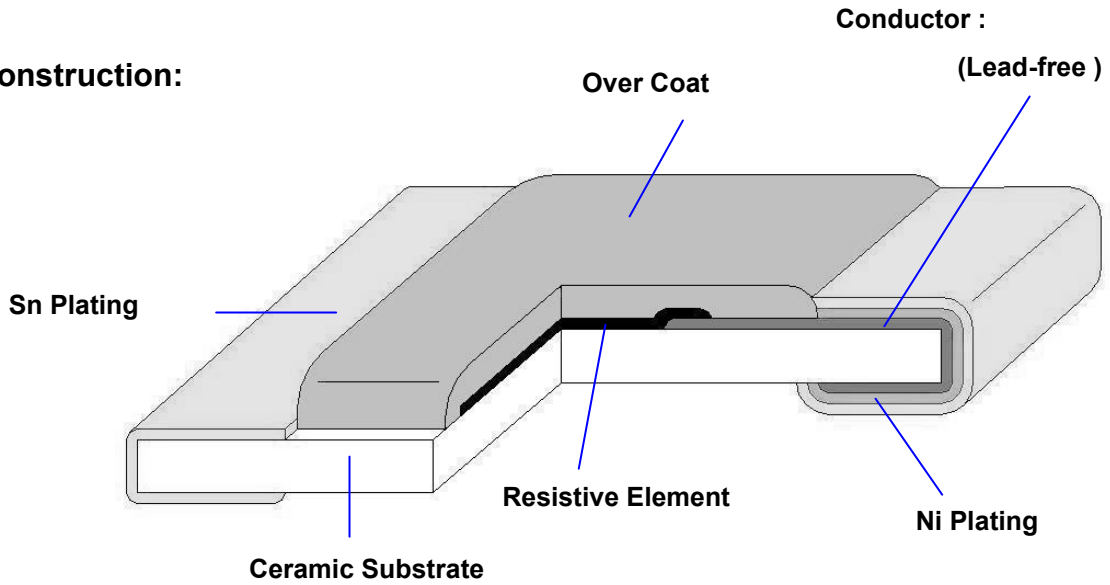


**1. Scope :**

This specification applies for the RL12(1206) of alloy film chip resistors made by TA-I.

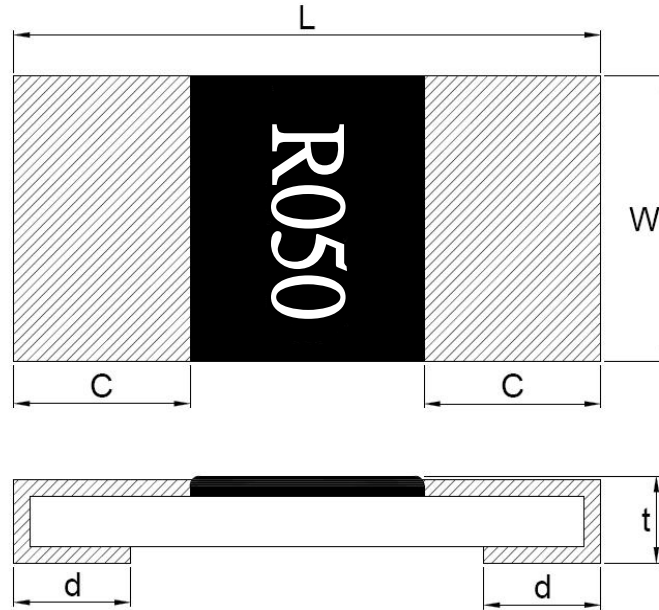
**2. Construction:**



**3. Type Designation:**

<u><b>RL</b></u>	<u><b>12</b></u>	<u><b>J</b></u>	<u><b>TN</b></u>	<u><b>R050</b></u>
Product Code	Size	Tolerance	Packaging	Nominal Resistance
RL : Chip Resistor	Power Rating			
12-1206(3216) 1/2W	J-±5% G-±2% F-±1%	TN-Lead Free &Paper Tape	4 Digits e.g., (E24) R050=50mΩ	

**4. Dimensions:**



UNIT: mm

Type	L	W	C	d	t
RL12	3.10 ±0.20	1.55 ±0.10	0.90 ±0.30	0.50 ±0.20	0.50 ±0.10

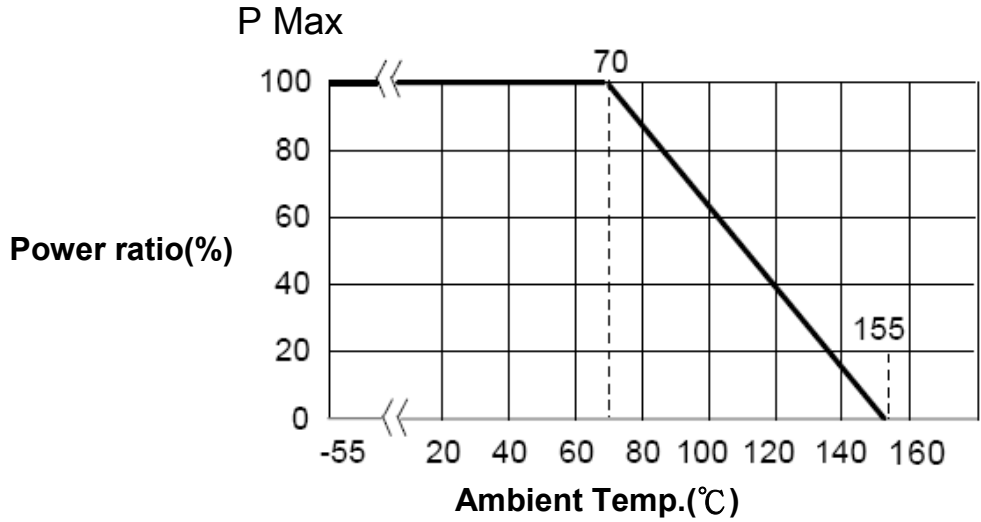
**5. Ratings & Characteristics :**

Characteristics	Feature		Measurement Method
	RL12		
Power Ratings (W)	1/2W		JIS Code 3A / JIS Code 3D
Resistance Value (mΩ)	31 ~ 91		Refer to JIS C 5201-1- 4.5
T.C.R (ppm/°C)	31-50 mΩ	51-91 mΩ	Refer to JIS C 5201-1-4.8
	±600ppm	±400ppm	
Operation Temperature Range (°C)	-55 ~ +155		
Resistance Tolerance (%)	±1, ±2, ±5		JIS C 5201-1- 4.2.5
Insulation Resistance (MΩ)	Over 100		Refer to JIS C 5201-1-4.6
Maximum Working Voltage (V)	$(P * R)^{1/2}$		

Note : Except for the above standardized products, we also provide the customized products.

**5.1 Derating Curve :**

For resistors operated at ambient temperature over 70°C , power rating shall be derated in accordance with figure 1.



**Figure 1**

**5.2 Rated Voltage:**

The rated voltage is calculated by the following formula:

$$E = \sqrt{P * R}$$

E=Rated Voltage(V)

P=Rated Power(W)

R=Resistance Value(Ω)

## 6 . Reliability Tests:

Test Items	Reference standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1-4.8 JIS-C5201-1-4.8	-55 ~ +125 °C	Refer to paragraph 5
Short Time Overload	IEC60115-1-4.13 JIS-C5201-1-4.13	2.5 X rated voltage, 5s	1%:± (1%+0.005 Ω ) 2%,5%:± (3%+0.005 Ω )
Load Life	IEC60115-1-4.25.1 JIS-C5201-1-4.25.1	1000 hours at rated power , 70°C , 1.5hours "ON " , 0.5hour "OFF"	1%:± (1%+0.001 Ω ) 2%,5%:± (3%+0.001 Ω )
Load Life with Humidity	IEC60115-1-4.24 JIS-C5201-1-4.24	1000 hours at rated power , 40 ± 2°C , 90~95% RH 1.5hours "ON " , 0.5hour "OFF"	1%:± (1%+0.001 Ω ) 2%,5%:± (3%+0.001 Ω )
Rapid Change of Temperature	IEC60115-1-4.19 JIS-C5201-1-4.19	-55°C (30 min. ) / +155 °C (30 min. ) 5 cycles	± 1%+0.005 Ω
Resistance to Soldering Heat	IEC60115-1-4.18 JIS-C5201-1-4.18	270 ± 5°C solder , 10 ± 1 sec dwell .	± 1%+0.005 Ω
Solderability	IEC60115-1-4.17 JIS-C5201-1-4.17	245±5°C solder, 2±0.5 sec dwell. Solder : Sn96.5 / Ag3.0 / Cu0.5	At least 95% of surface area of electrode shall be covered with new solder.
Robustness of Termination (Bending Strength)	IEC60115-1-4.33 JIS-C5201-1-4.33	3mm deflection	± 1%+0.005Ω
Resistance to Dry Heat	IEC60115-1-4.23.2 JIS-C5201-1-4.23.2	155 ± 5°C for 96 ± 4hrs	1%: ± (1%+0.005 Ω ) 2%,5%:± (2%+0.005 Ω )

Note\* :RCWV : Rated continuous working voltage .

## 7. Marking

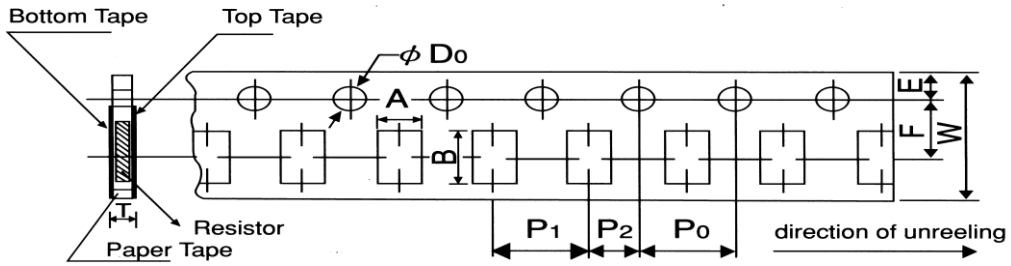
Resistance value is expressed by 4 digits, the first "R" means decimal point  
and the other digits represent for the normal resistance in Ω.

e.g., R050 =50 m Ω

**8. Taping & Reel**

**8.1 Taping Dimensions**

**8.1.1 4 mm pitch paper**

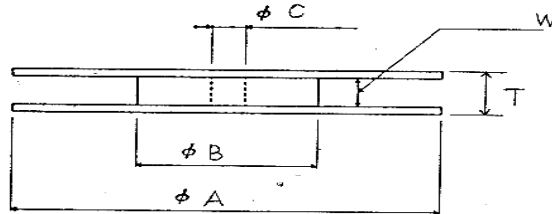
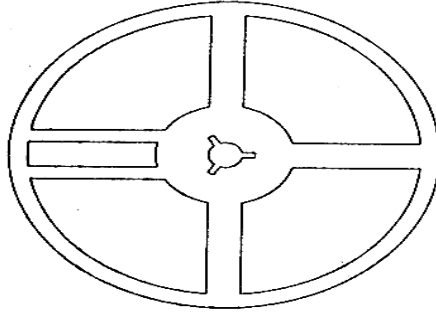


Packing	Type	A	B	W	F	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	D <sub>0</sub>	T
Paper Tape	RL12	2.0 ±0.15	3.6 ±0.2	8.0 ±0.2	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	φ 1.5 +0.1 -0	0.84 ±0.1

UNIT: mm

Type Size		Paper Tape
		4 mm pitch
		178mm/R
RL	12	5000

**8.2 Reel Specifications**

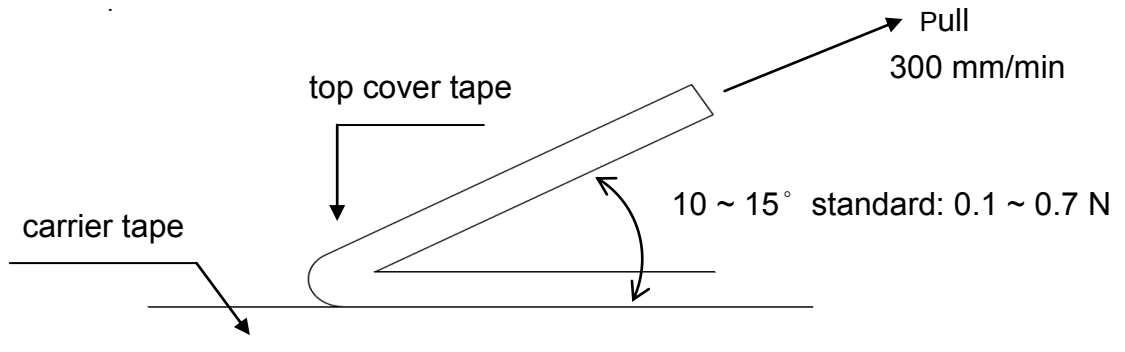


UNIT: mm

Series	ϕ A	ϕ B	ϕ C	W	T
RL 12	178±0.2	60 min	13.0 ±1.0	9.0 ±1.0	11.5 ±1.0

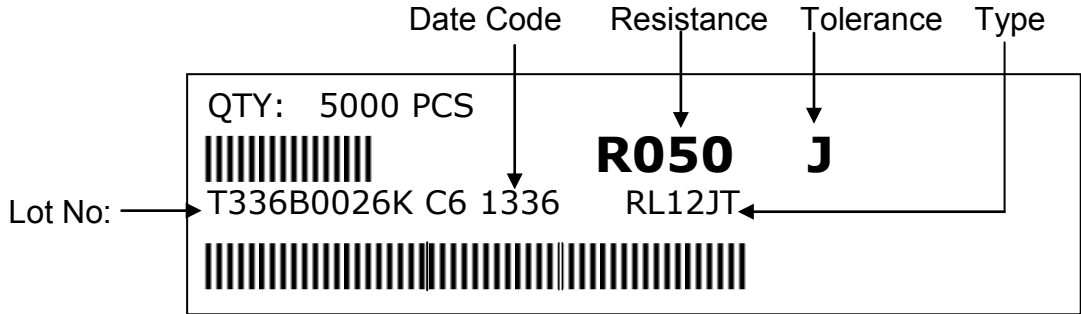
**8.3 Peel – off force :**

Peel - off force of paper and blister tape is in accordance with "JIS-C5202"  
that is , 0.1 to 0.7 N at a peel - off speed of 300 mm / minute.



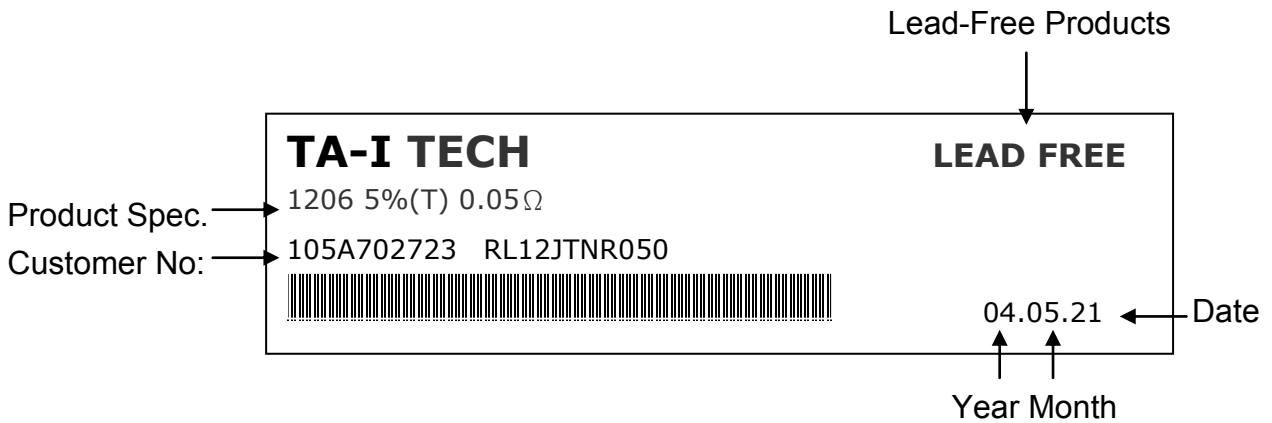
**9. Label**

**9.1 Manufacture Label :**

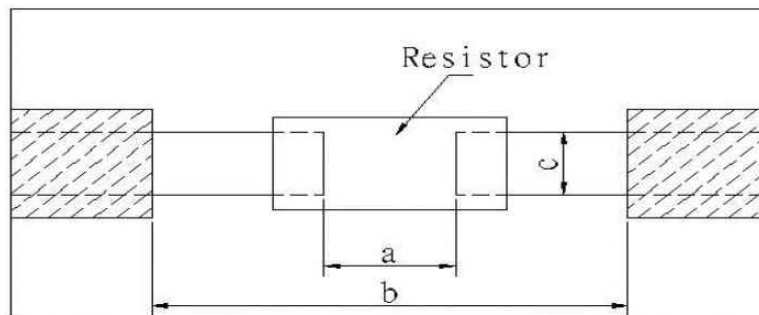


Manufacture Label

**9.2 Customer Label( By customer request ):**

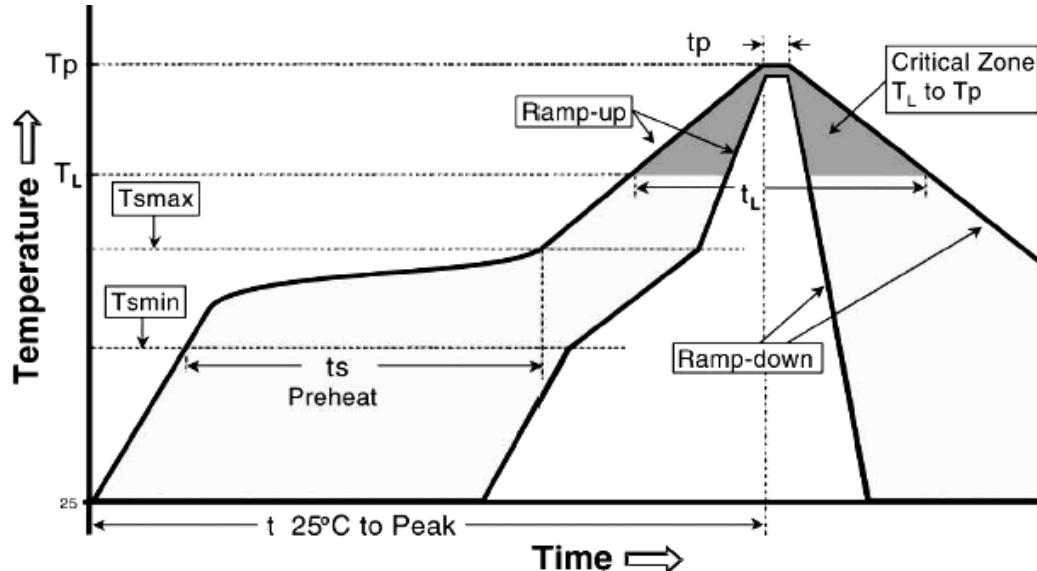


**10. Recommended land patterns**



Land pattern		Dimension ( mm )		
Type	Size	a	b	c
RL	12 (1206 )	2.0~2.4	4.4~5.0	1.2~1.8

**11. Recommend IR – Reflow profile :** ( Lead-Free solder : Sn96.5 / Ag3 / Cu0.5 )



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	8minutes max.

Allowed Re-flow times : 3 times

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

**12. Storage Conditions:**

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



<b>TA-I</b>	<b>Alloy Film Chip Resistors Low Resistance (31-91 mΩ)for 1206 Halogen-Free</b>	Document No	TRL-120S011H
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**13. Shelf Life:**

2 years from manufacturing date

**14.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.

**15. Manufacturing Country & City :**

TA-I TECHNOLOGY CO., LTD. ( Taiwan– Tao Yuan )

Tel: 886-3-3246169 Fax : 886-3-3246167

**Associated companies :**

(1) FORTUNE TASK RESISTOR FACTORY ( China – Dongguan )

Tel : 86-769-8339-4790~3 Fax : 86-769-8339-4794

(2) TA-I TECHNOLOGY (DONGGUAN ) CO., LTD. ( China –Dongguan )

Tel : 86-769-8339-4790~3 Fax : 86-769-8339-4794

(3) TA-I TECHNOLOGY ( SU ZHOU ) CO., LTD. ( China – Su Zhou)

Tel :86- 512-63457879 Fax : 86-512-63457869

(4) TAI OHM ELECTRONICS ( M ) SDN. BHD. ( Malaysia – Pulaupinang )

Tel :604- 3900480 Fax : 604-3901481

(5) P.T.TAI ELECTRONICS Indonesia ( Indonesia – Jakarta )

Tel :62-21-89830123 Fax : 62-21-89830703