



# Lead-Free Current Sensing Resistors RLPL12 ( Halogen-Free )

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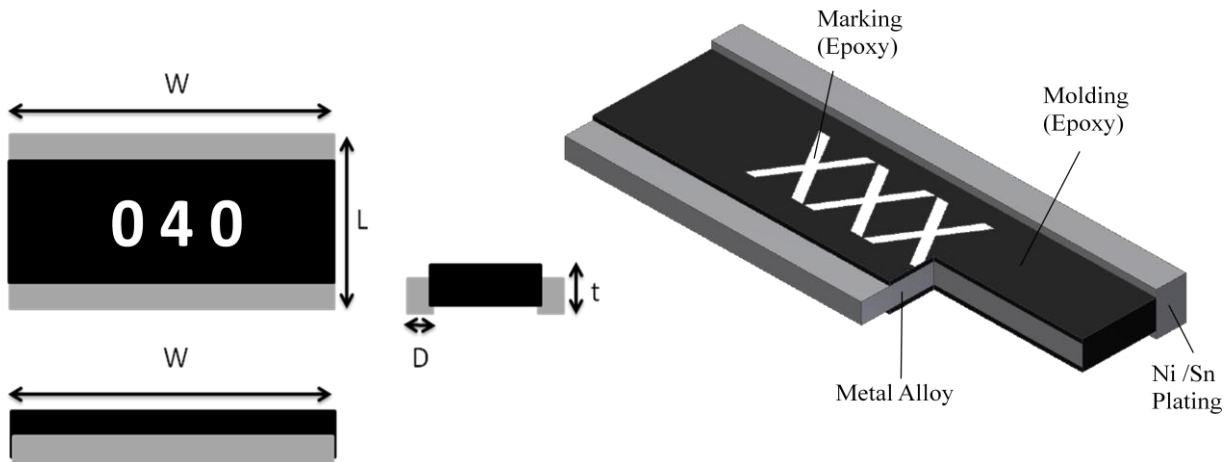
### 1. Scope :

This specification applied to the products of Lead-Free current sensing resistor of metal strip for Lead-Free RLPL12 manufactured by TA-I TECHNOLOGY CO.,LTD.

### 2. Type Designation :

RLPL12	F	E	G	M	R040
Series No.	Tolerance	Packaging	Power	Material	Resistance
L12→1225	F = ± 1% G = ± 2% J = ± 5%	E=Embossed	G = 3W	M = MnCu	R040=40mΩ

### 3. Construction and Dimension :



Series	L	W	D	T
RLPL12	3.20±0.3	6.40±0.30	0.5±0.20	0.9 ±0.25

UNIT: mm



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#### 4. Features:

Series	Size	Power (W)	Resistance Value	Operation Temperature Range	TCR	Tolerance
RLPL12	1225	3.0	2~40 mΩ	-55°C ~+170°C	±75ppm/°C	±1% ±2% ±5%

#### 5. Reliability Tests:

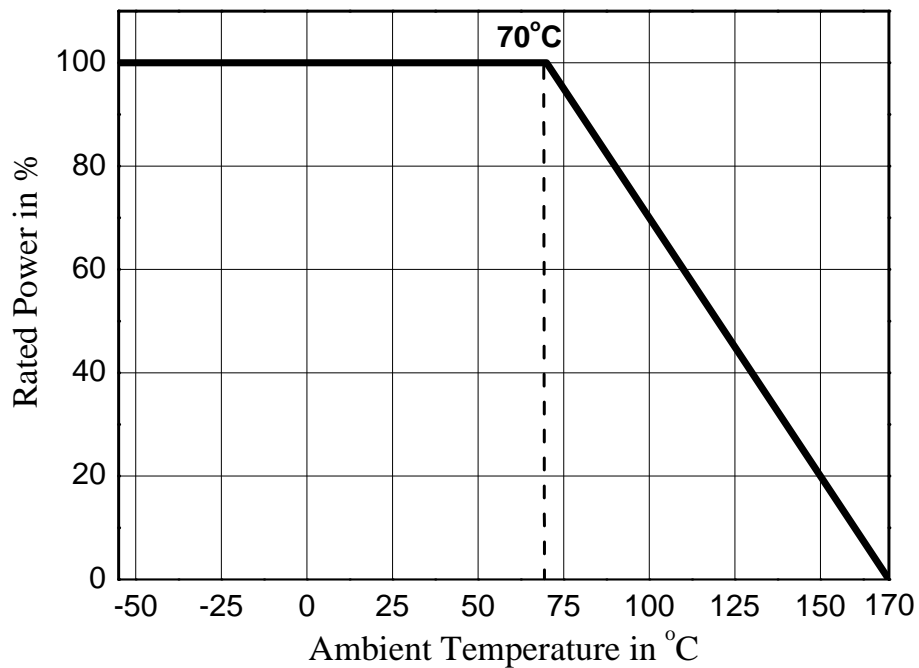
Test Items	Reference standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1-4.8 JIS-C5201-4.8	+25°C ~ +125°C	Refer 4.0
Load Life	IEC60115-1-4.25.1 JIS-C5201-4.25.1	1000hours at rated power, 70°C, 1.5hours "ON", 0.5hour "OFF"	< ±1%
Short Time Overload	IEC60115-1-4.13 JIS-C5201-4.13	5 X rated power for 5s	< ±1%
Moisture no Load	IEC60115-1- 4.24.2.1a) JIS-C5201- 4.24.2.1a)	85°C, 85%RH, 1000hrs	< ±1%
Temperature cycle	IEC60115-1-4.19 JIS-C5201-4.19	-55°C & +155°C, 300cycle, 15min per extreme condition	< ±1%
Resistance to Soldering Heat	IEC60115-1-4.18 JIS-C5201-4.18	260±5°C for 10±1 sec	< ±0.5%
Solderability	IEC60115-1-4.17 JIS-C5201-4.17	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-C5201-4.23.2	170°C, 1000hrs	< ±1%
Low Temperature Storage	IEC60115-1- 4.23.4 JIS-C5201-4.23.4	-55°C, 1000hrs	<±1%
Substrate Bending	IEC60115-1-4.33 JIS-C5201-4.33	Bending width 2mm	< ±0.5%
Insulation Resistance	IEC60115-1-4.6 JIS-C5201-4.6	100V DC for 1 minute	>100 MΩ



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## 5.1 Derating Curve



## 5.2 Rated Current & Voltage

The rated Current and Voltage are calculated by the following formula:

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

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

I: Rated Current (A)

V: Rated Voltage (V)

P: Rated Power (W)

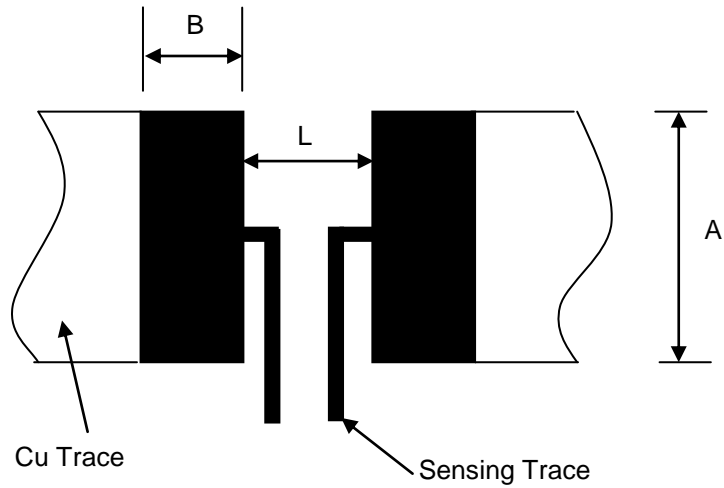
R: Resistance Value ( $\Omega$ )



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**RLPL12**  
**( Halogen-Free )**

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**6. Recommended Solder Pad Dimension**



Unit: mm

Series	Resistance (mΩ)	A	B	L
RLPL12	2 ~ 40	7.0	1.0	2.3

Note: \*The copper foil minimum thickness of PCB needs 3 oz



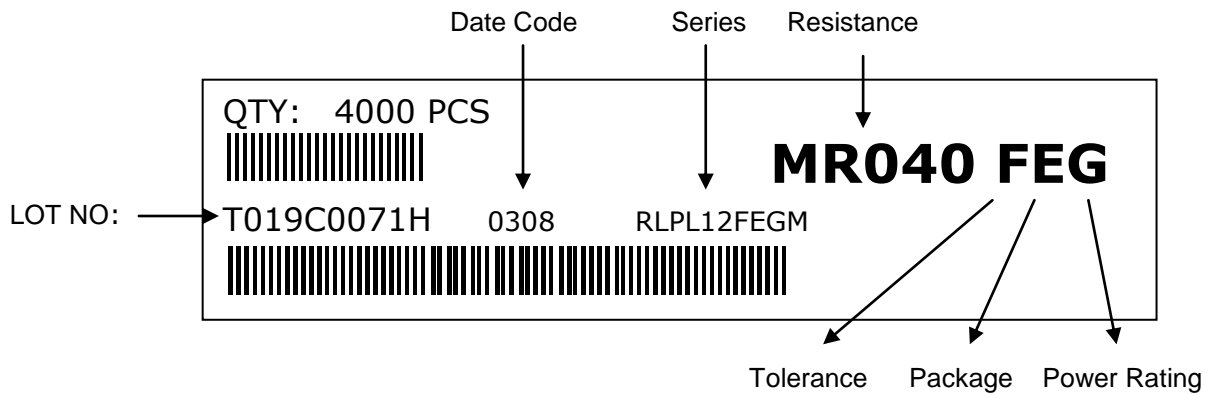
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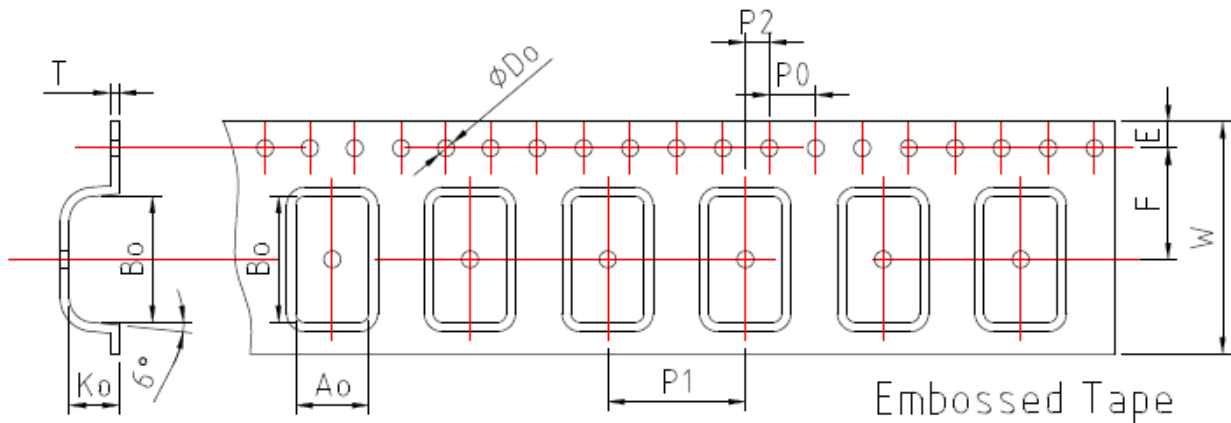
## 7. Number of Package:

Series	RLPL12
Pieces/Package	4000

## 8. Label:



## 9. Packaging



Embossed tape packaging dimension

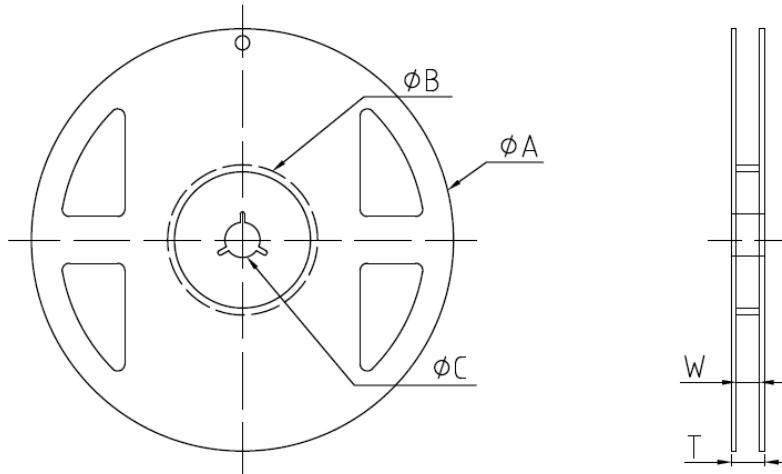
Symbol	A <sub>0</sub>	B <sub>0</sub>	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>1</sub>	D <sub>0</sub>	K <sub>0</sub>	T
RLPL12	3.60	6.90	12.00	1.75	5.50	4.00	4.00	4.00	2.00	1.20	0.30
Tolerance	±0.20	±0.20	±0.20	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.15	±0.10



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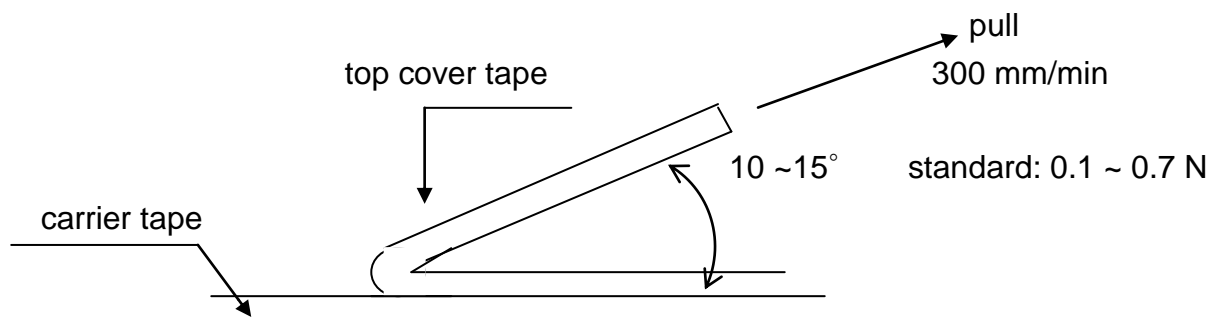
## 10. Reel Specification



Series	$\phi A$	$\phi B$	$\phi C$	W	T
RLPL12	178 $\pm$ 2.0	60 $\pm$ 1.0	13.0 $\pm$ 1.0	13.0 $\pm$ 1.0	15.4 $\pm$ 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:

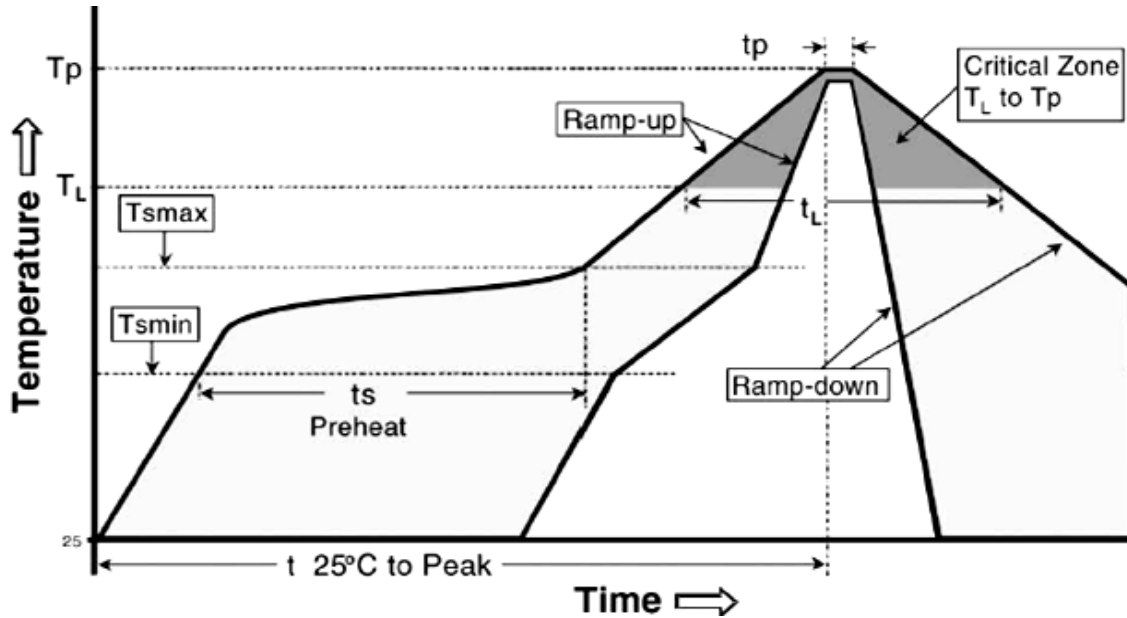
2 years from manufacturing date.



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



**Alloyed Re-flow times : 3 times**

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

**Iron Solder: 350±10°C , 3+1/-0 sec, 1 time**

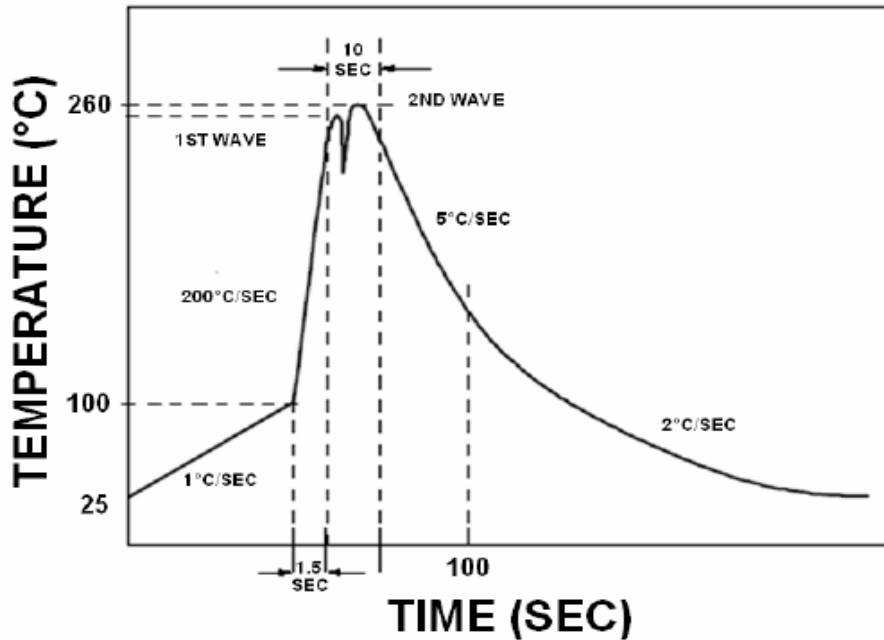
Profile Feature	Lead (Pb )-Free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C / second max.
Preheat - Temperature Min (T <sub>smin</sub> ) - Temperature Max (T <sub>smax</sub> ) - Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	150°C 200°C 60 -150 seconds
Time maintained above : - Temperature (T <sub>L</sub> ) - Time (T <sub>L</sub> )	217°C 60-120 seconds
Peak Temperature (T <sub>p</sub> )	260°C
Time within $\begin{matrix} +0 \\ -5 \end{matrix}$ °C of actual Peak Temperature (t <sub>p</sub> ) <sup>2</sup>	10 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8mimutes max.



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## 15. Recommend Wave-Solder profile : (solder : Sn96.5 / Ag3 / Cu0.5)



## 16. 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.