



## Lead-Free Current Sensing Resistors RLM Series

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### 1. Scope :

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

### 2. Type Designation :

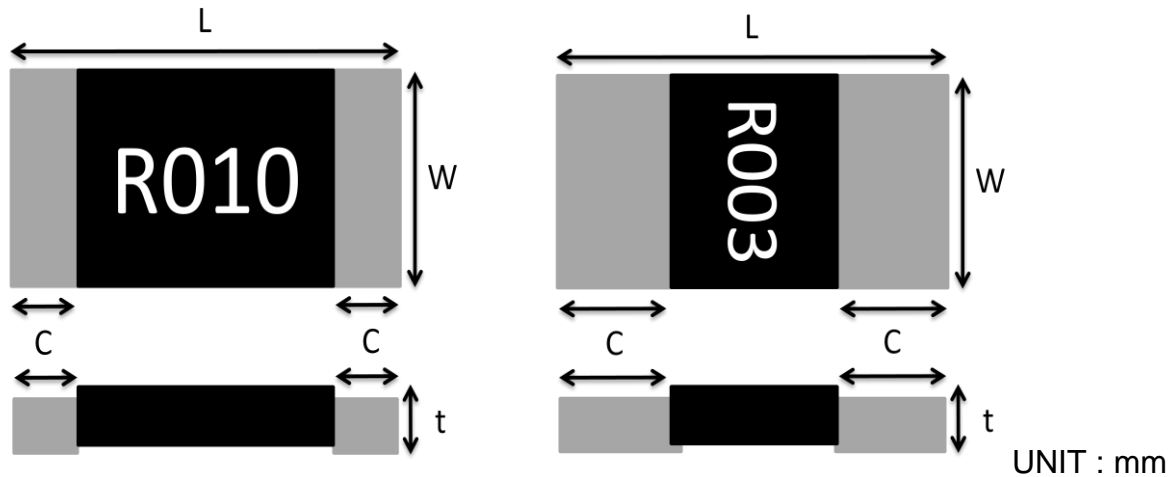
<u>RLM</u> Item	<u>20</u> Series No	<u>F</u> Resistance tolerance	<u>E</u> Packaging	<u>C</u> Power Rating	<u>R010</u> Resistance
	20:2010 (5025)	F:±1% G:±2% J:±5%	E: Embossed Tape	I=3/4W D=3/2W S=1/2W C=1W	e.g : R010=10mΩ

### 3. Construction and Dimension :

#### 3.1 Construction:



#### 3.2 Dimension:



Style	L	W	C	T	Material
RLM20	5.0±0.2	2.5±0.2	1.5±0.3(≤3mΩ)	0.60 ±0.20	Strip : Alloy Over Coating : Polymer Compound UL-94V-0 grade
			0.6±0.3(R>3mΩ)		



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### 4. Features:

Type	RLM20
Power Rating	3/2W、3/4W、1/2W、1W
Resistance Value	2~50mΩ
Operation Temperature Range	-55°C ~ +170°C
Temperature Coefficient of Resistance	±50ppm/°C
Tolerance	±1%, ±2%, ±5%
Insulation Resistance	Over 100MΩ
Maximum Working Voltage(V)	$(P \cdot R)^{1/2}$

### 5. Reliability Tests :

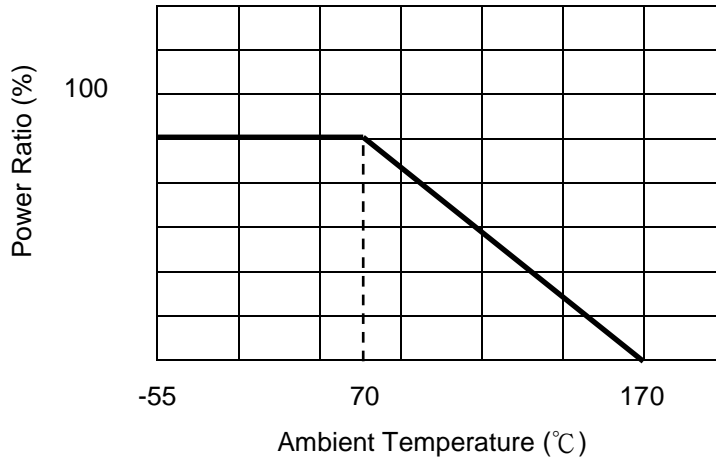
Test Items	Reference standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1 4.8 JIS C 5201-1 4.8	+25°C ~ +125°C	Refer 4.0
Load Life	IEC60115-1 4.25.1 JIS C 5201-1 4.25.1	1000hours at rated power, 70°C, 1.5hours "ON", 0.5hour "OFF"	< ±1%
Short Time Overload	IEC60115-1 4.13 JIS C 5201-1 4.13	5 X rated power for 5s	< ±0.5%
Moisture no Load	IEC60115-1 4.24.2.1a) JIS C 5201-1 4.24.2.1a)	85°C, 85%RH, 1000hrs	< ±1%
Temperature cycle	IEC60115-1 4.19 JIS C 5201-1 4.19	-55°C & +155°C, 300cycle, 15min per extreme condition	< ±1%
Resistance to Soldering Heat	IEC60115-1 4.18 JIS C 5201-1 4.18	260±5°C for 10±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	< ±0.5%
Substrate Bending	IEC60115-1 4.33 JIS C 5201-1 4.33	Bending width 2mm	< ±1%
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:

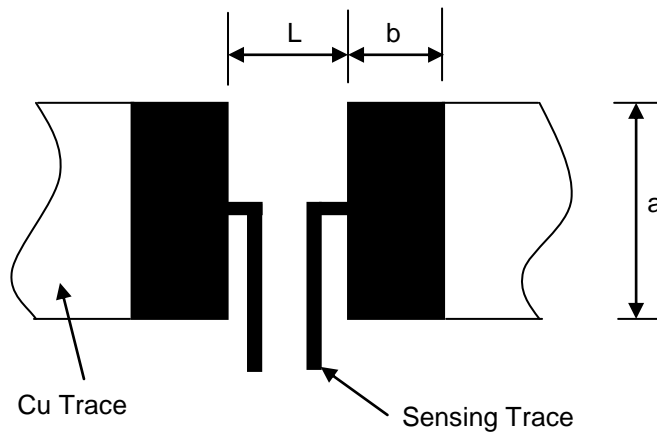
$$V = \sqrt{P \times R}$$

V: Rated Voltage(V)

P: Rated Power(W)

R: Resistance Value( $\Omega$ )

### 6. Recommended Solder Pad Dimension



Resistance Range ( $\Omega$ )	a	b	L
0.002-0.003	3.4 $\pm$ 0.2	3.5 $\pm$ 0.2	2.0 $\pm$ 0.2
0.004-0.050	3.4 $\pm$ 0.2	1.5 $\pm$ 0.2	3.5 $\pm$ 0.2

Unit: mm



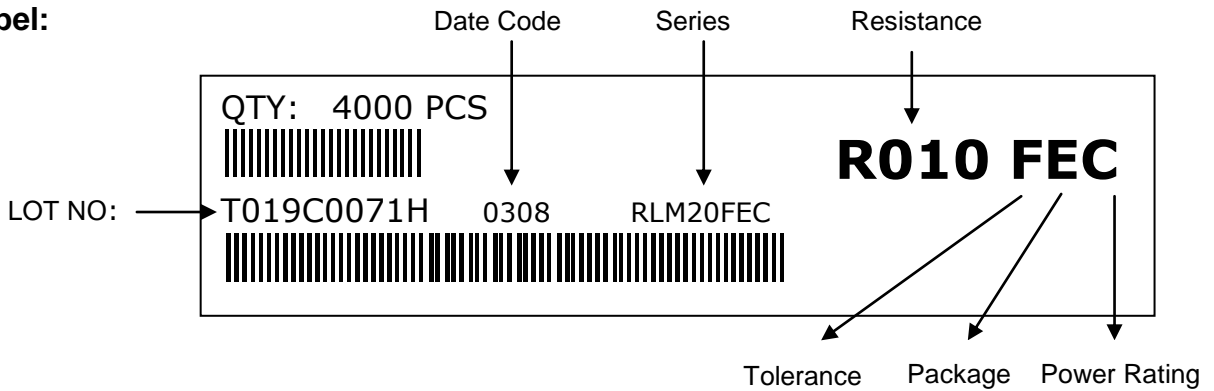
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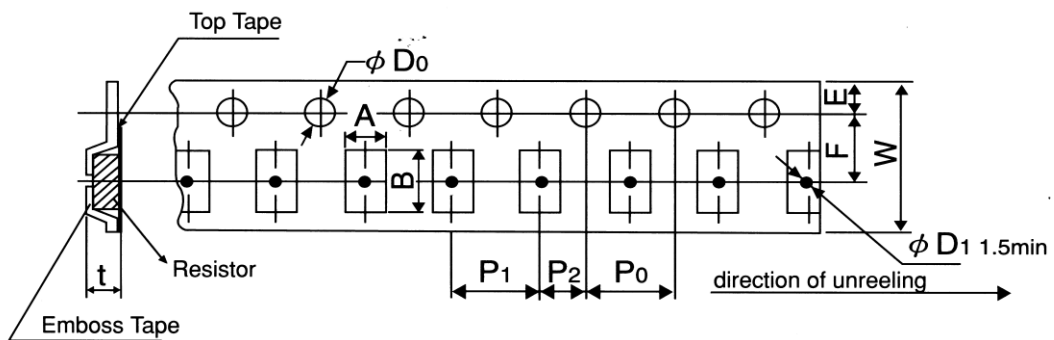
### 7. Number of Package:

4000 Pieces / package

### 8. Label:



### 9. Taping



Packing	Type	A	B	W	F	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	D <sub>0</sub>	T
Emboss	RLM20	2.8±0.2	5.3±0.2	12±0.2	5.5±0.05	1.75±0.1	4.0±0.1	2.0±0.05	4.0±0.05	φ 1.5 (+0.1/-0.1)	0.85±0.15

Unit: mm



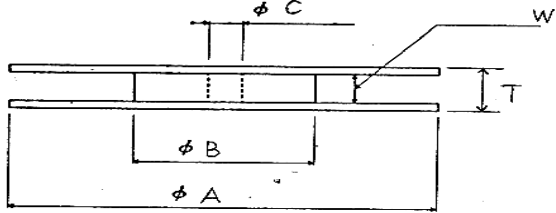
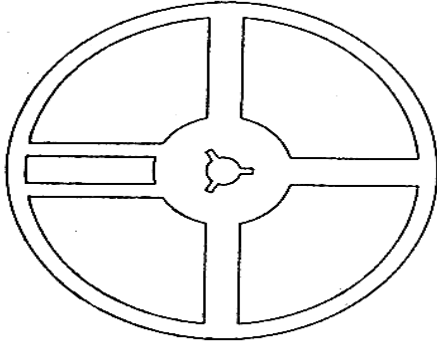
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### 10. Reel Specification

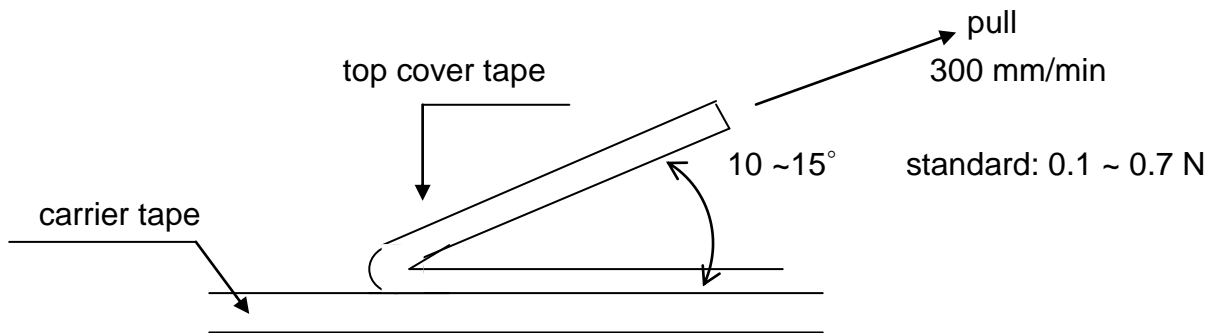


Series	$\phi A$	$\phi B$	$\phi C$	W	T
RLM 20	178.0 $\pm$ 2.0	60.0 $\pm$ 1.0	13.0 $\pm$ 1.0	13.0 $\pm$ 1.0	15.5 $\pm$ 1.0

Unit: mm

### 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:

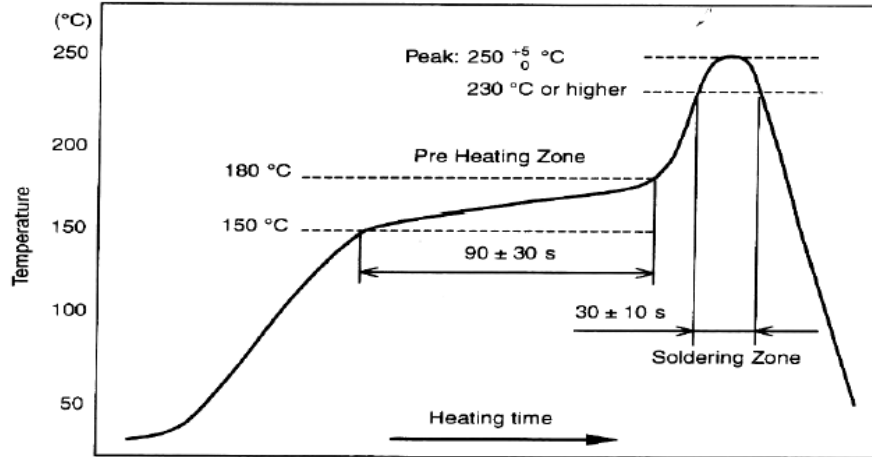
2 years from manufacturing date.



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



Peak :  $260 \begin{matrix} +5 \\ -5 \end{matrix} \text{ }^{\circ}\text{C}$  ,  $10 \pm 1 \text{ sec}$

Pre – heat Zone : 150 to 180  $^{\circ}\text{C}$  ,  $90 \pm 30 \text{ sec}$

Soldering Zone : 230 $^{\circ}\text{C}$  or higher ,  $30 \pm 10 \text{ sec}$

Iron Solder:  $350 \pm 10^{\circ}\text{C}$  ,  $3 + 1 / - 0 \text{ sec}$

### 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.

### 16. Manufacturing Country & City :

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