德砚电子
DE YAN DIAN ZI

一体成型功率电感

Data Sheet

RoHS ISO 9001 质量管理体系认证 ISO 14001 环境管理体系认证

Shenzhen Deyan Electronics Co., Ltd

Mini Molding Power Inductors

1. Scope

Featurs

1.1 Metal material for large current and low loss.
1.2 High performance (Isat) realized by metal dust core.
1.3 Low loss realized with low Rdc.
1.4 Closed magnetic circuit design reduces leakage flux.
1.5 Vinyl thermal spray, better surface compactness.
1.6 Environmental requirements must comply with the QESP-44 document
1.7 100% lead (Pb) free meet RoHS2.0 and Halogen， Reach and other legal and regulatory requirements standard.
1.8 Meet AEC-Q200 standard

Application

2.1 DC/DC converters.
2.2 Pad,Smart phone.
2.3 Portable gaming devices, Smart wear, Wi-Fi module.
2.4 Notebooks, VR, AR.
2.5 LCD displays, HDDs, DVCs, DSCs, etc.
2.6 Baseband power supply, Amplifier, Power management, Module power supply, Camera power manageme.

2. Ordering Procedure

D	3225	20	TP	-	4R7	MT	-	G	-	C
①	②	③	④		⑤	⑥		⑦		⑧

本产品符合
《AEC-Q200》标准

①Series Name: Mini Molding Power Inductors

②External Dimensions(L×W):3225=3.2*2.5 mm

③External Dimensions(H):20=2.0 mm

④Carbonyl Iron Powder

⑤Inductance value:4R7=4.7uH

⑥Tolerance:M=±20%

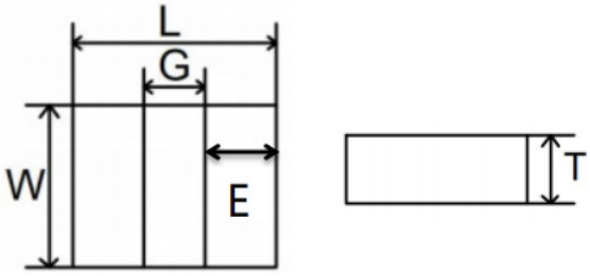
⑦Coating color:B=Black

⑧AEC-Q200

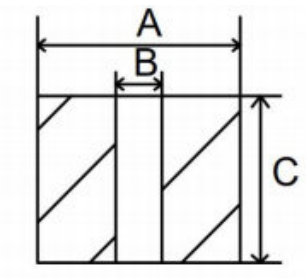
For special characteristics, please refer to the specific values in Item 5 "Specifications".

3. SHAPE AND DIMENSIONS

Outline Dimensions



Recommend Land Pattern Dimensions



Units:mm

Series	L	G/Typ	W	E	T	A/Typ	B/Typ	C/Typ
D322520TP-C	3.2±0.2	1.1	2.5±0.2	1.05±0.2	2.00Max.	3.20	1.00	2.50

4. Marking

No Marking

5. Specifications

P/N	L0(μH) @(0A) 1MHz	Rdc(mΩ)		Heat rating current Irms(A)		Saturation current Isat(A)	
		Typical	Max	Typical	Max	Typical	Max
D322520TP-4R7MT-G-C	4.7	81	94	3.5	3.0	4.0	3.0

Test remarks

Note 1.: All test data is referenced to 25 ℃ ambient.

Note 2.: Test Condition:1MHz, 1.0Vrms.

Note 3.: Irms:DC current (A) that will cause an approximate △T of 40 ℃.

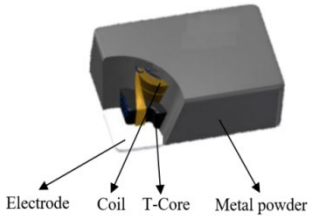
Note 4.: Isat:DC current (A) that will cause L0 to drop approximately 30%.

Note 5.: Operating Temperature Range -55℃ to + 125℃.

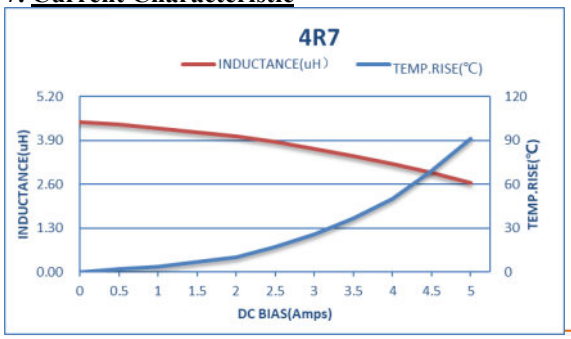
Note 6.: The part temperature (ambient + temp rise) should not exceed 125 under ℃ the worst case operating conditions. Circuit design, component placement, PCB trace size and thickness, airflow and other cooling provision all affect the part temperature. Part temperature should be verified in the end application.

Note 7.: The rated current as listed is either the saturation current or the heating current depending on which value is lower.

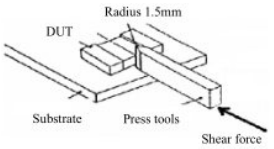
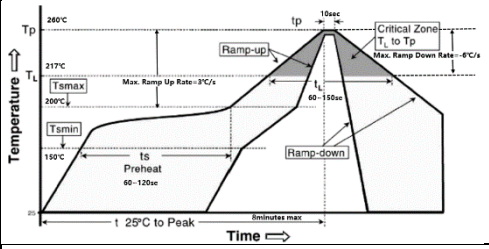
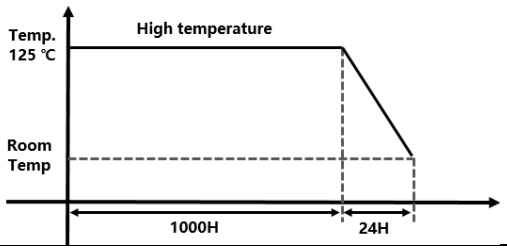
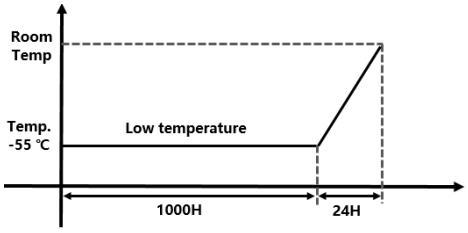
6. Structure

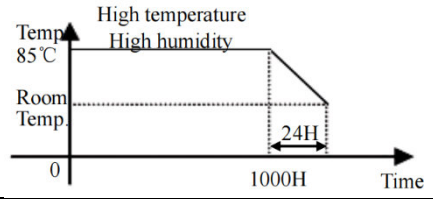
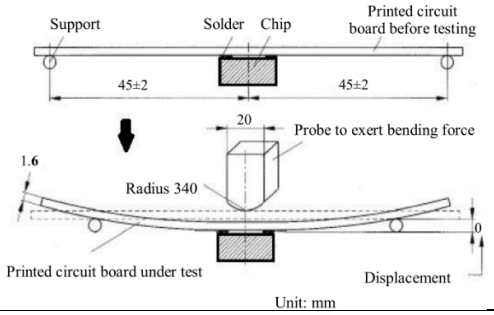


7. Current Characteristic



8. Reliability

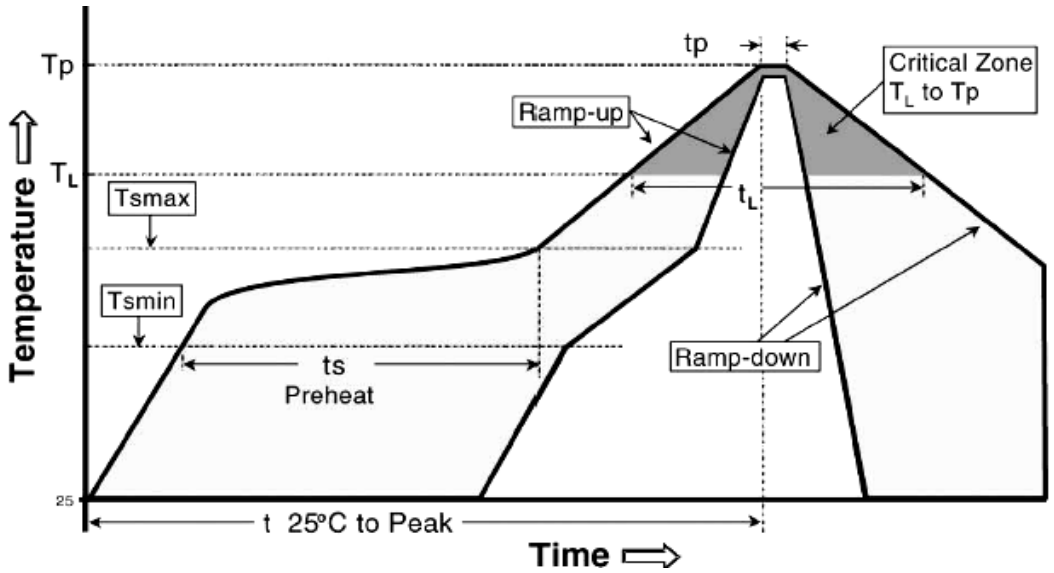
No.	Item	Requirements	Test Methods and Remarks	Reference	Sample Size
1	Solderability	(1) No case deformation or change in appearance. (2) Terminal area must have 95% min. Solder coverage.	①Temperature:245± 5℃. ②Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free). ③Sample immersion tin furnace 5 ±0.5s.	AEC-Q200 (J-STD 002)	32
2	Adhesion of teral electrode	(1)Strong bond between the pad and the core, without come off PCB.	①Preconditioning：245℃Reflow 3 times ②Inductors shall be subjected to (260+0/-5℃.)℃ for (10±5)s Soldering in the base whit 0.3mm solder. ③Aplombelectrode way plus tax X N for (60±1) seconds. Series / "X" N: ≤20系列 8; >20系列 17.7 	AEC-Q200 (AEC-Q200-006)	32
3	Reflow test	(1) No physical damage. (2)｜ΔL0/L0｜≤10%	① The peak temperature: 260+0/-5℃. ② Reflow:3times. ③ Temperature curve is as below 	AEC-Q200 (MIL-STD-202 Method 210)	32
4	High temperature	(1) No physical damage. (2)｜ΔL0/L0｜≤10%	① Preconditioning: Bake at 125+5℃ for 24±0.5H，245℃Reflow 3 times ②Temperature: 125±2℃. ③ Time : 1000 hours. ④Measurement at 24±4 hours after test conclusion 	AEC-Q200 (MIL-STD -202 Method 108)	77
5	Low temperature	(1) No physical damage. (2)｜ΔL0/L0｜≤10%	①Preconditioning: Bake at 125+5℃ for 24±0.5H，245℃Reflow 3 times ②Temperature: -55±2℃. ③Time : 1000 hours. ④ Measurement at 24±4 hours after test conclusion 	JESD22-A119A	77
6	Thermal shock	(1) No physical damage. (2)｜ΔL0/L0｜≤10%	①Preconditioning: Bake at 125+5℃ for 24±0.5H，245℃Reflow 3 times ②Repeat 500 cycle as follow : (-55±2 ℃ ,30±3minutes) 、(Room temperature, 5 minutes)、(+125±2 ℃ ,30±3minutes)、(Room temperature, 5 minutes) ③Measurement at 24±4 hours after test conclusion	MIL-STD -202 Method 107	77

No.	Item	Requirements	Test Methods and Remarks	Reference	Sample Size
7	Resistance to Soldering Heat	(1) No physical damage. (2) | ΔL0/L0 | ≤10%	①Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free). ②Solder Temperature: 260±5°C. ③Immersion Time: 10±1sec.	AEC-Q200（MIL-STD-202 Method 210）	32
8	Static Humidity	(1) No physical damage. (2) | ΔL0/L0 | ≤10%	①Preconditioning: Bake at 125+5℃ for 24±0.5H，245℃Reflow 3 times ②1000 hours, 85°C/85%RH. ③ Unpowered. ④Measurement at 24±4 hours after test conclusion 	AEC-Q200 (MIL-STD-202 Method 103)	77
9	Board Flex	(1) No physical damage. (2) | ΔL0/L0 | ≤10%	①Preconditioning：245℃Reflow 3 times ②Part mounted on a 100mm*40mm FR4 PCB board, which is 1.6±0.2 mm thick and as a Layer-thickness 35 μm ± 10 μm. ③ Bending speed is 1mm/s. ④ Keeping the P.C Board 2 mm minimum for 60 seconds. 	AEC-Q200 (AEC-Q200-005)	30
10	Vibration	(1) No physical damage. (2) | ΔL0/L0 | ≤10%	①Preconditioning：245℃Reflow 3 times ②Frequency range : 10~2000Hz. ③Amplitude: 1.5mm or 20g. ④ Sweep time and duration: 10~2000~10Hz for 20 minutes. ⑤ Each four hours in X,Y,Z direction, 12hours in total.	AEC-Q200 (MIL-STD-202 Method 204)	32
11	Mechanical Shock	(1) No physical damage. (2) | ΔL0/L0 | ≤10%	① Preconditioning：245℃Reflow 3 times ②Peak acceleration:100G/S ③Duration of pulse:6ms ④3times in each of 6(±X, ±Y, ±Z) axes.	AEC-Q200 (MIL-STD-202 Method 213)	32
12	Loading at High Temperature	(1) No physical damage. (2) | ΔL0/L0 | ≤10%	①Preconditioning: Bake at 125+5℃ for 24±0.5H，245℃Reflow 3 times ②Temperature: 85±2°C. ③ Time : 1000 hours. ④ Applied Current : Rated current. ⑤Measurement at 24±4 hours after test conclusion	AEC-Q200 (MIL-STD-202 Method 108)	77
13	Resistance to Solvents	(1) No physical damage. (2) | Δ L0/L0 | ≤10%	① Prepare solvent (isopropyl alcohol: kerosene: ethylbenzene =4:9:3 volume) ② Specimen be completely immersed in solvent for 3+0.5/-0min ③ Brush dipped in solution until wetted and brush part 10 strokes . ④ Repeat 2 more times, Air blow dry. ⑤Inspect at 3x magnifier for marking and 10x for part damage. Note: Add Aqueous wash chemical. OKEM Clean or equivalent. Do not use banned solvents.	AEC-Q200 (MIL-STD-202 Method 215)	5

9. Soldering Condition

(This is for recommendation, please customer perform adjustment according to actual application)

Recommend Reflow Soldering Profile：(solder : Sn96.5 / Ag3 / Cu0.5)



Profile Feature	Lead (Pb)-Free solder
Preheat： Temperature Min (Ts_{min}) Temperature Max (Ts_{max}) Time (Ts_{min} to Ts_{max}) (ts)	 150℃ 200℃ 60 -120 seconds
Average ramp-up rate： (Ts max to Tp)	 3℃ / second max.
Time maintained above : Temperature (T_L) Time (t_L)	 217℃ 60-150 seconds
Peak Temperature (Tp)	260℃
Time within $^{+0}_{-5}$℃ of actual peak Temperature (tp)[2]	10 seconds
Ramp-down Rate	6℃/second max.
Time 25℃ to Peak Temperature	8minutes max.

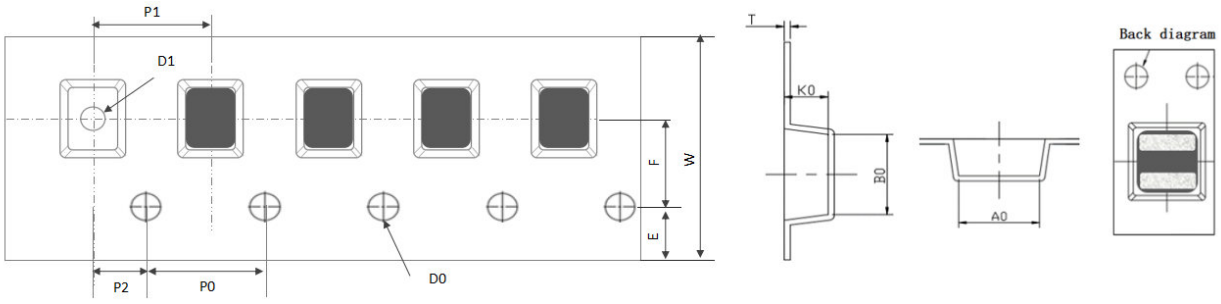
Allowed Re-flow times : 2 times

Remark : To avoid discoloration phenomena of chip on terminal electrodes, please use N_2 Re-flow furnace .

10. Packing

10.1 Dimension of plastic taping: (Unit: mm)

The following dimensions are related to the actual fit of the machine， for reference only.

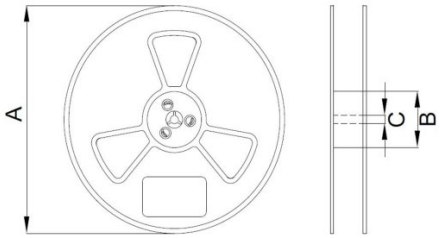


Series	W	A0	B0	D0	D1	E
公差	±0.10	+0.10/-0.05	+0.10/-0.05	+0.1/-0	±0.20	±0.10
322520	8.0	2.90	3.50	1.5	1.0	1.75

Series	F	K0	P0	P2	P1	T	包装数量
公差	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05	
322520	3.5	2.20	4.0	2.0	4.0	0.23	2K

10.2 Dimension of Reel：(Unit: mm)

Type	A ±2.0	B ±2.0	C ±2.0
All	178	60	13



11. Note

11.1 Storage Period

To maintain the solderability of terminal electrodes and to keep the packing material in good condition, product should be used within 12 months from the time of delivery. And the solderability of products electrodes may decrease as time passes, so in case of storage over 12 months, solderability shall be checked before actual usage.

11.2 Storage Conditions

Store products in a warehouse in compliance with the following condition:

Temperature：Inductors (product with taping) +15 to +35℃；Humidity：25~70%RH.

If the product is not used up 24H after opening, desiccant should be placed in the package and sealed

11.3 Do not subject products to rapid changes in temperature and humidity.

11.4 Do not store the products in chemical atmosphere such as one containing sulfurous acid gas or alkaline gas, that will causes poor solderability and corrosion of inductors.

11.5 Do not store products in bulk packaging to prevent collision among inductors which causes core chipping and wire breakage.

11.6 Store products on pallets to protect from humidity, dust, etc.

11.7 Avoid heat shock, vibration, direct sunlight, etc.

11.8 When designing the PCB, please consider the installation position of the non-magnetic shielded components to avoid failures caused by magnetic interference.

11.9 Do not place this product near magnets or objects with magnetic force.

11.10 The product will self-heat (temperature rise) due to power-on, and sufficient margin should be left in thermal design.

11.11 Mounting density

If this product is placed near heat-generating products, be sure to implement sufficient heat-dissipating measures. If this product is subjected to a significant amount of heat from other products, this could adversely affect product quality, resulting in a circuit malfunction or failure of the mounted section. Also, be sure that the product is used in a manner so that the heat that the product is subjected to from other products does not exceed the upper limit of the rated operating temperature for the product.

11.12 Since the static electricity carried by the human body will be transmitted to the ground wire, please use an anti-static wrist strap.

11.13 Grease on human hands may lead to decreased solderability. Please avoid direct contact with the terminals.
11.14 This product refers to the general standard used in audio-visual entertainment, home appliances, computers,office automation, communications, power modules, LED lighting, measuring equipment.Machine tools, industrial control panels, car accessories and other general electronic equipment. And the general electronicequipment should be used under the usual operation and usage methods.
11.15 Reworking with soldering iron

ITEM	Requirement
Pre-heating	150° C/approx. 1 min
Tip temperature of soldering iron	350° C max.
Soldering time	3 s (+1 s, -0 s)
Number of reworking operations	1 times max.
It is recommended to replace the product directly, rework may cause poor appearance	

11.16 We cannot warrant against failure caused by any use of our product that deviates from the intended use as described in this product specification.
11.17 Please approve our product specifications or transact the approval sheet for product specifications before ordering.
11.18 Our specification limits the quality of the component as a single unit. Please ensure the component is thoroughly evaluated in your application circuit.

12. Record

Version	Description	Date
A0	First version	Nov.4.2024