



**Current Sensing Resistors
RLM Series
(Halogen-Free)**

| | |
|-------------|---------------|
| Document No | TRLM-120S030A |
| Issued date | 2012/12/13 |
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1. Scope :

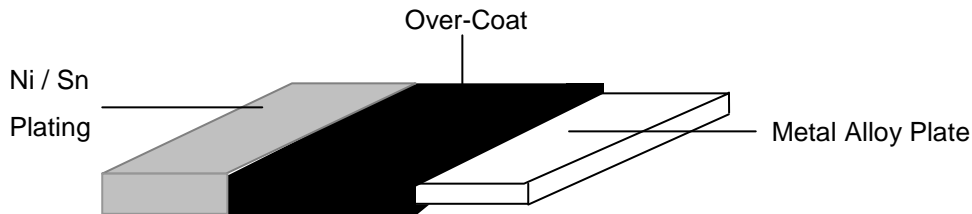
This specification applied to the products of current sensing resistor of metal foil for Lead-Free RLM series manufactured by TA-I TECHNOLOGY CO., LTD.

2. Type Designation :

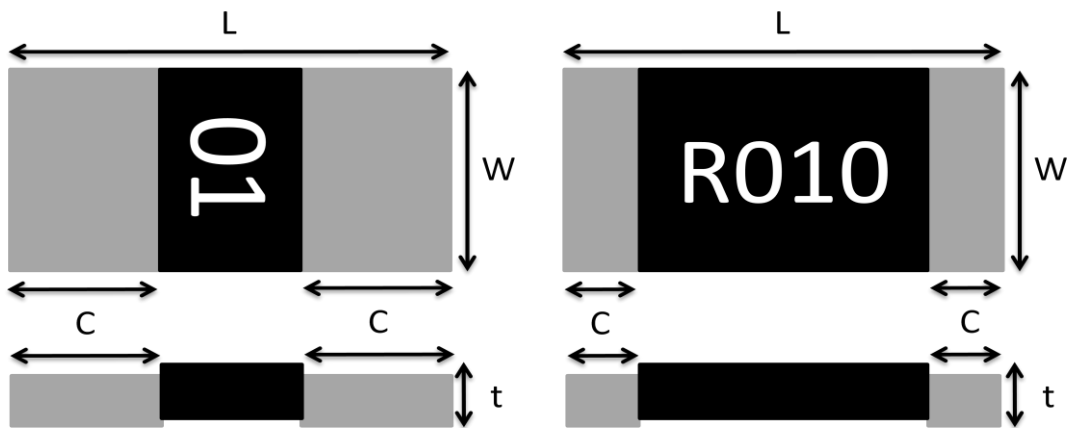
| <u>RLM</u> Item | <u>12</u> Series No | <u>E</u> Resistance tolerance | <u>I</u> Packaging | <u>C</u> Power Rating | <u>M</u> Metal | <u>R001</u> Resistance |
|--------------------|------------------------|----------------------------------|-----------------------|--------------------------|-------------------|---------------------------|
| | 12:1206 (3216) | F:±1% G:±2% J:±5% | T: Paper Tape | A=1/4W S=1/2W C=1W | M=MnCu | e.g: R001=1mΩ |

3. Construction and Dimension :

3.1 Construction:



3.2 Dimension:



UNIT: mm

| Style | L | W | C | t | Material |
|-------|----------|----------|--------------------------------|--------------------------------|-----------------------------------------------------------------|
| RLM12 | 3.2±0.20 | 1.6±0.20 | 1.1 ± 0.30 (R=1mΩ) | 0.75 ± 0.20 (R=1mΩ) | Strip : Alloy Over Coating : molding Compound UL-94 grade |
| | | | 0.5 ± 0.30 (2mΩ ≤ R ≤ 30mΩ) | 0.6 ± 0.20 (2mΩ ≤ R ≤ 30mΩ) | |



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4. Features:

| | | |
|---------------------------------------|----------------------|----------------|
| Type | RLM12 | |
| Power Rating | 1/4W & 1/2W & 1W | |
| Resistance Value | 1~30mΩ | |
| Operation Temperature Range | -55°C ~+170°C | |
| Temperature Coefficient of Resistance | ±200ppm/°C | R=1mΩ |
| | ±100ppm/°C | 2mΩ ≤ R ≤ 10mΩ |
| | ±75ppm/°C | R>10mΩ |
| Tolerance | ±1%、±2%、±5% | |
| Insulation Resistance | Over 100MΩ | |
| Maximum Working Voltage(V) | (P*R) ^{1/2} | |

Note*:1 Watts with total solder pad and trace size of 300mm²

5. Reliability Tests:

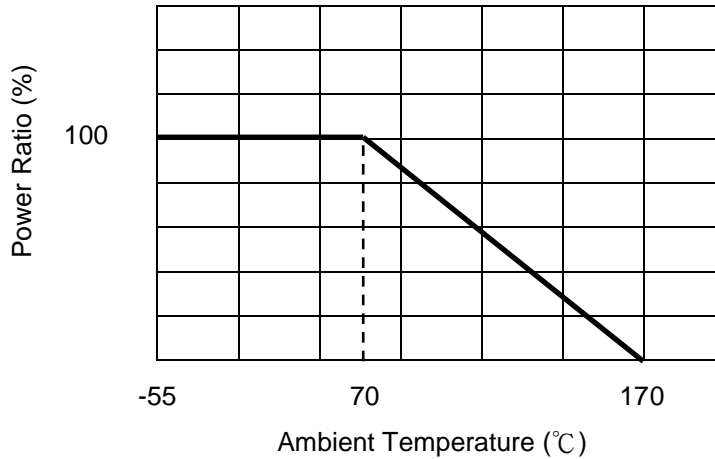
| Test Items | Reference standard | Condition of Test | Test Limits |
|---------------------------------------|--------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------|
| Temperature Coefficient of Resistance | IEC60115-1 4.8 JIS C 5201-1 4.8 | +25°C ~ +125°C | Refer 4.0 |
| Load Life | IEC60115-1 4.25.1 JIS C 5201-1 4.25.1 | 1000hours at rated power, 70°C, 1.5hours "ON", 0.5hour "OFF" | < ±1% |
| Short Time Overload | IEC60115-1 4.13 JIS C 5201-1 4.13 | 5 X rated power for 5s | < ±1% |
| Moisture no Load | IEC60115-1 4.24.2.1a) JIS C 5201-1 4.24.2.1a) | 85°C, 85%RH, 1000hrs | < ±0.5% |
| Temperature cycle | IEC60115-1 4.19 JIS C 5201-1 4.19 | -55°C & +155°C, 300cycle, 15min per extreme condition | < ±0.5% |
| Resistance to Soldering Heat | IEC60115-1 4.18 JIS C 5201-1 4.18 | 260±5°C for 20±1 sec | < ±0.5% |
| Solderability | IEC60115-1 4.17 JIS C 5201-1 4.17 | 245±5°C, 2±0.5sec | At least 95% of surface area of electrode shall be covered with new solder |
| High Temperature Exposure | IEC60115-1 4.23.2 JIS C 5201-1 4.23.2 | 170°C, 1000hrs | < ±1% |
| Low Temperature Storage | IEC60115-1 4.23.4 JIS C 5201-1 4.23.4 | -55°C, 1000hrs | < ±1% |
| Substrate Bending | IEC60115-1 4.33 JIS C 5201-1 4.33 | Bending width 2mm | < ±0.5% |
| Insulation Resistance | IEC60115-1 4.6 JIS C 5201-1 4.6 | 100V DC for 1 minute | >100 MΩ |



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5.1 Derating Curve



5.2 Rated Voltage

The rated voltage is calculated by the following formula:

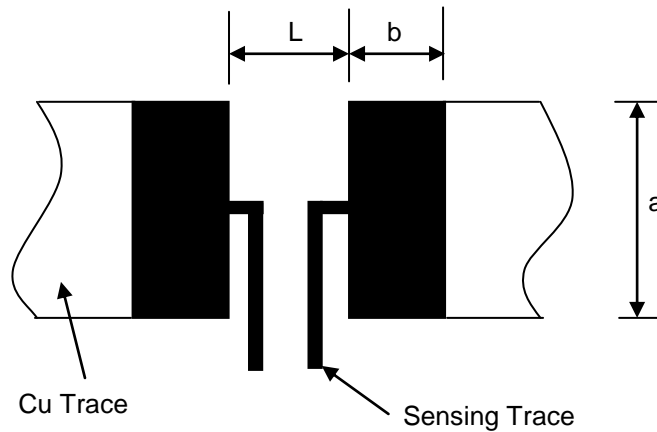
$$V = \sqrt{P \times R}$$

V: Rated Voltage (V)

P: Rated Power (W)

R: Resistance Value (Ω)

6. Recommended Solder Pad Dimension



| Resistance Range (Ω) | a | b | L |
|----------------------|-----|-----|-----|
| 0.001 | 1.8 | 2.3 | 1.0 |
| 0.002~0.030 | 1.8 | 1.7 | 1.6 |

Unit: mm



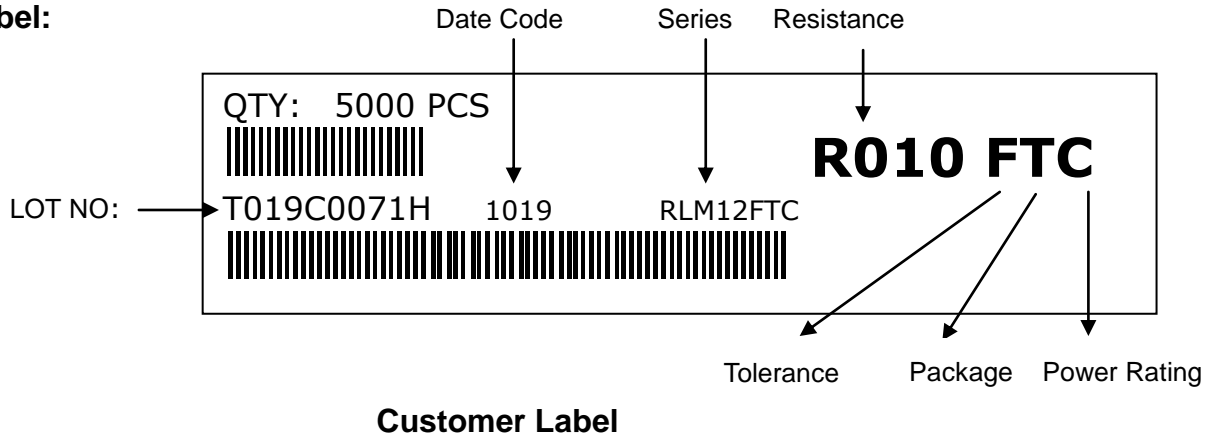
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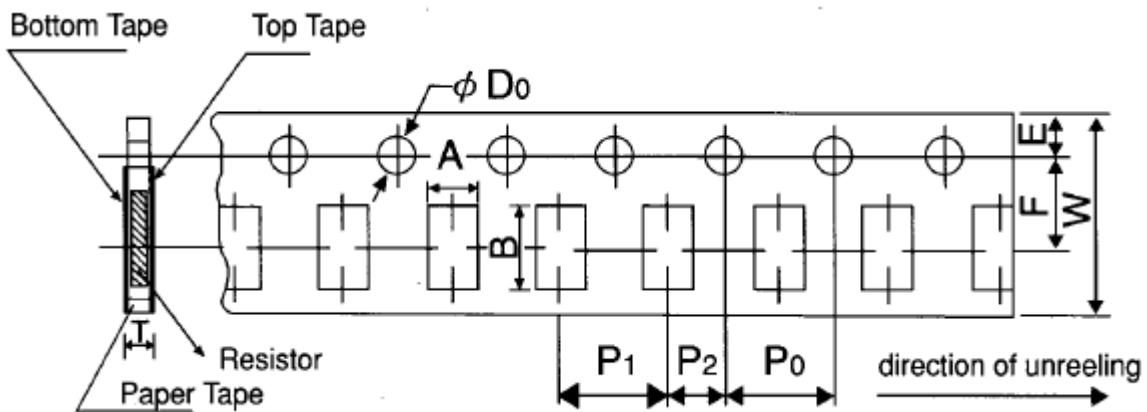
7. Number of Package:

5000 Pieces / package

8. Label:



9. Taping



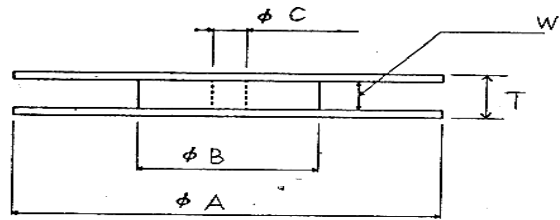
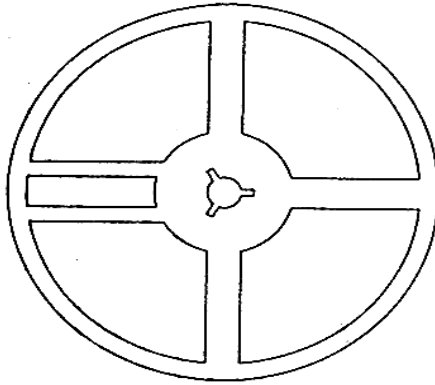
| Packing | Type | A | B | W | F | E | P ₁ | P ₂ | P ₀ | D ₀ | T |
|------------|-------|----------|---------|---------|----------|----------|----------------|----------------|----------------|--------------------|----------|
| Paper Tape | RLM12 | 2.0±0.15 | 3.6±0.2 | 8.0±0.2 | 3.5±0.05 | 1.75±0.1 | 4.0±0.1 | 2.0±0.05 | 4.0±0.1 | ϕ 1.5 (+0.1/-0) | 0.84±0.1 |



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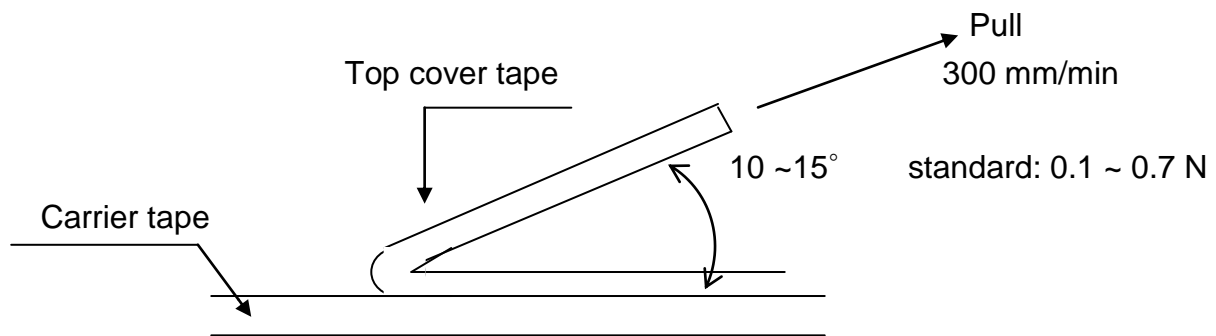
10. Reel Specification



| Series | ϕA | ϕB | ϕC | W | T |
|--------|----------|----------|----------|---------|----------|
| RLM12 | 178±2.0 | 60.0±1.0 | 13.0±1.0 | 9.0±1.0 | 11.5±1.0 |

11. Peeling Strength of Top Cover Tape

Test Condition: 0.1 to 0.7 N at a peel-off speed of 300 mm / min.



12. Storage Conditions:

Temperature: 5°C~35°C, Humidity: 40%~75%

13. Shelf Life:

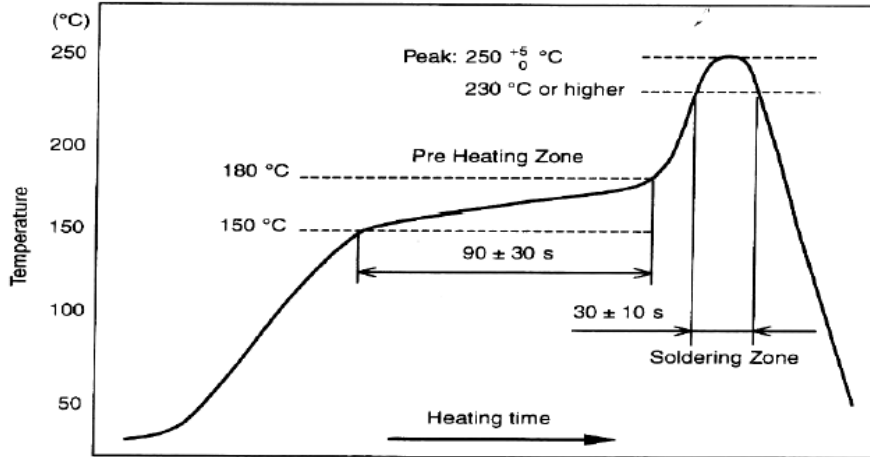
2 years from manufacturing date.



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14. Recommend IR – Reflow profile: (solder: Sn96.5 / Ag3 / Cu0.5)



Peak : 250 \pm 5 °C , 5 sec
- 0

Pre-heat zone : 150 to 180 °C , 90±30 sec

Soldering zone : 230°C or higher , 30±10 sec

15. ECN

Engineering Change Notice: The customer will be informed with ECN if there is significant modification on the characteristics and materials described in approval sheet.

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