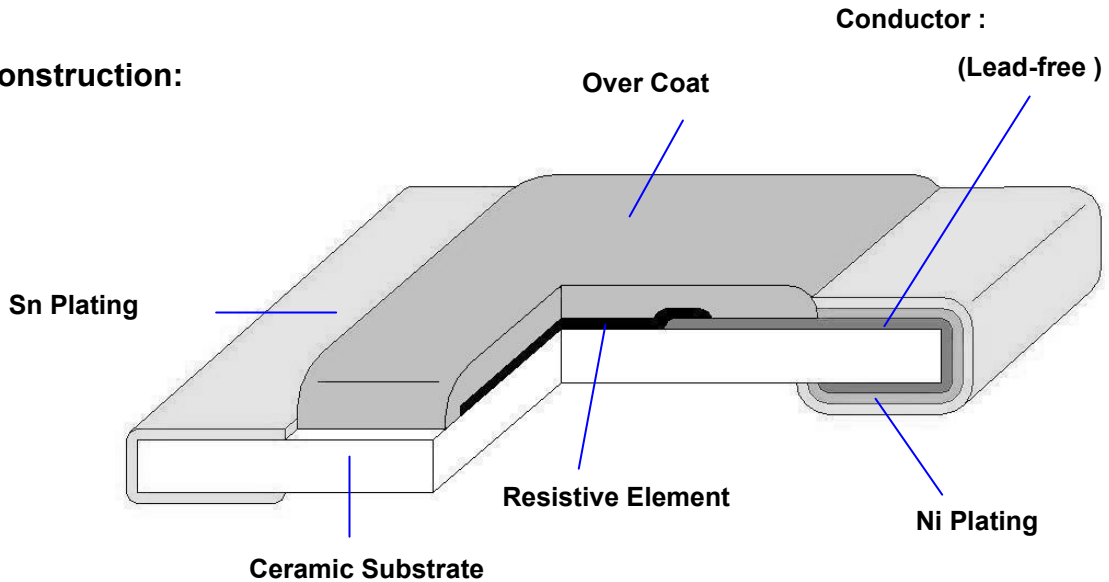


1. Scope :

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

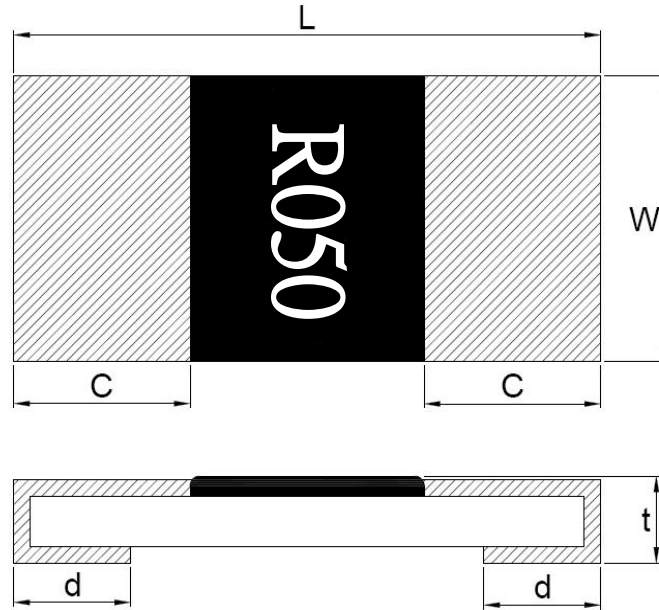
2. Construction:



3. Type Designation:

<u>RL</u>	<u>12</u>	<u>J</u>	<u>TN</u>	<u>R050</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.

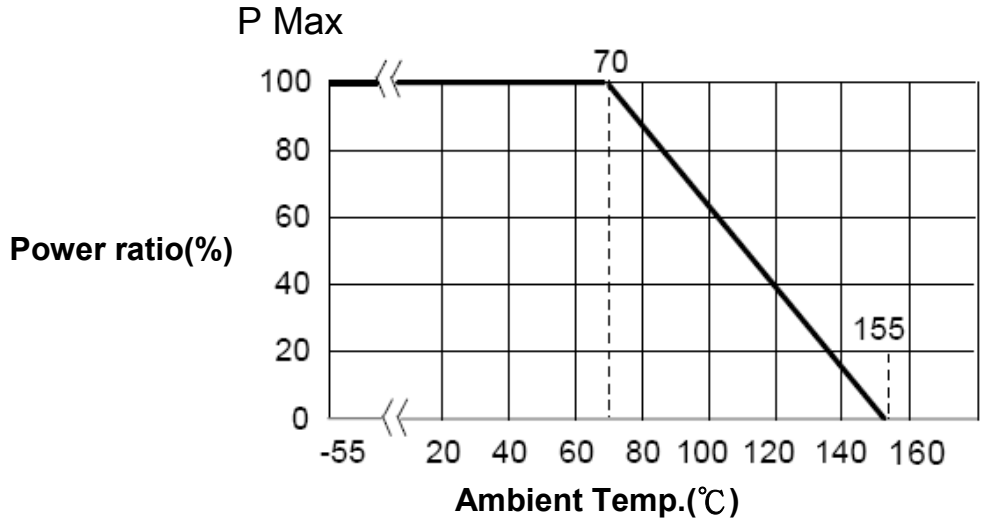


Figure 1

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

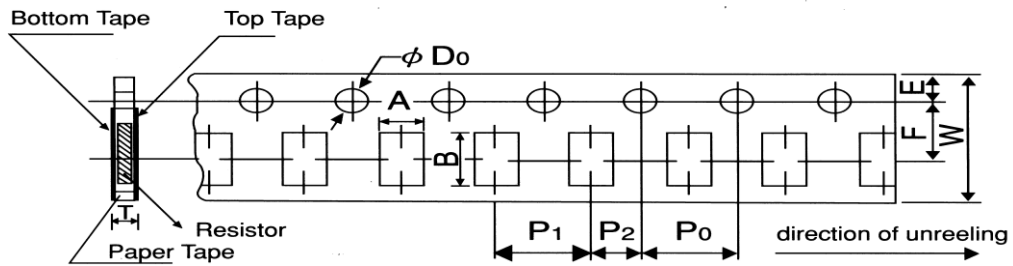
Resistance value is expressed by 4 digits, the first "R" means decimal point
and the other digits represent for the normal resistance in Ω.

e.g., R050 =50 m Ω

8. Taping & Reel

8.1 Taping Dimensions

8.1.1 4 mm pitch paper

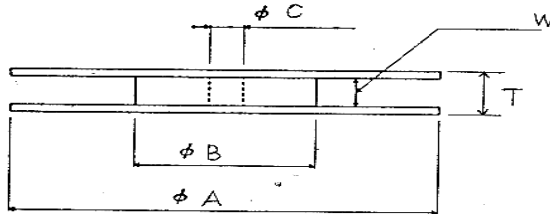
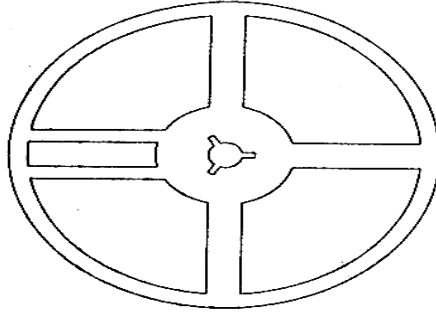


Packing	Type	A	B	W	F	E	P ₁	P ₂	P ₀	D ₀	T
Paper Tape	RL12	2.0 ±0.15	3.6 ±0.2	8.0 ±0.2	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	φ 1.5 ^{+0.1} ₋₀	0.84 ±0.1

UNIT: mm

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

8.2 Reel Specifications

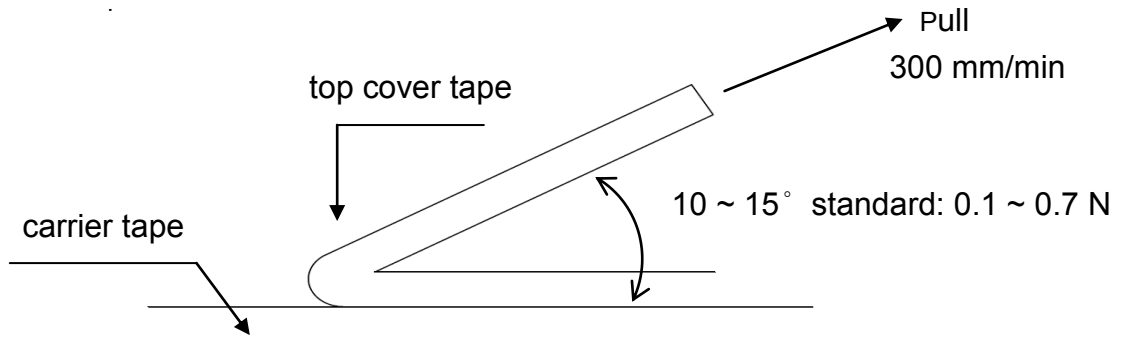


UNIT: mm

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

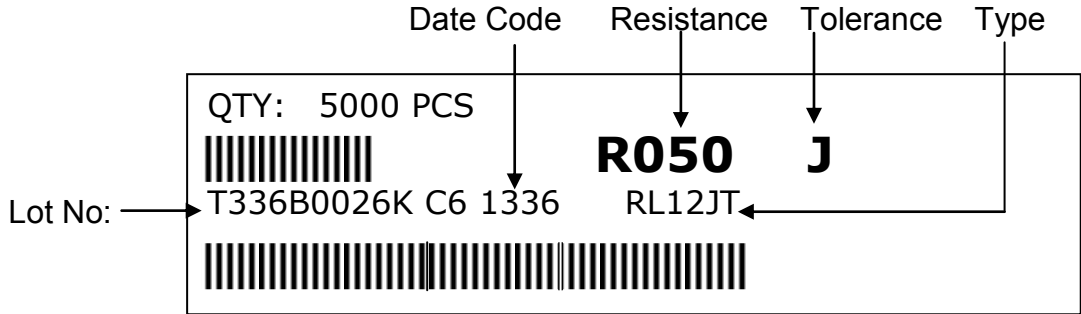
8.3 Peel – off force :

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.



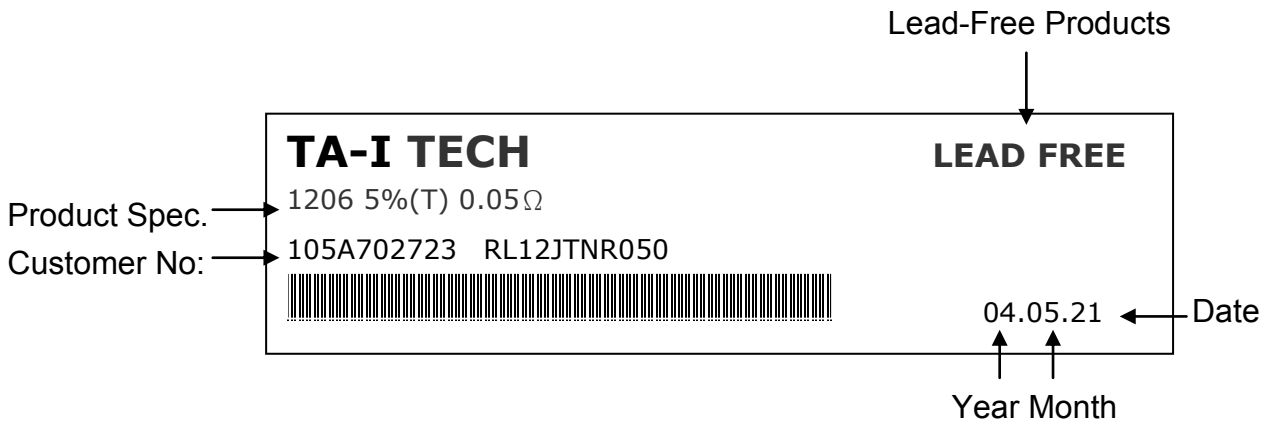
9. Label

9.1 Manufacture Label :

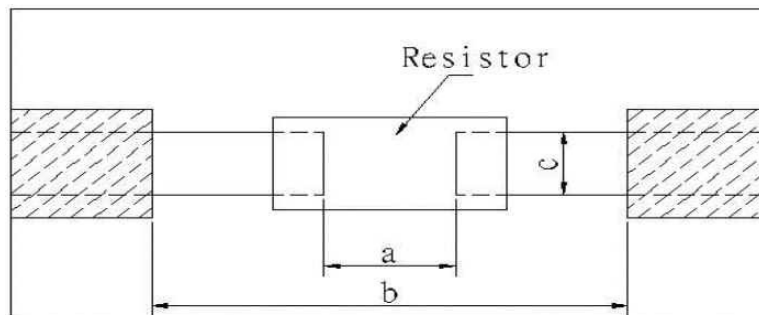


Manufacture Label

9.2 Customer Label(By customer request):

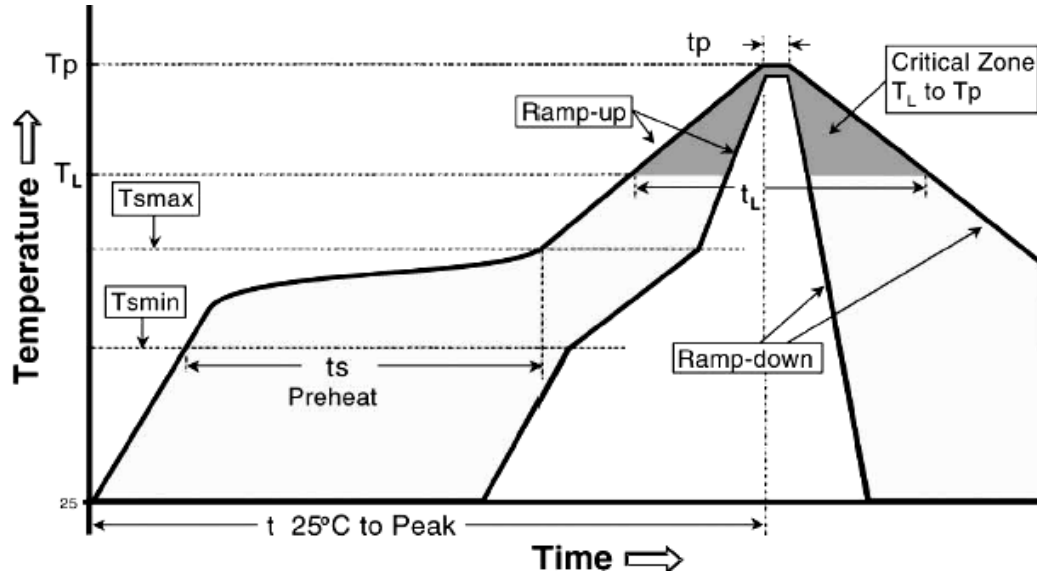


10. Recommended land patterns



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 _{smax} to T _p)	3°C / second max.
Preheat - Temperature Min (T _{smin}) - Temperature Max (T _{smax}) - Time (T _{smin} to T _{smax}) (t _s)	150°C 200°C 60 -150 seconds
Time maintained above : - Temperature (T _L) - Time (T _L)	217°C 60-120 seconds
Peak Temperature (T _p)	260°C
Time within $\begin{matrix} +0 \\ -5 \end{matrix}$ °C of actual Peak Temperature (t _p) ²	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%

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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