

## 零件承认书

SPECIFICATION FOR APPROVAL

客户名称: 0110

规格描述: ZEMSL0.252012F.4R7M 小尺寸一体成型电感252012 4.7uH

日期: 2024/10/10

增益签核:

| 制订 | 审核 | 核准 |
|----|----|----|
| 夏琳 | 陈雨 | 李万 |

客户签核:

| 工程 | 审核 | 核准 |
|----|----|----|
|    |    |    |



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物料类型:

一体成型电感

日期:

2024/10/10

版本:

A

# Mini Molding Power Inductors

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## 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 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.

### 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

ZEMSLO. 252012F. 4R7M

①

②

③

①Series Name: Mini Molding Power Inductors

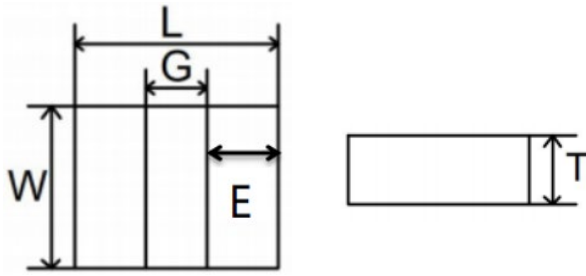
②External Dimensions(L×W):2520=2.5\*2.0 mm External Dimensions(H):12=1.2 mm

③Inductance value : 4.7uH Tolerance: M=±20%

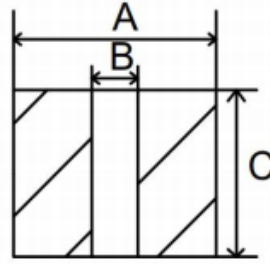
# Mini Molding Power Inductors

## 3. SHAPE AND DIMENSIONS

Outline Dimensions



Recommend Land Pattern Dimensions



Units:mm

| Series         | L             | G             | W             | E              | T        | A    | B    | C    |
|----------------|---------------|---------------|---------------|----------------|----------|------|------|------|
| ZEMSLO.252012F | $2.5 \pm 0.2$ | $0.8 \pm 0.2$ | $2.0 \pm 0.2$ | $0.85 \pm 0.2$ | 1.20Max. | 2.60 | 0.70 | 2.10 |

## 4. Marking

No Marking

## 5. Specifications

| P/N                 | L0( $\mu$ H)<br>@(0A) 1MHz | Rdc(m $\Omega$ ) |     | Heat rating current<br>Irms(A) |     | Saturation current<br>Isat(A) |     |
|---------------------|----------------------------|------------------|-----|--------------------------------|-----|-------------------------------|-----|
|                     |                            | Typical          | Max | Typical                        | Max | Typical                       | Max |
| ZEMSLO.252012F.4R7M | 4.7                        | 150              | 170 | 1.8                            | 1.5 | 2.4                           | 2.1 |

### Test remarks

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

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

Note 3.: Irms:DC current (A) that will cause an approximate  $\Delta T$  of 40 °C.

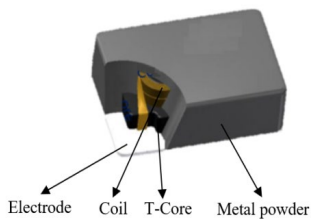
Note 4.: Isat:DC current (A) that will cause L0 to drop approximately 30%.

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

Note 6.: The part temperature (ambient + temp rise) should not exceed 125 under °C 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.

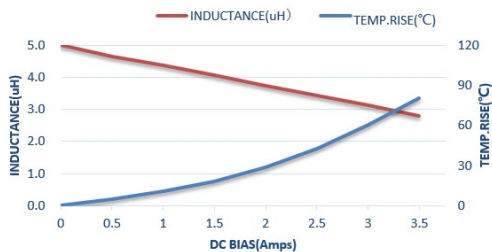
Note 7.: The rated current as listed is either the saturation current or the heating current depending on which value is lower.

## 6. Structure



## 7. Current Characteristic

ZEMSLO.252012F.4R7M



## Mini Molding Power Inductors

### 8. Reliability

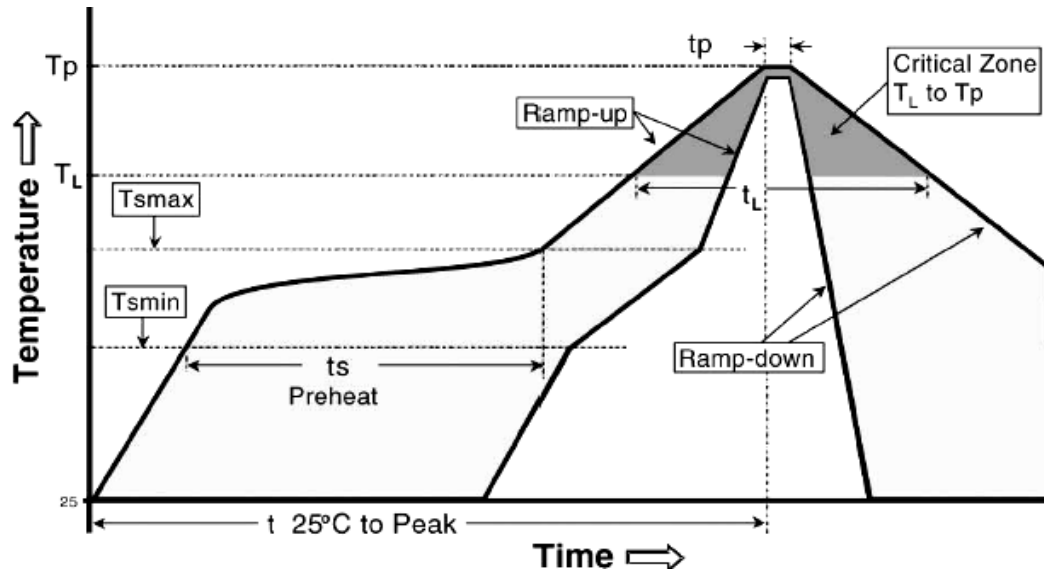
| Item                         | Requirements                                                                         | Test Methods and Remarks                                                                                                                                                                                                                                                                               |
|------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Insulation Resistance        | $\geq 100\text{M}\Omega$                                                             | 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 .<br>Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free).<br>Solder Temperature: $245 \pm 5^\circ\text{C}$ .<br>Immersion Time: $(5 \pm 1)$ s.                                                                                                                                                |
| Resistance to Soldering Heat | No visible mechanical damage.<br>Inductance change: Within $\pm 10\%$ .              | Dip pads in flux.<br>Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free).<br>Solder Temperature: $260 \pm 5^\circ\text{C}$ .<br>Immersion Time: $10 \pm 1$ sec.                                                                                                                                                |
| Adhesion of teral electrode  | Strong bond between the pad and the core, without come off PCB.                      | Inductors shall be subjected to $(260 \pm 5)^\circ\text{C}$ for $(20 \pm 5)$ s<br>Soldering in the base whit 0.3mm solder.<br>And then aplombelectrode way plus tax 12 N for $(10 \pm 1)$ seconds.                                                                                                     |
| High temperature             | No case deformation or change in appearance.<br>Inductance change: Within $\pm 10\%$ | Temperature: $125 \pm 2^\circ\text{C}$ .<br>Time : 1000 hours.<br>Measurement at $24 \pm 4$ hours after test conclusion.                                                                                                                                                                               |
| Low temperature              | No visible mechanical damage.<br>Inductance change: Within $\pm 10\%$                | Temperature: $-55 \pm 2^\circ\text{C}$ .<br>Time : 1000 hours.<br>Measurement at $24 \pm 4$ hours after test conclusion.                                                                                                                                                                               |
| Thermal shock                | No visible mechanical damage.<br>Inductance change: Within $\pm 10\%$                | The test sample shall be placed at $(-55 \pm 3)^\circ\text{C}$ and $(125 \pm 3)^\circ\text{C}$ for $(30 \pm 3)$ , different temperature conversion time is 2~3 utes.<br>The temperature cycle shall be repeated 32 cycles. Placed at room temperature for 2 hours, within $48 \pm 4$ hours of testing. |
| Temperature characteristic   | Inductance change Pc-b,Pc-d:<br>Within $\pm 10\%$                                    | a: $+20^\circ\text{C}$ (30~45) →<br>b: $-40^\circ\text{C}$ (30~45) →<br>c: $+20^\circ\text{C}$ (30~45) →<br>d: $+125^\circ\text{C}$ (30~45) →<br>e: $+20^\circ\text{C}$ (30~45)<br>$P_{c-b} = \frac{L_b - L_c}{L_c} \times 100\%$ ; $P_{c-d} = \frac{L_d - L_c}{L_c} \times 100\%$                     |
| Static Humidity              | No visible mechanical damage.<br>Inductance change: Within $\pm 10\%$                | Inductors shall be subjected to $(95 \pm 3)\% \text{RH}$ .<br>at $(60 \pm 2)^\circ\text{C}$ for $(1000 \pm 4)$ h.<br>Placed at room temperature for 2 hours, within 48 hours of testing.                                                                                                               |
| Life                         | No visible mechanical damage.<br>Inductance change: Within $\pm 10\%$                | Inductors shall be store at $(85 \pm 2)^\circ\text{C}$ for $(1000 \pm 4)$ hours with Irms applied.<br>Placed at room temperature for 2 hours, within 48 hours of testing                                                                                                                               |

# Mini Molding Power Inductors

## 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 ( $T_{smin}$ )                                                                             | 150°C                 |
| Temperature Max ( $T_{smax}$ )                                                                             | 200°C                 |
| Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )                                                                | 60 -120 seconds       |
| Average ramp-up rate:<br>( $T_{smax}$ 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 $+0^{\circ}\text{C}$ to $-5^{\circ}\text{C}$ of actual peak Temperature ( $t_p$ ) <sup>2</sup> | 10 seconds            |
| Ramp-down Rate                                                                                             | 6°C/second max.       |
| Time 25°C to Peak Temperature                                                                              | 8minutes max.         |

Allowed Re-flow times : 2 times

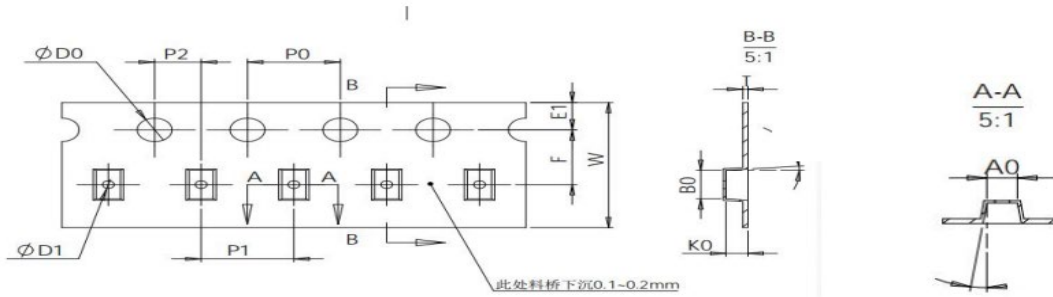
Remark : To avoid discoloration phenomena of chip on terminal electrodes, please use N<sub>2</sub> Re-flow furnace .

# Mini Molding Power Inductors

## 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.

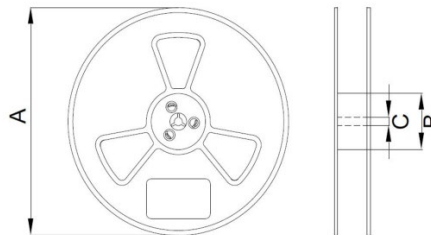


| Series | W        | A0              | B0              | D0      | D1    | E     |
|--------|----------|-----------------|-----------------|---------|-------|-------|
| 公差     | /        | /               | /               | +0.1/-0 | ±0.20 | ±0.10 |
| 252012 | 8.0±0.10 | 2.35+0.10/-0.05 | 2.80+0.10/-0.05 | 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 | ±0.05 |      |
| 252012 | 3.5   | 1.35±0.10 | 4.0   | 2.0   | 4.0   | 0.23  | 3K   |

### 10.2 Dimension of Reel : (Unit: mm)

| Type | A<br>±2.0 | B<br>±2.0 | C<br>±2.0 |
|------|-----------|-----------|-----------|
| All  | 178       | 60        | 13        |



## 11. Note

11.1 recommend products store in warehouse with temperature between 15 to 35℃ 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.

11.2 Cartons must be placed in correct direction which indicated on carton, otherwise the reel or wire will be deformed.

11.3 Storage conditions as below are inappropriate:

- Stored in high electrostatic environment
- Stored in direct sunshine, rain, snow or condensation.
- Exposed to sea wind or corrosive gases, such as Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>2</sub>, etc.

11.4 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.

## 12. Record

| Version | Description   | Page | Date       | Amended by | Checked by  |
|---------|---------------|------|------------|------------|-------------|
| A0      | First version | 1~5  | Nov.4.2023 | Xirui.Niu  | Congdian.Lu |