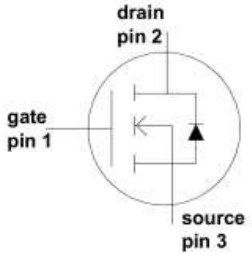
APC65R040WMF

Super-junction Power Mosfet

DATA SHEET

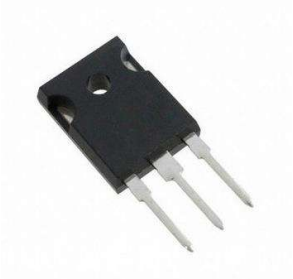
Features

- 650V,72A
  $R_{DS(ON)}$ <40mΩ @V_{GS}=10V TYP: 36mΩ
- Super junction technology
- Extremely low on resistance



Applications

- LED/LCD/PDP TV and monitor Lighting
- Solar/Renewable/UPS-Micro Inverter System
- Charger
- Power Supply



TO-247

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
C65R040WMF	APC65R040WMF	TO-247	-	-	1000

ABSOLUTE MAXIMUM RATINGS (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current (T_c =25℃)	I_D	72	A
Continuous Drain Current (T_c=100℃)	I_D	45	A
Pulsed Drain Current (1)	I_{DM}	216	A
Single Pulsed Avalanche Energy (2)	E_{AS}	1000	mJ
Drain Power Dissipation	P_D	500	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.25	℃/W
Thermal Resistance- Junction to Ambient	$R_{\theta JA}$	46	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_J=25℃ unless otherwise noted)

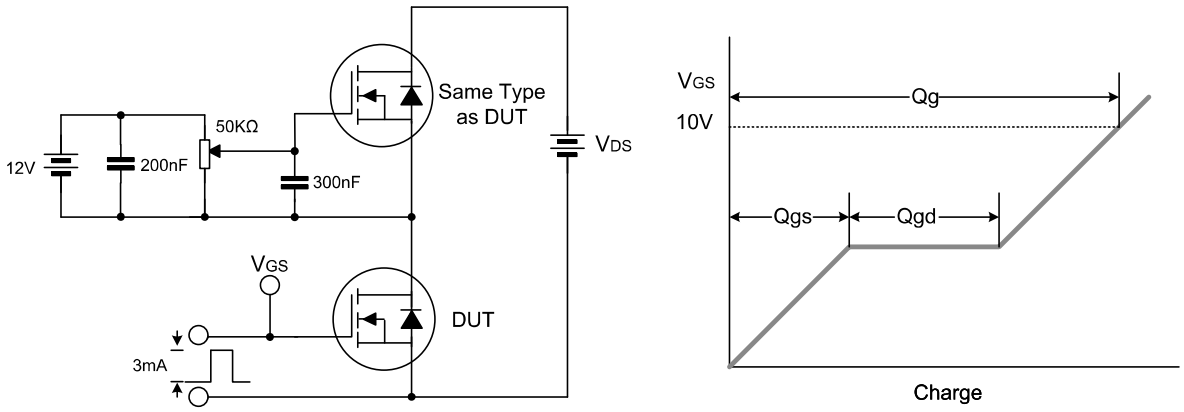
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	650	-	-	V
		V_{GS} = 0V, I_D =250μA T_j=150℃	700			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =650V, V_{GS} = 0V	-	-	5	uA
		V_{DS} =650V, V_{GS} = 0V T_j=150℃		1000		uA
Gate-body leakage current	I_{GSS}	V_{GS} =±30V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	3.2	-	4.6	V
Forward Transconductance	g_{FS}	V_{DS}=20V,I_D=35A	-	51.0	-	S
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =35A	-	35	40	mΩ
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =100V, V_{GS} =0V, f =1.0MHz	-	4900	-	pF
Output Capacitance	C_{oss}		-	265	-	
Reverse Transfer Capacitance	C_{rss}		-	1.6	-	
Gate Resistance	Rg	f =1.0MHz		0.9		Ω
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=400V, I_D=35A, R_G=27Ω, V_G=10V	-	128	-	ns
Turn-on rise time	t_r		-	112	-	
Turn-off delay time	$t_{d(off)}$		-	400	-	
Turn-off fall time	t_f		-	93	-	
Total Gate Charge	Qg	V_{DS}=480V, I_D=35A, V_{GS}=10V	-	158	-	nC
Gate-Source Charge	Qgs		-	41.0	-	
Gate-Drain Charge	Qgd		-	90	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	T_c=25℃, V_{GS} =0V, I_S=35A	-	0.9	1.1	V
Diode Forward current	I_S	T_c =25℃	-	-	72	A
Body Diode Reverse Recovery Time	trr	T_c=25℃， IF=35A,di/dt=100A/us		130		ns
Body Diode Reverse Recovery Charge	Qrr	T_c=25℃， IF=35A,di/dt=100A/us		0.81		uc

Notes:

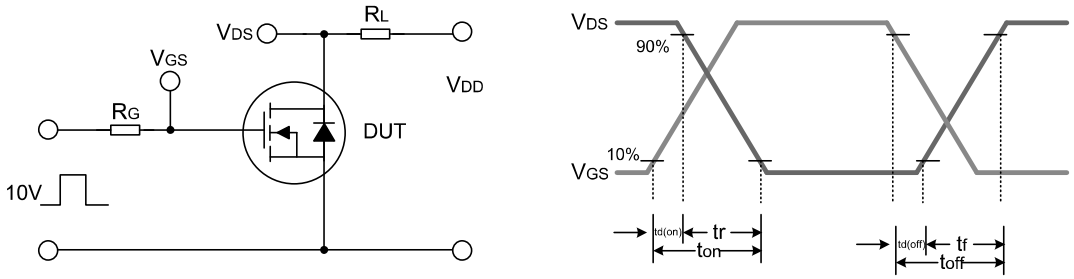
1. Pluse width limited by maximum junction temperature
2. L=30mH, IAS=8.2A, VG=10V, RG=30Ω, starting TJ=25°C
3. Pulse Test: Pulse width ≤300μs, Duty cycle≤2%
4. Essentially independent of operating temperature

Test Circuit

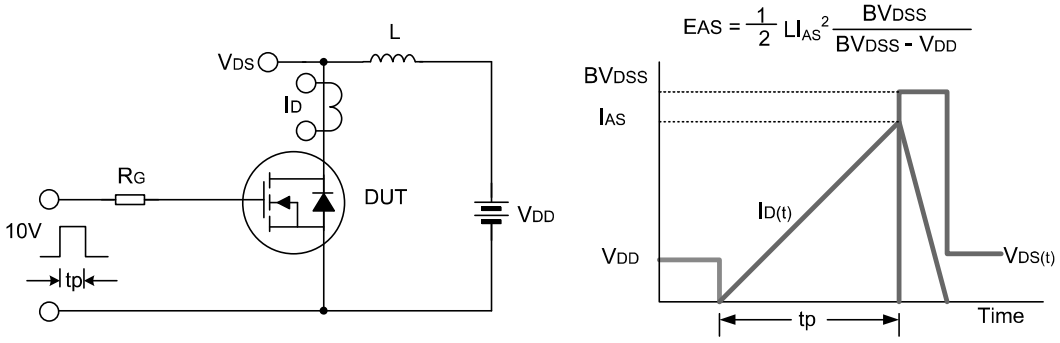
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Typical Performance Characteristics

Fig 1. Output Characteristics (T_j=25℃)

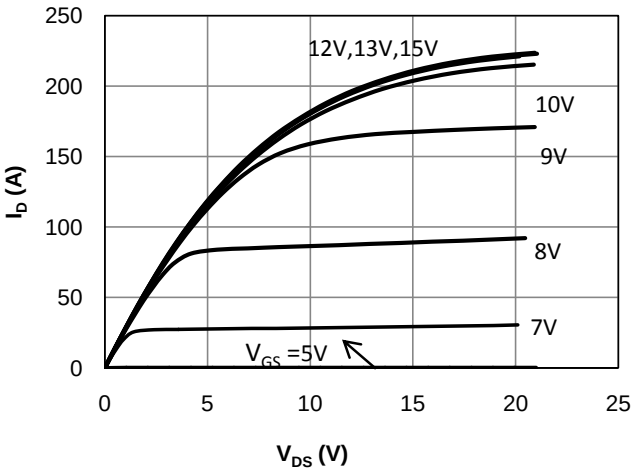


Fig 2. Output Characteristics (T_j=150℃)

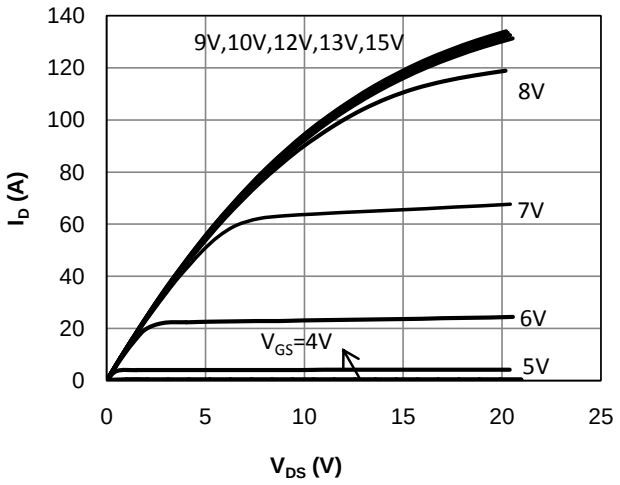


Fig 3: Transfer Characteristics

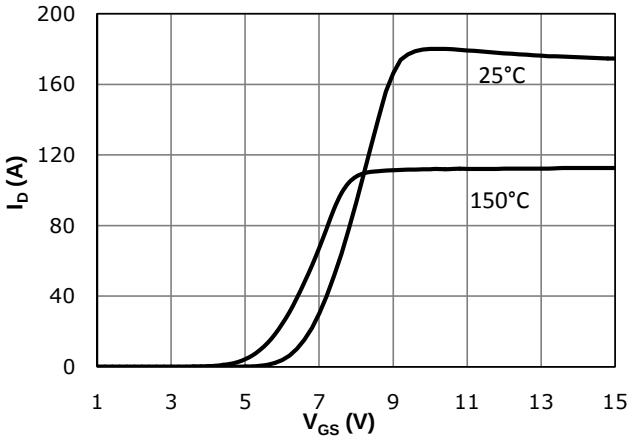


Fig 4: V_{TH} Vs. T_j Temperature Characteristics

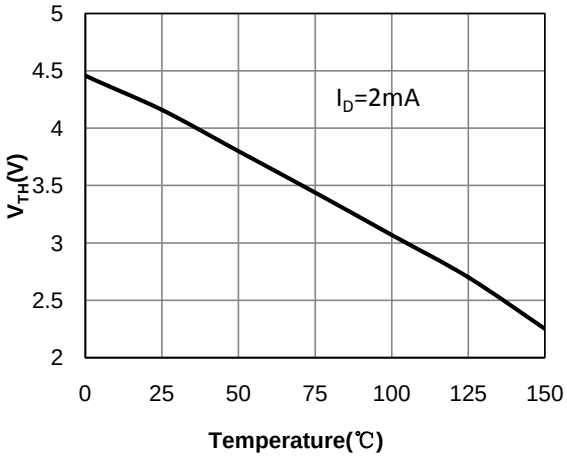


Fig 5: $R_{DS(on)}$ vs. I_{DS} Characteristics(T_j=25℃)

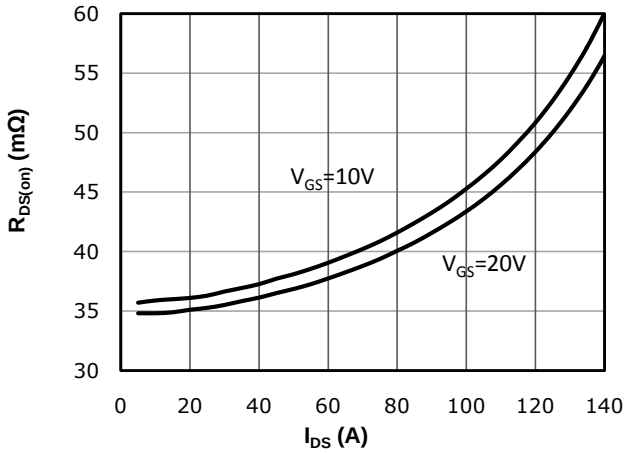
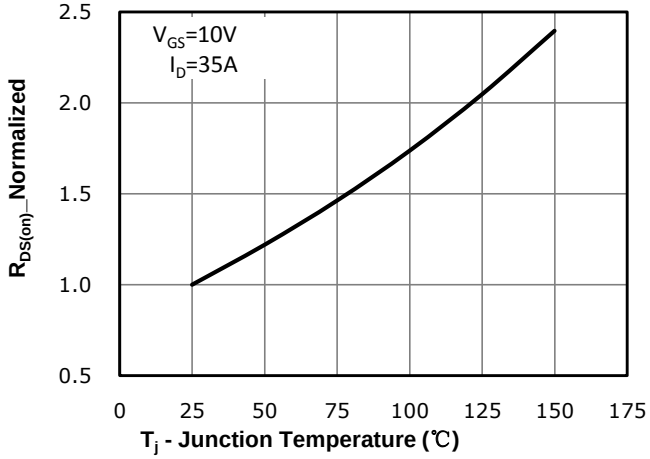


Fig 6: $R_{DS(on)}$ vs. Temperature



Typical Performance Characteristics

Fig 7: BV_{DSS} vs. Temperature

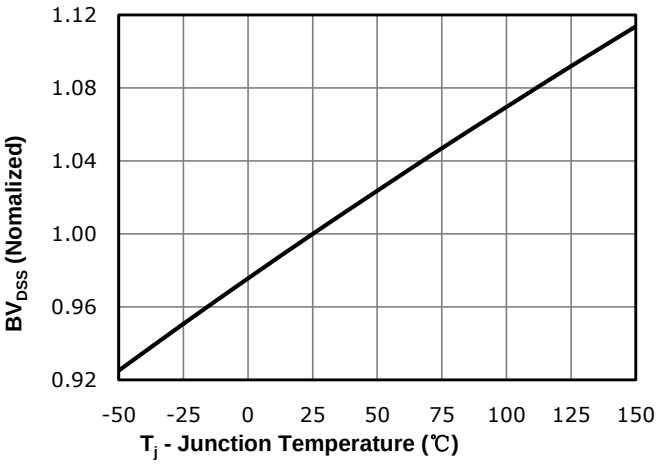


Fig 8: $R_{DS(on)}$ vs. Gate Voltage

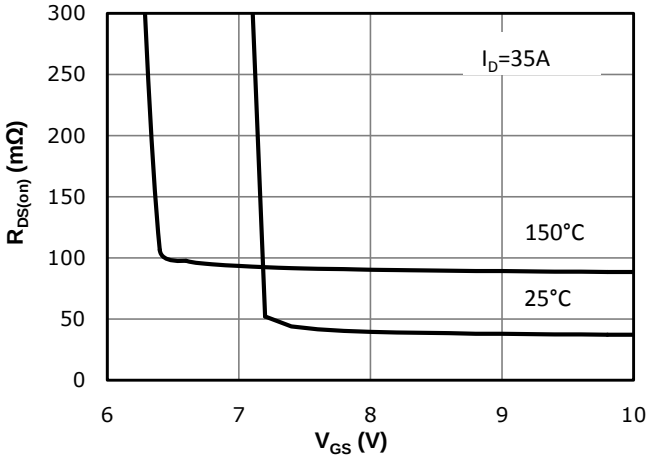


Fig 9: Body-diode Forward Characteristics

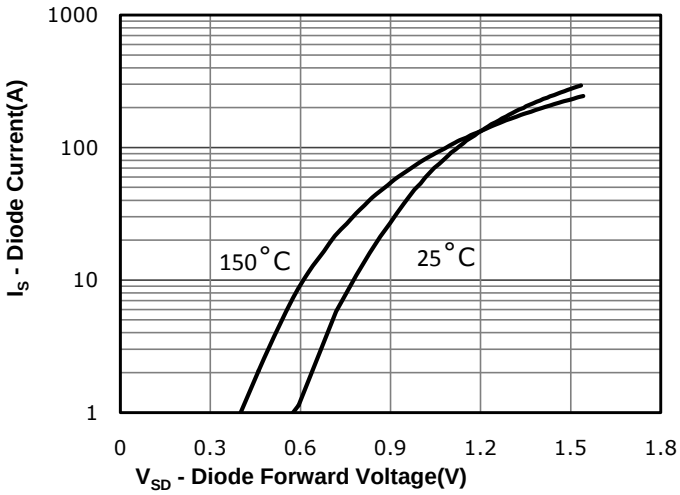


Fig 10: Gate Charge Characteristics

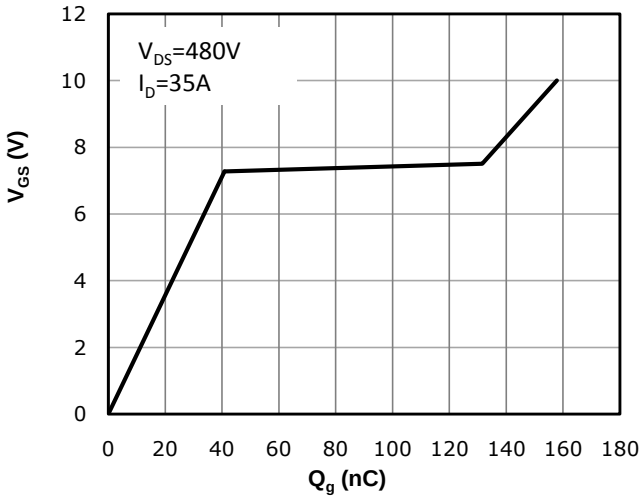


Fig 11: Capacitance Characteristics

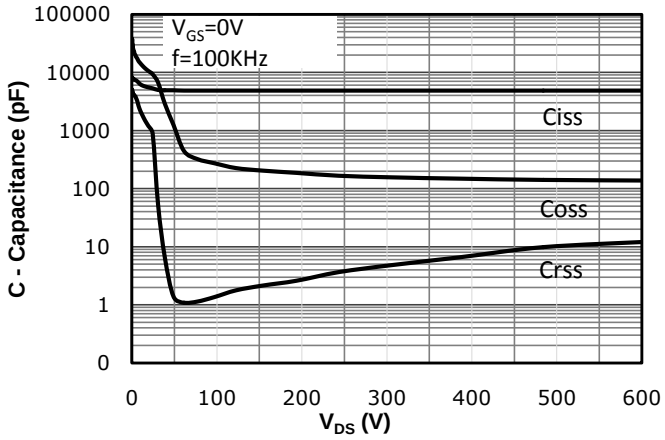
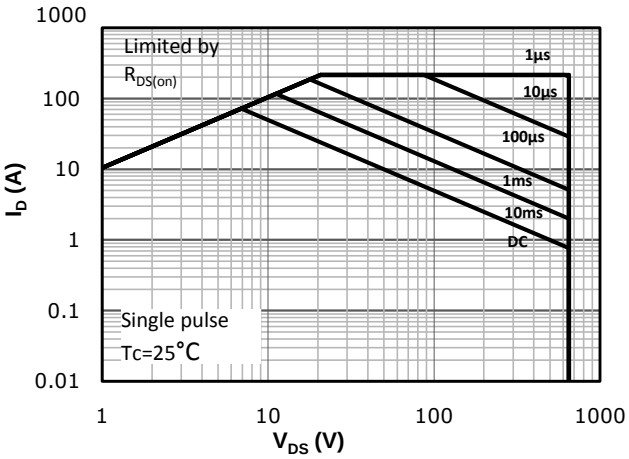
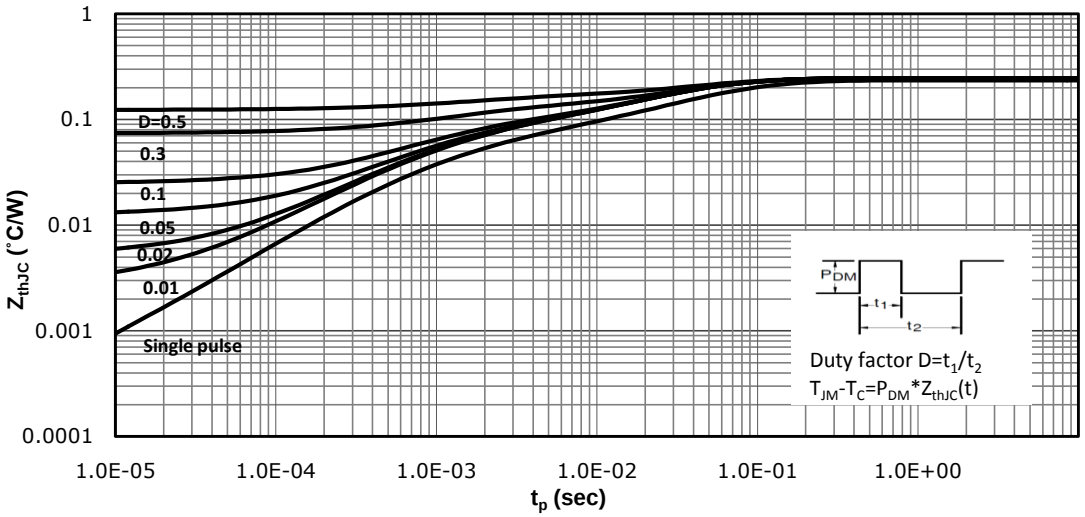


Fig 12: Safe Operating Area



Typical Performance Characteristics

Fig 13: Max. Transient Thermal Impedance



Package Dimensions

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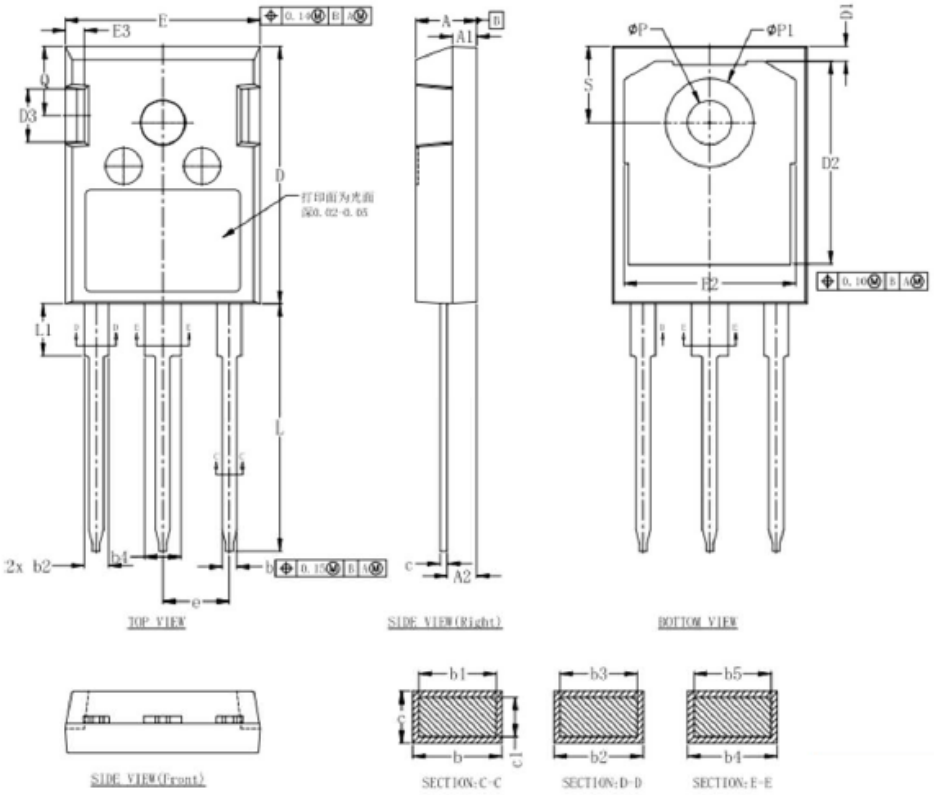

DIM / SYMBOL	MIN.	NOM.	MAX.
A	4.900	5.000	5.100
A1	1.940	2.040	2.140
A2	2.300	2.400	2.500
b	1.139	1.239	1.330
b1	1.099	1.199	1.299
b2	1.939	2.039	2.139
b3	1.899	1.999	2.099
b4	2.940	3.040	3.140
b5	2.900	3.000	3.100
c	0.550	0.640	0.700
c1	0.500	0.600	0.700
D	20.850	20.950	21.050
D1	1.022	1.222	1.400
D2	16.348	16.548	16.748
D3	4.232	4.332	4.432
E	15.800	15.900	16.000
E2	13.821	14.021	14.221
E3	1.430	1.530	1.630
e	5.436 BSC.		
L	19.900	20.100	20.300
L1	4.024	4.224	4.424
□P	3.500	3.600	3.700
□P1	7.088	7.188	7.288
Q	5.435	5.635	5.835
S	6.040	6.200	6.300

Revision History

Revision	Release	Remark
V1.0	2024/12/27	Initial Release

Disclaimer

The information given in this document describes the independent performance of the product,but similar performance is not guaranteed under other working conditions,and cannot be guaranteed when installed with other products or equipment.To achieve the required performance of the product in actual scenarios,the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings,operating conditions,or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability.Customers using or selling these products for use in medical,life-saving,or life-sustaining applications do so at their own risk and agree to fully indemnify.

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