

# Product Acknowledgement Letter

CustomerName : \_\_\_\_\_

ProductName: \_\_\_\_\_ Encapsulated Alloy Resistor

ProductSpecification: \_\_\_\_\_ LR2512D-3W-5mR-1%

ProductCode: \_\_\_\_\_

Dateofdocument: \_\_\_\_\_ 2026-06-12

## Approved Company Signature

|              |               |             |                                                                                                       |
|--------------|---------------|-------------|-------------------------------------------------------------------------------------------------------|
| Edited by    | Reviewed by   | Approved by | Company Seal<br> |
| ZhenhuanLiao | YongkangHuang | WenyiLeng   |                                                                                                       |

## Customer confirmation seal

|                 |             |             |              |
|-----------------|-------------|-------------|--------------|
| Acknowledged by | Reviewed by | Approved by | Company Seal |
|                 |             |             |              |

## ■ Purpose

Through the description of sample characteristics and inspection standards in this acknowledgment, we can better communicate with customers, reach an agreement, and avoid product quality disputes caused by insufficient communication.

## ■ Scope of application

This Certificate of Acceptance applies to the samples provided by Shenzhen Milliohm Electronic Co., Ltd and covers product characteristics and inspection standards.

## ■ Order association

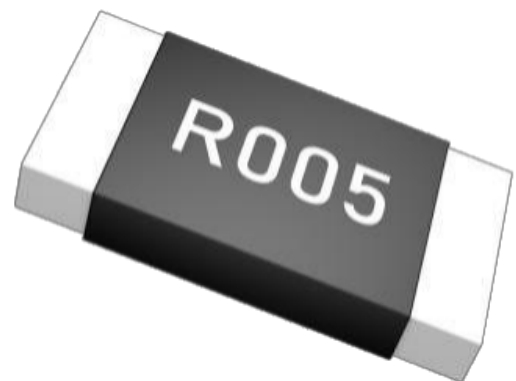
The Customer hereby acknowledges that the specifications and models of materials under all contractual orders with Shenzhen Milliohm Electronic Co., Ltd are consistent with the delivered products. If no objection or confirmation is received, this acknowledgement shall be deemed effective two weeks after the date of receipt by the Customer.

## ■ Product Features

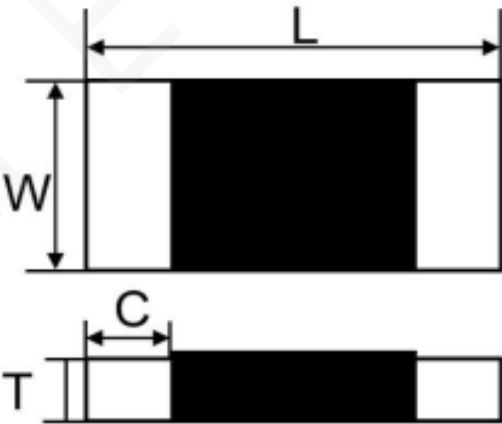
- ① The first manufacturer of alloy resistors using high thermal conductivity epoxy resin in China.
- ② Alloy chip, encapsulated for superior solderability, reliability, and overload ability.
- ③ Consistent performance, high precision, high reliability, high stability.
- ④ Low resistance temperature coefficient, ultra-low parasitic inductance, can be used for high-frequency AC current detection.
- ⑤ Compliant with ROHS and halogen-free requirements.

## ■ Product Application Scope

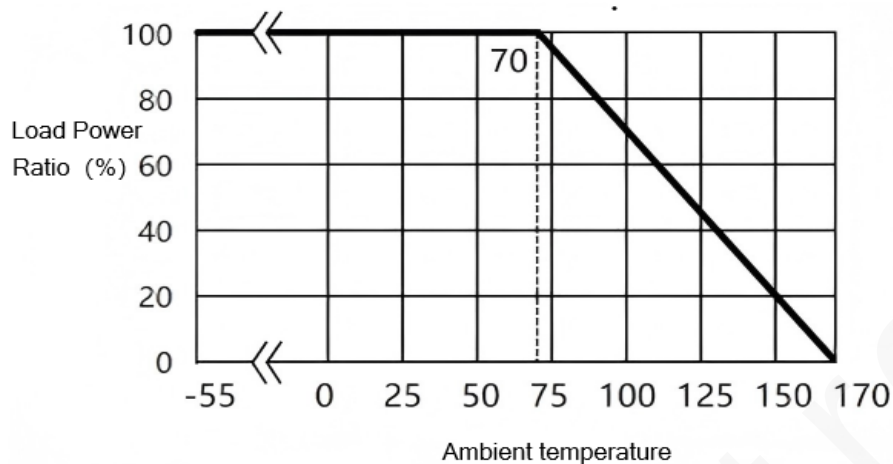
- ① Power Module
- ② Automatic Control System
- ③ Variable frequency drive
- ④ Servo drive system
- ⑤ Industrial equipment



| Selection Example: LR2512D-3W-5mR-1% |              |             |                  | Encapsulated Alloy Resistor |
|--------------------------------------|--------------|-------------|------------------|-----------------------------|
| <u>LR</u>                            | <u>2512D</u> | <u>3W</u>   | <u>5mR</u>       | <u>1%</u>                   |
| ↓                                    | ↓            | ↓           | ↓                | ↓                           |
| Product Type                         | Dimensions   | Rated Power | Resistance value | Resistance Tolerance        |
| LR                                   | 2512D        | 3W          | 5mR              | ±1%                         |

| Product dimensions                                                |                                                                                      |             |                 |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------|-----------------|
| Project                                                           | Parameter                                                                            |             |                 |
| Dimensions (mm)                                                   | L (6.4±0.2)                                                                          | W (3.2±0.2) | C (0.8±0.2)     |
|                                                                   | T (0.8±0.2)                                                                          |             |                 |
| 产品编码:<br>Shenzhen Milliohm Electronic Ltd<br>Controlled documents |  |             |                 |
| Rated Power                                                       | 3W                                                                                   |             |                 |
| Rated Current                                                     | 24.49A                                                                               |             |                 |
| Resistance Tolerance                                              | ±1%                                                                                  |             |                 |
| Resistance Temperature Coefficient                                | ±25ppm/°C                                                                            |             |                 |
| Resistance value                                                  | 5mR                                                                                  |             |                 |
| Operating temperature                                             | -55°C~+170°C                                                                         |             |                 |
| Customer confirmation                                             | Customer Signature:                                                                  |             | Signature date: |
| Remarks                                                           |                                                                                      |             |                 |

### Power Derating Curve



Op. Temp. Range: -55~+170°C; Power Deration Schematic (Resistor Temp@ 70°C)

### Rated Current Calculation Formula

$$I = \sqrt{P/R}$$

I

P

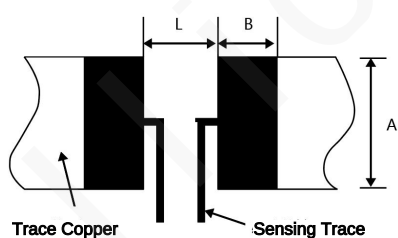
R

Rated Current (A)

Rated Power (W)

Resistance (Ω)

### Recommended Pad Dimensions (mm)



Resistancevalue

A

L

B

5mR

4.0

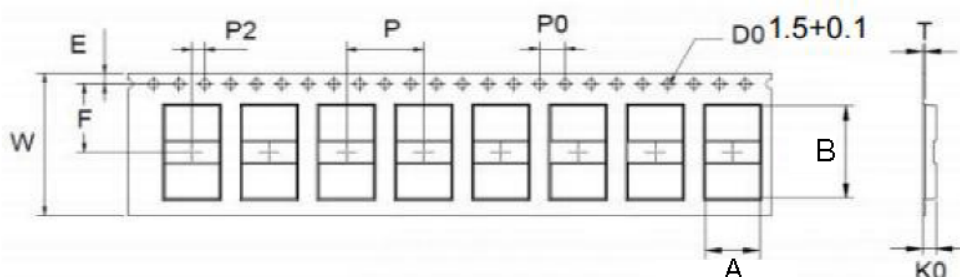
4.1

2.1

## ■ Reliability Test

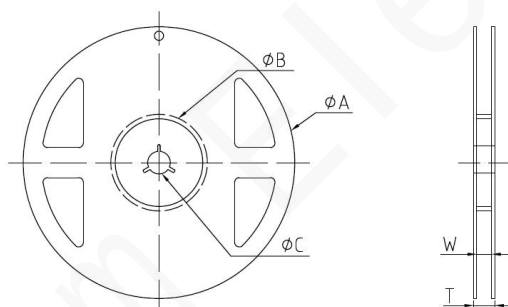
| Item                               | Standard                                      | Testing Conditions                                                                                                                                               | Testing Limit                                                           |
|------------------------------------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Temperature coefficient            | IEC60115-1-4.8<br>JIS-C5201-4.8               | Test temperature +25 ~ 125°C<br>Reference temperature +25°C                                                                                                      | Within specified value                                                  |
| Load Life                          | IEC60115-1-4.25.1<br>JIS-C5201-4.25.1         | At rated power: 1000 hours, 70°C, “ on” 1.5 hours, “ off” 0.5 hours                                                                                              | No visible damage<br>$\Delta R \pm 1\%$                                 |
| Short-term overload                | IEC60115-1-4.13<br>JIS-C5201-4.13             | 5 times rated power, 5 seconds                                                                                                                                   | No visible damage<br>$\Delta R \pm 1\%$                                 |
| High temperature and High humidity | IEC60115-1-4.24.2.1a)<br>JIS-C5201-4.24.2.1a) | 85°C, 85% relative humidity, 1000 hours, load 10% rated power                                                                                                    | No visible damage<br>$\Delta R \pm 1\%$                                 |
| Temperature Cycle                  | IEC60115-1-4.19<br>JIS-C5201-4.19             | -55@30min ~ +155@30min, 1000 cycles                                                                                                                              | No visible damage<br>$\Delta R \pm 0.5\%$                               |
| Withstand welding heat             | IEC60115-1-4.18<br>JIS-C5201-4.18             | 260 $\pm$ 5, 10 $\pm$ 1sec                                                                                                                                       | No visible damage<br>$\Delta R \pm 0.5\%$                               |
| Solderability                      | IEC60115-1-4.17<br>JIS-C5201-4.17             | 45 $\pm$ 5, 2 $\pm$ 0.5s                                                                                                                                         | At least 95% of the electrode surface should be covered with new solder |
| High temperature storage           | IEC60115-1-4.23.2<br>JIS-C5201-4.23.2         | 1000 hours @170, no load                                                                                                                                         | No visible damage<br>$\Delta R \pm 1\%$                                 |
| Low temperature storage            | IEC60115-1-4.23.4<br>JIS-C5201-4.23.4         | 1000 hours @-55, no load                                                                                                                                         | No visible damage<br>$\Delta R \pm 1\%$                                 |
| Substrate bending                  | IEC60115-1-4.33<br>JIS-C5201-4.33             | 2mm, holding time 60 $\pm$ 5 seconds                                                                                                                             | Within specified value                                                  |
| Withstand voltage                  | IEC60115-1 4.7<br>JIS C 5201-1 4.7            | Apply an AC voltage with an effective value of the maximum load voltage between the electrode and the substrate at a rate of about 100V/S for 60 $\pm$ 5 seconds | No breakdown or arcing                                                  |
| Solvent resistance                 | IEC60115-1 4.29<br>JIS C 5201-1 4.29          | Isopropyl alcohol (IPA), solvent temperature: 23 $\pm$ 5, duration 5 $\pm$ 0.5min                                                                                | Clear markings<br>No visible damage                                     |

## Tape Specifications (mm)



| A       | B       | W      | F        | E        | P     | P2    | P0    | D0       | T         |
|---------|---------|--------|----------|----------|-------|-------|-------|----------|-----------|
| 3.6±0.2 | 6.9±0.2 | 12±0.2 | 5.5±0.05 | 1.75±0.1 | 4±0.1 | 2±0.1 | 4±0.1 | Φ1.5±0.1 | 0.85±0.15 |

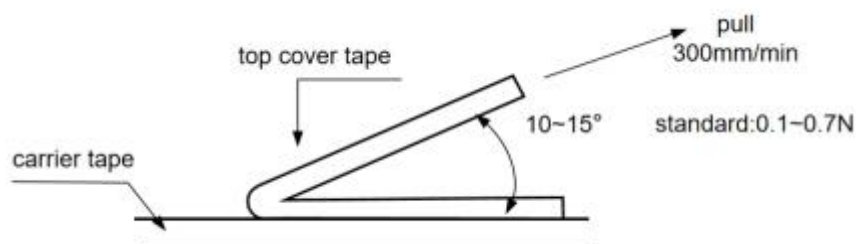
## Reel Specifications (mm)



| A     | B    | C    | W    | T      | Quantity  |
|-------|------|------|------|--------|-----------|
| 180±3 | 60±1 | 13±1 | 13±1 | 15.4±2 | 4000PCS/盘 |

## Peel Strength of Top Cover Tape

Peel Speed: 300 mm/min; Peel Force: 0.1N to 0.7N



## ■ Product Packaging and Instructions for Use

### 1. Product Packaging

Tape and reel packaging: 4000 PCS/reel

### 2. Product Usage Instructions

- ① During product use, pay attention to surface protection to prevent defects such as bumps and scratches on the product surface.
- ② When installing and using the product, avoid subjecting the product to mechanical stress.
- ③ When installing and using the product, avoid subjecting the product to mechanical stress.
- ④ The long-term operating power of the product shall be less than or equal to the rated power to avoid resistance drift caused by long-term overload.
- ⑤ When using the product under high temperature or poor heat dissipation conditions, derate the application with reference to the power derating curve.

### 3. Product Storage Instructions

- ① The product storage environment temperature is 5~35°C, humidity < 65%RH, and the humidity should be kept as low as possible.
- ② The product must be stored in a clean, dry environment free of harmful gases.
- ③ Before use, avoid removing the product from its packaging.
- ④ Under the above storage conditions, the product can be stored for 1 year.
- ⑤ For products stored for more than 1 year, check the surface for oxidation and perform a soldering test.