

Specification for Approval

| | |
|---------------|---------------------------------------|
| Customer | |
| Product Name | Wire Wound Molded SMD Power Inductors |
| Customer P/N: | |
| Cjiang P/N: | SPM2512 Series |

[New Released, Revised]

SPEC No.:

| | | |
|----------------------------|--|--|
| REMARK: | | |
| | | |
| Customer Approval Feedback | | |
| | | |

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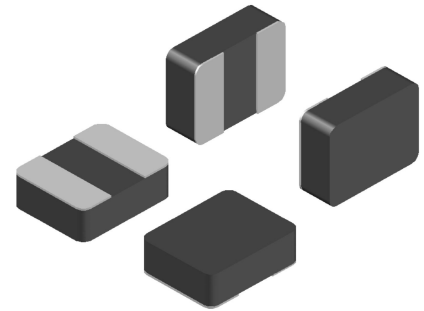
Version change history

| Rev | Date | Description | APPROVED | CHECKED | DRAWN |
|-----|----------|-------------|----------|---------|-------|
| 1.0 | 2022/8/9 | 文件制定 | Bond | Charles | 王云燕 |

Caution :

All products listed in this specification are developed, designed and intended for use in general electronics equipment. The products are not designed or Warranted to meet the requirements of the applications listed below, whose performance and/or quality require especially high reliability, or whose failure, malfunction or trouble might directly cause damage to society, person, or property. Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below. Please contact us for more details if you intend to use our products in the following applications.

1. Aircraft equipment.
2. Aerospace equipment.
3. Undersea equipment.
4. nuclear control equipment.
5. military equipment.
6. Power plant equipment.
7. Medical equipment.
8. Transportation equipment (automobiles, trains, ships,etc.)
9. Traffic signal equipment.
10. Disaster prevention / crime prevention equipment.
11. Data-processing equipment.
12. Applications of similar complexity or with reliability requirements comparable to the applications listed in the above.



1. Scope

Features

- 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.
- 1.6 100% lead (Pb) free meet RoHS standard.

2. 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.

3. Ordering Procedure

SPM 2512 - 1R0 M A
① ② ③ ④ ⑤

① Series Name: Mini Molding Power Inductors

② External Dimensions(L×W):2016=2.0*1.6 mm

③ Inductance value:1R0=1.0uH

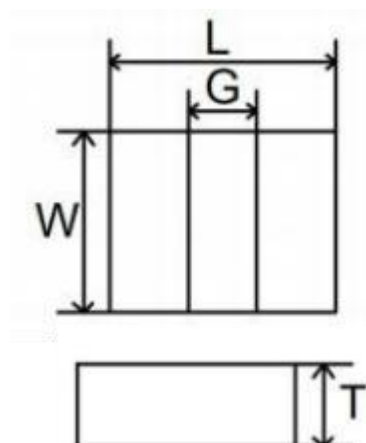
④ Tolerance:K=±10% M=±20% N=±30%

⑤ Special define:A=Routine B~Z=Special

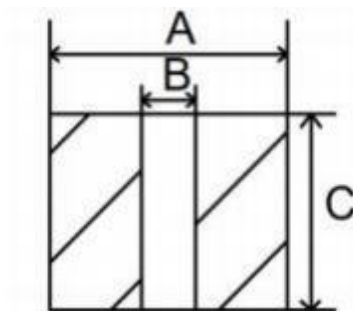
For special characteristics, please refer to the specific values in Item 5 "Specifications".

4. SHAPE AND DIMENSIONS

Outline Dimensions



Recommend Land Pattern Dimensions



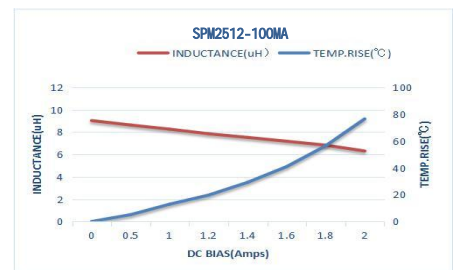
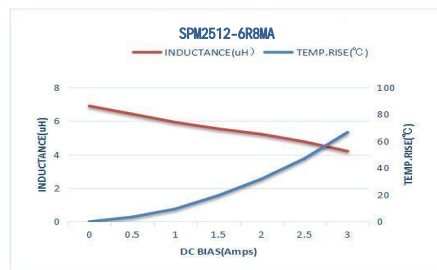
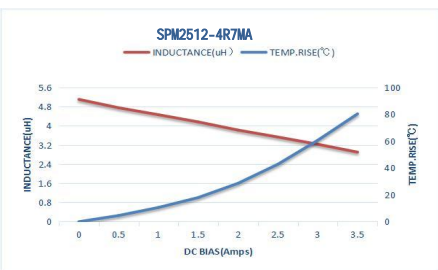
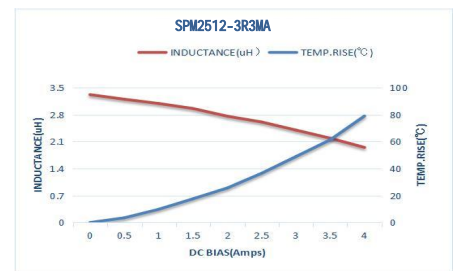
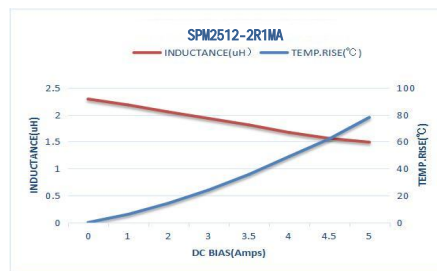
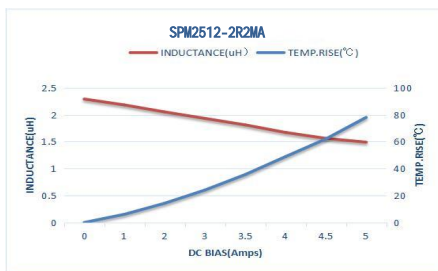
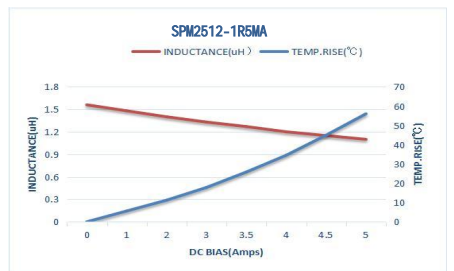
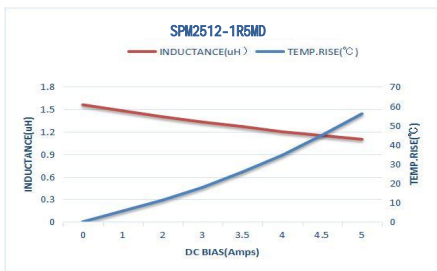
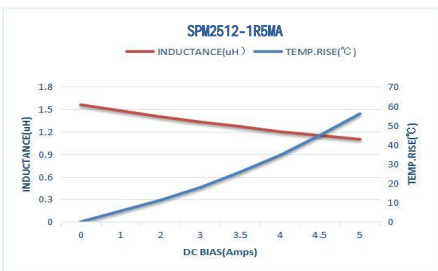
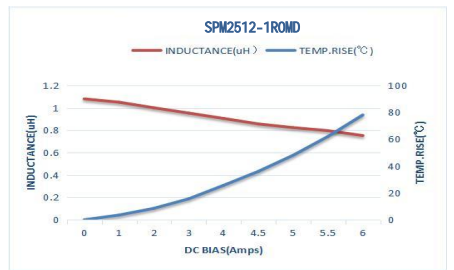
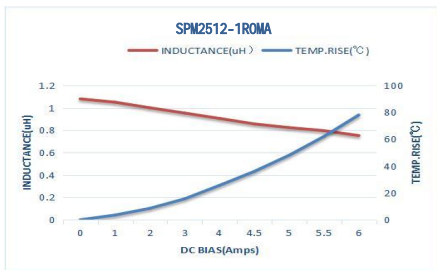
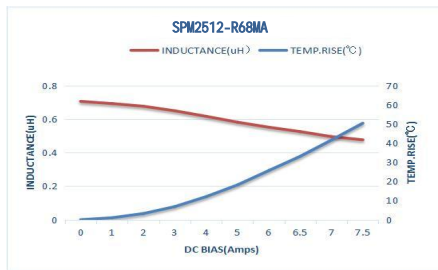
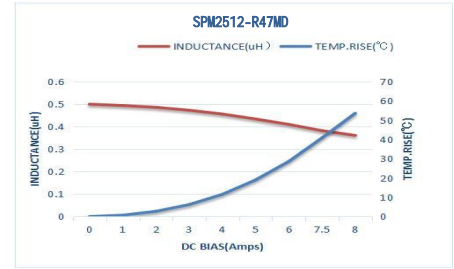
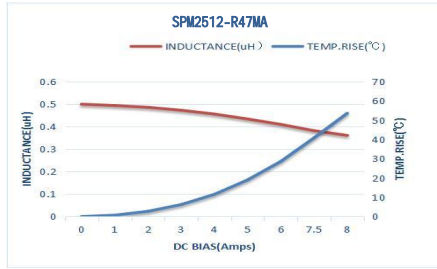
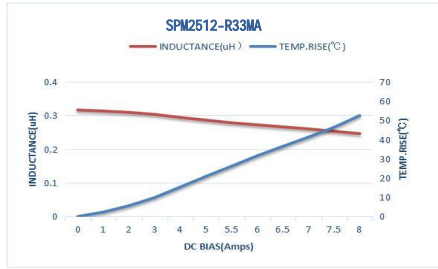
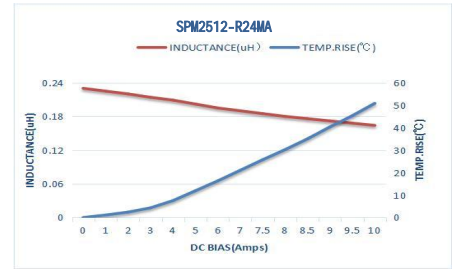
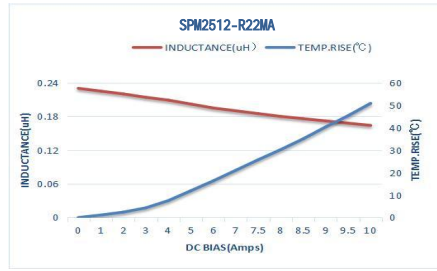
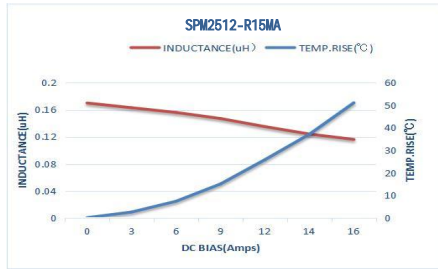
Units: mm

| Series | L | G (TYP) | W | T | A | B | C |
|---------|---------|---------|---------|----------|------|------|------|
| SPM2512 | 2.5±0.2 | 0.7 | 2.0±0.2 | 1.20Max. | 2.60 | 0.70 | 2.10 |

5. Marking

SPM2512(2.5*2.0*1.2mm)

| P/N | L0(μ H) @ (0A) 1MHz | Rdc(m Ω) | | Heat rating current I _{rms} (A) | | Saturation current I _{sat} (A) | |
|---------------|-----------------------------|------------------|-----|---|------|--|------|
| | | Typical | Max | Typical | Max | Typical | Max |
| SPM2512-R10MA | 0.1 | 6 | 10 | 12 | 10.5 | 13.5 | 12.5 |
| SPM2512-R15MA | 0.15 | 7 | 11 | 11.5 | 10 | 13.0 | 12.0 |
| SPM2512-R22MA | 0.22 | 9 | 14 | 8.2 | 7.6 | 9.6 | 9.0 |
| SPM2512-R24MA | 0.24 | 10 | 15 | 8.0 | 7.5 | 9.3 | 8.8 |
| SPM2512-R33MA | 0.33 | 11 | 17 | 6.8 | 6.4 | 8.3 | 7.8 |
| SPM2512-R47MA | 0.47 | 13 | 19 | 6.5 | 6.0 | 7.5 | 7.0 |
| SPM2512-R47MD | 0.47 | 11 | 13 | 8.0 | 7.5 | 8.5 | 8.0 |
| SPM2512-R68MA | 0.68 | 17 | 23 | 6.3 | 5.5 | 6.5 | 6.0 |
| SPM2512-1R0MA | 1.0 | 35 | 42 | 4.0 | 3.6 | 5.6 | 5.0 |
| SPM2512-1R0MD | 1.0 | 16 | 22 | 5.2 | 4.5 | 6.5 | 6.0 |
| SPM2512-1R5MA | 1.5 | 44 | 50 | 3.7 | 3.2 | 4.5 | 4.1 |
| SPM2512-1R5MD | 1.5 | 27 | 32 | 4.6 | 4.2 | 4.7 | 4.4 |
| SPM2512-2R2MA | 2.2 | 55 | 65 | 3.0 | 2.7 | 3.8 | 3.3 |
| SPM2512-3R3MA | 3.3 | 80 | 97 | 2.3 | 1.8 | 3.0 | 2.7 |
| SPM2512-4R7MA | 4.7 | 150 | 170 | 1.8 | 1.5 | 2.4 | 2.1 |
| SPM2512-6R8MA | 6.8 | 245 | 270 | 1.6 | 1.4 | 2.0 | 1.7 |
| SPM2512-100MA | 10.0 | 330 | 400 | 1.2 | 1.05 | 1.6 | 1.45 |



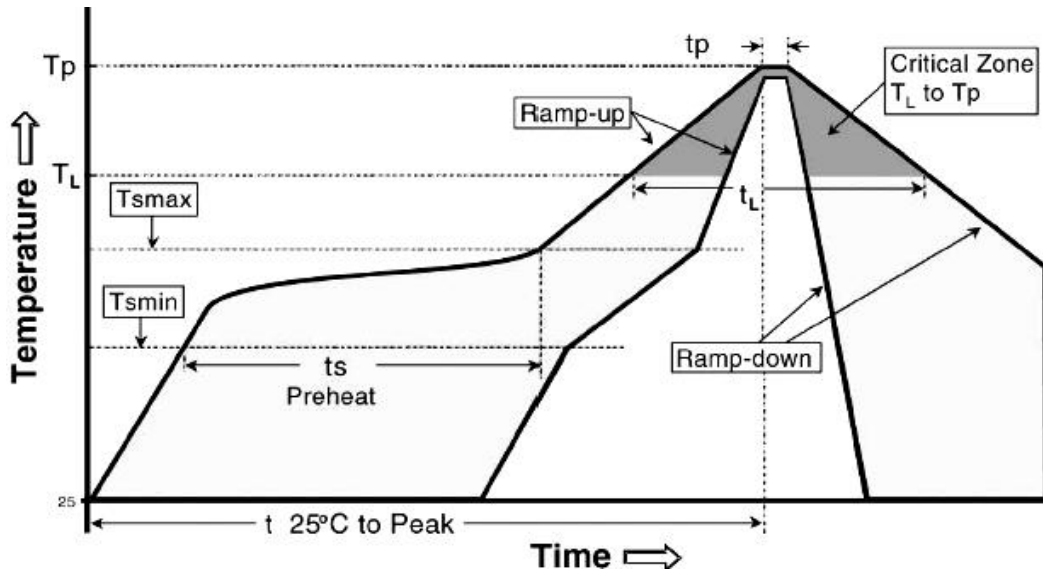
6. Reliability

| Item | Requirements | Test Methods and Remarks |
|------------------------------|--|---|
| Insulation Resistance | ≥100MΩ | 100 VDC between inductor coil and The middle of the top surface of the body for 60 seconds. |
| Solderability | 90% or more of electrode area shall be coated by new solde. | Dip pads in flux . Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free). Solder Temperature: 245±5℃. Immersion Time: (5±1) s. |
| Resistance to Soldering Heat | No visible mechanical damage. Inductance change: Within ±10. | Dip pads in flux. Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free). Solder Temperature: 260±5℃. Immersion Time: 10±1sec. |
| Adhesion of teral electrode | Strong bond between the pad and the core, without come off PCB. | Inductors shall be subjected to (260±5)°C for (20±5)s Soldering in the base whit 0.3mm solder. And then aplombelectrode way plus tax 10 N for (10±1) seconds. |
| High temperature | No case deformation or change in appearance. Inductance change: Within ±10% | Temperature: 125±2℃. Time : 1000 hours. Measurement at 24±4 hours after test conclusion. |
| Low temperature | No visible mechanical damage. Inductance change: Within ±10% | Temperature: -40±2℃. Time : 1000 hours. Measurement at 24±4 hours after test conclusion. |
| Thermal shock | No visible mechanical damage. Inductance change: Within ±10% | The test sample shall be placed at (-55±3)°C and (125±3)°C for (30±3) , different temperature conversion time is 2~3 utes. The temperature cycle shall be repeated 32 cycles. Placed at room temperature for 2 hours, within 48±4 hours of testing. |
| Temperature characteristic | Inductance change Pc-b,Pc-d: Within ±20% | a: +20 °C (30~45) → b: -40 °C (30~45) → c: +20 °C (30~45) → d: +125 °C (30~45) → e: +20 °C (30~45) $P_{c-b} = \frac{L_b - L_c}{L_c} \times 100\% \quad ; \quad P_{c-d} = \frac{L_d - L_c}{L_c} \times 100\%$ |
| Static Humidity | No visible mechanical damage. Inductance change: Within ±10% | Inductors shall be subjected to (95±3)%RH . at(60±2)°C for (1000±4) h. Placed at room temperature for 2 hours, within 48 hours of testing. |
| Life | No visible mechanical damage. Inductance change: Within ±10% | Inductors shall be store at (85±2)°C for (1000±4) hours with Irms applied. Placed at room temperature for 2 hours, within 48 hours of testing |

7. Soldering Condition

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

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



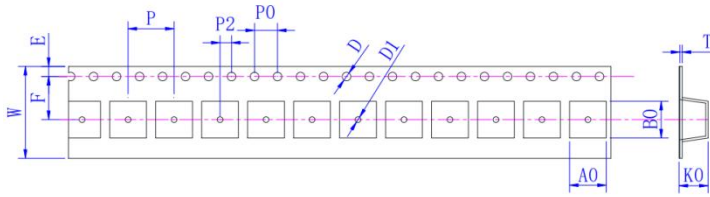
| Profile Feature | Lead (Pb)-Free solder |
|---|-----------------------|
| Preheat: | |
| Temperature Min (T_{smin}) | 150°C |
| Temperature Max (T_{smax}) | 200°C |
| Time (T_{smin} to T_{smax}) (t_s) | 60 -120 seconds |
| Average ramp-up rate: | |
| (T_{smax} to T_p) | 3°C / second max. |
| Time maintained above : | |
| Temperature (T_L) | 217°C |
| Time (t_L) | 60-150 seconds |
| Peak Temperature (T_p) | 260°C |
| Time within $+0_{-5}^{\circ}\text{C}$ of actual peak Temperature (t_p) ² | 10 seconds |
| Ramp-down Rate | 6°C/second max. |
| Time 25°C to Peak Temperature | 8minutes max. |

Allowed Re-flow times : 2 times

Remark : To avoid discoloration phenomena of chip on terminal electrodes, please use N₂ Re-flow furnace .

8. Packing

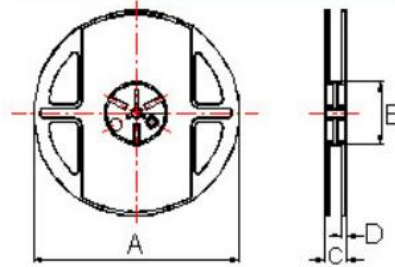
8.1 Dimension of plastic taping: (Unit: mm)



| Series | W ±0.30 | A0 ±0.05 | B0 +0.1/-0 | D +0.1/-0 | D1 Min | E ±0.10 | F ±0.10 | K0 ±0.05 | P0 ±0.10 | P2 ±0.10 | P ±0.10 | T ±0.05 | Qty/Reel |
|--------|------------|-------------|---------------|--------------|-----------|------------|------------|-------------|-------------|-------------|------------|------------|----------|
| 2512 | 8.00 | 2.40 | 2.80 | 1.50 | 1.0 | 1.75 | 3.50 | 1.40 | 4.00 | 2.00 | 4.00 | 0.23 | 3K |

8.2 Dimension of Reel : (Unit: mm)

| Type | A ±0.5 | B ±0.5 | C ±0.5 | D ±1 |
|------|-----------|-----------|-----------|---------|
| All | 178 | 60 | 12 | 1.5 |



9. Note

- 9.1 recommend products store in warehouse with temperature between 15 to 35°C under humidity between 25 to 75%RH
Even under storage conditions recommended above, solder ability of products will be degraded stored over 1 year old.
- 9.2 Cartons must be placed in correct direction which indicated on carton, otherwise the reel or wire will be deformed.
- 9.3 Storage conditions as below are inappropriate:
 - a. Stored in high electrostatic environment
 - b. Stored in direct sunshine, rain, snow or condensation.
 - c. Exposed to sea wind or corrosive gases, such as Cl₂, H₂S, NH₃, SO₂, NO₂, etc.
- 9.4 The products are used in circuit board thickness greater than 1.6mm. If customers use less than the thickness of the circuit board that you should confirm with the company, in order to recommend a more suitable product.

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