         | 2000   | 10 × 10                      | 0.12                                      | 94.5                              | 20                                      | 3300                                         | 2000   |
| 330                                       | 331 | 10 × 10                      | 0.14                                      | 82.5                              | 20                                      | 3400                                         | 2100   | 10 × 12                      | 0.12                                      | 115.5                             | 16                                      | 3500                                         | 2300   |
| 470                                       | 471 | 10 × 12                      | 0.14                                      | 117.5                             | 16                                      | 3500                                         | 2300   | 10 × 16                      | 0.12                                      | 164.5                             | 11                                      | 4000                                         | 2900   |
| 560                                       | 561 | 10 × 16                      | 0.14                                      | 140                               | 11                                      | 4000                                         | 2900   |                              |                                           |                                   |                                         |                                              |        |

| WV (V)<br>Parameter<br>參數<br>Cap. 容量 (µF) |     | 50 (1H)                      |                                           |                                   |                                         |                                              |        | 63 (1J)                      |                                           |                                   |                                         |                                              |        |
|-------------------------------------------|-----|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|
|                                           |     | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        |
|                                           |     |                              |                                           |                                   |                                         | ≤125°C                                       | ≤135°C |                              |                                           |                                   |                                         | ≤125°C                                       | ≤135°C |
| 33                                        | 330 |                              |                                           |                                   |                                         |                                              |        | 8 × 9                        | 0.08                                      | 20.79                             | 40                                      | 1900                                         | 1200   |
| 47                                        | 470 | 8 × 9                        | 0.10                                      | 23.5                              | 30                                      | 2200                                         | 1250   | 8 × 9                        | 0.08                                      | 29.61                             | 40                                      | 1900                                         | 1200   |
| 68                                        | 680 | 8 × 9                        | 0.10                                      | 34                                | 30                                      | 2200                                         | 1250   |                              |                                           |                                   |                                         |                                              |        |
| 82                                        | 820 |                              |                                           |                                   |                                         |                                              |        | 10 × 10                      | 0.08                                      | 51.66                             | 30                                      | 2300                                         | 1500   |
| 100                                       | 101 |                              |                                           |                                   |                                         |                                              |        | 10 × 12                      | 0.08                                      | 63                                | 20                                      | 3000                                         | 1650   |
| 120                                       | 121 | 10 × 10                      | 0.10                                      | 60                                | 28                                      | 2600                                         | 1600   |                              |                                           |                                   |                                         |                                              |        |
| 150                                       | 151 | 10 × 12                      | 0.10                                      | 75                                | 18                                      | 3200                                         | 2000   | 10 × 16                      | 0.08                                      | 94.5                              | 15                                      | 3500                                         | 2400   |
| 220                                       | 221 | 10 × 16                      | 0.10                                      | 110                               | 13                                      | 3700                                         | 2600   |                              |                                           |                                   |                                         |                                              |        |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 120Hz ≤ f ≤ 1KHz | 1KHz ≤ f ≤ 10KHz | 10KHz ≤ f ≤ 100KHz | 100KHz ≤ f ≤ 300KHz |
|----------------|------------------|------------------|--------------------|---------------------|
| Coefficient 系數 | 0.10             | 0.40             | 0.70               | 1.00                |

- Please refer to page 21 and page 23 about the taped or cutting product spec. 編帶與剪腳標準請查閱第 21 頁和 23 頁。
- Please refer to page 22 for the minimum package quantity. 最小包裝數量請查閱第 22 頁。
- Please refer to page 17 for the Part Number System. 產品編碼規則請查閱第 17 頁。

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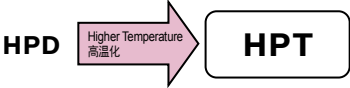
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CAT.2024/V1.3

HPT Series

RADIAL LEAD TYPE, 145°C ULTRA-HIGH TEMPERATURE  
插件式, 145°C 超高溫品

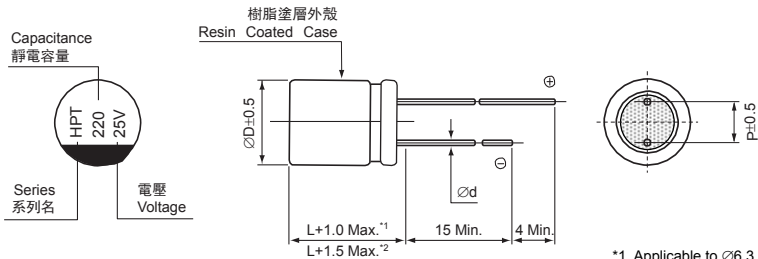
- Operating with wide temperature range -55~+145°C  
適用於 -55~+145°C 的寬溫範圍
- High reliability & high voltage are realized by hybrid electrolyte  
通過混合型電解質, 提升可靠性和高電壓化
- Endurance 2000 hours  
耐久性 2000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵



SPECIFICATIONS 特性表

| Items 項目                                                                                                     | Characteristics 主要特性                                                                                                                                                                                                                          |                                                      |  |                     |                  |      |               |                  |      |
|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--|---------------------|------------------|------|---------------|------------------|------|
| Category Temperature Range 工作溫度範圍                                                                            | -55 ~ +145°C                                                                                                                                                                                                                                  |                                                      |  |                     |                  |      |               |                  |      |
| Voltage Range 額定工作電壓範圍                                                                                       | 25 ~ 63V                                                                                                                                                                                                                                      |                                                      |  |                     |                  |      |               |                  |      |
| Capacitance Range 靜電容量範圍                                                                                     | 33 ~ 330μF                                                                                                                                                                                                                                    |                                                      |  |                     |                  |      |               |                  |      |
| Capacitance Tolerance 靜電容量允許偏差                                                                               | ±20% at 120Hz, 20°C                                                                                                                                                                                                                           |                                                      |  |                     |                  |      |               |                  |      |
| Leakage Current 漏電流                                                                                          | Leakage current ≤0.01CV (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                     |                                                      |  |                     |                  |      |               |                  |      |
| Dissipation Factor (tan δ) 損耗角正切                                                                             | ≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。                                                                                                                                                                                     |                                                      |  |                     |                  |      |               |                  |      |
| ESR 阻抗值                                                                                                      | ≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。                                                                                                                                                                                   |                                                      |  |                     |                  |      |               |                  |      |
| Stability at Low Temperature 低溫特性                                                                            | Measurement frequency 測試頻率: 100KHz <table><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C)/Z(20°C)</td><td>≤2.0</td></tr><tr><td>ZT/Z20 (max.)</td><td>Z(-55°C)/Z(20°C)</td><td>≤2.2</td></tr></table>                                            |                                                      |  | Impedance Ratio 阻抗比 | Z(-25°C)/Z(20°C) | ≤2.0 | ZT/Z20 (max.) | Z(-55°C)/Z(20°C) | ≤2.2 |
| Impedance Ratio 阻抗比                                                                                          | Z(-25°C)/Z(20°C)                                                                                                                                                                                                                              | ≤2.0                                                 |  |                     |                  |      |               |                  |      |
| ZT/Z20 (max.)                                                                                                | Z(-55°C)/Z(20°C)                                                                                                                                                                                                                              | ≤2.2                                                 |  |                     |                  |      |               |                  |      |
| Bias Humidity Test 耐濕負荷特性                                                                                    | When the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, 85% RH, they meet the characteristics listed below.<br>在 85°C 和相對濕度 85%環境下施加額定工作電壓 2000 小時並恢復至 20°C 後，電容器的特性符合下表要求。                       |                                                      |  |                     |                  |      |               |                  |      |
|                                                                                                              | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                    | Within ±30% of initial value 為初始值的±30%以內             |  |                     |                  |      |               |                  |      |
|                                                                                                              | Dissipation Factor 損耗角正切                                                                                                                                                                                                                      | 200% or less of initial specified value 不大於規範值的 200% |  |                     |                  |      |               |                  |      |
|                                                                                                              | ESR 阻抗值                                                                                                                                                                                                                                       | 200% or less of initial specified value 不大於規範值的 200% |  |                     |                  |      |               |                  |      |
|                                                                                                              | Leakage Current 漏電流                                                                                                                                                                                                                           | Initial specified value or less 不大於規範值               |  |                     |                  |      |               |                  |      |
|                                                                                                              | Appearance 外觀                                                                                                                                                                                                                                 | No significant damage 無明顯異常                          |  |                     |                  |      |               |                  |      |
| Endurance 耐久性                                                                                                | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 145°C, they meet the characteristics listed below.<br>在 145°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                             |                                                      |  |                     |                  |      |               |                  |      |
|                                                                                                              | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                    | Within ±30% of initial value 為初始值的±30%以內             |  |                     |                  |      |               |                  |      |
|                                                                                                              | Dissipation Factor 損耗角正切                                                                                                                                                                                                                      | 200% or less of initial specified value 不大於規範值的 200% |  |                     |                  |      |               |                  |      |
|                                                                                                              | ESR 阻抗值                                                                                                                                                                                                                                       | 200% or less of initial specified value 不大於規範值的 200% |  |                     |                  |      |               |                  |      |
|                                                                                                              | Leakage Current 漏電流                                                                                                                                                                                                                           | Initial specified value or less 不大於規範值               |  |                     |                  |      |               |                  |      |
| Shelf Life 高溫貯存特性                                                                                            | When the capacitors are restored to 20°C after leaving under no load at 145°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 145°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。 |                                                      |  |                     |                  |      |               |                  |      |
|                                                                                                              | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。                                                                                                            |                                                      |  |                     |                  |      |               |                  |      |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 9 for soldering conditions)<br>(焊接條件請查閱第 12 頁) | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                    | Within ±10% of initial value 初始值的±10%以內              |  |                     |                  |      |               |                  |      |
|                                                                                                              | Dissipation Factor 損耗角正切                                                                                                                                                                                                                      | Initial specified value or less 不大於規範值               |  |                     |                  |      |               |                  |      |
|                                                                                                              | Leakage Current 漏電流                                                                                                                                                                                                                           | Initial specified value or less 不大於規範值               |  |                     |                  |      |               |                  |      |
|                                                                                                              |                                                                                                                                                                                                                                               |                                                      |  |                     |                  |      |               |                  |      |
| Marking 標識                                                                                                   | Black print on the case top. 鋁殼頂部黑色字體印刷。                                                                                                                                                                                                      |                                                      |  |                     |                  |      |               |                  |      |

DRAWING 外形圖 (Unit: mm)



\*1. Applicable to Ø6.3 and Ø8 適用於Ø6.3和Ø8  
\*2. Applicable to Ø10 and above 適用於Ø10和Ø10以上

Dimension table in next page.  
尺寸表見下一頁。

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HPT Series

DIMENSIONS 尺寸表 (Unit: mm)

| ØD × L | 8 × 9 | 10 × 10 |
|--------|-------|---------|
| P      | 3.5   | 5.0     |
| Ød     | 0.6   | 0.6     |
| L      | 9.0   | 10.0    |

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| WV (V)<br>Parameter<br>參數<br>Cap. 容量<br>(µF) |     | 25 (1E)                      |                                           |                                   |                                         |                                              |        | 35 (1V)                      |                                           |                                   |                                         |                                              |        |
|----------------------------------------------|-----|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|
|                                              |     | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        |
|                                              |     |                              |                                           |                                   |                                         | ≤135°C                                       | ≤145°C |                              |                                           |                                   |                                         | ≤135°C                                       | ≤145°C |
| 150                                          | 151 |                              |                                           |                                   |                                         |                                              |        | 8 × 9                        | 0.12                                      | 52.5                              | 27                                      | 1600                                         | 700    |
| 220                                          | 221 | 8 × 9                        | 0.14                                      | 55                                | 27                                      | 1600                                         | 700    | 10 × 10                      | 0.12                                      | 77                                | 20                                      | 2000                                         | 900    |
| 270                                          | 271 | 10 × 10                      | 0.14                                      | 67.5                              | 20                                      | 2000                                         | 900    | 10 × 10                      | 0.12                                      | 94.5                              | 20                                      | 2000                                         | 900    |
| 330                                          | 331 | 10 × 10                      | 0.14                                      | 82.5                              | 20                                      | 2000                                         | 900    |                              |                                           |                                   |                                         |                                              |        |

| WV (V)<br>Parameter<br>參數<br>Cap. 容量<br>(µF) |     | 50 (1H)                      |                                           |                                   |                                         |                                              |        | 63 (1J)                      |                                           |                                   |                                         |                                              |        |
|----------------------------------------------|-----|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|------------------------------|-------------------------------------------|-----------------------------------|-----------------------------------------|----------------------------------------------|--------|
|                                              |     | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        | Case size<br>ØD×L (mm)<br>尺寸 | Dissipation<br>factor<br>(tan δ)<br>損耗角正切 | Leakage<br>current<br>(µA)<br>漏電流 | ESR (mΩ)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>100KHz<br>紋波電流 |        |
|                                              |     |                              |                                           |                                   |                                         | ≤135°C                                       | ≤145°C |                              |                                           |                                   |                                         | ≤135°C                                       | ≤145°C |
| 33                                           | 330 |                              |                                           |                                   |                                         |                                              |        | 8 × 9                        | 0.08                                      | 20.79                             | 40                                      | 1100                                         | 600    |
| 56                                           | 560 |                              |                                           |                                   |                                         |                                              |        | 10 × 10                      | 0.08                                      | 35.28                             | 30                                      | 1400                                         | 800    |
| 68                                           | 680 | 8 × 9                        | 0.10                                      | 34                                | 30                                      | 1250                                         | 600    | 10 × 10                      | 0.08                                      | 42.84                             | 30                                      | 1400                                         | 800    |
| 82                                           | 820 | 10 × 10                      | 0.10                                      | 41                                | 28                                      | 1600                                         | 800    | 10 × 10                      | 0.08                                      | 51.66                             | 30                                      | 1400                                         | 800    |
| 100                                          | 101 | 10 × 10                      | 0.10                                      | 50                                | 28                                      | 1600                                         | 800    |                              |                                           |                                   |                                         |                                              |        |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 120Hz ≤ f ≤ 1KHz | 1KHz ≤ f ≤ 10KHz | 10KHz ≤ f ≤ 100KHz | 100KHz ≤ f ≤ 300KHz |
|----------------|------------------|------------------|--------------------|---------------------|
| Coefficient 系數 | 0.10             | 0.40             | 0.70               | 1.00                |

- Please refer to page 21 and page 23 about the taped or cutting product spec. 編帶與剪腳標準請查閱第 21 頁和 23 頁。
- Please refer to page 22 for the minimum package quantity. 最小包裝數量請查閱第 22 頁。
- Please refer to page 17 for the Part Number System. 產品編碼規則請查閱第 17 頁。

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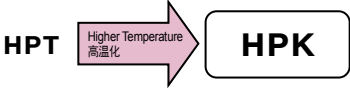
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CAT.2024/V1.3

HPK Series

RADIAL LEAD TYPE, 150°C ULTRA-HIGH TEMPERATURE  
插件式, 150°C 超高溫品

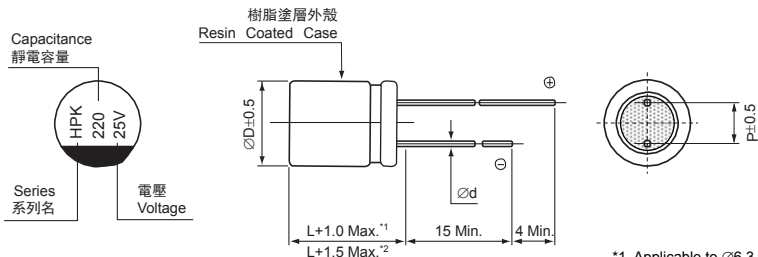
- Operating with wide temperature range -55~+150°C  
適用於 -55~+150°C 的寬溫範圍
- High reliability & high voltage are realized by hybrid electrolyte  
通過混合型電解質, 提升高可靠性和高電壓化
- Endurance 1000 hours  
耐久性 1000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵



SPECIFICATIONS 特性表

| Items 項目                                                                                                 | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category Temperature Range 工作溫度範圍                                                                        | -55 ~ +150°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Voltage Range 額定工作電壓範圍                                                                                   | 25 ~ 63V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Capacitance Range 靜電容量範圍                                                                                 | 33 ~ 270μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Capacitance Tolerance 靜電容量允許偏差                                                                           | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Leakage Current 漏電流                                                                                      | Leakage current ≤0.01CV (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                   |
| Dissipation Factor (tan δ) 損耗角正切                                                                         | ≤Specified value at 120Hz, 20°C. ≤規範值 (在 20°C 120Hz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ESR 阻抗值                                                                                                  | ≤Specified value at 100KHz, 20°C. ≤規範值 (在 20°C 100KHz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Stability at Low Temperature 低溫特性                                                                        | Measurement frequency 測試頻率: 100KHz<br>Impedance Ratio 阻抗比<br>Z(-25°C)/Z(20°C) ≤2.0<br>Z(-55°C)/Z(20°C) ≤2.2                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Bias Humidity Test 耐濕負荷特性                                                                                | When the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, 85% RH, they meet the characteristics listed below.<br>在 85°C 和相對濕度 85%環境下施加額定工作電壓 2000 小時並恢復至 20°C 後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值<br>Appearance 外觀 No significant damage 無明顯異常 |
| Endurance 耐久性                                                                                            | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 150°C, they meet the characteristics listed below.<br>在 150°C 環境中施加額定工作電壓 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±30% of initial value 為初始值的±30%以內<br>Dissipation Factor 損耗角正切 200% or less of initial specified value 不大於規範值的 200%<br>ESR 阻抗值 200% or less of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                   |
| Shelf Life 高溫貯存特性                                                                                        | When the capacitors are restored to 20°C after leaving under no load at 150°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 150°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                             |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 9 for soldering conditions)<br>(焊接條件請查閱第 12 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後, 電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±10% of initial value 初始值的±10%以內<br>Dissipation Factor 損耗角正切 Initial specified value or less 不大於規範值<br>Leakage Current 漏電流 Initial specified value or less 不大於規範值                                                                                                                                                                                                                  |
| Marking 標識                                                                                               | Black print on the case top. 鋁殼頂部黑色字體印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

DRAWING 外形圖 (Unit: mm)



\*1. Applicable to Ø6.3 and Ø8 適用於Ø6.3和Ø8  
\*2. Applicable to Ø10 and above 適用於Ø10和Ø10以上

Dimension table in next page.  
尺寸表見下一頁。

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HPK Series

DIMENSIONS 尺寸表 (Unit: mm)

| ØD × L | 8 × 10 | 10 × 10 |
|--------|--------|---------|
| P      | 3.5    | 5.0     |
| Ød     | 0.6    | 0.6     |
| L      | 10.0   | 10.0    |

DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

| WV (V)       |              | 25 (1E)                |                                  |                          |                                |                                            | 35 (1V)                |                                  |                          |                                |                                            |
|--------------|--------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|
| Cap. 容量 (µF) | Parameter 參數 | Case size ØD×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (µA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 150°C, 100KHz 紋波電流 | Case size ØD×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (µA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 150°C, 100KHz 紋波電流 |
| 100          | 101          | 8 × 10                 | 0.14                             | 25                       | 27                             | 800                                        | 8 × 10                 | 0.12                             | 35                       | 30                             | 770                                        |
| 150          | 151          |                        |                                  |                          |                                |                                            | 10 × 10                | 0.12                             | 52.5                     | 23                             | 950                                        |
| 270          | 271          | 10 × 10                | 0.14                             | 67.5                     | 20                             | 1000                                       |                        |                                  |                          |                                |                                            |

| WV (V)       |              | 50 (1H)                |                                  |                          |                                |                                            | 63 (1J)                |                                  |                          |                                |                                            |
|--------------|--------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|
| Cap. 容量 (µF) | Parameter 參數 | Case size ØD×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (µA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 150°C, 100KHz 紋波電流 | Case size ØD×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (µA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 150°C, 100KHz 紋波電流 |
| 33           | 330          |                        |                                  |                          |                                |                                            | 8 × 10                 | 0.08                             | 20.79                    | 40                             | 650                                        |
| 56           | 560          | 8 × 10                 | 0.10                             | 28                       | 35                             | 700                                        | 10 × 10                | 0.08                             | 35.28                    | 30                             | 840                                        |
| 100          | 101          | 10 × 10                | 0.10                             | 50                       | 28                             | 900                                        |                        |                                  |                          |                                |                                            |

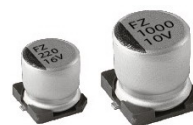
FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 120Hz ≤ f ≤ 1KHz | 1KHz ≤ f ≤ 10KHz | 10KHz ≤ f ≤ 100KHz | 100KHz ≤ f ≤ 300KHz |
|----------------|------------------|------------------|--------------------|---------------------|
| Coefficient 系數 | 0.10             | 0.40             | 0.70               | 1.00                |

- Please refer to page 21 and page 23 about the taped or cutting product spec. 編帶與剪腳標準請查閱第 21 頁和 23 頁。
- Please refer to page 22 for the minimum package quantity. 最小包裝數量請查閱第 22 頁。
- Please refer to page 17 for the Part Number System. 產品編碼規則請查閱第 17 頁。

## Aluminum Electrolytic Capacitors (Chip Type)

鋁電解電容器 (貼片式)



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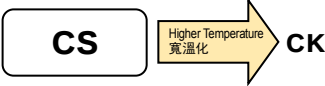
CAT.2024/V1.3

CS Series

CHIP TYPE, STANDARD

貼片式，標準品

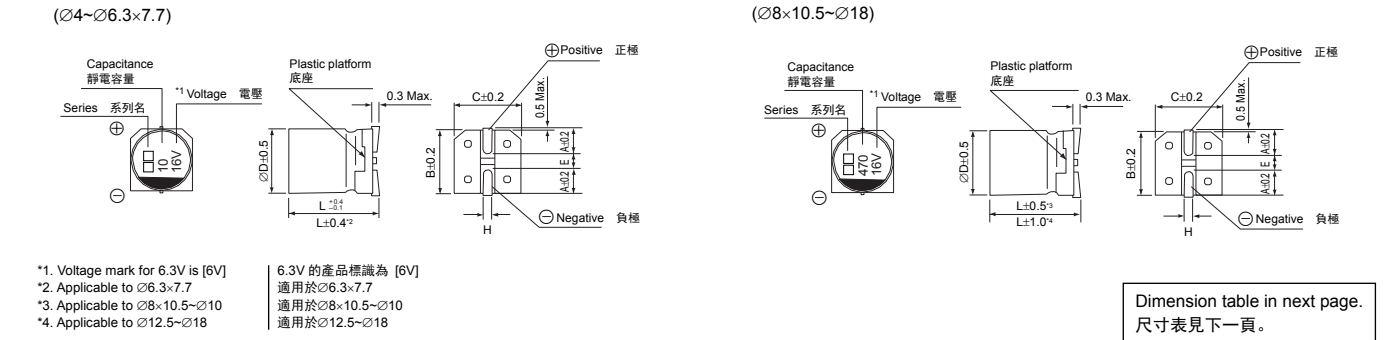
- Operating with general temperature range -55~+85°C  
適用於 -55~+85°C 的常規溫度範圍
- Endurance 2000 hours  
耐久性 2000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

| Items 項目                                                                                                         | Characteristics 主要特性                                                                                                                                                                                                                        |           |                                                                                               |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------|------|-------------|------|-------------------------------------------------------------------------------|------|-------------|---------|-------------------------------------------------------------------------------|---------|---------|
| Category Temperature Range 工作溫度範圍                                                                                | -55 ~ +85°C                                                                                                                                                                                                                                 |           |                                                                                               |      | -40 ~ +85°C |      |                                                                               |      | -25 ~ +85°C |         |                                                                               |         |         |
| Voltage Range 額定工作電壓範圍                                                                                           | 4 ~ 100V                                                                                                                                                                                                                                    |           |                                                                                               |      | 160 ~ 400V  |      |                                                                               |      | 450V        |         |                                                                               |         |         |
| Capacitance Range 靜電容量範圍                                                                                         | 0.1 ~ 10000µF                                                                                                                                                                                                                               |           |                                                                                               |      | 3.3 ~100µF  |      |                                                                               |      | 3.3 ~ 33µF  |         |                                                                               |         |         |
| Capacitance Tolerance 靜電容量允許偏差                                                                                   | ±20% at 120Hz, 20°C                                                                                                                                                                                                                         |           |                                                                                               |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
| Leakage Current<br>漏電流                                                                                           | Rated Voltage<br>額定工作電壓                                                                                                                                                                                                                     |           | 6.3 ~ 100V                                                                                    |      |             |      |                                                                               |      | 160 ~ 450V  |         |                                                                               |         |         |
|                                                                                                                  | Case size 尺寸                                                                                                                                                                                                                                |           | Ø4~Ø10                                                                                        |      |             |      | Ø12.5~Ø18                                                                     |      |             |         | Ø6.3~Ø18                                                                      |         |         |
|                                                                                                                  | Time<br>時間                                                                                                                                                                                                                                  |           | After 2 min. application of rated voltage at 20°C<br>在 20°C 環境中施加額定工作電壓 2 分鐘後                 |      |             |      | After 1 min. application of rated voltage at 20°C<br>在 20°C 環境中施加額定工作電壓 1 分鐘後 |      |             |         | After 5 min. application of rated voltage at 20°C<br>在 20°C 環境中施加額定工作電壓 5 分鐘後 |         |         |
|                                                                                                                  | Leakage current<br>漏電流                                                                                                                                                                                                                      |           | ≤0.01CV or 3µA, whichever is greater<br>≤0.01CV 或 3µA，取較大值                                    |      |             |      | ≤0.03CV or 4µA, whichever is greater<br>≤0.03CV 或 4µA，取較大值                    |      |             |         | ≤0.04CV+100µA, whichever is greater<br>≤0.04CV+100µA，取較大值                     |         |         |
|                                                                                                                  | C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                               |           |                                                                                               |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
| Dissipation Factor (tan δ)<br>損耗角正切                                                                              | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                     |           |                                                                                               |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
|                                                                                                                  | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                    |           | 4                                                                                             | 6.3  | 10          | 16   | 25                                                                            | 35   | 50          | 63      | 100                                                                           | 160~250 | 350~450 |
|                                                                                                                  | tan δ (max.)                                                                                                                                                                                                                                |           | Ø4~Ø10                                                                                        | 0.42 | 0.28        | 0.24 | 0.22                                                                          | 0.16 | 0.12        | 0.12    | 0.10                                                                          | 0.10    | 0.20    |
| 最大損耗角正切                                                                                                          |                                                                                                                                                                                                                                             | Ø12.5~Ø18 | 0.45                                                                                          | 0.38 | 0.34        | 0.30 | 0.26                                                                          | 0.22 | 0.18        | 0.14    | 0.10                                                                          | 0.20    | 0.25    |
| Stability at Low Temperature<br>低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                           |           |                                                                                               |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
|                                                                                                                  | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                    |           | 4                                                                                             | 6.3  | 10          | 16   | 25                                                                            | 35   | 50~100      | 160~250 | 350~450                                                                       |         |         |
|                                                                                                                  | Impedance Ratio<br>阻抗比<br>ZT/Z20 (max.)                                                                                                                                                                                                     | Ø4~Ø10    | Z(-25°C)/Z(20°C)                                                                              | 7    | 4           | 3    | 2                                                                             | 2    | 2           | 2       | 2                                                                             | 3       |         |
|                                                                                                                  |                                                                                                                                                                                                                                             |           | Z(-55°C)/Z(20°C)                                                                              | 15   | 8           | 6    | 4                                                                             | 4    | 3           | 3       | 3                                                                             | 6       |         |
|                                                                                                                  |                                                                                                                                                                                                                                             | Ø12.5~Ø18 | Z(-25°C)/Z(20°C)                                                                              | 7    | 5           | 4    | 3                                                                             | 2    | 2           | 2       | 2                                                                             | 2       | 4       |
| Z(-55°C)/Z(20°C)                                                                                                 | 17                                                                                                                                                                                                                                          |           | 12                                                                                            | 10   | 8           | 5    | 4                                                                             | 3    | 6           | 10      |                                                                               |         |         |
| Endurance<br>耐久性                                                                                                 | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below.<br>在 85°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                             |           |                                                                                               |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
|                                                                                                                  | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                  |           | Within ±20% of initial value (Within ±30% of initial value for 4V)<br>初始值的±20%以內 (4V 為±30%以內) |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
|                                                                                                                  | Dissipation Factor 損耗角正切                                                                                                                                                                                                                    |           | 200% or less of initial specified value 不大於規範值的 200%                                          |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
|                                                                                                                  | Leakage Current 漏電流                                                                                                                                                                                                                         |           | initial specified value or less 不大於規範值                                                        |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
| Shelf Life<br>高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 85°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。 |           |                                                                                               |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
|                                                                                                                  |                                                                                                                                                                                                                                             |           |                                                                                               |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
| Resistance to Soldering Heat<br>耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。                                                                                                          |           |                                                                                               |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
|                                                                                                                  | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                  |           | Within ±10% of initial value 初始值的±10%以內                                                       |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
|                                                                                                                  | Dissipation Factor 損耗角正切                                                                                                                                                                                                                    |           | initial specified value or less 不大於規範值                                                        |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
|                                                                                                                  | Leakage Current 漏電流                                                                                                                                                                                                                         |           | initial specified value or less 不大於規範值                                                        |      |             |      |                                                                               |      |             |         |                                                                               |         |         |
| Marking 標識                                                                                                       | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                      |           |                                                                                               |      |             |      |                                                                               |      |             |         |                                                                               |         |         |

DRAWING 外形圖 (Unit: mm)



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CS Series

□ DIMENSIONS (Unit: mm) 尺寸表

| ∅D x L  | 4 x 5.4 | 5 x 5.4 | 6.3 x 5.4/7.7 | 8 x 10.5 | 10 x 10.5/13.5 | 12.5 x 13.5/16 | 16 x 16.5 | 18 x 16.5/18.5 |
|---------|---------|---------|---------------|----------|----------------|----------------|-----------|----------------|
| A       | 2.0     | 2.2     | 2.6           | 3.0      | 3.3            | 4.9            | 5.8       | 6.2            |
| B       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4           | 13.0           | 17.0      | 19.0           |
| C       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4           | 13.0           | 17.0      | 19.0           |
| E ± 0.2 | 1.0     | 1.4     | 1.9           | 3.1      | 4.7            | 4.7            | 6.4       | 6.4            |
| L       | 5.4     | 5.4     | 5.4/7.7       | 10.5     | 10.5/13.5      | 13.5/16        | 16.5      | 16.5/18.5      |
| H       | 0.5~0.8 | 0.5~0.8 | 0.5~0.8       | 0.8~1.2  | 0.8~1.2        | 0.8~1.2        | 1.1~1.4   | 1.1~1.4        |

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼<br>μF | 4   |                          | 6.3           |                            | 10            |                          | 16             |                                           | 25                    |                         |                        |
|------------------------|-----|--------------------------|---------------|----------------------------|---------------|--------------------------|----------------|-------------------------------------------|-----------------------|-------------------------|------------------------|
|                        | 0G  |                          | 0J            |                            | 1A            |                          | 1C             |                                           | 1E                    |                         |                        |
| 4.7                    | 4R7 |                          |               |                            |               |                          |                |                                           |                       | 4 × 5.4                 | 19                     |
| 10                     | 100 |                          |               |                            |               |                          |                | 4 × 5.4                                   | 25                    | 5 × 5.4<br>(4 × 5.4)    | 28<br>(20)             |
| 15                     | 150 |                          |               |                            |               |                          |                | 4 × 5.4                                   | 28                    | 5 × 5.4                 | 34                     |
| 22                     | 220 |                          |               | 4 × 5.4                    | 31            | 5 × 5.4<br>(4 × 5.4)     | 35<br>(28)     | 5 × 5.4<br>(4 × 5.4)                      | 39<br>(28)            | 6.3 × 5.4<br>(5 × 5.4)  | 52<br>(35)             |
| 33                     | 330 | 4 × 5.4                  | 26            | 5 × 5.4<br>(4 × 5.4)       | 39<br>(31)    | 5 × 5.4<br>(4 × 5.4)     | 43<br>(32)     | 6.3 × 5.4<br>(5 × 5.4)                    | 57<br>(40)            | 6.3 × 5.4<br>(5 × 5.4)  | 63<br>(42)             |
| 47                     | 470 | 4 × 5.4                  | 34            | 5 × 5.4<br>(4 × 5.4)       | 47<br>(36)    | 5 × 5.4                  | 43             | 6.3 × 5.4<br>(5 × 5.4)                    | 68<br>(44)            | 6.3 × 5.4               | 68                     |
| 56                     | 560 | 4 × 5.4                  | 39            | 5 × 5.4                    | 46            | 6.3 × 5.4                | 57             | 6.3 × 5.4                                 | 74                    | 6.3 × 5.4               | 82                     |
| 68                     | 680 | 5 × 5.4                  | 45            | 6.3 × 5.4<br>(5 × 5.4)     | 62<br>(52)    | 6.3 × 5.4                | 72             | 6.3 × 5.4                                 | 80                    | 6.3 × 5.4               | 94                     |
| 100                    | 101 | 5 × 5.4                  | 61            | 6.3 × 5.4<br>(5 × 5.4)     | 71<br>(55)    | 6.3 × 5.4<br>(5 × 5.4)   | 76<br>(70)     | 6.3 × 5.4                                 | 86                    | 6.3 × 7.7               | 130                    |
| 150                    | 151 | 6.3 × 5.4                | 74            | 6.3 × 5.4                  | 78            | 6.3 × 5.4                | 88             | 6.3 × 7.7                                 | 135                   | 8 × 10.5<br>(6.3 × 7.7) | 200<br>(130)           |
| 220                    | 221 | 6.3 × 5.4                | 82            | 6.3 × 5.4                  | 95            | 6.3 × 7.7                | 150            | 8 × 10.5<br>(6.3 × 7.7)                   | 215<br>(150)          | 8 × 10.5                | 250                    |
| 330                    | 331 | 6.3 × 7.7                | 150           | 6.3 × 7.7                  | 150           | 8 × 10.5                 | 280            | 8 × 10.5                                  | 280                   | 10 × 10.5<br>(8 × 10.5) | 340<br>(310)           |
| 470                    | 471 | 6.3 × 7.7                | 150           | 8 × 10.5<br>(6.3 × 7.7)    | 300<br>(150)  | 10 × 10.5<br>(8 × 10.5)  | 320<br>(300)   | 10 × 10.5<br>(8 × 10.5)                   | 420<br>(330)          | 10 × 10.5               | 400                    |
| 680                    | 681 | 8 × 10.5                 | 300           | 8 × 10.5                   | 300           | 10 × 10.5                | 380            | 10 × 10.5                                 | 450                   | 10 × 13.5               | 550                    |
| 1000                   | 102 | 8 × 10.5                 | 330           | 10 × 10.5<br>(8 × 10.5)    | 430<br>(330)  | 10 × 10.5                | 450            | 12.5 × 13.5<br>(10 × 13.5)<br>(10 × 10.5) | 710<br>(550)<br>(490) | 12.5 × 13.5             | 820                    |
| 1500                   | 152 | 10 × 10.5                | 450           | 10 × 13.5<br>(10 × 10.5)   | 650<br>(450)  | 10 × 13.5                | 650            | 12.5 × 13.5                               | 750                   | 12.5 × 16               | 1000                   |
| 2200                   | 222 | 10 × 13.5<br>(10 × 10.5) | 620<br>(480)  | 12.5 × 13.5<br>(10 × 13.5) | 890<br>(720)  | 12.5 × 13.5              | 960            | 16 × 16.5<br>(12.5 × 16)                  | 1150<br>(1000)        | 16 × 16.5               | 1250                   |
| 3300                   | 332 | 10 × 13.5                | 700           | 12.5 × 16<br>(12.5 × 13.5) | 1000<br>(900) | 16 × 16.5<br>(12.5 × 16) | 1300<br>(1050) | 16 × 16.5                                 | 1350                  | 18 × 16.5               | 1450                   |
| 4700                   | 472 | 12.5 × 13.5              | 850           | 16 × 16.5                  | 1400          | 16 × 16.5                | 1450           | 18 × 16.5                                 | 1600                  | 18 × 18.5               | 1750                   |
| 6800                   | 682 | 16 × 16.5<br>(12.5 × 16) | 1350<br>(900) | 18 × 16.5                  | 1700          | 18 × 16.5                | 1700           | 18 × 18.5                                 | 2000                  | Case size<br>尺寸         | Ripple current<br>紋波電流 |
| 10000                  | 103 |                          |               | 18 × 18.5                  | 2000          | 18 × 18.5                | 2000           |                                           |                       |                         |                        |

| WV<br>Code<br>代碼<br>μF | 35  |                          | 50          |                                        | 63                   |                          | 100          |                          |                        |
|------------------------|-----|--------------------------|-------------|----------------------------------------|----------------------|--------------------------|--------------|--------------------------|------------------------|
|                        | 1V  |                          | 1H          |                                        | 1J                   |                          | 2A           |                          |                        |
| 0.1                    | 0R1 |                          | 4 × 5.4     | 1.0                                    | 4 × 5.4              | 1.0                      |              |                          |                        |
| 0.22                   | R22 |                          | 4 × 5.4     | 2.3                                    | 4 × 5.4              | 2.3                      |              |                          |                        |
| 0.33                   | R33 |                          | 4 × 5.4     | 3.5                                    | 4 × 5.4              | 3.5                      |              |                          |                        |
| 0.47                   | R47 |                          | 4 × 5.4     | 5.0                                    | 4 × 5.4              | 5.0                      |              |                          |                        |
| 1                      | 010 |                          | 4 × 5.4     | 10                                     | 4 × 5.4              | 10                       | 4 × 5.4      | 10                       |                        |
| 1.5                    | 1R5 |                          | 4 × 5.4     | 12                                     | 4 × 5.4              | 12                       | 6.3 × 5.4    | 15                       |                        |
| 2.2                    | 2R2 |                          | 4 × 5.4     | 15                                     | 4 × 5.4              | 15                       | 6.3 × 5.4    | 20                       |                        |
| 3.3                    | 3R3 | 4 × 5.4                  | 18          | 4 × 5.4                                | 18                   | 5 × 5.4                  | 20           | 6.3 × 7.7<br>(6.3 × 5.4) | 45<br>(28)             |
| 4.7                    | 4R7 | 4 × 5.4                  | 20          | 5 × 5.4<br>(4 × 5.4)                   | 23<br>(19)           | 5 × 5.4                  | 23           | 6.3 × 7.7<br>(6.3 × 5.4) | 50<br>(30)             |
| 10                     | 100 | 5 × 5.4<br>(4 × 5.4)     | 30<br>(20)  | 6.3 × 5.4<br>(5 × 5.4)                 | 34<br>(27)           | 6.3 × 7.7<br>(6.3 × 5.4) | 55<br>(34)   | 8 × 10.5<br>(6.3 × 7.7)  | 110<br>(50)            |
| 22                     | 220 | 6.3 × 5.4<br>(5 × 5.4)   | 54<br>(42)  | 6.3 × 5.4                              | 60                   | 8 × 10.5<br>(6.3 × 7.7)  | 140<br>(70)  | 10 × 10.5<br>(8 × 10.5)  | 180<br>(120)           |
| 33                     | 330 | 6.3 × 5.4                | 60          | 6.3 × 7.7                              | 85                   | 8 × 10.5<br>(6.3 × 7.7)  | 160<br>(85)  | 10 × 10.5                | 190                    |
| 47                     | 470 | 6.3 × 5.4<br>(6.3 × 7.7) | 70<br>(165) | 10 × 10.5<br>(8 × 10.5)<br>(6.3 × 7.7) | 130<br>(110)<br>(90) | 10 × 10.5<br>(8 × 10.5)  | 230<br>(170) | Case size<br>尺寸          | Ripple current<br>紋波電流 |

•Case size ∅DxL(mm), ripple current (mA rms) at 85°C, 120Hz •尺寸∅DxL(mm), 紋波電流(mA rms)於 85°C, 120Hz

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CS Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| μF   | WV<br>Code<br>代碼 | 35                                        |                       | 50                         |              | 63                                        |                       | 100         |     | 160                        |                        |
|------|------------------|-------------------------------------------|-----------------------|----------------------------|--------------|-------------------------------------------|-----------------------|-------------|-----|----------------------------|------------------------|
|      |                  | 1V                                        |                       | 1H                         |              | 1J                                        |                       | 2A          |     | 2C                         |                        |
| 22   | 220              |                                           |                       |                            |              |                                           |                       |             |     | 10 × 13.5                  | 100                    |
| 33   | 330              |                                           |                       |                            |              |                                           |                       |             |     | 12.5 × 13.5                | 290                    |
| 47   | 470              |                                           |                       |                            |              |                                           |                       | 10 × 10.5   | 240 | 12.5 × 13.5<br>(16 × 16.5) | 300<br>(370)           |
| 56   | 560              | 6.3 × 7.7                                 | 80                    | 6.3 × 7.7                  | 110          | 10 × 10.5                                 | 250                   |             |     | 12.5 × 16                  | 390                    |
| 68   | 680              | 6.3 × 7.7                                 | 110                   | 8 × 10.5                   | 170          | 10 × 10.5                                 | 260                   |             |     | 16 × 16.5                  | 500                    |
| 100  | 101              | 8 × 10.5<br>(6.3 × 7.7)                   | 175<br>(120)          | 10 × 10.5<br>(8 × 10.5)    | 240<br>(200) | 12.5 × 13.5<br>(10 × 13.5)<br>(10 × 10.5) | 380<br>(290)<br>(280) | 12.5 × 13.5 | 440 | 16 × 16.5<br>(18 × 16.5)   | 650<br>(690)           |
| 150  | 151              | 8 × 10.5                                  | 220                   | 10 × 10.5                  | 240          | 10 × 13.5                                 | 310                   | 12.5 × 13.5 | 540 |                            |                        |
| 220  | 221              | 10 × 10.5<br>(8 × 10.5)                   | 310<br>(270)          | 10 × 13.5<br>(10 × 10.5)   | 400<br>(320) | 12.5 × 13.5                               | 580                   | 16 × 16.5   | 700 |                            |                        |
| 330  | 331              | 10 × 10.5                                 | 350                   | 12.5 × 13.5<br>(10 × 13.5) | 600<br>(420) | 16 × 16.5<br>(12.5 × 16)                  | 820<br>(720)          | 18 × 16.5   | 780 |                            |                        |
| 470  | 471              | 12.5 × 13.5<br>(10 × 13.5)<br>(10 × 10.5) | 600<br>(530)<br>(400) | 16 × 16.5<br>(12.5 × 16)   | 850<br>(740) | 16 × 16.5                                 | 950                   |             |     |                            |                        |
| 680  | 681              | 12.5 × 13.5                               | 750                   | 16 × 16.5                  | 950          | 18 × 16.5                                 | 1100                  |             |     |                            |                        |
| 1000 | 102              | 16 × 16.5<br>(12.5 × 16)                  | 1100<br>(800)         | 18 × 16.5                  | 1350         |                                           |                       |             |     |                            |                        |
| 2200 | 222              | 18 × 16.5                                 | 1450                  |                            |              |                                           |                       |             |     | Case size<br>尺寸            | Ripple current<br>紋波電流 |
| 3300 | 333              | 18 × 18.5                                 | 1750                  |                            |              |                                           |                       |             |     |                            |                        |

| WV<br>Code<br>代碼 | μF  | 200         |     | 250                      |              | 350         |     | 400                        |              | 450                        |                        |
|------------------|-----|-------------|-----|--------------------------|--------------|-------------|-----|----------------------------|--------------|----------------------------|------------------------|
|                  |     | 2D          |     | 2E                       |              | 2V          |     | 2G                         |              | 2W                         |                        |
| 3.3              | 3R3 |             |     |                          |              |             |     | 10 × 13.5                  | 80           | 10 × 13.5                  | 80                     |
| 4.7              | 4R7 |             |     |                          |              | 10 × 13.5   | 115 | 10 × 13.5<br>(12.5 × 13.5) | 100<br>(120) | 10 × 13.5<br>(12.5 × 13.5) | 100<br>(120)           |
| 10               | 100 | 10 × 13.5   | 135 | 10 × 13.5                | 135          | 12.5 × 13.5 | 120 | 12.5 × 13.5                | 120          | 12.5 × 13.5<br>(12.5 × 16) | 120<br>(130)           |
| 22               | 220 | 12.5 × 13.5 | 240 | 12.5 × 13.5              | 150          | 16 × 16.5   | 140 | 16 × 16.5                  | 140          | 16 × 16.5                  | 140                    |
| 33               | 330 | 12.5 × 13.5 | 300 | 12.5 × 16<br>(16 × 16.5) | 240<br>(300) | 16 × 16.5   | 140 | 16 × 16.5                  | 140          | 18 × 16.5                  | 180                    |
| 47               | 470 | 16 × 16.5   | 420 | 16 × 16.5                | 340          | 18 × 16.5   | 280 | 18 × 16.5                  | 280          | Case size<br>尺寸            | Ripple current<br>紋波電流 |
| 100              | 101 | 16 × 16.5   | 420 | 18 × 16.5                | 440          | 18 × 18.5   | 350 | 18 × 18.5                  | 350          |                            |                        |

•Case size ØD×L(mm), ripple current (mA rms) at 85°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 85°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |             |                | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|----------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | Ø4 ~ Ø10    | 0.1 ~ 68μF     | 0.70 | 1.00  | 1.17  | 1.36 | 1.50   |
|                   |             | 100 ~ 3300μF   | 0.85 | 1.00  | 1.08  | 1.20 | 1.30   |
|                   | Ø12.5 ~ Ø18 | ~ 68μF         | 0.75 | 1.00  | 1.35  | 1.57 | 2.00   |
|                   |             | 100 ~ 680μF    | 0.80 | 1.00  | 1.23  | 1.34 | 1.50   |
|                   |             | 1000 ~ 10000μF | 0.85 | 1.00  | 1.10  | 1.13 | 1.15   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

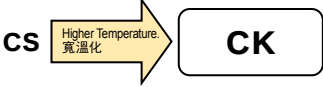
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

CK Series

CHIP TYPE, WIDE TEMPERATURE

貼片式，寬溫品

- Operating with wide temperature range -55~+105°C  
適用於 -55~+105°C 的寬溫範圍
- Endurance 2000 hours  
耐久性 2000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵

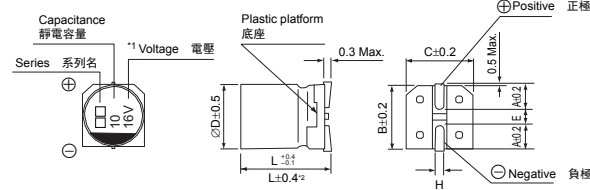


SPECIFICATIONS 特性表

| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                          |           |                                                                               |                                                                                                                                                                 |              |                                                                               |      |      |                                                                               |       |      |         |         |
|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------|-------|------|---------|---------|
| Category Temperature Range 工作溫度範圍                                                                             | -55 ~ +105°C                                                                                                                                                                                                                                  |           |                                                                               |                                                                                                                                                                 | -40 ~ +105°C |                                                                               |      |      | -25 ~ +105°C                                                                  |       |      |         |         |
| Voltage Range 額定工作電壓範圍                                                                                        | 4 ~ 100V                                                                                                                                                                                                                                      |           |                                                                               |                                                                                                                                                                 | 160 ~ 400V   |                                                                               |      |      | 450V                                                                          |       |      |         |         |
| Capacitance Range 靜電容量範圍                                                                                      | 0.1 ~ 8200µF                                                                                                                                                                                                                                  |           |                                                                               |                                                                                                                                                                 | 3.3 ~100µF   |                                                                               |      |      | 3.3 ~ 33µF                                                                    |       |      |         |         |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                           |           |                                                                               |                                                                                                                                                                 |              |                                                                               |      |      |                                                                               |       |      |         |         |
| Leakage Current 漏電流                                                                                           | Rated Voltage 額定工作電壓                                                                                                                                                                                                                          |           | 6.3 ~ 100V                                                                    |                                                                                                                                                                 |              |                                                                               |      |      | 160 ~ 450V                                                                    |       |      |         |         |
|                                                                                                               | Case size 尺寸                                                                                                                                                                                                                                  |           | Ø4~Ø10                                                                        |                                                                                                                                                                 |              | Ø12.5~Ø18                                                                     |      |      | Ø6.3~Ø18                                                                      |       |      |         |         |
|                                                                                                               | Time 時間                                                                                                                                                                                                                                       |           | After 2 min. application of rated voltage at 20°C<br>在 20°C 環境中施加額定工作電壓 2 分鐘後 |                                                                                                                                                                 |              | After 1 min. application of rated voltage at 20°C<br>在 20°C 環境中施加額定工作電壓 1 分鐘後 |      |      | After 5 min. application of rated voltage at 20°C<br>在 20°C 環境中施加額定工作電壓 5 分鐘後 |       |      |         |         |
|                                                                                                               | Leakage current 漏電流                                                                                                                                                                                                                           |           | ≤0.01CV or 3µA, whichever is greater<br>≤0.01CV 或 3µA，取較大值                    |                                                                                                                                                                 |              | ≤0.03CV or 4µA, whichever is greater<br>≤0.03CV 或 4µA，取較大值                    |      |      | ≤0.04CV+100µA, whichever is greater<br>≤0.04CV+100µA，取較大值                     |       |      |         |         |
|                                                                                                               | C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                 |           |                                                                               |                                                                                                                                                                 |              |                                                                               |      |      |                                                                               |       |      |         |         |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                       |           |                                                                               |                                                                                                                                                                 |              |                                                                               |      |      |                                                                               |       |      |         |         |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                      |           | 4                                                                             | 6.3                                                                                                                                                             | 10           | 16                                                                            | 25   | 35   | 50                                                                            | 63    | 100  | 160~250 | 350~450 |
|                                                                                                               | tan δ (max.)                                                                                                                                                                                                                                  |           | Ø4~Ø10                                                                        | 0.42                                                                                                                                                            | 0.30         | 0.26                                                                          | 0.22 | 0.16 | 0.14                                                                          | 0.12  | 0.10 | 0.10    | 0.20    |
| 最大損耗角正切                                                                                                       |                                                                                                                                                                                                                                               | Ø12.5~Ø18 | 0.45                                                                          | 0.38                                                                                                                                                            | 0.34         | 0.30                                                                          | 0.26 | 0.22 | 0.18                                                                          | 0.14  | 0.10 | 0.20    | 0.25    |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                             |           |                                                                               |                                                                                                                                                                 |              |                                                                               |      |      |                                                                               |       |      |         |         |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                      |           |                                                                               | 4                                                                                                                                                               | 6.3          | 10                                                                            | 16   | 25   | 35                                                                            | 50~63 | 100  | 160~250 | 350~450 |
|                                                                                                               | Impedance Ratio 阻抗比                                                                                                                                                                                                                           | Ø4~Ø10    | Z/(-25°C)/Z(20°C)                                                             | 7                                                                                                                                                               | 4            | 3                                                                             | 2    | 2    | 2                                                                             | 2     | 3    | 2       | 3       |
|                                                                                                               |                                                                                                                                                                                                                                               |           | Z/(-55°C)/Z(20°C)                                                             | 15                                                                                                                                                              | 8            | 6                                                                             | 4    | 4    | 3                                                                             | 3     | 4    | 3       | 6       |
|                                                                                                               | ZT/Z20 (max.)                                                                                                                                                                                                                                 | Ø12.5~Ø18 | Z/(-25°C)/Z(20°C)                                                             | 7                                                                                                                                                               | 5            | 4                                                                             | 3    | 2    | 2                                                                             | 2     | 2    | 2       | 4       |
|                                                                                                               |                                                                                                                                                                                                                                               |           | Z/(-55°C)/Z(20°C)                                                             | 17                                                                                                                                                              | 12           | 10                                                                            | 8    | 5    | 4                                                                             | 3     | 3    | 6       | 10      |
| Endurance 耐久性                                                                                                 | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                             |           |                                                                               |                                                                                                                                                                 |              |                                                                               |      |      |                                                                               |       |      |         |         |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                    |           |                                                                               | Within ±20% of initial value for capacitors of 10V or more<br>(Within ±30% of initial value for capacitors of 4V or less)<br>≥10V 為初始值的±20%以內 (≤4V 為初始值的±30%以內) |              |                                                                               |      |      |                                                                               |       |      |         |         |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                      |           |                                                                               | 200% or less of initial specified value 不大於規範值的 200%                                                                                                            |              |                                                                               |      |      |                                                                               |       |      |         |         |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                           |           |                                                                               | initial specified value or less 不大於規範值                                                                                                                          |              |                                                                               |      |      |                                                                               |       |      |         |         |
| Shelf Life 高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。 |           |                                                                               |                                                                                                                                                                 |              |                                                                               |      |      |                                                                               |       |      |         |         |
|                                                                                                               | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。                                                                                                            |           |                                                                               |                                                                                                                                                                 |              |                                                                               |      |      |                                                                               |       |      |         |         |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                    |           |                                                                               | Within ±10% of initial value 初始值的±10%以內                                                                                                                         |              |                                                                               |      |      |                                                                               |       |      |         |         |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                      |           |                                                                               | initial specified value or less 不大於規範值                                                                                                                          |              |                                                                               |      |      |                                                                               |       |      |         |         |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                           |           |                                                                               | initial specified value or less 不大於規範值                                                                                                                          |              |                                                                               |      |      |                                                                               |       |      |         |         |
|                                                                                                               |                                                                                                                                                                                                                                               |           |                                                                               |                                                                                                                                                                 |              |                                                                               |      |      |                                                                               |       |      |         |         |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                        |           |                                                                               |                                                                                                                                                                 |              |                                                                               |      |      |                                                                               |       |      |         |         |

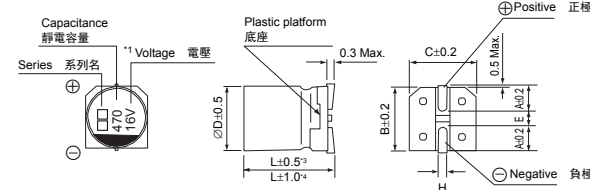
DRAWING 外形圖 (Unit: mm)

(Ø4~Ø6.3×7.7)



- \*1. Voltage mark for 6.3V is [6V]
- \*2. Applicable to Ø6.3×7.7
- \*3. Applicable to Ø8×10.5~Ø10
- \*4. Applicable to Ø12.5~Ø18

(Ø8×10.5~Ø18)



Dimension table in next page.  
尺寸表見下一頁。

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.

注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CK Series

□ DIMENSIONS (Unit: mm) 尺寸表

| ØD x L  | 4 x 5.4 | 5 x 5.4 | 6.3 x 5.4/7.7 | 8 x 6.2/10.5 | 10 x 10.5/12.5/13.5 | 12.5 x 13.5/16 | 16 x 16.5 | 18 x 16.5/18.5 |
|---------|---------|---------|---------------|--------------|---------------------|----------------|-----------|----------------|
| A       | 2.0     | 2.2     | 2.6           | 3.3/3.0      | 3.3                 | 4.9            | 5.8       | 6.2            |
| B       | 4.3     | 5.3     | 6.6           | 8.4          | 10.4                | 13.0           | 17.0      | 19.0           |
| C       | 4.3     | 5.3     | 6.6           | 8.4          | 10.4                | 13.0           | 17.0      | 19.0           |
| E ± 0.2 | 1.0     | 1.4     | 1.9           | 2.3/3.1      | 4.7                 | 4.7            | 6.4       | 6.4            |
| L       | 5.4     | 5.4     | 5.4/7.7       | 6.2/10.5     | 10.5/12.5/13.5      | 13.5/16        | 16.5      | 16.5/18.5      |
| H       | 0.5~0.8 | 0.5~0.8 | 0.5~0.8       | 0.8~1.2      | 0.8~1.2             | 0.8~1.2        | 1.1~1.4   | 1.1~1.4        |

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼<br>µF |     | 4                        |              | 6.3                        |              | 10                       |              | 16                                        |                       | 25                                    |                        |
|------------------------|-----|--------------------------|--------------|----------------------------|--------------|--------------------------|--------------|-------------------------------------------|-----------------------|---------------------------------------|------------------------|
|                        |     | 0G                       |              | 0J                         |              | 1A                       |              | 1C                                        |                       | 1E                                    |                        |
| 4.7                    | 4R7 |                          |              |                            |              |                          |              | 4 x 5.4                                   | 13                    | 4 x 5.4                               | 17                     |
| 10                     | 100 |                          |              |                            |              |                          |              | 4 x 5.4                                   | 20                    | 5 x 5.4<br>(4 x 5.4)                  | 23<br>(20)             |
| 22                     | 220 | 4 x 5.4                  | 20           | 4 x 5.4                    | 23           | 5 x 5.4<br>(4 x 5.4)     | 29<br>(22)   | 5 x 5.4<br>(4 x 5.4)                      | 32<br>(25)            | 6.3 x 5.4<br>(5 x 5.4)                | 39<br>(32)             |
| 33                     | 330 | 5 x 5.4<br>(4 x 5.4)     | 30<br>(25)   | 5 x 5.4<br>(4 x 5.4)       | 34<br>(30)   | 5 x 5.4<br>(4 x 5.4)     | 35<br>(30)   | 6.3 x 5.4<br>(5 x 5.4)                    | 45<br>(35)            | 6.3 x 5.4<br>(5 x 5.4)                | 48<br>(35)             |
| 47                     | 470 | 5 x 5.4<br>(4 x 5.4)     | 36<br>(30)   | 5 x 5.4<br>(4 x 5.4)       | 38<br>(35)   | 5 x 5.4                  | 38           | 6.3 x 5.4<br>(5 x 5.4)                    | 55<br>(40)            | 6.3 x 5.4                             | 60                     |
| 100                    | 101 | 6.3 x 5.4<br>(5 x 5.4)   | 64<br>(54)   | 6.3 x 5.4<br>(5 x 5.4)     | 69<br>(59)   | 6.3 x 5.4<br>(5 x 5.4)   | 80<br>(60)   | 6.3 x 5.4                                 | 80                    | 6.3 x 7.7<br>(6.3 x 5.4)<br>(8 x 6.2) | 100<br>(80)<br>(130)   |
| 150                    | 151 | 6.3 x 5.4                | 80           | 6.3 x 5.4                  | 85           | 6.3 x 5.4                | 85           | 6.3 x 7.7                                 | 105                   | 8 x 10.5<br>(6.3 x 7.7)               | 240<br>(120)           |
| 220                    | 221 | 6.3 x 5.4                | 90           | 6.3 x 7.7<br>(6.3 x 5.4)   | 120<br>(95)  | 6.3 x 7.7<br>(6.3 x 5.4) | 120<br>(95)  | 8 x 10.5<br>(6.3 x 7.7)                   | 270<br>(120)          | 8 x 10.5                              | 270                    |
| 330                    | 331 | 6.3 x 7.7                | 120          | 6.3 x 7.7                  | 120          | 8 x 10.5<br>(6.3 x 7.7)  | 290<br>(135) | 8 x 10.5                                  | 290                   | 10 x 10.5<br>(8 x 10.5)               | 380<br>(290)           |
| 470                    | 471 | 6.3 x 7.7                | 120          | 8 x 10.5<br>(6.3 x 7.7)    | 320<br>(120) | 10 x 10.5<br>(8 x 10.5)  | 380<br>(320) | 10 x 10.5<br>(8 x 10.5)                   | 380<br>(290)          | 10 x 10.5                             | 380                    |
| 680                    | 681 | 8 x 10.5                 | 320          | 8 x 10.5                   | 350          | 10 x 10.5<br>(8 x 10.5)  | 380<br>(350) | 10 x 10.5                                 | 380                   | 10 x 13.5                             | 400                    |
| 1000                   | 102 | 8 x 10.5                 | 320          | 10 x 10.5<br>(8 x 10.5)    | 410<br>(350) | 10 x 10.5                | 410          | 12.5 x 13.5<br>(10 x 13.5)<br>(10 x 10.5) | 550<br>(460)<br>(410) | 12.5 x 13.5                           | 580                    |
| 1500                   | 152 | 10 x 10.5                | 410          | 10 x 13.5<br>(10 x 10.5)   | 450<br>(410) | 10 x 13.5                | 460          | 12.5 x 13.5                               | 550                   | 12.5 x 16                             | 850                    |
| 2200                   | 222 | 10 x 13.5<br>(10 x 10.5) | 440<br>(410) | 12.5 x 13.5<br>(10 x 13.5) | 680<br>(560) | 12.5 x 13.5              | 680          | 16 x 16.5<br>(12.5 x 16)                  | 900<br>(750)          | 16 x 16.5                             | 1050                   |
| 3300                   | 332 | 10 x 13.5                | 490          | 12.5 x 16<br>(12.5 x 13.5) | 850<br>(810) | 16 x 16.5                | 1000         | 16 x 16.5                                 | 1000                  | 18 x 16.5                             | 1150                   |
| 4700                   | 472 | 12.5 x 13.5              | 600          | 16 x 16.5                  | 1000         | 16 x 16.5                | 1000         | 18 x 16.5                                 | 1225                  | 18 x 18.5                             | 1300                   |
| 6800                   | 682 | 16 x 16.5<br>(12.5 x 16) | 950<br>(650) | 18 x 16.5                  | 1290         | 18 x 16.5                | 1290         |                                           |                       | Case size<br>尺寸                       | Ripple current<br>紋波電流 |
| 8200                   | 822 |                          |              | 18 x 18.5                  | 1450         | 18 x 18.5                | 1450         |                                           |                       |                                       |                        |

| WV<br>Code<br>代碼<br>µF |     | 35                       |            | 50                       |             | 63                       |                        | 100                                       |                       |
|------------------------|-----|--------------------------|------------|--------------------------|-------------|--------------------------|------------------------|-------------------------------------------|-----------------------|
|                        |     | 1V                       |            | 1H                       |             | 1J                       |                        | 2A                                        |                       |
| 0.1                    | 0R1 |                          |            | 4 x 5.4                  | 2           | 4 x 5.4                  | 2                      |                                           |                       |
| 0.22                   | R22 |                          |            | 4 x 5.4                  | 4           | 4 x 5.4                  | 4                      |                                           |                       |
| 0.33                   | R33 |                          |            | 4 x 5.4                  | 4           | 4 x 5.4                  | 4                      |                                           |                       |
| 0.47                   | R47 |                          |            | 4 x 5.4                  | 5           | 4 x 5.4                  | 5                      |                                           |                       |
| 1                      | 010 |                          |            | 4 x 5.4                  | 8           | 4 x 5.4                  | 8                      | 4 x 5.4                                   | 8                     |
| 2.2                    | 2R2 |                          |            | 4 x 5.4                  | 12          | 4 x 5.4                  | 12                     | 6.3 x 5.4<br>(5 x 5.4)                    | 14<br>(12)            |
| 3.3                    | 3R3 | 4 x 5.4                  | 13         | 4 x 5.4                  | 14          | 5 x 5.4                  | 17                     | 6.3 x 7.7<br>(6.3 x 5.4)                  | 55<br>(20)            |
| 4.7                    | 4R7 | 4 x 5.4                  | 17         | 5 x 5.4<br>(4 x 5.4)     | 20<br>(14)  | 5 x 5.4                  | 20                     | 6.3 x 7.7<br>(6.3 x 5.4)                  | 50<br>(21)            |
| 10                     | 100 | 5 x 5.4<br>(4 x 5.4)     | 27<br>(18) | 6.3 x 5.4<br>(5 x 5.4)   | 32<br>(27)  | 6.3 x 7.7<br>(6.3 x 5.4) | 58<br>(32)             | 8 x 10.5<br>(8 x 6.2)<br>(6.3 x 7.7)      | 77<br>(55)<br>(58)    |
| 22                     | 220 | 6.3 x 5.4<br>(5 x 5.4)   | 44<br>(36) | 6.3 x 7.7<br>(6.3 x 5.4) | 58<br>(44)  | 8 x 10.5<br>(6.3 x 7.7)  | 100<br>(58)            | 10 x 10.5<br>(8 x 10.5)                   | 126<br>(100)          |
| 33                     | 330 | 6.3 x 5.4                | 50         | 6.3 x 7.7                | 65          | 8 x 10.5                 | 140                    | 10 x 10.5                                 | 150                   |
| 47                     | 470 | 6.3 x 7.7<br>(6.3 x 5.4) | 80<br>(58) | 8 x 10.5<br>(6.3 x 7.7)  | 170<br>(70) | 10 x 10.5<br>(8 x 10.5)  | 170<br>(160)           | 12.5 x 13.5<br>(10 x 13.5)<br>(10 x 10.5) | 250<br>(180)<br>(160) |
| 68                     | 680 |                          |            |                          |             | Case size<br>尺寸          | Ripple current<br>紋波電流 | 12.5 x 13.5<br>(10 x 13.5)                | 300<br>(180)          |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CAT.2024/V1.3

CK Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼 | μF  | 35                                        |                       | 50                                        |                       | 63                                        |                       | 100                        |              | 160                        |                        |
|------------------|-----|-------------------------------------------|-----------------------|-------------------------------------------|-----------------------|-------------------------------------------|-----------------------|----------------------------|--------------|----------------------------|------------------------|
|                  |     | 1V                                        |                       | 1H                                        |                       | 1J                                        |                       | 2A                         |              | 2C                         |                        |
| 22               | 220 |                                           |                       |                                           |                       |                                           |                       |                            |              | 10 × 13.5                  | 50                     |
| 33               | 330 |                                           |                       |                                           |                       |                                           |                       |                            |              | 12.5 × 13.5                | 95                     |
| 47               | 470 |                                           |                       |                                           |                       |                                           |                       |                            |              | 12.5 × 13.5<br>(16 × 16.5) | 205<br>(240)           |
| 100              | 101 | 8 × 10.5<br>(6.3 × 7.7)                   | 240<br>(92)           | 10 × 10.5<br>(8 × 10.5)                   | 250<br>(210)          | 12.5 × 13.5<br>(10 × 13.5)<br>(10 × 10.5) | 400<br>(350)<br>(310) | 16 × 16.5<br>(12.5 × 13.5) | 450<br>(380) | 16 × 16.5                  | 250                    |
| 150              | 151 | 8 × 10.5                                  | 240                   | 10 × 10.5                                 | 300                   | 10 × 13.5                                 | 350                   |                            |              |                            |                        |
| 220              | 221 | 10 × 10.5<br>(8 × 10.5)                   | 270<br>(250)          | 10 × 13.5<br>(10 × 10.5)                  | 330<br>(280)          | 16 × 16.5<br>(12.5 × 13.5)                | 560<br>(470)          | 16 × 16.5                  | 550          |                            |                        |
| 330              | 331 | 10 × 10.5                                 | 370                   | 16 × 16.5<br>(12.5 × 13.5)<br>(10 × 13.5) | 600<br>(490)<br>(295) | 16 × 16.5<br>(12.5 × 16)                  | 700<br>(510)          | 18 × 16.5                  | 590          |                            |                        |
| 470              | 471 | 12.5 × 13.5<br>(10 × 13.5)<br>(10 × 10.5) | 520<br>(400)<br>(370) | 16 × 16.5<br>(12.5 × 16)<br>(12.5 × 13.5) | 700<br>(550)<br>(470) | 16 × 16.5                                 | 750                   | 18 × 18.5                  | 980          |                            |                        |
| 680              | 681 | 12.5 × 13.5                               | 530                   | 16 × 16.5                                 | 750                   | 18 × 16.5                                 | 790                   |                            |              |                            |                        |
| 1000             | 102 | 16 × 16.5<br>(12.5 × 16)                  | 800<br>(600)          | 18 × 16.5                                 | 990                   |                                           |                       |                            |              |                            |                        |
| 1500             | 152 | 16 × 16.5                                 | 750                   |                                           |                       |                                           |                       |                            |              | Case size<br>尺寸            | Ripple current<br>紋波電流 |
| 2200             | 222 | 18 × 16.5                                 | 1050                  |                                           |                       |                                           |                       |                            |              |                            |                        |

| WV<br>Code<br>代碼 | μF  | 200         |     | 250         |     | 350         |     | 400                        |            | 450                        |                        |
|------------------|-----|-------------|-----|-------------|-----|-------------|-----|----------------------------|------------|----------------------------|------------------------|
|                  |     | 2D          |     | 2E          |     | 2V          |     | 2G                         |            | 2W                         |                        |
| 3.3              | 3R3 |             |     |             |     |             |     | 10 × 13.5<br>(8 × 10.5)    | 40<br>(35) | 10 × 13.5<br>(8 × 12.5)    | 40<br>(38)             |
| 4.7              | 4R7 |             |     | 10 × 13.5   | 65  | 10 × 13.5   | 45  | 10 × 13.5<br>(12.5 × 13.5) | 45<br>(48) | 10 × 13.5<br>(12.5 × 13.5) | 42<br>45               |
| 10               | 100 | 10 × 13.5   | 75  | 10 × 13.5   | 70  | 12.5 × 13.5 | 50  | 12.5 × 13.5                | 50         | 12.5 × 13.5                | 70                     |
| 22               | 220 | 12.5 × 13.5 | 105 | 12.5 × 13.5 | 105 | 16 × 16.5   | 85  | 16 × 16.5                  | 85         | 16 × 16.5                  | 85                     |
| 33               | 330 | 12.5 × 13.5 | 120 | 16 × 16.5   | 180 | 18 × 16.5   | 100 | 18 × 16.5                  | 100        | 18 × 16.5                  | 100                    |
| 47               | 470 | 16 × 16.5   | 220 | 16 × 16.5   | 220 |             |     |                            |            | Case size<br>尺寸            | Ripple current<br>紋波電流 |
| 100              | 101 | 18 × 16.5   | 280 | 18 × 16.5   | 260 |             |     |                            |            |                            |                        |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |             |               | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|---------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | Ø4 ~ Ø10    | 0.1 ~ 68μF    | 0.70 | 1.00  | 1.17  | 1.36 | 1.50   |
|                   |             | 100 ~ 3300μF  | 0.85 | 1.00  | 1.08  | 1.20 | 1.30   |
|                   | Ø12.5 ~ Ø18 | ~ 68μF        | 0.75 | 1.00  | 1.35  | 1.57 | 2.00   |
|                   |             | 100 ~ 680μF   | 0.80 | 1.00  | 1.23  | 1.34 | 1.50   |
|                   |             | 1000 ~ 8200μF | 0.85 | 1.00  | 1.10  | 1.13 | 1.15   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

SC Series

CHIP TYPE, LOW LEAKAGE CURRENT

貼片式，低漏電流品

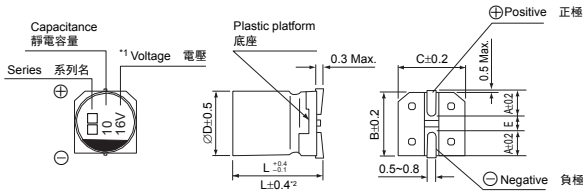


- Low leakage current (0.5~3.3µA max.)  
低漏電流 (0.5~3.3µA 最大值)
- Low cost for replacement of some tantalum applications  
可替換價格較高的鉭電容器
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵

SPECIFICATIONS 特性表

| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|--------|--------|------|----------------------------|-----------------------------------------|-----|----|--------|--------|-----------------------------------|------------------------------------------------------|-----|----|----|----|---------------------|----------------------------------------|----------------------|------|------|------|------|------|------|
| Category Temperature Range 工作溫度範圍                                                                             | -55 ~ +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Voltage Range 額定工作電壓範圍                                                                                        | 6.3 ~ 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Capacitance Range 靜電容量範圍                                                                                      | 0.1 ~ 220μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Leakage Current 漏電流                                                                                           | Leakage current ≤0.002CV or 0.5μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.002CV 或 0.5μA，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                     |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Surge Voltage & Dissipation Factor (tan δ) 浪湧電壓和損耗角正切                                                         | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Surge voltage 浪湧電壓</td><td>8.0</td><td>13</td><td>20</td><td>32</td><td>44</td><td>63</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table>                                                                                                                                            |      |      |        |        |      | Rated Voltage (V) 額定工作電壓   | 6.3                                     | 10  | 16 | 25     | 35     | 50                                | Surge voltage 浪湧電壓                                   | 8.0 | 13 | 20 | 32 | 44                  | 63                                     | tan δ (max.) 最大損耗角正切 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 |
| Rated Voltage (V) 額定工作電壓                                                                                      | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10   | 16   | 25     | 35     | 50   |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Surge voltage 浪湧電壓                                                                                            | 8.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 13   | 20   | 32     | 44     | 63   |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| tan δ (max.) 最大損耗角正切                                                                                          | 0.24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.20 | 0.16 | 0.14   | 0.12   | 0.10 |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16, 25</td><td>35, 50</td></tr><tr><td rowspan="2">Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td>Z(-25°C) / Z(20°C)</td><td>4</td><td>3</td><td>2</td><td>2</td></tr><tr><td>Z(-40°C) / Z(20°C)</td><td>8</td><td>6</td><td>4</td><td>3</td></tr></table>                                                                                                                                                                                 |      |      |        |        |      | Rated Voltage (V) 額定工作電壓   |                                         | 6.3 | 10 | 16, 25 | 35, 50 | Impedance Ratio 阻抗比 ZT/Z20 (max.) | Z(-25°C) / Z(20°C)                                   | 4   | 3  | 2  | 2  | Z(-40°C) / Z(20°C)  | 8                                      | 6                    | 4    | 3    |      |      |      |      |
| Rated Voltage (V) 額定工作電壓                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 6.3  | 10   | 16, 25 | 35, 50 |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Impedance Ratio 阻抗比 ZT/Z20 (max.)                                                                             | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4    | 3    | 2      | 2      |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
|                                                                                                               | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 8    | 6    | 4      | 3      |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Endurance 耐久性                                                                                                 | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below.<br>在 85°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="5">Within ±25% of initial value 初始值的±25%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="5">200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="5">initial specified value or less 不大於規範值</td></tr></table> |      |      |        |        |      | Capacitance Change 靜電容量變化率 | Within ±25% of initial value 初始值的±25%以內 |     |    |        |        | Dissipation Factor 損耗角正切          | 200% or less of initial specified value 不大於規範值的 200% |     |    |    |    | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |                      |      |      |      |      |      |      |
| Capacitance Change 靜電容量變化率                                                                                    | Within ±25% of initial value 初始值的±25%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Dissipation Factor 損耗角正切                                                                                      | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Leakage Current 漏電流                                                                                           | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="5">Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="5">initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="5">initial specified value or less 不大於規範值</td></tr></table>                                                                                            |      |      |        |        |      | Capacitance Change 靜電容量變化率 | Within ±10% of initial value 初始值的±10%以內 |     |    |        |        | Dissipation Factor 損耗角正切          | initial specified value or less 不大於規範值               |     |    |    |    | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |                      |      |      |      |      |      |      |
| Capacitance Change 靜電容量變化率                                                                                    | Within ±10% of initial value 初始值的±10%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Dissipation Factor 損耗角正切                                                                                      | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Leakage Current 漏電流                                                                                           | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |        |        |      |                            |                                         |     |    |        |        |                                   |                                                      |     |    |    |    |                     |                                        |                      |      |      |      |      |      |      |

DRAWING 外形圖 (Unit: mm)



\*1. Voltage mark for 6.3V is [6V]  
\*2. Applicable to Ø6.3x7.7

6.3V 的產品標識為 [6V]  
適用於 Ø6.3x7.7

DIMENSIONS (Unit: mm) 尺寸表

| ØD x L  | 4 x 5.4 | 5 x 5.4 | 6.3 x 5.4 | 6.3 x 7.7 |
|---------|---------|---------|-----------|-----------|
| A       | 2.0     | 2.2     | 2.6       | 2.6       |
| B       | 4.3     | 5.3     | 6.6       | 6.6       |
| C       | 4.3     | 5.3     | 6.6       | 6.6       |
| E ± 0.2 | 1.0     | 1.4     | 1.9       | 1.9       |
| L       | 5.4     | 5.4     | 5.4       | 7.7       |

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**注：**以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

SC Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & ESR 規格尺寸及最大允許紋波電流及 ESR 值

| WV<br><br>Parameter<br><br>參數<br><br>μF |     | 6.3 (0J)                        |                                      |                                                         | 10 (1A)                         |                                      |                                                         | 16 (1C)                         |                                      |                                                         |
|-----------------------------------------|-----|---------------------------------|--------------------------------------|---------------------------------------------------------|---------------------------------|--------------------------------------|---------------------------------------------------------|---------------------------------|--------------------------------------|---------------------------------------------------------|
|                                         |     | Case size<br>ØD×L<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C, 120Hz<br>E.S.R.值 | Ripple current<br>(mA rms) at<br>85°C,<br>120Hz<br>紋波電流 | Case size<br>ØD×L<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C, 120Hz<br>E.S.R.值 | Ripple current<br>(mA rms) at<br>85°C,<br>120Hz<br>紋波電流 | Case size<br>ØD×L<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C, 120Hz<br>E.S.R.值 | Ripple current<br>(mA rms) at<br>85°C,<br>120Hz<br>紋波電流 |
|                                         |     |                                 |                                      |                                                         |                                 |                                      |                                                         |                                 |                                      |                                                         |
| 10                                      | 100 |                                 |                                      |                                                         |                                 |                                      |                                                         | 4 × 5.4                         | 34.5                                 | 25                                                      |
| 22                                      | 220 | 4 × 5.4                         | 23.5                                 | 31                                                      | 5 × 5.4                         | 19.6                                 | 35                                                      | 5 × 5.4                         | 15.7                                 | 39                                                      |
| 33                                      | 330 | 5 × 5.4                         | 15.7                                 | 39                                                      | 5 × 5.4                         | 13.1                                 | 43                                                      | 6.3 × 5.4                       | 10.5                                 | 57                                                      |
| 47                                      | 470 | 5 × 5.4                         | 11.0                                 | 47                                                      | 6.3 × 5.4                       | 9.2                                  | 59                                                      | 6.3 × 5.4                       | 7.3                                  | 68                                                      |
| 100                                     | 101 | 6.3 × 5.4                       | 5.2                                  | 75                                                      | 6.3 × 5.4                       | 4.3                                  | 76                                                      | 6.3 × 7.7                       | 3.5                                  | 96                                                      |
| 220                                     | 221 | 6.3 × 7.7                       | 2.4                                  | 85                                                      |                                 |                                      |                                                         |                                 |                                      |                                                         |

| WV<br><br>Parameter<br><br>參數<br><br>μF |     | 25 (1E)                         |                                      |                                                         | 35 (1V)                         |                                      |                                                         | 50 (1H)                         |                                      |                                                         |
|-----------------------------------------|-----|---------------------------------|--------------------------------------|---------------------------------------------------------|---------------------------------|--------------------------------------|---------------------------------------------------------|---------------------------------|--------------------------------------|---------------------------------------------------------|
|                                         |     | Case size<br>ØD×L<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C, 120Hz<br>E.S.R.值 | Ripple current<br>(mA rms) at<br>85°C,<br>120Hz<br>紋波電流 | Case size<br>ØD×L<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C, 120Hz<br>E.S.R.值 | Ripple current<br>(mA rms) at<br>85°C,<br>120Hz<br>紋波電流 | Case size<br>ØD×L<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C, 120Hz<br>E.S.R.值 | Ripple current<br>(mA rms) at<br>85°C,<br>120Hz<br>紋波電流 |
|                                         |     |                                 |                                      |                                                         |                                 |                                      |                                                         |                                 |                                      |                                                         |
| 0.1                                     | 0R1 |                                 |                                      |                                                         |                                 |                                      |                                                         | 4 × 5.4                         | 2156                                 | 1.0                                                     |
| 0.22                                    | R22 |                                 |                                      |                                                         |                                 |                                      |                                                         | 4 × 5.4                         | 980                                  | 2.3                                                     |
| 0.33                                    | R33 |                                 |                                      |                                                         |                                 |                                      |                                                         | 4 × 5.4                         | 653                                  | 3.5                                                     |
| 0.47                                    | R47 |                                 |                                      |                                                         |                                 |                                      |                                                         | 4 × 5.4                         | 459                                  | 5                                                       |
| 1                                       | 010 |                                 |                                      |                                                         |                                 |                                      |                                                         | 4 × 5.4                         | 216                                  | 10                                                      |
| 2.2                                     | 2R2 |                                 |                                      |                                                         |                                 |                                      |                                                         | 4 × 5.4                         | 98                                   | 15                                                      |
| 3.3                                     | 3R3 |                                 |                                      |                                                         |                                 |                                      |                                                         | 4 × 5.4                         | 65                                   | 18                                                      |
| 4.7                                     | 4R7 | 4 × 5.4                         | 64.2                                 | 19                                                      | 4 × 5.4                         | 55.1                                 | 20                                                      | 5 × 5.4                         | 46                                   | 23                                                      |
| 10                                      | 100 | 5 × 5.4                         | 30.2                                 | 28                                                      | 5 × 5.4                         | 25.9                                 | 30                                                      | 6.3 × 5.4                       | 22                                   | 34                                                      |
| 22                                      | 220 | 6.3 × 5.4                       | 13.7                                 | 52                                                      | 6.3 × 5.4                       | 11.8                                 | 54                                                      | 6.3 × 7.7                       | 9.8                                  | 85                                                      |
| 33                                      | 330 | 6.3 × 5.4                       | 9.1                                  | 63                                                      | 6.3 × 7.7                       | 7.8                                  | 105                                                     |                                 |                                      |                                                         |
| 47                                      | 470 | 6.3 × 7.7                       | 6.4                                  | 100                                                     | 6.3 × 7.7                       | 5.5                                  | 110                                                     |                                 |                                      |                                                         |

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | ~50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|----------------|-------|-------|-------|------|--------|
| Coefficient 系數 | 0.70  | 1.00  | 1.17  | 1.36 | 1.50   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

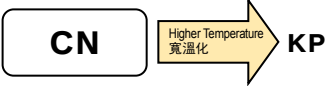
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

CN Series

CHIP TYPE, NON-POLARIZED

貼片式，無極性品

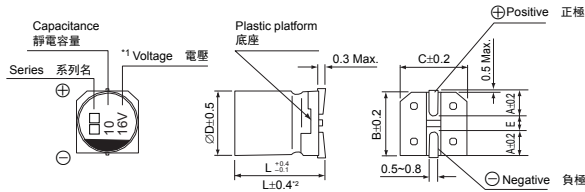
- Non-polarized with general temperature +85°C  
無極性和適用於 +85°C 的常規溫度
- Endurance 1000 hours  
耐久性 1000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------|--------|--------|----------------------------|-----------------------------------------|--------------------------|------------------------------------------------------|---------------------|----------------------------------------|--------------------------------------|--------------------|------|------|---|---|--------------------|---|---|---|---|
| Category Temperature Range 工作溫度範圍                                                                             | -55 ~ +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Voltage Range 額定工作電壓範圍                                                                                        | 6.3 ~ 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Capacitance Range 靜電容量範圍                                                                                      | 0.1 ~ 100μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Leakage Current 漏電流                                                                                           | Leakage current ≤0.05CV or 10μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.05CV 或 10μA，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                        |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16, 25</td><td>35, 50</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.24</td><td>0.20</td><td>0.17</td><td>0.15</td></tr></table>                                                                                                                                                                                                                                                                                                                          |      |        |        |        | Rated Voltage (V) 額定工作電壓   | 6.3                                     | 10                       | 16, 25                                               | 35, 50              | tan δ (max.) 最大損耗角正切                   | 0.24                                 | 0.20               | 0.17 | 0.15 |   |   |                    |   |   |   |   |
| Rated Voltage (V) 額定工作電壓                                                                                      | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10   | 16, 25 | 35, 50 |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| tan δ (max.) 最大損耗角正切                                                                                          | 0.24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.20 | 0.17   | 0.15   |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16, 25</td><td>35, 50</td></tr><tr><td rowspan="2">Impedance Ratio 阻抗比<br/>ZT/Z20 (max.)</td><td>Z(-25°C) / Z(20°C)</td><td>4</td><td>3</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C) / Z(20°C)</td><td>8</td><td>6</td><td>4</td><td>3</td></tr></table>                                                                                                                                                                                                            |      |        |        |        | Rated Voltage (V) 額定工作電壓   |                                         | 6.3                      | 10                                                   | 16, 25              | 35, 50                                 | Impedance Ratio 阻抗比<br>ZT/Z20 (max.) | Z(-25°C) / Z(20°C) | 4    | 3    | 2 | 2 | Z(-55°C) / Z(20°C) | 8 | 6 | 4 | 3 |
| Rated Voltage (V) 額定工作電壓                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 6.3  | 10     | 16, 25 | 35, 50 |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Impedance Ratio 阻抗比<br>ZT/Z20 (max.)                                                                          | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4    | 3      | 2      | 2      |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
|                                                                                                               | Z(-55°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 8    | 6      | 4      | 3      |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Endurance 耐久性                                                                                                 | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 85°C (the polarity needs to exchange every 250 hours), they meet the characteristics listed below.<br>在 85°C 環境中施加額定工作電壓 1000 小時（每 250 小時必須轉換一次極性）後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±20% of initial value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table> |      |        |        |        | Capacitance Change 靜電容量變化率 | Within ±20% of initial value 初始值的±20%以內 | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Capacitance Change 靜電容量變化率                                                                                    | Within ±20% of initial value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Dissipation Factor 損耗角正切                                                                                      | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Leakage Current 漏電流                                                                                           | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Shelf Life 高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 85°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                                               |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>                                                                                                                                                               |      |        |        |        | Capacitance Change 靜電容量變化率 | Within ±10% of initial value 初始值的±10%以內 | Dissipation Factor 損耗角正切 | initial specified value or less 不大於規範值               | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Capacitance Change 靜電容量變化率                                                                                    | Within ±10% of initial value 初始值的±10%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Dissipation Factor 損耗角正切                                                                                      | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Leakage Current 漏電流                                                                                           | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |

DRAWING 外形圖 (Unit: mm)



\*1. Voltage mark for 6.3V is [6V]  
\*2. Applicable to Ø6.3x7.7

DIMENSIONS (Unit: mm) 尺寸表

| ØD x L  | 4 x 5.4 | 5 x 5.4 | 6.3 x 5.4 | 6.3 x 7.7 | 8 x 10.5 |
|---------|---------|---------|-----------|-----------|----------|
| A       | 2.0     | 2.2     | 2.6       | 2.6       | 3.0      |
| B       | 4.3     | 5.3     | 6.6       | 6.6       | 8.4      |
| C       | 4.3     | 5.3     | 6.6       | 6.6       | 8.4      |
| E ± 0.2 | 1.0     | 1.4     | 1.9       | 1.9       | 3.1      |
| L       | 5.4     | 5.4     | 5.4       | 7.7       | 10.5     |

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CN Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼 | μF  | 6.3       |    | 10        |    | 16        |    | 25        |    | 35        |     | 50                       |                           |
|------------------|-----|-----------|----|-----------|----|-----------|----|-----------|----|-----------|-----|--------------------------|---------------------------|
|                  |     | 0J        |    | 1A        |    | 1C        |    | 1E        |    | 1V        |     | 1H                       |                           |
| 0.1              | 0R1 |           |    |           |    |           |    |           |    |           |     | 4 × 5.4                  | 1.0                       |
| 0.22             | R22 |           |    |           |    |           |    |           |    |           |     | 4 × 5.4                  | 2.0                       |
| 0.33             | R33 |           |    |           |    |           |    |           |    |           |     | 4 × 5.4                  | 2.8                       |
| 0.47             | R47 |           |    |           |    |           |    |           |    |           |     | 4 × 5.4                  | 4.0                       |
| 1                | 010 |           |    |           |    |           |    |           |    |           |     | 4 × 5.4                  | 8.4                       |
| 2.2              | 2R2 |           |    |           |    |           |    |           |    | 4 × 5.4   | 8.4 | 5 × 5.4                  | 13                        |
| 3.3              | 3R3 |           |    |           |    |           |    | 5 × 5.4   | 12 | 5 × 5.4   | 16  | 5 × 5.4                  | 17                        |
| 4.7              | 4R7 |           |    |           |    | 4 × 5.4   | 12 | 5 × 5.4   | 16 | 5 × 5.4   | 18  | 6.3 × 5.4                | 20                        |
| 10               | 100 |           |    | 4 × 5.4   | 17 | 5 × 5.4   | 23 | 6.3 × 5.4 | 27 | 6.3 × 5.4 | 29  | 6.3 × 5.4<br>(6.3 × 7.7) | 32<br>(36)                |
| 22               | 220 | 5 × 5.4   | 28 | 6.3 × 5.4 | 33 | 6.3 × 5.4 | 37 | 6.3 × 7.7 | 50 | 6.3 × 7.7 | 54  | 6.3 × 7.7<br>(8 × 10.5)  | 60<br>(65)                |
| 33               | 330 | 6.3 × 5.4 | 37 | 6.3 × 5.4 | 41 | 6.3 × 5.4 | 49 | 6.3 × 7.7 | 61 |           |     |                          |                           |
| 47               | 470 | 6.3 × 5.4 | 45 | 6.3 × 7.7 | 61 | 6.3 × 7.7 | 75 |           |    |           |     | Case size<br>尺寸          | Ripple<br>current<br>紋波電流 |
| 100              | 101 | 6.3 × 7.7 | 82 | 6.3 × 7.7 | 85 |           |    |           |    |           |     |                          |                           |

•Case size ∅D×L(mm), ripple current (mA rms) at 85°C, 120Hz •尺寸∅D×L(mm), 紋波電流(mA rms)於 85°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|----------------|------|-------|-------|------|--------|
| Coefficient 系數 | 0.70 | 1.00  | 1.17  | 1.36 | 1.50   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

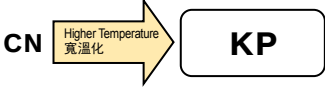
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

KP Series

CHIP TYPE, NON-POLARIZED, WIDE TEMPERATURE

貼片式，無極性寬溫品

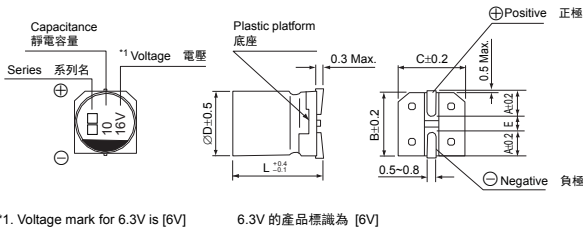
- Non-polarized with wide temperature range -55°C~+105°C  
無極性和適用於 -55°C~+105°C 的寬溫範圍
- Endurance 1000 hours  
耐久性 1000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------|--------|--------|----------------------------|-----------------------------------------|--------------------------|------------------------------------------------------|---------------------|----------------------------------------|--------------------------------------|--------------------|------|------|---|---|--------------------|---|---|---|---|
| Category Temperature Range 工作溫度範圍                                                                             | -55 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Voltage Range 額定工作電壓範圍                                                                                        | 6.3 ~ 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Capacitance Range 靜電容量範圍                                                                                      | 0.1 ~ 47μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Leakage Current 漏電流                                                                                           | Leakage current ≤0.05CV or 10μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.05CV 或 10μA，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                          |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16, 25</td><td>35, 50</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.24</td><td>0.20</td><td>0.17</td><td>0.15</td></tr></table>                                                                                                                                                                                                                                                                                                                            |      |        |        |        | Rated Voltage (V) 額定工作電壓   | 6.3                                     | 10                       | 16, 25                                               | 35, 50              | tan δ (max.) 最大損耗角正切                   | 0.24                                 | 0.20               | 0.17 | 0.15 |   |   |                    |   |   |   |   |
| Rated Voltage (V) 額定工作電壓                                                                                      | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10   | 16, 25 | 35, 50 |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| tan δ (max.) 最大損耗角正切                                                                                          | 0.24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.20 | 0.17   | 0.15   |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16, 25</td><td>35, 50</td></tr><tr><td rowspan="2">Impedance Ratio 阻抗比<br/>ZT/Z20 (max.)</td><td>Z(-25°C) / Z(20°C)</td><td>4</td><td>3</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C) / Z(20°C)</td><td>8</td><td>6</td><td>4</td><td>3</td></tr></table>                                                                                                                                                                                                              |      |        |        |        | Rated Voltage (V) 額定工作電壓   |                                         | 6.3                      | 10                                                   | 16, 25              | 35, 50                                 | Impedance Ratio 阻抗比<br>ZT/Z20 (max.) | Z(-25°C) / Z(20°C) | 4    | 3    | 2 | 2 | Z(-55°C) / Z(20°C) | 8 | 6 | 4 | 3 |
| Rated Voltage (V) 額定工作電壓                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 6.3  | 10     | 16, 25 | 35, 50 |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Impedance Ratio 阻抗比<br>ZT/Z20 (max.)                                                                          | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4    | 3      | 2      | 2      |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
|                                                                                                               | Z(-55°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 8    | 6      | 4      | 3      |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Endurance 耐久性                                                                                                 | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 105°C (the polarity needs to exchange every 250 hours), they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 1000 小時（每 250 小時必須轉換一次極性）後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±20% of initial value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table> |      |        |        |        | Capacitance Change 靜電容量變化率 | Within ±20% of initial value 初始值的±20%以內 | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Capacitance Change 靜電容量變化率                                                                                    | Within ±20% of initial value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Dissipation Factor 損耗角正切                                                                                      | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Leakage Current 漏電流                                                                                           | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Shelf Life 高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                                               |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>                                                                                                                                                                 |      |        |        |        | Capacitance Change 靜電容量變化率 | Within ±10% of initial value 初始值的±10%以內 | Dissipation Factor 損耗角正切 | initial specified value or less 不大於規範值               | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Capacitance Change 靜電容量變化率                                                                                    | Within ±10% of initial value 初始值的±10%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Dissipation Factor 損耗角正切                                                                                      | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Leakage Current 漏電流                                                                                           | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |        |        |        |                            |                                         |                          |                                                      |                     |                                        |                                      |                    |      |      |   |   |                    |   |   |   |   |

DRAWING 外形圖 (Unit: mm)



DIMENSIONS (Unit: mm) 尺寸表

| øD x L  | 4 x 5.4 | 5 x 5.4 | 6.3 x 5.4 |
|---------|---------|---------|-----------|
| A       | 2.0     | 2.2     | 2.6       |
| B       | 4.3     | 5.3     | 6.6       |
| C       | 4.3     | 5.3     | 6.6       |
| E ± 0.2 | 1.0     | 1.4     | 1.9       |
| L       | 5.4     | 5.4     | 5.4       |

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注：**以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

KP Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼 | μF  | 6.3       |    | 10        |    | 16        |    | 25        |    | 35        |     | 50              |                           |
|------------------|-----|-----------|----|-----------|----|-----------|----|-----------|----|-----------|-----|-----------------|---------------------------|
|                  |     | 0J        |    | 1A        |    | 1C        |    | 1E        |    | 1V        |     | 1H              |                           |
| 0.1              | 0R1 |           |    |           |    |           |    |           |    |           |     | 4 × 5.4         | 1.0                       |
| 0.22             | R22 |           |    |           |    |           |    |           |    |           |     | 4 × 5.4         | 2.0                       |
| 0.33             | R33 |           |    |           |    |           |    |           |    |           |     | 4 × 5.4         | 2.8                       |
| 0.47             | R47 |           |    |           |    |           |    |           |    |           |     | 4 × 5.4         | 4.0                       |
| 1                | 010 |           |    |           |    |           |    |           |    |           |     | 4 × 5.4         | 8.4                       |
| 2.2              | 2R2 |           |    |           |    |           |    |           |    | 4 × 5.4   | 8.4 | 5 × 5.4         | 13                        |
| 3.3              | 3R3 |           |    |           |    |           |    | 5 × 5.4   | 12 | 5 × 5.4   | 16  | 5 × 5.4         | 17                        |
| 4.7              | 4R7 |           |    |           |    | 4 × 5.4   | 12 | 5 × 5.4   | 16 | 5 × 5.4   | 18  | 6.3 × 5.4       | 20                        |
| 10               | 100 |           |    | 4 × 5.4   | 17 | 5 × 5.4   | 23 | 6.3 × 5.4 | 27 | 6.3 × 5.4 | 29  |                 |                           |
| 22               | 220 | 5 × 5.4   | 28 | 6.3 × 5.4 | 33 | 6.3 × 5.4 | 37 |           |    |           |     |                 |                           |
| 33               | 330 | 6.3 × 5.4 | 37 | 6.3 × 5.4 | 41 | 6.3 × 5.4 | 49 |           |    |           |     | Case size<br>尺寸 | Ripple<br>current<br>紋波電流 |
| 47               | 470 | 6.3 × 5.4 | 45 |           |    |           |    |           |    |           |     |                 |                           |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|----------------|------|-------|-------|------|--------|
| Coefficient 系數 | 0.70 | 1.00  | 1.17  | 1.36 | 1.50   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

LZ Series

CHIP TYPE, LOW IMPEDANCE

貼片式，低阻抗品

- Low impedance  
低阻抗
- Endurance 2000 hours  
耐久性 2000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵

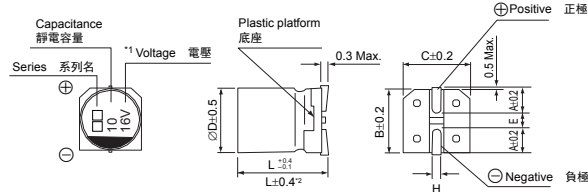


SPECIFICATIONS 特性表

| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                        |           |                    |                                                      |      |      |        |         |      |
|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------|------------------------------------------------------|------|------|--------|---------|------|
| Category Temperature Range 工作溫度範圍                                                                             | -55 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                |           |                    |                                                      |      |      |        |         |      |
| Voltage Range 額定工作電壓範圍                                                                                        | 6.3 ~ 100V                                                                                                                                                                                                                                                                                                                                                                  |           |                    |                                                      |      |      |        |         |      |
| Capacitance Range 靜電容量範圍                                                                                      | 1 ~ 4700μF                                                                                                                                                                                                                                                                                                                                                                  |           |                    |                                                      |      |      |        |         |      |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                         |           |                    |                                                      |      |      |        |         |      |
| Leakage Current 漏電流                                                                                           | Leakage current ≤0.01CV or 3μA (Ø4~Ø10), whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>Leakage current ≤0.03CV or 4μA (Ø12.5~Ø16), whichever is greater (after 1 minute application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3μA (Ø4~Ø10)，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>漏電流 ≤0.03CV 或 4μA (Ø12.5~Ø16)，取較大值（在 20°C 環境中施加額定工作電壓 1 分鐘後） |           |                    |                                                      |      |      |        |         |      |
|                                                                                                               | C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                               |           |                    |                                                      |      |      |        |         |      |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                                                                                                                                                     |           |                    |                                                      |      |      |        |         |      |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                                                                                    | 6.3       | 10                 | 16                                                   | 25   | 35   | 50, 63 | 80, 100 |      |
|                                                                                                               | tan δ (max.)                                                                                                                                                                                                                                                                                                                                                                | Ø4~Ø10    | 0.22               | 0.19                                                 | 0.16 | 0.14 | 0.12   | 0.12    | 0.10 |
|                                                                                                               | 最大損耗角正切                                                                                                                                                                                                                                                                                                                                                                     | Ø12.5~Ø16 | 0.26               | 0.22                                                 | 0.18 | 0.16 | 0.14   | 0.12    | 0.10 |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                                                                                                                                           |           |                    |                                                      |      |      |        |         |      |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                                                                                    |           |                    | 6.3                                                  | 10   | 16   | 25     | 35~100  |      |
|                                                                                                               | Impedance Ratio 阻抗比<br>ZT/Z20 (max.)                                                                                                                                                                                                                                                                                                                                        | Ø4~Ø10    | Z(-25°C) / Z(20°C) | 2                                                    | 2    | 2    | 2      | 2       |      |
|                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                             |           | Z(-55°C) / Z(20°C) | 5                                                    | 4    | 4    | 3      | 3       |      |
|                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                             | Ø12.5~Ø16 | Z(-25°C) / Z(20°C) | 3                                                    | 3    | 2    | 2      | 2       |      |
| Z(-55°C) / Z(20°C)                                                                                            | 10                                                                                                                                                                                                                                                                                                                                                                          |           | 8                  | 6                                                    | 4    | 3    |        |         |      |
| Endurance 耐久性                                                                                                 | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                                                                                                                                                           |           |                    |                                                      |      |      |        |         |      |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                                                                                                                  |           |                    | Within ±20% of initial value 初始值的±20%以內              |      |      |        |         |      |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                                                                                                                    |           |                    | 200% or less of initial specified value 不大於規範值的 200% |      |      |        |         |      |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                                                                                                                                         |           |                    | initial specified value or less 不大於規範值               |      |      |        |         |      |
| Shelf Life 高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                               |           |                    |                                                      |      |      |        |         |      |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。                                                                                                                                                                                                                                          |           |                    |                                                      |      |      |        |         |      |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                                                                                                                  |           |                    | Within ±10% of initial value 初始值的±10%以內              |      |      |        |         |      |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                                                                                                                    |           |                    | initial specified value or less 不大於規範值               |      |      |        |         |      |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                                                                                                                                         |           |                    | initial specified value or less 不大於規範值               |      |      |        |         |      |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                                                                                                                                      |           |                    |                                                      |      |      |        |         |      |

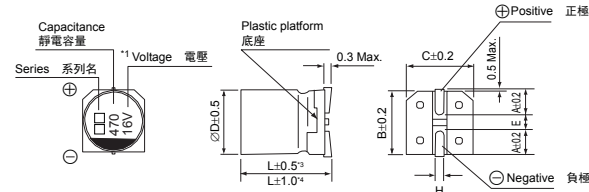
DRAWING 外形圖 (Unit: mm)

(Ø4~Ø6.3×7.7)



- \*1. Voltage mark for 6.3V is [6V]
  - \*2. Applicable to Ø6.3×7.7
  - \*3. Applicable to Ø8×10.5~Ø10
  - \*4. Applicable to Ø12.5~Ø16
- 6.3V 的產品標識為 [6V]  
適用於 Ø6.3×7.7  
適用於 Ø8×10.5~Ø10  
適用於 Ø12.5~Ø16

(Ø8×10.5~Ø16)



Dimension table in next page.  
尺寸表見下一頁。

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LZ Series

DIMENSIONS (Unit: mm) 尺寸表

| ØD x L  | 4 x 5.4 | 5 x 5.4 | 6.3 x 5.4 | 6.3 x 7.7 | 8 x 10.5 | 10 x 10.5 | 10 x 13.5 | 12.5 x 13.5 | 12.5 x 16 | 16 x 16.5 |
|---------|---------|---------|-----------|-----------|----------|-----------|-----------|-------------|-----------|-----------|
| A       | 2.0     | 2.2     | 2.6       | 2.6       | 3.0      | 3.3       | 3.3       | 4.9         | 4.9       | 5.8       |
| B       | 4.3     | 5.3     | 6.6       | 6.6       | 8.4      | 10.4      | 10.4      | 13.0        | 13.0      | 17.0      |
| C       | 4.3     | 5.3     | 6.6       | 6.6       | 8.4      | 10.4      | 10.4      | 13.0        | 13.0      | 17.0      |
| E ± 0.2 | 1.0     | 1.4     | 1.9       | 1.9       | 3.1      | 4.7       | 4.7       | 4.7         | 4.7       | 6.4       |
| L       | 5.4     | 5.4     | 5.4       | 7.7       | 10.5     | 10.5      | 13.5      | 13.5        | 16.0      | 16.5      |
| H       | 0.5~0.8 | 0.5~0.8 | 0.5~0.8   | 0.5~0.8   | 0.8~1.2  | 0.8~1.2   | 0.8~1.2   | 0.8~1.2     | 0.8~1.2   | 1.1~1.4   |

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Code<br>代碼<br>µF | 6.3                        |                |              | 10                         |                |              | 16                       |                |               |
|------------------------|----------------------------|----------------|--------------|----------------------------|----------------|--------------|--------------------------|----------------|---------------|
|                        | 0J                         |                |              | 1A                         |                |              | 1C                       |                |               |
| 10 100                 |                            |                |              |                            |                |              | 4 x 5.4                  | 3.0            | 60            |
| 15 150                 |                            |                |              |                            |                |              | 5 x 5.4<br>(4 x 5.4)     | 1.8<br>(3.0)   | 95<br>(60)    |
| 22 220                 | 4 x 5.4                    | 3.0            | 60           | 5 x 5.4<br>(4 x 5.4)       | 1.8<br>(3.0)   | 95<br>(60)   | 5 x 5.4<br>(4 x 5.4)     | 1.8<br>(3.0)   | 95<br>(60)    |
| 33 330                 | 5 x 5.4<br>(4 x 5.4)       | 1.8<br>(3.0)   | 95<br>(60)   | 5 x 5.4<br>(4 x 5.4)       | 1.8<br>(3.0)   | 95<br>(60)   | 6.3 x 5.4<br>(5 x 5.4)   | 1.0<br>(1.8)   | 140<br>(95)   |
| 47 470                 | 5 x 5.4<br>(4 x 5.4)       | 1.8<br>(3.0)   | 95<br>(60)   | 6.3 x 5.4<br>(5 x 5.4)     | 1.0<br>(1.8)   | 140<br>(95)  | 6.3 x 5.4<br>(5 x 5.4)   | 1.0<br>(1.8)   | 140<br>(95)   |
| 68 680                 | 6.3 x 5.4<br>(5 x 5.4)     | 1.0<br>(1.8)   | 140<br>(95)  | 6.3 x 5.4                  | 1.0            | 140          | 6.3 x 7.7<br>(6.3 x 5.4) | 0.6<br>(1.0)   | 230<br>(140)  |
| 100 101                | 6.3 x 5.4<br>(5 x 5.4)     | 1.0<br>(1.8)   | 140<br>(95)  | 6.3 x 7.7<br>(6.3 x 5.4)   | 0.6<br>(1.0)   | 230<br>(140) | 6.3 x 7.7<br>(6.3 x 5.4) | 0.6<br>(1.0)   | 230<br>(140)  |
| 150 151                | 6.3 x 7.7<br>(6.3 x 5.4)   | 0.6<br>(1.0)   | 230<br>(140) | 6.3 x 7.7<br>(6.3 x 5.4)   | 0.6<br>(1.0)   | 230<br>(140) | 6.3 x 7.7                | 0.6            | 230           |
| 220 221                | 6.3 x 7.7<br>(6.3 x 5.4)   | 0.6<br>(1.0)   | 230<br>(140) | 6.3 x 7.7                  | 0.6            | 230          | 8 x 10.5<br>(6.3 x 7.7)  | 0.3<br>(0.6)   | 450<br>(230)  |
| 330 331                | 6.3 x 7.7                  | 0.6            | 230          | 8 x 10.5                   | 0.3            | 450          | 10 x 10.5<br>(8 x 10.5)  | 0.15<br>(0.3)  | 670<br>(450)  |
| 470 471                | 8 x 10.5<br>(6.3 x 7.7)    | 0.3<br>(0.6)   | 450<br>(230) | 8 x 10.5                   | 0.3            | 450          | 10 x 10.5<br>(8 x 10.5)  | 0.15<br>(0.3)  | 670<br>(450)  |
| 680 681                | 8 x 10.5                   | 0.3            | 450          | 10 x 10.5                  | 0.15           | 670          | 10 x 10.5                | 0.15           | 670           |
| 1000 102               | 10 x 10.5<br>(8 x 10.5)    | 0.15<br>(0.3)  | 670<br>(450) | 10 x 10.5                  | 0.15           | 670          | 10 x 10.5                | 0.15           | 670           |
| 1500 152               | 10 x 13.5<br>(10 x 10.5)   | 0.13<br>(0.15) | 750<br>(670) | 12.5 x 13.5<br>(10 x 13.5) | 0.11<br>(0.13) | 820<br>(750) | 12.5 x 13.5              | 0.11           | 820           |
| 2200 222               | 12.5 x 13.5<br>(10 x 13.5) | 0.11<br>(0.13) | 820<br>(750) | 12.5 x 16                  | 0.09           | 950          | 16 x 16.5<br>(12.5 x 16) | 0.08<br>(0.09) | 1260<br>(950) |
| 3300 332               | 12.5 x 16<br>(12.5 x 13.5) | 0.09<br>(0.11) | 950<br>(820) | 16 x 16.5                  | 0.08           | 1260         | 16 x 16.5                | 0.08           | 1260          |
| 4700 472               | 16 x 16.5                  | 0.08           | 1260         | 16 x 16.5                  | 0.08           | 1260         |                          |                |               |

| WV<br>Code<br>代碼<br>µF | 25                       |              |              | 35                       |              |              | 50                             |                                         |                                                        |
|------------------------|--------------------------|--------------|--------------|--------------------------|--------------|--------------|--------------------------------|-----------------------------------------|--------------------------------------------------------|
|                        | 1E                       |              |              | 1V                       |              |              | 1H                             |                                         |                                                        |
| 1 010                  |                          |              |              | 4 x 5.4                  | 3.0          | 60           | 4 x 5.4                        | 5.0                                     | 30                                                     |
| 1.5 1R5                |                          |              |              | 4 x 5.4                  | 3.0          | 60           | 4 x 5.4                        | 5.0                                     | 30                                                     |
| 2.2 2R2                |                          |              |              | 4 x 5.4                  | 3.0          | 60           | 4 x 5.4                        | 5.0                                     | 30                                                     |
| 3.3 3R3                |                          |              |              | 4 x 5.4                  | 3.0          | 60           | 4 x 5.4                        | 5.0                                     | 30                                                     |
| 4.7 4R7                | 4 x 5.4                  | 3.0          | 60           | 4 x 5.4                  | 3.0          | 60           | 5 x 5.4                        | 3.0                                     | 50                                                     |
| 6.8 6R8                | 4 x 5.4                  | 3.0          | 60           | 5 x 5.4                  | 1.8          | 95           | 6.3 x 5.4                      | 2.0                                     | 70                                                     |
| 10 100                 | 5 x 5.4<br>(4 x 5.4)     | 1.8<br>(3.0) | 95<br>(60)   | 5 x 5.4<br>(4 x 5.4)     | 1.8<br>(3.0) | 95<br>(60)   | 6.3 x 5.4                      | 2.0                                     | 70                                                     |
| 15 150                 | 6.3 x 5.4                | 1.8          | 95           | 5 x 5.4                  | 1.8          | 95           | 6.3 x 5.4                      | 2.0                                     | 70                                                     |
| 22 220                 | 6.3 x 5.4<br>(5 x 5.4)   | 1.0<br>(1.8) | 140<br>(95)  | 6.3 x 5.4<br>(5 x 5.4)   | 1.0<br>(1.8) | 140<br>(95)  | 6.3 x 7.7<br>(6.3 x 5.4)       | 1.0<br>(2.0)                            | 120<br>(70)                                            |
| 33 330                 | 6.3 x 5.4<br>(5 x 5.4)   | 1.0<br>(1.8) | 140<br>(95)  | 6.3 x 7.7<br>(6.3 x 5.4) | 0.6<br>(1.0) | 230<br>(140) | 6.3 x 7.7                      | 1.0                                     | 120                                                    |
| 47 470                 | 6.3 x 7.7<br>(6.3 x 5.4) | 0.6<br>(1.0) | 230<br>(140) | 6.3 x 7.7<br>(6.3 x 5.4) | 0.6<br>(1.0) | 230<br>(140) | 6.3 x 7.7                      | 1.0                                     | 120                                                    |
| 68 680                 | 6.3 x 7.7                | 0.6          | 230          | 6.3 x 7.7                | 0.6          | 230          | 8 x 10.5                       | 0.6                                     | 300                                                    |
| 100 101                | 6.3 x 7.7                | 0.6          | 230          | 8 x 10.5<br>(6.3 x 7.7)  | 0.3<br>(0.6) | 450<br>(230) | 10 x 10.5<br>(8 x 10.5)        | 0.3<br>(0.6)                            | 500<br>(300)                                           |
| 150 151                | 8 x 10.5<br>(6.3 x 7.7)  | 0.3<br>(0.6) | 450<br>(230) | 8 x 10.5                 | 0.3          | 450          | 10 x 10.5                      | 0.3                                     | 500                                                    |
|                        |                          |              |              |                          |              |              | Case size<br>ØD x L (mm)<br>尺寸 | Impedance (Ω)<br>at 20°C, 100KHz<br>阻抗值 | Ripple current<br>(mA rms) at<br>105°C, 100KHz<br>紋波電流 |

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LZ Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Code<br>代碼 |     | 25                         |                |               | 35                         |                |               | 50                                        |                                         |                                                        |
|------------------|-----|----------------------------|----------------|---------------|----------------------------|----------------|---------------|-------------------------------------------|-----------------------------------------|--------------------------------------------------------|
| μF               |     | 1E                         |                |               | 1V                         |                |               | 1H                                        |                                         |                                                        |
| 220              | 221 | 8 × 10.5                   | 0.3            | 450           | 10 × 10.5<br>(8 × 10.5)    | 0.15<br>(0.3)  | 670<br>(450)  | 10 × 10.5                                 | 0.3                                     | 500                                                    |
| 330              | 331 | 10 × 10.5<br>(8 × 10.5)    | 0.15<br>(0.3)  | 670<br>(450)  | 10 × 10.5                  | 0.15           | 670           | 16 × 16.5<br>(12.5 × 13.5)<br>(10 × 13.5) | 0.12<br>(0.2)<br>(0.25)                 | 1060<br>(650)<br>(580)                                 |
| 470              | 471 | 10 × 10.5                  | 0.15           | 670           | 10 × 13.5<br>(10 × 10.5)   | 0.13<br>(0.15) | 750<br>(670)  | 16 × 16.5<br>(12.5 × 16)                  | 0.12<br>(0.15)                          | 1060<br>(700)                                          |
| 680              | 681 | 10 × 13.5                  | 0.13           | 750           | 12.5 × 13.5<br>(10 × 13.5) | 0.11<br>(0.13) | 820<br>(750)  | 16 × 16.5                                 | 0.12                                    | 1060                                                   |
| 1000             | 102 | 16 × 16.5<br>(12.5 × 13.5) | 0.08<br>(0.11) | 1260<br>(820) | 16 × 16.5<br>(12.5 × 16)   | 0.08<br>(0.09) | 1260<br>(950) |                                           |                                         |                                                        |
| 1500             | 152 | 12.5 × 16                  | 0.09           | 950           | 16 × 16.5                  | 0.08           | 1260          | Case size<br>∅D×L(mm)<br>尺寸               | Impedance (Ω)<br>at 20°C, 100KHz<br>阻抗值 | Ripple current<br>(mA rms) at<br>105°C, 100KHz<br>紋波電流 |
| 2200             | 222 | 16 × 16.5                  | 0.08           | 1260          |                            |                |               |                                           |                                         |                                                        |

| WV<br>Code<br>代碼 |     | 63          |      |     | 80        |     |     | 100                         |                                         |                                                        |
|------------------|-----|-------------|------|-----|-----------|-----|-----|-----------------------------|-----------------------------------------|--------------------------------------------------------|
| μF               |     | 1J          |      |     | 1K        |     |     | 2A                          |                                         |                                                        |
| 10               | 100 | 6.3 × 7.7   | 1.5  | 95  |           |     |     | 6.3 × 7.7                   | 4.0                                     | 65                                                     |
| 22               | 220 | 6.3 × 7.7   | 1.0  | 130 | 6.3 × 7.7 | 2.0 | 130 |                             |                                         |                                                        |
| 47               | 470 | 8 × 10.5    | 0.65 | 250 |           |     |     | 10 × 10.5                   | 0.65                                    | 350                                                    |
| 100              | 101 | 10 × 10.5   | 0.50 | 430 |           |     |     | 12.5 × 13.5                 | 0.60                                    | 500                                                    |
| 220              | 221 | 12.5 × 13.5 | 0.30 | 550 |           |     |     | Case size<br>∅D×L(mm)<br>尺寸 | Impedance (Ω)<br>at 20°C, 100KHz<br>阻抗值 | Ripple current<br>(mA rms) at<br>105°C, 100KHz<br>紋波電流 |
|                  |     |             |      |     |           |     |     |                             |                                         |                                                        |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |             |               | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|---------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | ∅4 ~ ∅10    | 1 ~ 68μF      | 0.35 | 0.50  | 0.64  | 0.83 | 1.00   |
|                   |             | 100 ~ 2200μF  | 0.40 | 0.55  | 0.70  | 0.85 | 1.00   |
|                   | ∅12.5 ~ ∅16 | ~ 680μF       | 0.45 | 0.65  | 0.80  | 0.90 | 1.00   |
|                   |             | 1000 ~ 4700μF | 0.65 | 0.85  | 0.95  | 1.00 | 1.00   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

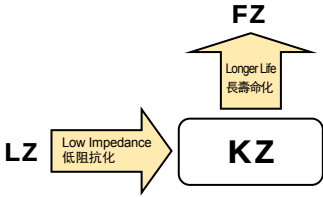
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

KZ Series

CHIP TYPE, EXTRA LOWER IMPEDANCE

貼片式，極低阻抗品

- Extra low impedance  
極低阻抗
- Impedance 40~60% less than LZ series  
阻抗值比 LZ 系列低 40~60%
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵

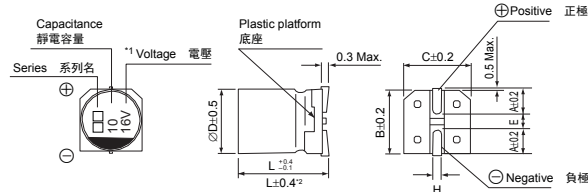


SPECIFICATIONS 特性表

| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                                    |           |                    |                                                      |      |      |      |        |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------|------------------------------------------------------|------|------|------|--------|
| Category Temperature Range 工作溫度範圍                                                                             | -55 ~ +105°C                                                                                                                                                                                                                                            |           |                    |                                                      |      |      |      |        |
| Voltage Range 額定工作電壓範圍                                                                                        | 6.3 ~ 100V                                                                                                                                                                                                                                              |           |                    |                                                      |      |      |      |        |
| Capacitance Range 靜電容量範圍                                                                                      | 4.7 ~ 4700μF                                                                                                                                                                                                                                            |           |                    |                                                      |      |      |      |        |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                     |           |                    |                                                      |      |      |      |        |
| Leakage Current 漏電流                                                                                           | Leakage current ≤0.01CV or 3μA (Ø4~Ø10), whichever is greater (after 2 minutes application of rated voltage at 20°C)                                                                                                                                    |           |                    |                                                      |      |      |      |        |
|                                                                                                               | Leakage current ≤0.03CV or 4μA (Ø12.5~Ø16), whichever is greater (after 1 minute application of rated voltage at 20°C)                                                                                                                                  |           |                    |                                                      |      |      |      |        |
|                                                                                                               | 漏電流 ≤0.01CV 或 3μA (Ø4~Ø10)，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>漏電流 ≤0.03CV 或 4μA (Ø12.5~Ø16)，取較大值（在 20°C 環境中施加額定工作電壓 1 分鐘後）                                                                                                                               |           |                    |                                                      |      |      |      |        |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                           |           |                    |                                                      |      |      |      |        |
|                                                                                                               | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                                 |           |                    |                                                      |      |      |      |        |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                | 6.3       | 10                 | 16                                                   | 25   | 35   | 50   | 100    |
|                                                                                                               | tan δ (max.)                                                                                                                                                                                                                                            | Ø4~Ø10    | 0.22               | 0.19                                                 | 0.16 | 0.14 | 0.12 | 0.10   |
|                                                                                                               | 最大損耗角正切                                                                                                                                                                                                                                                 | Ø12.5~Ø16 | 0.26               | 0.22                                                 | 0.18 | 0.16 | 0.14 | 0.10   |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                       |           |                    |                                                      |      |      |      |        |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                |           |                    | 6.3                                                  | 10   | 16   | 25   | 35~100 |
|                                                                                                               | Impedance Ratio 阻抗比<br>ZT/Z20 (max.)                                                                                                                                                                                                                    | Ø4~Ø10    | Z(-25°C) / Z(20°C) | 2                                                    | 2    | 2    | 2    | 2      |
|                                                                                                               |                                                                                                                                                                                                                                                         |           | Z(-55°C) / Z(20°C) | 5                                                    | 4    | 4    | 3    | 3      |
|                                                                                                               |                                                                                                                                                                                                                                                         | Ø12.5~Ø16 | Z(-25°C) / Z(20°C) | 3                                                    | 3    | 2    | 2    | 2      |
| Z(-55°C) / Z(20°C)                                                                                            | 10                                                                                                                                                                                                                                                      |           | 8                  | 6                                                    | 4    | 3    |      |        |
| Endurance 耐久性                                                                                                 | When the capacitors are restored to 20°C after 3000 hrs. (2000 hrs. for Ø4~Ø8) application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 3000 小時（Ø4~Ø8 為 2000 小時）後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 |           |                    |                                                      |      |      |      |        |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                              |           |                    | Within ±25% of initial value 初始值的±25%以內              |      |      |      |        |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                |           |                    | 200% or less of initial specified value 不大於規範值的 200% |      |      |      |        |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                     |           |                    | initial specified value or less 不大於規範值               |      |      |      |        |
| Shelf Life 高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。           |           |                    |                                                      |      |      |      |        |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。                                                                                                                      |           |                    |                                                      |      |      |      |        |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                              |           |                    | Within ±10% of initial value 初始值的±10%以內              |      |      |      |        |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                |           |                    | initial specified value or less 不大於規範值               |      |      |      |        |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                     |           |                    | initial specified value or less 不大於規範值               |      |      |      |        |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                  |           |                    |                                                      |      |      |      |        |

DRAWING 外形圖 (Unit: mm)

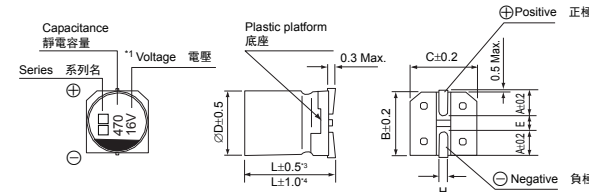
(Ø4~Ø6.3×7.7)



- \*1. Voltage mark for 6.3V is [6V]
- \*2. Applicable to Ø6.3×7.7
- \*3. Applicable to Ø8×10.5~Ø10
- \*4. Applicable to Ø12.5~Ø16

6.3V 的產品標識為 [6V]  
適用於 Ø6.3×7.7  
適用於 Ø8×10.5~Ø10  
適用於 Ø12.5~Ø16

(Ø8×10.5~Ø16)



Dimension table in next page.  
尺寸表見下一頁。

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KZ Series

DIMENSIONS (Unit: mm) 尺寸表

| ØD x L  | 4 x 5.8 | 5 x 5.8 | 6.3 x 5.8 | 6.3 x 7.7 | 8 x 10.5 | 10 x 10.5 | 10 x 13.5 | 12.5 x 13.5 | 12.5 x 16 | 16 x 16.5 |
|---------|---------|---------|-----------|-----------|----------|-----------|-----------|-------------|-----------|-----------|
| A       | 2.0     | 2.2     | 2.6       | 2.6       | 3.0      | 3.3       | 3.3       | 4.9         | 4.9       | 5.8       |
| B       | 4.3     | 5.3     | 6.6       | 6.6       | 8.4      | 10.4      | 10.4      | 13.0        | 13.0      | 17.0      |
| C       | 4.3     | 5.3     | 6.6       | 6.6       | 8.4      | 10.4      | 10.4      | 13.0        | 13.0      | 17.0      |
| E ± 0.2 | 1.0     | 1.4     | 1.9       | 1.9       | 3.1      | 4.7       | 4.7       | 4.7         | 4.7       | 6.4       |
| L       | 5.8     | 5.8     | 5.8       | 7.7       | 10.5     | 10.5      | 13.5      | 13.5        | 16.0      | 16.5      |

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Code<br>µF<br>代碼 | 6.3                      |                 |              | 10                       |                |              | 16                             |                                         |                                                        |
|------------------------|--------------------------|-----------------|--------------|--------------------------|----------------|--------------|--------------------------------|-----------------------------------------|--------------------------------------------------------|
|                        | 0J                       |                 |              | 1A                       |                |              | 1C                             |                                         |                                                        |
| 10 100                 |                          |                 |              |                          |                |              | 4 x 5.8                        | 1.8                                     | 80                                                     |
| 15 150                 |                          |                 |              |                          |                |              | 4 x 5.8                        | 1.8                                     | 80                                                     |
| 22 220                 | 4 x 5.8                  | 1.8             | 80           | 4 x 5.8                  | 1.8            | 80           | 5 x 5.8<br>(4 x 5.8)           | 0.76<br>(1.8)                           | 150<br>(80)                                            |
| 33 330                 | 5 x 5.8<br>(4 x 5.8)     | 0.76<br>(1.8)   | 150<br>(80)  | 5 x 5.8<br>(4 x 5.8)     | 0.76<br>(1.8)  | 150<br>(80)  | 6.3 x 5.8<br>(5 x 5.8)         | 0.44<br>(0.76)                          | 230<br>(150)                                           |
| 47 470                 | 5 x 5.8<br>(4 x 5.8)     | 0.76<br>(1.8)   | 150<br>(80)  | 6.3 x 5.8<br>(5 x 5.8)   | 0.44<br>(0.76) | 230<br>(150) | 6.3 x 5.8<br>(5 x 5.8)         | 0.44<br>(0.76)                          | 230<br>(150)                                           |
| 56 560                 | 5 x 5.8                  | 0.76            | 150          | 6.3 x 5.8                | 0.44           | 230          | 6.3 x 5.8                      | 0.44                                    | 230                                                    |
| 68 680                 | 6.3 x 5.8<br>(5 x 5.8)   | 0.44<br>(0.76)  | 230<br>(150) | 6.3 x 5.8                | 0.44           | 230          | 6.3 x 7.7<br>(6.3 x 5.8)       | 0.34<br>(0.44)                          | 280<br>(230)                                           |
| 100 101                | 6.3 x 5.8<br>(5 x 5.8)   | 0.44<br>(0.76)  | 230<br>(150) | 6.3 x 7.7<br>(6.3 x 5.8) | 0.34<br>(0.44) | 280<br>(230) | 6.3 x 7.7<br>(6.3 x 5.8)       | 0.34<br>(0.44)                          | 280<br>(230)                                           |
| 150 151                | 6.3 x 5.8                | 0.44            | 230          | 6.3 x 7.7                | 0.34           | 280          | 6.3 x 7.7                      | 0.34                                    | 280                                                    |
| 220 221                | 6.3 x 7.7<br>(6.3 x 5.8) | 0.34<br>(0.44)  | 280<br>(230) | 6.3 x 7.7                | 0.34           | 280          | 8 x 10.5<br>(6.3 x 7.7)        | 0.17<br>(0.34)                          | 450<br>(280)                                           |
| 330 331                | 6.3 x 7.7                | 0.34            | 280          | 8 x 10.5                 | 0.17           | 450          | 10 x 10.5<br>(8 x 10.5)        | 0.09<br>(0.17)                          | 670<br>(450)                                           |
| 470 471                | 8 x 10.5                 | 0.17            | 450          | 8 x 10.5                 | 0.17           | 450          | 10 x 10.5<br>(8 x 10.5)        | 0.09<br>(0.17)                          | 670<br>(450)                                           |
| 680 681                | 10 x 10.5<br>(8 x 10.5)  | 0.09<br>(0.17)  | 670<br>(450) | 10 x 10.5                | 0.09           | 670          | 10 x 13.5<br>(10 x 10.5)       | 0.075<br>(0.09)                         | 800<br>(670)                                           |
| 1000 102               | 10 x 10.5<br>(8 x 10.5)  | 0.09<br>(0.17)  | 670<br>(450) | 10 x 10.5                | 0.09           | 670          | 16 x 16.5<br>(12.5 x 13.5)     | 0.055<br>(0.065)                        | 1350<br>(1050)<br>(900)                                |
| 1500 152               | 10 x 13.5<br>(10 x 10.5) | 0.075<br>(0.09) | 800<br>(670) | 12.5 x 13.5              | 0.065          | 900          | 16 x 16.5                      | 0.055                                   | 1350                                                   |
| 2200 222               | 12.5 x 13.5              | 0.065           | 900          | 12.5 x 16                | 0.06           | 1050         | 16 x 16.5                      | 0.055                                   | 1350                                                   |
| 3300 332               | 12.5 x 16                | 0.06            | 1050         | 16 x 16.5                | 0.055          | 1350         | Case size<br>ØD x L (mm)<br>尺寸 | Impedance (Ω)<br>at 20°C, 100KHz<br>阻抗值 | Ripple current<br>(mA rms) at<br>105°C, 100KHz<br>紋波電流 |
| 4700 472               | 16 x 16.5                | 0.055           | 1350         |                          |                |              |                                |                                         |                                                        |

| WV<br>Code<br>µF<br>代碼 | 25                       |                |              | 35                       |                |              | 50                             |                                         |                                                        |
|------------------------|--------------------------|----------------|--------------|--------------------------|----------------|--------------|--------------------------------|-----------------------------------------|--------------------------------------------------------|
|                        | 1E                       |                |              | 1V                       |                |              | 1H                             |                                         |                                                        |
| 4.7 4R7                |                          |                |              | 4 x 5.8                  | 1.8            | 80           | 5 x 5.8<br>(4 x 5.8)           | 1.52<br>(3.0)                           | 85<br>(60)                                             |
| 10 100                 | 4 x 5.8                  | 1.8            | 80           | 5 x 5.8<br>(4 x 5.8)     | 0.76<br>(1.8)  | 150<br>(80)  | 6.3 x 5.8<br>(5 x 5.8)         | 0.88<br>(1.52)                          | 165<br>(85)                                            |
| 15 150                 | 5 x 5.8                  | 0.76           | 150          | 5 x 5.8                  | 0.76           | 150          | 6.3 x 5.8                      | 0.88                                    | 165                                                    |
| 22 220                 | 6.3 x 5.8<br>(5 x 5.8)   | 0.44<br>(0.76) | 230<br>(150) | 6.3 x 5.8<br>(5 x 5.8)   | 0.44<br>(0.76) | 230<br>(150) | 6.3 x 7.7<br>(6.3 x 5.8)       | 0.68<br>(0.88)                          | 185<br>(165)                                           |
| 33 330                 | 6.3 x 5.8<br>(5 x 5.8)   | 0.44<br>(0.76) | 230<br>(150) | 6.3 x 5.8                | 0.44           | 230          | 6.3 x 7.7                      | 0.68                                    | 185                                                    |
| 47 470                 | 6.3 x 7.7<br>(6.3 x 5.8) | 0.34<br>(0.44) | 280<br>(230) | 6.3 x 7.7<br>(6.3 x 5.8) | 0.34<br>(0.44) | 280<br>(230) | 6.3 x 7.7                      | 0.68                                    | 185                                                    |
| 56 560                 | 6.3 x 7.7<br>(6.3 x 5.8) | 0.34<br>(0.44) | 280<br>(230) | 6.3 x 7.7                | 0.34           | 280          | 8 x 10.5<br>(6.3 x 7.7)        | 0.34<br>(0.68)                          | 350<br>(185)                                           |
| 68 680                 | 6.3 x 7.7                | 0.34           | 280          | 6.3 x 7.7                | 0.34           | 280          | 8 x 10.5                       | 0.34                                    | 350                                                    |
| 100 101                | 6.3 x 7.7                | 0.34           | 280          | 8 x 10.5                 | 0.17           | 450          | 10 x 10.5<br>(8 x 10.5)        | 0.18<br>(0.34)                          | 670<br>(350)                                           |
| 150 151                | 8 x 10.5<br>(6.3 x 7.7)  | 0.17<br>(0.34) | 450<br>(280) | 10 x 10.5<br>(8 x 10.5)  | 0.09<br>(0.17) | 670<br>(450) | 10 x 10.5                      | 0.18                                    | 670                                                    |
|                        |                          |                |              |                          |                |              | Case size<br>ØD x L (mm)<br>尺寸 | Impedance (Ω)<br>at 20°C, 100KHz<br>阻抗值 | Ripple current<br>(mA rms) at<br>105°C, 100KHz<br>紋波電流 |

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CAT.2024/V1.3

KZ Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Code<br>代碼 |     | 25                       |                  |                | 35                         |                  |               | 50                          |                                         |                                                        |
|------------------|-----|--------------------------|------------------|----------------|----------------------------|------------------|---------------|-----------------------------|-----------------------------------------|--------------------------------------------------------|
| μF               |     | 1E                       |                  |                | 1V                         |                  |               | 1H                          |                                         |                                                        |
| 220              | 221 | 8 × 10.5                 | 0.17             | 450            | 10 × 10.5<br>(8 × 10.5)    | 0.09<br>(0.17)   | 670<br>(450)  | 10 × 13.5<br>(10 × 10.5)    | 0.16<br>(0.18)                          | 750<br>(670)                                           |
| 330              | 331 | 10 × 10.5<br>(8 × 10.5)  | 0.09<br>(0.17)   | 670<br>(450)   | 10 × 10.5                  | 0.09             | 670           | 12.5 × 13.5                 | 0.14                                    | 800                                                    |
| 470              | 471 | 10 × 13.5<br>(10 × 10.5) | 0.075<br>(0.09)  | 800<br>(670)   | 12.5 × 13.5<br>(10 × 13.5) | 0.065<br>(0.075) | 900<br>(800)  | 16 × 16.5<br>(12.5 × 16)    | 0.10<br>(0.12)                          | 1150<br>(900)                                          |
| 680              | 681 | 12.5 × 13.5              | 0.065            | 900            | 12.5 × 16<br>(12.5 × 13.5) | 0.060<br>(0.065) | 1050<br>(900) |                             |                                         |                                                        |
| 1000             | 102 | 16 × 16.5<br>(12.5 × 16) | 0.055<br>(0.060) | 1350<br>(1050) | 16 × 16.5                  | 0.055            | 1350          | Case size<br>ØD×L(mm)<br>尺寸 | Impedance (Ω)<br>at 20°C, 100KHz<br>阻抗值 | Ripple current<br>(mA rms) at<br>105°C, 100KHz<br>紋波電流 |
| 1500             | 152 | 16 × 16.5                | 0.055            | 1350           |                            |                  |               |                             |                                         |                                                        |

| WV<br>Code<br>代碼 |     | 100                         |                                         |                                                        |
|------------------|-----|-----------------------------|-----------------------------------------|--------------------------------------------------------|
| μF               |     | 2A                          |                                         |                                                        |
| 10               | 100 | 8 × 10.5                    | 1.8                                     | 110                                                    |
|                  |     | Case size<br>ØD×L(mm)<br>尺寸 | Impedance (Ω)<br>at 20°C, 100KHz<br>阻抗值 | Ripple current<br>(mA rms) at<br>105°C, 100KHz<br>紋波電流 |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |             |               | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|---------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | Ø4 ~ Ø10    | 4.7 ~ 68μF    | 0.35 | 0.50  | 0.64  | 0.83 | 1.00   |
|                   |             | 100 ~ 1500μF  | 0.40 | 0.55  | 0.70  | 0.85 | 1.00   |
|                   | Ø12.5 ~ Ø16 | ~ 680μF       | 0.45 | 0.65  | 0.80  | 0.90 | 1.00   |
|                   |             | 1000 ~ 4700μF | 0.65 | 0.85  | 0.95  | 1.00 | 1.00   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

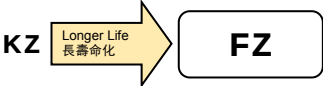
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

FZ Series

CHIP TYPE, LONG LIFE WITH EXTRA LOWER IMPEDANCE

貼片式，長壽命極低阻抗品

- Extra lower impedance  
極低阻抗
- Endurance 2000~5000 hours  
耐久性 2000~5000 小時
- Impedance 5~25% less than KZ series  
阻抗值比 KZ 系列低 5~25%
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵
- AEC-Q200 compliant (Please contact us for details)  
符合 AEC-Q200（請與我們聯繫瞭解詳細信息）

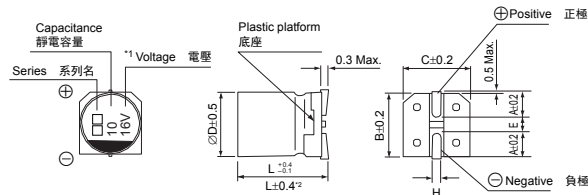


SPECIFICATIONS 特性表

| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                                                |  |                    |      |                                                      |      |      |        |       |      |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------|------|------------------------------------------------------|------|------|--------|-------|------|
| Category Temperature Range 工作溫度範圍                                                                             | -55 ~ +105°C                                                                                                                                                                                                                                                        |  |                    |      |                                                      |      |      |        |       |      |
| Voltage Range 額定工作電壓範圍                                                                                        | 6.3 ~ 100V                                                                                                                                                                                                                                                          |  |                    |      |                                                      |      |      |        |       |      |
| Capacitance Range 靜電容量範圍                                                                                      | 3.3 ~ 8200μF                                                                                                                                                                                                                                                        |  |                    |      |                                                      |      |      |        |       |      |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                 |  |                    |      |                                                      |      |      |        |       |      |
| Leakage Current 漏電流                                                                                           | Leakage current ≤0.01CV or 3μA (Ø4~Ø10), whichever is greater (after 2 minutes application of rated voltage at 20°C)                                                                                                                                                |  |                    |      |                                                      |      |      |        |       |      |
|                                                                                                               | Leakage current ≤0.03CV or 4μA (Ø12.5~Ø18), whichever is greater (after 1 minute application of rated voltage at 20°C)                                                                                                                                              |  |                    |      |                                                      |      |      |        |       |      |
|                                                                                                               | 漏電流 ≤0.01CV 或 3μA (Ø4~Ø10)，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>漏電流 ≤0.03CV 或 4μA (Ø12.5~Ø18)，取較大值（在 20°C 環境中施加額定工作電壓 1 分鐘後）                                                                                                                                           |  |                    |      |                                                      |      |      |        |       |      |
| C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                 |                                                                                                                                                                                                                                                                     |  |                    |      |                                                      |      |      |        |       |      |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                                             |  |                    |      |                                                      |      |      |        |       |      |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                            |  | 6.3                | 10   | 16                                                   | 25   | 35   | 50     | 63~80 | 100  |
|                                                                                                               | tan δ (max.) Ø4~Ø10                                                                                                                                                                                                                                                 |  | 0.26               | 0.19 | 0.16                                                 | 0.14 | 0.12 | 0.10   | 0.08  | 0.07 |
|                                                                                                               | 最大損耗角正切 Ø12.5~Ø18                                                                                                                                                                                                                                                   |  | 0.26               | 0.19 | 0.18                                                 | 0.16 | 0.14 | 0.10   | 0.08  | 0.07 |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                                   |  |                    |      |                                                      |      |      |        |       |      |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                            |  |                    |      | 6.3~16                                               |      |      | 25~100 |       |      |
|                                                                                                               | Impedance Ratio 阻抗比                                                                                                                                                                                                                                                 |  | Z(-25°C) / Z(20°C) |      |                                                      | 2    |      |        | 2     |      |
|                                                                                                               |                                                                                                                                                                                                                                                                     |  | Z(-40°C) / Z(20°C) |      |                                                      | 3    |      |        | 3     |      |
|                                                                                                               | ZT/Z20 (max.)                                                                                                                                                                                                                                                       |  | Z(-55°C) / Z(20°C) |      |                                                      | 4    |      |        | 3     |      |
| Endurance 耐久性                                                                                                 | When the capacitors are restored to 20°C after 5000 hrs. (2000 hrs. for Ø4~Ø6.3×5.8) application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 5000 小時（Ø4~Ø6.3×5.8 為 2000 小時）後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 |  |                    |      |                                                      |      |      |        |       |      |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                          |  |                    |      | Within ±30% of initial value 初始值的±30%以內              |      |      |        |       |      |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                            |  |                    |      | 200% or less of initial specified value 不大於規範值的 200% |      |      |        |       |      |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                                 |  |                    |      | initial specified value or less 不大於規範值               |      |      |        |       |      |
| Shelf Life 高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                       |  |                    |      |                                                      |      |      |        |       |      |
|                                                                                                               |                                                                                                                                                                                                                                                                     |  |                    |      |                                                      |      |      |        |       |      |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。                                                                                                                                  |  |                    |      |                                                      |      |      |        |       |      |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                          |  |                    |      | Within ±10% of initial value 初始值的±10%以內              |      |      |        |       |      |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                            |  |                    |      | initial specified value or less 不大於規範值               |      |      |        |       |      |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                                 |  |                    |      | initial specified value or less 不大於規範值               |      |      |        |       |      |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                              |  |                    |      |                                                      |      |      |        |       |      |

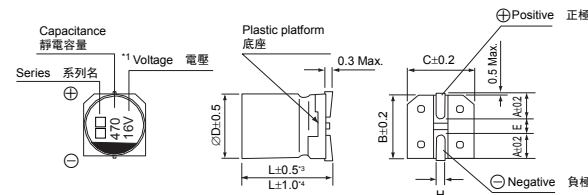
DRAWING 外形圖 (Unit: mm)

(Ø4~Ø6.3×7.7)



- \*1. Voltage mark for 6.3V is [6V]
  - \*2. Applicable to Ø6.3×7.7
  - \*3. Applicable to Ø8×10.5~Ø10
  - \*4. Applicable to Ø12.5~Ø18
- 6.3V 的產品標識為 [6V]  
適用於 Ø6.3×7.7  
適用於 Ø8×10.5~Ø10  
適用於 Ø12.5~Ø18

(Ø8×10.5~Ø18)



Dimension table in next page.  
尺寸表見下一頁。

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FZ Series

DIMENSIONS (Unit: mm) 尺寸表

| ∅D x L  | 4 x 5.8 | 5 x 5.8 | 6.3 x 5.8/7.7 | 8 x 10.5 | 10 x 10.5/13.5 | 12.5 x 13.5/16.0 | 16 x 16.5 | 18 x 16.5/18.5 |
|---------|---------|---------|---------------|----------|----------------|------------------|-----------|----------------|
| A       | 2.0     | 2.2     | 2.6           | 3.0      | 3.3            | 4.9              | 5.8       | 6.2            |
| B       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4           | 13.0             | 17.0      | 19.0           |
| C       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4           | 13.0             | 17.0      | 19.0           |
| E ± 0.2 | 1.0     | 1.4     | 1.9           | 3.1      | 4.7            | 4.7              | 6.4       | 6.4            |
| L       | 5.8     | 5.8     | 5.8/7.7       | 10.5     | 10.5/13.5      | 13.5/16.0        | 16.5      | 16.5/18.5      |
| H       | 0.5~0.8 | 0.5~0.8 | 0.5~0.8       | 0.8~1.2  | 0.8~1.2        | 0.8~1.2          | 1.1~1.4   | 1.1~1.4        |

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Code<br>代碼 |     | 6.3                        |                 |                | 10                       |                |              | 16                         |                  |                        |
|------------------|-----|----------------------------|-----------------|----------------|--------------------------|----------------|--------------|----------------------------|------------------|------------------------|
| μF               |     | 0J                         |                 |                | 1A                       |                |              | 1C                         |                  |                        |
| 10               | 100 |                            |                 |                |                          |                |              | 4 x 5.8                    | 1.35             | 90                     |
| 15               | 150 |                            |                 |                |                          |                |              | 4 x 5.8                    | 1.35             | 90                     |
| 22               | 220 | 4 x 5.8                    | 1.35            | 90             | 4 x 5.8                  | 1.35           | 90           | 5 x 5.8                    | 0.76             | 160                    |
| 33               | 330 | 5 x 5.8<br>(4 x 5.8)       | 0.76<br>(1.35)  | 160<br>(90)    | 5 x 5.8                  | 0.76           | 160          | 6.3 x 5.8                  | 0.44             | 240                    |
| 47               | 470 | 5 x 5.8<br>(4 x 5.8)       | 0.76<br>(1.35)  | 160<br>(90)    | 6.3 x 5.8                | 0.44           | 240          | 6.3 x 5.8<br>(5 x 5.8)     | 0.44<br>(0.76)   | 240<br>(160)           |
| 56               | 560 | 5 x 5.8                    | 0.76            | 160            | 6.3 x 5.8                | 0.44           | 240          | 6.3 x 5.8                  | 0.44             | 240                    |
| 68               | 680 | 6.3 x 5.8                  | 0.44            | 240            | 6.3 x 5.8                | 0.44           | 240          | 6.3 x 7.7<br>(6.3 x 5.8)   | 0.34<br>(0.44)   | 300<br>(240)           |
| 100              | 101 | 6.3 x 5.8                  | 0.44            | 240            | 6.3 x 7.7                | 0.34           | 300          | 6.3 x 7.7<br>(6.3 x 5.8)   | 0.34<br>(0.44)   | 300<br>(240)           |
| 150              | 151 | 6.3 x 5.8                  | 0.44            | 240            | 6.3 x 7.7                | 0.34           | 300          | 6.3 x 7.7                  | 0.34             | 300                    |
| 220              | 221 | 6.3 x 7.7<br>(6.3 x 5.8)   | 0.34<br>(0.44)  | 300<br>(240)   | 6.3 x 7.7                | 0.34           | 300          | 8 x 10.5<br>(6.3 x 7.7)    | 0.17<br>(0.34)   | 600<br>(300)           |
| 330              | 331 | 8 x 10.5                   | 0.17            | 600            | 10 x 10.5<br>(8 x 10.5)  | 0.09<br>(0.17) | 850<br>(600) | 10 x 10.5<br>(8 x 10.5)    | 0.08<br>(0.17)   | 850<br>(600)           |
| 470              | 471 | 8 x 10.5                   | 0.17            | 600            | 10 x 10.5<br>(8 x 10.5)  | 0.09<br>(0.17) | 850<br>(600) | 10 x 10.5<br>(8 x 10.5)    | 0.09<br>(0.17)   | 850<br>(600)           |
| 680              | 681 | 10 x 10.5<br>(8 x 10.5)    | 0.09<br>(0.17)  | 850<br>(600)   | 10 x 10.5                | 0.09           | 850          | 10 x 13.5<br>(10 x 10.5)   | 0.07<br>(0.09)   | 950<br>(850)           |
| 1000             | 102 | 10 x 10.5<br>(8 x 10.5)    | 0.09<br>(0.17)  | 850<br>(600)   | 10 x 13.5<br>(10 x 10.5) | 0.07<br>(0.09) | 950<br>(850) | 12.5 x 16<br>(12.5 x 13.5) | 0.055<br>(0.06)  | 1200<br>(1100)         |
| 1500             | 152 | 10 x 13.5                  | 0.09            | 950            | 12.5 x 13.5              | 0.06           | 1100         | 16 x 16.5                  | 0.05             | 1450                   |
| 2200             | 222 | 12.5 x 13.5                | 0.06            | 1100           | 12.5 x 16                | 0.055          | 1200         | 16 x 16.5                  | 0.05             | 1450                   |
| 3300             | 332 | 12.5 x 16<br>(12.5 x 13.5) | 0.055<br>(0.06) | 1200<br>(1100) | 16 x 16.5                | 0.05           | 1260         | 16 x 16.5                  | 0.05             | 1450                   |
| 4700             | 472 | 16 x 16.5                  | 0.05            | 1450           | 16 x 16.5                | 0.05           | 1450         | 18 x 16.5                  | 0.048            | 1500                   |
| 6800             | 682 | 18 x 16.5                  | 0.048           | 1500           | 18 x 16.5                | 0.048          | 1500         | Case size<br>尺寸            | Impedance<br>阻抗值 | Ripple current<br>紋波電流 |
| 8200             | 822 | 18 x 16.5                  | 0.048           | 1500           |                          |                |              |                            |                  |                        |

| WV<br>Code<br>代碼 |     | 25                                        |                           |                          | 35                                        |                          |                         | 50                                        |                            |                          |
|------------------|-----|-------------------------------------------|---------------------------|--------------------------|-------------------------------------------|--------------------------|-------------------------|-------------------------------------------|----------------------------|--------------------------|
| μF               |     | 1E                                        |                           |                          | 1V                                        |                          |                         | 1H                                        |                            |                          |
| 4.7              | 4R7 |                                           |                           |                          | 4 x 5.8                                   | 1.35                     | 90                      | 5 x 5.8                                   | 1.52                       | 85                       |
| 10               | 100 | 4 x 5.8                                   | 1.35                      | 90                       | 5 x 5.8                                   | 0.76                     | 160                     | 6.3 x 5.8<br>(5 x 5.8)                    | 0.88<br>(1.35)             | 165<br>(115)             |
| 15               | 150 | 5 x 5.8                                   | 0.76                      | 160                      | 5 x 5.8                                   | 0.76                     | 160                     | 6.3 x 5.8                                 | 0.88                       | 165                      |
| 22               | 220 | 6.3 x 5.8<br>(5 x 5.8)                    | 0.44<br>(0.76)            | 240<br>(160)             | 6.3 x 5.8                                 | 0.44                     | 240                     | 6.3 x 7.7<br>(6.3 x 5.8)                  | 0.68<br>(0.88)             | 195<br>(165)             |
| 33               | 330 | 6.3 x 5.8                                 | 0.44                      | 240                      | 6.3 x 5.8                                 | 0.44                     | 240                     | 6.3 x 7.7                                 | 0.68                       | 195                      |
| 47               | 470 | 6.3 x 7.7<br>(6.3 x 5.8)                  | 0.34<br>(0.44)            | 300<br>(240)             | 6.3 x 7.7<br>(6.3 x 5.8)                  | 0.34<br>(0.88)           | 300<br>(165)            | 8 x 10.5<br>(6.3 x 7.7)                   | 0.34<br>(0.68)             | 350<br>(195)             |
| 56               | 560 | 6.3 x 7.7                                 | 0.34                      | 300                      | 6.3 x 7.7                                 | 0.34                     | 300                     | 8 x 10.5                                  | 0.34                       | 350                      |
| 68               | 680 | 6.3 x 7.7                                 | 0.34                      | 300                      | 8 x 10.5                                  | 0.17                     | 600                     | 8 x 10.5                                  | 0.34                       | 350                      |
| 100              | 101 | 8 x 10.5<br>(6.3 x 7.7)                   | 0.17<br>(0.34)            | 600<br>(300)             | 8 x 10.5<br>(6.3 x 7.7)                   | 0.17<br>(0.34)           | 600<br>(300)            | 10 x 10.5<br>(8 x 10.5)                   | 0.18<br>(0.34)             | 670<br>(350)             |
| 150              | 151 | 8 x 10.5<br>(6.3 x 7.7)                   | 0.16<br>(0.34)            | 600<br>(300)             | 10 x 10.5<br>(8 x 10.5)                   | 0.09<br>(0.17)           | 850<br>(600)            | 10 x 13.5<br>(10 x 10.5)                  | 0.14<br>(0.18)             | 780<br>(670)             |
| 220              | 221 | 8 x 10.5                                  | 0.17                      | 600                      | 10 x 10.5<br>(8 x 10.5)                   | 0.09<br>(0.16)           | 850<br>(600)            | 10 x 13.5<br>(10 x 10.5)                  | 0.14<br>(0.26)             | 780<br>(750)             |
| 330              | 331 | 10 x 10.5<br>(8 x 10.5)                   | 0.09<br>(0.17)            | 850<br>(600)             | 10 x 13.5<br>(10 x 10.5)                  | 0.07<br>(0.10)           | 950<br>(850)            | 12.5 x 13.5                               | 0.12                       | 900                      |
| 470              | 471 | 10 x 13.5<br>(10 x 10.5)                  | 0.07<br>(0.09)            | 950<br>(850)             | 12.5 x 13.5<br>(10 x 13.5)<br>(10 x 10.5) | 0.06<br>(0.07)<br>(0.10) | 1100<br>(1000)<br>(950) | 16 x 16.5<br>(12.5 x 16)<br>(12.5 x 13.5) | 0.08<br>(0.10)<br>(0.08)   | 1250<br>(1050)<br>(1100) |
| 680              | 681 | 12.5 x 13.5                               | 0.06                      | 1100                     | 12.5 x 16<br>(12.5 x 13.5)                | 0.055<br>(0.06)          | 1200<br>(1100)          | 16 x 16.5                                 | 0.073                      | 1250                     |
| 1000             | 102 | 16 x 16.5<br>(12.5 x 16)<br>(12.5 x 13.5) | 0.05<br>(0.055)<br>(0.06) | 1450<br>(1200)<br>(1100) | 16 x 16.5                                 | 0.05                     | 1450                    | 18 x 18.5<br>(16 x 16.5)<br>(18 x 16.5)   | 0.073<br>(0.08)<br>(0.073) | 1250<br>(1000)<br>(1250) |
| 1500             | 152 | 16 x 16.5                                 | 0.05                      | 1450                     | 16 x 16.5                                 | 0.048                    | 1500                    | 18 x 16.5                                 | 0.066                      | 1500                     |
| 2200             | 222 | 16 x 16.5                                 | 0.05                      | 1450                     | 18 x 18.5                                 | 0.038                    | 1750                    | Case size<br>尺寸                           | Impedance<br>阻抗值           | Ripple current<br>紋波電流   |
| 3300             | 333 | 18 x 16.5<br>(18 x 18.5)                  | 0.048<br>(0.048)          | 1500<br>(1500)           |                                           |                          |                         |                                           |                            |                          |

•Case size 尺寸 ∅D×L(mm), Impedance 阻抗值 (Ω) at 20°C, 100KHz, Ripple current 紋波電流 (mA rms) at 105°C, 100KHz

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

FZ Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Code<br>μF<br>代碼 | 63  |                                           |                         | 80                    |                            |                | 100          |                                           |                                                   |
|------------------------|-----|-------------------------------------------|-------------------------|-----------------------|----------------------------|----------------|--------------|-------------------------------------------|---------------------------------------------------|
|                        | 1J  |                                           |                         | 1K                    |                            |                | 2A           |                                           |                                                   |
| 3.3                    | 3R3 |                                           |                         |                       | 5 × 5.8                    | 5.0            | 25           |                                           |                                                   |
| 4.7                    | 4R7 | 5 × 5.8                                   | 3.0                     | 50                    | 6.3 × 5.8                  | 3.0            | 40           |                                           |                                                   |
| 10                     | 100 | 6.3 × 7.7<br>(6.3 × 5.8)                  | 1.2<br>(1.5)            | 120<br>(80)           | 6.3 × 7.7                  | 2.4            | 60           | 8 × 10.5                                  | 1.3<br>130                                        |
| 22                     | 220 | 8 × 10.5<br>(6.3 × 7.7)                   | 0.65<br>(1.2)           | 250<br>(120)          | 8 × 10.5                   | 1.3            | 130          | 10 × 10.5<br>(8 × 10.5)                   | 0.7<br>(1.3)<br>200<br>(160)                      |
| 33                     | 330 | 8 × 10.5                                  | 0.65                    | 250                   | 10 × 10.5                  | 0.7            | 200          | 10 × 13.5                                 | 0.7<br>200                                        |
| 47                     | 470 | 10 × 10.5<br>(8 × 10.5)                   | 0.5<br>(0.65)           | 300<br>(250)          | 10 × 13.5                  | 0.45           | 300          | 12.5 × 13.5                               | 0.32<br>500                                       |
| 68                     | 680 | 12.5 × 13.5<br>(10 × 10.5)                | 0.16<br>(0.5)           | 800<br>(300)          | 12.5 × 13.5                | 0.32           | 500          | 12.5 × 13.5                               | 0.32<br>500                                       |
| 100                    | 101 | 12.5 × 13.5<br>(10 × 13.5)<br>(10 × 10.5) | 0.16<br>(0.25)<br>(0.5) | 800<br>(400)<br>(300) | 12.5 × 13.5<br>(10 × 13.5) | 0.32<br>(0.18) | 500<br>(750) | 16 × 16.5<br>(12.5 × 16)<br>(12.5 × 13.5) | 0.17<br>(0.26)<br>(0.32)<br>795<br>(550)<br>(500) |
| 150                    | 151 | 12.5 × 13.5<br>(10 × 13.5)                | 0.16<br>(0.25)          | 800<br>(650)          | 12.5 × 13.5                | 0.32           | 500          | 16 × 16.5<br>(12.5 × 16)                  | 0.17<br>(0.26)<br>650<br>(550)                    |
| 220                    | 221 | 12.5 × 13.5                               | 0.16                    | 800                   | 12.5 × 16<br>(12.5 × 13.5) | 0.26<br>(0.12) | 550<br>(900) | 18 × 16.5                                 | 0.15<br>850                                       |
| 330                    | 331 | 16 × 16.5                                 | 0.082                   | 900                   | 16 × 16.5                  | 0.17           | 795          | 18 × 16.5                                 | 0.15<br>850                                       |
| 470                    | 471 | 16 × 16.5                                 | 0.082                   | 900                   | 18 × 16.5                  | 0.15           | 850          | 18 × 18.5                                 | 0.15<br>950                                       |
| 680                    | 681 | 18 × 16.5                                 | 0.08                    | 1150                  | 18 × 18.5                  | 0.15           | 950          | Case size<br>尺寸                           | Impedance<br>阻抗值                                  |
| 1000                   | 102 | 18 × 18.5                                 | 0.06                    | 1250                  |                            |                |              |                                           |                                                   |

•Case size 尺寸 ØD×L(mm), Impedance 阻抗值 (Ω) at 20°C, 100KHz, Ripple current 紋波電流 (mA rms) at 105°C, 100KHz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |             |               | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|---------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | Ø4 ~ Ø10    | 4.7 ~ 68μF    | 0.35 | 0.50  | 0.64  | 0.83 | 1.00   |
|                   |             | 100 ~ 1500μF  | 0.40 | 0.55  | 0.70  | 0.85 | 1.00   |
|                   | Ø12.5 ~ Ø18 | ~ 68μF        | 0.40 | 0.55  | 0.70  | 0.85 | 1.00   |
|                   |             | 100 ~ 680μF   | 0.45 | 0.65  | 0.80  | 0.90 | 1.00   |
|                   |             | 1000 ~ 4700μF | 0.65 | 0.85  | 0.95  | 1.00 | 1.00   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

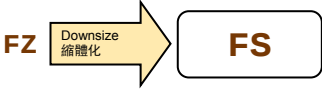
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

FS Series

CHIP TYPE, LONG LIFE WITH EXTRA LOWER IMPEDANCE

貼片式，長壽命極低阻抗品

- Extra lower impedance  
極低阻抗
- Endurance 2000~5000 hours  
耐久性 2000~5000 小時
- Miniature (size smaller than FZ series)  
縮體型（尺寸比 FZ 系列小）
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵

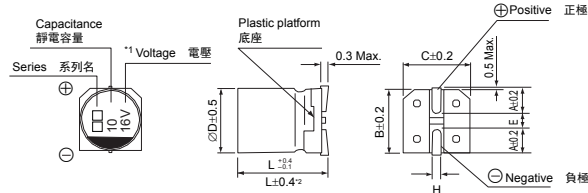


SPECIFICATIONS 特性表

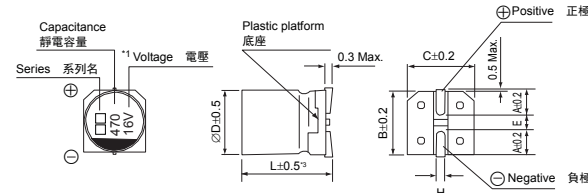
| Items 項目                                                                                                  | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------|---------|------|------|--|----------------------------|-----------------------------------------|----------|----|---------|----|----|--------------------------|------------------------------------------------------|------|------|------|------|------|---------------------|----------------------------------------|--|---|--|--|---------------|--------------------|---|--|---|--|--|
| Category Temperature Range 工作溫度範圍                                                                         | -55 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Voltage Range 額定工作電壓範圍                                                                                    | 6.3 ~ 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Capacitance Range 靜電容量範圍                                                                                  | 10 ~ 2200μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Capacitance Tolerance 靜電容量允許偏差                                                                            | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Leakage Current 漏電流                                                                                       | Leakage current ≤0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3μA，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                               |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Dissipation Factor (tan δ) 損耗角正切                                                                          | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.26</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table>                                                                                                                                                                                                                                                                                                       |          |      |         |      |      |  | Rated Voltage (V) 額定工作電壓   | 6.3                                     | 10       | 16 | 25      | 35 | 50 | tan δ (max.) 最大損耗角正切     | 0.26                                                 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Rated Voltage (V) 額定工作電壓                                                                                  | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 10       | 16   | 25      | 35   | 50   |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| tan δ (max.) 最大損耗角正切                                                                                      | 0.26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.19     | 0.16 | 0.14    | 0.12 | 0.10 |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Stability at Low Temperature 低溫特性                                                                         | Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td colspan="2">6.3 ~ 16</td><td colspan="3">25 ~ 50</td></tr><tr><td rowspan="2">Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td colspan="2">2</td><td colspan="3">2</td></tr><tr><td>Z(-40°C) / Z(20°C)</td><td colspan="2">3</td><td colspan="3">3</td></tr><tr><td>ZT/Z20 (max.)</td><td>Z(-55°C) / Z(20°C)</td><td colspan="2">4</td><td colspan="3">3</td></tr></table>                                                                                                                                 |          |      |         |      |      |  | Rated Voltage (V) 額定工作電壓   |                                         | 6.3 ~ 16 |    | 25 ~ 50 |    |    | Impedance Ratio 阻抗比      | Z(-25°C) / Z(20°C)                                   | 2    |      | 2    |      |      | Z(-40°C) / Z(20°C)  | 3                                      |  | 3 |  |  | ZT/Z20 (max.) | Z(-55°C) / Z(20°C) | 4 |  | 3 |  |  |
| Rated Voltage (V) 額定工作電壓                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6.3 ~ 16 |      | 25 ~ 50 |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Impedance Ratio 阻抗比                                                                                       | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2        |      | 2       |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
|                                                                                                           | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3        |      | 3       |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| ZT/Z20 (max.)                                                                                             | Z(-55°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 4        |      | 3       |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Endurance 耐久性                                                                                             | When the capacitors are restored to 20°C after 5000 hrs. (2000 hrs. for Ø4~Ø6.3×7.7) application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 5000 小時（Ø4~Ø6.3×7.7 為 2000 小時）後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="6">Within ±35% of initial value 初始值的±35%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="6">300% or less of initial specified value 不大於規範值的 300%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="6">initial specified value or less 不大於規範值</td></tr></table> |          |      |         |      |      |  | Capacitance Change 靜電容量變化率 | Within ±35% of initial value 初始值的±35%以內 |          |    |         |    |    | Dissipation Factor 損耗角正切 | 300% or less of initial specified value 不大於規範值的 300% |      |      |      |      |      | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |  |   |  |  |               |                    |   |  |   |  |  |
| Capacitance Change 靜電容量變化率                                                                                | Within ±35% of initial value 初始值的±35%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Dissipation Factor 損耗角正切                                                                                  | 300% or less of initial specified value 不大於規範值的 300%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Leakage Current 漏電流                                                                                       | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Shelf Life 高溫貯存特性                                                                                         | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                                                                  |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="6">Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="6">initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="6">initial specified value or less 不大於規範值</td></tr></table>                                                                                                                                                |          |      |         |      |      |  | Capacitance Change 靜電容量變化率 | Within ±10% of initial value 初始值的±10%以內 |          |    |         |    |    | Dissipation Factor 損耗角正切 | initial specified value or less 不大於規範值               |      |      |      |      |      | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |  |   |  |  |               |                    |   |  |   |  |  |
| Capacitance Change 靜電容量變化率                                                                                | Within ±10% of initial value 初始值的±10%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Dissipation Factor 損耗角正切                                                                                  | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Leakage Current 漏電流                                                                                       | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |
| Marking 標識                                                                                                | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |      |         |      |      |  |                            |                                         |          |    |         |    |    |                          |                                                      |      |      |      |      |      |                     |                                        |  |   |  |  |               |                    |   |  |   |  |  |

DRAWING 外形圖 (Unit: mm)

(Ø4~Ø6.3×7.7)



(Ø8×10.5~Ø10)



\*1. Voltage mark for 6.3V is [6V]  
\*2. Applicable to Ø6.3×7.7  
\*3. Applicable to Ø8×10.5~Ø10

Dimension table in next page.  
尺寸表見下一頁。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注：**以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

FS Series

DIMENSIONS (Unit: mm) 尺寸表

| ∅D x L  | 4 x 5.8 | 5 x 5.8 | 6.3 x 5.8/7.7 | 8 x 10.5 | 10 x 10.5 |
|---------|---------|---------|---------------|----------|-----------|
| A       | 2.0     | 2.2     | 2.6           | 3.0      | 3.3       |
| B       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4      |
| C       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4      |
| E ± 0.2 | 1.0     | 1.4     | 1.9           | 3.1      | 4.7       |
| L       | 5.8     | 5.8     | 5.8/7.7       | 10.5     | 10.5      |
| H       | 0.5~0.8 | 0.5~0.8 | 0.5~0.8       | 0.8~1.2  | 0.8~1.2   |

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Code<br>代碼 |     | 6.3       |      |      | 10        |      |      | 16              |                  |                        |
|------------------|-----|-----------|------|------|-----------|------|------|-----------------|------------------|------------------------|
| μF               |     | 0J        |      |      | 1A        |      |      | 1C              |                  |                        |
| 47               | 470 |           |      |      |           |      |      | 4 x 5.8         | 0.85             | 160                    |
| 68               | 680 |           |      |      | 4 x 5.8   | 0.85 | 160  | 5 x 5.8         | 0.36             | 240                    |
| 100              | 101 | 4 x 5.8   | 0.85 | 160  |           |      |      | 5 x 5.8         | 0.36             | 240                    |
| 150              | 151 |           |      |      | 5 x 5.8   | 0.36 | 240  | 6.3 x 5.8       | 0.26             | 300                    |
| 220              | 221 | 5 x 5.8   | 0.36 | 240  | 6.3 x 5.8 | 0.26 | 300  | 6.3 x 5.8       | 0.26             | 300                    |
| 330              | 331 | 6.3 x 5.8 | 0.26 | 300  | 6.3 x 7.7 | 0.16 | 600  | 6.3 x 7.7       | 0.16             | 600                    |
| 470              | 471 | 6.3 x 7.7 | 0.16 | 600  | 6.3 x 7.7 | 0.16 | 600  |                 |                  |                        |
| 680              | 681 | 6.3 x 7.7 | 0.16 | 600  |           |      |      | 8 x 10.5        | 0.08             | 850                    |
| 820              | 821 |           |      |      |           |      |      | 8 x 10.5        | 0.08             | 850                    |
| 1000             | 102 |           |      |      | 8 x 10.5  | 0.08 | 850  | 10 x 10.5       | 0.06             | 1190                   |
| 1200             | 122 |           |      |      |           |      |      | 10 x 10.5       | 0.06             | 1190                   |
| 1500             | 152 | 8 x 10.5  | 0.08 | 850  | 10 x 10.5 | 0.06 | 1190 | Case size<br>尺寸 | Impedance<br>阻抗值 | Ripple current<br>紋波電流 |
| 2200             | 222 | 10 x 10.5 | 0.06 | 1190 |           |      |      |                 |                  |                        |

| WV<br>Code<br>代碼 |     | 25        |      |      | 35        |      |      | 50                   |                  |                        |
|------------------|-----|-----------|------|------|-----------|------|------|----------------------|------------------|------------------------|
| μF               |     | 1E        |      |      | 1V        |      |      | 1H                   |                  |                        |
| 10               | 100 |           |      |      |           |      |      | 5 x 5.8<br>(4 x 5.8) | 0.88<br>(2.30)   | 165<br>(85)            |
| 22               | 220 | 4 x 5.8   | 0.85 | 160  | 4 x 5.8   | 0.85 | 160  | 5 x 5.8              | 0.88             | 165                    |
| 33               | 330 | 4 x 5.8   | 0.85 | 160  | 5 x 5.8   | 0.36 | 240  |                      |                  |                        |
| 47               | 470 | 5 x 5.8   | 0.36 | 240  | 5 x 5.8   | 0.36 | 240  | 6.3 x 5.8            | 0.68             | 195                    |
| 68               | 680 | 5 x 5.8   | 0.36 | 240  | 6.3 x 5.8 | 0.26 | 300  |                      |                  |                        |
| 100              | 101 | 6.3 x 5.8 | 0.26 | 300  | 6.3 x 5.8 | 0.26 | 300  | 6.3 x 7.7            | 0.34             | 350                    |
| 150              | 151 | 6.3 x 7.7 | 0.16 | 600  | 6.3 x 7.7 | 0.16 | 600  |                      |                  |                        |
| 220              | 221 | 6.3 x 7.7 | 0.16 | 600  |           |      |      | 8 x 10.5             | 0.18             | 670                    |
| 330              | 331 | 6.3 x 7.7 | 0.16 | 600  | 8 x 10.5  | 0.08 | 850  | 10 x 10.5            | 0.12             | 900                    |
| 390              | 391 |           |      |      | 8 x 10.5  | 0.08 | 850  |                      |                  |                        |
| 470              | 471 | 8 x 10.5  | 0.08 | 850  |           |      |      |                      |                  |                        |
| 560              | 561 | 8 x 10.5  | 0.08 | 850  | 10 x 10.5 | 0.06 | 1190 |                      |                  |                        |
| 680              | 681 |           |      |      | 10 x 10.5 | 0.06 | 1190 |                      |                  |                        |
| 820              | 821 | 10 x 10.5 | 0.06 | 1190 |           |      |      | Case size<br>尺寸      | Impedance<br>阻抗值 | Ripple current<br>紋波電流 |
| 1000             | 102 | 10 x 10.5 | 0.06 | 1190 |           |      |      |                      |                  |                        |

•Case size 尺寸 ∅DxL(mm), Impedance 阻抗值 (Ω) at 20°C, 100KHz, Ripple current 紋波電流 (mA rms) at 105°C, 100KHz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |              | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|--------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | 10 ~ 68μF    | 0.35 | 0.50  | 0.64  | 0.83 | 1.00   |
|                   | 100 ~ 2200μF | 0.40 | 0.55  | 0.70  | 0.85 | 1.00   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

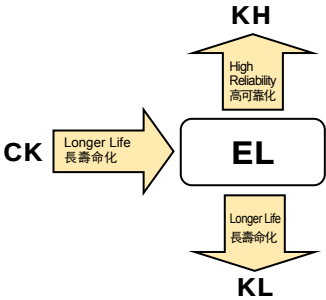
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EL Series

CHIP TYPE, LONG LIFE ASSURANCE

貼片式，寬溫長壽命品

- Wide temperature range -55~+105°C  
適用於 -55~+105°C 的寬溫範圍
- Endurance 2000~3000 hours  
耐久性 2000~3000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵

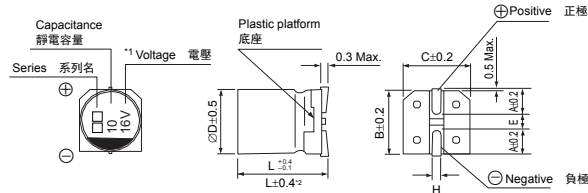


SPECIFICATIONS 特性表

| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                                                |           |                                                      |      |      |      |      |      |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------|------|------|------|------|------|
| Category Temperature Range 工作溫度範圍                                                                             | -55 ~ +105°C                                                                                                                                                                                                                                                        |           |                                                      |      |      |      |      |      |
| Voltage Range 額定工作電壓範圍                                                                                        | 6.3 ~ 50V                                                                                                                                                                                                                                                           |           |                                                      |      |      |      |      |      |
| Capacitance Range 靜電容量範圍                                                                                      | 0.1 ~ 3300μF                                                                                                                                                                                                                                                        |           |                                                      |      |      |      |      |      |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                 |           |                                                      |      |      |      |      |      |
| Leakage Current 漏電流                                                                                           | Leakage current ≤0.01CV or 3μA (Ø4~Ø10), whichever is greater (after 2 minutes application of rated voltage at 20°C)                                                                                                                                                |           |                                                      |      |      |      |      |      |
|                                                                                                               | Leakage current ≤0.03CV or 4μA (Ø12.5~Ø16), whichever is greater (after 1 minute application of rated voltage at 20°C)                                                                                                                                              |           |                                                      |      |      |      |      |      |
|                                                                                                               | 漏電流≤0.01CV 或 3μA (Ø4~Ø10)，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>漏電流≤0.03CV 或 4μA (Ø12.5~Ø16)，取較大值（在 20°C 環境中施加額定工作電壓 1 分鐘後）                                                                                                                                             |           |                                                      |      |      |      |      |      |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                       |           |                                                      |      |      |      |      |      |
|                                                                                                               | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                                             |           |                                                      |      |      |      |      |      |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                            | 6.3       | 10                                                   | 16   | 25   | 35   | 50   |      |
|                                                                                                               | tan δ (max.)                                                                                                                                                                                                                                                        | Ø4~Ø10    | 0.28                                                 | 0.24 | 0.20 | 0.16 | 0.13 | 0.12 |
|                                                                                                               | 最大損耗角正切                                                                                                                                                                                                                                                             | Ø12.5~Ø16 | 0.38                                                 | 0.34 | 0.30 | 0.26 | 0.22 | 0.18 |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                                   |           |                                                      |      |      |      |      |      |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                            |           | 6.3                                                  | 10   | 16   | 25   | 35   | 50   |
|                                                                                                               | Impedance Ratio 阻抗比<br>ZT/Z20 (max.)                                                                                                                                                                                                                                | Ø4~Ø10    | Z(-25°C) / Z(20°C)                                   | 3    | 3    | 2    | 2    | 2    |
|                                                                                                               |                                                                                                                                                                                                                                                                     |           | Z(-55°C) / Z(20°C)                                   | 8    | 5    | 4    | 3    | 3    |
|                                                                                                               |                                                                                                                                                                                                                                                                     | Ø12.5~Ø16 | Z(-25°C) / Z(20°C)                                   | 5    | 4    | 3    | 2    | 2    |
| Z(-55°C) / Z(20°C)                                                                                            | 12                                                                                                                                                                                                                                                                  |           | 10                                                   | 8    | 5    | 4    | 3    |      |
| Endurance 耐久性                                                                                                 | When the capacitors are restored to 20°C after 3000 hrs. (2000 hrs. for Ø4~Ø6.3×5.8) application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 3000 小時（Ø4~Ø6.3×5.8 為 2000 小時）後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 |           |                                                      |      |      |      |      |      |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                          |           | Within ±25% of initial value 初始值的±25%以內              |      |      |      |      |      |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                            |           | 200% or less of initial specified value 不大於規範值的 200% |      |      |      |      |      |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                                 |           | initial specified value or less 不大於規範值               |      |      |      |      |      |
| Shelf Life 高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                       |           |                                                      |      |      |      |      |      |
|                                                                                                               |                                                                                                                                                                                                                                                                     |           |                                                      |      |      |      |      |      |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。                                                                                                                                  |           |                                                      |      |      |      |      |      |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                          |           | Within ±10% of initial value 初始值的±10%以內              |      |      |      |      |      |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                            |           | initial specified value or less 不大於規範值               |      |      |      |      |      |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                                 |           | initial specified value or less 不大於規範值               |      |      |      |      |      |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                              |           |                                                      |      |      |      |      |      |

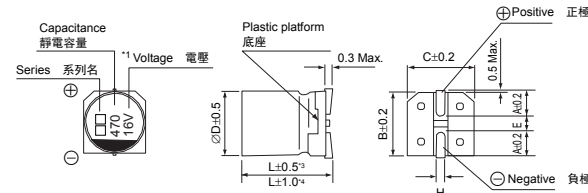
DRAWING 外形圖 (Unit: mm)

(Ø4~Ø6.3×7.7)



- \*1. Voltage mark for 6.3V is [6V]
  - \*2. Applicable to Ø6.3×7.7
  - \*3. Applicable to Ø8×10.5~Ø10
  - \*4. Applicable to Ø12.5~Ø16
- 6.3V 的產品標識為 [6V]  
適用於 Ø6.3×7.7  
適用於 Ø8×10.5~Ø10  
適用於 Ø12.5~Ø16

(Ø8×10.5~Ø16)



Dimension table in next page.  
尺寸表見下一頁。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注：**以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

EL Series

DIMENSIONS (Unit: mm) 尺寸表

| ∅D x L  | 4 x 5.8 | 5 x 5.8 | 6.3 x 5.8/7.7 | 8 x 10.5 | 10 x 10.5/13.5 | 12.5 x 13.5/16 | 16 x 16.5 |
|---------|---------|---------|---------------|----------|----------------|----------------|-----------|
| A       | 2.0     | 2.2     | 2.6           | 3.0      | 3.3            | 4.9            | 5.8       |
| B       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4           | 13.0           | 17.0      |
| C       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4           | 13.0           | 17.0      |
| E ± 0.2 | 1.0     | 1.4     | 1.9           | 3.1      | 4.7            | 4.7            | 6.4       |
| L       | 5.8     | 5.8     | 5.8/7.7       | 10.5     | 10.5/13.5      | 13.5/16.0      | 16.5      |
| H       | 0.5~0.8 | 0.5~0.8 | 0.5~0.8       | 0.8~1.2  | 0.8~1.2        | 0.8~1.2        | 1.1~1.4   |

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼 |     | 6.3                      |              | 10                         |              | 16                                        |                       | 25          |      | 35                         |              | 50                       |                               |
|------------------|-----|--------------------------|--------------|----------------------------|--------------|-------------------------------------------|-----------------------|-------------|------|----------------------------|--------------|--------------------------|-------------------------------|
| μF               |     | 0J                       |              | 1A                         |              | 1C                                        |                       | 1E          |      | 1V                         |              | 1H                       |                               |
| 0.1              | 0R1 |                          |              |                            |              |                                           |                       |             |      |                            |              | 4 x 5.8                  | 1                             |
| 0.22             | R22 |                          |              |                            |              |                                           |                       |             |      |                            |              | 4 x 5.8                  | 2                             |
| 0.33             | R33 |                          |              |                            |              |                                           |                       |             |      |                            |              | 4 x 5.8                  | 3                             |
| 0.47             | R47 |                          |              |                            |              |                                           |                       |             |      |                            |              | 4 x 5.8                  | 5                             |
| 1                | 010 |                          |              |                            |              |                                           |                       |             |      |                            |              | 4 x 5.8                  | 10                            |
| 2.2              | 2R2 |                          |              |                            |              |                                           |                       |             |      |                            |              | 4 x 5.8                  | 16                            |
| 3.3              | 3R3 |                          |              |                            |              |                                           |                       |             |      |                            |              | 4 x 5.8                  | 16                            |
| 4.7              | 4R7 |                          |              |                            |              |                                           |                       | 4 x 5.8     | 13   | 4 x 5.8                    | 14           | 5 x 5.8                  | 23                            |
| 10               | 100 |                          |              |                            |              | 4 x 5.8                                   | 18                    | 5 x 5.8     | 20   | 5 x 5.8                    | 21           | 6.3 x 5.8                | 35                            |
| 22               | 220 | 4 x 5.8                  | 22           | 5 x 5.8                    | 25           | 5 x 5.8                                   | 27                    | 6.3 x 5.8   | 36   | 6.3 x 5.8                  | 38           | 6.3 x 7.7                | 70                            |
| 33               | 330 | 5 x 5.8                  | 27           | 5 x 5.8                    | 30           | 6.3 x 5.8                                 | 40                    | 6.3 x 5.8   | 60   | 6.3 x 7.7                  | 84           | 8 x 10.5                 | 90                            |
| 47               | 470 | 5 x 5.8                  | 33           | 6.3 x 5.8                  | 41           | 6.3 x 5.8                                 | 48                    | 6.3 x 7.7   | 90   | 8 x 10.5                   | 98           | 8 x 10.5                 | 90                            |
| 100              | 101 | 6.3 x 5.8                | 50           | 6.3 x 5.8                  | 53           | 6.3 x 5.8                                 | 60                    | 8 x 10.5    | 130  | 8 x 10.5                   | 130          | 10 x 10.5                | 100                           |
| 150              | 151 | 6.3 x 5.8                | 55           | 6.3 x 7.7                  | 105          | 6.3 x 7.7                                 | 95                    | 8 x 10.5    | 140  | 10 x 10.5                  | 315          | 10 x 10.5                | 100                           |
| 220              | 221 | 6.3 x 7.7                | 100          | 8 x 10.5                   | 210          | 8 x 10.5                                  | 210                   | 10 x 10.5   | 190  | 10 x 10.5                  | 315          | 10 x 13.5<br>(10 x 10.5) | 250<br>(100)                  |
| 330              | 331 | 8 x 10.5                 | 210          | 8 x 10.5                   | 210          | 8 x 10.5                                  | 210                   | 10 x 10.5   | 315  | 10 x 10.5                  | 315          | 12.5 x 13.5              | 400                           |
| 470              | 471 | 8 x 10.5                 | 210          | 10 x 10.5                  | 315          | 10 x 10.5                                 | 315                   | 10 x 10.5   | 315  | 12.5 x 13.5<br>(10 x 13.5) | 500<br>(360) | 16 x 16.5<br>(12.5 x 16) | 650<br>(500)                  |
| 680              | 681 | 8 x 10.5                 | 210          | 10 x 10.5                  | 315          | 10 x 10.5                                 | 315                   | 10 x 13.5   | 380  | 12.5 x 13.5                | 500          |                          |                               |
| 1000             | 102 | 10 x 10.5                | 315          | 10 x 13.5<br>(10 x 10.5)   | 360<br>(315) | 12.5 x 13.5<br>(10 x 13.5)<br>(10 x 10.5) | 450<br>(350)<br>(315) | 12.5 x 13.5 | 550  | 16 x 16.5<br>(12.5 x 16)   | 700<br>(550) |                          |                               |
| 1500             | 152 | 10 x 13.5<br>(10 x 10.5) | 450<br>(315) | 12.5 x 13.5                | 500          | 12.5 x 13.5                               | 500                   | 12.5 x 16   | 800  |                            |              |                          |                               |
| 2200             | 222 | 12.5 x 13.5              | 620          | 12.5 x 16<br>(12.5 x 13.5) | 650<br>(600) | 16 x 16.5                                 | 900                   | 16 x 16.5   | 1000 |                            |              | Case size<br>尺寸          | Ripple<br>current<br>紋波電<br>流 |
| 3300             | 332 | 12.5 x 16                | 750          | 16 x 16.5                  | 950          |                                           |                       |             |      |                            |              |                          |                               |

•Case size ∅DxL(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸∅DxL(mm), 紋波電流(mA rms)於 105°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |             |              | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|--------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | ∅4 ~ ∅10    | 0.1 ~ 100μF  | 0.70 | 1.00  | 1.17  | 1.36 | 1.50   |
|                   |             | 150 ~ 1500μF | 0.85 | 1.00  | 1.08  | 1.20 | 1.30   |
|                   | ∅12.5 ~ ∅16 | ~ 470μF      | 0.75 | 1.00  | 1.35  | 1.57 | 2.00   |
|                   |             | 680 ~ 3300μF | 0.85 | 1.00  | 1.23  | 1.34 | 1.50   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

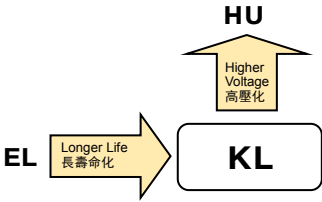
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KL Series

CHIP TYPE, 5000 HOURS LONG LIFE ASSURANCE

貼片式, 5000 小時長壽命品

- Wide temperature range -55~+105°C  
適用於 -55~+105°C 的寬溫範圍
- Endurance 3000~5000 hours  
耐久性 3000~5000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵

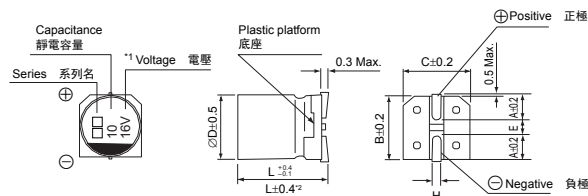


SPECIFICATIONS 特性表

| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                 |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------|------|------|--------|------|--------------------------|-----|----|----|----|----|--------|--------------|--------|------|------|------|------|------|------|---------|-----------|------|------|------|------|------|
| Category Temperature Range 工作溫度範圍                                                                             | -55 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                         |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| Voltage Range 額定工作電壓範圍                                                                                        | 6.3 ~ 100V                                                                                                                                                                                                                                                                                                                                                                           |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| Capacitance Range 靜電容量範圍                                                                                      | 0.1 ~ 3300μF                                                                                                                                                                                                                                                                                                                                                                         |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                  |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| Leakage Current 漏電流                                                                                           | Leakage current ≤0.01CV or 3μA (Ø4~Ø10), whichever is greater (after 2 minutes application of rated voltage at 20°C)                                                                                                                                                                                                                                                                 |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | Leakage current ≤0.03CV or 4μA (Ø12.5~Ø16), whichever is greater (after 1 minute application of rated voltage at 20°C)                                                                                                                                                                                                                                                               |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | 漏電流 ≤0.01CV 或 3μA (Ø4~Ø10), 取較大值 (在 20°C 環境中施加額定工作電壓 2 分鐘後)                                                                                                                                                                                                                                                                                                                          |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | 漏電流 ≤0.03CV 或 4μA (Ø12.5~Ø16), 取較大值 (在 20°C 環境中施加額定工作電壓 1 分鐘後)                                                                                                                                                                                                                                                                                                                       |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                        |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                                                                                                                                                              |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50~100</td></tr><tr><td>tan δ (max.)</td><td>Ø4~Ø10</td><td>0.28</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.13</td><td>0.12</td></tr><tr><td>最大損耗角正切</td><td>Ø12.5~Ø16</td><td>0.38</td><td>0.34</td><td>0.30</td><td>0.26</td><td>0.22</td><td>0.18</td></tr></table> |           |                                                      |      |      |        |      | Rated Voltage (V) 額定工作電壓 | 6.3 | 10 | 16 | 25 | 35 | 50~100 | tan δ (max.) | Ø4~Ø10 | 0.28 | 0.24 | 0.20 | 0.16 | 0.13 | 0.12 | 最大損耗角正切 | Ø12.5~Ø16 | 0.38 | 0.34 | 0.30 | 0.26 | 0.22 |
| Rated Voltage (V) 額定工作電壓                                                                                      | 6.3                                                                                                                                                                                                                                                                                                                                                                                  | 10        | 16                                                   | 25   | 35   | 50~100 |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| tan δ (max.)                                                                                                  | Ø4~Ø10                                                                                                                                                                                                                                                                                                                                                                               | 0.28      | 0.24                                                 | 0.20 | 0.16 | 0.13   | 0.12 |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| 最大損耗角正切                                                                                                       | Ø12.5~Ø16                                                                                                                                                                                                                                                                                                                                                                            | 0.38      | 0.34                                                 | 0.30 | 0.26 | 0.22   | 0.18 |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                                                                                                                                                    |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                                                                                             |           | 6.3                                                  | 10   | 16   | 25     | 35   | 50~100                   |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | Impedance Ratio 阻抗比<br>ZT/Z20 (max.)                                                                                                                                                                                                                                                                                                                                                 | Ø4~Ø10    | Z(-25°C) / Z(20°C)                                   | 3    | 3    | 2      | 2    | 2                        |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                      | Ø12.5~Ø16 | Z(-25°C) / Z(20°C)                                   | 5    | 4    | 3      | 2    | 2                        |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| Endurance 耐久性                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                      |           | Z(-55°C) / Z(20°C)                                   | 8    | 5    | 4      | 3    | 3                        |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                      |           | Z(-25°C) / Z(20°C)                                   | 5    | 4    | 3      | 2    | 2                        |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                      |           | Z(-55°C) / Z(20°C)                                   | 12   | 10   | 8      | 5    | 4                        | 3   |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | When the capacitors are restored to 20°C after 5000 hrs. (3000 hrs. for Ø4~Ø6.3×5.8) application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 5000 小時 (Ø4~Ø6.3×5.8 為 3000 小時) 後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。                                                                                                              |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                                                                                                                           |           | Within ±30% of initial value 初始值的±30%以內              |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                                                                                                                             |           | 300% or less of initial specified value 不大於規範值的 300% |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                                                                                                                                                  |           | initial specified value or less 不大於規範值               |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| Shelf Life 高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                      |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                      |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後, 電容器的特性符合下表要求。                                                                                                                                                                                                                                                  |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                                                                                                                           |           | Within ±10% of initial value 初始值的±10%以內              |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                                                                                                                             |           | initial specified value or less 不大於規範值               |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                                                                                                                                                  |           | initial specified value or less 不大於規範值               |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                                                                                                                                               |           |                                                      |      |      |        |      |                          |     |    |    |    |    |        |              |        |      |      |      |      |      |      |         |           |      |      |      |      |      |

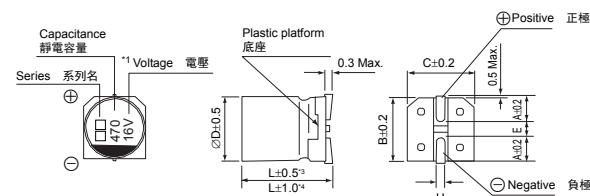
DRAWING 外形圖 (Unit: mm)

(Ø4~Ø6.3×7.7)



- \*1. Voltage mark for 6.3V is [6V]
  - \*2. Applicable to Ø6.3×7.7
  - \*3. Applicable to Ø8×10.5~Ø10
  - \*4. Applicable to Ø12.5~Ø16
- 6.3V 的產品標識為 [6V]  
適用於 Ø6.3×7.7  
適用於 Ø8×10.5~Ø10  
適用於 Ø12.5~Ø16

(Ø8×10.5~Ø16)



Dimension table in next page.  
尺寸表見下一頁。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注:** 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

KL Series

DIMENSIONS (Unit: mm) 尺寸表

| ∅D x L  | 4 x 5.8 | 5 x 5.8 | 6.3 x 5.8/7.7 | 8 x 10.5 | 10 x 10.5/13.5 | 12.5 x 13.5/16 | 16 x 16.5 |
|---------|---------|---------|---------------|----------|----------------|----------------|-----------|
| A       | 2.0     | 2.2     | 2.6           | 3.0      | 3.3            | 4.9            | 5.8       |
| B       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4           | 13.0           | 17.0      |
| C       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4           | 13.0           | 17.0      |
| E ± 0.2 | 1.0     | 1.4     | 1.9           | 3.1      | 4.7            | 4.7            | 6.4       |
| L       | 5.8     | 5.8     | 5.8/7.7       | 10.5     | 10.5/13.5      | 13.5/16.0      | 16.5      |
| H       | 0.5~0.8 | 0.5~0.8 | 0.5~0.8       | 0.8~1.2  | 0.8~1.2        | 0.8~1.2        | 1.1~1.4   |

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼<br>μF |     | 6.3                        |              | 10                         |              | 16          |     | 25                         |                        |
|------------------------|-----|----------------------------|--------------|----------------------------|--------------|-------------|-----|----------------------------|------------------------|
|                        |     | 0J                         |              | 1A                         |              | 1C          |     | 1E                         |                        |
| 10                     | 100 |                            |              |                            |              | 4 x 5.8     | 18  | 5 x 5.8                    | 27                     |
| 22                     | 220 | 4 x 5.8                    | 22           | 5 x 5.8                    | 30           | 5 x 5.8     | 30  | 6.3 x 5.8                  | 44                     |
| 33                     | 330 | 5 x 5.8                    | 35           | 5 x 5.8                    | 36           | 6.3 x 5.8   | 48  | 6.3 x 5.8                  | 50                     |
| 47                     | 470 | 5 x 5.8                    | 38           | 6.3 x 5.8                  | 50           | 6.3 x 5.8   | 50  | 6.3 x 7.7                  | 63                     |
| 100                    | 101 | 6.3 x 5.8                  | 69           | 6.3 x 7.7                  | 81           | 6.3 x 7.7   | 81  | 8 x 10.5                   | 116                    |
| 150                    | 151 | 6.3 x 7.7                  | 85           | 8 x 10.5                   | 125          | 8 x 10.5    | 125 | 10 x 10.5                  | 320                    |
| 220                    | 221 | 6.3 x 7.7                  | 120          | 8 x 10.5                   | 141          | 10 x 10.5   | 216 | 10 x 10.5                  | 320                    |
| 330                    | 331 | 8 x 10.5                   | 290          | 10 x 10.5                  | 290          | 10 x 10.5   | 290 | 10 x 10.5                  | 320                    |
| 470                    | 471 | 10 x 10.5                  | 320          | 10 x 10.5                  | 320          | 10 x 10.5   | 320 | 12.5 x 13.5<br>(10 x 13.5) | 400<br>(350)           |
| 680                    | 681 | 10 x 10.5                  | 320          | 10 x 10.5                  | 320          | 10 x 13.5   | 420 | 12.5 x 13.5                | 415                    |
| 1000                   | 102 | 10 x 10.5                  | 410          | 10 x 13.5                  | 390          | 12.5 x 13.5 | 550 | 12.5 x 13.5                | 460                    |
| 1500                   | 152 | 10 x 13.5                  | 450          | 12.5 x 13.5                | 480          | 12.5 x 13.5 | 650 | 12.5 x 16                  | 700                    |
| 2200                   | 222 | 12.5 x 13.5                | 680          | 12.5 x 16<br>(12.5 x 13.5) | 750<br>(700) | 16 x 16.5   | 800 |                            |                        |
| 3300                   | 332 | 12.5 x 16<br>(12.5 x 13.5) | 850<br>(800) | 16 x 16.5                  | 850          |             |     | Case size<br>尺寸            | Ripple current<br>紋波電流 |

| WV<br>Code<br>代碼<br>μF |     | 35                         |              | 50                         |              | 63                       |              | 100                                       |                        |
|------------------------|-----|----------------------------|--------------|----------------------------|--------------|--------------------------|--------------|-------------------------------------------|------------------------|
|                        |     | 1V                         |              | 1H                         |              | 1J                       |              | 2A                                        |                        |
| 0.1                    | 0R1 |                            |              | 4 x 5.8                    | 1.0          |                          |              |                                           |                        |
| 0.22                   | R22 |                            |              | 4 x 5.8                    | 2.6          |                          |              |                                           |                        |
| 0.33                   | R33 |                            |              | 4 x 5.8                    | 3.2          |                          |              |                                           |                        |
| 0.47                   | R47 |                            |              | 4 x 5.8                    | 5            |                          |              |                                           |                        |
| 1                      | 010 |                            |              | 4 x 5.8                    | 8            |                          |              |                                           |                        |
| 2.2                    | 2R2 |                            |              | 4 x 5.8                    | 12           |                          |              |                                           |                        |
| 3.3                    | 3R3 |                            |              | 4 x 5.8                    | 17           |                          |              | 6.3 x 7.7                                 | 30                     |
| 4.7                    | 4R7 | 4 x 5.8                    | 16           | 5 x 5.8                    | 22           |                          |              | 8 x 10.5                                  | 50                     |
| 10                     | 100 | 5 x 5.8                    | 27           | 6.3 x 5.8                  | 32           | 6.3 x 7.7                | 45           | 8 x 10.5                                  | 55                     |
| 22                     | 220 | 6.3 x 5.8                  | 44           | 6.3 x 7.7                  | 58           | 8 x 10.5                 | 65           | 10 x 10.5                                 | 70                     |
| 33                     | 330 | 6.3 x 7.7                  | 57           | 8 x 10.5                   | 140          | 10 x 10.5                | 80           | 10 x 10.5                                 | 80                     |
| 47                     | 470 | 8 x 10.5                   | 92           | 10 x 10.5                  | 310          | 10 x 10.5                | 90           | 12.5 x 13.5<br>(10 x 13.5)                | 250<br>(150)           |
| 100                    | 101 | 10 x 10.5                  | 151          | 10 x 10.5                  | 310          | 10 x 13.5                | 150          | 12.5 x 13.5                               | 300                    |
| 150                    | 151 | 10 x 10.5                  | 290          | 10 x 10.5                  | 310          |                          |              | 16 x 16.5<br>(12.5 x 16)<br>(12.5 x 13.5) | 600<br>(420)<br>(380)  |
| 220                    | 221 | 10 x 10.5                  | 375          | 12.5 x 13.5<br>(10 x 13.5) | 340<br>(320) | 12.5 x 13.5              | 470          |                                           |                        |
| 330                    | 331 | 12.5 x 13.5<br>(10 x 13.5) | 380<br>(375) | 12.5 x 16<br>(12.5 x 13.5) | 600<br>(500) | 16 x 16.5<br>(12.5 x 16) | 650<br>(550) |                                           |                        |
| 470                    | 471 | 12.5 x 13.5                | 520          | 16 x 16.5                  | 700          | 16 x 16.5                | 750          |                                           |                        |
| 680                    | 681 | 12.5 x 13.5                | 550          |                            |              |                          |              |                                           |                        |
| 1000                   | 102 | 16 x 16.5<br>(12.5 x 16)   | 750<br>(600) |                            |              |                          |              | Case size<br>尺寸                           | Ripple current<br>紋波電流 |

KL Series

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |             |              | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|--------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | Ø4 ~ Ø10    |              | 0.70 | 1.00  | 1.17  | 1.36 | 1.50   |
|                   | Ø12.5 ~ Ø16 | ~ 68µF       | 0.75 | 1.00  | 1.35  | 1.57 | 2.00   |
|                   |             | 100 ~ 470µF  | 0.80 | 1.00  | 1.23  | 1.34 | 1.50   |
|                   |             | 680 ~ 3300µF | 0.85 | 1.00  | 1.10  | 1.13 | 1.15   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

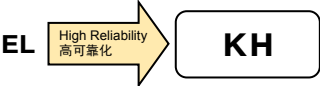
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

KH Series

CHIP TYPE, HIGH RELIABILITY

貼片式，高可靠品

- High temperature range up to +125°C  
適用於+125°C 的高溫範圍
- Suitable for automotive equipment  
汽車電子裝備
- Endurance 1000~5000 hours  
耐久性 1000~5000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵

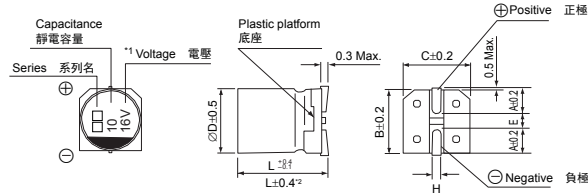


SPECIFICATIONS 特性表

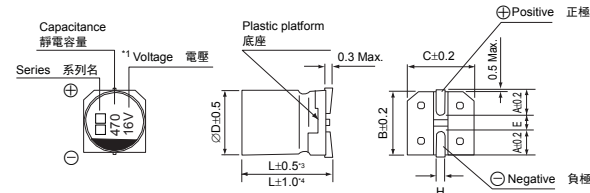
| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                    |                    |                                                      |      |      |        |         |         |         |         |
|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------|------|------|--------|---------|---------|---------|---------|
| Category Temperature Range 工作溫度範圍                                                                             | -40 ~ +125°C                                                                                                                                                                                                                                                                                                                                                                            |                    |                                                      |      |      |        |         |         |         |         |
| Voltage Range 額定工作電壓範圍                                                                                        | 10 ~ 450V                                                                                                                                                                                                                                                                                                                                                                               |                    |                                                      |      |      |        |         |         |         |         |
| Capacitance Range 靜電容量範圍                                                                                      | 3.3 ~ 4700μF                                                                                                                                                                                                                                                                                                                                                                            |                    |                                                      |      |      |        |         |         |         |         |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                     |                    |                                                      |      |      |        |         |         |         |         |
| Leakage Current 漏電流                                                                                           | Leakage current ≤0.03CV or 4μA (10V~100V), whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>Leakage current ≤0.04CV + 100μA (160V~450V), whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.03CV 或 4μA (10V~100V), 取較大值 (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>漏電流 ≤0.04CV + 100μA (160V~450V), 取較大值 (在 20°C 環境中施加額定工作電壓 2 分鐘後) |                    |                                                      |      |      |        |         |         |         |         |
|                                                                                                               | C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                           |                    |                                                      |      |      |        |         |         |         |         |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                                                                                                                                                                 |                    |                                                      |      |      |        |         |         |         |         |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                                                                                                | 10                 | 16                                                   | 25   | 35   | 50     | 63      | 100     | 160~250 | 400,450 |
|                                                                                                               | tan δ (max.)                                                                                                                                                                                                                                                                                                                                                                            | 0.24               | 0.20                                                 | 0.16 | 0.14 | 0.14   | 0.18    | 0.18    | —       | —       |
|                                                                                                               | 最大損耗角正切                                                                                                                                                                                                                                                                                                                                                                                 | 0.22               | 0.18                                                 | 0.16 | 0.14 | 0.12   | 0.14    | 0.10    | 0.20    | 0.20    |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                                                                                                                                                       |                    |                                                      |      |      |        |         |         |         |         |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                                                                                                |                    | 10                                                   | 16   | 25   | 35~100 | 160~250 | 400,450 |         |         |
|                                                                                                               | Impedance Ratio 阻抗比<br>ZT/Z20 (max.)                                                                                                                                                                                                                                                                                                                                                    | Ø4~Ø10             | Z(-25°C) / Z(20°C)                                   | 4    | 3    | 2      | 2       | —       | —       |         |
| Z(-40°C) / Z(20°C)                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                         |                    | 10                                                   | 8    | 6    | 4      | —       | —       |         |         |
|                                                                                                               | Ø12.5~Ø18                                                                                                                                                                                                                                                                                                                                                                               | Z(-25°C) / Z(20°C) | 4                                                    | 3    | 2    | 2      | 3       | 6       |         |         |
|                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                         | Z(-40°C) / Z(20°C) | 8                                                    | 6    | 4    | 3      | 6       | 10      |         |         |
| Endurance 耐久性                                                                                                 | The characteristics listed below shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for the specified time at 125°C.<br>在 125°C 環境中連續施加規定時間的額定工作電壓後，待溫度恢復至 20°C 時進行測量，電容器的特性符合下表要求。                                                                                                                                                         |                    |                                                      |      |      |        |         |         |         |         |
|                                                                                                               | Size (mm) 尺寸                                                                                                                                                                                                                                                                                                                                                                            |                    | Life time (hours) 壽命 (小時)                            |      |      |        |         |         |         |         |
|                                                                                                               | Ø6.3                                                                                                                                                                                                                                                                                                                                                                                    |                    | 1000                                                 |      |      |        |         |         |         |         |
|                                                                                                               | ØD8, Ø10 (10~100V)                                                                                                                                                                                                                                                                                                                                                                      |                    | 2000                                                 |      |      |        |         |         |         |         |
|                                                                                                               | ØD12.5~18 (160~450V)                                                                                                                                                                                                                                                                                                                                                                    |                    | 2000                                                 |      |      |        |         |         |         |         |
|                                                                                                               | ØD12.5~18 (10~100V)                                                                                                                                                                                                                                                                                                                                                                     |                    | 5000                                                 |      |      |        |         |         |         |         |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                                                                                                                              |                    | Within ±30% of initial value 初始值的±30%以內              |      |      |        |         |         |         |         |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                                                                                                                                |                    | 300% or less of initial specified value 不大於規範值的 300% |      |      |        |         |         |         |         |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                                                                                                                                                     |                    | initial specified value or less 不大於規範值               |      |      |        |         |         |         |         |
| Shelf Life 高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 125°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 125°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                           |                    |                                                      |      |      |        |         |         |         |         |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。                                                                                                                                                                                                                                                      |                    |                                                      |      |      |        |         |         |         |         |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                                                                                                                              |                    | Within ±10% of initial value 初始值的±10%以內              |      |      |        |         |         |         |         |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                                                                                                                                |                    | initial specified value or less 不大於規範值               |      |      |        |         |         |         |         |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                                                                                                                                                                     |                    | initial specified value or less 不大於規範值               |      |      |        |         |         |         |         |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                                                                                                                                                  |                    |                                                      |      |      |        |         |         |         |         |

DRAWING 外形圖 (Unit: mm)

(Ø4~Ø6.3×7.7)



(Ø8×10.5~Ø18)



\*1. Voltage mark for 6.3V is [6V]  
\*2. Applicable to Ø6.3×7.7

\*3. Applicable to Ø8×10.5~Ø10  
\*4. Applicable to Ø12.5~Ø18

Dimension table in next page.  
尺寸表見下一頁。

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**注:** 以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

KH Series

□ DIMENSIONS (Unit: mm) 尺寸表

| ∅D x L  | 4 x 5.8 | 5 x 5.8 | 6.3 x 5.8/7.7 | 8 x 10.5 | 10 x 10.5/13.5 | 12.5 x 13.5/16 | 16 x 16.5 | 18 x 16.5 |
|---------|---------|---------|---------------|----------|----------------|----------------|-----------|-----------|
| A       | 2.0     | 2.2     | 2.6           | 3.0      | 3.3            | 4.9            | 5.8       | 6.2       |
| B       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4           | 13.0           | 17.0      | 19.0      |
| C       | 4.3     | 5.3     | 6.6           | 8.4      | 10.4           | 13.0           | 17.0      | 19.0      |
| E ± 0.2 | 1.0     | 1.4     | 1.9           | 3.1      | 4.7            | 4.7            | 6.4       | 6.4       |
| L       | 5.8     | 5.8     | 5.8/7.7       | 10.5     | 10.5/13.5      | 13.5/16.0      | 16.5      | 16.5      |
| H       | 0.5~0.8 | 0.5~0.8 | 0.5~0.8       | 0.8~1.2  | 0.8~1.2        | 0.8~1.2        | 1.1~1.4   | 1.1~1.4   |

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & ESR 規格尺寸及最大允許紋波電流及 ESR 值

| WV<br>Parameter<br>參數<br>μF |     | 10 (1A)                         |                               |                                |                                                           | 16 (1C)                         |                               |                                |                                                           | 25 (1E)                         |                               |                                |                                                           |
|-----------------------------|-----|---------------------------------|-------------------------------|--------------------------------|-----------------------------------------------------------|---------------------------------|-------------------------------|--------------------------------|-----------------------------------------------------------|---------------------------------|-------------------------------|--------------------------------|-----------------------------------------------------------|
|                             |     | Case size<br>∅DxL<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C<br>E.S.R.值 | E.S.R. (Ω)<br>-40°C<br>E.S.R.值 | Ripple current<br>(mA rms)<br>at 125°C,<br>100KHz<br>紋波電流 | Case size<br>∅DxL<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C<br>E.S.R.值 | E.S.R. (Ω)<br>-40°C<br>E.S.R.值 | Ripple current<br>(mA rms)<br>at 125°C,<br>100KHz<br>紋波電流 | Case size<br>∅DxL<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C<br>E.S.R.值 | E.S.R. (Ω)<br>-40°C<br>E.S.R.值 | Ripple current<br>(mA rms)<br>at 125°C,<br>100KHz<br>紋波電流 |
|                             |     |                                 |                               |                                |                                                           |                                 |                               |                                |                                                           |                                 |                               |                                |                                                           |
| 33                          | 330 |                                 |                               |                                |                                                           |                                 |                               |                                |                                                           | 6.3 x 5.8                       | 3.3                           | 66                             | 45                                                        |
| 47                          | 470 |                                 |                               |                                |                                                           | 6.3 x 5.8                       | 3.3                           | 66                             | 43                                                        | 6.3 x 7.7                       | 2.3                           | 46                             | 68                                                        |
| 100                         | 101 | 6.3 x 7.7                       | 2.3                           | 46                             | 72                                                        | 8 x 10.5                        | 1.0                           | 20                             | 115                                                       | 8 x 10.5                        | 1.0                           | 20                             | 126                                                       |
| 220                         | 221 | 8 x 10.5                        | 1.0                           | 20                             | 136                                                       | 10 x 10.5                       | 0.7                           | 13.4                           | 175                                                       | 10 x 10.5                       | 0.7                           | 13.4                           | 211                                                       |
| 330                         | 331 | 10 x 10.5                       | 0.7                           | 13.4                           | 188                                                       | 10 x 13.5                       | 0.5                           | 9.5                            | 280                                                       | 12.5 x 13.5<br>(10 x 13.5)      | 0.14<br>(0.5)                 | 2.1<br>(9.5)                   | 750<br>(270)                                              |
| 470                         | 471 | 10 x 13.5                       | 0.5                           | 9.5                            | 300                                                       | 12.5 x 13.5                     | 0.14                          | 2.1                            | 750                                                       | 12.5 x 13.5                     | 0.14                          | 2.1                            | 750                                                       |
| 680                         | 681 |                                 |                               |                                |                                                           | 16 x 16.5<br>(12.5 x 13.5)      | 0.10<br>(0.14)                | 1.5<br>(2.1)                   | 1000<br>(750)                                             | 16 x 16.5                       | 0.10                          | 1.5                            | 1000                                                      |
| 1000                        | 102 | 12.5 x 16<br>(12.5 x 13.5)      | 0.11<br>(0.14)                | 1.5<br>(2.1)                   | 900<br>(750)                                              | 16 x 16.5                       | 0.10                          | 1.5                            | 1000                                                      | 16 x 16.5                       | 0.10                          | 1.5                            | 1000                                                      |
| 2200                        | 222 | 16 x 16.5                       | 0.10                          | 1.5                            | 1000                                                      | 18 x 16.5                       | 0.09                          | 1.5                            | 1100                                                      |                                 |                               |                                |                                                           |
| 3300                        | 332 | 18 x 16.5                       | 0.09                          | 1.5                            | 1100                                                      |                                 |                               |                                |                                                           |                                 |                               |                                |                                                           |
| 4700                        | 472 | 18 x 16.5                       | 0.09                          | 1.5                            | 1100                                                      |                                 |                               |                                |                                                           |                                 |                               |                                |                                                           |

| WV<br>Parameter<br>參數<br>μF |     | 35 (1V)                         |                               |                                |                                                           | 50 (1H)                                   |                               |                                |                                                           |
|-----------------------------|-----|---------------------------------|-------------------------------|--------------------------------|-----------------------------------------------------------|-------------------------------------------|-------------------------------|--------------------------------|-----------------------------------------------------------|
|                             |     | Case size<br>∅DxL<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C<br>E.S.R.值 | E.S.R. (Ω)<br>-40°C<br>E.S.R.值 | Ripple current<br>(mA rms)<br>at 125°C,<br>100KHz<br>紋波電流 | Case size<br>∅DxL<br>(mm)<br>尺寸           | E.S.R. (Ω)<br>20°C<br>E.S.R.值 | E.S.R. (Ω)<br>-40°C<br>E.S.R.值 | Ripple current<br>(mA rms)<br>at 125°C,<br>100KHz<br>紋波電流 |
|                             |     |                                 |                               |                                |                                                           |                                           |                               |                                |                                                           |
| 10                          | 100 | 6.3 x 5.8                       | 3.3                           | 66                             | 38                                                        | 6.3 x 7.7<br>(6.3 x 5.8)                  | 2.3<br>(3.3)                  | 46<br>(66)                     | 50<br>(38)                                                |
| 22                          | 220 | 6.3 x 5.8                       | 3.3                           | 66                             | 39                                                        | 6.3 x 7.7                                 | 2.3                           | 46                             | 50                                                        |
| 33                          | 330 | 6.3 x 7.7                       | 2.3                           | 46                             | 62                                                        | 8 x 10.5                                  | 1.0                           | 20                             | 83                                                        |
| 47                          | 470 | 8 x 10.5                        | 1.0                           | 20                             | 92                                                        | 10 x 10.5                                 | 0.7                           | 13.4                           | 111                                                       |
| 100                         | 101 | 10 x 10.5                       | 0.7                           | 13.4                           | 151                                                       | 12.5 x 13.5<br>(10 x 10.5)<br>(10 x 13.5) | 0.23<br>(0.7)<br>(0.5)        | 3.5<br>(13.4)<br>(12)          | 550<br>(151)<br>(260)                                     |
| 220                         | 221 | 12.5 x 13.5<br>(10 x 13.5)      | 0.14<br>(0.5)                 | 2.1<br>(9.5)                   | 750<br>(260)                                              | 16 x 16.5<br>(12.5 x 13.5)                | 0.15<br>(0.23)                | 2.3<br>(3.5)                   | 850<br>(550)                                              |
| 330                         | 331 | 12.5 x 13.5                     | 0.14                          | 2.1                            | 750                                                       | 16 x 16.5<br>(12.5 x 16)                  | 0.15<br>(0.18)                | 2.3<br>(2.7)                   | 850<br>(700)                                              |
| 470                         | 471 | 16 x 16.5<br>(12.5 x 16)        | 0.10<br>(0.11)                | 1.5<br>(1.5)                   | 1000<br>(900)                                             | 16 x 16.5                                 | 0.15                          | 2.3                            | 850                                                       |
| 1000                        | 102 | 18 x 16.5                       | 0.10                          | 1.5                            | 1000                                                      |                                           |                               |                                |                                                           |

| WV<br>Parameter<br>參數<br>μF |     | 63 (1J)                         |                               |                                |                                                           | 100 (2A)                        |                               |                                |                                                           |
|-----------------------------|-----|---------------------------------|-------------------------------|--------------------------------|-----------------------------------------------------------|---------------------------------|-------------------------------|--------------------------------|-----------------------------------------------------------|
|                             |     | Case size<br>∅DxL<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C<br>E.S.R.值 | E.S.R. (Ω)<br>-40°C<br>E.S.R.值 | Ripple current<br>(mA rms)<br>at 125°C,<br>100KHz<br>紋波電流 | Case size<br>∅DxL<br>(mm)<br>尺寸 | E.S.R. (Ω)<br>20°C<br>E.S.R.值 | E.S.R. (Ω)<br>-40°C<br>E.S.R.值 | Ripple current<br>(mA rms)<br>at 125°C,<br>100KHz<br>紋波電流 |
|                             |     |                                 |                               |                                |                                                           |                                 |                               |                                |                                                           |
| 10                          | 100 | 6.3 x 7.7                       | 2.3                           | 115                            | 42                                                        | 8 x 10.5                        | 1.00                          | 50                             | 53                                                        |
| 22                          | 220 | 8 x 10.5                        | 1.0                           | 50                             | 56                                                        | 10 x 10.5                       | 0.70                          | 35                             | 63                                                        |
| 33                          | 330 | 10 x 10.5                       | 0.7                           | 35                             | 77                                                        | 10 x 13.5                       | 0.45                          | 22.5                           | 130                                                       |
| 47                          | 470 | 10 x 13.5<br>(10 x 10.5)        | 0.45<br>(0.7)                 | 22.5<br>(35)                   | 150<br>(125)                                              | 12.5 x 13.5                     | 0.33                          | 16.5                           | 450                                                       |
| 68                          | 680 |                                 |                               |                                |                                                           | 12.5 x 16                       | 0.26                          | 13                             | 550                                                       |
| 100                         | 101 | 12.5 x 13.5                     | 0.25                          | 12.5                           | 500                                                       | 16 x 16.5                       | 0.24                          | 12                             | 650                                                       |
| 220                         | 221 | 12.5 x 16                       | 0.20                          | 10                             | 600                                                       |                                 |                               |                                |                                                           |
| 330                         | 331 | 16 x 16.5                       | 0.18                          | 9                              | 820                                                       |                                 |                               |                                |                                                           |

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.

注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

KH Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>μF<br>代碼 | 160         |     | 200         |     | 250       |     | 400         |     | 450             |                        |
|------------------------|-------------|-----|-------------|-----|-----------|-----|-------------|-----|-----------------|------------------------|
|                        | 2C          |     | 2D          |     | 2E        |     | 2G          |     | 2W              |                        |
| 3.3<br>3R3             |             |     |             |     |           |     |             |     | 12.5 × 16       | 65                     |
| 4.7<br>4R7             |             |     |             |     |           |     | 12.5 × 13.5 | 70  | 16 × 16.5       | 85                     |
| 6.8<br>6R8             |             |     |             |     |           |     | 16 × 16.5   | 100 |                 |                        |
| 10<br>100              | 12.5 × 13.5 | 100 | 12.5 × 13.5 | 100 | 12.5 × 16 | 110 |             |     | Case size<br>尺寸 | Ripple current<br>紋波電流 |
| 22<br>220              | 16 × 16.5   | 180 | 16 × 16.5   | 180 |           |     |             |     |                 |                        |

•Case size ØD×L(mm), ripple current (mA rms) at 125°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 125°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |         |              | 50Hz | 120Hz | 1KHz | 10KHz~ | 100KHz~ |
|-------------------|---------|--------------|------|-------|------|--------|---------|
| Coefficient<br>系數 | 10~100V | 10 ~ 100μF   | 0.35 | 0.40  | 0.75 | 0.90   | 1.00    |
|                   |         | 220 ~ 470μF  | 0.35 | 0.50  | 0.85 | 0.94   | 1.00    |
|                   |         | 680 ~ 4700μF | 0.40 | 0.60  | 0.85 | 0.95   | 1.00    |

| Frequency 頻率   |          | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz | 100KHz~ |
|----------------|----------|------|-------|-------|------|-------|---------|
| Coefficient 系數 | 160~450V | 0.75 | 1.00  | 1.25  | 1.50 | 1.75  | 1.80    |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

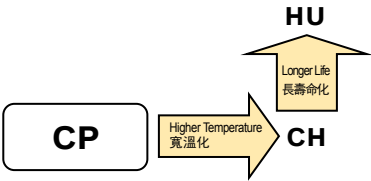
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

CP Series

CHIP TYPE, HIGH VOLTAGE, 3000 HOURS LOAD LIFE

貼片式, 3000 小時, 高壓長壽命品

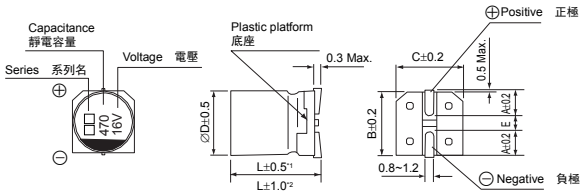
- Operating with wide temperature range -40~+85°C  
適用於 -40~+85°C 的寬溫範圍
- Endurance 3000 hours  
耐久性 3000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵



SPECIFICATIONS 特性表

| Items 項目                                                                                                  | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|----------------------------|-----------------------------------------|----------|--------------------------|------------------------------------------------------|------|---------------------|----------------------------------------|---|--|--|---|--|--|----|
| Category Temperature Range 工作溫度範圍                                                                         | -55 ~ +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Voltage Range 額定工作電壓範圍                                                                                    | 160 ~ 450V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Capacitance Range 靜電容量範圍                                                                                  | 3.3 ~ 100μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Capacitance Tolerance 靜電容量允許偏差                                                                            | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Leakage Current 漏電流                                                                                       | Leakage current ≤0.04CV + 100μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.04CV + 100μA, 取較大值 (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                        |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Dissipation Factor (tan δ) 損耗角正切                                                                          | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>160 ~ 250</td><td>400, 500</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.20</td><td>0.25</td></tr></table>                                                                                                                                                                                                                                                                                                                                         |          |  | Rated Voltage (V) 額定工作電壓   | 160 ~ 250                               | 400, 500 | tan δ (max.) 最大損耗角正切     | 0.20                                                 | 0.25 |                     |                                        |   |  |  |   |  |  |    |
| Rated Voltage (V) 額定工作電壓                                                                                  | 160 ~ 250                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 400, 500 |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| tan δ (max.) 最大損耗角正切                                                                                      | 0.20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.25     |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Stability at Low Temperature 低溫特性                                                                         | Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>160 ~ 250</td><td>400, 500</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>2</td></tr><tr><td>ZT/Z20 (max.)</td><td>Z(-40°C) / Z(20°C)</td><td>6</td></tr><tr><td></td><td></td><td>4</td></tr><tr><td></td><td></td><td>10</td></tr></table>                                                                                                                                                                                                      |          |  | Rated Voltage (V) 額定工作電壓   | 160 ~ 250                               | 400, 500 | Impedance Ratio 阻抗比      | Z(-25°C) / Z(20°C)                                   | 2    | ZT/Z20 (max.)       | Z(-40°C) / Z(20°C)                     | 6 |  |  | 4 |  |  | 10 |
| Rated Voltage (V) 額定工作電壓                                                                                  | 160 ~ 250                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 400, 500 |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Impedance Ratio 阻抗比                                                                                       | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2        |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| ZT/Z20 (max.)                                                                                             | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 6        |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
|                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4        |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
|                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 10       |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Endurance 耐久性                                                                                             | When the capacitors are restored to 20°C after 3000 hours application of the rated voltage at 85°C, they meet the characteristics listed below.<br>在 85°C 環境中施加額定工作電壓 3000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±20% of initial value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">initial specified value or less 不大於規範值</td></tr></table> |          |  | Capacitance Change 靜電容量變化率 | Within ±20% of initial value 初始值的±20%以內 |          | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% |      | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |   |  |  |   |  |  |    |
| Capacitance Change 靜電容量變化率                                                                                | Within ±20% of initial value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Dissipation Factor 損耗角正切                                                                                  | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Leakage Current 漏電流                                                                                       | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Shelf Life 高溫貯存特性                                                                                         | When the capacitors are restored to 20°C after leaving under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 85°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="2">Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="2">initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="2">initial specified value or less 不大於規範值</td></tr></table>                                                                                             |          |  | Capacitance Change 靜電容量變化率 | Within ±10% of initial value 初始值的±10%以內 |          | Dissipation Factor 損耗角正切 | initial specified value or less 不大於規範值               |      | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |   |  |  |   |  |  |    |
| Capacitance Change 靜電容量變化率                                                                                | Within ±10% of initial value 初始值的±10%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Dissipation Factor 損耗角正切                                                                                  | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Leakage Current 漏電流                                                                                       | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |
| Marking 標識                                                                                                | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |  |                            |                                         |          |                          |                                                      |      |                     |                                        |   |  |  |   |  |  |    |

DRAWING 外形圖 (Unit: mm)



- A pressure relief vent is attached to products over ØD=12.5  
ØD=12.5 以上產品有緩壓防爆閥
- \*1. Applicable to Ø8x10.5~Ø10  
適用於 Ø10
- \*2. Applicable to Ø12.5~Ø18  
適用於 Ø12.5~Ø18

DIMENSIONS (Unit: mm) 尺寸表

| ØD x L  | 10 x 13.5 | 12.5 x 13.5 | 12.5 x 16 | 16 x 16.5 |
|---------|-----------|-------------|-----------|-----------|
| A       | 3.3       | 4.9         | 4.9       | 5.8       |
| B       | 10.4      | 13.0        | 13.0      | 17.0      |
| C       | 10.4      | 13.0        | 13.0      | 17.0      |
| E ± 0.2 | 4.7       | 4.7         | 4.7       | 6.4       |
| L       | 13.5      | 13.5        | 16.0      | 16.5      |

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注: 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

CP Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>μF<br>代碼 | 160                        |              | 200         |     | 250         |     | 350             |                        |
|------------------------|----------------------------|--------------|-------------|-----|-------------|-----|-----------------|------------------------|
|                        | 2C                         |              | 2D          |     | 2E          |     | 2V              |                        |
| 4.7<br>4R7             |                            |              |             |     | 10 × 13.5   | 65  | 10 × 13.5       | 85                     |
| 10<br>100              |                            |              | 10 × 13.5   | 75  | 10 × 13.5   | 75  | 12.5 × 13.5     | 105                    |
| 22<br>220              | 10 × 13.5                  | 50           | 12.5 × 13.5 | 105 | 12.5 × 13.5 | 105 | 16 × 16.5       | 130                    |
| 33<br>330              | 12.5 × 13.5                | 95           | 12.5 × 13.5 | 120 | 16 × 16.5   | 135 |                 |                        |
| 47<br>470              | 12.5 × 13.5<br>(16 × 16.5) | 205<br>(240) |             |     | 16 × 16.5   | 220 | Case size<br>尺寸 | Ripple current<br>紋波電流 |
| 100<br>101             | 16 × 16.5                  | 250          |             |     |             |     |                 |                        |

| WV<br>Code<br>μF<br>代碼 | 400                     |            | 450                     |                        |
|------------------------|-------------------------|------------|-------------------------|------------------------|
|                        | 2G                      |            | 2W                      |                        |
| 3.3<br>3R3             | 8 × 13.5<br>(10 × 13.5) | 35<br>(40) | 8 × 13.5<br>(10 × 13.5) | 35<br>(40)             |
| 4.7<br>4R7             | 10 × 13.5               | 45         | 10 × 13.5               | 42                     |
| 10<br>100              | 12.5 × 13.5             | 50         | 12.5 × 13.5             | 55                     |
| 22<br>220              | 16 × 16.5               | 85         | 16 × 16.5               | 85                     |
|                        |                         |            | Case size<br>尺寸         | Ripple current<br>紋波電流 |

•Case size ØD×L(mm), ripple current (mA rms) at 85°C, 120Hz    •尺寸ØD×L(mm), 紋波電流(mA rms)於 85°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency<br>頻率   | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | 0.75 | 1.00  | 1.35  | 1.57 | 2.00   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

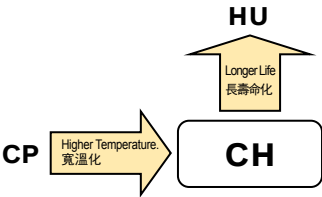
- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

CH Series

CHIP TYPE, HIGH VOLTAGE, 3000 HOURS LOAD LIFE

貼片式，3000 小時，高壓長壽命品

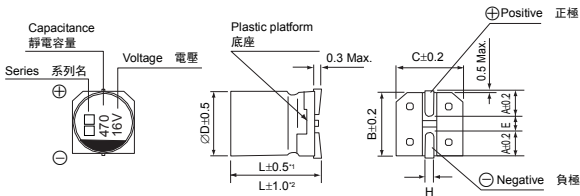
- Operating with wide temperature range -55~+105°C  
適用於 -55~+105°C 的寬溫範圍
- Endurance 3000 hours  
耐久性 3000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                                          |                                                      |          |    |
|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------|----|
| Category Temperature Range 工作溫度範圍                                                                             | -55 ~ +105°C                                                                                                                                                                                                                                  |                                                      |          |    |
| Voltage Range 額定工作電壓範圍                                                                                        | 160 ~ 450V                                                                                                                                                                                                                                    |                                                      |          |    |
| Capacitance Range 靜電容量範圍                                                                                      | 3.3 ~ 100μF                                                                                                                                                                                                                                   |                                                      |          |    |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                                           |                                                      |          |    |
| Leakage Current 漏電流                                                                                           | Leakage current ≤0.04CV + 100μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.04CV + 100μA, 取較大值 (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓         |                                                      |          |    |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                       |                                                      |          |    |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                      | 160 ~ 250                                            | 400, 500 |    |
|                                                                                                               | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                          | 0.20                                                 | 0.25     |    |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                             |                                                      |          |    |
|                                                                                                               | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                      | 160 ~ 250                                            | 400, 500 |    |
|                                                                                                               | Impedance Ratio 阻抗比<br>ZT/Z20 (max.)                                                                                                                                                                                                          | Z(-25°C) / Z(20°C)                                   | 2        | 4  |
|                                                                                                               |                                                                                                                                                                                                                                               | Z(-55°C) / Z(20°C)                                   | 6        | 10 |
| Endurance 耐久性                                                                                                 | When the capacitors are restored to 20°C after 3000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 3000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                             |                                                      |          |    |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                    | Within ±20% of initial value 初始值的±20%以內              |          |    |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                      | 200% or less of initial specified value 不大於規範值的 200% |          |    |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                           | initial specified value or less 不大於規範值               |          |    |
| Shelf Life 高溫貯存特性                                                                                             | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。 |                                                      |          |    |
|                                                                                                               |                                                                                                                                                                                                                                               |                                                      |          |    |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。                                                                                                            |                                                      |          |    |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                    | Within ±10% of initial value 初始值的±10%以內              |          |    |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                                      | initial specified value or less 不大於規範值               |          |    |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                                           | initial specified value or less 不大於規範值               |          |    |
| Marking 標識                                                                                                    | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                        |                                                      |          |    |

DRAWING 外形圖 (Unit: mm)



- A pressure relief vent is attached to products over  $\varnothing D=12.5$   
 $\varnothing D=12.5$  以上產品有緩壓防爆閥
- \*1. Applicable to  $\varnothing 8 \sim \varnothing 10$  適用於  $\varnothing 8 \sim \varnothing 10$
- \*2. Applicable to  $\varnothing 12.5 \sim \varnothing 16$  適用於  $\varnothing 12.5 \sim \varnothing 16$

DIMENSIONS 尺寸表 (Unit: mm)

| $\varnothing D \times L$ | 8 x 12.5 | 10 x 13.5 | 12.5 x 13.5 | 12.5 x 16 | 16 x 16.5 |
|--------------------------|----------|-----------|-------------|-----------|-----------|
| A                        | 3.0      | 3.3       | 4.9         | 4.9       | 5.8       |
| B                        | 8.4      | 10.4      | 13.0        | 13.0      | 17.0      |
| C                        | 8.4      | 10.4      | 13.0        | 13.0      | 17.0      |
| E ± 0.2                  | 3.1      | 4.7       | 4.7         | 4.7       | 6.4       |
| L                        | 12.5     | 13.5      | 13.5        | 16.0      | 16.5      |
| H                        | 0.8~1.2  | 0.8~1.2   | 0.8~1.2     | 0.8~1.2   | 1.1~1.4   |

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CH Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼 |     | 160                        |              | 200         |     | 250         |     | 350             |                        |
|------------------|-----|----------------------------|--------------|-------------|-----|-------------|-----|-----------------|------------------------|
| μF               |     | 2C                         |              | 2D          |     | 2E          |     | 2V              |                        |
| 4.7              | 4R7 |                            |              |             |     | 10 × 13.5   | 65  | 10 × 13.5       | 85                     |
| 10               | 100 |                            |              | 10 × 13.5   | 75  | 10 × 13.5   | 75  | 12.5 × 13.5     | 105                    |
| 22               | 220 | 10 × 13.5                  | 50           | 12.5 × 13.5 | 105 | 12.5 × 13.5 | 105 | 16 × 16.5       | 130                    |
| 33               | 330 | 12.5 × 13.5                | 95           | 12.5 × 13.5 | 120 | 16 × 16.5   | 135 |                 |                        |
| 47               | 470 | 12.5 × 13.5<br>(16 × 16.5) | 205<br>(240) |             |     | 16 × 16.5   | 220 | Case size<br>尺寸 | Ripple current<br>紋波電流 |
| 100              | 101 | 16 × 16.5                  | 250          | 16 × 16.5   | 250 |             |     |                 |                        |

| WV<br>Code<br>代碼 |     | 400                      |            | 450                        |                        |
|------------------|-----|--------------------------|------------|----------------------------|------------------------|
| μF               |     | 2G                       |            | 2W                         |                        |
| 3.3              | 3R3 | 8 × 13.5<br>(10 × 13.5)  | 35<br>(40) | 8 × 13.5<br>(10 × 13.5)    | 35<br>(40)             |
| 4.7              | 4R7 | 10 × 10.5<br>(10 × 13.5) | 40<br>(45) | 10 × 13.5<br>(12.5 × 13.5) | 42<br>(45)             |
| 8.2              | 8R2 | 10 × 13.5                | 50         |                            |                        |
| 10               | 100 | 12.5 × 13.5              | 50         | 12.5 × 13.5                | 55                     |
| 22               | 220 | 16 × 16.5                | 85         | 16 × 16.5                  | 85                     |
| 33               | 330 | 16 × 16.5                | 100        | 16 × 16.5                  | 100                    |
|                  |     |                          |            | Case size<br>尺寸            | Ripple current<br>紋波電流 |

•Case size ∅D×L(mm), ripple current (mA rms) at 105°C, 120Hz    •尺寸∅D×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

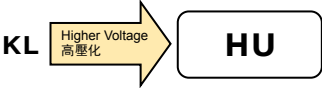
| Frequency 頻率   | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|----------------|------|-------|-------|------|--------|
| Coefficient 系數 | 0.75 | 1.00  | 1.35  | 1.57 | 2.00   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

HU Series  
CHIP TYPE, HIGH VOLTAGE, LONG LIFE  
貼片式，高壓長壽命品

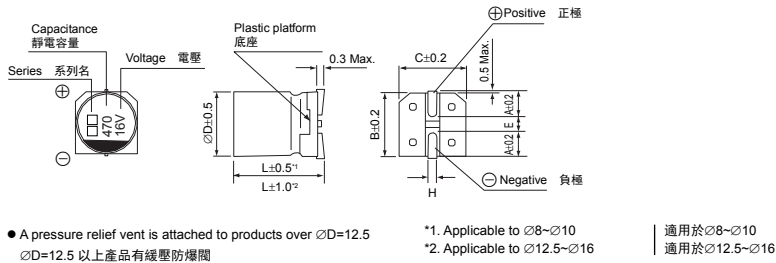
- Operating with wide temperature range -40~+105°C  
適用於 -40~+105°C 的寬溫範圍
- Endurance 5000 hours  
耐久性 5000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

| Items 項目                                                                                                  | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----|----------------------------|-----------------------------------------|----------|----------------------|--------------------------|------------------------------------------------------|---|---------------|---------------------|----------------------------------------|----|--|
| Category Temperature Range 工作溫度範圍                                                                         | -40 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Voltage Range 額定工作電壓範圍                                                                                    | 160 ~ 450V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Capacitance Range 靜電容量範圍                                                                                  | 3.3 ~ 47μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Capacitance Tolerance 靜電容量允許偏差                                                                            | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Leakage Current 漏電流                                                                                       | Leakage current ≤0.04CV + 100μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.04CV + 100μA, 取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                         |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Dissipation Factor (tan δ) 損耗角正切                                                                          | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>160~250</td><td>400, 500</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.15</td><td>0.20</td></tr></table>                                                                                                                                                                                                                                                                                                                                           |          |    | Rated Voltage (V) 額定工作電壓   | 160~250                                 | 400, 500 | tan δ (max.) 最大損耗角正切 | 0.15                     | 0.20                                                 |   |               |                     |                                        |    |  |
| Rated Voltage (V) 額定工作電壓                                                                                  | 160~250                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 400, 500 |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| tan δ (max.) 最大損耗角正切                                                                                      | 0.15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.20     |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Stability at Low Temperature 低溫特性                                                                         | Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>160~250</td><td>400, 500</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>3</td><td>6</td></tr><tr><td>ZT/Z20 (max.)</td><td>Z(-40°C) / Z(20°C)</td><td>6</td><td>10</td></tr></table>                                                                                                                                                                                                                                                              |          |    | Rated Voltage (V) 額定工作電壓   | 160~250                                 | 400, 500 | Impedance Ratio 阻抗比  | Z(-25°C) / Z(20°C)       | 3                                                    | 6 | ZT/Z20 (max.) | Z(-40°C) / Z(20°C)  | 6                                      | 10 |  |
| Rated Voltage (V) 額定工作電壓                                                                                  | 160~250                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 400, 500 |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Impedance Ratio 阻抗比                                                                                       | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3        | 6  |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| ZT/Z20 (max.)                                                                                             | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 6        | 10 |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Endurance 耐久性                                                                                             | When the capacitors are restored to 20°C after 5000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 5000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="3">Within ±20% of initial value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="3">200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="3">initial specified value or less 不大於規範值</td></tr></table> |          |    | Capacitance Change 靜電容量變化率 | Within ±20% of initial value 初始值的±20%以內 |          |                      | Dissipation Factor 損耗角正切 | 200% or less of initial specified value 不大於規範值的 200% |   |               | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |    |  |
| Capacitance Change 靜電容量變化率                                                                                | Within ±20% of initial value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Dissipation Factor 損耗角正切                                                                                  | 200% or less of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Leakage Current 漏電流                                                                                       | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Shelf Life 高溫貯存特性                                                                                         | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Resistance to Soldering Heat 耐焊接熱特性<br>(Please refer page 23 for soldering conditions)<br>(焊接條件請查閱第 23 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="3">Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="3">initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="3">initial specified value or less 不大於規範值</td></tr></table>                                                                                              |          |    | Capacitance Change 靜電容量變化率 | Within ±10% of initial value 初始值的±10%以內 |          |                      | Dissipation Factor 損耗角正切 | initial specified value or less 不大於規範值               |   |               | Leakage Current 漏電流 | initial specified value or less 不大於規範值 |    |  |
| Capacitance Change 靜電容量變化率                                                                                | Within ±10% of initial value 初始值的±10%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Dissipation Factor 損耗角正切                                                                                  | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Leakage Current 漏電流                                                                                       | initial specified value or less 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |
| Marking 標識                                                                                                | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |    |                            |                                         |          |                      |                          |                                                      |   |               |                     |                                        |    |  |

DRAWING 外形圖 (Unit: mm)



DIMENSIONS (Unit: mm) 尺寸表

| ØD x L  | 8 x 12.5 | 10 x 10.5/13.5 | 12.5 x 13.5 | 12.5 x 16 | 16 x 16.5 |
|---------|----------|----------------|-------------|-----------|-----------|
| A       | 3.0      | 3.3            | 4.9         | 4.9       | 5.8       |
| B       | 8.4      | 10.4           | 13.0        | 13.0      | 17.0      |
| C       | 8.4      | 10.4           | 13.0        | 13.0      | 17.0      |
| E ± 0.2 | 3.1      | 4.7            | 4.7         | 4.7       | 6.4       |
| L       | 12.5     | 10.5/13.5      | 13.5        | 16.0      | 16.5      |
| H       | 0.8~1.2  | 0.8~1.2        | 0.8~1.2     | 0.8~1.2   | 1.1~1.4   |

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HU Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>μF<br>代碼 | 160                        |              | 200                        |             | 250                        |              | 400                                    |                    | 450             |                           |
|------------------------|----------------------------|--------------|----------------------------|-------------|----------------------------|--------------|----------------------------------------|--------------------|-----------------|---------------------------|
|                        | 2C                         |              | 2D                         |             | 2E                         |              | 2G                                     |                    | 2W              |                           |
| 3.3<br>3R3             |                            |              |                            |             |                            |              |                                        |                    | 10 × 13.5       | 40                        |
| 4.7<br>4R7             |                            |              |                            |             | 10 × 10.5                  | 65           | 8 × 12.5<br>(10 × 10.5)<br>(10 × 13.5) | 45<br>(48)<br>(50) | 10 × 13.5       | 50                        |
| 6.8<br>6R8             |                            |              |                            |             | 10 × 10.5                  | 70           | 10 × 10.5<br>(10 × 13.5)               | 45<br>(60)         | 10 × 13.5       | 50                        |
| 10<br>100              |                            |              | 10 × 10.5<br>(10 × 13.5)   | 70<br>(80)  | 10 × 13.5                  | 105          | 10 × 13.5<br>(12.5 × 13.5)             | 65<br>(85)         | 12.5 × 13.5     | 85                        |
| 22<br>220              | 12.5 × 13.5                | 85           | 10 × 13.5<br>(12.5 × 13.5) | 95<br>(110) | 12.5 × 13.5<br>(12.5 × 16) | 120<br>(180) | 16 × 16.5                              | 95                 |                 |                           |
| 33<br>330              | 12.5 × 13.5                | 95           | 12.5 × 16                  | 220         |                            |              |                                        |                    | Case size<br>尺寸 | Ripple<br>current<br>紋波電流 |
| 47<br>470              | 12.5 × 13.5<br>(12.5 × 16) | 110<br>(260) |                            |             |                            |              |                                        |                    |                 |                           |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|----------------|------|-------|-------|------|--------|
| Coefficient 系數 | 0.80 | 1.00  | 1.25  | 1.40 | 1.60   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

Aluminum Electrolytic Capacitors (Radial Lead Type)  
鋁電解電容器 (引線式)



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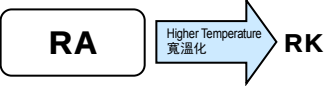
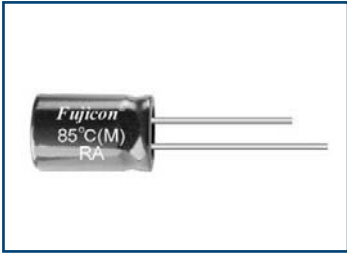
CAT.2024/V1.3

RA Series

STANDARD

標準品

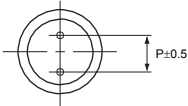
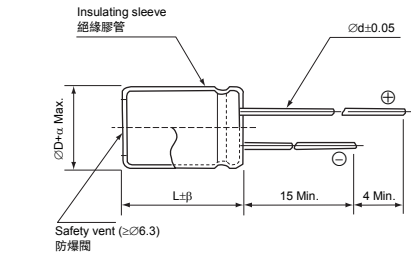
- Standard series for general purpose  
標準品通用型
- High performance and high reliability  
高性能與高可靠
- Endurance 2000 hours at 85°C  
在 85°C 環境中耐久性 2000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                    |                                                                                                                                        |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +85°C                                                                                                                                                                                                                                                                                             | -25 ~ +85°C                                                                                                                            |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 100V                                                                                                                                                                                                                                                                                              | 160 ~ 450V                                                                                                                             |
| Capacitance Range 靜電容量範圍          | 0.1 ~ 22000µF                                                                                                                                                                                                                                                                                           | 0.47 ~ 470µF                                                                                                                           |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                     |                                                                                                                                        |
| Leakage Current 漏電流               | Leakage current ≤0.01CV or 3µA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3µA 取較大值(在 20°C 環境中施加額定工作電壓 2 分鐘後)                                                                                                                                         | Leakage current ≤0.02CV + 15µA (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.02CV + 15µA (在 20°C 環境中施加額定工作電壓 5 分鐘後) |
| Dissipation Factor (tan δ) 損耗角正切  | C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓<br>When nominal capacitance is over 1000µF, tan δ shall be added 0.02 to the listed value with increase of every 1000µF.<br>當標稱靜電容量大於 1000µF, 其標稱靜電容量每增加 1000µF, 損耗角正切增加 0.02.<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C |                                                                                                                                        |
| Stability at Low Temperature 低溫特性 | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                | 6.3 10 16 25 35 50 63 100 160~250 350~450                                                                                              |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                                                                                    | 0.24 0.20 0.16 0.14 0.12 0.10 0.09 0.08 0.15 0.20                                                                                      |
|                                   | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                                                                       |                                                                                                                                        |
| Endurance 耐久性                     | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                | 6.3 10 16 25 35~100 160 200~350 400,450                                                                                                |
|                                   | Impedance Ratio Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                      | 4 3 2 2 2 4 8 16                                                                                                                       |
|                                   | Impedance Ratio Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                      | 10 8 6 4 3 8 12 —                                                                                                                      |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below.<br>在 85°C 環境中施加額定工作電壓 2000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。                                                                                       |                                                                                                                                        |
| Marking 標識                        | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                                              | Within ±20% of initial measured value 初始值的±20%以內                                                                                       |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                                                | ≤200% of initial specified value 不大於規範值的 200%                                                                                          |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                                                                                     | ≤initial specified value 不大於規範值                                                                                                        |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 5   | 6.3 | 8 (L≤11.5) | 8 (L≥16) | 10  | 13   | 16   | 18 | 22 | 25 |
|----|-----|-----|------------|----------|-----|------|------|----|----|----|
| P  | 2.0 | 2.5 | 3.5        | 5.0      | 7.5 | 10.0 | 12.5 |    |    |    |
| Ød | 0.5 | 0.6 | 0.8        |          |     |      |      |    |    |    |
| β  | 1.5 | 2.0 |            |          |     |      |      |    |    |    |
| α  | 0.5 | 1.0 |            |          |     |      |      |    |    |    |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 50Hz           | 120Hz | 300Hz | 1KHz | 10KHz~ |
|----------------|----------------|-------|-------|------|--------|
| Coefficient 系數 | 0.1 ~ 47µF     | 0.75  | 1.0   | 1.35 | 2.0    |
|                | 68 ~ 680µF     | 0.80  | 1.0   | 1.25 | 1.5    |
|                | 1000 ~ 22000µF | 0.85  | 1.0   | 1.10 | 1.15   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱, 溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能, 請在使用過程中適當降低紋波電流。

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RA Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼<br>μF |     | 6.3                  |                | 10                       |              | 16                       |              | 25                   |                | 35                   |                | 50                     |                | 63                   |                |
|------------------------|-----|----------------------|----------------|--------------------------|--------------|--------------------------|--------------|----------------------|----------------|----------------------|----------------|------------------------|----------------|----------------------|----------------|
|                        |     | 0J                   |                | 1A                       |              | 1C                       |              | 1E                   |                | 1V                   |                | 1H                     |                | 1J                   |                |
| 0.1                    | 0R1 |                      |                |                          |              |                          |              |                      |                |                      |                | 5 × 11                 | 6.4            | 5 × 11               | 7              |
| 0.22                   | R22 |                      |                |                          |              |                          |              |                      |                |                      |                | 5 × 11                 | 9.5            | 5 × 11               | 11             |
| 0.33                   | R33 |                      |                |                          |              |                          |              |                      |                |                      |                | 5 × 11                 | 11             | 5 × 11               | 13             |
| 0.47                   | R47 |                      |                |                          |              |                          |              |                      |                |                      |                | 5 × 11                 | 14             | 5 × 11               | 15             |
| 0.68                   | R68 |                      |                |                          |              |                          |              |                      |                |                      |                | 5 × 11                 | 17             | 5 × 11               | 19             |
| 1                      | 010 |                      |                |                          |              |                          |              |                      |                |                      |                | 5 × 11                 | 20             | 5 × 11               | 22             |
| 2.2                    | 2R2 |                      |                |                          |              |                          |              |                      |                |                      |                | 5 × 11                 | 29             | 5 × 11               | 34             |
| 3.3                    | 3R3 |                      |                |                          |              |                          |              |                      |                |                      |                | 5 × 11                 | 35             | 5 × 11               | 40             |
| 4.7                    | 4R7 |                      |                |                          |              |                          |              |                      |                |                      |                | 5 × 11                 | 42             | 5 × 11               | 48             |
| 6.8                    | 6R8 |                      |                |                          |              |                          |              |                      |                |                      |                | 5 × 11                 | 50             | 5 × 11               | 60             |
| 10                     | 100 |                      |                |                          |              | 5 × 11                   | 50           | 5 × 11               | 65             | 5 × 11               | 60             | 5 × 11                 | 65             | 5 × 11               | 70             |
| 22                     | 220 |                      |                | 5 × 11                   | 50           | 5 × 11                   | 55           | 5 × 11               | 90             | 5 × 11               | 95             | 5 × 11                 | 100            | 5 × 11               | 120            |
| 33                     | 330 |                      |                | 5 × 11                   | 65           | 5 × 11                   | 85           | 5 × 11               | 95             | 5 × 11               | 110            | 5 × 11<br>(6.3 × 11.5) | 125<br>(136)   | 6.3 × 11.5           | 145            |
| 47                     | 470 |                      |                | 5 × 11                   | 80           | 5 × 11                   | 90           | 5 × 11               | 115            | 5 × 11               | 130            | 6.3 × 11.5             | 165            | 6.3 × 11.5           | 170            |
| 68                     | 680 |                      |                | 5 × 11                   | 80           | 5 × 11                   | 104          | 5 × 11               | 140            | 6.3 × 11.5           | 170            | 6.3 × 11.5             | 195            | 8 × 11.5             | 245            |
| 100                    | 101 | 5 × 11               | 134            | 5 × 11                   | 140          | 5 × 11                   | 180          | 5 × 11               | 190            | 6.3 × 11.5           | 210            | 8 × 11.5               | 260            | 8 × 11.5             | 370            |
| 220                    | 221 | 5 × 11               | 200            | 5 × 11                   | 220          | 6.3 × 11.5               | 260          | 6.3 × 11.5           | 330            | 8 × 11.5             | 385            | 8 × 16<br>(10 × 12)    | 425<br>(482)   | 10 × 16              | 490            |
| 330                    | 331 | 6.3 × 11.5           | 240            | 6.3 × 11.5               | 290          | 6.3 × 11.5<br>(8 × 11.5) | 300<br>(340) | 8 × 11.5             | 440            | 10 × 12              | 490            | 10 × 16                | 585            | 10 × 20              | 710            |
| 470                    | 471 | 6.3 × 11.5           | 340            | 6.3 × 11.5<br>(8 × 11.5) | 350<br>(410) | 8 × 11.5                 | 440          | 8 × 11.5<br>(8 × 16) | 530<br>(550)   | 10 × 16              | 740            | 10 × 20                | 755            | 13 × 21              | 900            |
| 680                    | 681 | 8 × 11.5             | 468            | 8 × 11.5                 | 470          | 8 × 16                   | 560          | 10 × 16              | 645            | 10 × 20              | 930            | 13 × 21                | 925            | 13 × 25              | 1100           |
| 1000                   | 102 | 8 × 11.5             | 580            | 8 × 16<br>(10 × 12)      | 550<br>(650) | 8 × 16<br>(10 × 16)      | 770<br>(845) | 10 × 16<br>(10 × 20) | 860<br>(955)   | 13 × 21              | 1145           | 13 × 25                | 1300           | 16 × 25<br>(16 × 31) | 1340<br>(1450) |
| 2200                   | 222 | 8 × 20<br>(10 × 16)  | 660<br>(845)   | 10 × 20                  | 1070         | 10 × 20                  | 1210         | 13 × 21<br>(13 × 25) | 1300<br>(1400) | 16 × 25              | 1540           | 16 × 31<br>(18 × 35)   | 1700<br>(2100) | 18 × 35              | 2040           |
| 3300                   | 332 | 10 × 20              | 1185           | 13 × 21                  | 1420         | 13 × 25                  | 1400         | 13 × 21<br>(16 × 25) | 1500<br>(1600) | 16 × 31              | 2070           | 18 × 35                | 2500           | 22 × 40              | 2575           |
| 4700                   | 472 | 13 × 21              | 1545           | 13 × 25                  | 1780         | 16 × 25                  | 1700         | 16 × 31              | 2100           | 16 × 31<br>(18 × 35) | 2200<br>(2700) | 22 × 40                | 3040           | 25 × 40              | 3200           |
| 6800                   | 682 | 13 × 25              | 1870           | 16 × 25                  | 1880         | 16 × 31                  | 2100         | 18 × 35              | 2550           | 22 × 35              | 2900           | 25 × 40                | 3185           |                      |                |
| 10000                  | 103 | 16 × 31              | 2215           | 16 × 35                  | 2250         | 18 × 35                  | 2590         | 18 × 40<br>(22 × 40) | 2815<br>(3080) |                      |                |                        |                |                      |                |
| 15000                  | 153 | 18 × 31              | 2250           | 18 × 35                  | 2820         | 22 × 40                  | 3100         |                      |                |                      |                |                        |                |                      |                |
| 22000                  | 223 | 22 × 35<br>(22 × 40) | 2680<br>(3140) |                          |              |                          |              |                      |                |                      |                |                        |                |                      |                |

| WV<br>Code<br>代碼<br>μF |     | 100        |      | 160        |      | 200                  |              | 250                  |              | 350                  |              | 400                  |              | 450                   |              |
|------------------------|-----|------------|------|------------|------|----------------------|--------------|----------------------|--------------|----------------------|--------------|----------------------|--------------|-----------------------|--------------|
|                        |     | 2A         |      | 2C         |      | 2D                   |              | 2E                   |              | 2V                   |              | 2G                   |              | 2W                    |              |
| 0.1                    | 0R1 | 5 × 11     | 7.2  |            |      |                      |              |                      |              |                      |              |                      |              |                       |              |
| 0.22                   | R22 | 5 × 11     | 11   |            |      |                      |              |                      |              |                      |              |                      |              |                       |              |
| 0.33                   | R33 | 5 × 11     | 13   |            |      |                      |              |                      |              |                      |              |                      |              |                       |              |
| 0.47                   | R47 | 5 × 11     | 16   | 5 × 11     | 12   | 5 × 11               | 12           | 5 × 11               | 12           | 6.3 × 11.5           | 16           | 6.3 × 11.5           | 17           |                       |              |
| 0.68                   | R68 | 5 × 11     | 20   | 5 × 11     | 15   | 5 × 11               | 15           | 5 × 11               | 15           | 6.3 × 11.5           | 20           | 6.3 × 11.5           | 20           |                       |              |
| 1                      | 010 | 5 × 11     | 25   | 5 × 11     | 18   | 5 × 11               | 18           | 6.3 × 11.5           | 20           | 6.3 × 11.5           | 24           | 6.3 × 11.5           | 24           | 8 × 11.5              | 28           |
| 2.2                    | 2R2 | 5 × 11     | 33   | 6.3 × 11.5 | 25   | 6.3 × 11.5           | 33           | 6.3 × 11.5           | 33           | 6.3 × 11.5           | 37           | 8 × 11.5             | 37           | 8 × 11.5<br>(10 × 12) | 45<br>(55)   |
| 3.3                    | 3R3 | 5 × 11     | 40   | 6.3 × 11.5 | 35   | 6.3 × 11.5           | 46           | 6.3 × 11.5           | 46           | 8 × 11.5             | 50           | 8 × 11.5             | 50           | 10 × 12               | 65           |
| 4.7                    | 4R7 | 5 × 11     | 48   | 6.3 × 11.5 | 42   | 6.3 × 11.5           | 50           | 8 × 11.5             | 55           | 8 × 11.5             | 60           | 10 × 12              | 80           | 10 × 16               | 90           |
| 6.8                    | 6R8 | 5 × 11     | 55   | 8 × 11.5   | 58   | 8 × 11.5             | 67           | 8 × 11.5             | 77           | 10 × 12              | 85           | 10 × 16              | 100          | 10 × 20               | 125          |
| 10                     | 100 | 5 × 11     | 65   | 10 × 12    | 75   | 10 × 12              | 85           | 10 × 12<br>(10 × 16) | 100<br>(125) | 10 × 16              | 110          | 10 × 20              | 120          | 13 × 21<br>(13 × 25)  | 168<br>(185) |
| 22                     | 220 | 6.3 × 11.5 | 124  | 10 × 16    | 130  | 10 × 16              | 135          | 10 × 20              | 150          | 13 × 21              | 190          | 13 × 21<br>(13 × 25) | 200<br>(235) | 13 × 25               | 300          |
| 33                     | 330 | 8 × 11.5   | 177  | 10 × 16    | 175  | 10 × 20              | 180          | 13 × 21              | 215          | 13 × 25              | 275          | 13 × 25              | 275          | 16 × 25               | 320          |
| 47                     | 470 | 10 × 12    | 235  | 13 × 21    | 235  | 13 × 21              | 250          | 13 × 21              | 290          | 16 × 25              | 380          | 16 × 25              | 360          | 16 × 31               | 390          |
| 68                     | 680 | 10 × 16    | 293  | 13 × 21    | 330  | 13 × 25              | 340          | 16 × 25              | 380          | 16 × 31              | 450          | 16 × 35              | 435          | 16 × 35               | 460          |
| 100                    | 101 | 10 × 20    | 405  | 13 × 25    | 440  | 16 × 25              | 460          | 16 × 25              | 510          | 16 × 35<br>(18 × 35) | 510<br>(620) | 18 × 31<br>(18 × 35) | 520<br>(586) | 18 × 40               | 580          |
| 220                    | 221 | 13 × 25    | 640  | 16 × 31    | 790  | 16 × 35<br>(18 × 31) | 830<br>(850) | 18 × 35              | 890          |                      |              |                      |              |                       |              |
| 330                    | 331 | 13 × 25    | 757  | 18 × 31    | 970  | 18 × 35              | 1150         |                      |              |                      |              |                      |              |                       |              |
| 470                    | 471 | 16 × 25    | 910  | 18 × 40    | 1150 |                      |              |                      |              |                      |              |                      |              |                       |              |
| 680                    | 681 | 16 × 31    | 1365 |            |      |                      |              |                      |              |                      |              |                      |              |                       |              |
| 1000                   | 102 | 18 × 40    | 1820 |            |      |                      |              |                      |              |                      |              |                      |              |                       |              |

•Case size  $\varnothing D \times L$ (mm), ripple current (mA rms) at 85°C, 120Hz    •尺寸 $\varnothing D \times L$ (mm), 紋波電流(mA rms)於 85°C, 120Hz

- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec.    編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity.    最小包裝數量請查閱第22頁“包裝標準”。
- Please refer to page 18 for the Part Number System.    產品編碼規則請查閱第18頁。

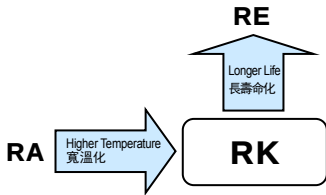
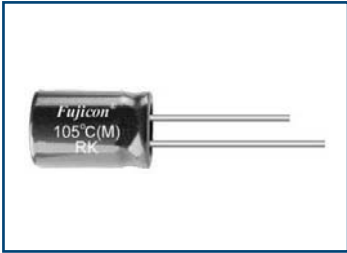
**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
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RK Series

WIDE TEMPERATURE

寬溫品

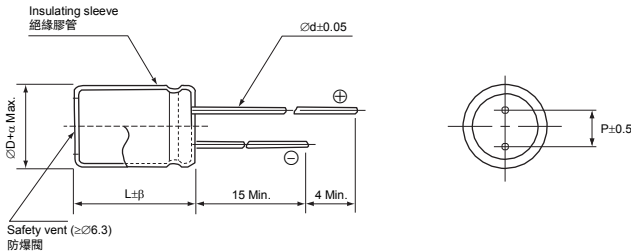
- Wide temperature range of -40~+105°C  
適用於 -40~+105°C 的寬溫範圍
- Standard series for general purposes  
標準品通用型
- Endurance 2000 hours  
耐久性 2000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                   |                                                                                                                                        |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                           | -25 ~ +105°C                                                                                                                           |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 100V                                                                                                                                                                                                                             | 160 ~ 450V                                                                                                                             |
| Capacitance Range 靜電容量範圍          | 0.47 ~ 15000μF                                                                                                                                                                                                                         | 0.47 ~ 470μF                                                                                                                           |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                    |                                                                                                                                        |
| Leakage Current 漏電流               | Leakage current ≤0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3μA, 取較大值 (在 20°C 環境中施加額定工作電壓 2 分鐘後)                                                                      | Leakage current ≤0.02CV + 15μA (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.02CV + 15μA (在 20°C 環境中施加額定工作電壓 5 分鐘後) |
| Dissipation Factor (tan δ) 損耗角正切  | C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                          |                                                                                                                                        |
|                                   | When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.<br>當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02。<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C |                                                                                                                                        |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                               | 6.3 10 16 25 35 50 63 100 160~250 350~450                                                                                              |
| Stability at Low Temperature 低溫特性 | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                   | 0.24 0.20 0.16 0.14 0.12 0.10 0.09 0.08 0.15 0.20                                                                                      |
|                                   | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                      |                                                                                                                                        |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                               | 6.3 10 16 25 35 50 63 100 160~250 350~450                                                                                              |
| Endurance 耐久性                     | Impedance Ratio 阻抗比                                                                                                                                                                                                                    | Z(-25°C) / Z(20°C) 4 3 2 2 3 4 —                                                                                                       |
|                                   | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                     | 8 6 4 3 4 —                                                                                                                            |
|                                   | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 2000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。                    |                                                                                                                                        |
| Shelf Life 高溫貯存特性                 | Capacitance Change 靜電容量變化率                                                                                                                                                                                                             | Within ±20% of initial measured value 初始值的±20%以內                                                                                       |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                               | ≤200% of initial specified value 不大於規範值的 200%                                                                                          |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                    | ≤initial specified value 不大於規範值                                                                                                        |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                 |                                                                                                                                        |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 5   | 6.3 | 8 (L≤11.5) | 8 (L≥16) | 10  | 13   | 16   | 18 | 22 | 25 |
|----|-----|-----|------------|----------|-----|------|------|----|----|----|
| P  | 2.0 | 2.5 | 3.5        | 5.0      | 7.5 | 10.0 | 12.5 |    |    |    |
| Ød | 0.5 | 0.5 | 0.5        | 0.6      | 0.6 | 0.8  |      |    |    |    |
| β  | 1.5 | 1.5 | 1.5        | 1.5      | 2.0 | 2.0  |      |    |    |    |
| α  | 0.5 | 0.5 | 0.5        | 0.5      | 0.5 | 1.0  |      |    |    |    |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   |                | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|----------------|----------------|------|-------|-------|------|--------|
| Coefficient 系數 | 0.47 ~ 47μF    | 0.75 | 1.00  | 1.35  | 1.55 | 2.00   |
|                | 68 ~ 680μF     | 0.80 | 1.00  | 1.25  | 1.34 | 1.50   |
|                | 1000 ~ 15000μF | 0.85 | 1.00  | 1.10  | 1.13 | 1.15   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱, 溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能, 請在使用過程中適當降低紋波電流。

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CAT.2024/V1.3

RK Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼<br>μF | 6.3 |                      | 10             |                                       | 16                    |                                  | 25                    |                                   | 35                    |                          | 50             |                        | 63             |                          |                |
|------------------------|-----|----------------------|----------------|---------------------------------------|-----------------------|----------------------------------|-----------------------|-----------------------------------|-----------------------|--------------------------|----------------|------------------------|----------------|--------------------------|----------------|
|                        | 0J  |                      | 1A             |                                       | 1C                    |                                  | 1E                    |                                   | 1V                    |                          | 1H             |                        | 1J             |                          |                |
| 0.47                   | R47 |                      |                |                                       |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 8              | 5 x 11                   | 8              |
| 0.68                   | R68 |                      |                |                                       |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 9              | 5 x 11                   | 9              |
| 1                      | 010 |                      |                |                                       |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 11             | 5 x 11                   | 13             |
| 2.2                    | 2R2 |                      |                |                                       |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 20             | 5 x 11                   | 15             |
| 3.3                    | 3R3 |                      |                |                                       |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 30             | 5 x 11                   | 19             |
| 4.7                    | 4R7 |                      |                |                                       |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 33             | 5 x 11                   | 22             |
| 6.8                    | 6R8 |                      |                |                                       |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 42             | 5 x 11                   | 34             |
| 10                     | 100 |                      |                |                                       |                       | 5 x 11                           | 50                    | 5 x 11                            | 38                    | 5 x 11                   | 41             | 5 x 11                 | 50             | 5 x 11                   | 50             |
| 22                     | 220 |                      |                | 5 x 11                                | 50                    | 5 x 11                           | 54                    | 5 x 11                            | 57                    | 5 x 11                   | 61             | 5 x 11<br>(6.3 x 11.5) | 78<br>(85)     | 6.3 x 11.5               | 86             |
| 33                     | 330 |                      |                | 5 x 11                                | 60                    | 5 x 11                           | 64                    | 5 x 11                            | 69                    | 5 x 11                   | 75             | 6.3 x 11.5             | 95             | 6.3 x 11.5               | 100            |
| 47                     | 470 | 5 x 11               | 62             | 5 x 11                                | 71                    | 5 x 11                           | 80                    | 5 x 11                            | 106                   | 5 x 11<br>(6.3 x 11.5)   | 106<br>(110)   | 6.3 x 11.5             | 125            | 6.3 x 11.5<br>(8 x 11.5) | 130<br>(150)   |
| 68                     | 680 | 5 x 11               | 80             | 5 x 11                                | 83                    | 5 x 11                           | 85                    | 5 x 11                            | 114                   | 6.3 x 11.5               | 121            | 8 x 11.5               | 144            | 8 x 11.5                 | 128            |
| 100                    | 101 | 5 x 11               | 95             | 5 x 11                                | 100                   | 5 x 11<br>(6.3 x 11.5)           | 120<br>(135)          | 5 x 11<br>(6.3 x 11.5)            | 120<br>(145)          | 6.3 x 11.5<br>(8 x 11.5) | 150<br>(180)   | 8 x 11.5<br>(10 x 12)  | 188<br>(200)   | 8 x 11.5<br>(10 x 12)    | 200<br>(295)   |
| 220                    | 221 | 5 x 11               | 150            | 5 x 11<br>(6.3 x 11.5)                | 155<br>(175)          | 6.3 x 11.5<br>(8 x 11.5)         | 190<br>(230)          | 6.3 x 11.5<br>(8 x 11.5)          | 190<br>(236)          | 8 x 11.5                 | 270            | 10 x 12<br>(10 x 16)   | 345<br>(370)   | 10 x 12<br>(10 x 16)     | 390<br>(440)   |
| 330                    | 331 | 6.3 x 11.5           | 170            | 6.3 x 11.5                            | 200                   | 8 x 11.5                         | 270                   | 8 x 11.5<br>(10 x 12)             | 310<br>(335)          | 10 x 12<br>(8 x 16)      | 395<br>(455)   | 10 x 16<br>(10 x 20)   | 420<br>(460)   | 10 x 20<br>(13 x 21)     | 510<br>(560)   |
| 470                    | 471 | 6.3 x 11.5           | 230            | 6.3 x 11.5<br>(8 x 11.5)<br>(10 x 12) | 260<br>(290)<br>(320) | 8 x 11.5                         | 310                   | 8 x 11.5<br>(8 x 16)<br>(10 x 12) | 325<br>(350)<br>(380) | 10 x 16<br>(10 x 20)     | 520<br>(550)   | 10 x 20<br>(13 x 21)   | 560<br>(630)   | 13 x 21<br>(13 x 25)     | 650<br>(700)   |
| 680                    | 681 | 8 x 11.5             | 314            | 8 x 11.5<br>(8 x 16)                  | 345<br>(390)          | 8 x 16<br>(10 x 16)              | 480<br>(520)          | 10 x 16                           | 520                   | 10 x 16<br>(10 x 20)     | 550<br>(590)   | 13 x 25                | 720            | 13 x 25<br>(16 x 25)     | 780<br>(800)   |
| 1000                   | 102 | 8 x 11.5             | 380            | 8 x 11.5<br>(8 x 16)<br>(10 x 12)     | 400<br>(425)<br>(585) | 8 x 20<br>(10 x 16)<br>(10 x 20) | 580<br>(645)<br>(700) | 10 x 16<br>(10 x 20)<br>(13 x 21) | 705<br>(775)<br>(845) | 13 x 21<br>(13 x 25)     | 810<br>(930)   | 13 x 25<br>(16 x 25)   | 950<br>(1080)  | 16 x 25                  | 930            |
| 2200                   | 222 | 10 x 12<br>(10 x 16) | 630<br>(690)   | 10 x 20<br>(13 x 21)                  | 760<br>(815)          | 10 x 20<br>(13 x 21)             | 735<br>(760)          | 13 x 21<br>(13 x 25)              | 890<br>(1110)         | 13 x 25<br>(16 x 25)     | 1080<br>(1260) | 16 x 35<br>(18 x 35)   | 1470<br>(1530) | 16 x 31<br>(18 x 35)     | 1565<br>(2180) |
| 3300                   | 332 | 10 x 20<br>(13 x 21) | 845<br>(920)   | 13 x 25                               | 1130                  | 13 x 21<br>(13 x 25)             | 980<br>(1170)         | 16 x 25                           | 1440                  | 16 x 31<br>(16 x 35)     | 1420<br>(1480) | 18 x 35                | 1770           | 22 x 40                  | 2510           |
| 4700                   | 472 | 13 x 21<br>(13 x 25) | 1200<br>(1240) | 13 x 25                               | 1280                  | 16 x 25                          | 1320                  | 16 x 31                           | 1650                  | 16 x 35<br>(18 x 35)     | 1720<br>(1900) | 18 x 40<br>(22 x 40)   | 2055<br>(2340) | 25 x 40                  | 3000           |
| 6800                   | 682 | 16 x 25              | 1480           | 16 x 31                               | 1510                  | 16 x 25<br>(16 x 31)             | 1620<br>(1930)        | 18 x 35                           | 2160                  | 22 x 40                  | 2216           | 25 x 40                | 2530           |                          |                |
| 10000                  | 103 | 16 x 31              | 1920           | 16 x 31<br>(16 x 35)                  | 2100<br>(2220)        | 18 x 35<br>(22x 30)              | 2350<br>(2450)        | 18 x 40                           | 2500                  |                          |                |                        |                |                          |                |
| 15000                  | 153 | 18 x 31              | 2390           |                                       |                       |                                  |                       |                                   |                       |                          |                |                        |                |                          |                |

| WV<br>Code<br>代碼<br>μF | 100 |                          | 160          |                       | 200        |                       | 250          |                       | 350          |                      | 400          |                                     | 450                   |                       |                           |
|------------------------|-----|--------------------------|--------------|-----------------------|------------|-----------------------|--------------|-----------------------|--------------|----------------------|--------------|-------------------------------------|-----------------------|-----------------------|---------------------------|
|                        | 2A  |                          | 2C           |                       | 2D         |                       | 2E           |                       | 2V           |                      | 2G           |                                     | 2W                    |                       |                           |
| 0.47                   | R47 | 5 x 11                   | 14           | 5 x 11                | 12         | 5 x 11                | 12           | 5 x 11                | 12           | 6.3 x 11.5           | 12           | 6.3 x 11.5                          | 12                    | 6.3 x 11.5            | 12                        |
| 0.68                   | R68 | 5 x 11                   | 15           | 5 x 11                | 13         | 5 x 11                | 13           | 5 x 11                | 13           | 6.3 x 11.5           | 13           | 6.3 x 11.5                          | 13                    | 8 x 11.5              | 13                        |
| 1                      | 010 | 5 x 11                   | 19           | 5 x 11                | 16         | 5 x 11                | 16           | 6.3 x 11.5            | 16           | 6.3 x 11.5           | 16           | 6.3 x 11.5<br>(8 x 11.5)            | 21<br>(25)            | 8 x 11.5              | 27                        |
| 2.2                    | 2R2 | 5 x 11                   | 30           | 6.3 x 11.5            | 23         | 6.3 x 11.5            | 30           | 6.3 x 11.5            | 35           | 8 x 11.5             | 38           | 6.3 x 11.5<br>(8 x 11.5)            | 32<br>(39)            | 8 x 11.5              | 39                        |
| 3.3                    | 3R3 | 5 x 11                   | 32           | 6.3 x 11.5            | 34         | 6.3 x 11.5            | 39           | 8 x 11.5              | 42           | 8 x 11.5             | 43           | 6.3 x 11.5<br>(8 x 9)<br>(8 x 11.5) | 40<br>(40)<br>(45)    | 8 x 11.5              | 45                        |
| 4.7                    | 4R7 | 5 x 11                   | 38           | 6.3 x 11.5            | 40         | 8 x 11.5              | 46           | 8 x 11.5              | 45           | 10 x 12              | 55           | 8 x 11.5<br>(10 x 12)               | 50<br>(55)            | 8 x 11.5<br>(10 x 12) | 50<br>(55)                |
| 6.8                    | 6R8 | 5 x 11                   | 52           | 8 x 11.5              | 48         | 8 x 11.5              | 52           | 8 x 11.5<br>(10 x 12) | 52<br>(57)   | 10 x 16              | 62           | 8 x 16<br>(10 x 16)                 | 65<br>(80)            | 10 x 16               | 90                        |
| 10                     | 100 | 5 x 11<br>(6.3 x 11.5)   | 66<br>(73)   | 8 x 11.5<br>(10 x 12) | 65<br>(60) | 8 x 11.5<br>(10 x 12) | 65<br>(70)   | 10 x 12<br>(10 x 16)  | 92<br>(116)  | 10 x 16              | 95           | 10 x 16<br>(10 x 20)                | 95<br>(105)           | 10 x 20<br>(13 x 21)  | 115<br>(125)              |
| 22                     | 220 | 6.3 x 11.5<br>(8 x 11.5) | 104<br>(120) | 10 x 16               | 96         | 10 x 16               | 140          | 10 x 16<br>(10 x 20)  | 140<br>(145) | 13 x 21              | 220          | 13 x 21<br>(13 x 25)<br>(16 x 20)   | 160<br>(170)<br>(185) | 13 x 25               | 185                       |
| 27                     | 270 |                          |              |                       |            |                       |              |                       |              |                      |              | 13 x 21                             | 160                   |                       |                           |
| 33                     | 330 | 8 x 11.5                 | 150          | 10 x 20               | 155        | 10 x 16<br>(10 x 20)  | 155<br>(170) | 13 x 21               | 190          | 13 x 25              | 215          | 13 x 25<br>(16 x 25)                | 185<br>(245)          | 16 x 20<br>(16 x 25)  | 207<br>(260)              |
| 47                     | 470 | 10 x 12                  | 190          | 13 x 21               | 220        | 13 x 21               | 220          | 13 x 21<br>(13 x 25)  | 210<br>(250) | 16 x 25              | 285          | 16 x 25<br>(16 x 31)                | 295<br>(320)          | 16 x 25<br>(16 x 31)  | 305<br>(313)              |
| 68                     | 680 | 10 x 16                  | 239          | 13 x 21               | 275        | 13 x 21<br>(13 x 25)  | 240<br>(270) | 16 x 25               | 365          | 16 x 31              | 370          | 16 x 31<br>(16 x 35)                | 350<br>(405)          | 16 x 35<br>(18 x 31)  | 435<br>(450)              |
| 100                    | 101 | 10 x 20                  | 320          | 13 x 25               | 355        | 16 x 25<br>(16 x 31)  | 385<br>(465) | 16 x 31               | 485          | 16 x 31<br>(18 x 35) | 395<br>(485) | 18 x 31<br>(18 x 35)                | 420<br>(540)          | 18 x 35<br>(18 x 40)  | 520<br>(560)              |
| 150                    | 151 | 13 x 21                  | 380          | 16 x 25               | 460        | 16 x 25               | 465          | 18 x 25               | 530          | 18 x 35              | 570          | 18 x 40                             | 600                   |                       |                           |
| 220                    | 221 | 13 x 25                  | 450          | 16 x 31               | 660        | 16 x 35<br>(18 x 31)  | 695<br>(755) | 18 x 35               | 760          |                      |              | 22x 40                              | 650                   |                       |                           |
| 330                    | 331 | 13 x 25                  | 625          | 18 x 35               | 820        | 18 x 35<br>(18 x 40)  | 820<br>(965) |                       |              |                      |              |                                     |                       |                       |                           |
| 470                    | 471 | 16 x 25                  | 780          | 18 x 40               | 975        | 22 x 40               | 1050         |                       |              |                      |              |                                     |                       |                       |                           |
| 680                    | 681 | 16 x 35                  | 1021         |                       |            |                       |              |                       |              |                      |              |                                     |                       |                       |                           |
| 1000                   | 102 | 18 x 40                  | 1344         |                       |            |                       |              |                       |              |                      |              |                                     |                       | Case size<br>尺寸       | Ripple<br>current<br>紋波電流 |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第 21 頁“編帶標準”及第 23 頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁“包裝標準”。
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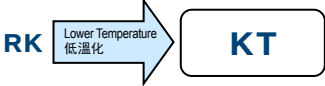
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KT Series

SLEEVELESS, WIDE TEMPERATURE

無膠管，寬溫品

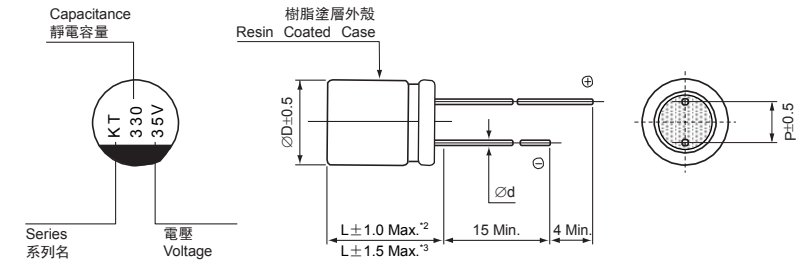
- Operating with wide temperature range -55~+105°C  
適用於 -55~+105°C 的寬溫範圍
- Endurance 2000 hours  
耐久性 2000 小時
- Sleeveless  
無膠管
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                          |                                                                               |                  |                                                                                                                                                                 |      |              |                                                                               |      |      |          |              |                                                                               |         |  |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------|-------------------------------------------------------------------------------|------|------|----------|--------------|-------------------------------------------------------------------------------|---------|--|
| Category Temperature Range 工作溫度範圍 | -55 ~ +105°C                                                                                                                                                                                                                                  |                                                                               |                  |                                                                                                                                                                 |      | -40 ~ +105°C |                                                                               |      |      |          | -25 ~ +105°C |                                                                               |         |  |
| Voltage Range 額定工作電壓範圍            | 4 ~ 100V                                                                                                                                                                                                                                      |                                                                               |                  |                                                                                                                                                                 |      | 160 ~ 400V   |                                                                               |      |      |          | 450V         |                                                                               |         |  |
| Capacitance Range 靜電容量範圍          | 0.1 ~ 8200μF                                                                                                                                                                                                                                  |                                                                               |                  |                                                                                                                                                                 |      | 3.3 ~100μF   |                                                                               |      |      |          | 3.3 ~ 33μF   |                                                                               |         |  |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                           |                                                                               |                  |                                                                                                                                                                 |      |              |                                                                               |      |      |          |              |                                                                               |         |  |
| Leakage Current 漏電流               | Rated Voltage 額定工作電壓                                                                                                                                                                                                                          | 6.3 ~ 100V                                                                    |                  |                                                                                                                                                                 |      |              |                                                                               |      |      |          | 160 ~ 450V   |                                                                               |         |  |
|                                   | Case size 尺寸                                                                                                                                                                                                                                  | Ø4~Ø10                                                                        |                  |                                                                                                                                                                 |      | Ø12.5~Ø18    |                                                                               |      |      | Ø6.3~Ø18 |              |                                                                               |         |  |
|                                   | Time 時間                                                                                                                                                                                                                                       | After 2 min. application of rated voltage at 20°C<br>在 20°C 環境中施加額定工作電壓 2 分鐘後 |                  |                                                                                                                                                                 |      |              | After 1 min. application of rated voltage at 20°C<br>在 20°C 環境中施加額定工作電壓 1 分鐘後 |      |      |          |              | After 5 min. application of rated voltage at 20°C<br>在 20°C 環境中施加額定工作電壓 5 分鐘後 |         |  |
|                                   | Leakage current 漏電流                                                                                                                                                                                                                           | ≤0.01CV or 3μA, whichever is greater<br>≤0.01CV 或 3μA，取較大值                    |                  |                                                                                                                                                                 |      |              | ≤0.03CV or 4μA, whichever is greater<br>≤0.03CV 或 4μA，取較大值                    |      |      |          |              | ≤0.04CV+100μA, whichever is greater<br>≤0.04CV+100μA，取較大值                     |         |  |
|                                   | C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                 |                                                                               |                  |                                                                                                                                                                 |      |              |                                                                               |      |      |          |              |                                                                               |         |  |
| Dissipation Factor (tan δ) 損耗角正切  | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                       |                                                                               |                  |                                                                                                                                                                 |      |              |                                                                               |      |      |          |              |                                                                               |         |  |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                      | 4                                                                             | 6.3              | 10                                                                                                                                                              | 16   | 25           | 35                                                                            | 50   | 63   | 100      | 160~250      | 350~450                                                                       |         |  |
|                                   | tan δ (max.)                                                                                                                                                                                                                                  | Ø4~Ø10                                                                        | 0.42             | 0.30                                                                                                                                                            | 0.26 | 0.22         | 0.16                                                                          | 0.14 | 0.12 | 0.10     | 0.10         | 0.20                                                                          | 0.25    |  |
|                                   | 最大損耗角正切                                                                                                                                                                                                                                       | Ø12.5~Ø18                                                                     | 0.45             | 0.38                                                                                                                                                            | 0.34 | 0.30         | 0.26                                                                          | 0.22 | 0.18 | 0.14     | 0.10         | 0.20                                                                          | 0.25    |  |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                             |                                                                               |                  |                                                                                                                                                                 |      |              |                                                                               |      |      |          |              |                                                                               |         |  |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                      |                                                                               |                  | 4                                                                                                                                                               | 6.3  | 10           | 16                                                                            | 25   | 35   | 50~63    | 100          | 160~250                                                                       | 350~450 |  |
|                                   | Impedance Ratio 阻抗比<br>ZT/Z20 (max.)                                                                                                                                                                                                          | Ø4~Ø10                                                                        | Z(-25°C)/Z(20°C) | 7                                                                                                                                                               | 4    | 3            | 2                                                                             | 2    | 2    | 2        | 3            | 2                                                                             | 3       |  |
|                                   |                                                                                                                                                                                                                                               |                                                                               | Z(-55°C)/Z(20°C) | 15                                                                                                                                                              | 8    | 6            | 4                                                                             | 4    | 3    | 3        | 4            | 3                                                                             | 6       |  |
|                                   |                                                                                                                                                                                                                                               | Ø12.5~Ø18                                                                     | Z(-25°C)/Z(20°C) | 7                                                                                                                                                               | 5    | 4            | 3                                                                             | 2    | 2    | 2        | 2            | 2                                                                             | 4       |  |
| Z(-55°C)/Z(20°C)                  | 17                                                                                                                                                                                                                                            |                                                                               | 12               | 10                                                                                                                                                              | 8    | 5            | 4                                                                             | 3    | 3    | 6        | 10           |                                                                               |         |  |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                             |                                                                               |                  |                                                                                                                                                                 |      |              |                                                                               |      |      |          |              |                                                                               |         |  |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                    |                                                                               |                  | Within ±20% of initial value for capacitors of 10V or more<br>(Within ±30% of initial value for capacitors of 4V or less)<br>≥10V 為初始值的±20%以內 (≤4V 為初始值的±30%以內) |      |              |                                                                               |      |      |          |              |                                                                               |         |  |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                                      |                                                                               |                  | 200% or less of initial specified value 不大於規範值的 200%                                                                                                            |      |              |                                                                               |      |      |          |              |                                                                               |         |  |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                           |                                                                               |                  | initial specified value or less 不大於規範值                                                                                                                          |      |              |                                                                               |      |      |          |              |                                                                               |         |  |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。 |                                                                               |                  |                                                                                                                                                                 |      |              |                                                                               |      |      |          |              |                                                                               |         |  |
| Marking 標識                        | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                        |                                                                               |                  |                                                                                                                                                                 |      |              |                                                                               |      |      |          |              |                                                                               |         |  |

DRAWING 外形圖 (Unit: mm)



\*1. Voltage mark for 6.3V is [6V]  
\*2. Applicable to Ø4~Ø8  
\*3. Applicable to Ø10 and above

Dimension table in next page.  
尺寸表見下一頁。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

KT Series

DIMENSIONS (Unit: mm) 尺寸表

| ØD x L | 4 x 5 | 5 x 5 | 6.3 x 5/7 | 8 x 5/10 | 10 x 10/13 | 12.5 x 13/16 | 16 x 16 | 18 x 16/18 |
|--------|-------|-------|-----------|----------|------------|--------------|---------|------------|
| P      | 1.5   | 2.0   | 2.5       | 3.5      | 5.0        | 5.0          | 7.5     | 7.5        |
| Ød     | 0.45  | 0.45  | 0.45      | 0.5      | 0.6        | 0.6          | 0.8     | 0.8        |
| L      | 5.0   | 5.0   | 5.0/7.0   | 5.0/10.0 | 10.0/13.0  | 13.0/16.0    | 16.0    | 16.0/18.0  |

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼 | μF  | 4                      |              | 6.3                      |              | 10                   |              | 16                                  |                       | 25                              |                        |
|------------------|-----|------------------------|--------------|--------------------------|--------------|----------------------|--------------|-------------------------------------|-----------------------|---------------------------------|------------------------|
|                  |     | 0G                     |              | 0J                       |              | 1A                   |              | 1C                                  |                       | 1E                              |                        |
| 4.7              | 4R7 |                        |              |                          |              |                      |              | 4 × 5                               | 13                    | 4 × 5                           | 17                     |
| 10               | 100 |                        |              |                          |              |                      |              | 4 × 5                               | 20                    | 5 × 5<br>(4 × 5)                | 23<br>(20)             |
| 22               | 220 | 4 × 5                  | 20           | 4 × 5                    | 23           | 5 × 5<br>(4 × 5)     | 29<br>(22)   | 5 × 5<br>(4 × 5)                    | 32<br>(25)            | 6.3 × 5<br>(5 × 5)              | 39<br>(32)             |
| 33               | 330 | 5 × 5<br>(4 × 5)       | 30<br>(25)   | 5 × 5<br>(4 × 5)         | 34<br>(30)   | 5 × 5<br>(4 × 5)     | 35<br>(30)   | 6.3 × 5<br>(5 × 5)                  | 45<br>(35)            | 6.3 × 5<br>(5 × 5)              | 48<br>(35)             |
| 47               | 470 | 5 × 5<br>(4 × 5)       | 36<br>(30)   | 5 × 5<br>(4 × 5)         | 38<br>(35)   | 5 × 5                | 38           | 6.3 × 5<br>(5 × 5)                  | 55<br>(40)            | 6.3 × 5                         | 60                     |
| 100              | 101 | 6.3 × 5<br>(5 × 5)     | 64<br>(54)   | 6.3 × 5<br>(5 × 5)       | 69<br>(59)   | 6.3 × 5<br>(5 × 5)   | 80<br>(60)   | 6.3 × 5                             | 80                    | 6.3 × 7<br>(6.3 × 5)<br>(8 × 5) | 100<br>(80)<br>(130)   |
| 150              | 151 | 6.3 × 5                | 80           | 6.3 × 5                  | 85           | 6.3 × 5              | 85           | 6.3 × 7                             | 105                   | 8 × 10<br>(6.3 × 7)             | 240<br>(120)           |
| 220              | 221 | 6.3 × 5                | 90           | 6.3 × 7<br>(6.3 × 5)     | 120<br>(95)  | 6.3 × 7<br>(6.3 × 5) | 120<br>(95)  | 8 × 10<br>(6.3 × 7)                 | 270<br>(120)          | 8 × 10                          | 270                    |
| 330              | 331 | 6.3 × 7                | 120          | 6.3 × 7                  | 120          | 8 × 10<br>(6.3 × 7)  | 290<br>(135) | 8 × 10                              | 290                   | 10 × 10<br>(8 × 10)             | 380<br>(290)           |
| 470              | 471 | 6.3 × 7                | 120          | 8 × 10<br>(6.3 × 7)      | 320<br>(120) | 10 × 10<br>(8 × 10)  | 380<br>(320) | 10 × 10<br>(8 × 10)                 | 380<br>(290)          | 10 × 10                         | 380                    |
| 680              | 681 | 8 × 10                 | 320          | 8 × 10                   | 350          | 10 × 10<br>(8 × 10)  | 380<br>(350) | 10 × 10                             | 380                   | 10 × 13                         | 400                    |
| 1000             | 102 | 8 × 10                 | 320          | 10 × 10<br>(8 × 10)      | 410<br>(350) | 10 × 10              | 410          | 12.5 × 13<br>(10 × 13)<br>(10 × 10) | 550<br>(460)<br>(410) | 12.5 × 13                       | 580                    |
| 1500             | 152 | 10 × 10                | 410          | 10 × 13<br>(10 × 10)     | 450<br>(410) | 10 × 13              | 460          | 12.5 × 13                           | 550                   | 12.5 × 16                       | 850                    |
| 2200             | 222 | 10 × 13<br>(10 × 10)   | 440<br>(410) | 12.5 × 13<br>(10 × 13)   | 680<br>(560) | 12.5 × 13            | 680          | 16 × 16<br>(12.5 × 16)              | 900<br>(750)          | 16 × 16                         | 1050                   |
| 3300             | 332 | 10 × 13                | 490          | 12.5 × 16<br>(12.5 × 13) | 850<br>(810) | 16 × 16              | 1000         | 16 × 16                             | 1000                  | 18 × 16                         | 1150                   |
| 4700             | 472 | 12.5 × 13              | 600          | 16 × 16                  | 1000         | 16 × 16              | 1000         | 18 × 16                             | 1225                  | 18 × 18                         | 1300                   |
| 6800             | 682 | 16 × 16<br>(12.5 × 16) | 950<br>(650) | 18 × 16                  | 1290         | 18 × 16              | 1290         |                                     |                       | Case size<br>尺寸                 | Ripple current<br>紋波電流 |
| 8200             | 822 |                        |              | 18 × 18                  | 1450         | 18 × 18              | 1450         |                                     |                       |                                 |                        |

| WV<br>Code<br>代碼 | μF  | 35                   |            | 50                   |             | 63                   |                        | 100                                 |                       |
|------------------|-----|----------------------|------------|----------------------|-------------|----------------------|------------------------|-------------------------------------|-----------------------|
|                  |     | 1V                   |            | 1H                   |             | 1J                   |                        | 2A                                  |                       |
| 0.1              | 0R1 |                      |            | 4 × 5                | 2           | 4 × 5                | 2                      |                                     |                       |
| 0.22             | R22 |                      |            | 4 × 5                | 4           | 4 × 5                | 4                      |                                     |                       |
| 0.33             | R33 |                      |            | 4 × 5                | 4           | 4 × 5                | 4                      |                                     |                       |
| 0.47             | R47 |                      |            | 4 × 5                | 5           | 4 × 5                | 5                      |                                     |                       |
| 1                | 010 |                      |            | 4 × 5                | 8           | 4 × 5                | 8                      | 4 × 5                               | 8                     |
| 2.2              | 2R2 |                      |            | 4 × 5                | 12          | 4 × 5                | 12                     | 6.3 × 5<br>(5 × 5)                  | 14<br>(12)            |
| 3.3              | 3R3 | 4 × 5                | 13         | 4 × 5                | 14          | 5 × 5                | 17                     | 6.3 × 7<br>(6.3 × 5)                | 55<br>(20)            |
| 4.7              | 4R7 | 4 × 5                | 17         | 5 × 5<br>(4 × 5)     | 20<br>(14)  | 5 × 5                | 20                     | 6.3 × 7<br>(6.3 × 5)                | 50<br>(21)            |
| 10               | 100 | 5 × 5<br>(4 × 5)     | 27<br>(18) | 6.3 × 5<br>(5 × 5)   | 32<br>(27)  | 6.3 × 7<br>(6.3 × 5) | 58<br>(32)             | 8 × 10<br>(8 × 5)<br>(6.3 × 7)      | 77<br>(55)<br>(58)    |
| 22               | 220 | 6.3 × 5<br>(5 × 5)   | 44<br>(36) | 6.3 × 7<br>(6.3 × 5) | 58<br>(44)  | 8 × 10<br>(6.3 × 7)  | 100<br>(58)            | 10 × 10<br>(8 × 10)                 | 126<br>(100)          |
| 33               | 330 | 6.3 × 5              | 50         | 6.3 × 7              | 65          | 8 × 10               | 140                    | 10 × 10                             | 150                   |
| 47               | 470 | 6.3 × 7<br>(6.3 × 5) | 80<br>(58) | 8 × 10<br>(6.3 × 7)  | 170<br>(70) | 10 × 10<br>(8 × 10)  | 160<br>(170)           | 12.5 × 13<br>(10 × 13)<br>(10 × 10) | 250<br>(180)<br>(160) |
| 68               | 680 |                      |            |                      |             | Case size<br>尺寸      | Ripple current<br>紋波電流 | 12.5 × 13<br>(10 × 13)              | 300<br>(180)          |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

KT Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼 | μF  | 35                                  |                       | 50                                    |                       | 63                                  |                       | 100                    |              | 160                    |                        |
|------------------|-----|-------------------------------------|-----------------------|---------------------------------------|-----------------------|-------------------------------------|-----------------------|------------------------|--------------|------------------------|------------------------|
|                  |     | 1V                                  |                       | 1H                                    |                       | 1J                                  |                       | 2A                     |              | 2C                     |                        |
| 22               | 220 |                                     |                       |                                       |                       |                                     |                       |                        |              | 10 × 13                | 50                     |
| 33               | 330 |                                     |                       |                                       |                       |                                     |                       |                        |              | 12.5 × 13              | 95                     |
| 47               | 470 |                                     |                       |                                       |                       |                                     |                       | 10 × 10                | 160          | 12.5 × 13<br>(16 × 16) | 205<br>(240)           |
| 100              | 101 | 8 × 10<br>(6.3 × 7)                 | 240<br>(92)           | 10 × 10<br>(8 × 10)                   | 250<br>(210)          | 12.5 × 13<br>(10 × 13)<br>(10 × 10) | 400<br>(350)<br>(310) | 16 × 16<br>(12.5 × 13) | 450<br>(380) | 16 × 16                | 250                    |
| 150              | 151 | 8 × 10                              | 240                   | 10 × 10                               | 300                   | 10 × 13                             | 350                   |                        |              |                        |                        |
| 220              | 221 | 10 × 10<br>(8 × 10)                 | 270<br>(250)          | 10 × 13<br>(10 × 10)                  | 330<br>(280)          | 16 × 16<br>(12.5 × 13)              | 560<br>(470)          | 16 × 16                | 550          |                        |                        |
| 330              | 331 | 10 × 10                             | 370                   | 16 × 16<br>(12.5 × 13)<br>(10 × 13)   | 600<br>(490)<br>(295) | 16 × 16<br>(12.5 × 16)              | 700<br>(510)          | 18 × 16                | 590          |                        |                        |
| 470              | 471 | 12.5 × 13<br>(10 × 13)<br>(10 × 10) | 520<br>(400)<br>(370) | 16 × 16<br>(12.5 × 16)<br>(12.5 × 13) | 700<br>(550)<br>(470) | 16 × 16                             | 750                   | 18 × 18                | 980          |                        |                        |
| 680              | 681 | 12.5 × 13                           | 530                   | 16 × 16                               | 750                   | 18 × 16                             | 790                   |                        |              |                        |                        |
| 1000             | 102 | 16 × 16<br>(12.5 × 16)              | 800<br>(600)          | 18 × 16                               | 990                   |                                     |                       |                        |              |                        |                        |
| 1500             | 152 | 16 × 16                             | 750                   |                                       |                       |                                     |                       |                        |              | Case size<br>尺寸        | Ripple current<br>紋波電流 |
| 2200             | 222 | 18 × 16                             | 1050                  |                                       |                       |                                     |                       |                        |              |                        |                        |

| WV<br>Code<br>代碼 | μF  | 200       |     | 250       |     | 350       |     | 400                    |            | 450                    |                        |
|------------------|-----|-----------|-----|-----------|-----|-----------|-----|------------------------|------------|------------------------|------------------------|
|                  |     | 2D        |     | 2E        |     | 2V        |     | 2G                     |            | 2W                     |                        |
| 3.3              | 3R3 |           |     |           |     |           |     | 10 × 13<br>(8 × 10)    | 40<br>(35) | 10 × 13<br>(8 × 12)    | 40<br>(38)             |
| 4.7              | 4R7 |           |     | 10 × 13   | 65  | 10 × 13   | 45  | 10 × 13<br>(12.5 × 13) | 45<br>(48) | 10 × 13<br>(12.5 × 13) | 42<br>45               |
| 10               | 100 | 10 × 13   | 75  | 10 × 13   | 70  | 12.5 × 13 | 50  | 12.5 × 13              | 50         | 12.5 × 13              | 70                     |
| 22               | 220 | 12.5 × 13 | 105 | 12.5 × 13 | 105 | 16 × 16   | 85  | 16 × 16                | 85         | 16 × 16                | 85                     |
| 33               | 330 | 12.5 × 13 | 120 | 16 × 16   | 180 | 18 × 16   | 100 | 18 × 16                | 100        | 18 × 16                | 100                    |
| 47               | 470 | 16 × 16   | 220 | 16 × 16   | 220 |           |     |                        |            | Case size<br>尺寸        | Ripple current<br>紋波電流 |
| 100              | 101 | 18 × 16   | 280 | 18 × 16   | 260 |           |     |                        |            |                        |                        |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |             |               | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|---------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | Ø4 ~ Ø10    | 0.1 ~ 68μF    | 0.70 | 1.00  | 1.17  | 1.36 | 1.50   |
|                   |             | 100 ~ 3300μF  | 0.85 | 1.00  | 1.08  | 1.20 | 1.30   |
|                   | Ø12.5 ~ Ø18 | ~ 68μF        | 0.75 | 1.00  | 1.35  | 1.57 | 2.00   |
|                   |             | 100 ~ 680μF   | 0.80 | 1.00  | 1.23  | 1.34 | 1.50   |
|                   |             | 1000 ~ 6800μF | 0.85 | 1.00  | 1.10  | 1.13 | 1.15   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

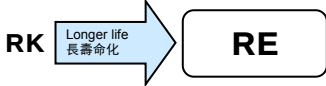
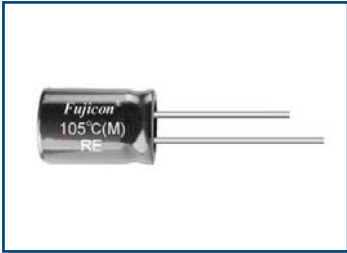
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第 21 頁 "編帶標準" 及第 23 頁 "引線成型與剪腳"。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁 "包裝標準"。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

RE Series

WIDE TEMPERATURE

寬溫品

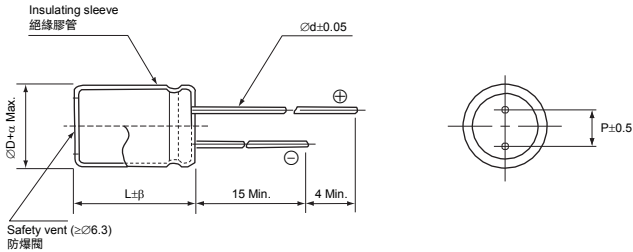
- Wide temperature range of -40~+105°C  
適用於 -40~+105°C 的寬溫範圍
- Standard series for general purposes  
標準品通用型
- Endurance 3000 hours  
耐久性 3000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                    |                                                                                                                                        |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                            | -25 ~ +105°C                                                                                                                           |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 100V                                                                                                                                                                                                                                                                                              | 160 ~ 450V                                                                                                                             |
| Capacitance Range 靜電容量範圍          | 0.47 ~ 15000μF                                                                                                                                                                                                                                                                                          | 1 ~ 470μF                                                                                                                              |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                     |                                                                                                                                        |
| Leakage Current 漏電流               | Leakage current ≤0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3μA 取較大值(在 20°C 環境中施加額定工作電壓 2 分鐘後)                                                                                                                                         | Leakage current ≤0.02CV + 15μA (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.02CV + 15μA (在 20°C 環境中施加額定工作電壓 5 分鐘後) |
| Dissipation Factor (tan δ) 損耗角正切  | C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓<br>When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.<br>當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02.<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C |                                                                                                                                        |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                                                                       |                                                                                                                                        |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 3000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 3000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。                                                                                     |                                                                                                                                        |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                         |                                                                                                                                        |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                                                                                  |                                                                                                                                        |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 5   | 6.3 | 8 (L≤11.5) | 8 (L≥16) | 10  | 13   | 16   | 18 | 22 | 25 |
|----|-----|-----|------------|----------|-----|------|------|----|----|----|
| P  | 2.0 | 2.5 | 3.5        | 5.0      | 7.5 | 10.0 | 12.5 |    |    |    |
| Ød | 0.5 | 0.5 | 0.6        | 0.6      | 0.8 | 0.8  | 0.8  |    |    |    |
| β  | 1.5 | 1.5 | 2.0        | 2.0      | 2.0 | 2.0  | 2.0  |    |    |    |
| α  | 0.5 | 0.5 | 1.0        | 1.0      | 1.0 | 1.0  | 1.0  |    |    |    |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償係數

| Frequency 頻率   | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|----------------|------|-------|-------|------|--------|
| Coefficient 係數 |      |       |       |      |        |
| 0.47 ~ 47μF    | 0.75 | 1.00  | 1.35  | 1.55 | 2.00   |
| 68 ~ 680μF     | 0.80 | 1.00  | 1.25  | 1.34 | 1.50   |
| 1000 ~ 15000μF | 0.85 | 1.00  | 1.10  | 1.13 | 1.15   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱, 溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能, 請在使用過程中適當降低紋波電流。

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注: 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

RE Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼<br>μF |     | 6.3                  |              | 10                                |                       | 16                               |                       | 25                                |                       | 35                       |                | 50                     |                | 63                   |                |
|------------------------|-----|----------------------|--------------|-----------------------------------|-----------------------|----------------------------------|-----------------------|-----------------------------------|-----------------------|--------------------------|----------------|------------------------|----------------|----------------------|----------------|
|                        |     | 0J                   |              | 1A                                |                       | 1C                               |                       | 1E                                |                       | 1V                       |                | 1H                     |                | 1J                   |                |
| 0.47                   | R47 |                      |              |                                   |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 8              | 5 x 11               | 8              |
| 0.68                   | R68 |                      |              |                                   |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 9              | 5 x 11               | 9              |
| 1                      | 010 |                      |              |                                   |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 11             | 5 x 11               | 13             |
| 2.2                    | 2R2 |                      |              |                                   |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 20             | 5 x 11               | 15             |
| 3.3                    | 3R3 |                      |              |                                   |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 30             | 5 x 11               | 19             |
| 4.7                    | 4R7 |                      |              |                                   |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 33             | 5 x 11               | 22             |
| 6.8                    | 6R8 |                      |              |                                   |                       |                                  |                       |                                   |                       |                          |                | 5 x 11                 | 42             | 5 x 11               | 34             |
| 10                     | 100 |                      |              |                                   |                       | 5 x 11                           | 50                    | 5 x 11                            | 38                    | 5 x 11                   | 41             | 5 x 11                 | 50             | 5 x 11               | 50             |
| 22                     | 220 |                      |              | 5 x 11                            | 50                    | 5 x 11                           | 54                    | 5 x 11                            | 57                    | 5 x 11                   | 61             | 5 x 11<br>(6.3 x 11.5) | 78<br>(85)     | 6.3 x 11.5           | 86             |
| 33                     | 330 |                      |              | 5 x 11                            | 60                    | 5 x 11                           | 64                    | 5 x 11                            | 69                    | 5 x 11                   | 75             | 6.3 x 11.5             | 95             | 6.3 x 11.5           | 100            |
| 47                     | 470 | 5 x 11               | 62           | 5 x 11                            | 71                    | 5 x 11                           | 80                    | 5 x 11                            | 106                   | 5 x 11<br>(6.3 x 11.5)   | 106<br>(110)   | 6.3 x 11.5             | 125            | 6.3 x 11.5           | 130            |
| 68                     | 680 | 5 x 11               | 80           | 5 x 11                            | 83                    | 5 x 11                           | 85                    | 5 x 11                            | 114                   | 6.3 x 11.5               | 121            | 8 x 11.5               | 144            | 8 x 11.5<br>(8 x 16) | 128<br>(135)   |
| 100                    | 101 | 5 x 11               | 95           | 5 x 11                            | 100                   | 5 x 11<br>(6.3 x 11.5)           | 120<br>(135)          | 5 x 11<br>(6.3 x 11.5)            | 120<br>(145)          | 6.3 x 11.5<br>(8 x 11.5) | 150<br>(180)   | 8 x 11.5<br>(10 x 12)  | 188<br>(200)   | 10 x 12              | 295            |
| 220                    | 221 | 5 x 11               | 150          | 5 x 11<br>(6.3 x 11.5)            | 155<br>(175)          | 6.3 x 11.5                       | 190                   | 6.3 x 11.5<br>(8 x 11.5)          | 190<br>(236)          | 8 x 11.5                 | 270            | 10 x 12<br>(10 x 16)   | 345<br>(370)   | 10 x 16              | 390            |
| 330                    | 331 | 6.3 x 11.5           | 170          | 6.3 x 11.5                        | 200                   | 8 x 11.5                         | 270                   | 8 x 11.5<br>(10 x 12)             | 310<br>(335)          | 10 x 12<br>(8 x 16)      | 395<br>(455)   | 10 x 16<br>(10 x 20)   | 420<br>(460)   | 10 x 20<br>(13 x 21) | 510<br>(560)   |
| 470                    | 471 | 6.3 x 11.5           | 230          | 6.3 x 11.5<br>(8 x 11.5)          | 260<br>(290)          | 8 x 11.5                         | 310                   | 8 x 11.5<br>(8 x 16)<br>(10 x 12) | 325<br>(350)<br>(380) | 10 x 16<br>(10 x 20)     | 520<br>(550)   | 13 x 21                | 560            | 13 x 21<br>(13 x 25) | 650<br>(700)   |
| 680                    | 681 | 8 x 11.5             | 314          | 8 x 11.5<br>(8 x 16)              | 345<br>(390)          | 8 x 16<br>(10 x 16)              | 480<br>(520)          | 10 x 16                           | 520                   | 10 x 16<br>(10 x 20)     | 550<br>(590)   | 13 x 25                | 720            | 16 x 25              | 800            |
| 1000                   | 102 | 8 x 11.5             | 380          | 8 x 11.5<br>(8 x 16)<br>(10 x 12) | 400<br>(425)<br>(585) | 8 x 20<br>(10 x 16)<br>(10 x 20) | 580<br>(645)<br>(700) | 10 x 20<br>(13 x 21)              | 775<br>(810)          | 13 x 21<br>(13 x 25)     | 845<br>(930)   | 16 x 25                | 930            | 16 x 25              | 1080           |
| 2200                   | 222 | 10 x 12<br>(10 x 16) | 630<br>(690) | 10 x 20<br>(13 x 21)              | 760<br>(815)          | 13 x 21                          | 760                   | 13 x 21<br>(13 x 25)              | 890<br>(1110)         | 13 x 25<br>(16 x 25)     | 1080<br>(1260) | 16 x 35<br>(18 x 35)   | 1470<br>(1530) | 16 x 31<br>(18 x 35) | 1565<br>(2180) |
| 3300                   | 332 | 10 x 20<br>(13 x 21) | 845<br>(920) | 13 x 25                           | 1130                  | 13 x 21<br>(13 x 25)             | 980<br>(1170)         | 16 x 25                           | 1440                  | 16 x 31<br>(16 x 35)     | 1420<br>(1480) | 18 x 35                | 1770           |                      |                |
| 4700                   | 472 | 13 x 25              | 1240         | 13 x 25                           | 1280                  | 16 x 25                          | 1320                  | 16 x 31                           | 1650                  | 18 x 35                  | 1900           | 22 x 40                | 2340           |                      |                |
| 6800                   | 682 | 16 x 25              | 1480         | 16 x 31                           | 1510                  | 16 x 31                          | 1930                  | 18 x 35                           | 2160                  | 22 x 40                  |                |                        |                |                      |                |
| 10000                  | 103 | 16 x 31              | 1920         | 16 x 35                           | 2220                  | 18 x 35                          | 2350                  |                                   |                       |                          |                |                        |                |                      |                |
| 15000                  | 153 | 18 x 31              | 2390         |                                   |                       |                                  |                       |                                   |                       |                          |                |                        |                |                      |                |

| WV<br>Code<br>代碼<br>μF |     | 100        |      | 160                   |            | 200                   |              | 250                   |              | 350        |     | 400                               |                       | 450                               |                           |
|------------------------|-----|------------|------|-----------------------|------------|-----------------------|--------------|-----------------------|--------------|------------|-----|-----------------------------------|-----------------------|-----------------------------------|---------------------------|
|                        |     | 2A         |      | 2C                    |            | 2D                    |              | 2E                    |              | 2V         |     | 2G                                |                       | 2W                                |                           |
| 1                      | 010 | 5 x 11     | 19   | 5 x 11                | 16         | 5 x 11                | 16           | 6.3 x 11.5            | 16           | 6.3 x 11.5 | 16  | 6.3 x 11.5<br>(8 x 11.5)          | 16<br>(20)            | 8 x 11.5                          | 17                        |
| 2.2                    | 2R2 | 5 x 11     | 30   | 6.3 x 11.5            | 23         | 6.3 x 11.5            | 30           | 6.3 x 11.5            | 35           | 8 x 11.5   | 38  | 6.3 x 11.5<br>(8 x 11.5)          | 32<br>(39)            | 8 x 11.5                          | 39                        |
| 3.3                    | 3R3 | 5 x 11     | 32   | 6.3 x 11.5            | 34         | 6.3 x 11.5            | 39           | 8 x 11.5              | 42           | 8 x 11.5   | 43  | 6.3 x 11.5<br>(8 x 11.5)          | 40<br>(45)            | 8 x 11.5                          | 45                        |
| 4.7                    | 4R7 | 5 x 11     | 38   | 6.3 x 11.5            | 40         | 8 x 11.5              | 46           | 8 x 11.5              | 45           | 10 x 12    | 55  | 8 x 11.5<br>(10 x 12)             | 50<br>(55)            | 10 x 12                           | 55                        |
| 6.8                    | 6R8 | 5 x 11     | 52   | 8 x 11.5              | 48         | 8 x 11.5              | 52           | 8 x 11.5<br>(10 x 12) | 52<br>(57)   | 10 x 16    | 62  | 8 x 16<br>(10 x 16)               | 65<br>(80)            | 10 x 16                           | 90                        |
| 10                     | 100 | 6.3 x 11.5 | 73   | 8 x 11.5<br>(10 x 12) | 65<br>(60) | 8 x 11.5<br>(10 x 12) | 65<br>(70)   | 10 x 12<br>(10 x 16)  | 92<br>(116)  | 10 x 16    | 95  | 10 x 16<br>(10 x 20)              | 95<br>(105)           | 10 x 20<br>(13 x 21)              | 120<br>(125)              |
| 22                     | 220 | 6.3 x 11.5 | 104  | 10 x 12               | 96         | 8 x 16<br>(10 x 16)   | 115<br>(140) | 10 x 16<br>(10 x 20)  | 140<br>(145) | 13 x 21    | 220 | 13 x 21<br>(13 x 25)<br>(16 x 20) | 160<br>(170)<br>(185) | 13 x 25                           | 185                       |
| 33                     | 330 | 8 x 11.5   | 150  | 10 x 20               | 155        | 10 x 20               | 170          | 13 x 21               | 190          | 13 x 25    | 215 | 13 x 25<br>(16 x 25)              | 185<br>(245)          | 16 x 20<br>(16 x 25)              | 207<br>(260)              |
| 47                     | 470 | 10 x 12    | 190  | 13 x 21               | 220        | 13 x 21               | 220          | 13 x 25               | 250          | 16 x 25    | 285 | 16 x 25<br>(16 x 31)              | 295<br>(320)          | 16 x 25<br>(16 x 31)              | 305<br>(313)              |
| 68                     | 680 | 10 x 16    | 239  | 13 x 21               | 275        | 13 x 25               | 270          | 16 x 25               | 365          | 16 x 31    | 370 | 16 x 31<br>(16 x 35)              | 350<br>(405)          | 16 x 31<br>(16 x 35)<br>(18 x 31) | 415<br>(435)<br>(450)     |
| 100                    | 101 | 10 x 20    | 320  | 13 x 25               | 355        | 16 x 25               | 385          | 16 x 31               | 485          | 18 x 35    | 485 | 18 x 31<br>(18 x 35)              | 420<br>(520)          | 18 x 35<br>(18 x 40)              | 540<br>(560)              |
| 220                    | 221 | 13 x 25    | 450  | 16 x 31               | 660        | 16 x 35<br>(18 x 31)  | 695<br>(755) | 18 x 35               | 760          |            |     |                                   |                       |                                   |                           |
| 330                    | 331 | 13 x 25    | 625  | 18 x 35               | 820        | 18 x 35<br>(18 x 40)  | 820<br>(965) |                       |              |            |     |                                   |                       |                                   |                           |
| 470                    | 471 | 16 x 25    | 780  | 18 x 40               | 975        |                       |              |                       |              |            |     |                                   |                       |                                   |                           |
| 680                    | 681 | 16 x 35    | 1021 |                       |            |                       |              |                       |              |            |     |                                   |                       | Case size<br>尺寸                   | Ripple<br>current<br>紋波電流 |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

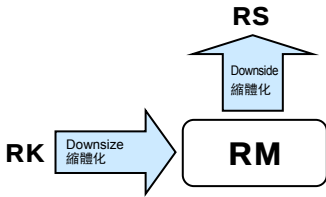
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RM Series

WIDE TEMPERATURE RANGE, HEIGHT 7(9)MM

7(9)MM 高，寬溫品

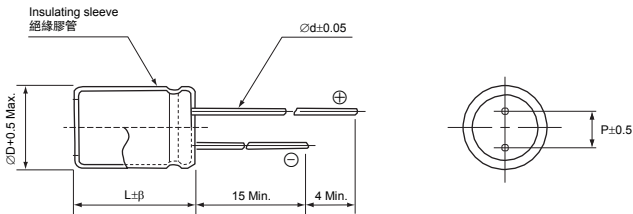
- Super miniature series with 7(9)mm height  
7(9)mm 高，超小型系列
- High performance and excellent temperature characteristics  
高性能和卓越的溫度特性
- Endurance 1000 hours  
耐久性 1000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                          |                    |                                                  |      |      |        |        |        |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------|------|------|--------|--------|--------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                  |                    |                                                  |      |      |        |        |        |
| Voltage Range 額定工作電壓範圍            | 4 ~ 63V                                                                                                                                                                                                                                       |                    |                                                  |      |      |        |        |        |
| Capacitance Range 靜電容量範圍          | 0.1 ~ 1000μF                                                                                                                                                                                                                                  |                    |                                                  |      |      |        |        |        |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                           |                    |                                                  |      |      |        |        |        |
| Leakage Current 漏電流               | Leakage current ≤0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3μA，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓              |                    |                                                  |      |      |        |        |        |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.<br>當標稱靜電容量大於 1000μF，其標稱靜電容量每增加 1000μF，損耗角正切增加 0.02。<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C          |                    |                                                  |      |      |        |        |        |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                      | 4                  | 6.3                                              | 10   | 16   | 25     | 35     | 50, 63 |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                          | 0.35               | 0.24                                             | 0.20 | 0.16 | 0.14   | 0.12   | 0.10   |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                             |                    |                                                  |      |      |        |        |        |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                      | 4                  | 6.3                                              | 10   | 16   | 25, 35 | 50, 63 |        |
|                                   | Impedance Ratio 阻抗比                                                                                                                                                                                                                           | Z(-25°C) / Z(20°C) | 6                                                | 4    | 3    | 2      | 2      | 2      |
|                                   |                                                                                                                                                                                                                                               | Z(-40°C) / Z(20°C) | 12                                               | 10   | 8    | 6      | 4      | 3      |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                             |                    |                                                  |      |      |        |        |        |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                    |                    | Within ±20% of initial measured value 初始值的±20%以內 |      |      |        |        |        |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                                      |                    | ≤200% of initial specified value 不大於規範值的 200%    |      |      |        |        |        |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                           |                    | ≤initial specified value 不大於規範值                  |      |      |        |        |        |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。 |                    |                                                  |      |      |        |        |        |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                        |                    |                                                  |      |      |        |        |        |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 4    | 5   | 6.3 | 8    |
|----|------|-----|-----|------|
| P  | 1.5  | 2.0 | 2.5 | 3.5  |
| Ød | 0.45 |     |     | 0.50 |
| β  | 1.0  |     |     |      |

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RM Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>μF<br>代碼 | 4   |         | 6.3 |                               | 10                    |                  | 16           |                               | 25                    |                               | 35                    |                               | 50                    |            | 63      |                           |
|------------------------|-----|---------|-----|-------------------------------|-----------------------|------------------|--------------|-------------------------------|-----------------------|-------------------------------|-----------------------|-------------------------------|-----------------------|------------|---------|---------------------------|
|                        | 0G  |         | 0J  |                               | 1A                    |                  | 1C           |                               | 1E                    |                               | 1V                    |                               | 1H                    |            | 1J      |                           |
| 0.1                    | 0R1 |         |     |                               |                       |                  |              |                               |                       |                               |                       |                               | 4 x 7                 | 1          | 4 x 7   | 2.4                       |
| 0.22                   | R22 |         |     |                               |                       |                  |              |                               |                       |                               |                       |                               | 4 x 7                 | 2.3        | 4 x 7   | 3.2                       |
| 0.33                   | R33 |         |     |                               |                       |                  |              |                               |                       |                               |                       |                               | 4 x 7                 | 3.5        | 4 x 7   | 4                         |
| 0.47                   | R47 |         |     |                               |                       |                  |              |                               |                       |                               |                       |                               | 4 x 7                 | 5          | 4 x 7   | 6                         |
| 0.68                   | R68 |         |     |                               |                       |                  |              |                               |                       |                               |                       |                               | 4 x 7                 | 10         | 4 x 7   | 11                        |
| 1                      | 010 |         |     |                               |                       |                  |              |                               |                       |                               |                       |                               | 4 x 7                 | 16         | 4 x 7   | 18                        |
| 2.2                    | 2R2 |         |     |                               |                       |                  |              |                               |                       |                               |                       |                               | 4 x 7                 | 24         | 4 x 7   | 26                        |
| 3.3                    | 3R3 |         |     |                               |                       |                  |              |                               |                       |                               |                       |                               | 4 x 7                 | 29         | 4 x 7   | 30                        |
| 4.7                    | 4R7 |         |     |                               |                       |                  |              |                               |                       |                               | 4 x 7                 | 26                            | 4 x 7                 | 32         | 5 x 7   | 33                        |
| 6.8                    | 6R8 |         |     |                               |                       |                  |              |                               |                       |                               | 4 x 7                 | 28                            | 4 x 7                 | 34         | 5 x 7   | 35                        |
| 10                     | 100 |         |     |                               |                       |                  | 4 x 7        | 28                            | 4 x 7                 | 28                            | 4 x 7<br>(5 x 7)      | 32<br>(40)                    | 4 x 7<br>(5 x 7)      | 34<br>(44) | 6.3 x 7 | 45                        |
| 22                     | 220 |         |     |                               |                       | 4 x 7            | 36           | 4 x 7                         | 45                    | 4 x 7<br>(5 x 7)              | 48<br>(50)            | 5 x 7                         | 53                    | 6.3 x 7    | 65      | 6.3 x 7                   |
| 33                     | 330 |         |     |                               |                       | 4 x 7            | 45           | 4 x 7                         | 48                    | 5 x 7                         | 52                    | 5 x 7                         | 67                    | 6.3 x 7    | 100     | 8 x 7                     |
| 47                     | 470 |         |     | 4 x 7                         | 45                    | 4 x 7            | 48           | 4 x 7<br>(5 x 7)              | 70<br>(80)            | 5 x 7<br>(6.3 x 7)            | 80<br>(85)            | 6.3 x 7                       | 90                    | 8 x 7      | 140     |                           |
| 68                     | 680 |         |     | 4 x 7                         | 45                    | 5 x 7            | 80           | 5 x 7                         | 85                    | 6.3 x 7                       | 105                   | 6.3 x 7                       | 120                   |            |         |                           |
| 100                    | 101 | 4 x 7   | 28  | 4 x 7<br>(5 x 7)              | 55<br>(85)            | 5 x 7            | 90           | 5 x 7<br>(6.3 x 7)            | 105<br>(125)          | 6.3 x 7<br>(8 x 7)<br>(8 x 9) | 125<br>(135)<br>(170) | 6.3 x 7<br>(8 x 7)<br>(8 x 9) | 135<br>(165)<br>(200) |            |         |                           |
| 220                    | 221 | 5 x 7   | 65  | 6.3 x 7                       | 110                   | 6.3 x 7          | 125          | 6.3 x 7<br>(8 x 7)<br>(8 x 9) | 138<br>(145)<br>(168) | 8 x 9                         | 179                   |                               |                       |            |         |                           |
| 330                    | 331 | 6.3 x 7 | 120 | 6.3 x 7                       | 130                   | 8 x 7<br>(8 x 9) | 150<br>(170) | 8 x 9                         | 188                   |                               |                       |                               |                       |            |         |                           |
| 470                    | 471 | 6.3 x 7 | 150 | 6.3 x 7<br>(8 x 7)<br>(8 x 9) | 140<br>(160)<br>(180) | 8 x 9            | 190          | 8 x 9                         | 200                   |                               |                       |                               |                       |            |         |                           |
| 1000                   | 102 | 8 x 9   | 215 | 8 x 9                         | 230                   |                  |              |                               |                       |                               |                       |                               |                       |            |         | Case size<br>尺寸           |
|                        |     |         |     |                               |                       |                  |              |                               |                       |                               |                       |                               |                       |            |         | Ripple<br>current<br>紋波電流 |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

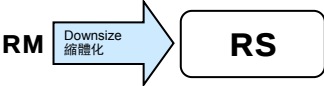
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

RS Series

WIDE TEMPERATURE RANGE, HEIGHT 5MM

5MM 高，寬溫品

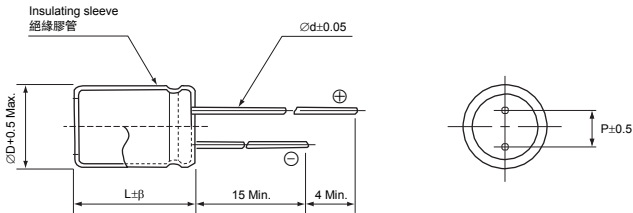
- Super miniature series with 5mm height  
5mm 高，超小型系列
- Suitable to replace tantalum capacitors at low cost  
可替換價格較高的鉭電容器
- Endurance 1000 hours  
耐久性 1000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |       |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-------|------|------|--|----------------------------|--------------------------------------------------|-----|----|----|-------|---------------------|--------------------|--------------------------|-----------------------------------------------|------|------|------|------|--------------------|------|---------------------|---------------------------------|---|---|--|--|--|--|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |      |       |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Voltage Range 額定工作電壓範圍            | 4 ~ 63V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |      |       |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Capacitance Range 靜電容量範圍          | 0.1 ~ 470µF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |       |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |      |       |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Leakage Current 漏電流               | Leakage current ≤0.01CV or 3µA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3µA，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                        |      |      |      |       |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Dissipation Factor (tan δ) 損耗角正切  | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.35</td><td>0.27</td><td>0.23</td><td>0.19</td><td>0.15</td><td>0.13</td><td>0.11</td></tr></table>                                                                                                                                                                                                                         |      |      |      |       |      |      |  | Rated Voltage (V) 額定工作電壓   | 4                                                | 6.3 | 10 | 16 | 25    | 35                  | 50                 | tan δ (max.) 最大損耗角正切     | 0.35                                          | 0.27 | 0.23 | 0.19 | 0.15 | 0.13               | 0.11 |                     |                                 |   |   |  |  |  |  |
| Rated Voltage (V) 額定工作電壓          | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6.3  | 10   | 16   | 25    | 35   | 50   |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| tan δ (max.) 最大損耗角正切              | 0.35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.27 | 0.23 | 0.19 | 0.15  | 0.13 | 0.11 |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25~50</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>7</td><td>3</td><td>3</td><td>2</td><td>2</td></tr><tr><td></td><td>Z(-40°C) / Z(20°C)</td><td>12</td><td>8</td><td>5</td><td>4</td><td>3</td></tr></table>                                                                                                                                                                                 |      |      |      |       |      |      |  | Rated Voltage (V) 額定工作電壓   | 4                                                | 6.3 | 10 | 16 | 25~50 | Impedance Ratio 阻抗比 | Z(-25°C) / Z(20°C) | 7                        | 3                                             | 3    | 2    | 2    |      | Z(-40°C) / Z(20°C) | 12   | 8                   | 5                               | 4 | 3 |  |  |  |  |
| Rated Voltage (V) 額定工作電壓          | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6.3  | 10   | 16   | 25~50 |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Impedance Ratio 阻抗比               | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 7    | 3    | 3    | 2     | 2    |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
|                                   | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 12   | 8    | 5    | 4     | 3    |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="7">Within ±25% of initial measured value 初始值的±25%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="7">≤200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="7">≤initial specified value 不大於規範值</td></tr></table> |      |      |      |       |      |      |  | Capacitance Change 靜電容量變化率 | Within ±25% of initial measured value 初始值的±25%以內 |     |    |    |       |                     |                    | Dissipation Factor 損耗角正切 | ≤200% of initial specified value 不大於規範值的 200% |      |      |      |      |                    |      | Leakage Current 漏電流 | ≤initial specified value 不大於規範值 |   |   |  |  |  |  |
| Capacitance Change 靜電容量變化率        | Within ±25% of initial measured value 初始值的±25%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |      |      |       |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Dissipation Factor 損耗角正切          | ≤200% of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |      |       |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Leakage Current 漏電流               | ≤initial specified value 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |      |       |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                           |      |      |      |       |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green and brown (Ø3×5) sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色和褐色 (Ø3×5) 膠管白字印刷 (PET)。                                                                                                                                                                                                                                                                                                                                                                                      |      |      |      |       |      |      |  |                            |                                                  |     |    |    |       |                     |                    |                          |                                               |      |      |      |      |                    |      |                     |                                 |   |   |  |  |  |  |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 3    | 4   | 5   | 6.3 | 8   |
|----|------|-----|-----|-----|-----|
| p  | 1.0  | 1.5 | 2.0 | 2.5 | 3.5 |
| Ød | 0.45 |     |     |     |     |
| β  | 1.0  |     |     |     |     |

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注：**以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

RS Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| μF   | WV<br>Code<br>代碼 | 4                |            | 6.3              |            | 10                 |            | 16                 |            | 25               |            | 35               |           | 50                 |                           |
|------|------------------|------------------|------------|------------------|------------|--------------------|------------|--------------------|------------|------------------|------------|------------------|-----------|--------------------|---------------------------|
|      |                  | 0G               |            | 0J               |            | 1A                 |            | 1C                 |            | 1E               |            | 1V               |           | 1H                 |                           |
| 0.1  | 0R1              |                  |            |                  |            |                    |            |                    |            |                  |            |                  |           | 3 x 5<br>(4 x 5)   | 2.0<br>(2.4)              |
| 0.22 | R22              |                  |            |                  |            |                    |            |                    |            |                  |            |                  |           | 3 x 5<br>(4 x 5)   | 3.0<br>(3.6)              |
| 0.33 | R33              |                  |            |                  |            |                    |            |                    |            |                  |            |                  |           | 3 x 5<br>(4 x 5)   | 3.7<br>(4.4)              |
| 0.47 | R47              |                  |            |                  |            |                    |            |                    |            |                  |            |                  |           | 3 x 5<br>(4 x 5)   | 4.4<br>(5.2)              |
| 0.68 | R68              |                  |            |                  |            |                    |            |                    |            |                  |            |                  |           | 3 x 5<br>(4 x 5)   | 5.3<br>(6.3)              |
| 1    | 010              |                  |            |                  |            |                    |            |                    |            |                  |            |                  |           | 3 x 5<br>(4 x 5)   | 6.4<br>(7.7)              |
| 2.2  | 2R2              |                  |            |                  |            |                    |            |                    |            |                  |            |                  |           | 3 x 5<br>(4 x 5)   | 9.5<br>(11)               |
| 3.3  | 3R3              |                  |            |                  |            |                    |            |                    |            |                  |            | 3 x 5<br>(4 x 5) | 9<br>(11) | 4 x 5              | 14                        |
| 4.7  | 4R7              |                  |            |                  |            |                    |            |                    |            | 3 x 5<br>(4 x 5) | 10<br>(12) | 4 x 5            | 13        | 4 x 5<br>(5 x 5)   | 16<br>(19)                |
| 6.8  | 6R8              |                  |            |                  |            | 3 x 5              | 11         | 3 x 5              | 14         | 4 x 5            | 15         | 4 x 5            | 17        | 5 x 5              | 23                        |
| 10   | 100              |                  |            | 3 x 5<br>(4 x 5) | 13<br>(15) | 3 x 5<br>(4 x 5)   | 14<br>(17) | 3 x 5<br>(4 x 5)   | 16<br>(16) | 4 x 5            | 19         | 5 x 5            | 22        | 5 x 5<br>(6.3 x 5) | 28<br>(33)                |
| 22   | 220              | 3 x 5<br>(4 x 5) | 16<br>(16) | 3 x 5<br>(4 x 5) | 18<br>(19) | 3 x 5<br>(4 x 5)   | 20<br>(22) | 4 x 5              | 29         | 5 x 5            | 34         | 5 x 5            | 36        | 6.3 x 5            | 40                        |
| 33   | 330              | 4 x 5            | 20         | 4 x 5            | 23         | 4 x 5              | 29         | 5 x 5              | 37         | 5 x 5            | 45         | 6.3 x 5          | 50        | 8 x 5              | 58                        |
| 47   | 470              | 4 x 5            | 24         | 4 x 5            | 28         | 5 x 5              | 35         | 5 x 5<br>(6.3 x 5) | 46<br>(49) | 6.3 x 5          | 54         | 6.3 x 5          | 62        | 8 x 5              | 71                        |
| 68   | 680              | 5 x 5            | 36         | 5 x 5            | 46         | 5 x 5              | 47         | 6.3 x 5            | 52         | 6.3 x 5          | 63         | 8 x 5            | 105       |                    |                           |
| 100  | 101              | 5 x 5            | 41         | 5 x 5            | 50         | 5 x 5<br>(6.3 x 5) | 50<br>(52) | 6.3 x 5<br>(8 x 5) | 58<br>(72) | 8 x 5            | 90         |                  |           |                    |                           |
| 220  | 221              | 6.3 x 5          | 56         | 6.3 x 5          | 60         | 6.3 x 5<br>(8 x 5) | 65<br>(78) | 8 x 5              | 86         |                  |            |                  |           |                    |                           |
| 330  | 331              | 8 x 5            | 80         | 8 x 5            | 86         | 8 x 5              | 90         |                    |            |                  |            |                  |           | Case size<br>尺寸    | Ripple<br>current<br>紋波電流 |
| 470  | 471              | 8 x 5            | 88         | 8 x 5            | 96         |                    |            |                    |            |                  |            |                  |           |                    |                           |

•Case size ∅D×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸∅D×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

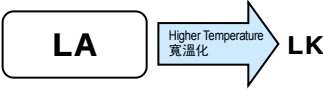
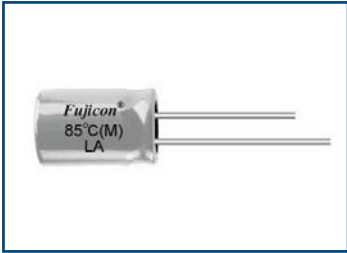
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

LA Series

LOW LEAKAGE CURRENT

低漏電流品

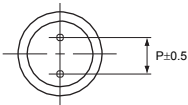
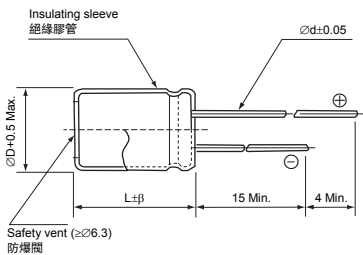
- Standard low leakage current series  
低漏電流標準型系列
- Suitable for high gain audio coupling applications  
適用於高增益音頻耦合器材
- Stable leakage current characteristics for a long period  
使漏電流特性處於長週期穩定
- Endurance 2000 hours at 85°C  
在 85°C 環境中耐久性 2000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                          |                    |      |                                                  |      |      |        |      |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------|--------------------------------------------------|------|------|--------|------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +85°C                                                                                                                                                                                                                                   |                    |      |                                                  |      |      |        |      |
| Voltage Range 額定工作電壓範圍            | 10 ~ 100V                                                                                                                                                                                                                                     |                    |      |                                                  |      |      |        |      |
| Capacitance Range 靜電容量範圍          | 1 ~ 4700μF                                                                                                                                                                                                                                    |                    |      |                                                  |      |      |        |      |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                           |                    |      |                                                  |      |      |        |      |
| Leakage Current 漏電流               | Leakage current ≤0.002CV or 0.4μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.002CV 或 0.4μA, 取較大值 (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓      |                    |      |                                                  |      |      |        |      |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.<br>當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02。<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C        |                    |      |                                                  |      |      |        |      |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                      | 10                 | 16   | 25                                               | 35   | 50   | 63     | 100  |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                          | 0.20               | 0.16 | 0.14                                             | 0.12 | 0.10 | 0.09   | 0.08 |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                             |                    |      |                                                  |      |      |        |      |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                      | 10, 25             |      |                                                  | 35   |      | 50~100 |      |
|                                   | Impedance Ratio 阻抗比                                                                                                                                                                                                                           | Z(-25°C) / Z(20°C) |      |                                                  | 4    |      | 2      |      |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below.<br>在 85°C 環境中施加額定工作電壓 2000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。                             |                    |      |                                                  |      |      |        |      |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                    |                    |      | Within ±20% of initial measured value 初始值的±20%以內 |      |      |        |      |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                                      |                    |      | ≤200% of initial specified value 不大於規範值的 200%    |      |      |        |      |
| Shelf Life 高溫貯存特性                 | Leakage Current 漏電流                                                                                                                                                                                                                           |                    |      | ≤initial specified value 不大於規範值                  |      |      |        |      |
|                                   | When the capacitors are restored to 20°C after leaving under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 85°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。 |                    |      |                                                  |      |      |        |      |
|                                   | Marking 標識                                                                                                                                                                                                                                    |                    |      |                                                  |      |      |        |      |
|                                   | Printed with black colour on orange sleeve (PVC) or printed with white colour on green sleeve (PET).<br>桔紅色膠管黑字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                      |                    |      |                                                  |      |      |        |      |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 5   | 6.3 | 8 (L≤11.5) | 8 (L≥16) | 10  | 13  | 16  |
|----|-----|-----|------------|----------|-----|-----|-----|
| P  | 2.0 | 2.5 | 3.5        |          | 5.0 |     | 7.5 |
| Ød | 0.5 |     |            | 0.6      |     |     | 0.8 |
| β  | 1.5 |     |            |          |     | 2.0 |     |

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注:** 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

LA Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>代碼 | μF  | 10         |      | 16                   |              | 25         |      | 35         |      | 50         |      | 63         |      | 100             |                           |
|------------------|-----|------------|------|----------------------|--------------|------------|------|------------|------|------------|------|------------|------|-----------------|---------------------------|
|                  |     | 1A         |      | 1C                   |              | 1E         |      | 1V         |      | 1H         |      | 1J         |      | 2A              |                           |
| 1                | 010 |            |      |                      |              |            |      |            |      |            |      | 5 x 11     | 22   | 5 x 11          | 18                        |
| 1.5              | 1R5 |            |      |                      |              |            |      |            |      |            |      | 5 x 11     | 25   | 5 x 11          | 22                        |
| 2.2              | 2R2 |            |      |                      |              |            |      |            |      | 5 x 11     | 28   | 5 x 11     | 30   | 5 x 11          | 26                        |
| 3.3              | 3R3 |            |      |                      |              |            |      |            |      | 5 x 11     | 35   | 5 x 11     | 37   | 5 x 11          | 32                        |
| 4.7              | 4R7 |            |      |                      |              |            |      |            |      | 5 x 11     | 42   | 5 x 11     | 44   | 5 x 11          | 38                        |
| 6.8              | 6R8 |            |      |                      |              |            |      | 5 x 11     | 46   | 5 x 11     | 50   | 5 x 11     | 53   | 5 x 11          | 53                        |
| 10               | 100 |            |      |                      |              | 5 x 11     | 55   | 5 x 11     | 55   | 5 x 1      | 70   | 5 x 11     | 73   | 6.3 x 11.5      | 76                        |
| 15               | 150 |            |      | 5 x 11               | 61           | 5 x 11     | 68   | 5 x 11     | 68   | 5 x 11     | 85   | 5 x 11     | 106  | 6.3 x 11.5      | 93                        |
| 22               | 220 | 5 x 11     | 69   | 5 x 11               | 73           | 5 x 11     | 82   | 5 x 11     | 94   | 5 x 11     | 122  | 6.3 x 11.5 | 129  | 6.3 x 11.5      | 130                       |
| 33               | 330 | 5 x 11     | 84   | 5 x 11               | 90           | 5 x 11     | 116  | 5 x 11     | 116  | 6.3 x 11.5 | 149  | 6.3 x 11.5 | 183  | 8 x 11.5        | 175                       |
| 47               | 470 | 5 x 11     | 101  | 5 x 11               | 110          | 5 x 11     | 115  | 6.3 x 11.5 | 145  | 6.3 x 11.5 | 150  | 8 x 11.5   | 190  | 10 x 12         | 227                       |
| 68               | 680 | 5 x 11     | 120  | 5 x 11               | 138          | 5 x 11     | 160  | 6.3 x 11.5 | 203  | 8 x 11.5   | 210  | 8 x 11.5   | 270  | 10 x 16         | 313                       |
| 100              | 101 | 5 x 11     | 145  | 5 x 11<br>(6.3x11.5) | 145<br>(180) | 6.3 x 11.5 | 190  | 8 x 11.5   | 240  | 8 x 11.5   | 255  | 10 x 12    | 320  | 10 x 20         | 380                       |
| 150              | 151 | 5 x 11     | 169  | 6.3 x 11.5           | 240          | 8 x 11.5   | 270  | 8 x 11.5   | 340  | 10 x 12    | 360  | 10 x 16    | 450  | 13 x 21         | 508                       |
| 220              | 221 | 6.3 x 11.5 | 250  | 6.3 x 11.5           | 300          | 8 x 11.5   | 320  | 10 x 12    | 420  | 10 x 16    | 490  | 10 x 20    | 565  | 13 x 25         | 699                       |
| 330              | 331 | 6.3 x 11.5 | 300  | 8 x 11.5             | 370          | 8 x 11.5   | 470  | 10 x 12    | 570  | 10 x 20    | 650  | 13 x 21    | 765  | 16 x 25         | 983                       |
| 470              | 471 | 8 x 11.5   | 415  | 8 x 11.5             | 510          | 10 x 12    | 620  | 10 x 20    | 740  | 13 x 21    | 860  | 13 x 25    | 990  | 16 x 31         | 1320                      |
| 680              | 681 | 8 x 11.5   | 580  | 10 x 16              | 715          | 10 x 16    | 860  | 10 x 20    | 1050 | 13 x 25    | 1200 | 16 x 25    | 1380 |                 |                           |
| 1000             | 102 | 10 x 12    | 790  | 10 x 20              | 910          | 10 x 20    | 1090 | 13 x 21    | 1300 | 16 x 25    | 1530 |            |      |                 |                           |
| 1500             | 152 | 10 x 20    | 1100 | 10 x 20              | 1275         | 13 x 25    | 1530 | 16 x 25    | 1820 |            |      |            |      |                 |                           |
| 2200             | 222 | 13 x 21    | 1240 | 13 x 25              | 1420         | 16 x 25    | 1660 |            |      |            |      |            |      |                 |                           |
| 3300             | 332 | 13 x 21    | 1590 | 13 x 25              | 1840         |            |      |            |      |            |      |            |      |                 |                           |
| 4700             | 472 | 13 x 25    | 1980 |                      |              |            |      |            |      |            |      |            |      | Case size<br>尺寸 | Ripple<br>current<br>紋波電流 |

•Case size ØD×L(mm), ripple current (mA rms) at 85°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 85°C, 120Hz

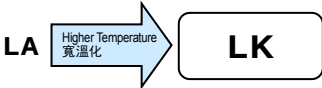
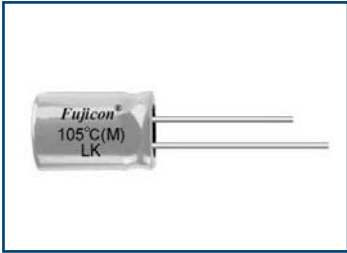
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

LK Series

LOW LEAKAGE CURRENT, WIDE TEMPERATURE RANGE

低漏電流寬溫品

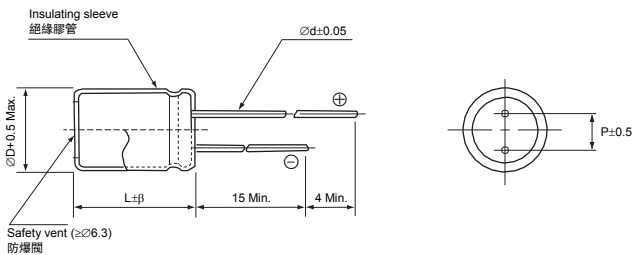
- Wide operating temperature range of -40~+105°C  
適用於 -40~+105°C 的寬溫範圍
- Low leakage current series  
低漏電流系列
- For Hi-Fi sound audio systems  
適用於高保真音響設備
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |         |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------|------|------|----------------------------|--------------------------------------------------|----|---------|----|----|--------------------------|-----------------------------------------------|------|------|------|------|---------------------|---------------------------------|---|---|---|--|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |         |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Voltage Range 額定工作電壓範圍            | 10 ~ 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |         |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Capacitance Range 靜電容量範圍          | 0.1 ~ 330μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |         |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |         |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Leakage Current 漏電流               | Leakage current ≤0.002CV or 0.4μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.002CV 或 0.4μA, 取較大值 (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                  |      |         |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.<br>當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02。<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table>                                                                                            |      |         |      |      | Rated Voltage (V) 額定工作電壓   | 10                                               | 16 | 25      | 35 | 50 | tan δ (max.) 最大損耗角正切     | 0.20                                          | 0.16 | 0.14 | 0.12 | 0.10 |                     |                                 |   |   |   |  |
| Rated Voltage (V) 額定工作電壓          | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 16   | 25      | 35   | 50   |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| tan δ (max.) 最大損耗角正切              | 0.20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.16 | 0.14    | 0.12 | 0.10 |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>10</td><td>16</td><td colspan="3">25 ~ 50</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>3</td><td>2</td><td colspan="2">2</td></tr><tr><td></td><td>Z(-40°C) / Z(20°C)</td><td>6</td><td>6</td><td colspan="2">4</td></tr></table>                                                                                                                                                                                                            |      |         |      |      | Rated Voltage (V) 額定工作電壓   | 10                                               | 16 | 25 ~ 50 |    |    | Impedance Ratio 阻抗比      | Z(-25°C) / Z(20°C)                            | 3    | 2    | 2    |      |                     | Z(-40°C) / Z(20°C)              | 6 | 6 | 4 |  |
| Rated Voltage (V) 額定工作電壓          | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 16   | 25 ~ 50 |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Impedance Ratio 阻抗比               | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3    | 2       | 2    |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
|                                   | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 6    | 6       | 4    |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="5">Within ±20% of initial measured value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="5">≤200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="5">≤initial specified value 不大於規範值</td></tr></table> |      |         |      |      | Capacitance Change 靜電容量變化率 | Within ±20% of initial measured value 初始值的±20%以內 |    |         |    |    | Dissipation Factor 損耗角正切 | ≤200% of initial specified value 不大於規範值的 200% |      |      |      |      | Leakage Current 漏電流 | ≤initial specified value 不大於規範值 |   |   |   |  |
| Capacitance Change 靜電容量變化率        | Within ±20% of initial measured value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |         |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Dissipation Factor 損耗角正切          | ≤200% of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |         |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Leakage Current 漏電流               | ≤initial specified value 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |         |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                           |      |         |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |
| Marking 標識                        | Printed with black colour on orange sleeve (PVC) or printed with white colour on green sleeve (PET).<br>桔紅色膠管黑字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                                                                                                                                                                                                                                                                                                                                  |      |         |      |      |                            |                                                  |    |         |    |    |                          |                                               |      |      |      |      |                     |                                 |   |   |   |  |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 5   | 6.3 | 8<br>(L≤11.5) | 8<br>(L≥16) | 10  |
|----|-----|-----|---------------|-------------|-----|
| P  | 2.0 | 2.5 | 3.5           |             | 5.0 |
| Ød | 0.5 |     |               | 0.6         |     |
| β  | 1.5 |     |               |             |     |

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注:** 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

LK Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>μF<br>代碼 | 10  |            | 16  |                        | 25           |            | 35     |            | 50     |                 |
|------------------------|-----|------------|-----|------------------------|--------------|------------|--------|------------|--------|-----------------|
|                        | 1A  |            | 1C  |                        | 1E           |            | 1V     |            | 1H     |                 |
| 0.47                   | R47 |            |     |                        |              |            |        |            | 5 x 11 | 9.6             |
| 0.68                   | R68 |            |     |                        |              |            |        |            | 5 x 11 | 11              |
| 1                      | 010 |            |     |                        |              |            |        |            | 5 x 11 | 14              |
| 1.5                    | 1R5 |            |     |                        |              |            |        |            | 5 x 11 | 17              |
| 2.2                    | 2R2 |            |     |                        |              |            |        |            | 5 x 11 | 21              |
| 3.3                    | 3R3 |            |     |                        |              |            |        |            | 5 x 11 | 25              |
| 4.7                    | 4R7 |            |     |                        |              |            |        |            | 5 x 11 | 30              |
| 6.8                    | 6R8 |            |     |                        |              |            |        |            | 5 x 11 | 36              |
| 10                     | 100 |            |     |                        |              |            |        |            | 5 x 11 | 44              |
| 15                     | 150 |            |     |                        |              |            | 5 x 11 | 54         | 5 x 11 | 62              |
| 22                     | 220 |            |     | 5 x 11                 | 54           | 5 x 11     | 57     | 5 x 11     | 61     | 5 x 11          |
| 33                     | 330 |            |     | 5 x 11                 | 64           | 5 x 11     | 69     | 5 x 11     | 75     | 6.3 x 11.5      |
| 47                     | 470 | 5 x 11     | 70  | 5 x 11                 | 79           | 5 x 11     | 82     | 6.3 x 11.5 | 100    | 6.3 x 11.5      |
| 68                     | 680 | 5 x 11     | 96  | 5 x 11                 | 108          | 5 x 11     | 115    | 6.3 x 11.5 | 156    | 8 x 11.5        |
| 100                    | 101 | 5 x 11     | 105 | 5 x 11<br>(6.3 x 11.5) | 115<br>(125) | 6.3 x 11.5 | 135    | 8 x 11.5   | 170    | 8 x 11.5        |
| 150                    | 151 | 5 x 11     | 150 | 6.3 x 11.5             | 175          | 8 x 11.5   | 190    | 10 x 12    | 245    | 10 x 12         |
| 220                    | 221 | 6.3 x 11.5 | 175 | 6.3 x 11.5             | 205          | 8 x 11.5   | 230    | 10 x 12    | 300    | 10 x 16         |
| 330                    | 331 | 6.3 x 11.5 | 245 | 8 x 11.5               | 285          | 8 x 11.5   | 345    | 10 x 16    | 400    |                 |
| 470                    | 471 | 8 x 11.5   | 355 | 8 x 11.5               | 365          | 10 x 12    | 470    | 10 x 20    | 565    | Case size<br>尺寸 |
| 1000                   | 102 | 10 x 12    | 600 | 10 x 16                | 745          | 10 x 20    | 850    |            |        |                 |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz    •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

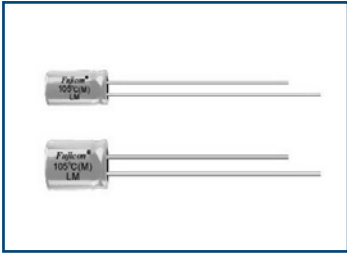
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec.    編帶與引線成型標準請查閱第 21 頁“編帶標準”及第 23 頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity.    最小包裝數量請查閱第 22 頁“包裝標準”。
- Please refer to page 18 for the Part Number System.    產品編碼規則請查閱第 18 頁。

LM Series

LOW LEAKAGE CURRENT, HEIGHT 7MM

7MM 高，低漏電流品

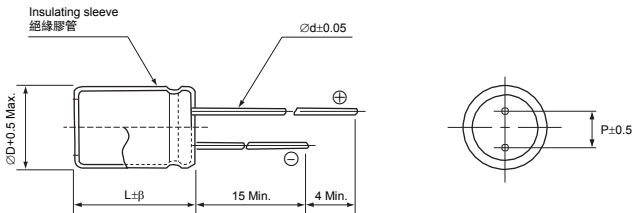
- Low leakage current series with 7mm height  
7mm 高，低漏電流品系列
- Endurance 1000 hours  
耐久性 1000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |       |       |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|-------|------|--------|--|----------------------------|--------------------------------------------------|----|-------|-------|---------------------|--------------------|--------------------------|-----------------------------------------------|------|------|------|--------------------|------|---------------------|---------------------------------|---|--|--|--|--|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |       |       |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 63V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |       |       |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Capacitance Range 靜電容量範圍          | 0.1 ~ 220μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |       |       |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |       |       |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Leakage Current 漏電流               | Leakage current ≤0.002CV or 0.4μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.002CV 或 0.4μA，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                  |      |       |       |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Dissipation Factor (tan δ) 損耗角正切  | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50, 63</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table>                                                                                                                                                                                                                                            |      |       |       |      |        |  | Rated Voltage (V) 額定工作電壓   | 6.3                                              | 10 | 16    | 25    | 35                  | 50, 63             | tan δ (max.) 最大損耗角正切     | 0.24                                          | 0.20 | 0.16 | 0.14 | 0.12               | 0.10 |                     |                                 |   |  |  |  |  |
| Rated Voltage (V) 額定工作電壓          | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10   | 16    | 25    | 35   | 50, 63 |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| tan δ (max.) 最大損耗角正切              | 0.24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.20 | 0.16  | 0.14  | 0.12 | 0.10   |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16~25</td><td>35~63</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>4</td><td>3</td><td>2</td><td>2</td></tr><tr><td></td><td>Z(-40°C) / Z(20°C)</td><td>10</td><td>6</td><td>4</td><td>3</td></tr></table>                                                                                                                                                                                                            |      |       |       |      |        |  | Rated Voltage (V) 額定工作電壓   | 6.3                                              | 10 | 16~25 | 35~63 | Impedance Ratio 阻抗比 | Z(-25°C) / Z(20°C) | 4                        | 3                                             | 2    | 2    |      | Z(-40°C) / Z(20°C) | 10   | 6                   | 4                               | 3 |  |  |  |  |
| Rated Voltage (V) 額定工作電壓          | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10   | 16~25 | 35~63 |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Impedance Ratio 阻抗比               | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4    | 3     | 2     | 2    |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
|                                   | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10   | 6     | 4     | 3    |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="6">Within ±20% of initial measured value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="6">≤200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="6">≤initial specified value 不大於規範值</td></tr></table> |      |       |       |      |        |  | Capacitance Change 靜電容量變化率 | Within ±20% of initial measured value 初始值的±20%以內 |    |       |       |                     |                    | Dissipation Factor 損耗角正切 | ≤200% of initial specified value 不大於規範值的 200% |      |      |      |                    |      | Leakage Current 漏電流 | ≤initial specified value 不大於規範值 |   |  |  |  |  |
| Capacitance Change 靜電容量變化率        | Within ±20% of initial measured value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |       |       |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Dissipation Factor 損耗角正切          | ≤200% of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |       |       |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Leakage Current 漏電流               | ≤initial specified value 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |       |       |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 500 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 500 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                             |      |       |       |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Marking 標識                        | Printed with black colour on orange sleeve (PVC) or printed with white colour on green sleeve (PET).<br>桔紅色膠管黑字印刷（PVC）或綠色膠管白字印刷（PET）。                                                                                                                                                                                                                                                                                                                                                                                                                   |      |       |       |      |        |  |                            |                                                  |    |       |       |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 4    | 5   | 6.3 | 8    |
|----|------|-----|-----|------|
| P  | 1.5  | 2.0 | 2.5 | 3.5  |
| Ød | 0.45 |     |     | 0.50 |
| β  | 1.0  |     |     |      |

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注：**以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

LM Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>μF<br>代碼 | 6.3 |         | 10  |         | 16 |         | 25    |         | 35    |         | 50    |         | 63              |                           |
|------------------------|-----|---------|-----|---------|----|---------|-------|---------|-------|---------|-------|---------|-----------------|---------------------------|
|                        | 0J  |         | 1A  |         | 1C |         | 1E    |         | 1V    |         | 1H    |         | 1J              |                           |
| 0.1                    | 0R1 |         |     |         |    |         |       |         |       |         | 4 x 7 | 1       | 4 x 7           | 2.4                       |
| 0.22                   | R22 |         |     |         |    |         |       |         |       |         | 4 x 7 | 2       | 4 x 7           | 3.2                       |
| 0.33                   | R33 |         |     |         |    |         |       |         |       |         | 4 x 7 | 3.5     | 4 x 7           | 4                         |
| 0.47                   | R47 |         |     |         |    |         |       |         |       |         | 4 x 7 | 5       | 4 x 7           | 6                         |
| 0.68                   | R68 |         |     |         |    |         |       |         |       |         | 4 x 7 | 7       | 4 x 7           | 9                         |
| 1                      | 010 |         |     |         |    |         |       |         |       |         | 4 x 7 | 10      | 4 x 7           | 16                        |
| 2.2                    | 2R2 |         |     |         |    |         |       |         |       |         | 4 x 7 | 15      | 4 x 7           | 18                        |
| 3.3                    | 3R3 |         |     |         |    |         |       |         | 4 x 7 | 16      | 4 x 7 | 18      | 4 x 7           | 20                        |
| 4.7                    | 4R7 |         |     |         |    |         |       |         | 4 x 7 | 18      | 4 x 7 | 22      | 4 x 7           | 26                        |
| 6.8                    | 6R8 |         |     |         |    |         | 4 x 7 | 18      | 4 x 7 | 24      | 4 x 7 | 28      | 5 x 7           | 32                        |
| 10                     | 100 |         |     |         |    | 4 x 7   | 29    | 4 x 7   | 33    | 5 x 7   | 36    | 5 x 7   | 44              | 6.3 x 7                   |
| 22                     | 220 | 4 x 7   | 34  | 4 x 7   | 38 | 4 x 7   | 44    | 5 x 7   | 51    | 5 x 7   | 57    | 6.3 x 7 | 65              | 8 x 7                     |
| 33                     | 330 | 4 x 7   | 42  | 4 x 7   | 47 | 4 x 7   | 57    | 5 x 7   | 63    | 6.3 x 7 | 72    | 8 x 7   | 85              |                           |
| 47                     | 470 | 4 x 7   | 50  | 5 x 7   | 59 | 5 x 7   | 68    | 6.3 x 7 | 78    | 8 x 7   | 85    |         |                 |                           |
| 68                     | 680 | 5 x 7   | 72  | 6.3 x 7 | 78 | 6.3 x 7 | 82    | 8 x 7   | 95    |         |       |         |                 |                           |
| 100                    | 101 | 6.3 x 7 | 76  | 8 x 7   | 96 | 8 x 7   | 105   |         |       |         |       |         |                 |                           |
| 220                    | 221 | 8 x 7   | 130 |         |    |         |       |         |       |         |       |         | Case size<br>尺寸 | Ripple<br>current<br>紋波電流 |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

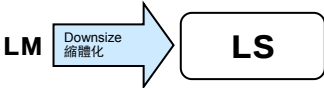
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第 21 頁“編帶標準”及第 23 頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

LS Series

LOW LEAKAGE CURRENT, HEIGHT 5MM

5MM 高，低漏電流品

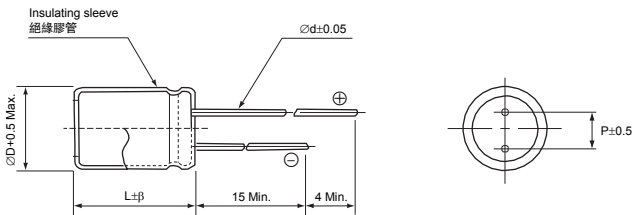
- Low leakage current series with 5mm height  
5mm 高，低漏電流品系列
- Designed for use in lightweight and portable equipment  
適用於小型及便攜器材
- Endurance 1000 hours  
耐久性 1000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |      |        |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|--------|------|--|----------------------------|--------------------------------------------------|-----|----|----|----|--------|----|--------------------------|-----------------------------------------------|------|------|------|------|------|------|---------------------|---------------------------------|----|----|---|---|---|---|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |      |      |        |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Voltage Range 額定工作電壓範圍            | 4 ~ 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |      |      |        |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Capacitance Range 靜電容量範圍          | 0.1 ~ 100µF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |      |        |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |      |      |        |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Leakage Current 漏電流               | Leakage current ≤0.002CV or 0.4µA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.002CV 或 0.4µA，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                  |      |      |      |      |        |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Dissipation Factor (tan δ) 損耗角正切  | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.35</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table>                                                                                                                                                                                                                         |      |      |      |      |        |      |  | Rated Voltage (V) 額定工作電壓   | 4                                                | 6.3 | 10 | 16 | 25 | 35     | 50 | tan δ (max.) 最大損耗角正切     | 0.35                                          | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 |                     |                                 |    |    |   |   |   |   |
| Rated Voltage (V) 額定工作電壓          | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6.3  | 10   | 16   | 25   | 35     | 50   |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| tan δ (max.) 最大損耗角正切              | 0.35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.24 | 0.20 | 0.16 | 0.14 | 0.12   | 0.10 |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td colspan="2">35, 50</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>7</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td></tr><tr><td></td><td>Z(-40°C) / Z(20°C)</td><td>15</td><td>10</td><td>8</td><td>6</td><td>4</td><td>3</td></tr></table>                                                                                                                                    |      |      |      |      |        |      |  | Rated Voltage (V) 額定工作電壓   | 4                                                | 6.3 | 10 | 16 | 25 | 35, 50 |    | Impedance Ratio 阻抗比      | Z(-25°C) / Z(20°C)                            | 7    | 4    | 3    | 2    | 2    | 2    |                     | Z(-40°C) / Z(20°C)              | 15 | 10 | 8 | 6 | 4 | 3 |
| Rated Voltage (V) 額定工作電壓          | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6.3  | 10   | 16   | 25   | 35, 50 |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Impedance Ratio 阻抗比               | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 7    | 4    | 3    | 2    | 2      | 2    |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
|                                   | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 15   | 10   | 8    | 6    | 4      | 3    |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="7">Within ±20% of initial measured value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="7">≤200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="7">≤initial specified value 不大於規範值</td></tr></table> |      |      |      |      |        |      |  | Capacitance Change 靜電容量變化率 | Within ±20% of initial measured value 初始值的±20%以內 |     |    |    |    |        |    | Dissipation Factor 損耗角正切 | ≤200% of initial specified value 不大於規範值的 200% |      |      |      |      |      |      | Leakage Current 漏電流 | ≤initial specified value 不大於規範值 |    |    |   |   |   |   |
| Capacitance Change 靜電容量變化率        | Within ±20% of initial measured value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |      |      |      |        |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Dissipation Factor 損耗角正切          | ≤200% of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |      |      |        |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Leakage Current 漏電流               | ≤initial specified value 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |      |      |        |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 500 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 500 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                             |      |      |      |      |        |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |
| Marking 標識                        | Printed with black colour on orange sleeve (PVC) or printed with white colour on green sleeve (PET).<br>桔紅色膠管黑字印刷（PVC）或綠色膠管白字印刷（PET）。                                                                                                                                                                                                                                                                                                                                                                                                                   |      |      |      |      |        |      |  |                            |                                                  |     |    |    |    |        |    |                          |                                               |      |      |      |      |      |      |                     |                                 |    |    |   |   |   |   |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 4    | 5   | 6.3 |
|----|------|-----|-----|
| p  | 1.5  | 2.0 | 2.5 |
| Ød | 0.45 |     |     |
| β  | 1.0  |     |     |

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注：**以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

LS Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>μF<br>代碼 | 4   |         | 6.3 |         | 10 |         | 16    |         | 25    |         | 35    |         | 50              |                           |
|------------------------|-----|---------|-----|---------|----|---------|-------|---------|-------|---------|-------|---------|-----------------|---------------------------|
|                        | 0G  |         | 0J  |         | 1A |         | 1C    |         | 1E    |         | 1V    |         | 1H              |                           |
| 0.1                    | 0R1 |         |     |         |    |         |       |         |       |         |       |         | 4 x 5           | 1                         |
| 0.22                   | R22 |         |     |         |    |         |       |         |       |         |       |         | 4 x 5           | 2                         |
| 0.33                   | R33 |         |     |         |    |         |       |         |       |         |       |         | 4 x 5           | 2.8                       |
| 0.47                   | R47 |         |     |         |    |         |       |         |       |         |       |         | 4 x 5           | 4                         |
| 0.68                   | R68 |         |     |         |    |         |       |         |       |         |       |         | 4 x 5           | 8.3                       |
| 1                      | 010 |         |     |         |    |         |       |         |       |         |       |         | 4 x 5           | 9                         |
| 2.2                    | 2R2 |         |     |         |    |         |       |         |       |         |       |         | 4 x 5           | 13                        |
| 3.3                    | 3R3 |         |     |         |    |         |       |         |       |         |       |         | 4 x 5           | 17                        |
| 4.7                    | 4R7 |         |     |         |    |         |       |         |       |         | 4 x 5 | 18      | 5 x 5           | 20                        |
| 6.8                    | 6R8 |         |     |         |    |         |       |         | 4 x 5 | 21      | 5 x 5 | 24      | 6.3 x 5         | 28                        |
| 10                     | 100 |         |     |         |    |         | 4 x 5 | 23      | 5 x 5 | 27      | 5 x 5 | 29      | 6.3 x 5         | 33                        |
| 22                     | 220 |         |     | 4 x 5   | 28 | 5 x 5   | 30    | 5 x 5   | 37    | 6.3 x 5 | 42    | 6.3 x 5 | 46              |                           |
| 33                     | 330 | 5 x 5   | 25  | 5 x 5   | 35 | 5 x 5   | 41    | 6.3 x 5 | 49    | 6.3 x 5 | 52    |         |                 |                           |
| 47                     | 470 | 5 x 5   | 33  | 5 x 5   | 45 | 6.3 x 5 | 52    | 6.3 x 5 | 58    |         |       |         |                 |                           |
| 68                     | 680 | 6.3 x 5 | 45  | 6.3 x 5 | 55 |         |       |         |       |         |       |         |                 |                           |
| 100                    | 101 | 6.3 x 5 | 56  | 6.3 x 5 | 70 |         |       |         |       |         |       |         | Case size<br>尺寸 | Ripple<br>current<br>紋波電流 |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

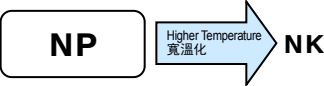
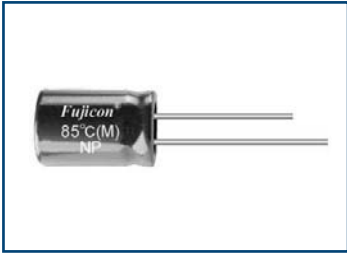
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第 21 頁 "編帶標準" 及第 23 頁 "引線成型與剪腳"。

● Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁 "包裝標準"。

● Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

NP Series  
NON-POLARIZED  
無極性品

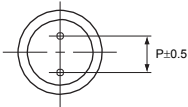
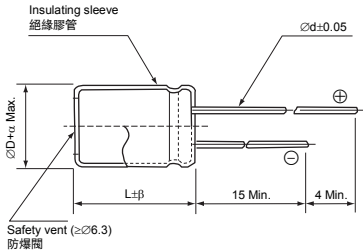
- Standard non-polarized series  
無極性標準型系列
- Designed for use in circuits with reversing polarity  
適用於極性變換電路
- Endurance 2000 hours at 85°C  
在 85°C 環境中耐久性 2000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                            |                                                  |                          |                                               |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------------------|--------------------------|-----------------------------------------------|---------------------|---------------------------------|---------------------|--------------------|---------|----------------------|------|------|------|------|--------------------|------|------|------|---|---|
| Category Temperature Range 工作溫度範圍 | -40 ~ +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |                                                  |                          |                                               |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 250V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |                                                  |                          |                                               |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Capacitance Range 靜電容量範圍          | 0.47 ~ 10000μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                                  |                          |                                               |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                                  |                          |                                               |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Leakage Current 漏電流               | Leakage current ≤0.03CV or 3μA, whichever is greater (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.03CV 或 3μA, 取較大值 (在 20°C 環境中施加額定工作電壓 5 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                |                            |                                                  |                          |                                               |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.<br>當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02。<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50~100</td><td>160</td><td>200~250</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.25</td><td>0.23</td><td>0.20</td><td>0.15</td><td>0.15</td><td>0.12</td><td>0.15</td><td>0.20</td></tr></table> | Rated Voltage (V) 額定工作電壓   | 6.3                                              | 10                       | 16                                            | 25                  | 35                              | 50~100              | 160                | 200~250 | tan δ (max.) 最大損耗角正切 | 0.25 | 0.23 | 0.20 | 0.15 | 0.15               | 0.12 | 0.15 | 0.20 |   |   |
| Rated Voltage (V) 額定工作電壓          | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 10                         | 16                                               | 25                       | 35                                            | 50~100              | 160                             | 200~250             |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| tan δ (max.) 最大損耗角正切              | 0.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.23                       | 0.20                                             | 0.15                     | 0.15                                          | 0.12                | 0.15                            | 0.20                |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25~100</td><td>160~250</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>3</td></tr><tr><td></td><td>Z(-40°C) / Z(20°C)</td><td>10</td><td>8</td><td>6</td><td>4</td><td>5</td></tr></table>                                                                                                                                                                    | Rated Voltage (V) 額定工作電壓   | 6.3                                              | 10                       | 16                                            | 25~100              | 160~250                         | Impedance Ratio 阻抗比 | Z(-25°C) / Z(20°C) | 4       | 3                    | 2    | 2    | 3    |      | Z(-40°C) / Z(20°C) | 10   | 8    | 6    | 4 | 5 |
| Rated Voltage (V) 額定工作電壓          | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 10                         | 16                                               | 25~100                   | 160~250                                       |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Impedance Ratio 阻抗比               | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4                          | 3                                                | 2                        | 2                                             | 3                   |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
|                                   | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10                         | 8                                                | 6                        | 4                                             | 5                   |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below.<br>在 85°C 環境中施加額定工作電壓 2000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±20% of initial measured value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>≤200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>≤initial specified value 不大於規範值</td></tr></table>                               | Capacitance Change 靜電容量變化率 | Within ±20% of initial measured value 初始值的±20%以內 | Dissipation Factor 損耗角正切 | ≤200% of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | ≤initial specified value 不大於規範值 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Capacitance Change 靜電容量變化率        | Within ±20% of initial measured value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                                  |                          |                                               |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Dissipation Factor 損耗角正切          | ≤200% of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |                                                  |                          |                                               |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Leakage Current 漏電流               | ≤initial specified value 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |                                                  |                          |                                               |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 85°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 85°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                     |                            |                                                  |                          |                                               |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                                  |                          |                                               |                     |                                 |                     |                    |         |                      |      |      |      |      |                    |      |      |      |   |   |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 5   | 6.3 | 8 (L≤11.5) | 8 (L≥16) | 10  | 13   | 16   | 18  | 22  | 25  |
|----|-----|-----|------------|----------|-----|------|------|-----|-----|-----|
| P  | 2.0 | 2.5 | 3.5        | 5.0      | 7.5 | 10.0 | 12.5 |     |     |     |
| Ød | 0.5 | 0.5 | 0.6        | 0.6      | 0.8 | 0.8  | 0.8  | 0.8 | 0.8 | 0.8 |
| β  | 1.5 | 1.5 | 1.5        | 1.5      | 2.0 | 2.0  | 2.0  | 2.0 | 2.0 | 2.0 |
| α  | 0.5 | 0.5 | 0.5        | 0.5      | 0.5 | 0.5  | 0.5  | 0.5 | 0.5 | 1.0 |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz~ |
|----------------|------|-------|-------|------|--------|
| Coefficient 系數 |      |       |       |      |        |
| 0.1 ~47μF      | 0.75 | 1.00  | 1.35  | 1.55 | 2.0    |
| 68 ~680μF      | 0.80 | 1.00  | 1.25  | 1.34 | 1.5    |
| 1000 ~10000μF  | 0.85 | 1.00  | 1.10  | 1.13 | 1.15   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱, 溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能, 請在使用過程中適當降低紋波電流。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注: 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

CAT.2024/V1.3

NP Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT
 規格尺寸及最大允許紋波電流

| WV<br>Code<br>μF<br>代碼 | 6.3 |            | 10   |            | 16   |                        | 25          |                      | 35           |            | 50   |            | 63   |            |      |
|------------------------|-----|------------|------|------------|------|------------------------|-------------|----------------------|--------------|------------|------|------------|------|------------|------|
|                        | 0J  |            | 1A   |            | 1C   |                        | 1E          |                      | 1V           |            | 1H   |            | 1J   |            |      |
| 0.47                   | R47 |            |      |            |      |                        |             |                      |              |            |      | 5 x 11     | 12   | 5 x 11     | 12   |
| 0.68                   | R68 |            |      |            |      |                        |             |                      |              |            |      | 5 x 11     | 14   | 5 x 11     | 14   |
| 1                      | 010 |            |      |            |      |                        |             |                      |              |            |      | 5 x 11     | 18   | 5 x 11     | 18   |
| 1.5                    | 1R5 |            |      |            |      |                        |             |                      |              |            |      | 5 x 11     | 21   | 5 x 11     | 21   |
| 2.2                    | 2R2 |            |      |            |      |                        |             |                      |              |            |      | 5 x 11     | 26   | 5 x 11     | 26   |
| 3.3                    | 3R3 |            |      |            |      |                        |             |                      |              |            |      | 5 x 11     | 32   | 5 x 11     | 32   |
| 4.7                    | 4R7 |            |      |            |      |                        |             |                      |              |            |      | 5 x 11     | 38   | 5 x 11     | 38   |
| 6.8                    | 6R8 |            |      |            |      |                        |             |                      |              |            |      | 5 x 11     | 46   | 5 x 11     | 46   |
| 10                     | 100 |            |      |            |      |                        |             |                      |              |            |      | 5 x 11     | 55   | 6.3 x 11.5 | 64   |
| 15                     | 150 |            |      |            |      |                        |             |                      |              | 5 x 11     | 61   | 6.3 x 11.5 | 78   | 6.3 x 11.5 | 78   |
| 22                     | 220 |            |      |            |      |                        |             | 5 x 11               | 73           | 6.3 x 11.5 | 84   | 6.3 x 11.5 | 94   | 8 x 11.5   | 111  |
| 33                     | 330 |            |      |            |      | 5 x 11                 | 78          | 6.3 x 11.5           | 103          | 6.3 x 11.5 | 103  | 8 x 11.5   | 136  | 10 x 12    | 158  |
| 47                     | 470 |            |      | 5 x 11     | 87   | 5 x 11<br>(6.3 x 11.5) | 92<br>(107) | 6.3 x 11.5           | 123          | 8 x 11.5   | 145  | 10 x 12    | 189  | 10 x 16    | 207  |
| 68                     | 680 | 5 x 11     | 100  | 6.3 x 11.5 | 120  | 6.3 x 11.5             | 129         | 8 x 11.5             | 175          | 10 x 12    | 203  | 10 x 16    | 249  | 10 x 20    | 272  |
| 100                    | 101 | 6.3 x 11.5 | 139  | 6.3 x 11.5 | 145  | 8 x 11.5               | 184         | 10 x 12              | 247          | 10 x 16    | 270  | 10 x 20    | 329  | 10 x 20    | 329  |
| 150                    | 151 | 6.3 x 11.5 | 171  | 8 x 11.5   | 210  | 10 x 12                | 262         | 10 x 12<br>(10 x 16) | 300<br>(331) | 10 x 20    | 361  | 10 x 20    | 404  | 13 x 21    | 474  |
| 220                    | 221 | 8 x 11.5   | 244  | 10 x 12    | 295  | 10 x 16                | 347         | 10 x 12<br>(10 x 20) | 310<br>(437) | 10 x 20    | 437  | 13 x 21    | 574  | 13 x 25    | 625  |
| 330                    | 331 | 10 x 12    | 347  | 10 x 16    | 396  | 10 x 20                | 464         | 10 x 20              | 535          | 13 x 21    | 628  | 16 x 25    | 850  | 16 x 25    | 850  |
| 470                    | 471 | 10 x 16    | 454  | 10 x 20    | 516  | 10 x 20                | 553         | 13 x 21              | 750          | 13 x 21    | 818  | 16 x 31    | 1110 | 16 x 35    | 1164 |
| 680                    | 681 | 10 x 20    | 595  | 13 x 21    | 729  | 13 x 21                | 781         | 13 x 25              | 984          | 16 x 25    | 1091 | 18 x 35    | 1503 | 18 x 40    | 1577 |
| 1000                   | 102 | 13 x 21    | 847  | 13 x 21    | 883  | 13 x 25                | 1033        | 16 x 25              | 1323         | 16 x 35    | 1519 | 18 x 40    | 1912 | 22 x 40    | 2105 |
| 1500                   | 152 | 13 x 21    | 999  | 13 x 25    | 1132 | 16 x 25                | 1338        | 16 x 35              | 1748         | 18 x 40    | 1968 | 22 x 40    | 2368 | 25 x 40    | 2607 |
| 2200                   | 222 | 13 x 25    | 1272 | 16 x 25    | 1463 | 16 x 35                | 1781        | 18 x 40              | 2254         | 22 x 40    | 2481 | 25 x 50    | 3221 |            |      |
| 3300                   | 332 | 16 x 25    | 1672 | 16 x 35    | 1985 | 18 x 40                | 2890        | 22 x 40              | 2890         | 25 x 40    | 3157 |            |      |            |      |
| 4700                   | 472 | 16 x 35    | 2221 | 18 x 40    | 2579 | 22 x 40                | 2987        | 25 x 50              | 3927         |            |      |            |      |            |      |
| 6800                   | 682 | 18 x 40    | 2840 | 22 x 40    | 3214 | 25 x 50                | 4004        |                      |              |            |      |            |      |            |      |
| 10000                  | 103 | 22 x 40    | 3516 | 25 x 50    | 4290 |                        |             |                      |              |            |      |            |      |            |      |

| WV<br>Code<br>μF<br>代碼 | 100 |                      | 160          |          | 200 |          | 250 |                 |                        |
|------------------------|-----|----------------------|--------------|----------|-----|----------|-----|-----------------|------------------------|
|                        | 2A  |                      | 2C           |          | 2D  |          | 2E  |                 |                        |
| 0.47                   | R47 | 5 x 11               | 12           |          |     |          |     |                 |                        |
| 0.68                   | R68 | 5 x 11               | 14           |          |     |          |     |                 |                        |
| 1                      | 010 | 5 x 11               | 18           |          |     |          |     |                 |                        |
| 1.5                    | 1R5 | 5 x 11               | 21           |          |     |          |     |                 |                        |
| 2.2                    | 2R2 | 5 x 11               | 26           |          |     |          |     |                 |                        |
| 3.3                    | 3R3 | 5 x 11               | 32           | 8 x 11.5 | 49  | 8 x 11.5 | 42  | 10 x 12         | 46                     |
| 4.7                    | 4R7 | 6.3 x 11.5           | 44           | 8 x 11.5 | 59  | 10 x 12  | 55  | 10 x 12         | 65                     |
| 6.8                    | 6R8 | 8 x 11.5             | 62           | 10 x 20  | 77  | 13 x 21  | 78  | 13 x 21         | 78                     |
| 10                     | 100 | 8 x 11.5<br>(8 x 16) | 75<br>(80)   | 13 x 21  | 109 | 13 x 21  | 95  | 13 x 25         | 103                    |
| 15                     | 150 | 10 x 12              | 107          | 13 x 21  | 134 | 13 x 25  | 127 | 16 x 25         | 140                    |
| 22                     | 220 | 10 x 12<br>(10 x 16) | 130<br>(142) | 13 x 25  | 177 | 16 x 25  | 170 | 16 x 31         | 186                    |
| 33                     | 330 | 10 x 20              | 189          | 16 x 25  | 240 | 16 x 35  | 239 | 18 x 35         | 256                    |
| 47                     | 470 | 13 x 21              | 265          | 16 x 35  | 329 | 18 x 40  | 321 |                 |                        |
| 68                     | 680 | 13 x 25              | 348          | 18 x 35  | 425 |          |     |                 |                        |
| 100                    | 101 | 16 x 25              | 468          |          |     |          |     |                 |                        |
| 150                    | 151 | 16 x 25              | 573          |          |     |          |     |                 |                        |
| 220                    | 221 | 16 x 35              | 797          |          |     |          |     |                 |                        |
| 330                    | 331 | 18 x 40              | 1098         |          |     |          |     |                 |                        |
| 470                    | 471 | 22 x 40              | 1443         |          |     |          |     | Case size<br>尺寸 | Ripple current<br>紋波電流 |
| 680                    | 681 | 25 x 40              | 1896         |          |     |          |     |                 |                        |

•Case size  $\varnothing D \times L$ (mm), ripple current (mA rms) at 85°C, 120Hz
 •尺寸 $\varnothing D \times L$ (mm), 紋波電流(mA rms)於 85°C, 120Hz

- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第 21 頁“編帶標準”及第 23 頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

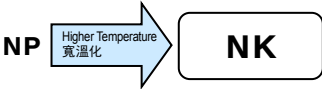
Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.
 注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

NK Series

NON-POLARIZED, WIDE TEMPERATURE RANGE

無極性寬溫品

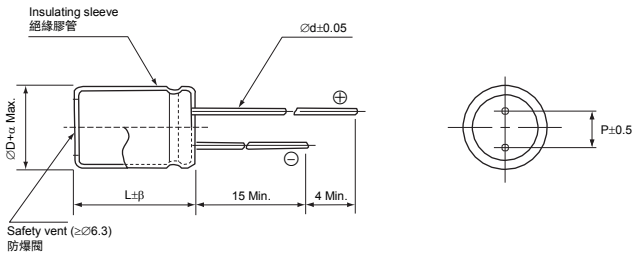
- Wide operating temperature range of -40~+105°C  
適用於 -40~+105°C 的寬溫範圍
- Designed for use in circuits with reversing polarity  
適用於極性變換電路
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|--------|------|--------|--|----------------------------|--------------------------------------------------|----|----|--------|---------------------|--------------------|--------------------------|-----------------------------------------------|------|------|------|--------------------|------|---------------------|---------------------------------|---|--|--|--|--|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |      |        |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 100V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |      |        |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Capacitance Range 靜電容量範圍          | 0.1 ~ 10000μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |        |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |      |        |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Leakage Current 漏電流               | Leakage current ≤0.03CV or 3μA, whichever is greater (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.03CV 或 3μA, 取較大值 (在 20°C 環境中施加額定工作電壓 5 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                        |      |      |        |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.<br>當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02。<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50~100</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.16</td><td>0.14</td><td>0.12</td></tr></table>                                                               |      |      |        |      |        |  | Rated Voltage (V) 額定工作電壓   | 6.3                                              | 10 | 16 | 25     | 35                  | 50~100             | tan δ (max.) 最大損耗角正切     | 0.24                                          | 0.20 | 0.16 | 0.16 | 0.14               | 0.12 |                     |                                 |   |  |  |  |  |
| Rated Voltage (V) 額定工作電壓          | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10   | 16   | 25     | 35   | 50~100 |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| tan δ (max.) 最大損耗角正切              | 0.24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.20 | 0.16 | 0.16   | 0.14 | 0.12   |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25~100</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>4</td><td>3</td><td>2</td><td>2</td></tr><tr><td></td><td>Z(-40°C) / Z(20°C)</td><td>8</td><td>6</td><td>4</td><td>3</td></tr></table>                                                                                                                                                                                                                 |      |      |        |      |        |  | Rated Voltage (V) 額定工作電壓   | 6.3                                              | 10 | 16 | 25~100 | Impedance Ratio 阻抗比 | Z(-25°C) / Z(20°C) | 4                        | 3                                             | 2    | 2    |      | Z(-40°C) / Z(20°C) | 8    | 6                   | 4                               | 3 |  |  |  |  |
| Rated Voltage (V) 額定工作電壓          | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10   | 16   | 25~100 |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Impedance Ratio 阻抗比               | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4    | 3    | 2      | 2    |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
|                                   | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 8    | 6    | 4      | 3    |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="6">Within ±20% of initial measured value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="6">≤200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="6">≤initial specified value 不大於規範值</td></tr></table> |      |      |        |      |        |  | Capacitance Change 靜電容量變化率 | Within ±20% of initial measured value 初始值的±20%以內 |    |    |        |                     |                    | Dissipation Factor 損耗角正切 | ≤200% of initial specified value 不大於規範值的 200% |      |      |      |                    |      | Leakage Current 漏電流 | ≤initial specified value 不大於規範值 |   |  |  |  |  |
| Capacitance Change 靜電容量變化率        | Within ±20% of initial measured value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |      |        |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Dissipation Factor 損耗角正切          | ≤200% of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |        |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Leakage Current 漏電流               | ≤initial specified value 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |        |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                           |      |      |        |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |        |      |        |  |                            |                                                  |    |    |        |                     |                    |                          |                                               |      |      |      |                    |      |                     |                                 |   |  |  |  |  |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 5   | 6.3 | 8<br>(L≤11.5) | 8<br>(L≥16) | 10  | 13  | 16  | 18 | 22   | 25   |
|----|-----|-----|---------------|-------------|-----|-----|-----|----|------|------|
| P  | 2.0 | 2.5 | 3.5           |             | 5.0 |     | 7.5 |    | 10.0 | 12.5 |
| Ød | 0.5 |     |               | 0.6         |     |     | 0.8 |    |      |      |
| β  | 1.5 |     |               |             |     | 2.0 |     |    |      |      |
| α  | 0.5 |     |               |             |     |     |     |    | 1.0  |      |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   |               | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz~ |
|----------------|---------------|------|-------|-------|------|--------|
| Coefficient 系數 | 0.1 ~ 47µF    | 0.75 | 1.00  | 1.35  | 1.55 | 2.00   |
|                | 68 ~ 680µF    | 0.80 | 1.00  | 1.25  | 1.34 | 1.50   |
|                | 1000 ~ 6800µF | 0.85 | 1.00  | 1.10  | 1.13 | 1.15   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱, 溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能, 請在使用過程中適當降低紋波電流。

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注: 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

CAT.2024/V1.3

NK Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

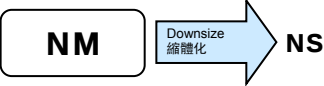
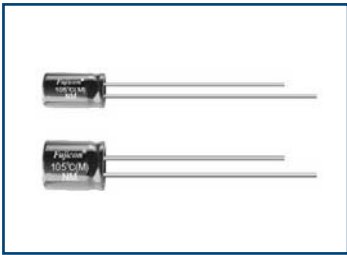
| WV<br>Code<br>μF<br>代碼 | 6.3 |            | 10   |            | 16   |            | 25     |            | 35     |            | 50         |            | 63         |            | 100        |                    |                           |
|------------------------|-----|------------|------|------------|------|------------|--------|------------|--------|------------|------------|------------|------------|------------|------------|--------------------|---------------------------|
|                        | 0J  |            | 1A   |            | 1C   |            | 1E     |            | 1V     |            | 1H         |            | 1J         |            | 2A         |                    |                           |
| 0.1                    | 0R1 |            |      |            |      |            |        |            |        |            | 5 x 11     | 3.6        | 5 x 11     | 3.9        | 5 x 11     | 4.2                |                           |
| 0.15                   | R15 |            |      |            |      |            |        |            |        |            | 5 x 11     | 4.4        | 5 x 11     | 4.8        | 5 x 11     | 5.1                |                           |
| 0.22                   | R22 |            |      |            |      |            |        |            |        |            | 5 x 11     | 5.3        | 5 x 11     | 5.8        | 5 x 11     | 6.2                |                           |
| 0.33                   | R33 |            |      |            |      |            |        |            |        |            | 5 x 11     | 6.5        | 5 x 11     | 7.2        | 5 x 11     | 7.5                |                           |
| 0.47                   | R47 |            |      |            |      |            |        |            |        |            | 5 x 11     | 7.8        | 5 x 11     | 8.5        | 5 x 11     | 9.2                |                           |
| 0.68                   | R68 |            |      |            |      |            |        |            |        |            | 5 x 11     | 9.4        | 5 x 11     | 10         | 5 x 11     | 11                 |                           |
| 1                      | 010 |            |      |            |      |            |        |            |        |            | 5 x 11     | 11         | 5 x 11     | 12         | 5 x 11     | 13                 |                           |
| 1.5                    | 1R5 |            |      |            |      |            |        |            |        |            | 5 x 11     | 14         | 5 x 11     | 15         | 5 x 11     | 16                 |                           |
| 2.2                    | 2R2 |            |      |            |      |            |        |            |        |            | 5 x 11     | 17         | 5 x 11     | 18         | 5 x 11     | 19                 |                           |
| 3.3                    | 3R3 |            |      |            |      |            |        |            |        |            | 5 x 11     | 21         | 5 x 11     | 23         | 6.3 x 11.5 | 27                 |                           |
| 4.7                    | 4R7 |            |      |            |      |            |        |            | 5 x 11 | 23         | 5 x 11     | 25         | 6.3 x 11.5 | 31         | 8 x 11.5   | 39                 |                           |
| 6.8                    | 6R8 |            |      |            |      |            | 5 x 11 | 26         | 5 x 11 | 27         | 6.3 x 11.5 | 34         | 6.3 x 11.5 | 37         | 10 x 12    | 54                 |                           |
| 10                     | 100 |            |      |            |      | 5 x 11     | 31     | 5 x 11     | 31     | 6.3 x 11.5 | 38         | 6.3 x 11.5 | 41         | 6.3 x 11.5 | 53         | 10 x 12            | 65                        |
| 15                     | 150 |            |      | 5 x 11     | 34   | 5 x 11     | 38     | 6.3 x 11.5 | 44     | 8 x 11.5   | 55         | 8 x 11.5   | 60         | 10 x 12    | 76         | 10 x 16            | 88                        |
| 22                     | 220 | 5 x 11     | 38   | 5 x 11     | 41   | 6.3 x 11.5 | 53     | 8 x 11.5   | 63     | 8 x 11.5   | 67         | 8 x 11.5   | 84         | 10 x 16    | 101        |                    |                           |
| 33                     | 330 | 5 x 11     | 46   | 6.3 x 11.5 | 58   | 8 x 11.5   | 77     | 8 x 11.5   | 77     | 10 x 12    | 95         | 10 x 16    | 113        | 10 x 16    | 124        |                    |                           |
| 47                     | 470 | 6.3 x 11.5 | 63   | 6.3 x 11.5 | 69   | 8 x 11.5   | 92     | 10 x 12    | 106    | 10 x 16    | 125        | 10 x 20    | 147        | 10 x 20    | 161        |                    |                           |
| 68                     | 680 | 6.3 x 11.5 | 76   | 8 x 11.5   | 98   | 10 x 12    | 128    | 10 x 16    | 140    | 10 x 20    | 164        | 10 x 20    | 177        | 13 x 21    | 227        |                    |                           |
| 100                    | 101 | 8 x 11.5   | 109  | 10 x 12    | 139  | 10 x 16    | 170    | 10 x 20    | 185    | 10 x 20    | 198        | 13 x 21    | 251        | 13 x 25    | 300        |                    |                           |
| 150                    | 151 | 10 x 12    | 155  | 10 x 16    | 186  | 10 x 20    | 227    | 13 x 21    | 267    | 13 x 21    | 285        | 13 x 25    | 336        | 16 x 25    | 408        |                    |                           |
| 220                    | 221 | 10 x 12    | 188  | 10 x 20    | 246  | 13 x 21    | 323    | 13 x 21    | 323    | 13 x 25    | 376        | 16 x 25    | 451        | 16 x 35    | 567        |                    |                           |
| 330                    | 331 | 10 x 16    | 252  | 13 x 21    | 354  | 13 x 21    | 396    | 13 x 25    | 431    | 16 x 25    | 511        | 16 x 35    | 634        | 18 x 35    | 745        |                    |                           |
| 470                    | 471 | 10 x 20    | 328  | 13 x 21    | 422  | 13 x 25    | 515    | 16 x 25    | 571    | 16 x 35    | 701        | 18 x 35    | 812        | 18 x 40    | 933        |                    |                           |
| 680                    | 681 | 13 x 21    | 464  | 13 x 25    | 554  | 16 x 25    | 687    | 16 x 35    | 788    | 18 x 35    | 904        | 18 x 40    | 1025       | 22 x 40    | 1236       |                    |                           |
| 1000                   | 102 | 13 x 25    | 613  | 16 x 25    | 745  | 16 x 35    | 956    | 18 x 35    | 1026   | 18 x 40    | 1151       | 22 x 40    | 1368       | 25 x 40    | 1637       |                    |                           |
| 1500                   | 152 | 16 x 25    | 800  | 16 x 35    | 999  | 18 x 35    | 1184   | 18 x 40    | 1243   | 22 x 40    | 1451       | 25 x 40    | 1694       |            |            |                    |                           |
| 2200                   | 222 | 16 x 35    | 1072 | 18 x 35    | 1242 | 18 x 40    | 1428   | 22 x 40    | 1572   | 25 x 50    | 1974       |            |            |            |            |                    |                           |
| 3300                   | 332 | 18 x 35    | 1361 | 18 x 40    | 1534 | 22 x 40    | 1835   | 25 x 40    | 2005   |            |            |            |            |            |            |                    |                           |
| 4700                   | 472 | 18 x 40    | 1650 | 22 x 40    | 1942 | 25 x 50    | 2498   |            |        |            |            |            |            |            |            |                    |                           |
| 6800                   | 682 | 18 x 35    | 2060 | 25 x 50    | 2603 |            |        |            |        |            |            |            |            |            |            | Case<br>size<br>尺寸 | Ripple<br>current<br>紋波電流 |
| 10000                  | 103 | 25 x 50    | 2755 |            |      |            |        |            |        |            |            |            |            |            |            |                    |                           |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第 21 頁“編帶標準”及第 23 頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

NM Series  
NON-POLARIZED, HEIGHT 7MM  
7MM 高，無極性品

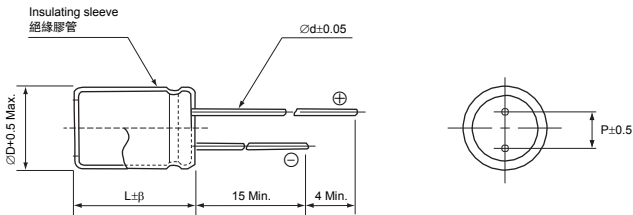
- Non-polarized series with 7mm height  
7mm 高，無極性品系列
- Endurance 1000 hours  
耐久性 1000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |       |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-------|--------|--|----------------------------|--------------------------------------------------|----|----|----|-------|--------|--------------------------|-----------------------------------------------|------|------|------|------|------|---------------------|---------------------------------|--|---|--|---|--|--|--|--|--|--|---|--|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |      |       |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 63V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |      |       |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Capacitance Range 靜電容量範圍          | 0.1 ~ 220μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |       |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |      |       |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Leakage Current 漏電流               | Leakage current ≤0.05CV or 10μA, whichever is greater (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.05CV 或 10μA，取較大值（在 20°C 環境中施加額定工作電壓 5 分鐘後）<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                      |      |      |      |       |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Dissipation Factor (tan δ) 損耗角正切  | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50, 63</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table>                                                                                                                                                                                                                                            |      |      |      |       |        |  | Rated Voltage (V) 額定工作電壓   | 6.3                                              | 10 | 16 | 25 | 35    | 50, 63 | tan δ (max.) 最大損耗角正切     | 0.24                                          | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Rated Voltage (V) 額定工作電壓          | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10   | 16   | 25   | 35    | 50, 63 |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| tan δ (max.) 最大損耗角正切              | 0.24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.20 | 0.16 | 0.14 | 0.12  | 0.10   |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td colspan="2">6.3</td><td colspan="2">10</td><td colspan="2">16~63</td></tr><tr><td>Impedance Ratio 阻抗比</td><td colspan="2">Z(-25°C) / Z(20°C)</td><td colspan="2">4</td><td colspan="2">3</td></tr><tr><td></td><td colspan="2">Z(-40°C) / Z(20°C)</td><td colspan="2">8</td><td colspan="2">6</td></tr><tr><td></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">4</td></tr></table>                                                                     |      |      |      |       |        |  | Rated Voltage (V) 額定工作電壓   | 6.3                                              |    | 10 |    | 16~63 |        | Impedance Ratio 阻抗比      | Z(-25°C) / Z(20°C)                            |      | 4    |      | 3    |      |                     | Z(-40°C) / Z(20°C)              |  | 8 |  | 6 |  |  |  |  |  |  | 4 |  |
| Rated Voltage (V) 額定工作電壓          | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      | 10   |      | 16~63 |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Impedance Ratio 阻抗比               | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      | 4    |      | 3     |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
|                                   | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      | 8    |      | 6     |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |      | 4     |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="6">Within ±20% of initial measured value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="6">≤200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="6">≤initial specified value 不大於規範值</td></tr></table> |      |      |      |       |        |  | Capacitance Change 靜電容量變化率 | Within ±20% of initial measured value 初始值的±20%以內 |    |    |    |       |        | Dissipation Factor 損耗角正切 | ≤200% of initial specified value 不大於規範值的 200% |      |      |      |      |      | Leakage Current 漏電流 | ≤initial specified value 不大於規範值 |  |   |  |   |  |  |  |  |  |  |   |  |
| Capacitance Change 靜電容量變化率        | Within ±20% of initial measured value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |      |      |       |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Dissipation Factor 損耗角正切          | ≤200% of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |      |       |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Leakage Current 漏電流               | ≤initial specified value 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |      |       |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 500 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 500 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                             |      |      |      |       |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |      |       |        |  |                            |                                                  |    |    |    |       |        |                          |                                               |      |      |      |      |      |                     |                                 |  |   |  |   |  |  |  |  |  |  |   |  |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 4    | 5   | 6.3 |
|----|------|-----|-----|
| p  | 1.5  | 2.0 | 2.5 |
| Ød | 0.45 |     |     |
| β  | 1.0  |     |     |

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

NM Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Code<br>μF<br>代碼 |     | 6.3     |     | 10      |     | 16      |     | 25      |    | 35      |    | 50      |     | 63              |                           |
|------------------------|-----|---------|-----|---------|-----|---------|-----|---------|----|---------|----|---------|-----|-----------------|---------------------------|
|                        |     | 0J      |     | 1A      |     | 1C      |     | 1E      |    | 1V      |    | 1H      |     | 1J              |                           |
| 0.1                    | 0R1 |         |     |         |     |         |     |         |    |         |    | 4 x 7   | 1   | 4 x 7           | 2.4                       |
| 0.22                   | R22 |         |     |         |     |         |     |         |    |         |    | 4 x 7   | 2   | 4 x 7           | 3.2                       |
| 0.33                   | R33 |         |     |         |     |         |     |         |    |         |    | 4 x 7   | 3.5 | 4 x 7           | 4                         |
| 0.47                   | R47 |         |     |         |     |         |     |         |    |         |    | 4 x 7   | 5   | 4 x 7           | 6                         |
| 0.68                   | R68 |         |     |         |     |         |     |         |    |         |    | 4 x 7   | 7   | 4 x 7           | 9                         |
| 1                      | 010 |         |     |         |     |         |     |         |    |         |    | 4 x 7   | 10  | 4 x 7           | 16                        |
| 2.2                    | 2R2 |         |     |         |     |         |     |         |    |         |    | 4 x 7   | 15  | 4 x 7           | 18                        |
| 3.3                    | 3R3 |         |     |         |     |         |     |         |    | 4 x 7   | 16 | 4 x 7   | 18  | 5 x 7           | 20                        |
| 4.7                    | 4R7 |         |     |         |     |         |     |         |    | 4 x 7   | 18 | 5 x 7   | 22  | 6.3 x 7         | 26                        |
| 6.8                    | 6R8 |         |     |         |     |         |     | 4 x 7   | 18 | 5 x 7   | 22 | 5 x 7   | 28  | 6.3 x 7         | 32                        |
| 10                     | 100 | 4 x 7   | 16  | 4 x 7   | 18  | 4 x 7   | 20  | 5 x 7   | 28 | 5 x 7   | 32 | 6.3 x 7 | 36  | 8 x 7           | 42                        |
| 22                     | 220 | 4 x 7   | 20  | 4 x 7   | 32  | 5 x 7   | 36  | 6.3 x 7 | 44 | 6.3 x 7 | 48 | 8 x 7   | 53  |                 |                           |
| 33                     | 330 | 4 x 7   | 26  | 5 x 7   | 36  | 5 x 7   | 42  | 6.3 x 7 | 52 | 8 x 7   | 67 |         |     |                 |                           |
| 47                     | 470 | 5 x 7   | 45  | 5 x 7   | 60  | 6.3 x 7 | 78  | 8 x 7   | 85 |         |    |         |     |                 |                           |
| 68                     | 680 | 6.3 x 7 | 45  | 6.3 x 7 | 78  | 6.3 x 7 | 82  | 8 x 7   | 95 |         |    |         |     |                 |                           |
| 100                    | 101 | 6.3 x 7 | 76  | 8 x 7   | 102 | 8 x 7   | 105 |         |    |         |    |         |     | Case size<br>尺寸 | Ripple<br>current<br>紋波電流 |
| 220                    | 221 | 8 x 7   | 115 |         |     |         |     |         |    |         |    |         |     |                 |                           |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

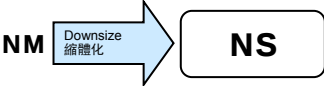
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第 21 頁“編帶標準”及第 23 頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

NS Series

NON-POLARIZED, HEIGHT 5MM

5MM 高，無極性品

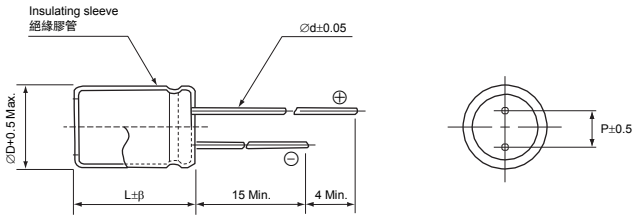
- Non-polarized series with 5mm height  
5mm 高，無極性品系列
- Uniquely designed for use in lightweight and portable equipment  
適用於小型及便攜器材
- Endurance 1000 hours  
耐久性 1000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |        |       |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------|-------|------|------|----------------------------|--------------------------------------------------|--------------------------|-----------------------------------------------|---------------------|---------------------------------|--------------------|----------------------|------|------|------|------|--------------------|------|---|---|---|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |        |       |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |        |       |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Capacitance Range 靜電容量範圍          | 0.1 ~ 47μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |        |       |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |        |       |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Leakage Current 漏電流               | Leakage current ≤0.05CV or 10μA, whichever is greater (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.05CV 或 10μA，取較大值（在 20°C 環境中施加額定工作電壓 5 分鐘後）<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                  |      |        |       |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Dissipation Factor (tan δ) 損耗角正切  | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.24</td><td>0.20</td><td>0.17</td><td>0.17</td><td>0.15</td><td>0.15</td></tr></table>                                                                                                                                                                                                            |      |        |       |      |      | Rated Voltage (V) 額定工作電壓   | 6.3                                              | 10                       | 16                                            | 25                  | 35                              | 50                 | tan δ (max.) 最大損耗角正切 | 0.24 | 0.20 | 0.17 | 0.17 | 0.15               | 0.15 |   |   |   |
| Rated Voltage (V) 額定工作電壓          | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 10   | 16     | 25    | 35   | 50   |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| tan δ (max.) 最大損耗角正切              | 0.24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.20 | 0.17   | 0.17  | 0.15 | 0.15 |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16, 25</td><td>35~50</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>4</td><td>3</td><td>2</td><td>2</td></tr><tr><td></td><td>Z(-40°C) / Z(20°C)</td><td>8</td><td>6</td><td>4</td><td>3</td></tr></table>                                                                                                                                                                        |      |        |       |      |      | Rated Voltage (V) 額定工作電壓   | 6.3                                              | 10                       | 16, 25                                        | 35~50               | Impedance Ratio 阻抗比             | Z(-25°C) / Z(20°C) | 4                    | 3    | 2    | 2    |      | Z(-40°C) / Z(20°C) | 8    | 6 | 4 | 3 |
| Rated Voltage (V) 額定工作電壓          | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 10   | 16, 25 | 35~50 |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Impedance Ratio 阻抗比               | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4    | 3      | 2     | 2    |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
|                                   | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 8    | 6      | 4     | 3    |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±20% of initial measured value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>≤200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>≤initial specified value 不大於規範值</td></tr></table> |      |        |       |      |      | Capacitance Change 靜電容量變化率 | Within ±20% of initial measured value 初始值的±20%以內 | Dissipation Factor 損耗角正切 | ≤200% of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | ≤initial specified value 不大於規範值 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Capacitance Change 靜電容量變化率        | Within ±20% of initial measured value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |        |       |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Dissipation Factor 損耗角正切          | ≤200% of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |        |       |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Leakage Current 漏電流               | ≤initial specified value 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |        |       |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 500 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 500 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                         |      |        |       |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。                                                                                                                                                                                                                                                                                                                                                                                 |      |        |       |      |      |                            |                                                  |                          |                                               |                     |                                 |                    |                      |      |      |      |      |                    |      |   |   |   |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 4    | 5   | 6.3 |
|----|------|-----|-----|
| p  | 1.5  | 2.0 | 2.5 |
| Ød | 0.45 |     |     |
| β  | 1.0  |     |     |

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注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

NS Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| μF   | WV<br>Code<br>代碼 | 6.3     |    | 10      |    | 16      |    | 25      |    | 35      |    | 50              |                        |
|------|------------------|---------|----|---------|----|---------|----|---------|----|---------|----|-----------------|------------------------|
|      |                  | 0J      |    | 1A      |    | 1C      |    | 1E      |    | 1V      |    | 1H              |                        |
| 0.1  | 0R1              |         |    |         |    |         |    |         |    |         |    | 4 x 5           | 3.2                    |
| 0.22 | R22              |         |    |         |    |         |    |         |    |         |    | 4 x 5           | 4.7                    |
| 0.33 | R33              |         |    |         |    |         |    |         |    |         |    | 4 x 5           | 5.8                    |
| 0.47 | R47              |         |    |         |    |         |    |         |    |         |    | 4 x 5           | 6.9                    |
| 0.68 | R68              |         |    |         |    |         |    |         |    |         |    | 4 x 5           | 8.3                    |
| 1    | 010              |         |    |         |    |         |    |         |    |         |    | 4 x 5           | 10                     |
| 2.2  | 2R2              |         |    |         |    |         |    | 4 x 5   | 10 | 4 x 5   | 11 | 5 x 5           | 12                     |
| 3.3  | 3R3              |         |    |         |    |         |    | 4 x 5   | 14 | 4 x 5   | 16 | 5 x 5           | 21                     |
| 4.7  | 4R7              |         |    |         |    | 4 x 5   | 12 | 4 x 5   | 16 | 4 x 5   | 18 | 6.3 x 5         | 24                     |
| 6.8  | 6R8              |         |    |         |    | 4 x 5   | 18 | 5 x 5   | 20 | 5 x 5   | 24 | 6.3 x 5         | 32                     |
| 10   | 100              | 4 x 5   | 14 | 4 x 5   | 18 | 4 x 5   | 20 | 5 x 5   | 21 | 6.3 x 5 | 28 |                 |                        |
| 22   | 220              | 5 x 5   | 25 | 5 x 5   | 30 | 5 x 5   | 32 | 6.3 x 5 | 34 |         |    |                 |                        |
| 33   | 330              | 5 x 5   | 35 | 6.3 x 5 | 37 | 6.3 x 5 | 42 |         |    |         |    | Case size<br>尺寸 | Ripple current<br>紋波電流 |
| 47   | 470              | 6.3 x 5 | 40 |         |    |         |    |         |    |         |    |                 |                        |

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C, 120Hz

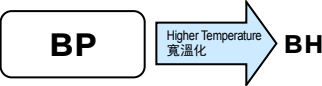
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第 21 頁“編帶標準”及第 23 頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

BP Series

BI-POLARIZED, HIGH RIPPLE CURRENT

雙極性，高紋波電流品

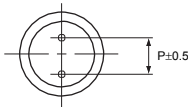
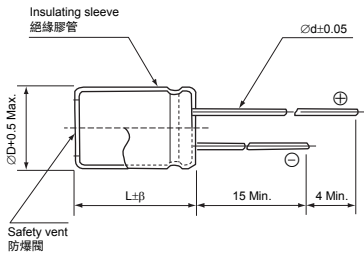
- High frequency and high ripple current characteristics  
高頻及高紋波電流特性
- Suitable for horizontal deflection circuit  
適用於水平偏轉電路
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                                  |                          |                                               |                     |                                 |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------------------|--------------------------|-----------------------------------------------|---------------------|---------------------------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                  |                          |                                               |                     |                                 |
| Voltage Range 額定工作電壓範圍            | 25 & 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                                                  |                          |                                               |                     |                                 |
| Capacitance Range 靜電容量範圍          | 2.2 ~ 10μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                            |                                                  |                          |                                               |                     |                                 |
| Capacitance Tolerance 靜電容量允許偏差    | ±10% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |                                                  |                          |                                               |                     |                                 |
| Leakage Current 漏電流               | Leakage current ≤0.03CV+50μA (Max.) (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.03CV+50μA (Max.) (在 20°C 環境中施加額定工作電壓 5 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                       |                            |                                                  |                          |                                               |                     |                                 |
| Dissipation Factor (tan δ) 損耗角正切  | (Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C)<br>Less than 0.05 不大於 0.05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                                  |                          |                                               |                     |                                 |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz<br>Impedance Ratio 阻抗比<br><table><tr><td>Z(-25°C) / Z(20°C)</td><td>1.5</td></tr><tr><td>Z(-40°C) / Z(20°C)</td><td>3.0</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                             | Z(-25°C) / Z(20°C)         | 1.5                                              | Z(-40°C) / Z(20°C)       | 3.0                                           |                     |                                 |
| Z(-25°C) / Z(20°C)                | 1.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |                                                  |                          |                                               |                     |                                 |
| Z(-40°C) / Z(20°C)                | 3.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |                                                  |                          |                                               |                     |                                 |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 85°C (the polarity needs to exchange every 250 hours), they meet the characteristics listed below.<br>在 85°C 環境中施加額定工作電壓 1000 小時（每 250 小時必須轉換一次極性）後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。<br><table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±15% of initial measured value 初始值的±15%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>≤200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>≤initial specified value 不大於規範值</td></tr></table> | Capacitance Change 靜電容量變化率 | Within ±15% of initial measured value 初始值的±15%以內 | Dissipation Factor 損耗角正切 | ≤200% of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | ≤initial specified value 不大於規範值 |
| Capacitance Change 靜電容量變化率        | Within ±15% of initial measured value 初始值的±15%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |                                                  |                          |                                               |                     |                                 |
| Dissipation Factor 損耗角正切          | ≤200% of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |                                                  |                          |                                               |                     |                                 |
| Leakage Current 漏電流               | ≤initial specified value 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                            |                                                  |                          |                                               |                     |                                 |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 85°C for 500 hours, they meet the specified value for endurance characteristics listed above.<br>在 85°C 環境中無負荷放置 500 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                                               |                            |                                                  |                          |                                               |                     |                                 |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                                  |                          |                                               |                     |                                 |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 13  | 16  | 18 |
|----|-----|-----|----|
| P  | 5.0 | 7.5 |    |
| Ød | 0.6 | 0.8 |    |
| β  | 2.0 |     |    |

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Parameter<br>Code<br>代碼<br>μF | 25 (1E)                      |                                                    | 50 (1H)                      |                                                    |
|-------------------------------------|------------------------------|----------------------------------------------------|------------------------------|----------------------------------------------------|
|                                     | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current<br>(Ap-p) at 85°C, 15.75KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current<br>(Ap-p) at 85°C, 15.75KHz<br>紋波電流 |
| 2.2                                 | 13 × 25                      | 5.0                                                | 13 × 25                      | 5.0                                                |
| 3.3                                 | 16 × 25                      | 6.0                                                | 16 × 25                      | 6.0                                                |
| 4.7                                 | 16 × 32                      | 7.0                                                | 16 × 32                      | 7.0                                                |
| 5.6                                 | 16 × 32                      | 7.5                                                | 16 × 32                      | 7.5                                                |
| 6.8                                 | 16 × 35                      | 8.0                                                | 16 × 35                      | 8.0                                                |
| 8.2                                 | 16 × 35                      | 9.0                                                | 16 × 35                      | 9.0                                                |
| 10                                  | 18 × 35                      | 10.0                                               | 18 × 35                      | 10.0                                               |

- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。
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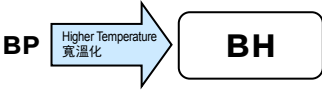
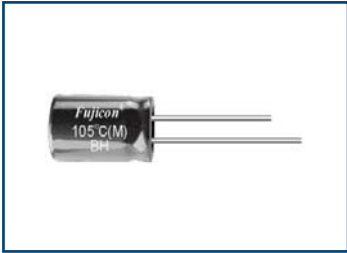
CAT.2024/V1.3

BH Series

BI-POLARIZED, HIGH RIPPLE CURRENT

雙極性，高紋波電流品

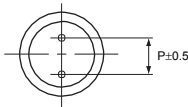
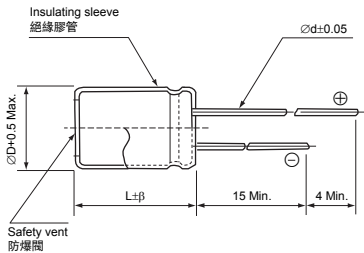
- High frequency and high ripple current characteristics  
高頻及高紋波電流特性
- Suitable for horizontal deflection circuit  
適用於水平偏轉電路
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Voltage Range 額定工作電壓範圍            | 25 & 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Capacitance Range 靜電容量範圍          | 2.2 ~ 10μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Capacitance Tolerance 靜電容量允許偏差    | ±10% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Leakage Current 漏電流               | Leakage current ≤0.03CV+50μA (Max.) (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.03CV+50μA (Max.) (在 20°C 環境中施加額定工作電壓 5 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                    |
| Dissipation Factor (tan δ) 損耗角正切  | (Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C)<br>Less than 0.05 不大於 0.05                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz<br>Impedance Ratio 阻抗比<br>Z(-25°C) / Z(20°C) 1.5<br>Z(-40°C) / Z(20°C) 3.0                                                                                                                                                                                                                                                                                                                                                                                         |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 1000 hours application of the rated voltage at 105°C (the polarity needs to exchange every 250 hours), they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 1000 小時（每 250 小時必須轉換一次極性）後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。<br>Capacitance Change 靜電容量變化率 Within ±15% of initial measured value 初始值的±15%以內<br>Dissipation Factor 損耗角正切 ≤200% of initial specified value 不大於規範值的 200%<br>Leakage Current 漏電流 ≤initial specified value 不大於規範值 |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 500 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 500 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                          |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                                                                                                                                                                                                                                                                               |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 13  | 16  | 18 |
|----|-----|-----|----|
| P  | 5.0 | 7.5 |    |
| Ød | 0.6 | 0.8 |    |
| β  | 2.0 |     |    |

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

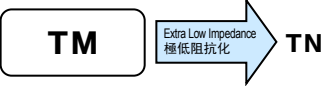
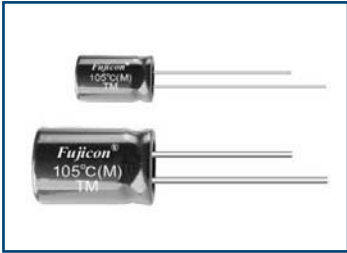
| WV<br>Parameter<br>Code<br>代碼<br>μF | 25 (1E)                      | 50 (1H)                      |                                                     |
|-------------------------------------|------------------------------|------------------------------|-----------------------------------------------------|
|                                     | Case size<br>ØD×L (mm)<br>尺寸 | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current<br>(Ap-p) at 105°C, 15.75KHz<br>紋波電流 |
| 2.2                                 | 2R2                          | 13 × 25                      | 3.0                                                 |
| 3.3                                 | 3R3                          | 16 × 25                      | 3.6                                                 |
| 4.7                                 | 4R7                          | 16 × 32                      | 4.2                                                 |
| 5.6                                 | 5R6                          | 16 × 32                      | 4.5                                                 |
| 6.8                                 | 6R8                          | 16 × 35                      | 4.8                                                 |
| 8.2                                 | 8R2                          | 16 × 35                      | 5.0                                                 |
| 10                                  | 100                          | 18 × 35                      | 6.0                                                 |

- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

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TM Series  
LOW IMPEDANCE  
低阻抗品

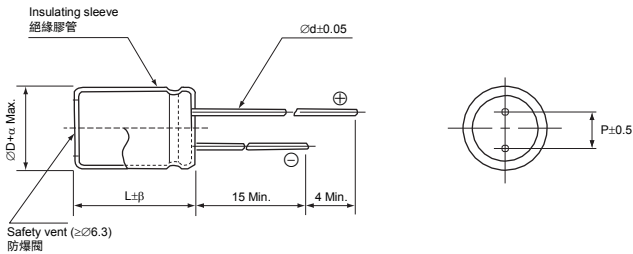
- Low impedance at high frequency  
高頻低阻抗
- Ideally suited for use of switching power supplies  
適用於開關電源
- Endurance 2000~3000 hours  
壽命持久性 2000~3000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                    |                                                                                                                                        |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                            | -25 ~ +105°C                                                                                                                           |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 100V                                                                                                                                                                                                                                                                                              | 160 ~ 450V                                                                                                                             |
| Capacitance Range 靜電容量範圍          | 1 ~ 15000μF                                                                                                                                                                                                                                                                                             | 22 ~ 330μF                                                                                                                             |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                     |                                                                                                                                        |
| Leakage Current 漏電流               | Leakage current ≤0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3μA, 取較大值 (在 20°C 環境中施加額定工作電壓 2 分鐘後)                                                                                                                                       | Leakage current ≤0.02CV + 15μA (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.02CV + 15μA (在 20°C 環境中施加額定工作電壓 5 分鐘後) |
| Dissipation Factor (tan δ) 損耗角正切  | C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓<br>When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.<br>當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02.<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C |                                                                                                                                        |
| Stability at Low Temperature 低溫特性 | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                | 6.3 10 16~35 50, 63 100 160~250 350~450                                                                                                |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                                                                                    | 0.18 0.14 0.12 0.10 0.08 0.15 0.20                                                                                                     |
|                                   | Impedance Ratio 阻抗比                                                                                                                                                                                                                                                                                     | Z(-25°C) / Z(20°C) 2 2 3 8<br>Z(-40°C) / Z(20°C) 4 3 — —                                                                               |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 3000 hours (25~28 products are for 2000 hours) application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 3000 小時 (25~28 產品為 2000 小時) 後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。                            |                                                                                                                                        |
| Shelf Life 高溫貯存特性                 | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                                              | Within ±20% of initial measured value 初始值的±20%以內                                                                                       |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                                                | ≤200% of initial specified value 不大於規範值的 200%                                                                                          |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                                                                                     | ≤initial specified value 不大於規範值                                                                                                        |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                                                                                  |                                                                                                                                        |

DRAWING 外形圖 (Unit: mm)



| ØD | 5   | 6.3 | 8<br>(L≤11.5) | 8<br>(L≥16) | 10  | 13  | 16  | 18 | 22   |
|----|-----|-----|---------------|-------------|-----|-----|-----|----|------|
| P  | 2.0 | 2.5 | 3.5           |             | 5.0 |     | 7.5 |    | 10.0 |
| Ød | 0.5 |     |               | 0.6         |     |     | 0.8 |    |      |
| β  | 1.5 |     |               |             |     | 2.0 |     |    |      |
| α  | 0.5 |     |               |             |     |     |     |    | 1.0  |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償係數

| Frequency 頻率      |                | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|----------------|------|-------|-------|------|--------|
| Coefficient<br>係數 | 1 ~ 47μF       | 0.75 | 1.00  | 1.35  | 1.55 | 2.0    |
|                   | 68 ~ 680μF     | 0.80 | 1.00  | 1.25  | 1.34 | 1.5    |
|                   | 1000 ~ 15000μF | 0.85 | 1.00  | 1.10  | 1.13 | 1.15   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱, 溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能, 請在使用過程中適當降低紋波電流。

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TM Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>參數<br><br>μF |     | 6.3 (0J)                     |                                              |                                 |                  | 10 (1A)                      |                                              |                                 |                  |
|---------------------------------|-----|------------------------------|----------------------------------------------|---------------------------------|------------------|------------------------------|----------------------------------------------|---------------------------------|------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  |
|                                 |     |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |
| 33                              | 330 |                              |                                              |                                 |                  | 5 × 11                       | 2.10                                         | 74                              | 111              |
| 47                              | 470 | 5 × 11                       | 2.10                                         | 56                              | 117              | 5 × 11                       | 1.90                                         | 88                              | 132              |
| 68                              | 680 | 5 × 11                       | 1.90                                         | 74                              | 140              | 5 × 11                       | 1.74                                         | 106                             | 156              |
| 100                             | 101 | 5 × 11                       | 1.70                                         | 113                             | 170              | 5 × 11                       | 1.30                                         | 147                             | 221              |
| 220                             | 221 | 6.3 × 11.5                   | 0.92                                         | 158                             | 260              | 6.3 × 11.5                   | 0.59                                         | 185                             | 280              |
| 330                             | 331 | 6.3 × 11.5                   | 0.83                                         | 195                             | 300              | 6.3 × 11.5                   | 0.33                                         | 215                             | 410              |
| 470                             | 471 | 8 × 11.5                     | 0.62                                         | 385                             | 578              | 8 × 11.5<br>(10 × 12)        | 0.29<br>(0.25)                               | 443<br>(465)                    | 563<br>(630)     |
| 680                             | 681 | 8 × 11.5                     | 0.44                                         | 483                             | 627              | 8 × 11.5                     | 0.13                                         | 482                             | 697              |
| 1000                            | 102 | 8 × 11.5                     | 0.36                                         | 505                             | 645              | 8 × 16<br>(10 × 12)          | 0.10<br>(0.098)                              | 816<br>(820)                    | 928<br>(935)     |
| 1200                            | 122 | 8 × 16                       | 0.18                                         | 525                             | 685              | 10 × 16                      | 0.095                                        | 835                             | 969              |
| 1500                            | 152 | 10 × 12<br>(10 × 16)         | 0.16<br>(0.16)                               | 787<br>(787)                    | 964<br>(964)     | 10 × 16<br>(10 × 20)         | 0.094<br>(0.092)                             | 905<br>(1029)                   | 1050<br>(1208)   |
| 2200                            | 222 | 10 × 20                      | 0.095                                        | 1002                            | 1195             | 10 × 20<br>(13 × 21)         | 0.08<br>(0.08)                               | 1006<br>(1103)                  | 1200<br>(1315)   |
| 3300                            | 332 | 10 × 20<br>(13 × 21)         | 0.093<br>(0.087)                             | 1100<br>(1189)                  | 1225<br>(1391)   | 13 × 25<br>(16 × 20)         | 0.065<br>(0.063)                             | 1573<br>(1425)                  | 1812<br>(1645)   |
| 4700                            | 472 | 13 × 25                      | 0.068                                        | 1608                            | 1875             | 16 × 25                      | 0.060                                        | 1971                            | 2262             |
| 6800                            | 682 | 13 × 25<br>(16 × 25)         | 0.067<br>(0.065)                             | 1680<br>(1776)                  | 1905<br>(2076)   | 16 × 31                      | 0.048                                        | 2390                            | 2650             |
| 10000                           | 103 | 16 × 31                      | 0.050                                        | 2169                            | 2404             | 18 × 31                      | 0.035                                        | 2590                            | 2730             |
| 15000                           | 153 | 18 × 31                      | 0.040                                        | 2380                            | 2850             |                              |                                              |                                 |                  |

| WV<br>Parameter<br>參數<br><br>μF |     | 16 (1C)                             |                                              |                                 |                       | 25 (1E)                           |                                              |                                 |                       |
|---------------------------------|-----|-------------------------------------|----------------------------------------------|---------------------------------|-----------------------|-----------------------------------|----------------------------------------------|---------------------------------|-----------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸        | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                       | Case size<br>ØD×L (mm)<br>尺寸      | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                       |
|                                 |     |                                     |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz      |                                   |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz      |
| 22                              | 220 | 5 × 11                              | 2                                            | 66                              | 132                   | 5 × 11                            | 1.90                                         | 65                              | 130                   |
| 33                              | 330 | 5 × 11                              | 1.8                                          | 81                              | 163                   | 5 × 11                            | 1.60                                         | 78                              | 156                   |
| 47                              | 470 | 5 × 11                              | 1.4                                          | 97                              | 194                   | 5 × 11                            | 1.30                                         | 106                             | 198                   |
| 68                              | 580 | 5 × 11                              | 0.93                                         | 134                             | 201                   | 6.3 × 11.5                        | 0.82                                         | 152                             | 228                   |
| 100                             | 101 | 5 × 11<br>(6.3 × 11.5)              | 0.09<br>(0.85)                               | 152<br>(163)                    | 230<br>(244)          | 6.3 × 11.5                        | 0.71                                         | 198                             | 265                   |
| 220                             | 221 | 6.3 × 11.5<br>(8 × 11.5)            | 0.50<br>(0.45)                               | 320<br>(358)                    | 400<br>(430)          | 6.3 × 11.5<br>(8 × 11.5)          | 0.46<br>(0.38)                               | 305<br>(356)                    | 440<br>(480)          |
| 330                             | 331 | 8 × 11.5                            | 0.41                                         | 425                             | 565                   | 8 × 11.5<br>(10 × 12)             | 0.36<br>(0.25)                               | 434<br>(645)                    | 656<br>(840)          |
| 470                             | 471 | 6.3 × 15<br>(8 × 11.5)<br>(10 × 12) | 0.38<br>(0.35)<br>(0.30)                     | 465<br>(503)<br>(600)           | 660<br>(707)<br>(845) | 8 × 11.5<br>(8 × 16)<br>(10 × 12) | 0.32<br>(0.23)<br>(0.20)                     | 500<br>(600)<br>(700)           | 780<br>(949)<br>(970) |
| 680                             | 681 | 8 × 16<br>(10 × 12)                 | 0.26<br>(0.24)                               | 768<br>(815)                    | 1024<br>(1038)        | 10 × 16                           | 0.10                                         | 924                             | 1387                  |
| 1000                            | 102 | 10 × 16<br>(10 × 20)                | 0.12<br>(0.14)                               | 982<br>(1000)                   | 1126<br>(1207)        | 10 × 16<br>(10 × 20)              | 0.09<br>(0.068)                              | 1179<br>(1179)                  | 1386<br>(1386)        |
| 1200                            | 122 | 10 × 20                             | 0.15                                         | 1035                            | 1268                  | 13 × 21                           | 0.065                                        | 1280                            | 1515                  |
| 1500                            | 152 | 10 × 20<br>(13 × 21)                | 0.096<br>(0.072)                             | 1100<br>(1182)                  | 1270<br>(1355)        | 13 × 25                           | 0.062                                        | 1403                            | 1621                  |
| 2200                            | 222 | 13 × 25                             | 0.063                                        | 1453                            | 1674                  | 13 × 25<br>(16 × 25)              | 0.063<br>(0.055)                             | 1500<br>(1567)                  | 1774<br>(1839)        |
| 3300                            | 332 | 13 × 30                             | 0.056                                        | 1619                            | 1816                  | 16 × 31<br>(18 × 25)              | 0.050<br>(0.052)                             | 2003<br>(1745)                  | 2391<br>(1992)        |
| 4700                            | 472 | 16 × 25                             | 0.050                                        | 2173                            | 2403                  | 16 × 35                           | 0.040                                        | 2420                            | 2840                  |
| 6800                            | 682 | 16 × 35                             | 0.040                                        | 2440                            | 2797                  | 18 × 35                           | 0.035                                        | 2840                            | 3250                  |
| 10000                           | 103 | 18 × 35                             | 0.038                                        | 2850                            | 3230                  |                                   |                                              |                                 |                       |

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TM Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>參數<br><br>μF |     | 35 (1V)                      |                                              |                                 |                  | 50 (1H)                      |                                              |                                 |                  |
|---------------------------------|-----|------------------------------|----------------------------------------------|---------------------------------|------------------|------------------------------|----------------------------------------------|---------------------------------|------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  |
|                                 |     |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |
| 1                               | 010 |                              |                                              |                                 |                  | 5 × 11                       | 4.2                                          | 16                              | 32               |
| 2.2                             | 2R2 |                              |                                              |                                 |                  | 5 × 11                       | 4.0                                          | 18                              | 36               |
| 3.3                             | 3R3 |                              |                                              |                                 |                  | 5 × 11                       | 3.8                                          | 20                              | 40               |
| 4.7                             | 4R7 |                              |                                              |                                 |                  | 5 × 11                       | 2.5                                          | 29                              | 58               |
| 6.8                             | 6R8 |                              |                                              |                                 |                  | 5 × 11                       | 2.2                                          | 38                              | 76               |
| 10                              | 100 | 5 × 11                       | 1.80                                         | 55                              | 100              | 5 × 11                       | 2.0                                          | 52                              | 104              |
| 22                              | 220 | 5 × 11<br>(6.3 × 11.5)       | 1.50<br>(1.40)                               | 67<br>(75)                      | 134<br>(145)     | 5 × 11<br>(6.3 × 11.5)       | 1.6<br>(1.0)                                 | 68<br>(76)                      | 136<br>(150)     |
| 33                              | 330 | 5 × 11                       | 1.20                                         | 81                              | 163              | 6.3 × 11.5                   | 0.8                                          | 85                              | 175              |
| 47                              | 470 | 6.3 × 11.5<br>(6.3 × 7)      | 1.10<br>(1.20)                               | 114<br>(102)                    | 229<br>(210)     | 6.3 × 11.5                   | 0.71                                         | 125                             | 225              |
| 68                              | 680 | 6.3 × 11.5                   | 0.85                                         | 137                             | 273              | 8 × 11.5                     | 0.65                                         | 215                             | 385              |
| 100                             | 101 | 6.3 × 11.5<br>(8 × 11.5)     | 0.68<br>(0.50)                               | 205<br>(273)                    | 340<br>(409)     | 8 × 11.5                     | 0.4                                          | 380                             | 480              |
| 220                             | 221 | 8 × 11.5<br>(8 × 16)         | 0.27<br>(0.25)                               | 484<br>(510)                    | 725<br>(750)     | 8 × 16<br>(10 × 12)          | 0.25<br>(0.20)                               | 580<br>(600)                    | 760<br>(805)     |
| 330                             | 331 | 8 × 16<br>(10 × 16)          | 0.16<br>(0.14)                               | 540<br>(610)                    | 795<br>(900)     | 10 × 20                      | 0.10                                         | 900                             | 1045             |
| 470                             | 470 | 10 × 16<br>(10 × 20)         | 0.12<br>(0.10)                               | 810<br>(960)                    | 1020<br>(1095)   | 10 × 20<br>(13 × 21)         | 0.09<br>(0.088)                              | 1000<br>(1085)                  | 1120<br>(1260)   |
| 680                             | 681 | 10 × 20<br>(10 × 25)         | 0.085<br>(0.072)                             | 1015<br>(1089)                  | 1160<br>(1433)   | 13 × 25                      | 0.078                                        | 1275                            | 1464             |
| 1000                            | 102 | 13 × 21                      | 0.065                                        | 1350                            | 1490             | 13 × 25<br>(16 × 25)         | 0.075<br>(0.065)                             | 1305<br>(1460)                  | 1500<br>(1700)   |
| 1500                            | 152 | 13 × 25                      | 0.060                                        | 1580                            | 1715             | 16 × 31                      | 0.050                                        | 1710                            | 1990             |
| 2200                            | 222 | 16 × 25                      | 0.055                                        | 1759                            | 2069             | 16 × 35<br>(18 × 31)         | 0.045<br>(0.045)                             | 2076<br>(2076)                  | 2326<br>(2326)   |
| 3300                            | 332 | 16 × 35<br>(18 × 25)         | 0.045<br>(0.050)                             | 2300<br>(2165)                  | 2520<br>(2420)   | 18 × 35                      | 0.04                                         | 2500                            | 2700             |
| 4700                            | 472 | 18 × 35                      | 0.038                                        | 2450                            | 2875             |                              |                                              |                                 |                  |

| WV<br>Parameter<br>參數<br><br>μF |     | 63 (1J)                      |                                              |                                 |                  | 100 (2A)                     |                                              |                                 |                  |
|---------------------------------|-----|------------------------------|----------------------------------------------|---------------------------------|------------------|------------------------------|----------------------------------------------|---------------------------------|------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  |
|                                 |     |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |
| 1                               | 010 |                              |                                              |                                 |                  | 5 × 11                       | 7                                            | 47                              | 66               |
| 2.2                             | 2R2 |                              |                                              |                                 |                  | 5 × 11                       | 6                                            | 66                              | 72               |
| 3.3                             | 3R3 |                              |                                              |                                 |                  | 5 × 11                       | 5                                            | 68                              | 78               |
| 4.7                             | 4R7 | 5 × 11                       | 2.5                                          | 45                              | 71               | 5 × 11                       | 4                                            | 72                              | 88               |
| 10                              | 100 | 5 × 11                       | 1.5                                          | 50                              | 81               | 6.3 × 11.5                   | 1.2                                          | 100                             | 180              |
| 22                              | 220 | 5 × 11                       | 1.2                                          | 110                             | 165              | 8 × 11.5                     | 0.66                                         | 196                             | 282              |
| 33                              | 330 | 6.3 × 11.5                   | 0.85                                         | 135                             | 210              | 8 × 11.5                     | 0.5                                          | 310                             | 380              |
| 47                              | 470 | 8 × 11.5                     | 0.56                                         | 210                             | 330              | 8 × 16<br>(10 × 12)          | 0.32<br>(0.25)                               | 405<br>(460)                    | 500<br>(630)     |
| 68                              | 680 | 8 × 11.5                     | 0.56                                         | 210                             | 330              | 10 × 16                      | 0.25                                         | 515                             | 780              |
| 100                             | 101 | 8 × 16<br>(10 × 12)          | 0.50<br>(0.40)                               | 370<br>(380)                    | 581<br>(600)     | 10 × 16<br>(10 × 20)         | 0.22<br>(0.16)                               | 600<br>(650)                    | 820<br>(890)     |
| 220                             | 221 | 10 × 16<br>(10 × 20)         | 0.35<br>(0.27)                               | 540<br>(710)                    | 850<br>(1000)    | 13 × 25                      | 0.13                                         | 920                             | 1280             |
| 330                             | 331 | 10 × 20<br>(13 × 21)         | 0.20<br>(0.16)                               | 860<br>(950)                    | 1100<br>(1200)   | 16 × 25                      | 0.09                                         | 1200                            | 1440             |
| 470                             | 471 | 13 × 25                      | 0.14                                         | 1100                            | 1300             | 16 × 31                      | 0.06                                         | 1560                            | 1790             |
| 680                             | 681 | 16 × 25                      | 0.08                                         | 1215                            | 1450             | 18 × 35                      | 0.055                                        | 1650                            | 1850             |
| 1000                            | 102 | 16 × 25<br>(16 × 31)         | 0.06<br>(0.06)                               | 1295<br>(1350)                  | 1525<br>(1600)   | 18 × 40                      | 0.051                                        | 1700                            | 2040             |
| 2200                            | 222 | 18 × 40                      | 0.045                                        | 1500                            | 1800             |                              |                                              |                                 |                  |

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TM Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>參數<br><br>μF |     | 160 (2C)                     |                                              |                                 |                  | 200 (2D)                     |                                              |                                 |                  |
|---------------------------------|-----|------------------------------|----------------------------------------------|---------------------------------|------------------|------------------------------|----------------------------------------------|---------------------------------|------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  |
|                                 |     |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |
| 10                              | 100 |                              |                                              |                                 |                  | 8 × 11.5<br>(10 × 12)        | 7.80<br>(6.20)                               | 225<br>(240)                    | 295<br>(320)     |
| 22                              | 220 | 10 × 20                      | 1.30                                         | 315                             | 440              | 10 × 16<br>(10 × 20)         | 4.30<br>(4.20)                               | 285<br>(300)                    | 365<br>(380)     |
| 33                              | 330 | 10 × 20                      | 1.30                                         | 405                             | 565              | 13 × 21                      | 3.0                                          | 425                             | 560              |
| 47                              | 470 | 10 × 20<br>(13 × 21)         | 1.12<br>(0.91)                               | 495<br>(525)                    | 685<br>(725)     | 13 × 21                      | 2.6                                          | 510                             | 785              |
| 68                              | 680 | 13 × 25                      | 0.63                                         | 680                             | 950              | 13 × 25                      | 1.4                                          | 645                             | 875              |
| 100                             | 101 | 16 × 25<br>(16 × 31)         | 0.27<br>(0.25)                               | 920<br>(925)                    | 1280<br>(1290)   | 13 × 25                      | 0.95                                         | 715                             | 980              |
| 150                             | 151 | 16 × 31                      | 0.22                                         | 930                             | 1300             | 16 × 31<br>(18 × 25)         | 0.80<br>(0.72)                               | 745<br>(730)                    | 995<br>(985)     |
| 220                             | 221 | 16 × 31                      | 0.22                                         | 930                             | 1300             | 18 × 31                      | 0.45                                         | 750                             | 1000             |
| 330                             | 331 | 16 × 35<br>(18 × 31)         | 0.22<br>(0.22)                               | 1580<br>(1580)                  | 1700<br>(1700)   | 18 × 35<br>(22 × 35)         | 0.38<br>(0.28)                               | 760<br>(795)                    | 1050<br>(1135)   |

| WV<br>Parameter<br>參數<br><br>μF |     | 250 (2E)                     |                                              |                                 |                  | 350 (2V)                     |                                              |                                 |                  |
|---------------------------------|-----|------------------------------|----------------------------------------------|---------------------------------|------------------|------------------------------|----------------------------------------------|---------------------------------|------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  |
|                                 |     |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |
| 4.7                             | 4R7 | 8 × 11.5                     | 7.00                                         | 90                              | 145              | 8 × 11.5<br>(10 × 12)        | 6.5<br>(6.2)                                 | 115<br>(140)                    | 460<br>(195)     |
| 6.8                             | 6R8 | 10 × 12                      | 5.80                                         | 115                             | 180              | 10 × 12<br>(10 × 16)         | 5.4<br>(5.0)                                 | 145<br>(150)                    | 210<br>(220)     |
| 10                              | 100 | 10 × 16                      | 4.50                                         | 150                             | 245              | 10 × 16<br>(10 × 20)         | 4.5<br>(4.2)                                 | 160<br>(175)                    | 230<br>(275)     |
| 22                              | 220 | 10 × 20                      | 3.20                                         | 265                             | 360              | 13 × 21<br>(13 × 25)         | 3.9<br>(2.5)                                 | 295<br>(300)                    | 400<br>(455)     |
| 33                              | 330 | 13 × 21                      | 2.50                                         | 310                             | 495              | 13 × 25<br>(16 × 20)         | 3.4<br>(3.0)                                 | 405<br>(465)                    | 525<br>(645)     |
| 47                              | 470 | 13 × 25                      | 1.90                                         | 425                             | 570              | 16 × 25                      | 2.8                                          | 550                             | 705              |
| 68                              | 680 | 16 × 25                      | 1.20                                         | 480                             | 655              | 16 × 31                      | 2.0                                          | 625                             | 825              |
| 100                             | 101 | 16 × 31<br>(18 × 31)         | 0.65<br>(0.40)                               | 505<br>(550)                    | 690<br>(750)     | 16 × 35<br>(18 × 31)         | 1.2<br>(0.7)                                 | 700<br>(705)                    | 905<br>(960)     |
| 150                             | 151 | 18 × 35<br>(22 × 35)         | 0.30<br>(0.24)                               | 600<br>(630)                    | 845<br>(900)     | 18 × 35                      | 0.6                                          | 1020                            | 1050             |
| 220                             | 221 | 22 × 35                      | 0.25                                         | 750                             | 1000             |                              |                                              |                                 |                  |

| WV<br>Parameter<br>參數<br><br>μF |     | 400 (2G)                     |                                              |                                 |                  | 450 (2W)                     |                                              |                                 |                  |
|---------------------------------|-----|------------------------------|----------------------------------------------|---------------------------------|------------------|------------------------------|----------------------------------------------|---------------------------------|------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current (mA rms)<br>紋波電流 |                  |
|                                 |     |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |                              |                                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |
| 2.2                             | 2R2 | 6.3 × 11.5<br>(8 × 11.5)     | 8.8<br>(8.0)                                 | 80<br>(95)                      | 110<br>(130)     | 8 × 11.5                     | 7.0                                          | 95                              | 138              |
| 3.3                             | 3R3 | 8 × 11.5                     | 8.0                                          | 105                             | 140              | 8 × 11.5                     | 6.0                                          | 105                             | 140              |
| 4.7                             | 4R7 | 8 × 11.5<br>(10 × 12)        | 8.0<br>(6.0)                                 | 130<br>(135)                    | 175<br>(210)     | 10 × 12                      | 5.6                                          | 150                             | 200              |
| 6.8                             | 6R8 | 10 × 12<br>(10 × 16)         | 5.0<br>(4.5)                                 | 150<br>(160)                    | 220<br>(230)     | 10 × 16                      | 6.5                                          | 205                             | 265              |
| 10                              | 100 | 10 × 16<br>(10 × 20)         | 3.6<br>(3.6)                                 | 195<br>(205)                    | 265<br>(285)     | 10 × 20                      | 9.0                                          | 235                             | 320              |
| 22                              | 220 | 13 × 21                      | 3.8                                          | 310                             | 420              | 13 × 35                      | 6.0                                          | 415                             | 570              |
| 27                              | 270 | 13 × 21                      | 3.8                                          | 310                             | 420              |                              |                                              |                                 |                  |
| 33                              | 330 | 16 × 20<br>(16 × 25)         | 3.4<br>(3.0)                                 | 405<br>(465)                    | 525<br>(645)     | 16 × 31                      | 2.4                                          | 385                             | 710              |
| 39                              | 390 |                              |                                              |                                 |                  | 16 × 25                      | 2.8                                          | 450                             | 650              |
| 47                              | 470 | 16 × 25<br>(16 × 31)         | 2.8<br>(2.6)                                 | 550<br>(585)                    | 705<br>(775)     | 16 × 35<br>(18 × 26)         | 1.8<br>(1.2)                                 | 515<br>(585)                    | 755<br>(800)     |
| 68                              | 680 | 16 × 31                      | 2.0                                          | 625                             | 825              | 18 × 31                      | 1.0                                          | 620                             | 845              |
| 100                             | 101 | 18 × 31<br>(18 × 35)         | 1.2<br>(0.7)                                 | 700<br>(705)                    | 905<br>(960)     | 18 × 35                      | 0.64                                         | 380                             | 520              |
| 150                             | 151 | 18 × 40                      | 0.6                                          | 1020                            | 1050             |                              |                                              |                                 |                  |

● Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。  
● Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。  
● Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

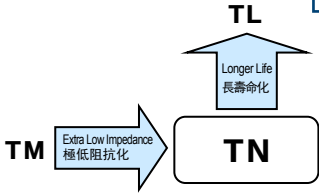
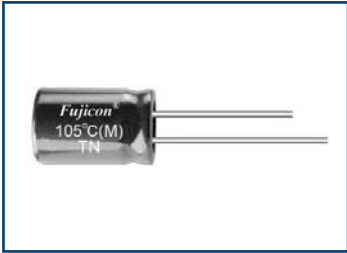
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TN Series

EXTREMELY LOW IMPEDANCE

極低阻抗品

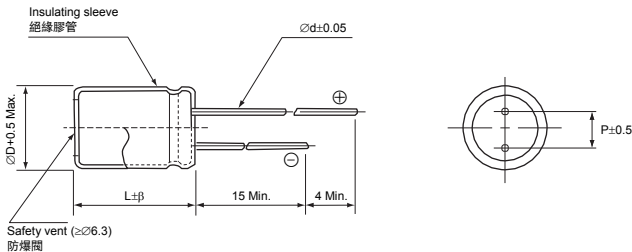
- Extremely low impedance at high frequency  
高頻極低阻抗
- Ideally suited for use of switching power supplies  
適用於開關電源
- Endurance 5000 hours  
(2000~3000 hours for smaller case sizes as specified below)  
耐久性 5000 小時（小尺寸為 2000~3000 小時）
- Comply with the RoHS & REACH  
1.5oHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                   |                                                   |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Category 工作溫度範圍                   | -40 ~ +105°C                                                                                                                                                                                                                           | -25 ~ +105°C                                      |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 63V                                                                                                                                                                                                                              | 160 ~ 450V                                        |
| Capacitance Range 靜電容量範圍          | 1 ~ 15000µF                                                                                                                                                                                                                            | 22 ~ 330µF                                        |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                    |                                                   |
| Leakage Current 漏電流               | Leakage current ≤0.01CV or 3µA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3µA, 取較大值 (在 20°C 環境中施加額定工作電壓 2 分鐘後)<br>C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓     |                                                   |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000µF, tan δ shall be added 0.02 to the listed value with increase of every 1000µF.<br>當標稱靜電容量大於 1000µF, 其標稱靜電容量每增加 1000µF, 損耗角正切增加 0.02.<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C |                                                   |
| Stability at Low Temperature 低溫特性 | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                               | 6.3 10 16 25 35 50 63 100 160~250 350~450         |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                   | 0.22 0.19 0.16 0.14 0.12 0.10 0.09 0.08 0.15 0.20 |
|                                   | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                      |                                                   |
| Endurance 耐久性                     | Size (mm) 尺寸                                                                                                                                                                                                                           | Life time (hours) 壽命 (小時)                         |
|                                   | ØD5, Ø6.3                                                                                                                                                                                                                              | 2000                                              |
|                                   | ØD8                                                                                                                                                                                                                                    | 3000                                              |
| Shelf Life 高溫貯存特性                 | Capacitance Change 靜電容量變化率                                                                                                                                                                                                             | Within ±20% of initial measured value 初始值的±20%以內  |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                               | ≤200% of initial specified value 不大於規範值的 200%     |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                    | ≤initial specified value 不大於規範值                   |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                 |                                                   |

DRAWING 外形圖 (Unit: mm)



| ØD | 5   | 6.3 | 8 (L≤11.5) | 8 (L≥16) | 10  | 13 | 16 | 18 |
|----|-----|-----|------------|----------|-----|----|----|----|
| P  | 2.0 | 2.5 | 3.5        | 5.0      | 7.5 |    |    |    |
| Ød | 0.5 | 0.5 | 0.6        | 0.6      | 0.8 |    |    |    |
| β  | 1.5 | 1.5 | 2.0        | 2.0      | 2.0 |    |    |    |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |                | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|----------------|------|-------|-------|------|--------|
| Coefficient<br>係數 | 1 ~ 47μF       | 0.75 | 1.00  | 1.35  | 1.55 | 2.0    |
|                   | 68 ~ 680μF     | 0.80 | 1.00  | 1.25  | 1.34 | 1.5    |
|                   | 1000 ~ 15000μF | 0.85 | 1.00  | 1.10  | 1.13 | 1.15   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

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TN Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>参数<br><br>μF |     | 6.3 (0J)                        |                                                 |                                    |                  | 10 (1A)                         |                                                 |                                    |                  | 16 (1C)                         |                                                 |                                    |                          | 25 (1E)                         |                                                 |                                    |                          |
|---------------------------------|-----|---------------------------------|-------------------------------------------------|------------------------------------|------------------|---------------------------------|-------------------------------------------------|------------------------------------|------------------|---------------------------------|-------------------------------------------------|------------------------------------|--------------------------|---------------------------------|-------------------------------------------------|------------------------------------|--------------------------|
|                                 |     | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>纹波电流 |                  | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>纹波电流 |                  | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>纹波电流 |                          | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>纹波电流 |                          |
|                                 |     |                                 |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz |                                 |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz |                                 |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz         |                                 |                                                 |                                    |                          |
|                                 |     |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                          |                                 |                                                 |                                    |                          |
| 33                              | 330 |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                          | 5 × 11                          | 0.80                                            | 88                                 | 155                      |
| 47                              | 470 |                                 |                                                 |                                    |                  | 5 × 11                          | 0.90                                            | 75                                 | 125              | 5 × 11                          | 0.80                                            | 92                                 | 155                      | 6.3×11.5                        | 0.55                                            | 125                                | 210                      |
| 68                              | 680 |                                 |                                                 |                                    |                  | 5 × 11                          | 0.80                                            | 97                                 | 155              | 6.3×11.5                        | 0.50                                            | 135                                | 220                      | 6.3×11.5                        | 0.36                                            | 160                                | 260                      |
| 100                             | 101 | 5 × 11                          | 0.85                                            | 99                                 | 150              | 5 × 11<br>(6.3×11.5)            | 0.70<br>(0.55)                                  | 115<br>(135)                       | 185<br>(210)     | 6.3×11.5                        | 0.35                                            | 175                                | 265                      | 6.3×11.5<br>(8×11.5)            | 0.32<br>(0.24)                                  | 195<br>(254)                       | 312<br>(383)             |
| 150                             | 151 | 6.3×11.5                        | 0.49                                            | 155                                | 225              | 6.3×11.5                        | 0.35                                            | 185                                | 265              | 8 × 11.5                        | 0.23                                            | 270                                | 388                      | 8 × 11.5                        | 0.16                                            | 320                                | 460                      |
| 220                             | 221 | 6.3×11.5                        | 0.30                                            | 205                                | 285              | 6.3×11.5<br>(8×11.5)            | 0.30<br>(0.24)                                  | 225<br>(283)                       | 305<br>(387)     | 6.3×11.5<br>(8 × 11.5)          | 0.25<br>(0.16)                                  | 300<br>(335)                       | 410<br>(460)             | 8 × 11.5<br>(10×12)             | 0.14<br>(0.13)                                  | 370<br>(435)                       | 500<br>(600)             |
| 330                             | 331 | 6.3×11.5<br>(8×11.5)            | 0.26<br>(0.20)                                  | 220<br>(223)                       | 290<br>(292)     | 6.3×11.5<br>(8×11.5)            | 0.20<br>(0.16)                                  | 305<br>(350)                       | 425<br>(460)     | 8 × 11.5<br>(10×12)             | 0.14<br>(0.12)                                  | 400<br>(480)                       | 520<br>(625)             | 8 × 16<br>(10×12)               | 0.12<br>(0.10)                                  | 450<br>(595)                       | 545<br>(680)             |
| 470                             | 471 | 8 × 11.5<br>(10×12)             | 0.18<br>(0.14)                                  | 325<br>(455)                       | 435<br>(575)     | 8 × 11.5<br>(10×12)             | 0.15<br>(0.13)                                  | 405<br>(475)                       | 575<br>(600)     | 8 × 11.5<br>(10×12)             | 0.12<br>(0.10)                                  | 575<br>(520)                       | 645<br>(680)             | 10 × 16<br>(10×20)              | 0.084<br>(0.065)                                | 680<br>(810)                       | 890<br>(1020)            |
| 680                             | 681 | 10 × 16                         | 0.11                                            | 580                                | 700              | 10 × 12<br>(10×16)              | 0.11<br>(0.09)                                  | 545<br>(635)                       | 650<br>(770)     | 10 × 20                         | 0.065                                           | 845                                | 1020                     | 10 × 20<br>(13×21)              | 0.054<br>(0.046)                                | 985<br>(1160)                      | 1165<br>(1392)           |
| 820                             | 821 | 8 × 11.5                        | 0.12                                            | 455                                | 575              |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                          |                                 |                                                 |                                    |                          |
| 1000                            | 102 | 10 × 12<br>(10×20)              | 0.095<br>(0.075)                                | 715<br>(820)                       | 865<br>(950)     | 8 × 16<br>(10×20)               | 0.068<br>(0.060)                                | 760<br>(915)                       | 880<br>(1060)    | 10 × 16<br>(10×20)              | 0.058<br>(0.055)                                | 850<br>(950)                       | 1060<br>(1185)           | 10 × 20<br>(13×21)<br>(13×25)   | 0.046<br>(0.043)<br>(0.036)                     | 1150<br>(1200)<br>(1430)           | 1400<br>(1475)<br>(1660) |
| 1500                            | 152 | 10 × 25                         | 0.055                                           | 1090                               | 1220             | 10 × 20<br>(13×21)              | 0.058<br>(0.045)                                | 1020<br>(1266)                     | 1245<br>(1417)   | 10 × 20<br>(13×25)              | 0.050<br>(0.036)                                | 1050<br>(1490)                     | 1245<br>(1660)           | 16 × 20                         | 0.034                                           | 1590                               | 1770                     |
| 2200                            | 222 | 10 × 20<br>(13×21)              | 0.050<br>(0.043)                                | 1115<br>(1296)                     | 1305<br>(1438)   | 10 × 25<br>(13×25)              | 0.038<br>(0.035)                                | 1375<br>(1530)                     | 1550<br>(1710)   | 13 × 21<br>(13×25)<br>(16×20)   | 0.035<br>(0.034)<br>(0.033)                     | 1485<br>(1545)<br>(1620)           | 1695<br>(1705)<br>(1800) | 13 × 25<br>(16×25)              | 0.030<br>(0.028)                                | 1645<br>(1848)                     | 1750<br>(2051)           |
| 3300                            | 332 | 13 × 25                         | 0.034                                           | 1530                               | 1710             | 16 × 20                         | 0.031                                           | 1660                               | 1850             | 13 × 25<br>(16×25)              | 0.034<br>(0.027)                                | 1700<br>(1888)                     | 1725<br>(2095)           | 16 × 35                         | 0.020                                           | 2410                               | 2680                     |
| 4700                            | 472 | 16 × 25                         | 0.032                                           | 1728                               | 1935             | 16 × 31                         | 0.023                                           | 2170                               | 2420             | 16 × 35                         | 0.020                                           | 2410                               | 2680                     | 18 × 31<br>(18×40)              | 0.019<br>(0.018)                                | 2515<br>(2660)                     | 2785<br>(2960)           |
| 6800                            | 682 | 16 × 31                         | 0.024                                           | 2130                               | 2370             | 16 × 35                         | 0.020                                           | 2410                               | 2680             | 18 × 35                         | 0.018                                           | 2610                               | 2900                     |                                 |                                                 |                                    |                          |
| 10000                           | 103 | 16 × 40                         | 0.020                                           | 2470                               | 2750             | 18 × 40                         | 0.017                                           | 2730                               | 3040             |                                 |                                                 |                                    |                          |                                 |                                                 |                                    |                          |
| 15000                           | 153 | 18 × 40                         | 0.018                                           | 2660                               | 2960             |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                          |                                 |                                                 |                                    |                          |

| WV<br>Parameter<br>参数<br><br>μF |     | 35V (1V)                         |                                                 |                                    |                       | 50V (1H)                          |                                                 |                                    |                        | 63V (1J)                          |                                                 |                                    |                          |
|---------------------------------|-----|----------------------------------|-------------------------------------------------|------------------------------------|-----------------------|-----------------------------------|-------------------------------------------------|------------------------------------|------------------------|-----------------------------------|-------------------------------------------------|------------------------------------|--------------------------|
|                                 |     | Case size<br>ØD×L<br>(mm)<br>尺寸  | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>纹波电流 |                       | Case size<br>ØD×L<br>(mm)<br>尺寸   | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>纹波电流 |                        | Case size<br>ØD×L<br>(mm)<br>尺寸   | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>纹波电流 |                          |
|                                 |     |                                  |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz      |                                   |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz       |                                   |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz         |
|                                 |     |                                  |                                                 |                                    |                       |                                   |                                                 |                                    |                        |                                   |                                                 |                                    |                          |
| 1                               | 101 |                                  |                                                 |                                    |                       | 5 × 11                            | 4.0                                             | 18                                 | 36                     |                                   |                                                 |                                    |                          |
| 1.5                             | 1R5 |                                  |                                                 |                                    |                       | 5 × 11                            | 3.8                                             | 22                                 | 45                     |                                   |                                                 |                                    |                          |
| 2.2                             | 2R2 |                                  |                                                 |                                    |                       | 5 × 11                            | 3.5                                             | 27                                 | 54                     |                                   |                                                 |                                    |                          |
| 3.3                             | 3R3 |                                  |                                                 |                                    |                       | 5 × 11                            | 3.0                                             | 33                                 | 66                     |                                   |                                                 |                                    |                          |
| 4.7                             | 4R7 |                                  |                                                 |                                    |                       | 5 × 11                            | 2.2                                             | 40                                 | 81                     |                                   |                                                 |                                    |                          |
| 6.8                             | 6R8 |                                  |                                                 |                                    |                       | 5 × 11                            | 1.8                                             | 45                                 | 91                     |                                   |                                                 |                                    |                          |
| 10                              | 100 |                                  |                                                 |                                    |                       | 5 × 11                            | 1.4                                             | 57                                 | 115                    | 5 × 11                            | 1.06                                            | 67                                 | 135                      |
| 15                              | 150 |                                  |                                                 |                                    |                       | 5 × 11                            | 0.93                                            | 72                                 | 145                    | 6.3 × 11.5                        | 0.73                                            | 92                                 | 185                      |
| 22                              | 220 | 5 × 11                           | 0.75                                            | 85                                 | 160                   | 5 × 11<br>(6.3 × 11.5)            | 0.86<br>(0.65)                                  | 85<br>(100)                        | 165<br>(195)           | 6.3 × 11.5                        | 0.52                                            | 110                                | 215                      |
| 33                              | 330 | 6.3 × 11.5                       | 0.49                                            | 125                                | 225                   | 6.3 × 11.5                        | 0.43                                            | 135                                | 240                    | 8 × 11.5                          | 0.35                                            | 179                                | 320                      |
| 47                              | 470 | 6.3 × 11.5                       | 0.34                                            | 160                                | 270                   | 6.3 × 11.5<br>(8 × 11.5)          | 0.10<br>(0.30)                                  | 170<br>(204)                       | 300<br>(344)           | 8 × 11.5                          | 0.25                                            | 215                                | 365                      |
| 68                              | 680 | 8 × 11.5                         | 0.24                                            | 239                                | 384                   | 8 × 11.5                          | 0.20                                            | 255                                | 410                    | 8 × 16<br>(10 × 12)               | 0.28<br>(0.19)                                  | 250<br>(310)                       | 380<br>(495)             |
| 100                             | 101 | 8 × 11.5                         | 0.16                                            | 305                                | 460                   | 8 × 16<br>(10 × 16)               | 0.18<br>(0.16)                                  | 315<br>(385)                       | 490<br>(581)           | 8 × 16<br>(10 × 20)               | 0.16<br>(0.12)                                  | 400<br>(495)                       | 615<br>(750)             |
| 150                             | 151 | 10 × 12                          | 0.12                                            | 435                                | 625                   | 10 × 20                           | 0.10                                            | 570                                | 820                    | 10 × 25                           | 0.09                                            | 665                                | 950                      |
| 220                             | 221 | 8 × 16<br>(10 × 12)<br>(10 × 16) | 0.12<br>(0.10)<br>(0.09)                        | 485<br>(520)<br>(560)              | 700<br>(735)<br>(770) | 10 × 16<br>(10 × 20)<br>(10 × 25) | 0.09<br>(0.09)<br>(0.075)                       | 615<br>(650)<br>(760)              | 850<br>(900)<br>(1040) | 10 × 20<br>(13 × 21)              | 0.080<br>(0.065)                                | 785<br>(835)                       | 1010<br>(1140)           |
| 330                             | 331 | 10 × 16<br>(10 × 20)             | 0.063<br>(0.060)                                | 745<br>(810)                       | 1000<br>(1060)        | 10 × 20<br>(13 × 21)              | 0.058<br>(0.055)                                | 885<br>(978)                       | 1150<br>(1281)         | 13 × 21<br>(13 × 25)              | 0.056<br>(0.049)                                | 945<br>(1090)                      | 1295<br>(1420)           |
| 470                             | 471 | 10 × 20<br>(13 × 21)             | 0.050<br>(0.046)                                | 995<br>(1112)                      | 1300<br>(1401)        | 10 × 20<br>(13 × 21)              | 0.054<br>(0.050)                                | 980<br>(1085)                      | 1285<br>(1385)         | 13 × 25<br>(16 × 25)              | 0.045<br>(0.042)                                | 1220<br>(1350)                     | 1580<br>(1700)           |
| 680                             | 681 | 13 × 25                          | 0.036                                           | 1370                               | 1660                  | 16 × 20                           | 0.040                                           | 1350                               | 1630                   | 16 × 25<br>(16 × 31)              | 0.042<br>(0.032)                                | 1400<br>(1700)                     | 1800<br>(2050)           |
| 1000                            | 102 | 16 × 20                          | 0.034                                           | 1330                               | 1770                  | 16 × 25<br>(16 × 31)              | 0.036<br>(0.032)                                | 1755<br>(1830)                     | 1950<br>(2120)         | 16 × 31<br>(18 × 31)<br>(18 × 35) | 0.030<br>(0.032)<br>(0.029)                     | 1840<br>(1840)<br>(1970)           | 2180<br>(2180)<br>(2280) |
| 1500                            | 152 | 16 × 31                          | 0.028                                           | 2149                               | 2385                  | 16 × 35                           | 0.026                                           | 2170                               | 2410                   | 18 × 35                           | 0.026                                           | 1850                               | 2165                     |
| 2200                            | 222 | 16 × 31<br>(16 × 35)             | 0.024<br>(0.020)                                | 2365<br>(2410)                     | 2600<br>(2680)        | 18 × 35<br>(18 × 40)              | 0.026<br>(0.024)                                | 2265<br>(2300)                     | 2485<br>(2560)         |                                   |                                                 |                                    |                          |
| 3300                            | 332 | 18 × 40                          | 0.017                                           | 2730                               | 3040                  |                                   |                                                 |                                    |                        |                                   |                                                 |                                    |                          |

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

TN Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>參數<br><br>μF |     | 100 (2A)                        |                                                 |                                    |                  | 160 (2C)                        |                                                 |                                    |                  | 200 (2D)                        |                                                 |                                    |                  | 250 (2E)                        |                                                 |                                    |                  |
|---------------------------------|-----|---------------------------------|-------------------------------------------------|------------------------------------|------------------|---------------------------------|-------------------------------------------------|------------------------------------|------------------|---------------------------------|-------------------------------------------------|------------------------------------|------------------|---------------------------------|-------------------------------------------------|------------------------------------|------------------|
|                                 |     | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>紋波電流 |                  | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>紋波電流 |                  | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>紋波電流 |                  | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>紋波電流 |                  |
|                                 |     |                                 |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz |                                 |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz |                                 |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz |                                 |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz |
|                                 |     |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  |
| 2.2                             | 2R2 | 5 × 11                          | 2.50                                            | 25                                 | 52               |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  | 5 × 11                          | 0.80                                            | 88                                 | 155              |
| 3.3                             | 3R3 | 5 × 11                          | 2.50                                            | 30                                 | 64               |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  | 8 × 11.5                        | 1.40                                            | 105                                | 200              |
| 4.7                             | 4R7 | 5 × 11                          | 2.50                                            | 35                                 | 76               |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  | 8 × 11.5                        | 2.00                                            | 135                                | 240              |
| 6.8                             | 6R8 | 6.3×11.5                        | 1.00                                            | 70                                 | 128              |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  | 8 × 11.5                        | 2.80                                            | 165                                | 275              |
| 10                              | 100 | 8 × 11.5                        | 0.60                                            | 125                                | 224              |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  | 10 × 16                         | 3.50                                            | 170                                | 300              |
| 22                              | 220 | 8 × 11.5<br>(10×12)             | 0.50<br>(0.40)                                  | 130<br>(185)                       | 285<br>(319)     | 10 × 20                         | 1.30                                            | 310                                | 440              | 10 × 20                         | 1.5                                             | 310                                | 440              | 13 × 21                         | 2.30                                            | 315                                | 480              |
| 33                              | 330 | 10 × 16                         | 0.30                                            | 285                                | 417              | 10 × 20                         | 1.30                                            | 395                                | 565              | 13 × 21                         | 0.91                                            | 390                                | 590              | 13 × 25                         | 1.70                                            | 435                                | 630              |
| 47                              | 470 | 10 × 16<br>(13×21)              | 0.08<br>(0.15)                                  | 445<br>(380)                       | 680<br>(570)     | 13 × 21                         | 0.91                                            | 470                                | 725              | 13 × 21                         | 0.91                                            | 515                                | 780              | 13 × 25                         | 1.70                                            | 435                                | 630              |
| 68                              | 680 | 13 × 25                         | 0.12                                            | 490                                | 760              | 13 × 25                         | 0.63                                            | 675                                | 950              | 13 × 25                         | 0.63                                            | 675                                | 950              | 16 × 25                         | 0.78                                            | 765                                | 1000             |
| 100                             | 101 | 10 × 16<br>(16×25)              | 0.22<br>(0.07)                                  | 450<br>(905)                       | 700<br>(1250)    | 16 × 25                         | 0.27                                            | 980                                | 1280             | 16 × 25                         | 0.27                                            | 980                                | 1280             | 16 × 31                         | 0.63                                            | 1080                               | 1400             |
| 150                             | 151 | 16 × 31                         | 0.05                                            | 1080                               | 1400             | 16 × 31                         | 0.22                                            | 1015                               | 1300             | 18 × 25                         | 0.27                                            | 1190                               | 1500             | 18 × 31                         | 0.42                                            | 1100                               | 1450             |
| 220                             | 221 | 18 × 40                         | 0.03                                            | 1695                               | 1980             | 16 × 31                         | 0.22                                            | 1015                               | 1300             | 18 × 31                         | 0.22                                            | 1350                               | 1700             | 18 × 40                         | 0.35                                            | 1175                               | 1485             |
| 330                             | 331 |                                 |                                                 |                                    |                  | 18 × 31                         | 0.22                                            | 1350                               | 1700             |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  |

| WV<br>Parameter<br>參數<br><br>μF |     | 350V (2V)                       |                                                 |                                    |                  | 400V (2G)                       |                                                 |                                    |                  | 450V (2W)                       |                                                 |                                    |                 |
|---------------------------------|-----|---------------------------------|-------------------------------------------------|------------------------------------|------------------|---------------------------------|-------------------------------------------------|------------------------------------|------------------|---------------------------------|-------------------------------------------------|------------------------------------|-----------------|
|                                 |     | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>紋波電流 |                  | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>紋波電流 |                  | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>紋波電流 |                 |
|                                 |     |                                 |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz |                                 |                                                 | 105°C,<br>120Hz                    | 105°C,<br>100KHz |                                 |                                                 | 105°C,<br>120Hz                    | 105°C,<br>120Hz |
|                                 |     |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                  |                                 |                                                 |                                    |                 |
| 3.3                             | 3R3 |                                 |                                                 |                                    |                  | 8 × 11.5                        | 4.80                                            | 60                                 | 110              | 10 × 20                         | 6.5                                             | 75                                 | 150             |
| 4.7                             | 4R7 |                                 |                                                 |                                    |                  | 8 × 11.5                        | 4.20                                            | 75                                 | 125              | 13 × 21                         | 3.6                                             | 105                                | 200             |
| 10                              | 100 | 10 × 20                         | 2.90                                            | 100                                | 180              | 10 × 20                         | 2.90                                            | 95                                 | 180              | 13 × 25                         | 2.5                                             | 185                                | 315             |
| 22                              | 220 | 13 × 21                         | 2.10                                            | 160                                | 270              | 13 × 25                         | 1.30                                            | 175                                | 300              | 16 × 25                         | 1.7                                             | 380                                | 570             |
| 33                              | 330 | 16 × 20                         | 0.91                                            | 365                                | 600              | 16 × 20                         | 0.91                                            | 365                                | 600              | 16 × 31                         | 1.1                                             | 435                                | 620             |
| 47                              | 470 | 16 × 25                         | 0.73                                            | 485                                | 700              | 16 × 25                         | 0.73                                            | 485                                | 700              | 18 × 31                         | 0.93                                            | 650                                | 900             |
| 68                              | 680 | 16 × 31                         | 0.49                                            | 845                                | 1100             | 16 × 31                         | 0.49                                            | 845                                | 1100             | 18 × 35                         | 0.71                                            | 670                                | 980             |
| 100                             | 101 | 18 × 31                         | 0.40                                            | 855                                | 1170             | 18 × 40                         | 0.34                                            | 975                                | 1250             |                                 |                                                 |                                    |                 |

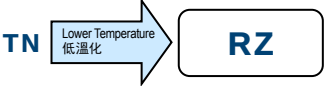
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

RZ Series

SLEEVELESS, LONG LIFE WITH EXTRA LOWER IMPEDANCE

無膠管，長壽命極低阻抗品

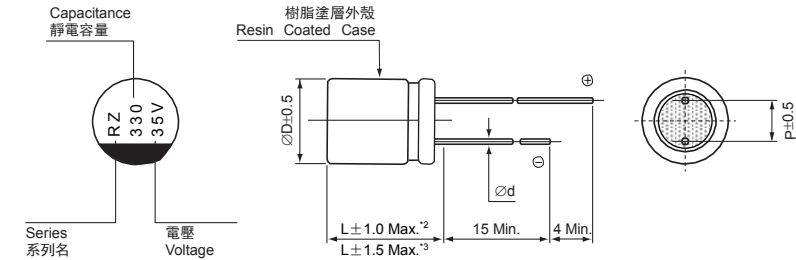
- Extra lower impedance with temperature range -55~+105°C  
極低阻抗和適用於 -55~+105°C 的溫度範圍
- Endurance 2000~5000 hours  
耐久性 2000~5000 小時
- Sleeveless  
無膠管
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

| Items 項目                           | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                        |                    |      |                                                      |      |      |          |       |      |      |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------|------------------------------------------------------|------|------|----------|-------|------|------|
| Operation Temperature Range 使用溫度範圍 | -55 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                |                    |      |                                                      |      |      |          |       |      |      |
| Voltage Range 額定工作電壓範圍             | 6.3 ~ 100V                                                                                                                                                                                                                                                                                                                                                                  |                    |      |                                                      |      |      |          |       |      |      |
| Capacitance Range 靜電容量範圍           | 3.3 ~ 8200μF                                                                                                                                                                                                                                                                                                                                                                |                    |      |                                                      |      |      |          |       |      |      |
| Capacitance Tolerance 靜電容量允許偏差     | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                         |                    |      |                                                      |      |      |          |       |      |      |
| Leakage Current 漏電流                | Leakage current ≤0.01CV or 3μA (Ø4~Ø10), whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>Leakage current ≤0.03CV or 4μA (Ø12.5~Ø18), whichever is greater (after 1 minute application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3μA (Ø4~Ø10)，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>漏電流 ≤0.03CV 或 4μA (Ø12.5~Ø18)，取較大值（在 20°C 環境中施加額定工作電壓 1 分鐘後） |                    |      |                                                      |      |      |          |       |      |      |
|                                    | C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                               |                    |      |                                                      |      |      |          |       |      |      |
| Dissipation Factor (tan δ) 損耗角正切   | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                                                                                                                                                     |                    |      |                                                      |      |      |          |       |      |      |
|                                    | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                                                                                    | 6.3                | 10   | 16                                                   | 25   | 35   | 50       | 63~80 | 100  |      |
|                                    | tan δ (max.)                                                                                                                                                                                                                                                                                                                                                                | Ø4~Ø10             | 0.26 | 0.19                                                 | 0.16 | 0.14 | 0.12     | 0.10  | 0.08 | 0.07 |
|                                    | 最大損耗角正切                                                                                                                                                                                                                                                                                                                                                                     | Ø12.5~Ø18          | 0.26 | 0.19                                                 | 0.18 | 0.16 | 0.14     | 0.10  | 0.08 | 0.07 |
| Stability at Low Temperature 低溫特性  | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                                                                                                                                           |                    |      |                                                      |      |      |          |       |      |      |
|                                    | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                                                                                    |                    |      | 6.3 ~ 16                                             |      |      | 25 ~ 100 |       |      |      |
|                                    | Impedance Ratio 阻抗比                                                                                                                                                                                                                                                                                                                                                         | Z(-25°C) / Z(20°C) |      |                                                      | 2    |      |          | 2     |      |      |
|                                    |                                                                                                                                                                                                                                                                                                                                                                             | Z(-40°C) / Z(20°C) |      |                                                      | 3    |      |          | 3     |      |      |
|                                    | ZT/Z20 (max.)                                                                                                                                                                                                                                                                                                                                                               | Z(-55°C) / Z(20°C) |      |                                                      | 4    |      |          | 3     |      |      |
| Endurance 耐久性                      | When the capacitors are restored to 20°C after 5000 hrs. (2000 hrs. for Ø4~Ø6.3×5.8) application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 5000 小時（Ø4~Ø6.3×5.8 為 2000 小時）後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                                                                                                         |                    |      |                                                      |      |      |          |       |      |      |
|                                    | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                                                                                                                  |                    |      | Within ±30% of initial value 初始值的±30%以內              |      |      |          |       |      |      |
|                                    | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                                                                                                                    |                    |      | 200% or less of initial specified value 不大於規範值的 200% |      |      |          |       |      |      |
|                                    | Leakage Current 漏電流                                                                                                                                                                                                                                                                                                                                                         |                    |      | initial specified value or less 不大於規範值               |      |      |          |       |      |      |
| Shelf Life 高溫貯存特性                  | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                               |                    |      |                                                      |      |      |          |       |      |      |
| Marking 標識                         | Black print on the case top. 鋁殼頂部黑字印刷。                                                                                                                                                                                                                                                                                                                                      |                    |      |                                                      |      |      |          |       |      |      |

DRAWING 外形圖 (Unit: mm)



\*1. Voltage mark for 6.3V is [6V]  
\*2. Applicable to Ø4~Ø8  
\*3. Applicable to Ø10 and above

6.3V 的產品標識為 [6V]  
適用於 Ø4~Ø8  
適用於 Ø10 和 Ø10 以上

Dimension table in next page.  
尺寸表見下一頁。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
**注：**以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

RZ Series

DIMENSIONS (Unit: mm) 尺寸表

| ∅D x L | 4 x 5 | 5 x 5 | 6.3 x 5/7 | 8 x 10 | 10 x 10/13 | 12.5 x 13/16 | 16 x 16 | 18 x 16/18 |
|--------|-------|-------|-----------|--------|------------|--------------|---------|------------|
| P      | 1.5   | 2.0   | 2.5       | 3.5    | 5.0        | 5.0          | 7.5     | 7.5        |
| ∅d     | 0.45  | 0.45  | 0.45      | 0.5    | 0.6        | 0.6          | 0.8     | 0.8        |
| L      | 5.0   | 5.0   | 5.0/7.0   | 10.0   | 10.0/13.0  | 13.0/16.0    | 16.0    | 16.0/18.0  |

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Code<br>代碼<br>μF |     | 6.3                      |                 |                | 10                   |                |              | 16                       |                  |                        |
|------------------------|-----|--------------------------|-----------------|----------------|----------------------|----------------|--------------|--------------------------|------------------|------------------------|
|                        |     | 0J                       |                 |                | 1A                   |                |              | 1C                       |                  |                        |
| 10                     | 100 |                          |                 |                |                      |                |              | 4 × 5                    | 1.35             | 90                     |
| 15                     | 150 |                          |                 |                |                      |                |              | 4 × 5                    | 1.35             | 90                     |
| 22                     | 220 | 4 × 5                    | 1.35            | 90             | 4 × 5                | 1.35           | 90           | 5 × 5                    | 0.76             | 160                    |
| 33                     | 330 | 5 × 5<br>(4 × 5)         | 0.76<br>(1.35)  | 160<br>(90)    | 5 × 5                | 0.76           | 160          | 6.3 × 5                  | 0.44             | 240                    |
| 47                     | 470 | 5 × 5<br>(4 × 5)         | 0.76<br>(1.35)  | 160<br>(90)    | 6.3 × 5              | 0.44           | 240          | 6.3 × 5<br>(5 × 5)       | 0.44<br>(0.76)   | 240<br>(160)           |
| 56                     | 560 | 5 × 5                    | 0.76            | 160            | 6.3 × 5              | 0.44           | 240          | 6.3 × 5                  | 0.44             | 240                    |
| 68                     | 680 | 6.3 × 5                  | 0.44            | 240            | 6.3 × 5              | 0.44           | 240          | 6.3 × 7<br>(6.3 × 5)     | 0.34<br>(0.44)   | 300<br>(240)           |
| 100                    | 101 | 6.3 × 5                  | 0.44            | 240            | 6.3 × 7              | 0.34           | 300          | 6.3 × 7<br>(6.3 × 5)     | 0.34<br>(0.44)   | 300<br>(240)           |
| 150                    | 151 | 6.3 × 5                  | 0.44            | 240            | 6.3 × 7              | 0.34           | 300          | 6.3 × 7                  | 0.34             | 300                    |
| 220                    | 221 | 6.3 × 7<br>(6.3 × 5)     | 0.34<br>(0.44)  | 300<br>(240)   | 6.3 × 7              | 0.34           | 300          | 8 × 10<br>(6.3 × 7)      | 0.17<br>(0.34)   | 600<br>(300)           |
| 330                    | 331 | 8 × 10                   | 0.17            | 600            | 10 × 10<br>(8 × 10)  | 0.09<br>(0.17) | 850<br>(600) | 10 × 10<br>(8 × 10)      | 0.08<br>(0.17)   | 850<br>(600)           |
| 470                    | 471 | 8 × 10                   | 0.17            | 600            | 10 × 10<br>(8 × 10)  | 0.09<br>(0.17) | 850<br>(600) | 10 × 10<br>(8 × 10)      | 0.09<br>(0.17)   | 850<br>(600)           |
| 680                    | 681 | 10 × 10<br>(8 × 10)      | 0.09<br>(0.17)  | 850<br>(600)   | 10 × 10              | 0.09           | 850          | 10 × 13<br>(10 × 10)     | 0.07<br>(0.09)   | 950<br>(850)           |
| 1000                   | 102 | 10 × 10<br>(8 × 10)      | 0.09<br>(0.17)  | 850<br>(600)   | 10 × 13<br>(10 × 10) | 0.07<br>(0.09) | 950<br>(850) | 12.5 × 16<br>(12.5 × 13) | 0.055<br>(0.06)  | 1200<br>(1100)         |
| 1500                   | 152 | 10 × 13                  | 0.09            | 950            | 12.5 × 13            | 0.06           | 1100         | 16 × 16                  | 0.05             | 1450                   |
| 2200                   | 222 | 12.5 × 13                | 0.06            | 1100           | 12.5 × 16            | 0.055          | 1200         | 16 × 16                  | 0.05             | 1450                   |
| 3300                   | 332 | 12.5 × 16<br>(12.5 × 13) | 0.055<br>(0.06) | 1200<br>(1100) | 16 × 16              | 0.05           | 1260         | 16 × 16                  | 0.05             | 1450                   |
| 4700                   | 472 | 16 × 16                  | 0.05            | 1450           | 16 × 16              | 0.05           | 1450         | 18 × 16                  | 0.048            | 1500                   |
| 6800                   | 682 | 18 × 16                  | 0.048           | 1500           | 18 × 16              | 0.048          | 1500         | Case size<br>尺寸          | Impedance<br>阻抗值 | Ripple current<br>紋波電流 |
| 8200                   | 822 | 18 × 16                  | 0.048           | 1500           |                      |                |              |                          |                  |                        |

| WV<br>Code<br>代碼<br>μF |     | 25                                    |                           |                          | 35                                  |                          |                         | 50                                    |                            |                          |
|------------------------|-----|---------------------------------------|---------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------|---------------------------------------|----------------------------|--------------------------|
|                        |     | 1E                                    |                           |                          | 1V                                  |                          |                         | 1H                                    |                            |                          |
| 4.7                    | 4R7 |                                       |                           |                          | 4 × 5                               | 1.35                     | 90                      | 5 × 5                                 | 1.52                       | 85                       |
| 10                     | 100 | 4 × 5                                 | 1.35                      | 90                       | 5 × 5                               | 0.76                     | 160                     | 6.3 × 5<br>(5 × 5)                    | 0.88<br>(1.35)             | 165<br>(115)             |
| 15                     | 150 | 5 × 5                                 | 0.76                      | 160                      | 5 × 5                               | 0.76                     | 160                     | 6.3 × 5                               | 0.88                       | 165                      |
| 22                     | 220 | 6.3 × 5<br>(5 × 5)                    | 0.44<br>(0.76)            | 240<br>(160)             | 6.3 × 5                             | 0.44                     | 240                     | 6.3 × 7<br>(6.3 × 5)                  | 0.68<br>(0.88)             | 195<br>(165)             |
| 33                     | 330 | 6.3 × 5                               | 0.44                      | 240                      | 6.3 × 5                             | 0.44                     | 240                     | 6.3 × 7                               | 0.68                       | 195                      |
| 47                     | 470 | 6.3 × 7<br>(6.3 × 5)                  | 0.34<br>(0.44)            | 300<br>(240)             | 6.3 × 7<br>(6.3 × 5)                | 0.34<br>(0.88)           | 300<br>(165)            | 8 × 10<br>(6.3 × 7)                   | 0.34<br>(0.68)             | 350<br>(195)             |
| 56                     | 560 | 6.3 × 7                               | 0.34                      | 300                      | 6.3 × 7                             | 0.34                     | 300                     | 8 × 10                                | 0.34                       | 350                      |
| 68                     | 680 | 6.3 × 7                               | 0.34                      | 300                      | 8 × 10                              | 0.17                     | 600                     | 8 × 10                                | 0.34                       | 350                      |
| 100                    | 101 | 8 × 10<br>(6.3 × 7)                   | 0.17<br>(0.34)            | 600<br>(300)             | 8 × 10                              | 0.17                     | 600                     | 10 × 10<br>(8 × 10)                   | 0.18<br>(0.34)             | 670<br>(350)             |
| 150                    | 151 | 8 × 10<br>(6.3 × 7)                   | 0.16<br>(0.34)            | 600<br>(300)             | 10 × 10<br>(8 × 10)                 | 0.09<br>(0.16)           | 850<br>(600)            | 10 × 13<br>(10 × 10)                  | 0.14<br>(0.18)             | 780<br>(670)             |
| 220                    | 221 | 8 × 10                                | 0.17                      | 600                      | 10 × 10<br>(8 × 10)                 | 0.09<br>(0.16)           | 850<br>(600)            | 10 × 13.5<br>(10 × 10.5)              | 0.14<br>(0.26)             | 780<br>(750)             |
| 330                    | 331 | 10 × 10<br>(8 × 10)                   | 0.09<br>(0.17)            | 850<br>(600)             | 10 × 13<br>(10 × 10)                | 0.07<br>(0.10)           | 950<br>(850)            | 12.5 × 13                             | 0.12                       | 900                      |
| 470                    | 471 | 10 × 13<br>(10 × 10)                  | 0.07<br>(0.09)            | 950<br>(850)             | 12.5 × 13<br>(10 × 13)<br>(10 × 10) | 0.06<br>(0.07)<br>(0.10) | 1100<br>(1000)<br>(950) | 16 × 16<br>(12.5 × 16)<br>(12.5 × 13) | 0.08<br>(0.10)<br>(0.08)   | 1250<br>(1050)<br>(1100) |
| 680                    | 681 | 12.5 × 13                             | 0.06                      | 1100                     | 12.5 × 16<br>(12.5 × 13)            | 0.055<br>(0.06)          | 1200<br>(1100)          | 16 × 16                               | 0.073                      | 1250                     |
| 1000                   | 102 | 16 × 16<br>(12.5 × 16)<br>(12.5 × 13) | 0.05<br>(0.055)<br>(0.06) | 1450<br>(1200)<br>(1100) | 16 × 16                             | 0.05                     | 1450                    | 18 × 18<br>(16 × 16)<br>(18 × 16)     | 0.073<br>(0.08)<br>(0.073) | 1250<br>(1000)<br>(1250) |
| 1500                   | 152 | 16 × 16                               | 0.05                      | 1450                     | 16 × 16                             | 0.048                    | 1500                    | Case size<br>尺寸                       | Impedance<br>阻抗值           | Ripple current<br>紋波電流   |
| 2200                   | 222 | 16 × 16                               | 0.05                      | 1450                     | 18 × 18                             | 0.038                    | 1750                    |                                       |                            |                          |
| 3300                   | 333 | 18 × 16<br>(18 × 18)                  | 0.048<br>(0.048)          | 1500<br>(1500)           |                                     |                          |                         |                                       |                            |                          |

•Case size 尺寸 ∅D×L(mm), Impedance 阻抗值 (Ω) at 20°C, 100KHz, Ripple current 紋波電流 (mA rms) at 105°C, 100KHz

RZ Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Code<br>μF<br>代碼 | 63  |                                     |                         | 80                    |                          |                | 100          |                                       |                                                   |
|------------------------|-----|-------------------------------------|-------------------------|-----------------------|--------------------------|----------------|--------------|---------------------------------------|---------------------------------------------------|
|                        | 1J  |                                     |                         | 1K                    |                          |                | 2A           |                                       |                                                   |
| 3.3                    | 3R3 |                                     |                         | 5 × 5                 | 5.0                      | 25             |              |                                       |                                                   |
| 4.7                    | 4R7 | 5 × 5                               | 3.0                     | 50                    | 6.3 × 5                  | 3.0            | 40           |                                       |                                                   |
| 10                     | 100 | 6.3 × 7<br>(6.3 × 5)                | 1.2<br>(1.5)            | 120<br>(80)           | 6.3 × 7                  | 2.4            | 60           | 8 × 10                                | 1.3<br>130                                        |
| 22                     | 220 | 8 × 10<br>(6.3 × 7)                 | 0.65<br>(1.2)           | 250<br>(120)          | 8 × 10                   | 1.3            | 130          | 10 × 10<br>(8 × 10)                   | 0.7<br>(1.3)<br>200<br>(160)                      |
| 33                     | 330 | 8 × 10                              | 0.65                    | 250                   | 10 × 10                  | 0.7            | 200          | 10 × 13                               | 0.7<br>200                                        |
| 47                     | 470 | 10 × 10<br>(8 × 10)                 | 0.5<br>(0.65)           | 300<br>(250)          | 10 × 13                  | 0.45           | 300          | 12.5 × 13                             | 0.32<br>500                                       |
| 68                     | 680 | 12.5 × 13<br>(10 × 10)              | 0.16<br>(0.5)           | 800<br>(300)          | 12.5 × 13                | 0.32           | 500          | 12.5 × 13                             | 0.32<br>500                                       |
| 100                    | 101 | 12.5 × 13<br>(10 × 13)<br>(10 × 10) | 0.16<br>(0.25)<br>(0.5) | 800<br>(400)<br>(300) | 12.5 × 13<br>(10 × 13)   | 0.32<br>(0.18) | 500<br>(750) | 16 × 16<br>(12.5 × 16)<br>(12.5 × 13) | 0.17<br>(0.26)<br>(0.32)<br>795<br>(550)<br>(500) |
| 150                    | 151 | 12.5 × 13<br>(10 × 13)              | 0.16<br>(0.25)          | 800<br>(650)          | 12.5 × 13                | 0.32           | 500          | 16 × 16<br>(12.5 × 16)                | 0.17<br>(0.26)<br>650<br>(550)                    |
| 220                    | 221 | 12.5 × 13                           | 0.16                    | 800                   | 12.5 × 16<br>(12.5 × 13) | 0.26<br>(0.12) | 550<br>(900) | 18 × 16                               | 0.15<br>850                                       |
| 330                    | 331 | 16 × 16                             | 0.082                   | 900                   | 16 × 16                  | 0.17           | 795          | 18 × 16                               | 0.15<br>850                                       |
| 470                    | 471 | 16 × 16                             | 0.082                   | 900                   | 18 × 16                  | 0.15           | 850          | 18 × 18                               | 0.15<br>950                                       |
| 680                    | 681 | 18 × 16                             | 0.08                    | 1150                  | 18 × 18                  | 0.15           | 950          | Case size<br>尺寸                       | Impedance<br>阻抗值                                  |
| 1000                   | 102 | 18 × 18                             | 0.06                    | 1250                  |                          |                |              |                                       |                                                   |

•Case size 尺寸 ØD×L(mm), Impedance 阻抗值 (Ω) at 20°C, 100KHz, Ripple current 紋波電流 (mA rms) at 105°C, 100KHz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |             |               | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|---------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | Ø4 ~ Ø10    | 4.7 ~ 68μF    | 0.35 | 0.50  | 0.64  | 0.83 | 1.00   |
|                   |             | 100 ~ 1500μF  | 0.40 | 0.55  | 0.70  | 0.85 | 1.00   |
|                   | Ø12.5 ~ Ø18 | ~ 68μF        | 0.40 | 0.55  | 0.70  | 0.85 | 1.00   |
|                   |             | 100 ~ 680μF   | 0.45 | 0.65  | 0.80  | 0.90 | 1.00   |
|                   |             | 1000 ~ 4700μF | 0.65 | 0.85  | 0.95  | 1.00 | 1.00   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

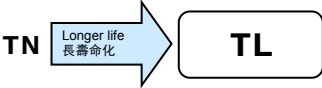
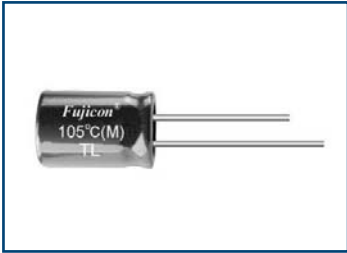
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第 21 頁“編帶標準”及第 23 頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

TL Series

EXTREMELY LOW IMPEDANCE, LONG LIFE

極低阻抗，長壽命品

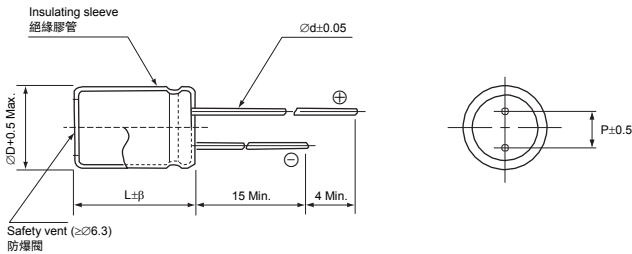
- Endurance 4000~10000 hours  
耐久性 4000~10000 小時
- Suitable for long life applications  
適用於長壽命應用
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------|------|------|------|------|----------|--------------------------|--------------------------|-----|-----------|-----------|-------------------|------|-------|----------|----------------------|---------------------|--------------------|------|-------|----------------------------|--------------------------------------------------|------|------|--|---|--|--------------------|--------------------------|-----------------------------------------------|--|---|--|---|--|---|---------------------|---------------------------------|--|--|--|--|--|--|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 100V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Capacitance Range 靜電容量範圍          | 0.47 ~ 18000μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Leakage Current 漏電流               | Leakage current ≤0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3μA，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Dissipation Factor (tan δ) 損耗角正切  | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td><td>0.08</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |      |      |      |      |      |          | Rated Voltage (V) 額定工作電壓 | 6.3                      | 10  | 16        | 25        | 35                | 50   | 63    | 100      | tan δ (max.) 最大損耗角正切 | 0.22                | 0.19               | 0.16 | 0.14  | 0.12                       | 0.10                                             | 0.09 | 0.08 |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Rated Voltage (V) 額定工作電壓          | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10        | 16   | 25   | 35   | 50   | 63   | 100      |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| tan δ (max.) 最大損耗角正切              | 0.22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.19      | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08     |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td colspan="2">6.3</td><td colspan="2">10</td><td colspan="2">16</td><td colspan="2">25 ~ 100</td></tr><tr><td rowspan="2">Impedance Ratio 阻抗比</td><td colspan="2">Z(-25°C) / Z(20°C)</td><td colspan="2">4</td><td colspan="2">3</td><td colspan="2">2</td><td colspan="2">2</td></tr><tr><td colspan="2">Z(-40°C) / Z(20°C)</td><td colspan="2">8</td><td colspan="2">6</td><td colspan="2">4</td><td colspan="2">3</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |      |      |      |      |      |          | Rated Voltage (V) 額定工作電壓 |                          | 6.3 |           | 10        |                   | 16   |       | 25 ~ 100 |                      | Impedance Ratio 阻抗比 | Z(-25°C) / Z(20°C) |      | 4     |                            | 3                                                |      | 2    |  | 2 |  | Z(-40°C) / Z(20°C) |                          | 8                                             |  | 6 |  | 4 |  | 3 |                     |                                 |  |  |  |  |  |  |
| Rated Voltage (V) 額定工作電壓          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 6.3       |      | 10   |      | 16   |      | 25 ~ 100 |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Impedance Ratio 阻抗比               | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           | 4    |      | 3    |      | 2    |          | 2                        |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
|                                   | Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           | 8    |      | 6    |      | 4    |          | 3                        |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Endurance 耐久性                     | <p>The characteristics listed below shall be satisfied when the capacitors are restored to 20°C after subject to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105°C.<br/>在 105°C 環境中的規定時間內施加額定紋波電流（峰值電壓不得超過額定電壓）後，電容器經直流電壓後恢復至 20°C 時，應符合下表參數要求。</p> <table><tr><td rowspan="2">Size (mm) 尺寸</td><td colspan="2">Life time (hours) 壽命（小時）</td></tr><tr><td>6.3 ~ 10V</td><td>16 ~ 100V</td></tr><tr><td>Ø5, Ø6.3 (Ø5×15)*</td><td>4000</td><td>5000*</td></tr><tr><td>Ø8, Ø10</td><td>6000</td><td>7000</td></tr><tr><td>ØD≥13</td><td>8000</td><td>10000</td></tr></table> <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="7">Within ±25% of initial measured value 初始值的±25%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="7">≤200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="7">≤initial specified value 不大於規範值</td></tr></table> |           |      |      |      |      |      |          | Size (mm) 尺寸             | Life time (hours) 壽命（小時） |     | 6.3 ~ 10V | 16 ~ 100V | Ø5, Ø6.3 (Ø5×15)* | 4000 | 5000* | Ø8, Ø10  | 6000                 | 7000                | ØD≥13              | 8000 | 10000 | Capacitance Change 靜電容量變化率 | Within ±25% of initial measured value 初始值的±25%以內 |      |      |  |   |  |                    | Dissipation Factor 損耗角正切 | ≤200% of initial specified value 不大於規範值的 200% |  |   |  |   |  |   | Leakage Current 漏電流 | ≤initial specified value 不大於規範值 |  |  |  |  |  |  |
| Size (mm) 尺寸                      | Life time (hours) 壽命（小時）                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
|                                   | 6.3 ~ 10V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 16 ~ 100V |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Ø5, Ø6.3 (Ø5×15)*                 | 4000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 5000*     |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Ø8, Ø10                           | 6000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 7000      |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| ØD≥13                             | 8000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 10000     |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Capacitance Change 靜電容量變化率        | Within ±25% of initial measured value 初始值的±25%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Dissipation Factor 損耗角正切          | ≤200% of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Leakage Current 漏電流               | ≤initial specified value 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |      |      |      |      |      |          |                          |                          |     |           |           |                   |      |       |          |                      |                     |                    |      |       |                            |                                                  |      |      |  |   |  |                    |                          |                                               |  |   |  |   |  |   |                     |                                 |  |  |  |  |  |  |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 5   | 6.3 | 8<br>(L≤11.5) | 8<br>(L≥16) | 10  | 13  | 16  | 18 |
|----|-----|-----|---------------|-------------|-----|-----|-----|----|
| P  | 2.0 | 2.5 | 3.5           |             | 5.0 |     | 7.5 |    |
| Ød | 0.5 |     |               | 0.6         |     |     | 0.8 |    |
| β  | 1.5 |     |               |             |     | 2.0 |     |    |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |                | 60Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|----------------|------|-------|-------|------|--------|
| Coefficient<br>系數 | < 33μF         | 0.20 | 0.42  | 0.52  | 0.70 | 0.90   |
|                   | 39 ~ 270μF     | 0.26 | 0.50  | 0.55  | 0.73 | 0.92   |
|                   | 330 ~ 680μF    | 0.28 | 0.55  | 0.60  | 0.77 | 0.94   |
|                   | 820 ~ 1800μF   | 0.35 | 0.60  | 0.70  | 0.80 | 0.96   |
|                   | 2200 ~ 18000μF | 0.42 | 0.70  | 0.77  | 0.85 | 0.98   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CAT.2024/V1.3

TL Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>參數<br><br>μF |     | 6.3 (0J)                        |                                                 |                                                            | 10 (1A)                           |                                                 |                                                            | 16 (1C)                         |                                                 |                                                            | 25 (1E)                           |                                                 |                                                            |
|---------------------------------|-----|---------------------------------|-------------------------------------------------|------------------------------------------------------------|-----------------------------------|-------------------------------------------------|------------------------------------------------------------|---------------------------------|-------------------------------------------------|------------------------------------------------------------|-----------------------------------|-------------------------------------------------|------------------------------------------------------------|
|                                 |     | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple<br>current<br>紋波電流<br>(mA rms,<br>105°C,<br>100KHz) | Case size<br>ØD×L<br>(mm)<br>尺寸   | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple<br>current<br>紋波電流<br>(mA rms,<br>105°C,<br>100KHz) | Case size<br>ØD×L<br>(mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple<br>current<br>紋波電流<br>(mA rms,<br>105°C,<br>100KHz) | Case size<br>ØD×L<br>(mm)<br>尺寸   | Impedance<br>(Ω) max.<br>20°C,<br>100KHz<br>阻抗值 | Ripple<br>current<br>紋波電流<br>(mA rms,<br>105°C,<br>100KHz) |
| 47                              | 470 |                                 |                                                 |                                                            |                                   |                                                 |                                                            |                                 |                                                 |                                                            | 5 x 11<br>(5 x 15)                | 0.58<br>(0.55)                                  | 210<br>(230)                                               |
| 56                              | 560 |                                 |                                                 |                                                            |                                   |                                                 |                                                            | 5 x 11                          | 0.58                                            | 210                                                        |                                   |                                                 |                                                            |
| 100                             | 101 | 5 x 11                          | 0.9                                             | 150                                                        | 5 x 11<br>(5 x 15)                | 0.58<br>(0.52)                                  | 210<br>(230)                                               | 6.3 x 11.5                      | 0.35                                            | 295                                                        | 6.3 x 11.5                        | 0.22                                            | 340                                                        |
| 120                             | 121 |                                 |                                                 |                                                            |                                   |                                                 |                                                            | 6.3 x 11.5                      | 0.35                                            | 340                                                        |                                   |                                                 |                                                            |
| 150                             | 151 | 5 x 11<br>(5 x 15)              | 0.58<br>(0.52)                                  | 210<br>(230)                                               |                                   |                                                 |                                                            | 6.3 x 11.5                      | 0.22                                            | 340                                                        |                                   |                                                 |                                                            |
| 220                             | 221 |                                 |                                                 |                                                            | 6.3 x 11.5                        | 0.22                                            | 340                                                        | 8 x 11.5                        | 0.16                                            | 430                                                        | 8 x 11.5<br>(10 x 12)             | 0.11<br>(0.10)                                  | 640<br>(735)                                               |
| 270                             | 271 |                                 |                                                 |                                                            |                                   |                                                 |                                                            |                                 |                                                 |                                                            | 8 x 16                            | 0.085                                           | 820                                                        |
| 330                             | 331 | 6.3 x 11.5                      | 0.22                                            | 340                                                        |                                   |                                                 |                                                            | 8 x 11.5                        | 0.11                                            | 640                                                        | 8 x 16<br>(10 x 12)               | 0.083<br>(0.080)                                | 840<br>(865)                                               |
| 470                             | 471 |                                 |                                                 |                                                            | 8 x 11.5                          | 0.11                                            | 640                                                        | 8 x 16<br>(10 x 12)             | 0.083<br>(0.080)                                | 840<br>(865)                                               | 8 x 20<br>(10 x 16)               | 0.064<br>(0.060)                                | 1050<br>(1210)                                             |
| 560                             | 561 |                                 |                                                 |                                                            |                                   |                                                 |                                                            | 8 x 16                          | 0.083                                           | 880                                                        |                                   |                                                 |                                                            |
| 680                             | 681 | 8 x 11.5                        | 0.13                                            | 640                                                        | 8 x 16<br>(10 x 12)               | 0.083<br>(0.080)                                | 840<br>(865)                                               | 8 x 20<br>(10 x 16)             | 0.064<br>(0.060)                                | 1050<br>(1210)                                             | 10 x 20<br>(13 x 21)              | 0.046<br>(0.049)                                | 1400<br>(1450)                                             |
| 820                             | 82  | 10 x 12                         | 0.080                                           | 865                                                        |                                   |                                                 |                                                            |                                 |                                                 |                                                            | 10 x 25                           | 0.042                                           | 1650                                                       |
| 1000                            | 102 | 8 x 16                          | 0.087                                           | 840                                                        | 8 x 20<br>(10 x 16)               | 0.064<br>(0.060)                                | 1050<br>(1210)                                             | 10 x 20<br>(13 x 21)            | 0.046<br>(0.049)                                | 1400<br>(1450)                                             | 10 x 30<br>(13 x 21)<br>(16 x 20) | 0.031<br>(0.035)<br>(0.042)                     | 1910<br>(1900)<br>(1940)                                   |
| 1200                            | 122 | 8 x 20<br>(10 x 16)             | 0.069<br>(0.060)                                | 1050<br>(1210)                                             | 10 x 20                           | 0.046                                           | 1400                                                       | 10 x 25                         | 0.042                                           | 1650                                                       | 13 x 25                           | 0.043                                           | 2210                                                       |
| 1500                            | 152 | 13 x 21                         | 0.046                                           | 1400                                                       | 10 x 25<br>(13 x 21)              | 0.042<br>(0.049)                                | 1650<br>(1450)                                             | 10 x 20<br>(13 x 21)            | 0.072<br>(0.035)                                | 1500<br>(1900)                                             | 13 x 25                           | 0.027                                           | 2230                                                       |
| 1800                            | 182 | 13 x 21                         | 0.049                                           | 1450                                                       |                                   |                                                 |                                                            |                                 |                                                 |                                                            | 13 x 30<br>(16 x 25)              | 0.024<br>(0.027)                                | 2650<br>(2530)                                             |
| 2200                            | 222 | 13 x 21                         | 0.042                                           | 1650                                                       | 10 x 30<br>(13 x 21)<br>(16 x 20) | 0.031<br>(0.035)<br>(0.042)                     | 1910<br>(1900)<br>(1940)                                   | 13 x 25<br>(18 x 20)            | 0.027<br>(0.043)                                | 2230<br>(2210)                                             | 13 x 35<br>(16 x 25)              | 0.020<br>(0.026)                                | 2880<br>(2860)                                             |
| 2700                            | 272 | 13 x 25                         | 0.042                                           | 1940                                                       | 13 x 25                           | 0.043                                           | 2210                                                       | 13 x 30<br>(16 x 25)            | 0.024<br>(0.027)                                | 2650<br>(2530)                                             | 16 x 25<br>(16 x 31)              | 0.026<br>(0.017)                                | 2860<br>(3350)                                             |
| 3300                            | 332 | 13 x 25                         | 0.035                                           | 1900                                                       | 13 x 25                           | 0.027                                           | 2230                                                       | 13 x 35                         | 0.020                                           | 2880                                                       | 13 x 30<br>(16 x 35)<br>(18 x 31) | 0.036<br>(0.017)<br>(0.019)                     | 2880<br>(3450)<br>(3140)                                   |
| 3900                            | 392 | 13 x 25<br>(18 x 16)            | 0.027<br>(0.043)                                | 2230<br>(2210)                                             | 13 x 30<br>(16 x 25)              | 0.024<br>(0.027)                                | 2650<br>(2530)                                             | 16 x 35<br>(18 x 31)            | 0.021<br>(0.026)                                | 2930<br>(2860)                                             | 16 x 40<br>(18 x 31)              | 0.015<br>(0.015)                                | 3610<br>(4170)                                             |
| 4700                            | 472 | 13 x 30                         | 0.024                                           | 2650                                                       | 13 x 35                           | 0.020                                           | 2880                                                       | 16 x 35<br>(18 x 31)            | 0.017<br>(0.019)                                | 3450<br>(3140)                                             | 16 x 40<br>(18 x 35)              | 0.013<br>(0.014)                                | 4080<br>(4220)                                             |
| 5600                            | 562 | 13 x 35<br>(16 x 20)            | 0.020<br>(0.027)                                | 2880<br>(2530)                                             | 16 x 31<br>(18 x 25)              | 0.021<br>(0.026)                                | 2930<br>(2860)                                             | 16 x 35<br>(18 x 31)            | 0.015<br>(0.015)                                | 3610<br>(4170)                                             | 18 x 40                           | 0.012                                           | 4280                                                       |
| 6800                            | 682 | 16 x 31<br>(18 x 25)            | 0.021<br>(0.026)                                | 2930<br>(2860)                                             | 16 x 31<br>(18 x 25)              | 0.017<br>(0.019)                                | 3450<br>(3140)                                             | 18 x 35                         | 0.013                                           | 4080                                                       |                                   |                                                 |                                                            |
| 8200                            | 822 | 16 x 31                         | 0.017                                           | 3450                                                       | 16 x 35<br>(18 x 31)              | 0.015<br>(0.015)                                | 3610<br>(4170)                                             | 18 x 35                         | 0.014                                           | 4220                                                       |                                   |                                                 |                                                            |
| 10000                           | 103 | 16 x 35<br>(18 x 31)            | 0.015<br>(0.019)                                | 3610<br>(3140)                                             | 16 x 40<br>(18 x 35)              | 0.013<br>(0.014)                                | 4080<br>(4220)                                             | 18 x 40                         | 0.012                                           | 4280                                                       |                                   |                                                 |                                                            |
| 12000                           | 123 | 16 x 40<br>(18 x 31)            | 0.013<br>(0.015)                                | 4080<br>(4170)                                             | 18 x 40                           | 0.012                                           | 4280                                                       |                                 |                                                 |                                                            |                                   |                                                 |                                                            |
| 15000                           | 153 | 18 x 35                         | 0.014                                           | 4220                                                       |                                   |                                                 |                                                            |                                 |                                                 |                                                            |                                   |                                                 |                                                            |
| 18000                           | 183 | 18 x 40                         | 0.012                                           | 4280                                                       |                                   |                                                 |                                                            |                                 |                                                 |                                                            |                                   |                                                 |                                                            |

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TL Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>參數<br>μF |     | 35 (1V)                                        |                                              |                                                      | 50 (1H)                           |                                              |                                                      | 63 (1J)                      |                                              |                                                      |
|-----------------------------|-----|------------------------------------------------|----------------------------------------------|------------------------------------------------------|-----------------------------------|----------------------------------------------|------------------------------------------------------|------------------------------|----------------------------------------------|------------------------------------------------------|
|                             |     | Case size<br>ØD×L (mm)<br>尺寸                   | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(mA rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(mA rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(mA rms,<br>105°C, 100KHz) |
| 0.47                        | R47 |                                                |                                              |                                                      | 5 x 11                            | 7.2                                          | 17                                                   |                              |                                              |                                                      |
| 1                           | 010 |                                                |                                              |                                                      | 5 x 11<br>(5 x 15)                | 5.2<br>(5.0)                                 | 30<br>(33)                                           |                              |                                              |                                                      |
| 2.2                         | 2R2 |                                                |                                              |                                                      | 5 x 11<br>(5 x 15)                | 3.3<br>(3.0)                                 | 43<br>(48)                                           |                              |                                              |                                                      |
| 3.3                         | 3R3 |                                                |                                              |                                                      | 5 x 11<br>(5 x 15)                | 2.9<br>(2.6)                                 | 53<br>(56)                                           |                              |                                              |                                                      |
| 4.7                         | 4R7 |                                                |                                              |                                                      | 5 x 11<br>(5 x 15)                | 2.5<br>(2.2)                                 | 95<br>(100)                                          |                              |                                              |                                                      |
| 10                          | 100 |                                                |                                              |                                                      | 5 x 11<br>(6.3 x 11.5)            | 2.0<br>(2.0)                                 | 120<br>(130)                                         |                              |                                              |                                                      |
| 15                          | 150 |                                                |                                              |                                                      |                                   |                                              |                                                      | 6.3 x 11.5                   | 1.2                                          | 165                                                  |
| 22                          | 220 |                                                |                                              |                                                      | 5 x 11<br>(6.3 x 11.5)            | 0.8<br>(0.91)                                | 180<br>(180)                                         | 6.3 x 11.5                   | 1.0                                          | 215                                                  |
| 33                          | 330 | 5 x 11<br>(5 x 15)                             | 0.58<br>(0.55)                               | 210<br>(235)                                         | 6.3 x 11.5                        | 0.75                                         | 225                                                  | 6.3 x 11.5                   | 0.49                                         | 265                                                  |
| 47                          | 470 | 6.3 x 11.5                                     | 0.22                                         | 340                                                  | 6.3 x 11.5<br>(8 x 11.5)          | 0.4<br>(0.39)                                | 250<br>(295)                                         |                              |                                              |                                                      |
| 56                          | 560 | 6.3 x 11.5                                     | 0.22                                         | 340                                                  |                                   |                                              |                                                      | 8 x 11.5                     | 0.31                                         | 500                                                  |
| 82                          | 820 |                                                |                                              |                                                      |                                   |                                              |                                                      | 8 x 16<br>(10 x 12)          | 0.22<br>(0.15)                               | 665<br>(690)                                         |
| 100                         | 101 | 6.3 x 11.5<br>(8 x 11.5)                       | 0.20<br>(0.19)                               | 450<br>(500)                                         | 10 x 12                           | 0.22                                         | 555                                                  | 10 x 12                      | 0.15                                         | 690                                                  |
| 120                         | 121 |                                                |                                              |                                                      | 10 x 16                           | 0.154                                        | 730                                                  | 8 x 20<br>(10 x 16)          | 0.17<br>(0.11)                               | 820<br>(950)                                         |
| 150                         | 151 | 8 x 11.5                                       | 0.11                                         | 640                                                  | 10 x 16                           | 0.16                                         | 760                                                  |                              |                                              |                                                      |
| 180                         | 181 | 8 x 16                                         | 0.086                                        | 850                                                  | 10 x 16                           | 0.118                                        | 910                                                  | 10 x 20<br>(13 x 21)         | 0.078<br>(0.101)                             | 1150<br>(1150)                                       |
| 220                         | 221 | 8 x 11.5<br>(8 x 16)<br>(10 x 12)              | 0.10<br>(0.086)<br>(0.080)                   | 745<br>(850)<br>(865)                                | 10 x 16<br>(10 x 20)              | 0.11<br>(0.11)                               | 980<br>(1050)                                        | 10 x 25                      | 0.064                                        | 1350                                                 |
| 270                         | 271 | 8 x 20<br>(10 x 12)                            | 0.064<br>(0.053)                             | 1050<br>(1160)                                       | 10 x 20<br>(13 x 21)              | 0.078<br>(0.079)                             | 1220<br>(1260)                                       | 13 x 21                      | 0.057                                        | 1500                                                 |
| 330                         | 331 | 10 x 16                                        | 0.060                                        | 1210                                                 | 10 x 25                           | 0.072                                        | 1440                                                 |                              |                                              |                                                      |
| 390                         | 391 |                                                |                                              |                                                      |                                   |                                              |                                                      | 13 x 25                      | 0.043                                        | 1900                                                 |
| 470                         | 471 | 10 x 20<br>(13 x 21)                           | 0.046<br>(0.049)                             | 1400<br>(1450)                                       | 13 x 21<br>(16 x 20)              | 0.059<br>(0.072)                             | 1660<br>(1690)                                       | 13 x 30<br>(16 x 25)         | 0.039<br>(0.045)                             | 2300<br>(2000)                                       |
| 560                         | 561 | 13 x 21                                        | 0.042                                        | 1650                                                 | 13 x 21<br>(13 x 25)<br>(16 x 20) | 0.059<br>(0.044)<br>(0.070)                  | 1750<br>(1950)<br>(1930)                             | 13 x 35                      | 0.034                                        | 2500                                                 |
| 680                         | 681 | 13 x 21<br>(16 x 20)                           | 0.035<br>(0.042)                             | 1900<br>(1940)                                       | 13 x 17<br>(13 x 25)<br>(13 x 30) | 0.046<br>(0.044)<br>(0.039)                  | 1850<br>(1950)<br>(2310)                             | 16 x 31                      | 0.035                                        | 2600                                                 |
| 820                         | 821 |                                                |                                              |                                                      | 13 x 35<br>(16 x 20)              | 0.033<br>(0.044)                             | 2510<br>(2210)                                       | 16 x 31<br>(18 x 25)         | 0.029<br>(0.034)                             | 2850<br>(2800)                                       |
| 1000                        | 102 | 13 x 21<br>(16 x 25)<br>(18 x 20)              | 0.058<br>(0.027)<br>(0.043)                  | 2150<br>(2230)<br>(2210)                             | 13 x 40<br>(16 x 25)<br>(18 x 20) | 0.027<br>(0.033)<br>(0.047)                  | 2920<br>(2555)<br>(2490)                             | 16 x 31<br>(16 x 35)         | 0.039<br>(0.027)                             | 2850<br>(2900)                                       |
| 1200                        | 122 | 13 x 30<br>(16 x 20)                           | 0.024<br>(0.027)                             | 2650<br>(2530)                                       | 16 x 31<br>(18 x 25)              | 0.027<br>(0.028)                             | 3010<br>(2740)                                       | 16 x 40<br>(18 x 31)         | 0.025<br>(0.028)                             | 3400<br>(3300)                                       |
| 1500                        | 152 | 13 x 35                                        | 0.020                                        | 2880                                                 | 16 x 35                           | 0.024                                        | 3150                                                 | 18 x 35                      | 0.025                                        | 3400                                                 |
| 1800                        | 182 | 16 x 31<br>(18 x 25)                           | 0.021<br>(0.026)                             | 2930<br>(2860)                                       | 16 x 40<br>(18 x 31)              | 0.021<br>(0.024)                             | 3710<br>(3635)                                       | 18 x 40                      | 0.024                                        | 3500                                                 |
| 2200                        | 222 | 16 x 31<br>(16 x 35)<br>(18 x 25)<br>(18 x 31) | 0.021<br>(0.016)<br>(0.021)<br>(0.019)       | 3300<br>(3500)<br>(3300)<br>(3140)                   | 18 x 35<br>(18 x 40)              | 0.022<br>(0.020)                             | 3680<br>(3750)                                       |                              |                                              |                                                      |
| 2700                        | 272 | 16 x 40<br>(18 x 35)                           | 0.015<br>(0.015)                             | 3610<br>(4170)                                       | 18 x 40                           | 0.018                                        | 3800                                                 |                              |                                              |                                                      |
| 3300                        | 332 | 16 x 40<br>(18 x 35)                           | 0.013<br>(0.014)                             | 4080<br>(4220)                                       |                                   |                                              |                                                      |                              |                                              |                                                      |

| WV<br>Parameter<br>參數<br>μF |     | 80 (1K)                      |                                              |                                                      | 100 (2A)                     |                                              |                                                      |
|-----------------------------|-----|------------------------------|----------------------------------------------|------------------------------------------------------|------------------------------|----------------------------------------------|------------------------------------------------------|
|                             |     | Case size<br>ØD×L (mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(mA rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(mA rms,<br>105°C, 100KHz) |
| 47                          | 470 |                              |                                              |                                                      | 10 x 16                      | 0.28                                         | 680                                                  |
| 220                         | 221 |                              |                                              |                                                      | 13 x 21                      | 0.064                                        | 1350                                                 |
| 470                         | 471 |                              |                                              |                                                      | 16 x 25                      | 0.043                                        | 2500                                                 |
| 1500                        | 152 | 18 x 40                      | 0.028                                        | 3650                                                 |                              |                                              |                                                      |

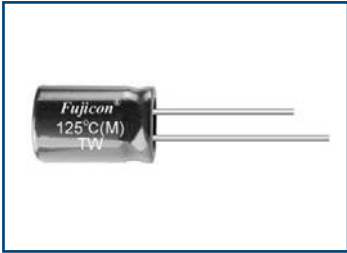
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

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TW Series

HIGH TEMPERATURE, FOR 125°C USE

125°C 高温品

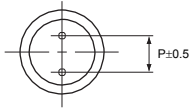
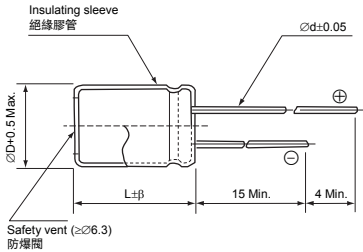


- Low impedance at high frequency  
高頻低阻抗
- For electronic control units and other high temperature applications  
適用於電子控制器與其他高溫應用
- Endurance 2000 hours at 125°C  
在 125°C 環境中耐久性 2000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH

SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                  |                                                                                                                                        |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +125°C                                                                                                                                                                                                                                                                                          |                                                                                                                                        |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 50V                                                                                                                                                                                                                                                                                             | 63 ~ 250V                                                                                                                              |
| Capacitance Range 靜電容量範圍          | 1 ~ 15000µF                                                                                                                                                                                                                                                                                           | 0.47 ~ 100µF                                                                                                                           |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                   |                                                                                                                                        |
| Leakage Current 漏電流               | Leakage current ≤0.01CV or 3µA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3µA 取較大值(在 20°C 環境中施加額定工作電壓 2 分鐘後)                                                                                                                                       | Leakage current ≤0.02CV + 15µA (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.02CV + 15µA (在 20°C 環境中施加額定工作電壓 5 分鐘後) |
| Dissipation Factor (tan δ) 損耗角正切  | C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                         |                                                                                                                                        |
|                                   | When nominal capacitance is over 1000µF, tan δ shall be added 0.02 to the listed value with increase of every 1000µF.<br>當標稱靜電容量大於 1000µF, 其標稱靜電容量每增加 1000µF, 損耗角正切增加 0.02。                                                                                                                           |                                                                                                                                        |
|                                   | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                                                                               |                                                                                                                                        |
| Stability at Low Temperature 低溫特性 | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                              | 6.3 ~ 10      16 ~ 250                                                                                                                 |
|                                   | Impedance Ratio 阻抗比                                                                                                                                                                                                                                                                                   | Z(-25°C) / Z(20°C)      3      2                                                                                                       |
|                                   |                                                                                                                                                                                                                                                                                                       | Z(-40°C) / Z(20°C)      5      4                                                                                                       |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 125°C, they meet the characteristics listed below (Ø5, Ø6.3 and WV≥100 products are for 1000 hours).<br>在 125°C 環境中施加額定工作電壓 2000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求 (Ø5, Ø6.3 和 WV≥100 產品為 1000 小時)。 |                                                                                                                                        |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                                            | Within ±20% of initial measured value 初始值的±20%以內                                                                                       |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                                              | ≤300% of initial specified value 不大於規範值的 300%                                                                                          |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                                                                                   | ≤initial specified value 不大於規範值                                                                                                        |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 125°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 125°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合耐久性特性中所列的規定值。                                                       |                                                                                                                                        |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                                                                                |                                                                                                                                        |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 5   | 6.3 | 8<br>(L≤11.5) | 8<br>(L≥16) | 10  | 13  | 16  | 18 |
|----|-----|-----|---------------|-------------|-----|-----|-----|----|
| P  | 2.0 | 2.5 | 3.5           |             | 5.0 |     | 7.5 |    |
| Ød | 0.5 |     |               | 0.6         |     |     | 0.8 |    |
| β  | 1.5 |     |               |             |     | 2.0 |     |    |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Cap.(µF) 容量 | Frequency 頻率 | 120Hz | 300Hz | 1KHz | 10KHz | 100KHz |
|-------------|--------------|-------|-------|------|-------|--------|
| 1000 > CV   |              | 0.50  | 0.64  | 0.83 | 0.90  | 1.0    |
| 1000 ≤ CV   |              | 0.67  | 0.79  | 0.91 | 0.95  | 1.0    |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱, 溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能, 請在使用過程中適當降低紋波電流。

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TW Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>參數<br>μF |     | 6.3 (0J)                     |                                              |                                                     | 10 (1A)                      |                                              |                                                     | 16 (1C)                      |                                              |                                                     |
|-----------------------------|-----|------------------------------|----------------------------------------------|-----------------------------------------------------|------------------------------|----------------------------------------------|-----------------------------------------------------|------------------------------|----------------------------------------------|-----------------------------------------------------|
|                             |     | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C, 100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C, 100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C, 100KHz<br>紋波電流 |
| 47                          | 470 |                              |                                              |                                                     |                              |                                              |                                                     | 5 × 11                       | 1.0                                          | 24                                                  |
| 68                          | 680 |                              |                                              |                                                     | 5 × 11                       | 1.0                                          | 124                                                 | 6.3 × 11.5                   | 0.65                                         | 176                                                 |
| 100                         | 101 | 5 × 11                       | 1.1                                          | 120                                                 | 6.3 × 11.5                   | 0.71                                         | 168                                                 | 6.3 × 11.5                   | 0.45                                         | 212                                                 |
| 150                         | 151 | 6.3 × 11.5                   | 0.64                                         | 180                                                 | 6.3 × 11.5                   | 0.45                                         | 212                                                 | 8 × 11.5                     | 0.30                                         | 310                                                 |
| 220                         | 221 | 6.3 × 11.5                   | 0.39                                         | 228                                                 | 8 × 11.5                     | 0.31                                         | 310                                                 | 8 × 11.5                     | 0.21                                         | 368                                                 |
| 330                         | 331 | 8 × 11.5                     | 0.26                                         | 234                                                 | 8 × 11.5                     | 0.21                                         | 368                                                 | 10 × 12.5                    | 0.16                                         | 500                                                 |
| 470                         | 471 | 10 × 12.5                    | 0.18                                         | 460                                                 | 10 × 12.5                    | 0.17                                         | 480                                                 | 10 × 16                      | 0.12                                         | 616                                                 |
| 680                         | 681 | 10 × 16                      | 0.14                                         | 560                                                 | 10 × 16                      | 0.12                                         | 616                                                 | 10 × 20                      | 0.085                                        | 816                                                 |
| 1000                        | 102 | 10 × 20                      | 0.097                                        | 760                                                 | 10 × 20                      | 0.078                                        | 848                                                 | 13 × 21                      | 0.061                                        | 1129                                                |
| 1500                        | 152 | 10 × 25                      | 0.071                                        | 976                                                 | 13 × 21                      | 0.059                                        | 1134                                                | 13 × 25                      | 0.047                                        | 1328                                                |
| 2200                        | 222 | 13 × 21                      | 0.056                                        | 1150                                                | 13 × 25                      | 0.044                                        | 1368                                                | 16 × 20                      | 0.043                                        | 1440                                                |
| 3300                        | 332 | 13 × 25                      | 0.044                                        | 1368                                                | 16 × 20                      | 0.040                                        | 1480                                                | 16 × 25                      | 0.035                                        | 1676                                                |
| 4700                        | 472 | 16 × 25                      | 0.042                                        | 1548                                                | 16 × 31.5                    | 0.030                                        | 1936                                                | 16 × 35.5                    | 0.026                                        | 2144                                                |
| 6800                        | 682 | 16 × 31.5                    | 0.031                                        | 1896                                                | 16 × 35.5                    | 0.026                                        | 2144                                                | 18 × 35.5                    | 0.023                                        | 2320                                                |
| 10000                       | 103 | 16 × 40                      | 0.026                                        | 2200                                                | 18 × 40                      | 0.022                                        | 2432                                                |                              |                                              |                                                     |
| 15000                       | 153 | 18 × 40                      | 0.023                                        | 2368                                                |                              |                                              |                                                     |                              |                                              |                                                     |

| WV<br>Parameter<br>參數<br>μF |     | 25 (1E)                      |                                              |                                                     | 35 (1V)                      |                                              |                                                     | 50 (1H)                      |                                              |                                                     |
|-----------------------------|-----|------------------------------|----------------------------------------------|-----------------------------------------------------|------------------------------|----------------------------------------------|-----------------------------------------------------|------------------------------|----------------------------------------------|-----------------------------------------------------|
|                             |     | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C, 100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C, 100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Impedance (Ω)<br>max. 20°C,<br>100KHz<br>阻抗值 | Ripple current<br>(mA rms)<br>125°C, 100KHz<br>紋波電流 |
| 1                           | 010 |                              |                                              |                                                     |                              |                                              |                                                     | 5 × 11                       | 5.2                                          | 29                                                  |
| 1.5                         | 1R5 |                              |                                              |                                                     |                              |                                              |                                                     | 5 × 11                       | 4.9                                          | 36                                                  |
| 2.2                         | 2R2 |                              |                                              |                                                     |                              |                                              |                                                     | 5 × 11                       | 4.5                                          | 43                                                  |
| 3.3                         | 3R3 |                              |                                              |                                                     |                              |                                              |                                                     | 5 × 11                       | 3.9                                          | 53                                                  |
| 4.7                         | 4R7 |                              |                                              |                                                     |                              |                                              |                                                     | 5 × 11                       | 2.9                                          | 65                                                  |
| 6.8                         | 6R8 |                              |                                              |                                                     |                              |                                              |                                                     | 5 × 11                       | 2.3                                          | 73                                                  |
| 10                          | 100 |                              |                                              |                                                     |                              |                                              |                                                     | 5 × 11                       | 1.8                                          | 92                                                  |
| 15                          | 150 |                              |                                              |                                                     |                              |                                              |                                                     | 5 × 11                       | 1.2                                          | 116                                                 |
| 22                          | 220 |                              |                                              |                                                     | 5 × 11                       | 0.97                                         | 128                                                 | 6.3 × 11.5                   | 0.84                                         | 156                                                 |
| 33                          | 330 | 5 × 11                       | 1.0                                          | 124                                                 | 6.3 × 11.5                   | 0.64                                         | 180                                                 | 6.3 × 11.5                   | 0.56                                         | 192                                                 |
| 47                          | 470 | 6.3 × 11.5                   | 0.72                                         | 168                                                 | 6.3 × 11.5                   | 0.44                                         | 216                                                 | 8 × 11.5                     | 0.39                                         | 275                                                 |
| 68                          | 680 | 6.3 × 11.5                   | 0.47                                         | 208                                                 | 8 × 11.5                     | 0.31                                         | 307                                                 | 8 × 11.5                     | 0.26                                         | 328                                                 |
| 100                         | 101 | 8 × 11.5                     | 0.31                                         | 306                                                 | 8 × 11.5                     | 0.21                                         | 368                                                 | 10 × 16                      | 0.21                                         | 465                                                 |
| 150                         | 151 | 8 × 11.5                     | 0.21                                         | 368                                                 | 10 × 12.5                    | 0.16                                         | 500                                                 | 10 × 20                      | 0.13                                         | 656                                                 |
| 220                         | 221 | 10 × 12.5                    | 0.17                                         | 480                                                 | 10 × 16                      | 0.12                                         | 616                                                 | 10 × 25                      | 0.098                                        | 832                                                 |
| 330                         | 331 | 10 × 16                      | 0.12                                         | 600                                                 | 10 × 20                      | 0.078                                        | 848                                                 | 13 × 21                      | 0.072                                        | 1025                                                |
| 470                         | 471 | 10 × 20                      | 0.084                                        | 816                                                 | 13 × 21                      | 0.060                                        | 1121                                                | 13 × 25                      | 0.057                                        | 1200                                                |
| 680                         | 681 | 13 × 21                      | 0.060                                        | 1114                                                | 13 × 25                      | 0.047                                        | 1328                                                | 16 × 20                      | 0.052                                        | 1304                                                |
| 1000                        | 102 | 13 × 25                      | 0.047                                        | 1328                                                | 16 × 20                      | 0.044                                        | 1416                                                | 16 × 25                      | 0.039                                        | 1696                                                |
| 1500                        | 152 | 16 × 20                      | 0.044                                        | 1416                                                | 16 × 31.5                    | 0.036                                        | 1908                                                | 16 × 40                      | 0.034                                        | 1928                                                |
| 2200                        | 222 | 16 × 25                      | 0.036                                        | 1641                                                | 16 × 35.5                    | 0.026                                        | 2144                                                | 18 × 40                      | 0.031                                        | 2048                                                |
| 3300                        | 332 | 16 × 35.5                    | 0.026                                        | 2144                                                | 18 × 40                      | 0.022                                        | 2432                                                |                              |                                              |                                                     |
| 4700                        | 472 | 18 × 40                      | 0.023                                        | 2368                                                |                              |                                              |                                                     |                              |                                              |                                                     |

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CAT.2024/V1.3

TW Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>參數<br><br>μF |     | 63 (1J)                      |                                                  | 100 (2A)                     |                                                  | 160 (2C)                     |                                                  |
|---------------------------------|-----|------------------------------|--------------------------------------------------|------------------------------|--------------------------------------------------|------------------------------|--------------------------------------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA<br>rms) 125°C, 100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA<br>rms) 125°C, 100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA<br>rms) 125°C, 100KHz<br>紋波電流 |
| 0.47                            | R47 | 8 × 11.5                     | 13                                               | 8 × 11.5                     | 13                                               | 10 × 12.5                    | 10                                               |
| 1                               | 010 | 8 × 11.5                     | 19                                               | 8 × 11.5                     | 19                                               | 10 × 12.5                    | 15                                               |
| 2.2                             | 2R2 | 8 × 11.5                     | 28                                               | 10 × 12.5                    | 33                                               | 10 × 16                      | 24                                               |
| 3.3                             | 3R3 | 8 × 11.5                     | 34                                               | 10 × 16                      | 44                                               | 10 × 16                      | 32                                               |
| 4.7                             | 4R7 | 8 × 11.5                     | 41                                               | 10 × 16                      | 52                                               | 10 × 20                      | 38                                               |
| 10                              | 100 | 8 × 11.5                     | 61                                               | 10 × 20                      | 83                                               | 13 × 21                      | 66                                               |
| 22                              | 220 | 10 × 16                      | 113                                              | 13 × 25                      | 157                                              | 16 × 25                      | 118                                              |
| 33                              | 330 | 10 × 20                      | 151                                              | 16 × 25                      | 214                                              | 16 × 31.5                    | 158                                              |
| 47                              | 470 | 13 × 21                      | 211                                              | 16 × 31.5                    | 279                                              |                              |                                                  |
| 100                             | 101 | 13 × 25                      | 336                                              |                              |                                                  |                              |                                                  |

| WV<br>Parameter<br>參數<br><br>μF |     | 200 (2D)                     |                                                  | 250 (2E)                     |                                                  |
|---------------------------------|-----|------------------------------|--------------------------------------------------|------------------------------|--------------------------------------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA<br>rms) 125°C, 100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA<br>rms) 125°C, 100KHz<br>紋波電流 |
| 0.47                            | R47 | 10 × 12.5                    | 10                                               | 10 × 12.5                    | 10                                               |
| 1                               | 010 | 10 × 12.5                    | 15                                               | 10 × 12.5                    | 14                                               |
| 2.2                             | 2R2 | 10 × 16                      | 24                                               | 10 × 16                      | 24                                               |
| 3.3                             | 3R3 | 10 × 20                      | 32                                               | 10 × 20                      | 32                                               |
| 4.7                             | 4R7 | 10 × 20                      | 38                                               | 13 × 21                      | 45                                               |
| 10                              | 100 | 13 × 21                      | 72                                               | 16 × 25                      | 79                                               |
| 22                              | 220 | 16 × 31.5                    | 129                                              |                              |                                                  |

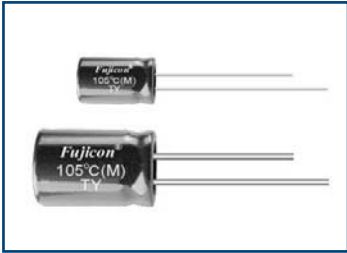
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

TY Series

HIGH RIPPLE CURRENT, HIGH RELIABILITY

高紋波電流，高可靠品

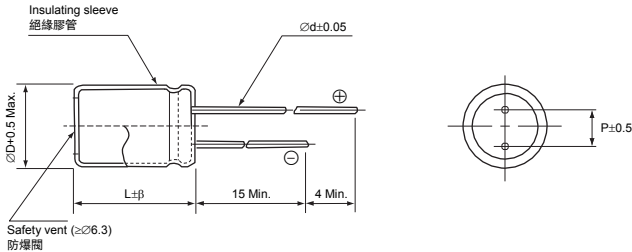
- High frequency, high ripple current and low impedance  
高頻、高紋波電流和低阻抗
- Endurance 2000~7000 hours  
耐久性 2000~7000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                          |                    |                           |                                                  |      |      |        |       |  |   |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------|--------------------------------------------------|------|------|--------|-------|--|---|--|--|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                                                                                  |                    |                           |                                                  |      |      |        |       |  |   |  |  |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 50V                                                                                                                                                                                                                                                                                                                                     |                    |                           |                                                  |      |      |        |       |  |   |  |  |
| Capacitance Range 靜電容量範圍          | 22 ~ 18000µF                                                                                                                                                                                                                                                                                                                                  |                    |                           |                                                  |      |      |        |       |  |   |  |  |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                           |                    |                           |                                                  |      |      |        |       |  |   |  |  |
| Leakage Current 漏電流               | Leakage current ≤0.01CV or 3µA, whichever is greater (after 2 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.01CV 或 3µA，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後）<br>C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                              |                    |                           |                                                  |      |      |        |       |  |   |  |  |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000µF, tan δ shall be added 0.02 to the listed value with increase of every 1000µF.<br>當標稱靜電容量大於 1000µF，其標稱靜電容量每增加 1000µF，損耗角正切增加 0.02。<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                          |                    |                           |                                                  |      |      |        |       |  |   |  |  |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                                                      | 6.3                | 10                        | 16                                               | 25   | 35   | 50     |       |  |   |  |  |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                                                                                                                          | 0.22               | 0.19                      | 0.16                                             | 0.14 | 0.12 | 0.10   |       |  |   |  |  |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                                                                                                             |                    |                           |                                                  |      |      |        |       |  |   |  |  |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                                                      | 6.3                |                           | 10                                               |      | 16   |        | 25~50 |  |   |  |  |
|                                   | Impedance Ratio 阻抗比                                                                                                                                                                                                                                                                                                                           | Z(-25°C) / Z(20°C) |                           | 4                                                |      | 3    |        | 2     |  |   |  |  |
|                                   |                                                                                                                                                                                                                                                                                                                                               | Z(-40°C) / Z(20°C) |                           | 8                                                |      | 6    |        | 4     |  | 3 |  |  |
| Endurance 耐久性                     | The characteristics listed below shall be satisfied when the capacitors are restored to 20°C after subject to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105°C.<br>在 105°C 環境中的規定時間內施加額定紋波電流（峰值電壓不得超過額定電壓）後，電容器經直流電壓後恢復至 20°C 時，應符合下表參數要求。 |                    |                           |                                                  |      |      |        |       |  |   |  |  |
|                                   | Size (mm) 尺寸                                                                                                                                                                                                                                                                                                                                  |                    | Life time (hours) 壽命 (小時) |                                                  |      |      |        |       |  |   |  |  |
|                                   |                                                                                                                                                                                                                                                                                                                                               |                    | 6.3~10V                   |                                                  |      |      | 16~50V |       |  |   |  |  |
|                                   | Ø5, Ø6.3                                                                                                                                                                                                                                                                                                                                      |                    | 2000                      |                                                  |      |      | 3000   |       |  |   |  |  |
|                                   | Ø8, Ø10                                                                                                                                                                                                                                                                                                                                       |                    | 4000                      |                                                  |      |      | 5000   |       |  |   |  |  |
|                                   | ØD≥13                                                                                                                                                                                                                                                                                                                                         |                    | 6000                      |                                                  |      |      | 7000   |       |  |   |  |  |
|                                   |                                                                                                                                                                                                                                                                                                                                               |                    |                           |                                                  |      |      |        |       |  |   |  |  |
| Capacitance Change 靜電容量變化率        |                                                                                                                                                                                                                                                                                                                                               |                    |                           | Within ±25% of initial measured value 初始值的±25%以內 |      |      |        |       |  |   |  |  |
| Dissipation Factor 損耗角正切          |                                                                                                                                                                                                                                                                                                                                               |                    |                           | ≤200% of initial specified value 不大於規範值的 200%    |      |      |        |       |  |   |  |  |
| Leakage Current 漏電流               |                                                                                                                                                                                                                                                                                                                                               |                    |                           | ≤initial specified value 不大於規範值                  |      |      |        |       |  |   |  |  |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                 |                    |                           |                                                  |      |      |        |       |  |   |  |  |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                                                                                                                        |                    |                           |                                                  |      |      |        |       |  |   |  |  |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 5   | 6.3 | 8 (L≤11.5) | 8 (L≤16) | 10  | 13 | 16  | 18 |
|----|-----|-----|------------|----------|-----|----|-----|----|
| P  | 2.0 | 2.5 | 3.5        |          | 5.0 |    | 7.5 |    |
| Ød |     | 0.5 |            |          | 0.6 |    | 0.8 |    |
| β  |     |     | 1.5        |          |     |    | 2.0 |    |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |                | 120Hz | 1KHz | 10KHz | 100KHz |
|-------------------|----------------|-------|------|-------|--------|
| Coefficient<br>係數 | 22 ~ 180μF     | 0.40  | 0.75 | 0.90  | 1.0    |
|                   | 220 ~ 560μF    | 0.50  | 0.85 | 0.94  | 1.0    |
|                   | 680 ~ 1800μF   | 0.60  | 0.87 | 0.95  | 1.0    |
|                   | 2200 ~ 3900μF  | 0.75  | 0.90 | 0.95  | 1.0    |
|                   | 4700 ~ 18000μF | 0.85  | 0.95 | 0.98  | 1.0    |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

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CAT.2024/V1.3

TY Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| Case size<br>ØD×L (mm)<br>尺寸 | WV<br>Items<br>項目 | 6.3 (0J)                    |       |                              |                  |                                                         | 10 (1A)                     |       |                              |                  |                                                         | 16 (1C)                     |       |                              |                  |                                                         |
|------------------------------|-------------------|-----------------------------|-------|------------------------------|------------------|---------------------------------------------------------|-----------------------------|-------|------------------------------|------------------|---------------------------------------------------------|-----------------------------|-------|------------------------------|------------------|---------------------------------------------------------|
|                              |                   | Capacitance<br>(μF)<br>靜電容量 |       | Impedance<br>(Ω) max.<br>阻抗值 |                  | Ripple current<br>紋波電流<br>(mA rms,<br>105°C,<br>100KHz) | Capacitance<br>(μF)<br>靜電容量 |       | Impedance<br>(Ω) max.<br>阻抗值 |                  | Ripple current<br>紋波電流<br>(mA rms,<br>105°C,<br>100KHz) | Capacitance<br>(μF)<br>靜電容量 |       | Impedance<br>(Ω) max.<br>阻抗值 |                  | Ripple current<br>紋波電流<br>(mA rms,<br>105°C,<br>100KHz) |
|                              |                   |                             |       | 20°C,<br>100KHz              | -10°C,<br>100KHz |                                                         |                             |       | 20°C,<br>100KHz              | -10°C,<br>100KHz |                                                         |                             |       | 20°C,<br>100KHz              | -10°C,<br>100KHz |                                                         |
|                              |                   |                             |       |                              |                  |                                                         |                             |       |                              |                  |                                                         |                             |       |                              |                  |                                                         |
| 5 × 11                       | 150               | 151                         | 1.16  | 4.6                          | 215              | 100                                                     | 101                         | 1.16  | 4.6                          | 215              | 56                                                      | 560                         | 1.16  | 4.6                          | 215              |                                                         |
| 6.3 × 11.5                   | 330               | 331                         | 0.44  | 1.74                         | 345              | 220                                                     | 221                         | 0.44  | 1.74                         | 345              | 120                                                     | 121                         | 0.44  | 1.74                         | 345              |                                                         |
| 8 × 11.5                     | 680               | 681                         | 0.26  | 1.04                         | 645              | 470                                                     | 471                         | 0.26  | 1.04                         | 645              | 330                                                     | 331                         | 0.26  | 1.04                         | 645              |                                                         |
| 10 × 12                      | 820               | 820                         | 0.16  | 0.64                         | 870              | 680                                                     | 681                         | 0.16  | 0.064                        | 870              | 470                                                     | 471                         | 0.174 | 0.70                         | 845              |                                                         |
| 10 × 16                      | 1200              | 122                         | 0.12  | 0.48                         | 1215             | 1000                                                    | 102                         | 0.12  | 0.480                        | 1215             | 680                                                     | 681                         | 0.138 | 0.54                         | 1055             |                                                         |
| 10 × 20                      | 1500              | 152                         | 0.092 | 0.36                         | 1410             | 1200                                                    | 122                         | 0.092 | 0.360                        | 1410             | 1000                                                    | 102                         | 0.092 | 0.36                         | 1410             |                                                         |
| 10 × 25                      | 2200              | 222                         | 0.084 | 0.34                         | 1655             | 1500                                                    | 152                         | 0.084 | 0.340                        | 1655             | 1200                                                    | 122                         | 0.084 | 0.34                         | 1655             |                                                         |
| 10 × 30                      | 2700              | 272                         | 0.062 | 0.24                         | 1915             | 2200                                                    | 222                         | 0.062 | 0.240                        | 1915             | 1500                                                    | 152                         | 0.062 | 0.24                         | 1915             |                                                         |
| 13 × 21                      | 3300              | 332                         | 0.070 | 0.24                         | 1905             | 2200                                                    | 222                         | 0.070 | 0.120                        | 1905             | 1500                                                    | 152                         | 0.070 | 0.24                         | 1905             |                                                         |
| 13 × 25                      | 3900              | 392                         | 0.054 | 0.178                        | 2235             | 3300                                                    | 332                         | 0.054 | 0.178                        | 2235             | 2200                                                    | 222                         | 0.054 | 0.178                        | 2235             |                                                         |
| 13 × 30                      | 4700              | 472                         | 0.048 | 0.156                        | 2655             | 3900                                                    | 392                         | 0.048 | 0.156                        | 2655             | 2700                                                    | 272                         | 0.048 | 0.156                        | 2655             |                                                         |
| 13 × 35                      | 5600              | 562                         | 0.040 | 0.130                        | 2885             | 4700                                                    | 472                         | 0.040 | 0.130                        | 2885             | 3300                                                    | 332                         | 0.040 | 0.130                        | 2885             |                                                         |
| 16 × 20                      | 5600              | 562                         | 0.054 | 0.156                        | 2535             | 3900                                                    | 392                         | 0.054 | 0.156                        | 2535             | 2700                                                    | 272                         | 0.054 | 0.140                        | 2535             |                                                         |
| 16 × 25                      | 6800              | 682                         | 0.042 | 0.120                        | 2935             | 5600                                                    | 562                         | 0.042 | 0.120                        | 2935             | 3900                                                    | 392                         | 0.042 | 0.120                        | 2935             |                                                         |
| 16 × 31                      | 8200              | 822                         | 0.034 | 0.100                        | 3455             | 6800                                                    | 682                         | 0.034 | 0.100                        | 3455             | 4700                                                    | 472                         | 0.034 | 0.100                        | 3455             |                                                         |
| 16 × 35                      | 10000             | 103                         | 0.030 | 0.088                        | 3615             | 8200                                                    | 822                         | 0.030 | 0.088                        | 3615             | 5600                                                    | 562                         | 0.030 | 0.088                        | 3615             |                                                         |
| 16 × 40                      | 12000             | 123                         | 0.026 | 0.076                        | 4085             | 10000                                                   | 103                         | 0.026 | 0.076                        | 4085             | 6800                                                    | 682                         | 0.026 | 0.076                        | 4085             |                                                         |
| 18 × 20                      | 6800              | 682                         | 0.052 | 0.134                        | 2865             | 5600                                                    | 562                         | 0.052 | 0.134                        | 2865             | 3900                                                    | 392                         | 0.052 | 0.134                        | 2865             |                                                         |
| 18 × 25                      | 10000             | 103                         | 0.038 | 0.098                        | 3145             | 6800                                                    | 682                         | 0.038 | 0.098                        | 3145             | 4700                                                    | 472                         | 0.038 | 0.049                        | 3145             |                                                         |
| 18 × 31                      | 12000             | 123                         | 0.030 | 0.080                        | 4175             | 8200                                                    | 822                         | 0.030 | 0.080                        | 4175             | 5600                                                    | 562                         | 0.030 | 0.040                        | 4175             |                                                         |
| 18 × 35                      | 15000             | 153                         | 0.028 | 0.076                        | 4225             | 10000                                                   | 103                         | 0.028 | 0.076                        | 4225             | 8200                                                    | 822                         | 0.028 | 0.038                        | 4225             |                                                         |
| 18 × 40                      | 18000             | 183                         | 0.024 | 0.064                        | 4285             | 12000                                                   | 123                         | 0.024 | 0.064                        | 4285             | 10000                                                   | 103                         | 0.024 | 0.032                        | 4285             |                                                         |

| Case size<br>ØD×L (mm)<br>尺寸 | WV<br>Items<br>項目 | 25 (1E)                     |       |                              |                  |                                                         | 35 (1V)                     |       |                              |                  |                                                         | 50 (1H)                     |       |                              |                  |                                                         |
|------------------------------|-------------------|-----------------------------|-------|------------------------------|------------------|---------------------------------------------------------|-----------------------------|-------|------------------------------|------------------|---------------------------------------------------------|-----------------------------|-------|------------------------------|------------------|---------------------------------------------------------|
|                              |                   | Capacitance<br>(μF)<br>靜電容量 |       | Impedance<br>(Ω) max.<br>阻抗值 |                  | Ripple current<br>紋波電流<br>(mA rms,<br>105°C,<br>100KHz) | Capacitance<br>(μF)<br>靜電容量 |       | Impedance<br>(Ω) max.<br>阻抗值 |                  | Ripple current<br>紋波電流<br>(mA rms,<br>105°C,<br>100KHz) | Capacitance<br>(μF)<br>靜電容量 |       | Impedance<br>(Ω) max.<br>阻抗值 |                  | Ripple current<br>紋波電流<br>(mA rms,<br>105°C,<br>100KHz) |
|                              |                   |                             |       | 20°C,<br>100KHz              | -10°C,<br>100KHz |                                                         |                             |       | 20°C,<br>100KHz              | -10°C,<br>100KHz |                                                         |                             |       | 20°C,<br>100KHz              | -10°C,<br>100KHz |                                                         |
|                              |                   |                             |       |                              |                  |                                                         |                             |       |                              |                  |                                                         |                             |       |                              |                  |                                                         |
| 5 × 11                       | 47                | 470                         | 1.16  | 4.6                          | 215              | 33                                                      | 330                         | 1.16  | 2.3                          | 215              | 22                                                      | 220                         | 1.4   | 5.6                          | 185              |                                                         |
| 6.3 × 11.5                   | 100               | 101                         | 0.44  | 1.74                         | 345              | 56                                                      | 560                         | 0.44  | 1.74                         | 345              | 56                                                      | 560                         | 0.6   | 2.4                          | 300              |                                                         |
| 8 × 11.5                     | 220               | 221                         | 0.26  | 1.04                         | 645              | 150                                                     | 151                         | 0.26  | 1.04                         | 645              | 100                                                     | 101                         | 0.34  | 1.36                         | 560              |                                                         |
| 10 × 12                      | 330               | 331                         | 0.160 | 0.64                         | 870              | 220                                                     | 221                         | 0.160 | 0.64                         | 865              | 150                                                     | 151                         | 0.24  | 0.96                         | 785              |                                                         |
| 10 × 16                      | 470               | 471                         | 0.120 | 0.48                         | 1215             | 330                                                     | 331                         | 0.100 | 0.48                         | 1215             | 220                                                     | 221                         | 0.168 | 0.68                         | 1055             |                                                         |
| 10 × 20                      | 680               | 681                         | 0.092 | 0.36                         | 1410             | 470                                                     | 471                         | 0.080 | 0.36                         | 1410             | 270                                                     | 271                         | 0.110 | 0.48                         | 1225             |                                                         |
| 10 × 25                      | 820               | 821                         | 0.084 | 0.34                         | 1655             | 560                                                     | 561                         | 0.084 | 0.34                         | 1655             | 330                                                     | 331                         | 0.090 | 0.44                         | 1445             |                                                         |
| 10 × 30                      | 1000              | 102                         | 0.062 | 0.24                         | 1915             | 680                                                     | 681                         | 0.062 | 0.24                         | 1915             | 470                                                     | 471                         | 0.086 | 0.34                         | 1695             |                                                         |
| 13 × 21                      | 1000              | 102                         | 0.070 | 0.24                         | 1905             | 680                                                     | 681                         | 0.070 | 0.24                         | 1905             | 470                                                     | 471                         | 0.090 | 0.30                         | 1665             |                                                         |
| 13 × 25                      | 1500              | 152                         | 0.054 | 0.178                        | 2235             | 1000                                                    | 102                         | 0.054 | 0.178                        | 2235             | 560                                                     | 561                         | 0.070 | 0.22                         | 1955             |                                                         |
| 13 × 30                      | 1800              | 182                         | 0.048 | 0.156                        | 2650             | 1200                                                    | 122                         | 0.048 | 0.156                        | 2655             | 680                                                     | 681                         | 0.068 | 0.20                         | 2315             |                                                         |
| 13 × 35                      | 2200              | 222                         | 0.040 | 0.130                        | 2885             | 1500                                                    | 152                         | 0.040 | 0.130                        | 2885             | 820                                                     | 821                         | 0.070 | 0.20                         | 2515             |                                                         |
| 16 × 20                      | 1800              | 182                         | 0.054 | 0.156                        | 2535             | 1200                                                    | 122                         | 0.054 | 0.156                        | 2535             | 820                                                     | 821                         | 0.068 | 0.166                        | 2215             |                                                         |
| 16 × 25                      | 2700              | 272                         | 0.042 | 0.120                        | 2935             | 1800                                                    | 182                         | 0.042 | 0.120                        | 2935             | 1000                                                    | 102                         | 0.050 | 0.150                        | 2560             |                                                         |
| 16 × 31                      | 3300              | 332                         | 0.034 | 0.100                        | 3455             | 2200                                                    | 222                         | 0.034 | 0.100                        | 3455             | 1200                                                    | 122                         | 0.044 | 0.132                        | 3015             |                                                         |
| 16 × 35                      | 3900              | 392                         | 0.030 | 0.088                        | 3615             | 2700                                                    | 272                         | 0.030 | 0.088                        | 3615             | 1500                                                    | 152                         | 0.038 | 0.114                        | 3155             |                                                         |
| 16 × 40                      | 4700              | 472                         | 0.026 | 0.076                        | 4085             | 3300                                                    | 332                         | 0.026 | 0.076                        | 4085             | 1800                                                    | 182                         | 0.032 | 0.960                        | 2715             |                                                         |
| 18 × 20                      | 2200              | 222                         | 0.052 | 0.134                        | 2865             | 1800                                                    | 182                         | 0.052 | 0.134                        | 2865             | 1000                                                    | 102                         | 0.072 | 0.194                        | 2495             |                                                         |
| 18 × 25                      | 3300              | 332                         | 0.038 | 0.098                        | 3145             | 2200                                                    | 222                         | 0.038 | 0.098                        | 3145             | 1200                                                    | 122                         | 0.052 | 0.140                        | 2745             |                                                         |
| 18 × 31                      | 3900              | 392                         | 0.030 | 0.080                        | 4175             | 2700                                                    | 272                         | 0.030 | 0.080                        | 4175             | 1800                                                    | 182                         | 0.042 | 0.114                        | 3640             |                                                         |
| 18 × 35                      | 4700              | 472                         | 0.028 | 0.076                        | 4225             | 3300                                                    | 332                         | 0.028 | 0.076                        | 4225             | 2200                                                    | 222                         | 0.034 | 0.092                        | 3685             |                                                         |
| 18 × 40                      | 5600              | 562                         | 0.024 | 0.064                        | 4285             | 3900                                                    | 392                         | 0.024 | 0.064                        | 4285             | 2700                                                    | 272                         | 0.028 | 0.076                        | 3805             |                                                         |

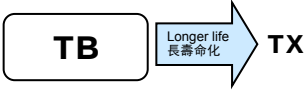
● Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。  
● Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。  
● Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

TB Series

HIGH RIPPLE CURRENT

高紋波電流品

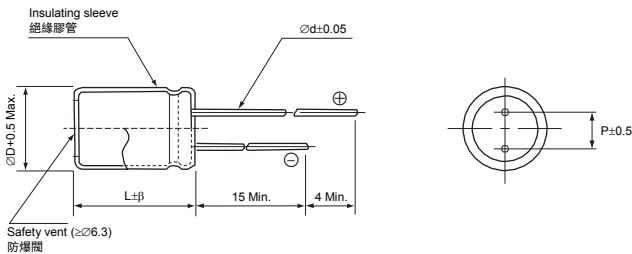
- High ripple current  
高紋波電流特性
- Endurance 2000~5000 hours  
耐久性 2000~5000 小時
- Suitable for electronic ballast, power supply and LED lighting  
適用於電子鎮流器，電源和 LED 照明
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                           |                                                  |      |      |      |      |      |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------|------|------|------|------|
| Category Temperature Range 工作溫度範圍 | -25 ~ +105°C                                                                                                                                                                                                                                                                                                                                   |                                                  |      |      |      |      |      |
| Voltage Range 額定工作電壓範圍            | 160 ~ 450V                                                                                                                                                                                                                                                                                                                                     |                                                  |      |      |      |      |      |
| Capacitance Range 靜電容量範圍          | 2.2 ~ 100μF                                                                                                                                                                                                                                                                                                                                    |                                                  |      |      |      |      |      |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                            |                                                  |      |      |      |      |      |
| Leakage Current 漏電流               | Leakage current ≤0.02CV + 25μA (after 5 minutes application of rated voltage at 20°C) or Leakage current ≤0.04CV + 100μA (after 1 minute application of rated voltage at 20°C)<br>漏電流 ≤0.02CV + 25μA (在 20°C 環境中施加額定工作電壓 5 分鐘後) 或<br>漏電流 ≤0.04CV + 100μA (在 20°C 環境中施加額定工作電壓 1 分鐘後)                                                            |                                                  |      |      |      |      |      |
|                                   | C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                  |                                                  |      |      |      |      |      |
| Dissipation Factor (tan δ) 損耗角正切  | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                                                                                                                        |                                                  |      |      |      |      |      |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                                                       | 160                                              | 200  | 250  | 350  | 400  | 450  |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                                                                                                                           | 0.15                                             | 0.15 | 0.15 | 0.20 | 0.20 | 0.20 |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                                                                                                              |                                                  |      |      |      |      |      |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                                                                                       | 160                                              | 200  | 250  | 350  | 400  | 450  |
|                                   | Impedance Ratio 阻抗比                                                                                                                                                                                                                                                                                                                            | Z(-25°C) / Z(20°C)                               | 3    | 3    | 3    | 6    | 6    |
| Endurance 耐久性                     | After an application of DC bias voltage plus the rated ripple current for 5000 hours (3000 hours for Ø8, 2000 hours for Ø6.3) at 105°C the peak voltage shall not exceed the rated DC voltage, capacitors meet the characteristics listed below.<br>在 105°C 環境下，在不超過額定電壓的範圍內重疊規定的紋波電流，施加 5000 小時（Ø8 為 3000 小時，Ø6.3 為 2000 小時）電壓後，電容器的特性符合下表規定。 |                                                  |      |      |      |      |      |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                                                                                     | Within ±20% of initial measured value 初始值的±20%以內 |      |      |      |      |      |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                                                                                       | ≤200% of initial specified value 不大於規範值的 200%    |      |      |      |      |      |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                                                                                                                            | ≤initial specified value 不大於規範值                  |      |      |      |      |      |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合高溫負荷特性中所列的規定值。                                                                                                 |                                                  |      |      |      |      |      |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。                                                                                                                                                                                                            |                                                  |      |      |      |      |      |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



| ØD | 6.3 | 8 (L≤11.5) | 8 (L≥16) | 10  | 13 | 16  | 18 |
|----|-----|------------|----------|-----|----|-----|----|
| P  | 2.5 | 3.5        |          | 5.0 |    | 7.5 |    |
| Ød | 0.5 |            | 0.6      |     |    | 0.8 |    |
| β  |     | 1.5        |          |     |    | 2.0 |    |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   |              | 120Hz | 1KHz | 10KHz | 100KHz |
|----------------|--------------|-------|------|-------|--------|
| Coefficient 系數 | 2.2 ~ 5.6μF  | 0.20  | 0.40 | 0.80  | 1.00   |
|                | 6.8 ~ 15μF   | 0.30  | 0.60 | 0.90  | 1.00   |
|                | 22μF ~ 180μF | 0.40  | 0.70 | 0.90  | 1.00   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

TB Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Parameter<br>參數<br>μF |     | 160 (2C)                     |                                                  | 200 (2D)                     |                                                  | 250 (2E)                     |                                                  |
|-----------------------------|-----|------------------------------|--------------------------------------------------|------------------------------|--------------------------------------------------|------------------------------|--------------------------------------------------|
|                             |     | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA<br>rms) 105°C, 100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA<br>rms) 105°C, 100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA<br>rms) 105°C, 100KHz<br>紋波電流 |
| 2.2                         | 2R2 | 6.3 × 11.5                   | 60                                               | 6.3 × 11.5                   | 65                                               | 8 × 11.5                     | 70                                               |
| 3.3                         | 3R3 | 8 × 11.5                     | 72                                               | 8 × 11.5                     | 95                                               | 8 × 11.5                     | 75                                               |
| 4.7                         | 4R7 | 8 × 11.5                     | 80                                               | 8 × 11.5                     | 98                                               | 8 × 11.5                     | 98                                               |
| 5.6                         | 5R6 | 8 × 11.5                     | 84                                               | 8 × 11.5                     | 102                                              | 8 × 16                       | 100                                              |
| 6.8                         | 6R8 | 8 × 11.5                     | 90                                               | 8 × 16<br>(10 × 12)          | 102<br>(108)                                     | 8 × 16                       | 102                                              |
| 8.2                         | 8R2 | 8 × 11.5                     | 100                                              | 10 × 12                      | 112                                              | 10 × 16                      | 112                                              |
| 10                          | 100 | 8 × 11.5                     | 206                                              | 10 × 12                      | 210                                              | 10 × 16                      | 230                                              |
| 15                          | 150 | 10 × 12                      | 235                                              | 10 × 16                      | 255                                              | 10 × 20                      | 265                                              |
| 22                          | 220 | 10 × 16                      | 245                                              | 10 × 20                      | 285                                              | 10 × 20<br>(13 × 21)         | 290<br>(300)                                     |
| 33                          | 330 | 10 × 20                      | 265                                              | 13 × 21                      | 300                                              | 13 × 21                      | 345                                              |
| 47                          | 470 | 13 × 21                      | 300                                              | 13 × 21                      | 345                                              | 13 × 21<br>(13 × 25)         | 390<br>(410)                                     |
| 68                          | 680 | 13 × 21                      | 330                                              | 13 × 25                      | 385                                              | 16 × 25                      | 485                                              |
| 100                         | 101 | 13 × 25                      | 380                                              | 16 × 25                      | 465                                              | 16 × 31                      | 510                                              |

| WV<br>Parameter<br>參數<br>μF |     | 350 (2V)                     |                                                  | 400 (2G)                     |                                                  | 450 (2W)                     |                                                  |
|-----------------------------|-----|------------------------------|--------------------------------------------------|------------------------------|--------------------------------------------------|------------------------------|--------------------------------------------------|
|                             |     | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA<br>rms) 105°C, 100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA<br>rms) 105°C, 100KHz<br>紋波電流 | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA<br>rms) 105°C, 100KHz<br>紋波電流 |
| 2.2                         | 2R2 | 8 × 11.5                     | 65                                               | 8 × 11.5                     | 72                                               | 8 × 11.5                     | 85                                               |
| 3.3                         | 3R3 | 10 × 12                      | 100                                              | 10 × 12                      | 105                                              | 10 × 12                      | 110                                              |
| 4.7                         | 4R7 | 10 × 12                      | 115                                              | 8 × 11.5<br>(10 × 12)        | 75<br>(120)                                      | 10 × 12                      | 130                                              |
| 5.6                         | 5R6 | 10 × 12                      | 135                                              | 10 × 16                      | 150                                              | 10 × 16                      | 160                                              |
| 6.8                         | 6R8 | 10 × 16                      | 155                                              | 10 × 16                      | 165                                              | 10 × 16                      | 175                                              |
| 8.2                         | 8R2 | 10 × 16                      | 190                                              | 10 × 20                      | 205                                              | 10 × 20                      | 230                                              |
| 10                          | 100 | 10 × 20                      | 230                                              | 10 × 20                      | 230                                              | 10 × 20                      | 270                                              |
| 15                          | 150 | 13 × 21                      | 275                                              | 13 × 21                      | 285                                              | 13 × 21                      | 350                                              |
| 22                          | 220 | 13 × 21                      | 345                                              | 13 × 21<br>(13 × 25)         | 350<br>(390)                                     | 13 × 25                      | 420                                              |
| 33                          | 330 | 13 × 25                      | 410                                              | 13 × 25<br>(16 × 20)         | 420<br>(480)                                     | 16 × 25                      | 505                                              |
| 47                          | 470 | 16 × 25                      | 485                                              | 16 × 25                      | 505                                              | 18 × 25                      | 610                                              |
| 68                          | 680 | 16 × 31                      | 580                                              | 18 × 25                      | 610                                              | 16 × 31<br>(18 × 31)         | 732<br>(732)                                     |
| 100                         | 101 | 16 × 35                      | 695                                              | 18 × 31<br>(18 × 35)         | 732<br>(845)                                     | 18 × 35<br>(18 × 40)         | 845<br>(875)                                     |
| 180                         | 181 | 18 × 35                      | 825                                              |                              |                                                  |                              |                                                  |

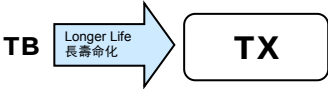
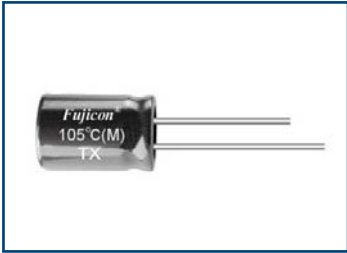
- Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

TX Series

HIGH RIPPLE CURRENT, LONG LIFE

高紋波電流，長壽命品

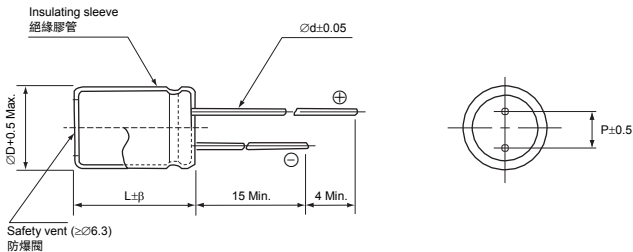
- High ripple current  
高紋波電流特性
- Endurance 5000~10000 hours  
耐久性 5000~10000 小時
- Suitable for electronic ballast, power supply and LED lighting  
適用於電子鎮流器，電源和 LED 照明
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|-----|--------------------------|--------------------------|-----|------|------|------|-------|----------------------|----------------------------|--------------------------------------------------|--------------------------|-----------------------------------------------|---------------------|---------------------------------|---|---|
| Category Temperature Range 工作溫度範圍 | -25 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Voltage Range 額定工作電壓範圍            | 160 ~ 450V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Capacitance Range 靜電容量範圍          | 2.2 ~ 330μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Leakage Current 漏電流               | Leakage current ≤0.03CV + 15μA (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.03CV + 15μA (在 20°C 環境中施加額定工作電壓 5 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Dissipation Factor (tan δ) 損耗角正切  | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.20</td><td>0.20</td><td>0.20</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |      |      |     | Rated Voltage (V) 額定工作電壓 | 160                      | 200 | 250  | 350  | 400  | 450   | tan δ (max.) 最大損耗角正切 | 0.15                       | 0.15                                             | 0.15                     | 0.20                                          | 0.20                | 0.20                            |   |   |
| Rated Voltage (V) 額定工作電壓          | 160                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 200  | 250  | 350  | 400  | 450  |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| tan δ (max.) 最大損耗角正切              | 0.15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.15 | 0.15 | 0.20 | 0.20 | 0.20 |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>3</td><td>3</td><td>3</td><td>5</td><td>5</td><td>6</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |     | Rated Voltage (V) 額定工作電壓 |                          | 160 | 200  | 250  | 350  | 400   | 450                  | Impedance Ratio 阻抗比        | Z(-25°C) / Z(20°C)                               | 3                        | 3                                             | 3                   | 5                               | 5 | 6 |
| Rated Voltage (V) 額定工作電壓          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 160  | 200  | 250  | 350  | 400  | 450 |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Impedance Ratio 阻抗比               | Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3    | 3    | 3    | 5    | 5    | 6   |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Endurance 耐久性                     | <p>The characteristics listed below shall be satisfied when the capacitors are restored to 20°C after subject to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105°C.<br/>在 105°C 環境中的規定時間內施加額定紋波電流（峰值電壓不得超過額定電壓）後，電容器經直流電壓後恢復至 20°C 時，應符合下表參數要求。</p> <table><tr><td>Size (mm) 尺寸</td><td>Life time (hours) 壽命（小時）</td></tr><tr><td>ØD8</td><td>5000</td></tr><tr><td>ØD10</td><td>8000</td></tr><tr><td>ØD≥13</td><td>10000</td></tr></table> <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±20% of initial measured value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>≤200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>≤initial specified value 不大於規範值</td></tr></table> |      |      |      |      |      |     | Size (mm) 尺寸             | Life time (hours) 壽命（小時） | ØD8 | 5000 | ØD10 | 8000 | ØD≥13 | 10000                | Capacitance Change 靜電容量變化率 | Within ±20% of initial measured value 初始值的±20%以內 | Dissipation Factor 損耗角正切 | ≤200% of initial specified value 不大於規範值的 200% | Leakage Current 漏電流 | ≤initial specified value 不大於規範值 |   |   |
| Size (mm) 尺寸                      | Life time (hours) 壽命（小時）                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| ØD8                               | 5000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| ØD10                              | 8000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| ØD≥13                             | 10000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Capacitance Change 靜電容量變化率        | Within ±20% of initial measured value 初始值的±20%以內                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Dissipation Factor 損耗角正切          | ≤200% of initial specified value 不大於規範值的 200%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Leakage Current 漏電流               | ≤initial specified value 不大於規範值                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |      |      |      |      |     |                          |                          |     |      |      |      |       |                      |                            |                                                  |                          |                                               |                     |                                 |   |   |

DRAWING 外形圖 (Unit: mm)



| ØD | 8<br>(L≤11.5) | 8<br>(L≥16) | 10  | 13  | 16  | 18 |
|----|---------------|-------------|-----|-----|-----|----|
| P  | 3.5           |             | 5.0 |     | 7.5 |    |
| Ød | 0.5           | 0.6         |     |     | 0.8 |    |
| β  | 1.5           |             |     | 2.0 |     |    |

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   |            | 120Hz | 1KHz | 10KHz | 100KHz |
|----------------|------------|-------|------|-------|--------|
| Coefficient 系數 | 2.2 ~ 68μF | 0.85  | 0.90 | 1.00  | 1.10   |
|                | 82 ~ 330μF | 0.90  | 0.95 | 1.00  | 1.10   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

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TX Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Parameter<br>參數<br><br>μF |     | 160 (2C)                     |                                 |                  | 200 (2D)                     |                                 |                  |
|---------------------------------|-----|------------------------------|---------------------------------|------------------|------------------------------|---------------------------------|------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA rms)<br>紋波電流 |                  | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA rms)<br>紋波電流 |                  |
|                                 |     |                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |
| 10                              | 100 | 10 × 16                      | 125                             | 313              | 10 × 16                      | 140                             | 350              |
| 22                              | 220 | 10 × 20                      | 200                             | 500              | 10 × 20                      | 200                             | 500              |
| 33                              | 330 | 10 × 20                      | 250                             | 625              | 10 × 20                      | 260                             | 650              |
| 47                              | 470 | 10 × 20                      | 300                             | 750              | 13 × 21                      | 390                             | 975              |
| 68                              | 680 | 13 × 21                      | 470                             | 1175             | 13 × 21                      | 470                             | 1175             |
| 82                              | 820 | 13 × 21                      | 510                             | 1275             | 16 × 20                      | 550                             | 1375             |
| 100                             | 101 | 13 × 25<br>(16 × 20)         | 620<br>(630)                    | 1395<br>(1418)   | 16 × 20                      | 630                             | 1418             |
| 150                             | 151 | 16 × 25                      | 770                             | 1733             | 16 × 31                      | 840                             | 1890             |
| 220                             | 221 | 16 × 31                      | 1020                            | 2295             | 18 × 31                      | 1050                            | 2363             |
| 330                             | 331 | 18 × 35                      | 1390                            | 3128             | 18 × 40                      | 1430                            | 3218             |

| WV<br>Parameter<br>參數<br><br>μF |     | 250 (2E)                     |                                 |                  | 350 (2V)                     |                                 |                  |
|---------------------------------|-----|------------------------------|---------------------------------|------------------|------------------------------|---------------------------------|------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA rms)<br>紋波電流 |                  | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA rms)<br>紋波電流 |                  |
|                                 |     |                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |
| 2.2                             | 2R2 | 8 × 11.5                     | 75                              | 130              | 8 × 11.5                     | 80                              | 165              |
| 3.3                             | 3R3 | 8 × 11.5                     | 80                              | 145              | 10 × 12                      | 90                              | 185              |
| 4.7                             | 4R7 | 8 × 11.5                     | 96                              | 180              | 10 × 12                      | 100                             | 210              |
| 6.8                             | 6R8 | 8 × 16<br>(10 × 12)          | 105<br>(120)                    | 235<br>(250)     | 10 × 16                      | 125                             | 275              |
| 10                              | 100 | 10 × 20                      | 140                             | 350              | 10 × 20                      | 140                             | 650              |
| 22                              | 220 | 10 × 20                      | 200                             | 500              | 16 × 20                      | 360                             | 900              |
| 47                              | 470 | 13 × 21                      | 390                             | 975              | 16 × 20                      | 430                             | 1075             |
| 68                              | 680 | 16 × 20                      | 520                             | 1300             | 16 × 31<br>(18 × 25)         | 560<br>(550)                    | 1400<br>(1375)   |
| 82                              | 820 | 16 × 25                      | 550                             | 1375             | 18 × 31                      | 610                             | 1525             |
| 100                             | 101 | 16 × 25<br>(16 × 31)         | 620<br>(680)                    | 1450<br>(1530)   | 18 × 31                      | 700                             | 1575             |
| 150                             | 151 | 18 × 31                      | 860                             | 1935             | 18 × 40                      | 960                             | 2160             |
| 220                             | 221 | 18 × 40                      | 1130                            | 2543             |                              |                                 |                  |

| WV<br>Parameter<br>參數<br><br>μF |     | 400 (2G)                     |                                 |                  | 450 (2W)                     |                                 |                  |
|---------------------------------|-----|------------------------------|---------------------------------|------------------|------------------------------|---------------------------------|------------------|
|                                 |     | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA rms)<br>紋波電流 |                  | Case size<br>ØD×L (mm)<br>尺寸 | Ripple current (mA rms)<br>紋波電流 |                  |
|                                 |     |                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |                              | 105°C,<br>120Hz                 | 105°C,<br>100KHz |
| 2.2                             | 2R2 | 8 × 11.5<br>(10 × 12)        | 80<br>85                        | 165<br>175       |                              |                                 |                  |
| 3.3                             | 3R3 | 10 × 12                      | 90                              | 185              | 10 × 12                      | 60                              | 165              |
| 4.7                             | 4R7 | 10 × 12                      | 100                             | 210              | 10 × 16                      | 70                              | 185              |
| 5.6                             | 5R6 | 10 × 12                      | 105                             | 200              |                              |                                 |                  |
| 6.8                             | 6R8 | 10 × 12<br>(10 × 16)         | 111<br>(125)                    | 230<br>(275)     | 10 × 20                      | 110                             | 275              |
| 10                              | 100 | 10 × 16<br>(10 × 20)         | 120<br>(140)                    | 320<br>(350)     | 13 × 21                      | 180                             | 450              |
| 22                              | 220 | 13 × 21                      | 260                             | 650              | 16 × 20                      | 290                             | 725              |
| 33                              | 330 | 16 × 20                      | 360                             | 900              | 16 × 25                      | 390                             | 975              |
| 39                              | 390 | 16 × 20                      | 380                             | 950              |                              |                                 |                  |
| 47                              | 470 | 16 × 25<br>(18 × 20)         | 470<br>(450)                    | 1175<br>(1125)   | 18 × 25                      | 480                             | 1200             |
| 68                              | 680 | 18 × 25                      | 585                             | 1463             | 18 × 31                      | 630                             | 1575             |
| 82                              | 820 | 18 × 31                      | 610                             | 1525             | 18 × 35                      | 715                             | 1788             |
| 100                             | 101 | 18 × 35                      | 765                             | 1721             | 18 × 40                      | 800                             | 1800             |

● Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。  
● Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。  
● Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

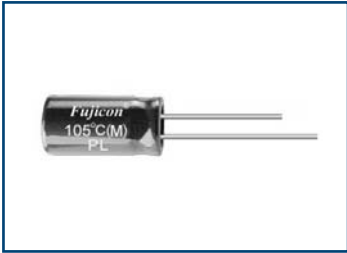
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PL Series

HIGH RIPPLE CURRENT, HIGH RILIABILITY

高紋波電流，高可靠品

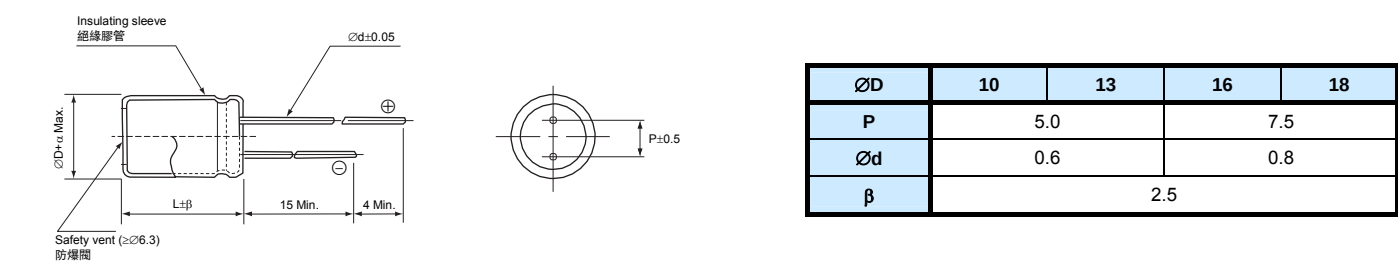
- High ripple current  
高紋波電流特性
- Endurance 5000 hours  
耐久性 5000 小時
- Suitable for SMPS and adaptor  
適用於開關式電源及變壓器
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                        |                                                  |              |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                |                                                  | -25 ~ +105°C |
| Voltage Range 額定工作電壓範圍            | 400V                                                                                                                                                                                                                                                        |                                                  | 450V         |
| Capacitance Range 靜電容量範圍          | 33 ~ 150μF                                                                                                                                                                                                                                                  |                                                  | 33 ~ 150μF   |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                         |                                                  |              |
| Leakage Current 漏電流               | Leakage current ≤0.02CV + 15μA (after 5 minutes application of rated voltage at 20°C)<br>漏電流 ≤0.02CV + 15μA (在 20°C 環境中施加額定工作電壓 5 分鐘後)<br>C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                     |                                                  |              |
| Dissipation Factor (tan δ) 損耗角正切  | Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                                                                                                                                                                                     |                                                  |              |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                    | 400                                              | 450          |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                                        | 0.24                                             | 0.24         |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                                           |                                                  |              |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                    | 400                                              | 450          |
|                                   | Impedance Ratio 阻抗比                                                                                                                                                                                                                                         | Z(-25°C) / Z(20°C)                               | 6            |
|                                   |                                                                                                                                                                                                                                                             | Z(-40°C) / Z(20°C)                               | 6<br>—       |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after applying rated voltage and rated ripple current for 5000 hours at 105°C, the capacitors shall meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓及額定紋波電流 5000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。 |                                                  |              |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                  | Within ±20% of initial measured value 初始值的±20%以內 |              |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                    | ≤200% of initial specified value 不大於規範值的 200%    |              |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                                         | ≤initial specified value 不大於規範值                  |              |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。               |                                                  |              |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                                      |                                                  |              |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   |             | 60Hz | 120Hz | 1KHz | 10KHz~ |
|----------------|-------------|------|-------|------|--------|
| Coefficient 系數 | 400 ~ 450VV | 0.80 | 1.00  | 1.40 | 1.50   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

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PL Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>Parameter<br>μF 參數 |     | 400 (2G)                          |                                 |                         | 450 (2W)                          |                                 |                        |
|--------------------------|-----|-----------------------------------|---------------------------------|-------------------------|-----------------------------------|---------------------------------|------------------------|
|                          |     | Case size<br>ØD×L (mm)<br>尺寸      | Ripple current (mA rms)<br>紋波電流 |                         | Case size<br>ØD×L (mm)<br>尺寸      | Ripple current (mA rms)<br>紋波電流 |                        |
|                          |     |                                   | 105°C,<br>120Hz                 | 105°C,<br>100KHz        |                                   | 105°C,<br>120Hz                 | 105°C,<br>100KHz       |
| 33                       | 330 | 10 × 35                           | 320                             | 480                     | 10 × 40<br>(13 × 30)              | 350<br>(350)                    | 525<br>(525)           |
| 39                       | 390 | 10 × 40<br>(13 × 30)              | 380<br>(380)                    | 570<br>(570)            | 10 × 45<br>(13 × 35)<br>(16 × 25) | 390<br>(400)<br>(370)           | 585<br>(600)<br>(555)  |
| 47                       | 470 | 10 × 45<br>(16 × 25)              | 425<br>(400)                    | 638<br>(600)            | 10 × 50<br>(13 × 40)<br>(16 × 31) | 445<br>(425)<br>(455)           | 668<br>(683)<br>(683)  |
| 56                       | 560 | 10 × 50<br>(13 × 35)              | 490<br>(475)                    | 735<br>(713)            | 13 × 45<br>(16 × 35)              | 500<br>(550)                    | 750<br>(750)           |
| 68                       | 680 | 13 × 40<br>(16 × 31)              | 550<br>(530)                    | 825<br>(795)            | 16 × 40<br>(18 × 31)              | 590<br>(550)                    | 885<br>(825)           |
| 82                       | 820 | 13 × 45<br>(16 × 35)              | 615<br>(605)                    | 923<br>(908)            | 13 × 50<br>(16 × 45)<br>(18 × 35) | 625<br>(675)<br>(645)           | 938<br>(1013)<br>(968) |
| 100                      | 101 | 13 × 50<br>(16 × 40)<br>(18 × 31) | 690<br>(740)<br>(625)           | 1035<br>(1110)<br>(938) | 16 × 50<br>(18 × 40)              | 785<br>(740)                    | 1178<br>(1110)         |
| 120                      | 121 | 16 × 45<br>(18 × 35)              | 795<br>(730)                    | 1193<br>(1095)          | 18 × 45                           | 825                             | 1238                   |
| 150                      | 151 | 18 × 45                           | 910                             | 1365                    | 18 × 50                           | 950                             | 1425                   |

● Please refer to page 21 "Taping Specifications" & page 23 "Lead Forming & Cutting" about the taped or formed product spec. 編帶與引線成型標準請查閱第21頁“編帶標準”及第23頁“引線成型與剪腳”。  
● Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第22頁“包裝標準”。  
● Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第18頁。

Aluminum Electrolytic Capacitors (Snap-in Terminal Type)  
鋁電解電容器 (導箔式)



**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.

注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

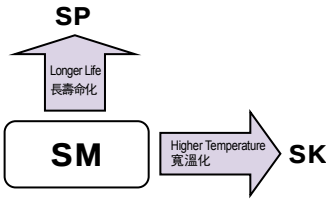
CAT.2024/V1.3

SM Series

SNAP-IN TERMINAL TYPE, STANDARD

導箔型，標準品

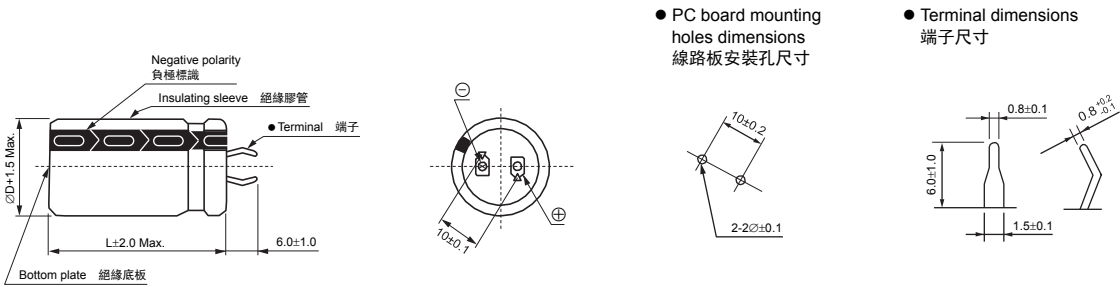
- Standard snap-in terminal series  
導箔型標準品系列
- Voltage range of 6.3~450V  
額定工作電壓範圍 6.3~450V
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                              |                                                                        |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +85°C                                                                                                                                                                                                                       | -25 ~ +85°C                                                            |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 350V                                                                                                                                                                                                                        | 400 ~ 450V                                                             |
| Capacitance Range 靜電容量範圍          | 82 ~ 100000µF                                                                                                                                                                                                                     | 68 ~ 560µF                                                             |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                               |                                                                        |
| Leakage Current 漏電流               | $I \leq 3\sqrt{CV}$ (after 5 minutes application of rated voltage at 20°C) (在 20°C 環境中施加額定工作電壓 5 分鐘後)<br>I: Leakage current (µA) 漏電流, C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                               |                                                                        |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000µF, tan δ shall be added 0.01 to the listed value with increase of every 1000µF. 當標稱靜電容量大於 1000µF，其標稱靜電容量每增加 1000µF，損耗角正切增加 0.01。<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C |                                                                        |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                          | 6.3 10 16, 25 35 50, 63 80, 100 160~400 450                            |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                              | 0.45 0.40 0.35 0.30 0.25 0.20 0.15 0.20                                |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                 |                                                                        |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                          | 6.3~16 25 35 50, 63 80~100 160~250 350~450                             |
|                                   | Impedance Ratio 阻抗比                                                                                                                                                                                                               | Z(-25°C) / Z(20°C) 4 3 3 2 2 4 8<br>Z(-40°C) / Z(20°C) 15 10 8 6 5 — — |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below.<br>在 85°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                   |                                                                        |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                        | Within ±20% of initial value 初始值的±20%以內                                |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                          | Less than 200% of specified value 不大於規範值的 200%                         |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 85°C for 1000 hours, they meet the specified listed below.<br>在 85°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                                   |                                                                        |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                        | Within ±20% of initial value 初始值的±20%以內                                |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                          | Less than 200% of specified value 不大於規範值的 200%                         |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                            |                                                                        |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |             | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|------|-------|-------|------|--------|
| Coefficient<br>係數 | ~ 100μF     | 0.88 | 1.0   | 1.06  | 1.15 | 1.20   |
|                   | 160 ~ 250μF | 0.85 | 1.0   | 1.20  | 1.25 | 1.45   |
|                   | 315μF ~     | 0.88 | 1.0   | 1.15  | 1.20 | 1.40   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

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注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

SM Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>μF ∅D |     | 6.3 (0J)        |                 |                 |                 | 10 (1A)                                 |                 |                 |                 | 16 (1C)         |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              | 22              | 25              | 30              | 35              |
| 10000       | 103 |                 |                 |                 |                 |                                         |                 |                 |                 | 22 x 25<br>3.32 |                 |                 |                 |
| 12000       | 123 |                 |                 |                 |                 | 22 x 25<br>3.31                         |                 |                 |                 | 22 x 30<br>3.56 | 25 x 25<br>3.89 |                 |                 |
| 15000       | 153 | 22 x 25<br>3.39 |                 |                 |                 | 22 x 30<br>3.82                         | 25 x 25<br>3.39 |                 |                 | 22 x 35<br>4.29 | 25 x 30<br>4.45 | 30 x 25<br>4.56 |                 |
| 18000       | 183 | 22 x 30<br>3.85 | 25 x 25<br>3.96 |                 |                 | 22 x 35<br>4.28                         | 25 x 25<br>4.17 |                 |                 | 22 x 40<br>4.77 | 25 x 35<br>4.96 | 30 x 30<br>5.10 |                 |
| 22000       | 223 | 22 x 35<br>4.34 | 25 x 25<br>4.22 |                 |                 | 22 x 40<br>4.79                         | 25 x 30<br>4.71 | 30 x 25<br>4.83 |                 | 22 x 50<br>5.51 | 25 x 40<br>5.51 | 30 x 30<br>5.39 |                 |
| 27000       | 273 | 22 x 40<br>4.85 | 25 x 30<br>4.77 | 30 x 25<br>4.89 |                 | 22 x 45<br>5.30                         | 25 x 35<br>5.26 | 30 x 30<br>5.41 |                 |                 | 25 x 45<br>6.06 | 30 x 35<br>5.98 | 35 x 25<br>5.80 |
| 33000       | 333 | 22 x 50<br>5.83 | 25 x 35<br>5.32 | 30 x 30<br>5.47 |                 | 22 x 50<br>5.82                         | 25 x 40<br>5.81 | 30 x 30<br>5.69 | 35 x 25<br>5.81 |                 |                 | 30 x 40<br>6.56 | 35 x 30<br>6.41 |
| 39000       | 393 |                 | 25 x 40<br>5.82 | 30 x 30<br>5.70 | 35 x 25<br>5.82 |                                         | 25 x 45<br>6.31 | 30 x 35<br>6.22 | 35 x 30<br>6.8  |                 |                 | 30 x 45<br>7.08 | 35 x 35<br>6.96 |
| 47000       | 473 |                 | 25 x 45<br>6.35 | 30 x 35<br>6.26 | 35 x 30<br>6.41 |                                         | 25 x 50<br>6.83 | 30 x 40<br>6.78 | 35 x 30<br>6.62 |                 |                 | 30 x 50<br>7.62 | 35 x 40<br>7.54 |
| 56000       | 563 |                 | 25 x 50<br>6.85 | 30 x 40<br>6.80 | 35 x 30<br>6.64 |                                         |                 | 30 x 45<br>7.31 | 35 x 35<br>7.18 |                 |                 |                 | 35 x 45<br>8.08 |
| 68000       | 683 |                 |                 | 30 x 45<br>7.35 | 35 x 35<br>7.23 |                                         |                 |                 | 35 x 40<br>7.76 |                 |                 |                 | 35 x 50<br>8.63 |
| 100000      | 104 |                 |                 |                 | 35 x 45<br>8.34 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |                 |                 |                 |                 |

| WV<br>μF ∅D |     | 25 (1E)         |                 |                 |                 | 35 (1V)                                 |                 |                 |                 | 50 (1H)         |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              | 22              | 25              | 30              | 35              |
| 3300        | 332 |                 |                 |                 |                 |                                         |                 |                 |                 | 22 x 30<br>2.97 | 25 x 25<br>3.06 |                 |                 |
| 4700        | 472 |                 |                 |                 |                 | 22 x 30<br>3.06                         | 25 x 25<br>2.98 |                 |                 | 22 x 40<br>3.83 | 25 x 35<br>3.98 | 30 x 25<br>3.86 | 35 x 25<br>4.19 |
| 5600        | 562 | 22 x 25<br>2.65 |                 |                 |                 | 22 x 35<br>3.28                         | 25 x 30<br>3.39 |                 |                 | 22 x 45<br>4.26 | 25 x 40<br>4.44 | 30 x 30<br>4.35 | 35 x 25<br>4.44 |
| 6800        | 682 | 22 x 30<br>3.06 | 25 x 25<br>3.15 |                 |                 | 22 x 40<br>3.73                         | 25 x 30<br>3.67 | 30 x 25<br>3.76 |                 | 22 x 50<br>4.77 | 25 x 40<br>4.76 | 30 x 35<br>4.92 | 35 x 30<br>5.04 |
| 8200        | 822 | 22 x 35<br>3.45 | 25 x 30<br>3.57 |                 |                 | 22 x 45<br>4.13                         | 25 x 35<br>4.10 | 30 x 30<br>4.22 |                 |                 | 25 x 50<br>5.43 | 30 x 40<br>5.38 | 35 x 30<br>5.26 |
| 10000       | 103 | 22 x 40<br>3.95 | 25 x 30<br>3.89 | 30 x 25<br>3.99 |                 | 22 x 50<br>4.68                         | 35 x 40<br>4.68 | 30 x 30<br>4.58 |                 |                 |                 | 30 x 45<br>6.07 | 35 x 35<br>5.97 |
| 12000       | 123 | 22 x 45<br>4.41 | 25 x 35<br>4.37 | 30 x 30<br>4.50 |                 |                                         | 25 x 45<br>5.18 | 30 x 35<br>5.11 | 35 x 30<br>5.24 |                 |                 | 30 x 50<br>6.62 | 35 x 40<br>6.55 |
| 15000       | 153 | 22 x 50<br>4.94 | 25 x 40<br>4.94 | 30 x 35<br>5.10 |                 |                                         |                 | 30 x 40<br>5.72 | 35 x 35<br>5.88 |                 |                 |                 | 35 x 45<br>7.20 |
| 18000       | 183 |                 | 25 x 45<br>5.45 | 30 x 35<br>5.38 | 35 x 30<br>5.51 |                                         |                 | 30 x 45<br>6.28 | 35 x 40<br>6.46 |                 |                 |                 | 35 x 50<br>7.74 |
| 22000       | 223 |                 |                 | 30 x 45<br>6.22 | 35 x 35<br>6.12 |                                         |                 |                 | 35 x 45<br>7.07 |                 |                 |                 | 35 x 55<br>8.28 |
| 27000       | 273 |                 |                 | 30 x 50<br>6.82 | 35 x 40<br>6.74 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |                 |                 |                 |                 |
| 33000       | 333 |                 |                 |                 | 35 x 45<br>7.35 |                                         |                 |                 |                 |                 |                 |                 |                 |

| WV<br>μF ∅D |     | 63 (1J)         |                 |                 |                 | 80 (1K)         |                 |                 |                 | 100 (2A)                                |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              |
| 1200        | 122 |                 |                 |                 |                 | 22 x 25<br>2.24 |                 |                 |                 | 22 x 30<br>2.39                         | 25 x 25<br>2.46 |                 |                 |
| 1500        | 152 |                 |                 |                 |                 | 22 x 30<br>2.67 |                 |                 |                 | 22 x 35<br>2.83                         | 25 x 30<br>2.93 | 30 x 25<br>3.00 |                 |
| 1800        | 182 | 22 x 25<br>2.20 |                 |                 |                 | 22 x 30<br>2.92 | 25 x 25<br>3.01 |                 |                 | 22 x 40<br>3.26                         | 25 x 35<br>3.39 | 30 x 30<br>3.49 |                 |
| 2200        | 222 | 22 x 30<br>2.50 | 25 x 25<br>2.58 |                 |                 | 22 x 35<br>3.25 | 25 x 30<br>3.36 | 30 x 25<br>3.45 |                 | 22 x 45<br>3.58                         | 25 x 40<br>3.74 | 30 x 30<br>3.66 |                 |
| 2700        | 272 | 22 x 35<br>2.94 | 25 x 30<br>3.04 |                 |                 | 22 x 40<br>3.79 | 25 x 35<br>3.94 | 30 x 30<br>4.05 |                 |                                         | 25 x 45<br>4.33 | 30 x 35<br>4.27 | 35 x 30<br>4.37 |
| 3300        | 332 | 22 x 35<br>3.14 | 25 x 30<br>3.26 | 30 x 25<br>3.34 |                 | 22 x 45<br>4.18 | 25 x 40<br>4.36 | 30 x 30<br>4.27 |                 |                                         | 25 x 50<br>4.76 | 30 x 40<br>4.72 | 35 x 35<br>4.85 |
| 3900        | 392 | 22 x 40<br>3.60 | 25 x 35<br>3.74 | 30 x 30<br>3.85 |                 | 22 x 50<br>4.75 | 25 x 45<br>4.96 | 30 x 35<br>4.89 |                 |                                         |                 | 30 x 45<br>5.36 | 35 x 35<br>5.27 |
| 4700        | 472 | 22 x 50<br>4.19 | 25 x 40<br>4.19 | 30 x 35<br>4.10 | 35 x 30<br>4.19 |                 | 25 x 50<br>5.44 | 30 x 40<br>5.39 | 35 x 30<br>5.27 |                                         |                 | 30 x 50<br>5.86 | 35 x 40<br>5.80 |
| 5600        | 562 |                 | 25 x 45<br>4.65 | 30 x 35<br>4.58 | 35 x 30<br>4.70 |                 |                 | 30 x 45<br>5.91 | 35 x 35<br>5.81 |                                         |                 |                 | 35 x 45<br>6.34 |
| 6800        | 682 |                 | 25 x 50<br>5.20 | 30 x 40<br>5.16 | 35 x 30<br>5.04 |                 |                 |                 | 35 x 40<br>5.46 |                                         |                 |                 | 35 x 45<br>6.52 |
| 8200        | 822 |                 |                 | 30 x 45<br>5.62 | 35 x 35<br>5.53 |                 |                 |                 | 35 x 45<br>6.91 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |
| 10000       | 103 |                 |                 | 30 x 50<br>6.32 | 35 x 40<br>6.25 |                 |                 |                 | 35 x 60<br>8.24 |                                         |                 |                 |                 |
| 12000       | 123 |                 |                 |                 | 35 x 45<br>6.83 |                 |                 |                 |                 |                                         |                 |                 |                 |

•Case size ∅D×L(mm), ripple current (A rms) at 85°C, 120Hz •尺寸∅D×L(mm), 紋波電流(A rms)於 85°C, 120Hz

SM Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>μF ∅D |     | 160 (2C)        |                 |                 |                 | 200 (2D)        |                 |                 |                 | 250 (2E)                                |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              |
| 150         | 151 |                 |                 |                 |                 |                 |                 |                 |                 | 22 x 25<br>0.90                         | 25 x 20<br>0.92 |                 |                 |
| 180         | 181 |                 |                 |                 |                 | 22 x 20<br>0.91 |                 |                 |                 | 22 x 25<br>0.90                         | 25 x 20<br>1.01 |                 |                 |
| 220         | 221 | 22 x 20<br>1.01 |                 |                 |                 | 22 x 25<br>1.09 | 25 x 20<br>1.11 |                 |                 | 22 x 25<br>1.09                         | 25 x 25<br>1.19 | 30 x 20<br>1.22 |                 |
| 270         | 271 | 22 x 25<br>1.20 | 25 x 20<br>1.32 |                 |                 | 22 x 25<br>1.20 | 25 x 25<br>1.32 | 30 x 20<br>1.35 |                 | 22 x 30<br>1.28                         | 25 x 25<br>1.32 | 30 x 20<br>1.35 |                 |
| 330         | 331 | 22 x 25<br>1.33 | 25 x 20<br>1.36 |                 |                 | 22 x 30<br>1.42 | 25 x 25<br>1.46 | 30 x 20<br>1.49 |                 | 22 x 35<br>1.50                         | 25 x 30<br>1.56 | 30 x 25<br>1.60 | 35 x 20<br>1.62 |
| 390         | 391 | 22 x 25<br>1.45 | 25 x 25<br>1.59 | 30 x 20<br>1.62 |                 | 22 x 30<br>1.54 | 25 x 25<br>1.59 | 30 x 25<br>1.74 | 35 x 20<br>1.77 | 22 x 40<br>1.72                         | 25 x 30<br>1.69 | 30 x 25<br>1.73 | 35 x 20<br>1.77 |
| 470         | 471 | 22 x 30<br>1.69 | 25 x 25<br>1.75 | 30 x 20<br>1.78 |                 | 22 x 35<br>1.79 | 25 x 30<br>1.86 | 30 x 25<br>1.90 | 35 x 20<br>1.94 | 22 x 45<br>1.98                         | 25 x 35<br>1.96 | 30 x 30<br>2.02 | 35 x 25<br>2.06 |
| 560         | 561 | 22 x 35<br>1.96 | 25 x 30<br>2.03 | 30 x 25<br>2.08 | 35 x 20<br>2.12 | 22 x 40<br>2.06 | 25 x 35<br>2.14 | 30 x 25<br>2.08 | 35 x 25<br>2.25 | 22 x 50<br>2.26                         | 25 x 40<br>2.25 | 30 x 30<br>2.20 | 35 x 25<br>2.25 |
| 680         | 681 | 22 x 40<br>2.27 | 25 x 30<br>2.23 | 30 x 25<br>2.29 | 35 x 20<br>2.33 | 22 x 45<br>2.38 | 25 x 40<br>2.48 | 30 x 30<br>2.43 | 35 x 25<br>2.48 |                                         | 25 x 45<br>2.60 | 30 x 35<br>2.56 | 35 x 30<br>2.62 |
| 820         | 821 | 22 x 45<br>2.61 | 25 x 35<br>2.59 | 30 x 30<br>2.67 | 35 x 25<br>2.73 | 22 x 50<br>2.73 | 25 x 45<br>2.85 | 30 x 35<br>2.81 | 35 x 30<br>2.88 |                                         |                 | 30 x 40<br>2.95 | 35 x 35<br>3.03 |
| 1000        | 102 | 22 x 50<br>3.01 | 25 x 40<br>3.01 | 30 x 30<br>2.95 | 35 x 25<br>3.01 | 22 x 50<br>2.82 | 25 x 45<br>2.85 | 30 x 40<br>3.26 | 35 x 30<br>3.18 |                                         |                 | 30 x 45<br>3.40 | 35 x 40<br>3.50 |
| 1200        | 122 |                 | 25 x 45<br>3.23 | 30 x 35<br>3.37 | 35 x 30<br>3.26 |                 |                 | 30 x 45<br>3.49 | 35 x 35<br>3.43 |                                         |                 |                 | 35 x 45<br>3.74 |
| 1500        | 152 |                 |                 | 30 x 40<br>3.73 | 35 x 35<br>3.83 |                 |                 | 30 x 50<br>4.06 | 35 x 40<br>4.01 |                                         |                 |                 | 35 x 50<br>4.35 |
| 1800        | 182 |                 |                 |                 | 35 x 40<br>4.39 |                 |                 |                 | 35 x 45<br>4.58 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |

| WV<br>μF ∅D |     | 315 (2F)        |                 |                 |                 | 350 (2V)        |                 |                 |                 | 400 (2G)                                |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              |
| 68          | 680 |                 |                 |                 |                 |                 |                 |                 |                 | 22 x 20<br>0.56                         |                 |                 |                 |
| 82          | 820 |                 |                 |                 |                 | 22 x 20<br>0.62 |                 |                 |                 | 22 x 25<br>0.66                         | 25 x 20<br>0.68 |                 |                 |
| 100         | 101 | 22 x 20<br>0.68 |                 |                 |                 | 22 x 25<br>0.73 | 25 x 20<br>0.75 |                 |                 | 22 x 30<br>0.78                         | 25 x 25<br>0.81 | 30 x 20<br>0.82 |                 |
| 120         | 121 | 22 x 25<br>0.80 | 25 x 20<br>0.82 |                 |                 | 22 x 30<br>0.86 | 25 x 25<br>0.88 | 30 x 20<br>0.90 |                 | 22 x 30<br>0.86                         | 25 x 25<br>0.88 | 30 x 20<br>0.90 |                 |
| 150         | 151 | 22 x 30<br>0.96 | 25 x 25<br>0.99 | 30 x 20<br>1.01 |                 | 22 x 35<br>1.01 | 25 x 30<br>1.05 | 30 x 20<br>1.01 |                 | 22 x 35<br>1.01                         | 25 x 30<br>1.05 | 30 x 25<br>1.08 | 35 x 20<br>1.09 |
| 180         | 181 | 22 x 35<br>1.11 | 25 x 30<br>1.15 | 30 x 25<br>1.18 | 35 x 20<br>1.20 | 22 x 40<br>1.17 | 25 x 35<br>1.21 | 30 x 25<br>1.18 | 35 x 20<br>1.20 | 22 x 40<br>1.17                         | 25 x 35<br>1.21 | 30 x 25<br>1.18 | 35 x 25<br>1.28 |
| 220         | 221 | 22 x 40<br>1.29 | 25 x 30<br>1.27 | 30 x 25<br>1.30 | 35 x 20<br>1.33 | 22 x 45<br>1.35 | 25 x 35<br>1.34 | 30 x 30<br>1.38 | 35 x 25<br>1.41 | 22 x 45<br>1.35                         | 25 x 40<br>1.41 | 30 x 30<br>1.38 | 35 x 25<br>1.41 |
| 270         | 271 | 22 x 45<br>1.50 | 25 x 35<br>1.49 | 30 x 30<br>1.53 | 35 x 25<br>1.56 |                 | 25 x 45<br>1.64 | 30 x 35<br>1.61 | 35 x 25<br>1.65 |                                         | 25 x 45<br>1.64 | 30 x 35<br>1.61 | 35 x 30<br>1.65 |
| 330         | 331 | 22 x 50<br>1.73 | 25 x 40<br>1.73 | 30 x 35<br>1.78 | 35 x 30<br>1.83 |                 | 25 x 50<br>1.89 | 30 x 40<br>1.87 | 35 x 30<br>1.83 |                                         | 25 x 50<br>1.89 | 30 x 40<br>1.87 | 35 x 30<br>1.83 |
| 390         | 391 |                 | 25 x 45<br>1.97 | 30 x 35<br>1.94 | 35 x 30<br>1.99 |                 |                 | 30 x 45<br>2.12 | 35 x 35<br>2.09 |                                         |                 | 30 x 45<br>2.12 | 35 x 35<br>2.09 |
| 470         | 471 |                 |                 | 30 x 40<br>2.23 | 35 x 35<br>2.29 |                 |                 | 30 x 50<br>2.43 | 35 x 40<br>2.40 |                                         |                 | 30 x 50<br>2.43 | 35 x 40<br>2.40 |
| 560         | 561 |                 |                 |                 | 35 x 40<br>2.62 |                 |                 |                 | 35 x 45<br>2.73 |                                         |                 |                 | 35 x 45<br>2.73 |
| 680         | 681 |                 |                 |                 | 35 x 45<br>3.01 |                 |                 |                 | 35 x 50<br>3.13 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |
| 820         | 821 |                 |                 |                 | 35 x 50<br>3.44 |                 |                 |                 |                 |                                         |                 |                 | 35 x 50<br>2.98 |

| WV<br>μF ∅D |     | 450 (2W)        |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              |
| 56          | 560 | 22 x 20<br>0.51 |                 |                 |                 |
| 68          | 680 | 22 x 25<br>0.60 | 25 x 20<br>0.62 |                 |                 |
| 82          | 820 | 22 x 30<br>0.71 | 25 x 25<br>0.73 | 30 x 20<br>0.74 |                 |
| 100         | 101 | 22 x 35<br>0.83 | 25 x 30<br>0.86 | 30 x 25<br>0.88 | 35 x 20<br>0.89 |
| 120         | 121 | 22 x 40<br>0.95 | 25 x 35<br>0.99 | 30 x 25<br>0.96 | 35 x 20<br>0.98 |
| 150         | 151 | 22 x 50<br>1.17 | 25 x 40<br>1.17 | 30 x 30<br>1.14 | 35 x 25<br>1.17 |
| 180         | 181 |                 | 25 x 45<br>1.34 | 30 x 35<br>1.32 | 35 x 25<br>1.28 |
| 220         | 221 |                 | 25 x 50<br>1.54 | 30 x 40<br>1.53 | 35 x 30<br>1.49 |
| 270         | 270 |                 |                 | 30 x 45<br>1.77 | 35 x 35<br>1.74 |
| 330         | 331 |                 |                 | 30 x 50<br>2.03 | 35 x 40<br>2.01 |
| 390         | 391 |                 |                 |                 | 35 x 45<br>2.28 |
| 470         | 471 |                 |                 |                 | 35 x 45<br>2.52 |

→ Case size ∅D×L(mm)  
→ Ripple current (A rms) at 85°C, 120Hz

→ 尺寸∅D×L(mm)  
→ 紋波電流(A rms)於 85°C, 120Hz

● Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁 "包裝標準"。  
● Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

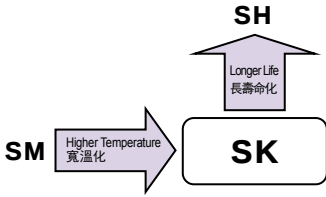
Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

SK Series

SNAP-IN TERMINAL TYPE, WIDE TEMPERATURE RANGE

導箔型，寬溫品

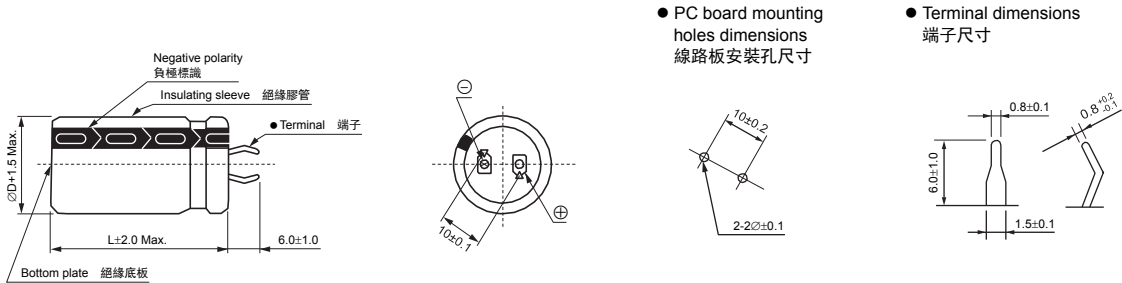
- Wide temperature range of -40(-25)~+105°C  
適用於 -40(-25)~+105°C 的寬溫溫度範圍
- Standard snap-in terminal series  
導箔型標準品系列
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                 |                                                |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                         | -25 ~ +105°C                                   |
| Voltage Range 額定工作電壓範圍            | 6.3 ~ 350V                                                                                                                                                                                                                           | 400 ~ 450V                                     |
| Capacitance Range 靜電容量範圍          | 68 ~ 68000µF                                                                                                                                                                                                                         | 56 ~ 470µF                                     |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                  |                                                |
| Leakage Current 漏電流               | $I \leq 3\sqrt{CV}$ (after 5 minutes application of rated voltage at 20°C) (在 20°C 環境中施加額定工作電壓 5 分鐘後)<br>I: Leakage current (µA) 漏電流, C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                  |                                                |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000µF, tan δ shall be added 0.01 to the listed value with increase of every 1000µF.<br>當標稱靜電容量大於 1000µF，其標稱靜電容量每增加 1000µF，損耗角正切增加 0.01。<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C |                                                |
| Stability at Low Temperature 低溫特性 | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                             | 10 16 25, 35 50, 63 80, 100 160~400 450        |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                 | 0.50 0.40 0.35 0.25 0.20 0.15 0.20             |
|                                   | Impedance Ratio 阻抗比                                                                                                                                                                                                                  | Z(-25°C) / Z(20°C) 5 4 4 2 4 8                 |
| Endurance 耐久性                     | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                    |                                                |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                             | 10~16 25 35 50~100 160~250 350~450             |
|                                   | Impedance Ratio 阻抗比                                                                                                                                                                                                                  | Z(-40°C) / Z(20°C) 15 15 12 6 — —              |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 2000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                    |                                                |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                           | Within ±20% of initial value 初始值的±20%以內        |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                             | Less than 200% of specified value 不大於規範值的 200% |
| Marking 標識                        | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified listed below.<br>在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。                                    |                                                |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                           | Within ±20% of initial value 初始值的±20%以內        |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                             | Less than 200% of specified value 不大於規範值的 200% |
| Marking 標識                        | Leakage Current 漏電流                                                                                                                                                                                                                  |                                                |
|                                   | Less than specified value 不大於規範值                                                                                                                                                                                                     |                                                |
|                                   | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                               |                                                |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償係數

| Frequency 頻率      |             | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|------|-------|-------|------|--------|
| Coefficient<br>係數 | ~ 100μF     | 0.88 | 1.0   | 1.06  | 1.15 | 1.20   |
|                   | 160 ~ 250μF | 0.85 | 1.0   | 1.20  | 1.25 | 1.45   |
|                   | 315μF ~     | 0.88 | 1.0   | 1.15  | 1.20 | 1.40   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CAT.2024/V1.3

SK Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>μF ∅D |     | 6.3 (0J)        |                 |                 |                 | 10 (1A)         |                 |                 |                 | 16 (1C)                                 |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              |
| 8200        | 822 |                 |                 |                 |                 |                 |                 |                 |                 | 22 x 25<br>2.14                         |                 |                 |                 |
| 10000       | 103 |                 |                 |                 |                 | 22 x 25<br>2.17 |                 |                 |                 | 22 x 30<br>2.48                         | 25 x 25<br>2.56 |                 |                 |
| 12000       | 123 | 22 x 25<br>2.19 |                 |                 |                 | 22 x 30<br>2.48 |                 |                 |                 | 22 x 35<br>2.80                         | 25 x 30<br>2.90 | 30 x 25<br>2.97 |                 |
| 15000       | 153 | 22 x 30<br>2.53 |                 |                 |                 | 22 x 35<br>2.83 | 25 x 25<br>2.75 |                 |                 | 22 x 40<br>3.17                         | 25 x 35<br>3.29 | 30 x 30<br>3.38 |                 |
| 18000       | 183 | 22 x 35<br>2.85 | 25 x 25<br>2.77 |                 |                 | 22 x 35<br>3.00 | 25 x 30<br>3.11 |                 |                 | 22 x 45<br>3.50                         | 25 x 40<br>3.65 | 30 x 30<br>3.57 |                 |
| 22000       | 223 | 22 x 35<br>3.04 | 25 x 30<br>3.15 |                 |                 | 22 x 40<br>3.35 | 25 x 35<br>3.48 | 30 x 25<br>3.38 |                 |                                         | 25 x 45<br>4.03 | 30 x 35<br>3.98 |                 |
| 27000       | 273 | 22 x 40<br>3.40 | 25 x 35<br>3.53 | 30 x 25<br>3.42 |                 | 22 x 50<br>3.88 | 25 x 40<br>3.87 | 30 x 30<br>3.79 |                 |                                         | 25 x 50<br>4.42 | 30 x 40<br>4.39 | 35 x 30<br>4.29 |
| 33000       | 333 | 22 x 50<br>3.92 | 25 x 40<br>3.91 | 30 x 30<br>3.83 |                 |                 | 25 x 45<br>4.26 | 30 x 35<br>4.20 |                 |                                         |                 | 30 x 45<br>4.79 | 35 x 35<br>4.71 |
| 39000       | 393 |                 | 25 x 45<br>4.26 | 30 x 35<br>4.20 |                 |                 | 25 x 50<br>4.60 | 30 x 40<br>4.57 |                 |                                         |                 | 30 x 50<br>5.16 | 35 x 40<br>5.10 |
| 47000       | 473 |                 | 25 x 50<br>4.63 | 30 x 40<br>4.60 | 35 x 30<br>4.50 |                 |                 | 30 x 45<br>4.95 | 35 x 30<br>4.46 |                                         |                 |                 | 35 x 45<br>5.50 |
| 56000       | 563 |                 |                 | 30 x 50<br>5.17 | 35 x 40<br>5.12 |                 |                 | 30 x 45<br>4.95 | 35 x 35<br>4.87 |                                         |                 |                 |                 |
| 68000       | 683 |                 |                 |                 | 35 x 45<br>5.52 |                 |                 |                 | 35 x 45<br>5.49 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |

| WV<br>μF ∅D |     | 25 (1E)         |                 |                 |                 | 35 (1V)         |                 |                 |                 | 50 (1H)                                 |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              |
| 2700        | 272 |                 |                 |                 |                 |                 |                 |                 |                 | 22 x 30<br>1.94                         |                 |                 |                 |
| 3300        | 332 |                 |                 |                 |                 | 22 x 25<br>1.62 |                 |                 |                 | 22 x 35<br>2.20                         |                 |                 |                 |
| 3900        | 392 |                 |                 |                 |                 | 22 x 30<br>1.88 |                 |                 |                 | 22 x 40<br>2.52                         | 25 x 35<br>2.62 | 30 x 25<br>2.54 |                 |
| 4700        | 472 | 22 x 25<br>1.73 |                 |                 |                 | 22 x 35<br>2.14 | 25 x 25<br>2.09 |                 |                 | 22 x 45<br>2.81                         | 25 x 40<br>2.93 | 30 x 30<br>2.87 |                 |
| 5600        | 562 | 22 x 30<br>1.98 |                 |                 |                 | 22 x 35<br>2.29 | 25 x 30<br>2.37 | 30 x 25<br>2.43 |                 | 22 x 50<br>3.11                         | 25 x 40<br>3.11 | 30 x 35<br>3.21 |                 |
| 6800        | 682 | 22 x 30<br>2.14 |                 |                 |                 | 22 x 40<br>2.61 | 25 x 35<br>2.71 | 30 x 30<br>2.79 |                 | 22 x 50<br>3.11                         | 25 x 50<br>3.64 | 30 x 40<br>3.61 | 35 x 30<br>3.53 |
| 8200        | 822 | 22 x 35<br>2.42 | 25 x 30<br>2.50 |                 |                 | 22 x 50<br>3.02 | 25 x 40<br>3.02 | 30 x 30<br>2.95 |                 |                                         |                 | 30 x 45<br>3.94 | 35 x 35<br>3.87 |
| 10000       | 103 | 22 x 40<br>2.77 | 25 x 35<br>2.88 |                 |                 |                 | 25 x 45<br>3.43 | 30 x 35<br>3.38 |                 |                                         |                 | 30 x 50<br>4.42 | 35 x 40<br>4.37 |
| 12000       | 123 | 22 x 45<br>3.09 | 25 x 40<br>3.22 | 30 x 30<br>3.15 |                 |                 | 25 x 50<br>3.78 | 30 x 40<br>3.75 | 35 x 30<br>3.67 |                                         |                 |                 | 35 x 45<br>4.78 |
| 15000       | 153 |                 | 25 x 45<br>3.62 | 30 x 35<br>3.57 | 35 x 30<br>3.65 |                 |                 | 30 x 45<br>4.19 | 35 x 35<br>4.12 |                                         |                 |                 | 35 x 50<br>5.24 |
| 18000       | 183 |                 | 25 x 50<br>4.36 | 30 x 40<br>3.95 | 35 x 35<br>4.06 |                 |                 |                 | 35 x 40<br>4.52 |                                         |                 |                 | 35 x 55<br>5.70 |
| 22000       | 223 |                 |                 | 30 x 45<br>4.36 | 35 x 35<br>4.28 |                 |                 |                 | 35 x 45<br>4.95 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |
| 27000       | 273 |                 |                 |                 | 35 x 45<br>4.92 |                 |                 |                 |                 |                                         |                 |                 |                 |

| WV<br>μF ∅D |     | 63 (1J)         |                 |                 |                 | 80 (1K)         |                 |                 |                 | 100 (2A)                                |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              |
| 820         | 821 |                 |                 |                 |                 | 22 x 25<br>1.37 |                 |                 |                 | 22 x 30<br>1.46                         | 25 x 25<br>1.51 |                 |                 |
| 1000        | 102 |                 |                 |                 |                 | 22 x 30<br>1.62 | 25 x 25<br>1.67 |                 |                 | 22 x 35<br>1.71                         | 25 x 30<br>1.77 |                 |                 |
| 1200        | 122 | 22 x 25<br>1.37 |                 |                 |                 | 22 x 30<br>1.67 | 25 x 25<br>1.72 |                 |                 | 22 x 40<br>1.86                         | 25 x 35<br>1.94 | 30 x 25<br>1.88 |                 |
| 1500        | 152 | 22 x 30<br>1.50 | 25 x 25<br>1.54 |                 |                 | 22 x 35<br>1.98 | 25 x 30<br>2.05 |                 |                 | 22 x 45<br>2.18                         | 25 x 40<br>2.28 | 30 x 30<br>2.23 |                 |
| 1800        | 182 | 22 x 30<br>1.64 | 25 x 25<br>1.69 |                 |                 | 22 x 40<br>2.28 | 25 x 35<br>2.37 | 30 x 25<br>2.30 |                 |                                         | 25 x 45<br>2.61 | 30 x 35<br>2.57 |                 |
| 2200        | 222 | 22 x 35<br>1.86 | 25 x 30<br>1.92 |                 |                 | 22 x 45<br>2.51 | 25 x 35<br>2.49 | 30 x 30<br>2.56 |                 |                                         | 25 x 50<br>2.85 | 30 x 40<br>2.83 | 35 x 30<br>2.76 |
| 2700        | 272 | 22 x 40<br>2.17 | 25 x 30<br>2.13 | 30 x 25<br>2.18 |                 |                 | 25 x 45<br>3.03 | 30 x 35<br>2.99 |                 |                                         |                 | 30 x 45<br>3.27 | 35 x 30<br>3.22 |
| 3300        | 332 | 22 x 50<br>2.53 | 25 x 40<br>2.53 | 30 x 30<br>2.48 |                 |                 | 25 x 50<br>3.33 | 30 x 40<br>3.30 | 35 x 30<br>3.23 |                                         |                 | 30 x 50<br>3.59 | 35 x 40<br>3.55 |
| 3900        | 392 |                 | 25 x 45<br>2.88 | 30 x 35<br>2.84 |                 |                 |                 | 30 x 45<br>3.75 | 35 x 35<br>3.69 |                                         |                 |                 | 35 x 45<br>4.03 |
| 4700        | 472 |                 | 25 x 40<br>3.20 | 30 x 40<br>3.17 | 35 x 30<br>3.10 |                 |                 | 30 x 50<br>4.90 | 35 x 40<br>4.06 |                                         |                 |                 | 35 x 50<br>4.40 |
| 5600        | 562 |                 |                 | 30 x 45<br>3.51 | 35 x 35<br>3.46 |                 |                 |                 | 35 x 45<br>4.44 |                                         |                 |                 | 35 x 50<br>4.65 |
| 6800        | 682 |                 |                 | 30 x 50<br>3.92 | 35 x 40<br>3.88 |                 |                 |                 | 35 x 50<br>4.90 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |
| 8200        | 822 |                 |                 |                 | 35 x 45<br>4.22 |                 |                 |                 |                 |                                         |                 |                 | 35 x 50<br>5.50 |
| 10000       | 103 |                 |                 |                 | 35 x 50<br>4.74 |                 |                 |                 |                 |                                         |                 |                 |                 |

•Case size ∅D×L(mm), ripple current (A rms) at 105°C, 120Hz •尺寸∅D×L(mm), 紋波電流(A rms)於 105°C, 120Hz

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注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

SK Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>μF ∅D |     | 160 (2C)        |                 |                 |                 | 200 (2D)                                |                 |                 |                 | 250 (2E)        |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              | 22              | 25              | 30              | 35              |
| 150         | 151 |                 |                 |                 |                 |                                         |                 |                 |                 | 22 x 25<br>0.68 | 25 x 20<br>0.69 |                 |                 |
| 180         | 181 | 22 x 20<br>0.69 |                 |                 |                 | 22 x 20<br>0.69                         |                 |                 |                 | 22 x 25<br>0.74 | 25 x 30<br>0.76 | 30 x 20<br>0.83 |                 |
| 220         | 221 | 22 x 20<br>0.76 |                 |                 |                 | 22 x 25<br>0.78                         | 25 x 20<br>0.80 |                 |                 | 22 x 30<br>0.88 | 25 x 25<br>0.90 | 30 x 20<br>0.92 |                 |
| 270         | 271 | 22 x 25<br>0.91 | 25 x 20<br>0.93 |                 |                 | 22 x 25<br>0.93                         | 25 x 25<br>0.96 | 30 x 20<br>0.98 |                 | 22 x 35<br>1.03 | 25 x 30<br>1.06 | 30 x 25<br>1.09 | 35 x 20<br>1.11 |
| 330         | 331 | 22 x 25<br>1.01 | 25 x 25<br>1.10 | 30 x 20<br>1.13 |                 | 22 x 30<br>1.05                         | 25 x 25<br>1.10 | 30 x 20<br>1.15 |                 | 22 x 40<br>1.20 | 25 x 30<br>1.18 | 30 x 25<br>1.21 | 35 x 20<br>1.23 |
| 390         | 391 | 22 x 30<br>1.17 | 25 x 25<br>1.20 | 30 x 20<br>1.23 |                 | 22 x 40<br>1.22                         | 25 x 30<br>1.25 | 30 x 25<br>1.28 | 35 x 20<br>1.32 | 22 x 45<br>1.36 | 25 x 40<br>1.42 | 30 x 30<br>1.39 | 35 x 25<br>1.42 |
| 470         | 471 | 22 x 35<br>1.36 | 25 x 25<br>1.32 | 30 x 25<br>1.44 | 35 x 20<br>1.47 | 22 x 45<br>1.38                         | 25 x 35<br>1.43 | 30 x 30<br>1.48 | 35 x 20<br>1.53 | 22 x 50<br>1.56 | 25 x 40<br>1.56 | 30 x 30<br>1.53 | 35 x 25<br>1.56 |
| 560         | 561 | 22 x 40<br>1.56 | 25 x 30<br>1.53 | 30 x 25<br>1.57 | 35 x 25<br>1.70 | 22 x 50<br>1.60                         | 25 x 40<br>1.66 | 30 x 30<br>1.72 | 35 x 25<br>1.78 |                 | 25 x 50<br>1.86 | 30 x 35<br>1.76 | 35 x 30<br>1.80 |
| 680         | 681 | 22 x 45<br>1.80 | 25 x 35<br>1.79 | 30 x 25<br>1.73 | 35 x 25<br>1.88 |                                         | 25 x 45<br>1.78 | 30 x 35<br>1.85 | 35 x 30<br>1.92 |                 |                 | 30 x 45<br>2.12 | 35 x 35<br>2.09 |
| 820         | 821 | 22 x 50<br>2.06 | 25 x 40<br>2.06 | 30 x 30<br>2.02 | 35 x 25<br>2.06 |                                         |                 | 30 x 40<br>2.05 | 35 x 35<br>2.12 |                 |                 |                 | 35 x 40<br>2.40 |
| 1000        | 102 |                 | 25 x 45<br>2.38 | 30 x 35<br>2.35 | 35 x 30<br>2.41 |                                         |                 | 30 x 45<br>2.20 | 35 x 40<br>2.32 |                 |                 |                 | 35 x 45<br>2.76 |
| 1200        | 122 |                 | 25 x 50<br>2.52 | 30 x 40<br>2.50 | 35 x 30<br>2.44 |                                         |                 |                 | 35 x 50<br>2.48 |                 |                 |                 | 35 x 50<br>2.91 |
| 1500        | 152 |                 |                 |                 | 35 x 40<br>3.00 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |                 |                 |                 |                 |

| WV<br>μF ∅D |     | 315 (2F)        |                 |                 |                 | 350 (2V)                                |                 |                 |                 | 400 (2G)        |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              | 22              | 25              | 30              | 35              |
| 56          | 560 |                 |                 |                 |                 |                                         |                 |                 |                 | 22 x 20<br>0.37 |                 |                 |                 |
| 68          | 680 |                 |                 |                 |                 | 22 x 20<br>0.41                         |                 |                 |                 | 22 x 25<br>0.44 | 25 x 20<br>0.45 |                 |                 |
| 82          | 820 | 22 x 20<br>0.45 |                 |                 |                 | 22 x 25<br>0.48                         | 25 x 20<br>0.49 |                 |                 | 22 x 30<br>0.51 | 25 x 25<br>0.53 | 30 x 20<br>0.54 |                 |
| 100         | 101 | 22 x 25<br>0.53 | 25 x 20<br>0.55 |                 |                 | 22 x 25<br>0.53                         | 25 x 25<br>0.59 | 30 x 20<br>0.60 |                 | 22 x 35<br>0.60 | 25 x 30<br>0.62 | 30 x 20<br>0.60 |                 |
| 120         | 121 | 22 x 30<br>0.62 | 25 x 25<br>0.64 | 30 x 20<br>0.65 |                 | 22 x 30<br>0.62                         | 25 x 25<br>0.64 | 30 x 20<br>0.65 |                 | 22 x 40<br>0.69 | 25 x 30<br>0.68 | 30 x 25<br>0.70 | 35 x 20<br>0.71 |
| 150         | 151 | 22 x 35<br>0.74 | 25 x 30<br>0.76 | 30 x 20<br>0.73 |                 | 22 x 40<br>0.78                         | 25 x 30<br>0.76 | 30 x 25<br>0.78 | 35 x 20<br>0.80 | 22 x 45<br>0.81 | 25 x 35<br>0.81 | 30 x 30<br>0.83 | 35 x 20<br>0.80 |
| 180         | 181 | 22 x 40<br>0.85 | 25 x 35<br>0.88 | 30 x 25<br>0.86 | 35 x 20<br>0.87 | 22 x 45<br>0.89                         | 25 x 35<br>0.88 | 30 x 30<br>0.91 | 35 x 20<br>0.87 | 22 x 50<br>0.93 | 25 x 40<br>0.93 | 30 x 30<br>0.91 | 35 x 25<br>0.93 |
| 220         | 221 | 22 x 45<br>0.98 | 25 x 35<br>0.98 | 30 x 30<br>1.00 | 35 x 20<br>0.96 | 22 x 50<br>1.03                         | 25 x 40<br>1.03 | 30 x 30<br>1.00 | 35 x 25<br>1.03 |                 | 25 x 45<br>1.07 | 30 x 35<br>1.06 | 35 x 30<br>1.08 |
| 270         | 271 |                 | 25 x 45<br>1.19 | 30 x 35<br>1.17 | 35 x 25<br>1.14 |                                         | 25 x 45<br>1.19 | 30 x 35<br>1.17 | 35 x 30<br>1.20 |                 | 25 x 50<br>1.24 | 30 x 40<br>1.23 | 35 x 30<br>1.20 |
| 330         | 331 |                 | 25 x 50<br>1.37 | 30 x 40<br>1.36 | 35 x 30<br>1.33 |                                         |                 | 30 x 40<br>1.36 | 35 x 35<br>1.40 |                 | 25 x 45<br>1.36 | 30 x 45<br>1.42 | 35 x 35<br>1.40 |
| 390         | 391 |                 |                 | 30 x 45<br>1.54 | 35 x 35<br>1.52 |                                         |                 | 30 x 45<br>1.54 | 35 x 40<br>1.59 |                 |                 | 30 x 50<br>1.61 | 35 x 40<br>1.59 |
| 470         | 471 |                 |                 | 30 x 50<br>1.76 | 35 x 40<br>1.74 |                                         |                 |                 | 35 x 45<br>1.82 |                 |                 |                 | 35 x 45<br>1.82 |
| 560         | 561 |                 |                 |                 | 35 x 40<br>1.90 |                                         |                 |                 | 35 x 50<br>2.06 |                 |                 |                 | 35 x 50<br>2.06 |
| 680         | 681 |                 |                 |                 | 35 x 50<br>2.27 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |                 |                 |                 | 35 x 50<br>2.15 |

| WV<br>μF ∅D |     | 450 (2W)        |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              |
| 47          | 470 | 22 x 20<br>0.34 |                 |                 |                 |
| 56          | 560 | 22 x 25<br>0.40 | 25 x 20<br>0.41 |                 |                 |
| 68          | 680 | 22 x 30<br>0.47 | 25 x 25<br>0.48 | 30 x 20<br>0.49 |                 |
| 82          | 820 | 22 x 35<br>0.54 | 25 x 30<br>0.56 | 30 x 20<br>0.54 |                 |
| 100         | 101 | 22 x 40<br>0.63 | 25 x 30<br>0.62 | 30 x 25<br>0.64 | 35 x 20<br>0.65 |
| 120         | 121 | 22 x 45<br>0.73 | 25 x 35<br>0.72 | 30 x 30<br>0.74 | 35 x 25<br>0.76 |
| 150         | 151 | 22 x 50<br>0.85 | 25 x 40<br>0.85 | 30 x 30<br>0.83 | 35 x 25<br>0.85 |
| 180         | 181 |                 | 25 x 45<br>0.97 | 30 x 35<br>0.96 | 35 x 30<br>0.98 |
| 220         | 221 |                 | 25 x 50<br>1.12 | 30 x 40<br>1.11 | 35 x 30<br>1.08 |
| 270         | 270 |                 |                 | 30 x 45<br>1.28 | 35 x 35<br>1.26 |
| 330         | 331 |                 |                 | 30 x 50<br>1.48 | 35 x 40<br>1.46 |
| 390         | 391 |                 |                 |                 | 35 x 45<br>1.66 |
| 470         | 471 |                 |                 |                 | 35 x 45<br>1.85 |

→ Case size ∅D×L(mm)  
→ Ripple current (A rms) at 105°C, 120Hz

→ 尺寸∅D×L(mm)  
→ 紋波電流(A rms)於 105°C, 120Hz

- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁 "包裝標準"。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

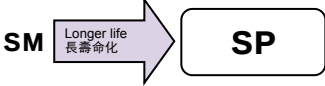
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SP Series

SNAP-IN TERMINAL TYPE, LONG LIFE

導箔型, 長壽命品

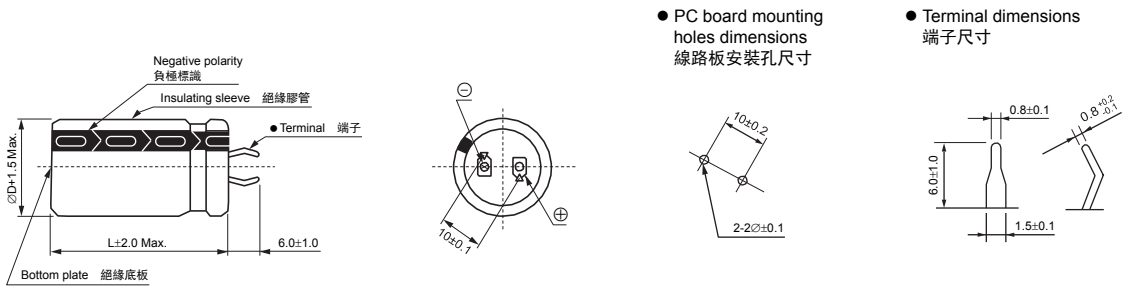
- Endurance 3000 hours at 85°C  
在 85°C 環境中耐久性 3000 小時
- Long life  
長壽命
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                |                                                                    |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Category 溫度範圍                     | -40 ~ +85°C                                                                                                                                                                                                                         | -25 ~ +85°C                                                        |
| Voltage Range 額定工作電壓範圍            | 16 ~ 350V                                                                                                                                                                                                                           | 400 ~ 450V                                                         |
| Capacitance Range 靜電容量範圍          | 82 ~ 68000µF                                                                                                                                                                                                                        | 56 ~ 560µF                                                         |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                 |                                                                    |
| Leakage Current 漏電流               | $I \leq 3\sqrt{CV}$ (after 5 minutes application of rated voltage at 20°C) (在 20°C 環境中施加額定工作電壓 5 分鐘後)<br>I: Leakage current (µA) 漏電流, C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                 |                                                                    |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000µF, tan δ shall be added 0.01 to the listed value with increase of every 1000µF. 當標稱靜電容量大於 1000µF, 其標稱靜電容量每增加 1000µF, 損耗角正切增加 0.01.<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C |                                                                    |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                            | 16 25 35 50 63 80 100 160~250 350~450                              |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                | 0.50 0.45 0.40 0.35 0.30 0.25 0.20 0.10 0.15                       |
| Stability at Low Temperature 低溫特性 | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                   |                                                                    |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                            | 16 25~35 50~63 80~100 160~350 400, 450                             |
|                                   | Impedance Ratio 阻抗比                                                                                                                                                                                                                 | Z(-25°C) / Z(20°C) 4 3 2 2 4 8<br>Z(-40°C) / Z(20°C) 15 10 8 5 — — |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 3000 hours application of the rated voltage at 85°C, they meet the characteristics listed below.<br>在 85°C 環境中施加額定工作電壓 3000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。                   |                                                                    |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                          | Within ±20% of initial value 初始值的±20%以內                            |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                            | Less than 200% of specified value 不大於規範值的 200%                     |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                 | Less than specified value 不大於規範值                                   |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 85°C for 1000 hours, they meet the specified listed below.<br>在 85°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。                                   |                                                                    |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                          | Within ±20% of initial value 初始值的±20%以內                            |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                            | Less than 200% of specified value 不大於規範值的 200%                     |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                 | Less than specified value 不大於規範值                                   |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                              |                                                                    |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償係數

| Frequency 頻率      |             | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|-------------------|-------------|------|-------|-------|------|--------|
| Coefficient<br>係數 | ~ 100μF     | 0.88 | 1.0   | 1.06  | 1.15 | 1.20   |
|                   | 160 ~ 250μF | 0.85 | 1.0   | 1.20  | 1.25 | 1.45   |
|                   | 315μF ~     | 0.88 | 1.0   | 1.15  | 1.20 | 1.40   |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱, 溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能, 請在使用過程中適當降低紋波電流。

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SP Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>μF ∅D |     | 16 (1C)         |                 |                 |                 | 25 (1E)         |                 |                 |                 | 35 (1V)                                 |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 25              | 30              | 22              | 35              | 30                                      | 22              | 25              | 35              |
| 4700        | 472 |                 |                 |                 |                 |                 |                 |                 |                 | 22 x 25<br>2.21                         | 25 x 25<br>2.42 |                 |                 |
| 5600        | 562 |                 |                 |                 |                 | 22 x 25<br>2.31 |                 |                 |                 | 22 x 30<br>2.69                         | 25 x 25<br>2.69 |                 |                 |
| 6800        | 682 |                 |                 |                 |                 | 22 x 25<br>2.38 | 25 x 25<br>2.78 |                 |                 | 22 x 35<br>2.70                         | 25 x 25<br>2.67 | 30 x 25<br>2.99 |                 |
| 8200        | 822 | 22 x 25<br>2.43 |                 |                 |                 | 22 x 25<br>2.56 | 25 x 25<br>2.85 |                 |                 | 22 x 35<br>3.09                         | 25 x 30<br>3.12 | 30 x 25<br>3.04 |                 |
| 10000       | 103 | 22 x 25<br>2.60 | 25 x 25<br>2.81 |                 |                 | 22 x 30<br>2.97 | 25 x 25<br>2.93 | 30 x 25<br>3.21 |                 | 22 x 40<br>3.22                         | 25 x 35<br>3.37 | 30 x 25<br>3.36 | 35 x 25<br>3.32 |
| 12000       | 123 | 22 x 25<br>2.88 | 25 x 25<br>2.96 |                 |                 | 22 x 35<br>3.33 | 25 x 30<br>3.26 | 30 x 25<br>3.59 | 35 x 25<br>3.58 | 22 x 45<br>3.71                         | 25 x 40<br>3.79 | 30 x 30<br>3.74 | 35 x 25<br>3.75 |
| 15000       | 153 | 22 x 30<br>3.45 | 25 x 25<br>3.38 | 30 x 25<br>3.60 |                 | 22 x 40<br>3.68 | 25 x 35<br>3.77 | 30 x 25<br>3.73 | 35 x 25<br>3.96 |                                         | 25 x 45<br>4.55 | 30 x 35<br>4.54 | 35 x 25<br>4.37 |
| 18000       | 183 | 22 x 30<br>3.47 | 25 x 25<br>3.47 |                 |                 | 22 x 45<br>4.36 | 25 x 35<br>4.20 | 30 x 30<br>4.40 | 35 x 25<br>4.34 |                                         | 25 x 50<br>4.84 | 30 x 40<br>4.87 | 35 x 30<br>5.03 |
| 22000       | 223 | 22 x 35<br>3.84 | 25 x 30<br>3.93 | 30 x 25<br>4.08 | 35 x 25<br>4.15 |                 | 25 x 45<br>4.71 | 30 x 35<br>4.70 | 35 x 25<br>4.60 |                                         |                 | 30 x 45<br>5.79 | 35 x 55<br>5.71 |
| 27000       | 273 | 22 x 45<br>4.63 | 25 x 40<br>4.72 |                 |                 |                 |                 | 30 x 45<br>5.79 | 35 x 35<br>5.71 |                                         |                 |                 | 35 x 45<br>6.81 |
| 33000       | 333 | 22 x 50<br>5.20 | 25 x 45<br>5.41 | 30 x 35<br>5.40 | 35 x 25<br>5.19 |                 |                 |                 | 35 x 40<br>6.31 |                                         |                 |                 |                 |
| 39000       | 393 |                 |                 | 30 x 40<br>6.02 | 35 x 30<br>5.88 |                 |                 |                 | 35 x 45<br>6.92 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |
| 47000       | 473 |                 |                 | 30 x 45<br>6.95 | 35 x 35<br>6.85 |                 |                 |                 |                 |                                         |                 |                 |                 |
| 56000       | 563 |                 |                 |                 | 35 x 40<br>7.39 |                 |                 |                 |                 |                                         |                 |                 |                 |
| 68000       | 683 |                 |                 |                 | 35 x 45<br>8.06 |                 |                 |                 |                 |                                         |                 |                 |                 |

| WV<br>μF ∅D |     | 50 (1H)         |                 |                 |                 | 63 (1J)         |                 |                 |                 | 80 (1K)                                 |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              |
| 1200        | 122 |                 |                 |                 |                 |                 |                 |                 |                 | 22 x 25<br>1.62                         |                 |                 |                 |
| 1500        | 152 |                 |                 |                 |                 |                 |                 |                 |                 | 22 x 25<br>1.81                         |                 |                 |                 |
| 1800        | 182 |                 |                 |                 |                 | 22 x 25<br>1.90 |                 |                 |                 | 22 x 30<br>2.14                         | 25 x 25<br>2.14 |                 |                 |
| 2200        | 222 | 22 x 25<br>1.93 |                 |                 |                 | 22 x 30<br>2.35 | 25 x 25<br>2.30 |                 |                 | 22 x 35<br>2.37                         | 25 x 30<br>2.39 | 30 x 25<br>2.48 |                 |
| 2700        | 272 | 22 x 25<br>2.05 |                 |                 |                 | 22 x 35<br>2.50 | 25 x 25<br>2.34 |                 |                 | 22 x 40<br>2.78                         | 25 x 35<br>2.82 | 30 x 25<br>2.74 |                 |
| 3300        | 332 | 22 x 30<br>2.41 | 25 x 25<br>2.38 |                 |                 | 22 x 35<br>2.62 | 25 x 30<br>2.69 | 30 x 25<br>2.78 |                 | 22 x 45<br>3.14                         | 25 x 40<br>3.20 | 30 x 30<br>3.16 | 35 x 25<br>3.24 |
| 3900        | 392 | 22 x 30<br>2.51 | 25 x 25<br>2.46 |                 |                 | 22 x 40<br>2.90 | 25 x 35<br>3.09 | 30 x 30<br>3.09 |                 | 22 x 50<br>3.58                         | 25 x 45<br>3.67 | 30 x 35<br>3.66 | 35 x 25<br>3.52 |
| 4700        | 472 | 22 x 35<br>2.83 | 25 x 30<br>3.03 | 30 x 25<br>3.01 |                 | 22 x 50<br>3.49 | 25 x 40<br>3.37 | 30 x 30<br>3.37 | 35 x 25<br>3.36 |                                         | 25 x 50<br>4.10 | 30 x 40<br>4.13 | 35 x 30<br>4.03 |
| 5600        | 562 | 22 x 40<br>3.21 | 25 x 35<br>3.37 | 30 x 25<br>3.17 | 35 x 25<br>3.47 |                 | 25 x 45<br>3.77 | 30 x 35<br>3.75 | 35 x 30<br>3.88 |                                         |                 | 30 x 45<br>4.61 | 35 x 35<br>4.54 |
| 6800        | 682 | 22 x 45<br>3.73 | 25 x 35<br>3.59 | 30 x 30<br>3.56 | 35 x 25<br>3.64 |                 | 25 x 50<br>4.41 | 30 x 40<br>4.41 | 35 x 30<br>4.04 |                                         |                 | 30 x 50<br>5.18 | 35 x 40<br>5.15 |
| 8200        | 822 |                 | 25 x 40<br>4.10 | 30 x 30<br>4.12 | 35 x 25<br>4.07 |                 |                 |                 |                 |                                         |                 |                 | 35 x 45<br>5.80 |
| 10000       | 103 |                 | 25 x 50<br>4.91 | 30 x 35<br>4.68 | 35 x 30<br>4.59 |                 |                 | 30 x 50<br>5.49 | 35 x 40<br>5.47 |                                         |                 |                 | 35 x 50<br>6.69 |
| 12000       | 123 |                 |                 | 30 x 40<br>5.10 | 35 x 35<br>5.30 |                 |                 |                 | 35 x 45<br>5.97 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |
| 15000       | 153 |                 |                 | 30 x 50<br>6.28 | 35 x 40<br>6.24 |                 |                 |                 |                 |                                         |                 |                 |                 |
| 18000       | 183 |                 |                 |                 | 35 x 45<br>7.18 |                 |                 |                 |                 |                                         |                 |                 |                 |

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CAT.2024/V1.3

SP Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>μF ∅D |     | 100 (2A)        |                 |                 |                 | 160 (2C)                                |                 |                 |                 | 200 (2D)        |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              | 22              | 25              | 30              | 35              |
| 220         | 221 |                 |                 |                 |                 |                                         |                 |                 |                 | 22 x 25<br>1.15 |                 |                 |                 |
| 270         | 271 |                 |                 |                 |                 | 22 x 25<br>1.27                         |                 |                 |                 | 22 x 25<br>1.30 |                 |                 |                 |
| 330         | 331 |                 |                 |                 |                 | 22 x 25<br>1.40                         |                 |                 |                 | 22 x 25<br>1.40 | 25 x 25<br>1.43 |                 |                 |
| 390         | 391 |                 |                 |                 |                 | 22 x 30<br>1.62                         |                 |                 |                 | 22 x 25<br>1.42 | 25 x 25<br>1.63 |                 |                 |
| 470         | 471 |                 |                 |                 |                 | 22 x 30<br>1.77                         | 25 x 25<br>1.77 |                 |                 | 22 x 30<br>1.68 | 25 x 25<br>1.68 | 30 x 25<br>1.85 |                 |
| 560         | 561 |                 |                 |                 |                 | 22 x 30/35<br>1.92/2.05                 | 25 x 25<br>1.92 | 30 x 25<br>2.02 |                 | 22 x 35<br>1.97 | 25 x 30<br>2.05 | 30 x 25<br>2.05 |                 |
| 680         | 681 |                 |                 |                 |                 | 22 x 35<br>2.12                         | 25 x 30<br>2.22 | 30 x 25<br>2.22 |                 | 22 x 40<br>2.24 | 25 x 30<br>2.13 | 30 x 25<br>2.21 | 35 x 25<br>2.10 |
| 820         | 821 |                 |                 |                 |                 | 22 x 40<br>2.32                         | 25 x 30<br>2.32 | 30 x 25<br>2.31 | 35 x 25<br>2.50 | 22 x 45<br>2.32 | 25 x 35<br>2.23 | 30 x 30<br>2.62 | 35 x 25<br>2.39 |
| 1000        | 102 |                 |                 |                 |                 | 22 x 50<br>2.88                         | 25 x 40<br>2.86 | 30 x 30<br>2.82 | 35 x 25<br>2.79 | 22 x 50<br>2.57 | 25 x 40<br>2.50 | 30 x 30<br>2.47 | 35 x 25<br>2.53 |
| 1200        | 122 | 22 x 30<br>2.12 | 25 x 25<br>2.10 |                 |                 |                                         | 25 x 45<br>3.27 | 30 x 35<br>3.25 | 35 x 30<br>3.24 |                 | 25 x 45<br>2.89 | 30 x 35<br>2.88 | 35 x 30<br>2.97 |
| 1500        | 152 | 22 x 35<br>2.45 | 25 x 30<br>2.43 | 30 x 25<br>2.46 |                 |                                         |                 | 30 x 40<br>3.77 | 35 x 35<br>3.75 |                 | 25 x 55<br>3.41 | 30 x 45<br>3.46 | 35 x 35<br>3.42 |
| 1800        | 182 | 22 x 40<br>2.77 | 25 x 35<br>2.77 | 30 x 25<br>2.65 |                 |                                         |                 | 30 x 45<br>4.10 | 35 x 35<br>4.08 |                 |                 | 30 x 50<br>3.97 | 35 x 40<br>3.95 |
| 2200        | 222 | 22 x 45<br>3.12 | 25 x 40<br>3.20 | 30 x 30<br>3.10 | 35 x 25<br>3.14 |                                         |                 |                 | 35 x 45<br>4.72 |                 |                 | 30 x 60<br>4.51 | 35 x 45<br>4.35 |
| 2700        | 272 |                 | 25 x 45<br>3.61 | 30 x 35<br>3.60 | 35 x 30<br>3.71 |                                         |                 |                 | 35 x 55<br>5.53 |                 |                 |                 | 35 x 55<br>4.79 |
| 3300        | 332 |                 | 25 x 50<br>4.06 | 30 x 40<br>4.05 | 35 x 35<br>4.07 |                                         |                 |                 |                 |                 |                 |                 |                 |
| 3900        | 392 |                 |                 | 30 x 45<br>4.60 | 35 x 35<br>4.50 |                                         |                 |                 |                 |                 |                 |                 |                 |
| 4700        | 472 |                 |                 | 30 x 50<br>5.13 | 35 x 40<br>5.12 |                                         |                 |                 |                 |                 |                 |                 |                 |
| 5600        | 562 |                 |                 |                 | 35 x 45<br>5.75 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |                 |                 |                 |                 |
| 6800        | 682 |                 |                 |                 | 35 x 50<br>6.01 |                                         |                 |                 |                 |                 |                 |                 |                 |

| WV<br>μF ∅D |     | 250 (2E)        |                 |                 |                 | 350 (2V)                                |                 |                 |                 | 400 (2G)        |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              | 22              | 25              | 30              | 35              |
| 68          | 680 |                 |                 |                 |                 |                                         |                 |                 |                 | 22 x 25<br>0.72 |                 |                 |                 |
| 82          | 820 |                 |                 |                 |                 | 22 x 25<br>0.70                         |                 |                 |                 | 22 x 25<br>0.80 |                 |                 |                 |
| 100         | 101 |                 |                 |                 |                 | 22 x 25<br>0.77                         | 25 x 20<br>0.73 |                 |                 | 22 x 25<br>0.81 | 25 x 20<br>0.79 |                 |                 |
| 120         | 121 |                 |                 |                 |                 | 22 x 25<br>0.99                         | 25 x 20<br>0.80 |                 |                 | 22 x 30<br>1.04 | 25 x 25<br>1.06 |                 |                 |
| 150         | 151 |                 |                 |                 |                 |                                         | 25 x 25<br>1.00 | 30 x 25<br>1.04 |                 | 22 x 30<br>1.06 | 25 x 25<br>1.06 | 30 x 25<br>1.24 |                 |
| 180         | 181 | 22 x 25<br>1.01 |                 |                 |                 | 22 x 35<br>1.15                         | 25 x 30<br>1.20 | 30 x 25<br>1.37 |                 | 22 x 35<br>1.16 | 25 x 30<br>1.23 | 30 x 25<br>1.45 | 35 x 25<br>1.54 |
| 220         | 221 | 22 x 25<br>1.18 | 25 x 25<br>1.24 |                 |                 | 22 x 40<br>1.30                         | 25 x 30<br>1.28 | 30 x 25<br>1.37 |                 | 22 x 40<br>1.39 | 25 x 30<br>1.33 | 30 x 25<br>1.38 | 35 x 25<br>1.44 |
| 270         | 271 | 22 x 25<br>1.21 | 25 x 25<br>1.30 |                 |                 | 22 x 45<br>1.42                         | 25 x 35<br>1.40 | 30 x 30<br>1.41 | 35 x 25<br>1.42 | 22 x 45<br>1.54 | 25 x 35<br>1.48 | 30 x 30<br>1.56 | 35 x 25<br>1.53 |
| 330         | 331 | 22 x 35<br>1.35 | 25 x 30<br>1.38 | 30 x 25<br>1.40 |                 | 22 x 50<br>1.69                         | 25 x 40<br>1.64 | 30 x 30<br>1.64 | 35 x 25<br>1.77 | 22 x 50<br>1.70 | 25 x 45<br>1.76 | 30 x 35<br>1.76 | 35 x 30<br>1.68 |
| 390         | 391 | 22 x 40<br>1.57 | 25 x 30<br>1.57 | 30 x 25<br>1.58 |                 |                                         | 25 x 45<br>1.84 | 30 x 35<br>1.88 | 35 x 30<br>1.90 |                 | 25 x 45<br>1.86 | 30 x 40<br>1.89 | 35 x 35<br>1.97 |
| 470         | 471 | 22 x 40<br>1.72 | 25 x 35<br>1.73 | 30 x 30<br>1.80 |                 |                                         |                 | 30 x 40<br>1.91 | 35 x 30<br>1.95 |                 |                 | 30 x 45<br>2.18 | 35 x 40<br>2.12 |
| 560         | 561 | 22 x 45<br>2.02 | 25 x 40<br>2.04 | 30 x 35<br>2.01 | 35 x 30<br>2.11 |                                         |                 | 30 x 45<br>2.15 | 35 x 40<br>2.20 |                 |                 |                 | 35 x 45<br>2.20 |
| 680         | 681 | 22 x 50<br>2.48 | 25 x 45<br>2.54 | 30 x 30<br>2.38 | 35 x 30<br>2.54 |                                         |                 |                 |                 |                 |                 |                 |                 |
| 820         | 821 |                 | 25 x 50<br>2.92 | 30 x 45<br>2.78 | 35 x 40<br>2.87 |                                         |                 |                 |                 |                 |                 |                 |                 |
| 1000        | 102 |                 | 25 x 55<br>3.06 | 30 x 50<br>3.11 | 35 x 45<br>3.06 |                                         |                 |                 |                 |                 |                 |                 |                 |
| 1200        | 122 |                 |                 |                 | 35 x 50<br>3.20 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |                 |                 |                 |                 |
| 1500        | 152 |                 |                 | 30 x 60<br>4.06 | 35 x 55<br>3.92 |                                         |                 |                 |                 |                 |                 |                 |                 |

•Case size ∅D×L(mm), ripple current (A rms) at 85°C, 120Hz

•尺寸∅D×L(mm), 紋波電流(A rms)於 85°C, 120Hz

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CAT.2024/V1.3

SP Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| WV<br>μF ∅D |     | 450 (2W)        |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              |
| 56          | 560 | 22 x 25<br>0.68 |                 |                 |                 |
| 68          | 680 | 22 x 20<br>0.58 |                 |                 |                 |
| 82          | 820 | 22 x 25<br>0.69 | 25 x 25<br>0.75 |                 |                 |
| 100         | 101 | 22 x 25<br>0.77 | 25 x 25<br>0.83 |                 |                 |
| 120         | 121 | 22 x 35<br>0.97 | 25 x 25<br>0.91 | 30 x 25<br>1.10 |                 |
| 150         | 151 | 22 x 35<br>1.20 | 25 x 30<br>1.16 | 30 x 25<br>1.16 |                 |
| 180         | 181 | 22 x 40<br>1.21 | 25 x 35<br>1.31 | 30 x 30<br>1.19 | 35 x 25<br>1.35 |
| 220         | 221 | 22 x 50<br>1.48 | 25 x 40<br>1.47 | 30 x 35<br>1.42 | 35 x 30<br>1.45 |
| 270         | 270 |                 | 25 x 45<br>1.59 | 30 x 35<br>1.69 | 35 x 30<br>1.61 |
| 330         | 331 |                 | 25 x 50<br>1.76 | 30 x 40<br>1.93 | 35 x 35<br>1.88 |
| 390         | 391 |                 |                 | 30 x 45<br>2.00 | 35 x 40<br>1.95 |
| 470         | 471 |                 |                 | 30 x 50<br>2.15 | 35 x 45<br>2.10 |
| 560         | 561 |                 |                 |                 | 35 x 50<br>2.26 |

→ Case size ∅D×L(mm)  
→ Ripple current (A rms) at 85°C, 120Hz

→ 尺寸∅D×L(mm)  
→ 紋波電流(A rms)於 85°C, 120Hz

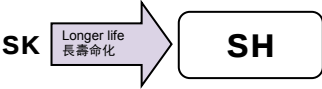
- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁 “包裝標準”。
  - Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

SH Series

SNAP-IN TERMINAL TYPE, LONG LIFE

導箔型, 長壽命品

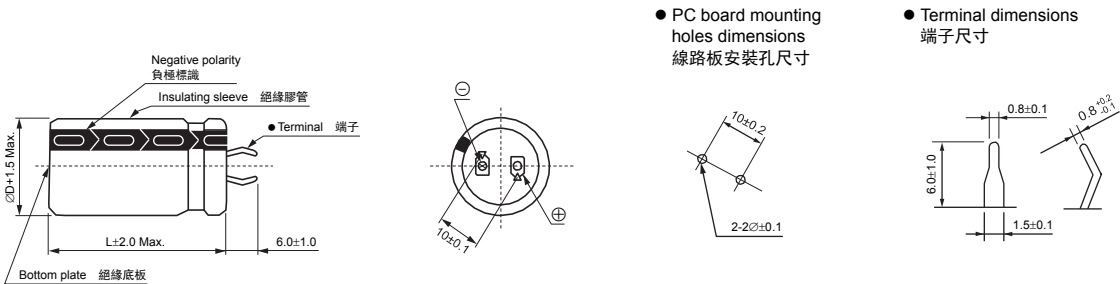
- Endurance 3000 hours  
持久性 3000 小時
- Long life  
長壽命
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                   |                                                |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                           | -25 ~ +105°C                                   |
| Voltage Range 額定工作電壓範圍            | 16 ~ 350V                                                                                                                                                                                                                              | 400 ~ 450V                                     |
| Capacitance Range 靜電容量範圍          | 100 ~ 22000µF                                                                                                                                                                                                                          | 100 ~ 680µF                                    |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                    |                                                |
| Leakage Current 漏電流               | $I \leq 3\sqrt{CV}$ (after 5 minutes application of rated voltage at 20°C) (在 20°C 環境中施加額定工作電壓 5 分鐘後)<br>I: Leakage current (µA) 漏電流, C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                    |                                                |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000µF, tan δ shall be added 0.01 to the listed value with increase of every 1000µF.<br>當標稱靜電容量大於 1000µF, 其標稱靜電容量每增加 1000µF, 損耗角正切增加 0.01.<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C |                                                |
| Stability at Low Temperature 低溫特性 | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                               | 16 25 35 50 63 80 100 160~250 350~450          |
|                                   | Impedance Ratio $Z(-25^{\circ}\text{C}) / Z(20^{\circ}\text{C})$                                                                                                                                                                       | 4 3 2 2 4 8                                    |
|                                   | tan δ (max.) 最大損耗角正切                                                                                                                                                                                                                   | 0.50 0.45 0.40 0.35 0.30 0.25 0.20 0.10 0.15   |
| Endurance 持久性                     | Measurement frequency 測試頻率: 120Hz                                                                                                                                                                                                      |                                                |
|                                   | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                               | 16 25~35 50~63 80~100 160~350 400, 450         |
|                                   | Impedance Ratio $Z(-40^{\circ}\text{C}) / Z(20^{\circ}\text{C})$                                                                                                                                                                       | 15 10 8 5 — —                                  |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after 3000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 3000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。                    |                                                |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                             | Within ±20% of initial value 初始值的±20%以內        |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                               | Less than 200% of specified value 不大於規範值的 200% |
| Marking 標識                        | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified listed below.<br>在 105°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。                                    |                                                |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                             | Within ±20% of initial value 初始值的±20%以內        |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                               | Less than 200% of specified value 不大於規範值的 200% |
| Marking 標識                        | Leakage Current 漏電流                                                                                                                                                                                                                    |                                                |
|                                   | Less than specified value 不大於規範值                                                                                                                                                                                                       |                                                |
|                                   | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                 |                                                |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率   | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|----------------|------|-------|-------|------|--------|
| Coefficient 系數 | 0.88 | 1.0   | 1.06  | 1.15 | 1.20   |
| ~ 100µF        | 0.85 | 1.0   | 1.20  | 1.25 | 1.45   |
| 160 ~ 250µF    | 0.88 | 1.0   | 1.15  | 1.20 | 1.40   |
| 315µF ~        |      |       |       |      |        |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱, 溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能, 請在使用過程中適當降低紋波電流。

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SH Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

| <div>WV</div> <div>μF</div> <div>ØD</div> |     | 16 (1C)         |                 |                 |                 | 25 (1E)         |                 |                 |                 | 35 (1V)                                 |                 |                 |                 |
|-------------------------------------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|
|                                           |     | 22              | 25              | 30              | 35              | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              |
| 2200                                      | 222 |                 |                 |                 |                 |                 |                 |                 |                 | 22 x 25<br>1.14                         | 25 x 25<br>1.51 |                 |                 |
| 3300                                      | 332 |                 |                 |                 |                 | 22 x 25<br>1.25 |                 |                 |                 | 22 x 30<br>1.51                         | 25 x 30<br>1.92 |                 |                 |
| 4700                                      | 472 | 22 x 25<br>1.30 |                 |                 |                 | 22 x 30<br>1.61 | 25 x 25<br>1.61 |                 |                 | 22 x 35<br>1.92                         | 25 x 40<br>2.31 | 30 x 25<br>1.92 |                 |
| 6800                                      | 682 | 22 x 35<br>1.80 | 25 x 30<br>1.80 |                 |                 | 22 x 35<br>1.91 | 25 x 30<br>1.91 | 30 x 25<br>1.91 |                 | 22 x 45<br>2.31                         | 25 x 45<br>2.87 | 30 x 30<br>2.33 |                 |
| 10000                                     | 103 | 22 x 45<br>2.34 | 25 x 35<br>2.25 | 30 x 25<br>2.19 |                 | 22 x 45<br>2.51 | 25 x 40<br>2.42 | 30 x 30<br>2.42 | 35 x 25<br>2.42 |                                         |                 | 30 x 35<br>2.87 | 35 x 30<br>2.87 |
| 15000                                     | 153 |                 | 25 x 45<br>2.83 | 30 x 35<br>2.82 | 35 x 30<br>2.82 |                 | 25 x 45<br>3.12 | 30 x 35<br>3.11 | 35 x 30<br>3.11 |                                         |                 | 30 x 45<br>3.66 | 35 x 40<br>3.66 |
| 22000                                     | 223 |                 |                 | 30 x 45<br>3.13 | 35 x 35<br>3.09 |                 |                 | 30 x 45<br>3.85 | 35 x 40<br>3.85 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 | 35 x 45<br>4.53 |

| <div>WV</div> <div>μF</div> <div>ØD</div> |     | 50 (1H)         |                 |                 |                 | 63 (1J)         |                 |                 |                         | 80 (1K)                                 |                 |                 |                 |
|-------------------------------------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------------|-----------------------------------------|-----------------|-----------------|-----------------|
|                                           |     | 22              | 25              | 30              | 35              | 22              | 25              | 30              | 35                      | 22                                      | 25              | 30              | 35              |
| 1000                                      | 102 |                 |                 |                 |                 | 22 x 20<br>0.90 |                 |                 |                         | 22 x 25<br>1.05                         | 25 x 20<br>1.04 |                 |                 |
| 1200                                      | 122 |                 |                 |                 |                 | 22 x 20<br>1.05 |                 |                 |                         | 22 x 30<br>1.24                         | 25 x 25<br>1.24 |                 |                 |
| 1500                                      | 152 | 22 x 25<br>1.22 |                 |                 |                 | 22 x 25<br>1.28 | 25 x 20<br>1.27 |                 |                         | 22 x 35<br>1.54                         | 25 x 30<br>1.54 | 30 x 25<br>1.61 |                 |
| 2200                                      | 222 | 22 x 30<br>1.59 | 25 x 25<br>1.59 |                 |                 | 22 x 35<br>1.78 | 25 x 25<br>1.60 | 30 x 25<br>1.78 |                         | 22 x 45<br>1.95                         | 25 x 35<br>1.94 | 30 x 30<br>2.05 | 35 x 25<br>2.10 |
| 2700                                      | 272 |                 |                 |                 |                 | 22 x 35<br>1.81 | 25 x 30<br>1.83 | 30 x 25<br>1.89 |                         |                                         |                 |                 |                 |
| 3300                                      | 332 | 22 x 35<br>1.93 | 25 x 30<br>1.88 | 30 x 25<br>1.88 |                 | 22 x 40<br>2.00 | 25 x 35<br>2.03 | 30 x 30<br>2.03 | 35 x 25<br>2.03         |                                         | 25 x 50<br>2.25 | 30 x 35<br>2.24 | 35 x 30<br>2.30 |
| 3900                                      | 392 |                 |                 |                 |                 | 22 x 50<br>2.37 | 25 x 40<br>2.22 | 30 x 30<br>2.19 | 35 x 25<br>2.24         |                                         |                 |                 |                 |
| 4700                                      | 472 | 22 x 45<br>2.43 | 25 x 35<br>2.34 | 30 x 30<br>2.42 | 35 x 25<br>2.42 |                 | 25 x 45<br>2.56 | 30 x 35<br>2.66 | 35 x 30<br>2.66         |                                         |                 | 30 x 45<br>2.84 | 35 x 35<br>2.80 |
| 5600                                      | 562 |                 |                 |                 |                 |                 | 25 x 50<br>2.93 | 30 x 35<br>2.79 | 35 x 30<br>2.88         |                                         |                 |                 |                 |
| 6800                                      | 682 |                 | 25 x 45<br>3.10 | 30 x 35<br>3.10 | 35 x 30<br>3.10 |                 |                 | 30 x 40<br>3.25 | 35 x 35/40<br>3.26/3.49 |                                         |                 |                 | 35 x 35<br>3.50 |
| 8200                                      | 822 |                 |                 |                 |                 |                 |                 |                 | 35 x 40<br>3.52         | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |
| 10000                                     | 103 |                 |                 | 30 x 45<br>4.18 | 35 x 40<br>4.20 |                 |                 |                 |                         |                                         |                 |                 | 35 x 70<br>4.45 |

| <div>WV</div> <div>μF</div> <div>ØD</div> |     | 100 (2A)        |                 |                 |                 | 160 (2C)        |                 |                 |                 | 200 (2D)                                |                 |                 |                 |
|-------------------------------------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|
|                                           |     | 22              | 25              | 30              | 35              | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              |
| 180                                       | 181 |                 |                 |                 |                 |                 |                 |                 |                 | 22 x 20<br>0.70                         |                 |                 |                 |
| 220                                       | 221 |                 |                 |                 |                 | 22 x 20<br>0.71 |                 |                 |                 |                                         | 25 x 20<br>0.84 |                 |                 |
| 270                                       | 271 |                 |                 |                 |                 |                 | 25 x 20<br>0.85 |                 |                 | 22 x 25<br>1.03                         |                 |                 |                 |
| 330                                       | 331 |                 |                 |                 |                 | 22 x 25<br>0.98 | 25 x 20<br>0.94 |                 |                 | 22 x 30<br>1.21                         |                 |                 |                 |
| 390                                       | 391 |                 |                 |                 |                 | 22 x 25<br>1.03 | 25 x 25<br>1.09 |                 |                 | 22 x 35<br>1.39                         | 25 x 25<br>1.31 |                 |                 |
| 470                                       | 471 |                 |                 |                 |                 | 22 x 30<br>1.21 | 25 x 25<br>1.19 |                 |                 | 22 x 35<br>1.52                         | 25 x 30<br>1.52 |                 |                 |
| 560                                       | 561 |                 |                 |                 |                 | 22 x 35<br>1.40 | 25 x 30<br>1.40 | 30 x 25<br>1.40 |                 | 22 x 40<br>1.66                         | 25 x 35<br>1.75 | 30 x 25<br>1.64 |                 |
| 680                                       | 681 |                 |                 |                 |                 | 22 x 40<br>1.62 | 25 x 35<br>1.61 | 30 x 25<br>1.54 |                 | 22 x 45<br>2.04                         | 25 x 40<br>2.04 | 30 x 30<br>1.96 |                 |
| 820                                       | 82  |                 |                 |                 |                 | 22 x 45<br>1.86 | 25 x 40<br>1.86 | 30 x 30<br>1.79 | 35 x 25<br>1.79 |                                         | 25 x 45<br>2.34 | 30 x 35<br>2.27 |                 |
| 1000                                      | 102 | 22 x 30<br>1.36 | 25 x 25<br>1.36 |                 |                 | 22 x 50<br>1.91 | 25 x 45<br>2.15 | 30 x 35<br>2.09 | 35 x 30<br>1.98 |                                         | 25 x 50<br>2.46 |                 |                 |
| 1200                                      | 122 | 22 x 35<br>1.48 | 25 x 30<br>1.49 |                 |                 |                 | 25 x 50<br>2.35 | 30 x 40<br>2.35 | 35 x 35<br>2.29 |                                         |                 |                 |                 |
| 1500                                      | 152 | 22 x 40<br>1.82 | 25 x 35<br>1.85 | 30 x 25<br>1.80 |                 |                 |                 | 30 x 45<br>2.56 | 35 x 40<br>2.72 |                                         |                 |                 | 35 x 50<br>2.85 |
| 1800                                      | 182 |                 |                 |                 |                 |                 |                 |                 | 35 x 45<br>3.09 |                                         |                 |                 |                 |
| 2200                                      | 222 |                 | 25 x 45<br>2.50 | 30 x 35<br>2.50 | 35 x 30<br>2.50 |                 |                 |                 | 35 x 55<br>3.51 |                                         |                 |                 |                 |
| 2700                                      | 272 |                 | 25 x 50<br>2.70 | 30 x 40<br>2.72 | 35 x 35<br>2.82 |                 |                 |                 | 35 x 60<br>4.05 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |
| 3300                                      | 102 |                 |                 | 30 x 45<br>3.11 | 35 x 35<br>3.07 |                 |                 |                 |                 |                                         |                 |                 |                 |
| 3900                                      | 122 |                 |                 | 30 x 50<br>3.40 | 35 x 40<br>3.38 |                 |                 |                 |                 |                                         |                 |                 |                 |
| 4700                                      | 152 |                 |                 |                 | 35 x 45<br>3.90 |                 |                 |                 |                 |                                         |                 |                 |                 |

•Case size ØD×L(mm), ripple current (A rms) at 105°C, 120Hz    •尺寸ØD×L(mm), 紋波電流(A rms)於 105°C, 120Hz

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.  
注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CAT.2024/V1.3

SH Series

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT
 規格尺寸及最大允許紋波電流

| WV<br>μF ∅D |     | 250 (2E)        |                 |                 |                 | 350 (2V)        |                 |                 |                 | 400 (2G)                                |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              | 22              | 25              | 30              | 35              | 22                                      | 25              | 30              | 35              |
| 56          | 560 |                 |                 |                 |                 |                 |                 |                 |                 | 22 x 20<br>0.41                         |                 |                 |                 |
| 68          | 680 |                 |                 |                 |                 |                 |                 |                 |                 | 22 x 25<br>0.52                         | 25 x 20<br>0.49 |                 |                 |
| 100         | 101 |                 |                 |                 |                 | 22 x 25<br>0.52 | 25 x 20<br>0.52 |                 |                 | 22 x 30<br>0.67                         |                 |                 |                 |
| 120         | 121 |                 |                 |                 |                 | 22 x 30<br>0.62 | 25 x 25<br>0.65 |                 |                 | 22 x 35<br>0.78                         | 25 x 25<br>0.69 |                 |                 |
| 150         | 151 |                 |                 |                 |                 | 22 x 35<br>0.74 |                 |                 |                 | 22 x 40<br>0.91                         | 25 x 30<br>0.83 | 30 x 25<br>0.86 |                 |
| 180         | 181 | 22 x 25<br>0.77 |                 |                 |                 | 22 x 40<br>0.81 | 25 x 30<br>0.77 | 30 x 25<br>0.80 |                 | 22 x 40<br>1.04                         | 25 x 35<br>1.04 |                 |                 |
| 220         | 221 | 22 x 30<br>0.80 | 25 x 25<br>0.82 |                 |                 | 22 x 45<br>0.94 | 25 x 35<br>0.91 |                 |                 | 22 x 50<br>1.17                         | 25 x 40<br>1.14 | 30 x 30<br>1.12 | 35 x 25<br>1.15 |
| 270         | 271 | 22 x 30<br>1.02 | 25 x 25<br>1.08 |                 |                 | 22 x 50<br>1.09 | 25 x 40<br>1.06 | 30 x 30<br>1.05 | 35 x 25<br>1.08 |                                         | 25 x 50<br>1.40 | 30 x 35<br>1.39 | 35 x 30<br>1.31 |
| 330         | 331 | 22 x 35<br>1.20 | 25 x 30<br>1.27 | 30 x 25<br>1.34 |                 |                 | 25 x 45<br>1.24 | 30 x 35<br>1.24 | 35 x 30<br>1.23 |                                         |                 | 30 x 40<br>1.31 | 35 x 30<br>1.27 |
| 390         | 391 | 22 x 40<br>1.38 | 25 x 35<br>1.46 | 30 x 25<br>1.39 |                 |                 |                 | 30 x 40<br>1.42 | 35 x 30<br>1.39 |                                         |                 | 30 x 45<br>1.49 | 35 x 35<br>1.47 |
| 470         | 471 | 22 x 45<br>1.46 | 25 x 40<br>1.49 | 30 x 30<br>1.50 |                 |                 |                 | 30 x 45<br>1.50 | 35 x 35<br>1.51 |                                         |                 | 30 x 50<br>1.52 | 35 x 40<br>1.53 |
| 560         | 561 |                 | 25 x 45<br>1.63 | 30 x 40<br>1.66 | 35 x 30<br>1.68 |                 |                 | 30 x 50<br>1.78 | 35 x 40<br>1.77 |                                         |                 |                 | 35 x 50<br>1.80 |
| 680         | 681 |                 | 25 x 50<br>2.04 | 30 x 35<br>2.06 | 35 x 30<br>2.06 |                 |                 | 30 x 60<br>1.94 | 35 x 50<br>1.95 | → Case size 尺寸<br>→ Ripple current 紋波電流 |                 |                 |                 |
| 820         | 821 |                 |                 | 30 x 45<br>2.30 | 35 x 40<br>2.31 |                 |                 |                 |                 |                                         |                 |                 |                 |
| 1000        | 102 |                 |                 | 30 x 50<br>2.63 | 35 x 40<br>2.76 |                 |                 |                 |                 |                                         |                 |                 |                 |
| 1200        | 122 |                 |                 |                 | 35 x 50<br>2.92 |                 |                 |                 |                 |                                         |                 |                 |                 |
| 1500        | 152 |                 |                 |                 | 35 x 60<br>3.34 |                 |                 |                 |                 |                                         |                 |                 |                 |

| WV<br>μF ∅D |     | 450 (2W)        |                 |                 |                 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|
|             |     | 22              | 25              | 30              | 35              |
| 82          | 820 |                 | 25 x 25<br>0.57 |                 |                 |
| 100         | 101 | 22 x 35<br>0.67 |                 |                 |                 |
| 120         | 121 | 22 x 40<br>0.78 | 25 x 30<br>0.74 | 30 x 25<br>0.77 |                 |
| 150         | 151 | 22 x 45<br>0.92 | 25 x 35<br>0.89 | 30 x 30<br>0.93 | 35 x 25<br>0.95 |
| 180         | 181 | 22 x 50<br>1.06 | 25 x 40<br>1.03 | 30 x 30<br>1.01 | 35 x 25<br>1.04 |
| 220         | 221 |                 | 25 x 45<br>1.18 | 30 x 35<br>1.18 | 35 x 30<br>1.22 |
| 270         | 271 |                 |                 | 30 x 40<br>1.17 |                 |
| 330         | 331 |                 |                 | 30 x 50<br>1.32 | 35 x 40<br>1.64 |
| 390         | 391 |                 |                 |                 | 35 x 40<br>1.50 |
| 470         | 471 |                 |                 |                 | 35 x 50<br>1.65 |

→ Case size ∅D×L(mm)  
 → Ripple current (A rms) at 105°C, 120Hz

→ 尺寸∅D×L(mm)  
 → 紋波電流(A rms)於 105°C, 120Hz

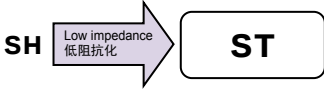
● Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁“包裝標準”。  
 ● Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

ST Series

SNAP-IN TERMINAL TYPE, LOW IMPEDANCE

導箔型, 低阻抗品

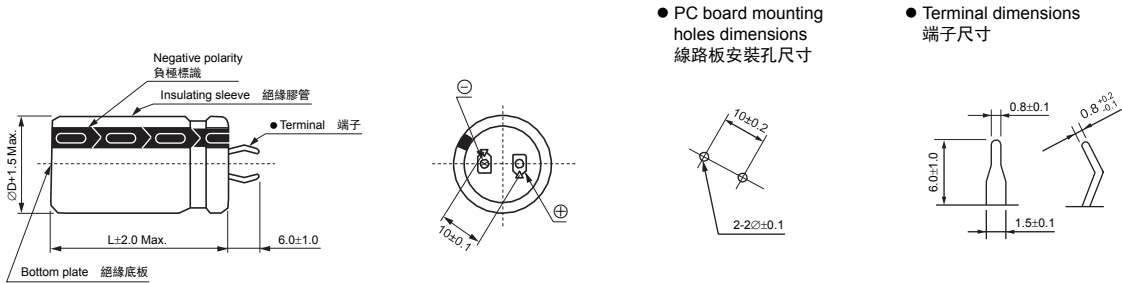
- Low impedance, high reliability  
低阻抗, 高信賴性
- Endurance 3000~5000 hours  
耐久性 3000~5000 小時
- Comply with the RoHS & REACH  
符合 RoHS 與 REACH



SPECIFICATIONS 特性表

| Items 項目                          | Characteristics 主要特性                                                                                                                                                                                                                                                           |                                                |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Category Temperature Range 工作溫度範圍 | -40 ~ +105°C                                                                                                                                                                                                                                                                   | -25 ~ +105°C                                   |
| Voltage Range 額定工作電壓範圍            | 16 ~ 100V                                                                                                                                                                                                                                                                      | 160 ~ 450V                                     |
| Capacitance Range 靜電容量範圍          | 1000 ~ 22000µF                                                                                                                                                                                                                                                                 | 220 ~ 4700µF                                   |
| Capacitance Tolerance 靜電容量允許偏差    | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                            |                                                |
| Leakage Current 漏電流               | $I \leq 3\sqrt{CV}$ (after 5 minutes application of rated voltage at 20°C) (在 20°C 環境中施加額定工作電壓 5 分鐘後)<br>I: Leakage current (µA) 漏電流, C: Nominal capacitance (µF) 標稱靜電容量, V: Rated voltage (V) 額定電壓                                                                            |                                                |
| Dissipation Factor (tan δ) 損耗角正切  | When nominal capacitance is over 1000µF, tan δ shall be added 0.01 to the listed value with increase of every 1000µF.<br>當標稱靜電容量大於 1000µF, 其標稱靜電容量每增加 1000µF, 損耗角正切增加 0.01.<br>Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C                                         |                                                |
| Stability at Low Temperature 低溫特性 | Rated Voltage (V) 額定工作電壓                                                                                                                                                                                                                                                       | 16 25 35 50 63 80 100 160~250 350~450          |
|                                   | Impedance Ratio Z(-25°C) / Z(20°C)                                                                                                                                                                                                                                             | 4 3 2 2 4 8                                    |
|                                   | Impedance Ratio Z(-40°C) / Z(20°C)                                                                                                                                                                                                                                             | 15 10 8 5 — —                                  |
| Endurance 耐久性                     | When the capacitors are restored to 20°C after 5000 hours (WV≤100 products are for 3000 hours) application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 5000 小時 (WV≤100 產品為 3000 小時) 後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。 |                                                |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                     | Within ±20% of initial value 初始值的±20%以內        |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                       | Less than 200% of specified value 不大於規範值的 200% |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                                                            | Less than specified value 不大於規範值               |
| Shelf Life 高溫貯存特性                 | When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified listed below.<br>在 105°C 環境中無負荷放置 1000 小時後, 待電容器恢復至 20°C 時進行測量, 電容器的特性符合下表要求。                                                                            |                                                |
|                                   | Capacitance Change 靜電容量變化率                                                                                                                                                                                                                                                     | Within ±15% of initial value 初始值的±15%以內        |
|                                   | Dissipation Factor 損耗角正切                                                                                                                                                                                                                                                       | Less than 130% of specified value 不大於規範值的 130% |
|                                   | Leakage Current 漏電流                                                                                                                                                                                                                                                            | Less than specified value 不大於規範值               |
| Marking 標識                        | Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET).<br>黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。                                                                                                                                         |                                                |

DRAWING & DIMENSIONS 外形圖及尺寸 (Unit: mm)



FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

| Frequency 頻率      |             | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz |
|-------------------|-------------|------|-------|-------|------|-------|
| Coefficient<br>係數 | ~ 100μF     | 0.88 | 1.00  | 1.06  | 1.15 | 1.20  |
|                   | 160 ~ 250μF | 0.85 | 1.00  | 1.20  | 1.25 | 1.45  |
|                   | 315μF       | 0.88 | 1.00  | 1.15  | 1.20 | 1.40  |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱, 溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能, 請在使用過程中適當降低紋波電流。

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注: 以上所提供的設計及特性參數僅供參考, 任何修改不作預先通知。如果在使用上有疑問, 請在採購前與我們聯繫, 以便提供技術上的協助。

ST Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>參數<br>μF |     | 16 (1C)                           |                                              |                                                     | 25 (1E)                           |                                              |                                                     | 35 (1V)                           |                                              |                                                     |
|-----------------------------|-----|-----------------------------------|----------------------------------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------|-----------------------------------------------------|
|                             |     | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) |
|                             |     |                                   |                                              |                                                     |                                   |                                              |                                                     |                                   |                                              |                                                     |
| 2200                        | 222 |                                   |                                              |                                                     |                                   |                                              |                                                     | 22 x 25                           | 0.241                                        | 1.14                                                |
| 3300                        | 332 |                                   |                                              |                                                     | 22 x 25                           | 0.181                                        | 1.25                                                | 22 x 30<br>(25 x 30)              | 0.161<br>(0.161)                             | 1.51<br>(1.92)                                      |
| 4700                        | 472 | 22 x 25                           | 0.141                                        | 1.30                                                | 22 x 30<br>(25 x 25)              | 0.127<br>(0.127)                             | 1.61<br>(1.61)                                      | 22 x 35<br>(25 x 40)<br>(30 x 25) | 0.113<br>(0.113)<br>(0.113)                  | 1.92<br>(2.31)<br>(1.92)                            |
| 6800                        | 682 | 22 x 35<br>(25 x 30)              | 0.098<br>(0.098)                             | 1.80<br>(1.80)                                      | 22 x 35<br>(25 x 30)              | 0.088<br>(0.088)                             | 1.91<br>(1.91)                                      | 22 x 45<br>(25 x 45)<br>(30 x 30) | 0.078<br>(0.078)<br>(0.078)                  | 2.31<br>(2.87)<br>(2.33)                            |
| 10000                       | 103 | 22 x 45<br>(25 x 35)<br>(30 x 25) | 0.066<br>(0.066)<br>(0.066)                  | 2.34<br>(2.25)<br>(2.19)                            | 22 x 45<br>(25 x 40)<br>(30 x 30) | 0.060<br>(0.060)<br>(0.060)                  | 2.51<br>(2.42)<br>(2.42)                            | 30 x 35<br>(35 x 30)              | 0.053<br>(0.053)                             | 2.87<br>(2.87)                                      |
| 15000                       | 153 | 25 x 45<br>(30 x 35)<br>(35 x 30) | 0.044<br>(0.044)<br>(0.044)                  | 2.82<br>(2.82)<br>(2.82)                            | 25 x 45<br>(30 x 35)<br>(35 x 30) | 0.040<br>(0.040)<br>(0.040)                  | 3.11<br>(3.11)<br>(3.11)                            | 30 x 45<br>(35 x 40)              | 0.035<br>(0.035)                             | 3.66<br>(3.66)                                      |
| 22000                       | 223 | 30 x 45<br>(35 x 35)              | 0.030<br>(0.030)                             | 3.13<br>(3.09)                                      | 30 x 45<br>(35 x 40)              | 0.027<br>(0.027)                             | 3.85<br>(3.85)                                      | 35 x 45                           | 0.024                                        | 4.53                                                |

| WV<br>Parameter<br>參數<br>μF |     | 50 (1H)                                        |                                              |                                                     | 63 (1J)                                                     |                                                   |                                                     | 80 (1K)                           |                                              |                                                     |
|-----------------------------|-----|------------------------------------------------|----------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------|-----------------------------------------------------|
|                             |     | Case size<br>ØD×L (mm)<br>尺寸                   | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸                                | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值      | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) |
|                             |     |                                                |                                              |                                                     |                                                             |                                                   |                                                     |                                   |                                              |                                                     |
| 1000                        | 102 |                                                |                                              |                                                     | 22 x 25                                                     | 0.398                                             | 0.90                                                | 22 x 25                           | 0.332                                        | 1.05                                                |
| 1200                        | 122 |                                                |                                              |                                                     | 22 x 25                                                     | 0.332                                             | 1.05                                                | 22 x 30<br>(25 x 25)              | 0.276<br>(0.276)                             | 1.24<br>(1.24)                                      |
| 1500                        | 152 | 22 x 25                                        | 0.310                                        | 1.22                                                | 22 x 25                                                     | 0.265                                             | 1.28                                                | 22 x 35<br>(25 x 30)              | 0.221<br>(0.221)                             | 1.54<br>(1.54)                                      |
| 2200                        | 222 | 22 x 30<br>(25 x 25)                           | 0.211<br>(0.211)                             | 1.59<br>(1.59)                                      | 22 x 35<br>(25 x 25)                                        | 0.181<br>(0.181)                                  | 1.78<br>(1.60)                                      | 22 x 45<br>(25 x 35)<br>(30 x 30) | 0.151<br>(0.151)<br>(0.151)                  | 1.95<br>(1.94)<br>(2.05)                            |
| 2700                        | 272 |                                                |                                              |                                                     | 22 x 35<br>(25 x 30)                                        | 0.147<br>(0.147)                                  | 1.81<br>(1.81)                                      |                                   |                                              |                                                     |
| 3300                        | 332 | 22 x 35<br>(25 x 30)                           | 0.141<br>(0.141)                             | 1.93<br>(1.88)                                      | 22 x 40<br>(25 x 35)<br>(30 x 25)<br>(35 x 25)              | 0.121<br>(0.121)<br>(0.121)<br>(0.121)            | 2.00<br>(2.03)<br>(1.81)<br>(2.03)                  | 25 x 50<br>(30 x 35)<br>(35 x 30) | 0.101<br>(0.101)<br>(0.101)                  | 2.25<br>(2.24)<br>(2.30)                            |
| 3900                        | 392 |                                                |                                              |                                                     | 20 x 50<br>(22 x 50)<br>(25 x 40)<br>(30 x 30)<br>(35 x 25) | 0.102<br>(0.102)<br>(0.102)<br>(0.102)<br>(0.102) | 2.16<br>(2.37)<br>(2.22)<br>(2.19)<br>(2.24)        |                                   |                                              |                                                     |
| 4700                        | 472 | 22 x 45<br>(25 x 35)<br>(30 x 30)<br>(35 x 25) | 0.099<br>(0.099)<br>(0.099)<br>(0.099)       | 2.43<br>(2.34)<br>(2.42)<br>(2.42)                  | 25 x 45<br>(30 x 35)<br>(35 x 25)                           | 0.085<br>(0.085)<br>(0.085)                       | 2.56<br>(2.66)<br>(2.46)                            | 30 x 45<br>(35 x 35)              | 0.071<br>(0.071)                             | 2.84<br>(2.80)                                      |
| 5600                        | 562 |                                                |                                              |                                                     | 25 x 50<br>(30 x 35)<br>(35 x 30)                           | 0.071<br>(0.071)<br>(0.071)                       | 2.93<br>(2.79)<br>(2.88)                            |                                   |                                              |                                                     |
| 6800                        | 682 | 25 x 45<br>(30 x 35)<br>(35 x 30)              | 0.068<br>(0.068)<br>(0.068)                  | 3.10<br>(3.10)<br>(3.10)                            | 30 x 40<br>(35 x 35)<br>(35 x 40)                           | 0.059<br>(0.059)<br>(0.059)                       | 3.25<br>(3.26)<br>(3.49)                            |                                   |                                              |                                                     |
| 8200                        | 822 | 30 x 45<br>(35 x 40)                           | 0.046<br>(0.046)                             | 4.18<br>(4.20)                                      | 35 x 40                                                     | 0.049                                             | 3.52                                                |                                   |                                              |                                                     |

| WV<br>Parameter<br>參數<br>μF |     | 100 (2A)                     |                                              |                                                     | 160 (2C)                          |                                              |                                                     | 200 (2D)                          |                                              |                                                     |
|-----------------------------|-----|------------------------------|----------------------------------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------|-----------------------------------------------------|
|                             |     | Case size<br>ØD×L (mm)<br>尺寸 | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) |
|                             |     |                              |                                              |                                                     |                                   |                                              |                                                     |                                   |                                              |                                                     |
| 220                         | 221 |                              |                                              |                                                     | 22 x 25                           | 0.603                                        | 0.73                                                | 22 x 25                           | 0.603                                        | 0.80                                                |
| 270                         | 271 |                              |                                              |                                                     | 22 x 25                           | 0.491                                        | 0.81                                                | 22 x 25                           | 0.491                                        | 1.03                                                |
| 330                         | 331 |                              |                                              |                                                     | 22 x 25<br>(25 x 25)              | 0.402<br>(0.402)                             | 0.98<br>(0.94)                                      | 22 x 30                           | 0.402                                        | 1.21                                                |
| 390                         | 391 |                              |                                              |                                                     | 22 x 25<br>(25 x 25)              | 0.340<br>(0.340)                             | 1.03<br>(1.09)                                      | 22 x 35<br>(25 x 25)              | 0.340<br>(0.340)                             | 1.39<br>(1.31)                                      |
| 470                         | 471 |                              |                                              |                                                     | 22 x 30<br>(25 x 25)              | 0.282<br>(0.282)                             | 1.21<br>(1.19)                                      | 22 x 35<br>(25 x 30)              | 0.282<br>(0.282)                             | 1.52<br>(1.52)                                      |
| 560                         | 561 |                              |                                              |                                                     | 22 x 35<br>(25 x 30)<br>(30 x 25) | 0.237<br>(0.237)<br>(0.237)                  | 1.40<br>(1.40)<br>(1.40)                            | 22 x 40<br>(25 x 35)<br>(30 x 25) | 0.237<br>(0.237)<br>(0.237)                  | 1.66<br>(1.75)<br>(1.64)                            |
| 680                         | 681 |                              |                                              |                                                     | 22 x 40<br>(25 x 35)              | 0.195<br>(0.195)                             | 1.62<br>(1.61)                                      | 22 x 45<br>(25 x 40)              | 0.195<br>(0.195)                             | 2.04<br>(2.04)                                      |

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注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

ST Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>參數<br>μF |     | 100 (2A)                          |                                              |                                                     | 160 (2C)                          |                                              |                                                     | 200 (2D)                          |                                              |                                                     |
|-----------------------------|-----|-----------------------------------|----------------------------------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------|-----------------------------------------------------|
|                             |     | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) |
| 820                         | 82  |                                   |                                              |                                                     | 22 x 45<br>(25 x 40)<br>(30 x 30) | 0.162<br>(0.162)<br>(0.162)                  | 1.86<br>(1.86)<br>(1.79)                            | 25 x 45<br>(30 x 35)              | 0.162<br>(0.162)                             | 2.34<br>(2.27)                                      |
| 1000                        | 102 | 22 x 30<br>(25 x 25)              | 0.265<br>(0.265)                             | 1.36<br>(1.36)                                      | 22 x 50<br>(25 x 45)<br>(30 x 35) | 0.133<br>(0.133)<br>(0.133)                  | 2.81<br>(2.15)<br>(2.09)                            | 25 x 50<br>(30 x 40)<br>(35 x 30) | 0.133<br>(0.133)<br>(0.199)                  | 2.26<br>(2.63)<br>(2.51)                            |
| 1200                        | 122 | 22 x 35<br>(25 x 30)              | 0.221<br>(0.221)                             | 1.48<br>(1.49)                                      | 25 x 50<br>(30 x 40)<br>(35 x 30) | 0.111<br>(0.111)<br>(0.166)                  | 2.35<br>(2.35)<br>(2.29)                            | 30 x 45<br>(35 x 35)              | 0.111<br>(0.166)                             | 3.00<br>(2.92)                                      |
| 1500                        | 152 | 22 x 40<br>(25 x 35)<br>(30 x 25) | 0.177<br>(0.177)<br>(0.177)                  | 1.82<br>(1.85)<br>(1.80)                            | 30 x 35<br>(35 x 35)              | 0.088<br>(0.133)                             | 2.56<br>(2.72)                                      | 30 x 50<br>(35 x 40)              | 0.088<br>(0.133)                             | 3.36<br>(3.34)                                      |
| 1800                        | 182 |                                   |                                              |                                                     | 30 x 45<br>(35 x 40)              | 0.074<br>(0.111)                             | 2.97<br>(3.09)                                      | 30 x 60<br>(35 x 45)              | 0.074<br>(0.111)                             | 3.64<br>(3.51)                                      |
| 2200                        | 222 | 25 x 45<br>(30 x 35)<br>(35 x 30) | 0.121<br>(0.121)<br>(0.121)                  | 2.50<br>(2.50)<br>(2.50)                            | 30 x 60<br>(35 x 50)              | 0.060<br>(0.090)                             | 3.48<br>(3.51)                                      | 35 x 55                           | 0.090                                        | 4.01                                                |
| 2700                        | 272 | 25 x 50<br>(30 x 40)<br>(35 x 35) | 0.098<br>(0.098)<br>(0.098)                  | 2.70<br>(2.72)<br>(2.82)                            | 35 x 55                           | 0.074                                        | 4.05                                                |                                   |                                              |                                                     |
| 3300                        | 102 | 30 x 45<br>(35 x 35)              | 0.080<br>(0.080)                             | 3.11<br>(3.07)                                      |                                   |                                              |                                                     |                                   |                                              |                                                     |
| 3900                        | 122 | 30 x 50<br>(35 x 40)              | 0.068<br>(0.068)                             | 3.40<br>(3.38)                                      |                                   |                                              |                                                     |                                   |                                              |                                                     |
| 4700                        | 152 | 35 x 45                           | 0.056                                        | 3.90                                                |                                   |                                              |                                                     |                                   |                                              |                                                     |

| WV<br>Parameter<br>參數<br>μF |     | 250 (2E)                          |                                              |                                                     | 350 (2V)                          |                                              |                                                     | 400 (2G)                          |                                              |                                                     |
|-----------------------------|-----|-----------------------------------|----------------------------------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------|-----------------------------------------------------|
|                             |     | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) | Case size<br>ØD×L (mm)<br>尺寸      | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) |
| 68                          | 680 |                                   |                                              |                                                     |                                   |                                              |                                                     | 22 x 25                           | 2.927                                        | 0.52                                                |
| 82                          | 820 |                                   |                                              |                                                     |                                   |                                              |                                                     | 22 x 30                           | 2.427                                        | 0.54                                                |
| 100                         | 101 |                                   |                                              |                                                     | 22 x 25                           | 1.990                                        | 0.52                                                | 22 x 30                           | 1.990                                        | 0.67                                                |
| 120                         | 121 |                                   |                                              |                                                     | 22 x 30<br>(25 x 25)              | 1.659<br>(1.659)                             | 0.62<br>(0.65)                                      | 22 x 35<br>(25 x 25)              | 1.659<br>(1.659)                             | 0.78<br>(0.69)                                      |
| 150                         | 151 |                                   |                                              |                                                     | 22 x 35                           | 0.885                                        | 0.74                                                | 22 x 40<br>(25 x 30)              | 1.327<br>(1.327)                             | 0.91<br>(0.83)                                      |
| 180                         | 181 | 22x 25                            | 0.737                                        | 0.77                                                | 22 x 40<br>(25 x 30)              | 1.106<br>(1.106)                             | 0.81<br>(0.77)                                      | 22 x 45<br>(25 x 35)              | 1.106<br>(1.106)                             | 1.04<br>(0.97)                                      |
| 220                         | 221 | 22 x 30                           | 0.603                                        | 0.87                                                | 22 x 45<br>(25 x 35)              | 0.905<br>(0.905)                             | 0.94<br>(0.91)                                      | 22 x 50<br>(25 x 40)<br>(30 x 30) | 0.905<br>(0.905)<br>(0.905)                  | 1.17<br>(1.14)<br>(1.12)                            |
| 270                         | 271 | 22 x 30<br>(25 x 25)              | 0.491<br>(0.491)                             | 1.02<br>(1.08)                                      | 22 x 50<br>(25 x 40)<br>(30 x 30) | 0.491<br>(0.491)<br>(0.491)                  | 1.09<br>(1.06)<br>(1.05)                            | 25 x 50<br>(30 x 35)<br>(35 x 30) | 0.737<br>(0.737)                             | 1.40<br>(1.39)<br>(1.31)                            |
| 330                         | 331 | 22 x 35<br>(25 x 30)              | 0.402<br>(0.402)                             | 1.20<br>(1.27)                                      | 25 x 45<br>(30 x 35)<br>(35 x 30) | 0.402<br>(0.402)<br>(0.603)                  | 1.24<br>(1.24)<br>(1.33)                            | 30 x 40<br>(35 x 30)              | 0.603<br>(0.603)                             | 1.31<br>(1.27)                                      |
| 390                         | 391 | 22 x 40<br>(25 x 35)<br>(30 x 25) | 0.340<br>(0.340)<br>(0.340)                  | 1.38<br>(1.46)<br>(1.39)                            | 30 x 40<br>(35 x 30)              | 0.340<br>(0.510)                             | 1.42<br>(1.39)                                      | 30 x 45<br>(35 x 35)              | 0.510<br>(0.510)                             | 1.49<br>(1.47)                                      |
| 470                         | 471 | 22 x 45<br>(25 x 40)<br>(30 x 30) | 0.282<br>(0.282)<br>(0.282)                  | 1.46<br>(1.69)<br>(1.63)                            | 30 x 45<br>(35 x 35)              | 0.282<br>(0.423)                             | 1.56<br>(1.53)                                      | 30 x 50<br>(35 x 40)              | 0.423<br>(0.423)                             | 1.72<br>(1.71)                                      |
| 560                         | 561 | 25 x 45                           | 0.237                                        | 1.93                                                | 30 x 50<br>(35 x 40)              | 0.237<br>(0.355)                             | 1.77                                                | 30 x 60<br>(35 x 45)              | 0.355<br>(0.355)                             | 2.03<br>(2.23)                                      |
| 680                         | 681 | 25 x 50<br>(30 x 35)<br>(35 x 30) | 0.195<br>(0.195)<br>(0.293)                  | 2.04<br>(2.06)<br>(2.06)                            | 30 x 60<br>(35 x 50)              | 0.195<br>(0.293)                             | 1.94                                                | 35 x 55                           | 0.293                                        | 2.31                                                |
| 820                         | 821 | 30 x 45<br>(35 x 35)              | 0.162<br>(0.243)                             | 2.48<br>(2.41)                                      | 35 x 55                           | 0.243                                        | 2.23                                                | 35 x 60                           | 0.243                                        | 2.54                                                |
| 1000                        | 102 | 30 x 50<br>(35 x 40)              | 0.133<br>(0.199)                             | 2.65<br>(2.76)                                      |                                   |                                              |                                                     |                                   |                                              |                                                     |
| 1200                        | 122 | 30 x 50<br>(35 x 40)              | 0.111<br>(0.166)                             | 3.14<br>(3.14)                                      |                                   |                                              |                                                     |                                   |                                              |                                                     |
| 1500                        | 152 | 30 x 60<br>(35 x 45)              | 0.102<br>(0.135)                             | 3.36<br>(3.34)                                      |                                   |                                              |                                                     |                                   |                                              |                                                     |
| 1800                        | 182 | 35 x 60                           | 0.111                                        | 3.97                                                |                                   |                                              |                                                     |                                   |                                              |                                                     |

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ST Series

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

| WV<br>Parameter<br>參數<br>μF |     | 450 (2W)                                       |                                              |                                                     |
|-----------------------------|-----|------------------------------------------------|----------------------------------------------|-----------------------------------------------------|
|                             |     | Case size<br>ØDxL (mm)<br>尺寸                   | Impedance<br>(Ω) max.<br>20°C, 100KHz<br>阻抗值 | Ripple current<br>紋波電流<br>(A rms,<br>105°C, 100KHz) |
| 82                          | 820 | 22 x 30<br>(25 x 25)                           | 2.427<br>(2.427)                             | 0.54<br>(0.57)                                      |
| 100                         | 101 | 22 x 35                                        | 1.990                                        | 0.67                                                |
| 120                         | 121 | 22 x 40<br>(25 x 30)<br>(30 x 25)              | 1.659<br>(1.659)<br>(1.659)                  | 0.78<br>(0.74)<br>(0.77)                            |
| 150                         | 151 | 22 x 45<br>(25 x 35)<br>(30 x 30)<br>(35 x 25) | 1.327<br>(1.327)<br>(1.327)<br>(1.327)       | 0.92<br>(0.89)<br>(0.93)<br>(0.95)                  |
| 180                         | 181 | 22 x 50<br>(25 x 40)<br>(30 x 30)<br>(35 x 25) | 1.106<br>(1.106)<br>(1.106)<br>(1.106)       | 1.06<br>(1.03)<br>(1.01)<br>(1.04)                  |
| 220                         | 221 | 25 x 45<br>(30 x 35)<br>(35 x 30)              | 0.905<br>(0.905)<br>(0.905)                  | 1.18<br>(1.18)<br>(1.22)                            |
| 270                         | 271 | 30 x 40                                        | 0.737                                        | 1.17                                                |
| 330                         | 331 | 30 x 50<br>(35 x 35)                           | 0.603<br>(0.603)                             | 1.42<br>(1.64)                                      |
| 390                         | 391 | 35 x 40                                        | 0.510                                        | 1.54                                                |
| 470                         | 471 | 35 x 50                                        | 0.423                                        | 1.85                                                |
| 560                         | 561 | 35 x 50                                        | 0.355                                        | 2.02                                                |

- Please refer to page 22 "Packaging Specifications" for the minimum package quantity. 最小包裝數量請查閱第 22 頁“包裝標準”。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

