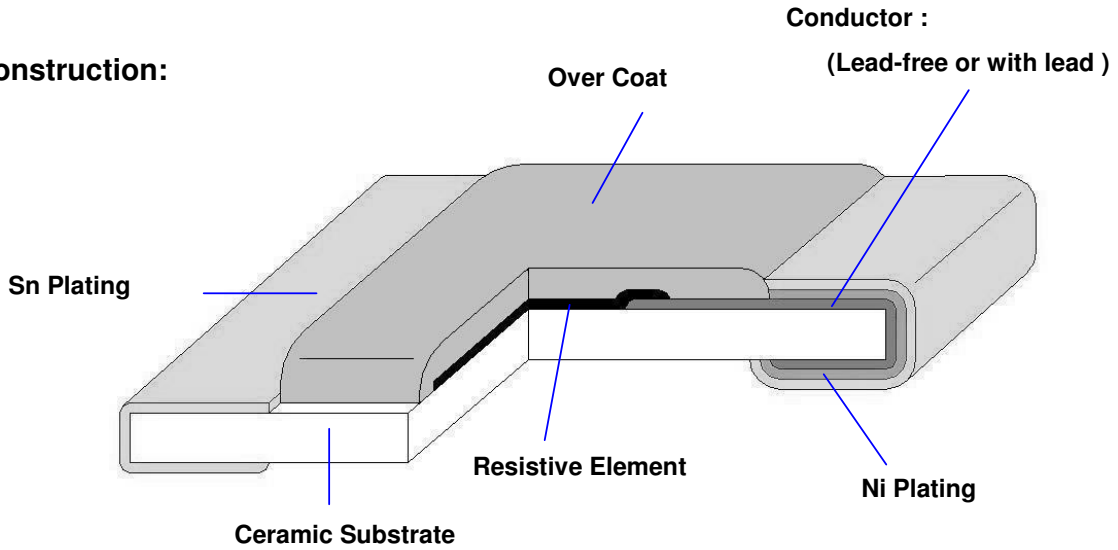


1. Scope :

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

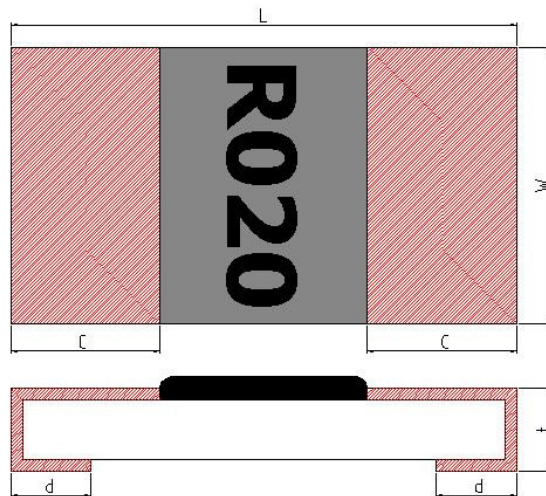
2. Construction:



3. Type Designation:

<u>RL</u>	<u>12</u>	<u>J</u>	<u>TN</u>	<u>R020</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) R020=20mΩ	

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)	20 ~ 91			Refer to JIS C 5202 5.1
T.C.R (ppm/°C)	20 mΩ	21-50 mΩ	51-91 mΩ	Refer to JIS C 5202 5.2
	±800ppm	±600ppm	±400ppm	
Operation Temperature Range (°C)	-55 ~ +125			
Resistance Tolerance (%)	±1, ±2, ±5			JIS C 5201 4.2.5
Insulation Resistance (MΩ)	Over 100			Refer to JIS C 5202 5.6 Mounting condition G
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.

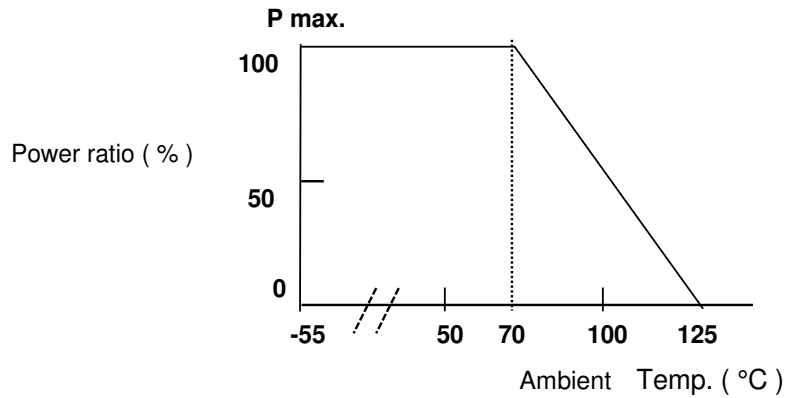


Figure 1

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:(As specified in JIS C 5202)

Test Items	Reference standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	JIS-C5202-5.2	-55 ~ +125 °C	Refer to paragraph 5
Short Time Overload	JIS-C5202-5.5	2.5 X rated voltage, 5s	± 2%+0.005 Ω
Load Life	JIS-C5202-7.10	1000 hours at rated power , 70°C , 1.5hours "ON ", 0.5hour "OFF"	± 3%+0.001 Ω
Load Life with Humidity	JIS-C5202-7.9	1000 hours at rated power , 40 ± 2°C , 90~95% RH 1.5hours "ON ", 0.5hour "OFF"	± 3%+0.001 Ω
Rapid Change of Temperature	JIS-C5202-7.4	-55°C (30 min.) / +125 °C (30 min.) 5 cycles	± 1%+0.005 Ω
Resistance to Soldering Heat	JIS-C5202-6.10	270 ± 5°C solder , 10 ± 1 sec dwell .	± 1%+0.005 Ω
Solderability	JIS-C5202-6.11	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)	JIS-C5202-6.1	3mm deflection	± 1%+0.005 Ω
Resistance to Dry Heat	JIS-C5202-7.2	125 ± 5°C for 96 ± 4hrs	± 2%+0.001 Ω

Note* :RCWV : Rated continuous working voltage .

7. Marking

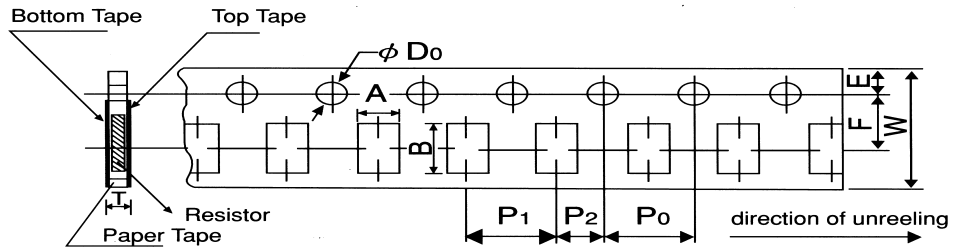
Resistance value is expressed by 4 digits, the first "R" means decimal point and the other digits represent for the normal resistance in Ω.

e.g., R020 =20 m Ω

8. Taping & Reel

8.1 Taping Dimensions

8.1.1 4 mm pitch paper

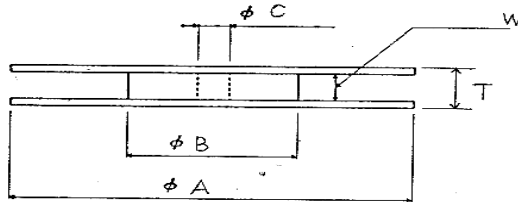
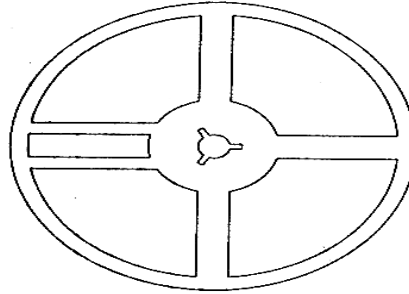


Packing	Type	A	B	W	F	E	P ₁	P ₂	P ₀	D ₀	T
Paper Tape	RL12	2.0 ±0.15	3.6 ±0.2	8.0 ±0.2	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	φ 1.5 +0.1 -0	0.84 ±0.1

UNIT: mm

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

8.2 Reel Specifications

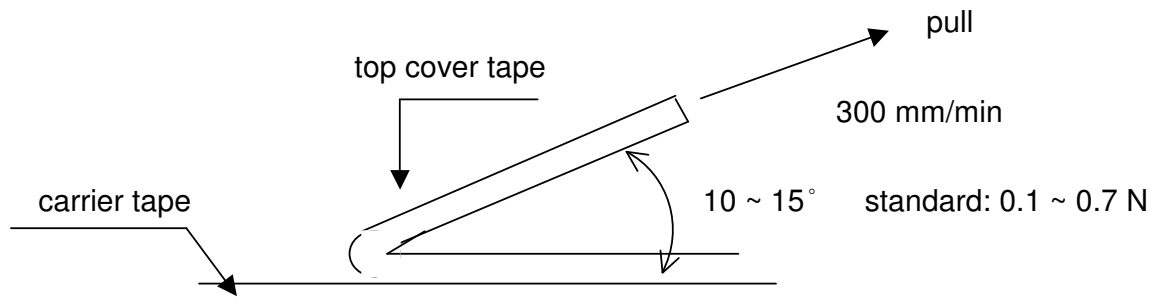


UNIT: mm

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

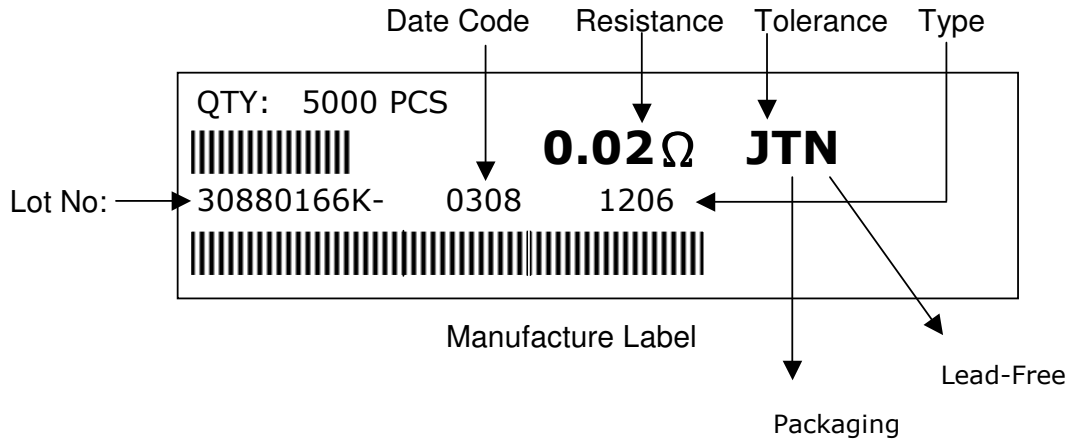
8.3 Peel – off force :

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

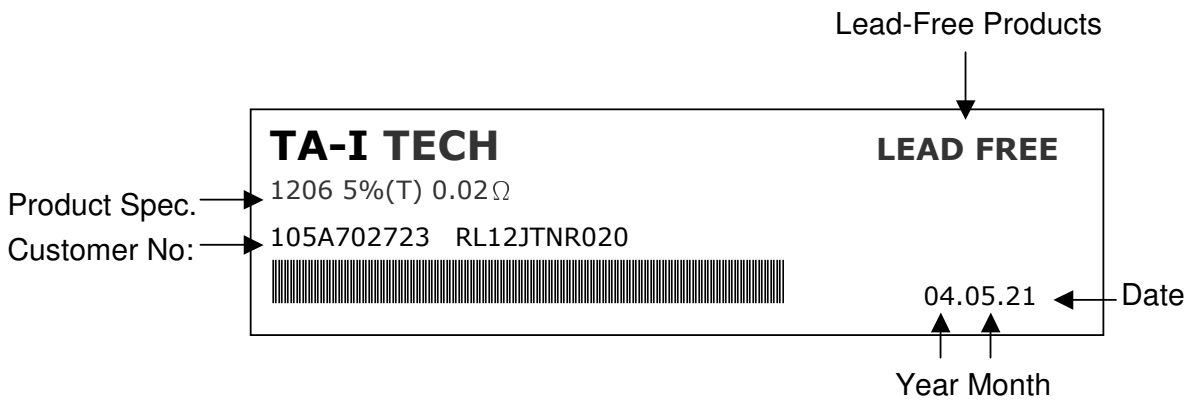


9. Label

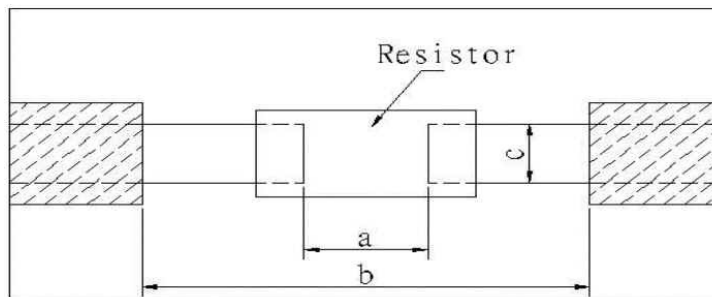
9.1 Manufacture Label :



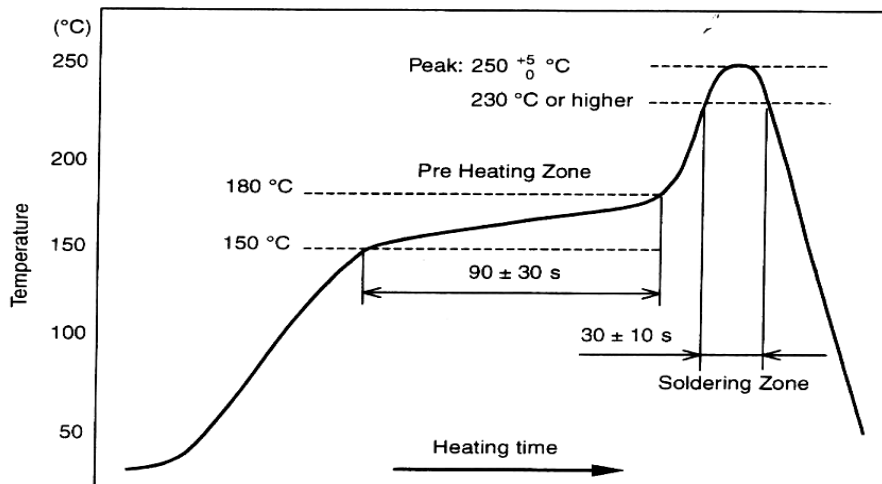
9.2 Customer Label(By customer request):



10. Recommended land patterns



Land pattern		Dimension (mm)		
		a	b	c
Type	Size			
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)

Peak : $250 \begin{smallmatrix} +5 \\ -0 \end{smallmatrix} \text{ } ^\circ\text{C}$, 5 sec

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

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

12. Storage Conditions:

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

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.

TA-I	Thick Film Chip Resistors Low Resistance (20-91 mΩ)for 1206	No	TRL-12OS011B
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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 :002-62-21-44820254 Fax : 002-62-21-44820256

TA-I TECHNOLOGY CO., LTD

TA-I	Thick Film Chip Resistors Low Resistance (20-91 mΩ)for 1206	No	TRL-12OS011B
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Revise record

Date	Content	Owner
Jul.11.2006	<ol style="list-style-type: none"> 1. Adding "Recommend IR – Reflow profile" 2. Adding Customer label 3. Adding shelf life 4. 2. Conductor : Adding to (Lead-free or with lead) 5. 3. Type Designation: 12-1206 changed 12-1206(3216) 6. Reliability Tests: <ul style="list-style-type: none"> Solderability : 235 ± 5°C solder, 2 ± 0.5 sec dwell. Changed to 245±5°C solder, 2±0.5 sec dwell. Solder : Sn96.5 / Ag3.0 / Cu0.5 Resistance to Dry Heat : <ul style="list-style-type: none"> Test Limits : ± 3%+0.005 Ω changed ± 2%+0.001 Ω 7. 8.2 Reel Specifications: <ul style="list-style-type: none"> φ A 180+0 / -3.0 changed 178 ±2.0 φ B 60 min changed 60.0±1.0 T 11.4 ±2.0 changed 11.5 ±1.0 8. 9.1 Manufacture label : <ul style="list-style-type: none"> Series number 3 codes changed to 4 codes 9. 10. Recommended land patterns : <ul style="list-style-type: none"> RL12 a 2.2 changed 2.0~2.4 b 4.7 changed 4.4~5.0 c 1.4 changed 1.2~1.8 10. 15. Manufacturing Country & City: <ul style="list-style-type: none"> Adding TA-I TECHNOLOGY (DONGGUAN) CO., LTD 	Vincent