



Alloy Film Chip Resistors

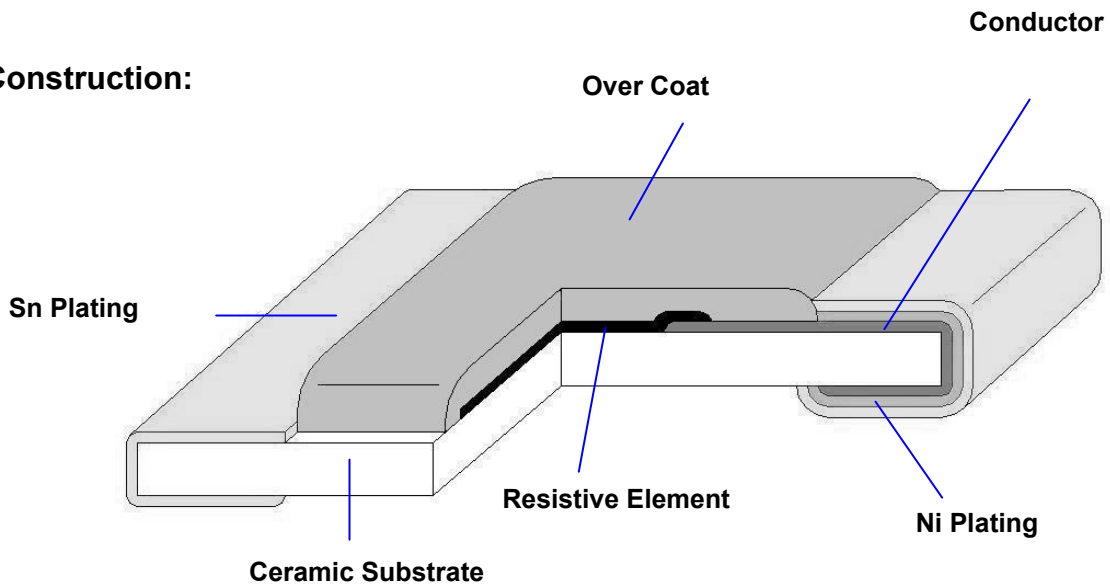
Low Resistance for 1210
Halogen-Free

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1. Scope :

This specification applies for the RL13 (1210) of alloy film chip resistors made by TA-I.

2. Construction:



3. Type Designation:

<u>RL</u>	<u>13</u>	<u>F</u>	<u>TN</u>	<u>R020</u>
Product Code	Size	Tolerance	Packaging	Nominal Resistance
RL : Chip Resistor	Power Rating			
13-1210(3226) 1/2W	F - ±1% G - ±2% J - ±5%	TN-Lead Free & Paper Tape	4 Digits e.g., (E24) R390=0.39Ω 3 Digits e.g., (E24) R39=0.39Ω	



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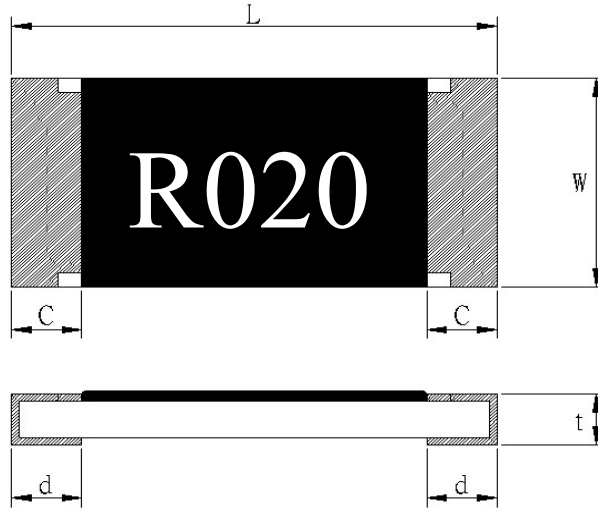
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4. Dimensions:



UNIT: mm

Type	L	W	C	d	t
RL13	3.10 ±0.20	2.55 ± 0.2	0.50 ±0.30	0.50 ± 0.20	0.55 ± 0.15

5. Ratings & Characteristics :

Characteristics	Feature				Measurement Method
	RL13				
Power Ratings (W)	1/2W				JIS Code 3A / JIS Code 3D
Resistance Value (mΩ)	100~910	20	21-50	51-91	Refer to JIS C 5201-1 4.5
T.C.R (ppm/°C)	±200	±800	±600	±400	Refer to JIS C 5201-1 4.8
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)	$(P * R)^{1/2}$				



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5.1 Derating Curve :

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

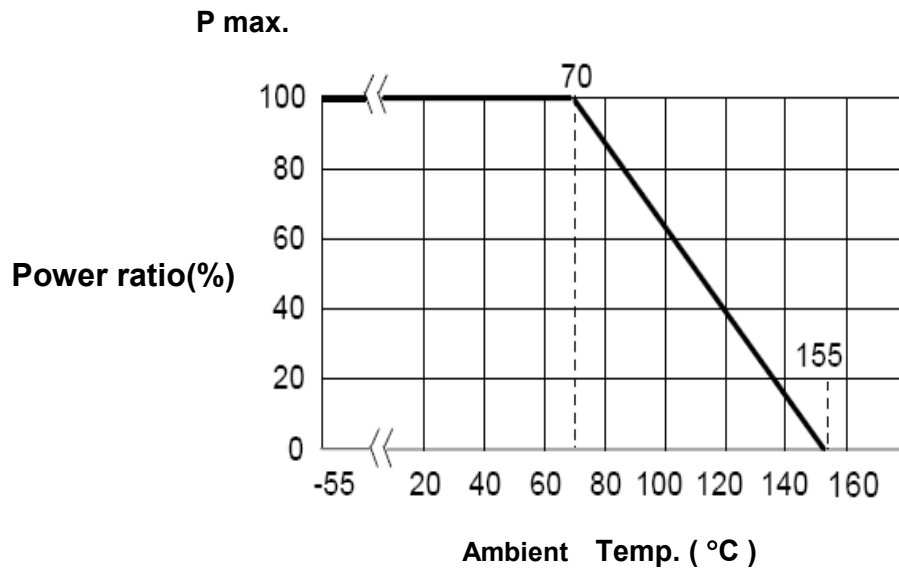


Figure 1

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)



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6. Reliability Tests:

Test Items	Reference standard	Condition of Test	Test Limits $\Delta R/R$
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

7.1.1 E96: 1%

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., R100 =100 mΩ

7.1.2 E24: 2%,5%

Resistance value is expressed by 3 digits, the first "R" means decimal point and the other digits represent for the normal resistance in Ω.

e.g., R10 =100 mΩ



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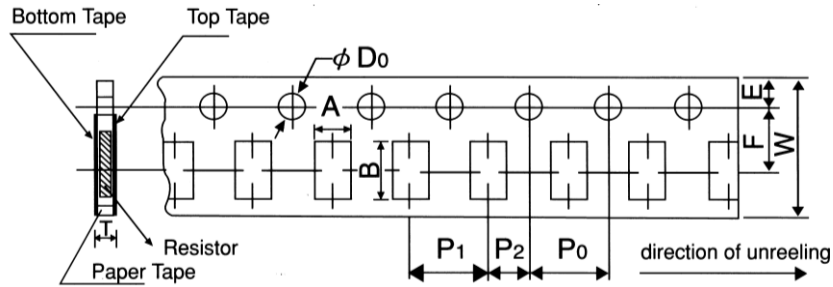
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8. Taping & Reel

8.1 Taping Dimensions

8.1.1 4 mm pitch paper

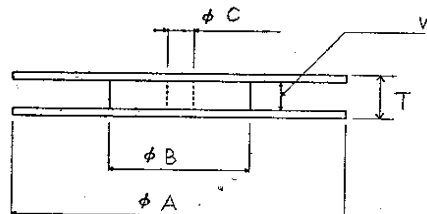
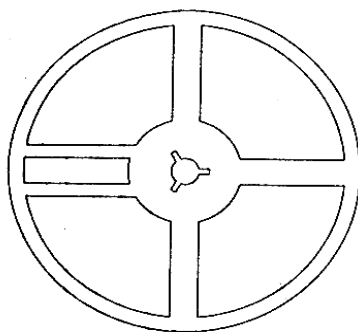


Packing	Type	A	B	W	F	E	P ₁	P ₂	P ₀	D ₀	T
Paper Tape	RL13	2.8 ±0.2	3.6 ±0.2	8.0 ±0.2	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	φ 1.5 ^{+0.1} ₋₀	0.84 ±0.1

UNIT: mm

Type	Size	Paper Tape
		4 mm pitch
		178mm/R
RL	13	5000

8.2 Reel Specifications



UNIT: mm

Series	φ A	φ B	φ C	W	T
RL 13	178 ±2.0	60 ±1.0	13.0 ±1.0	9.0 ±1.0	11.5 ±1.0



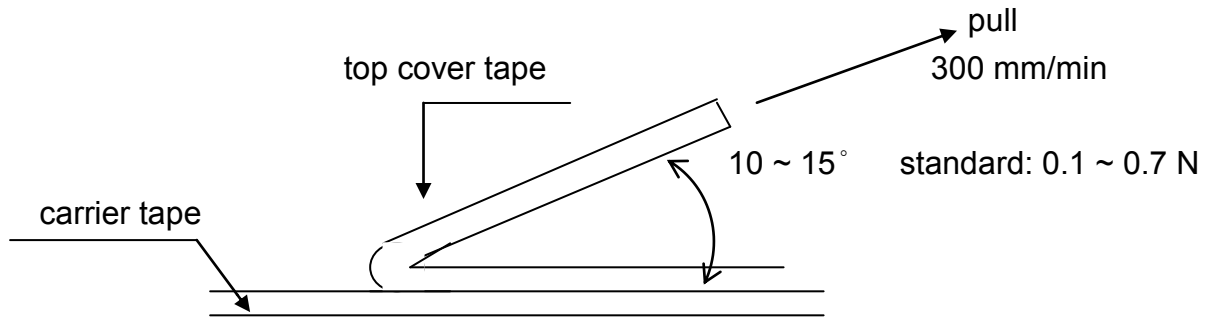
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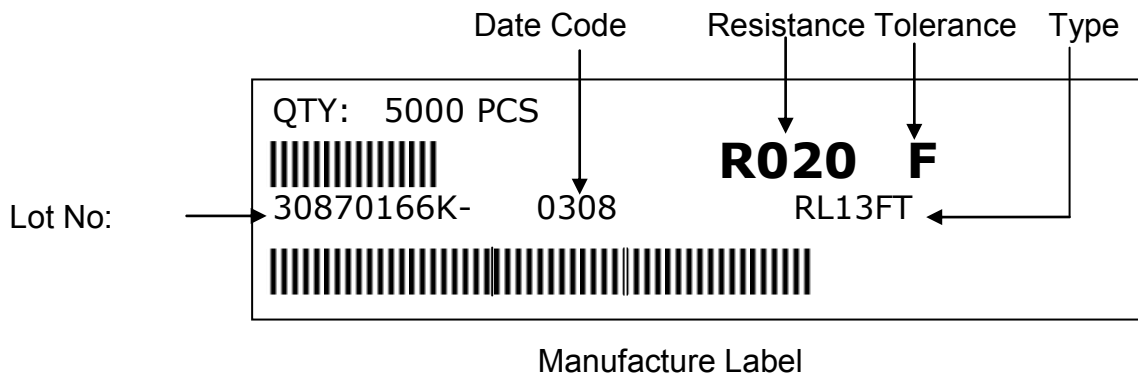
8.3 Peel – off force :

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.

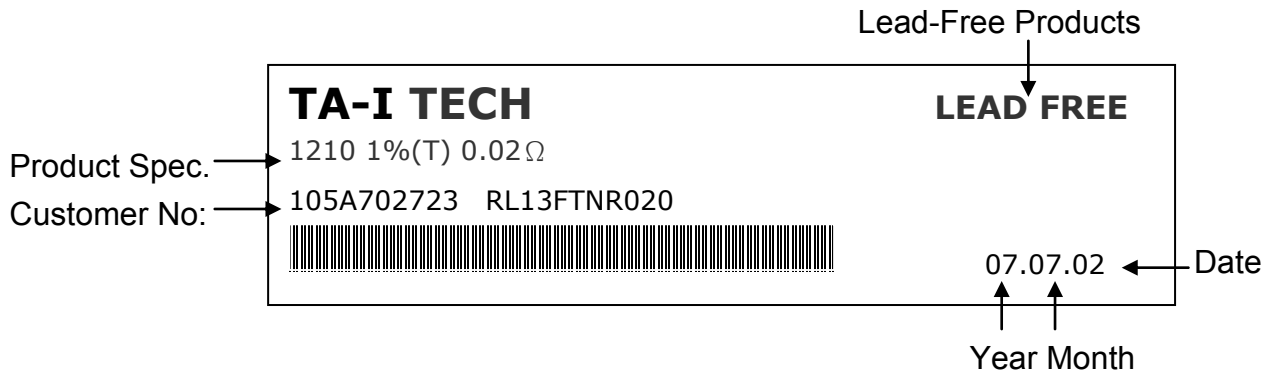


9. Label

9.1 Manufacture Label :



9.2 Customer Label (By customer request):





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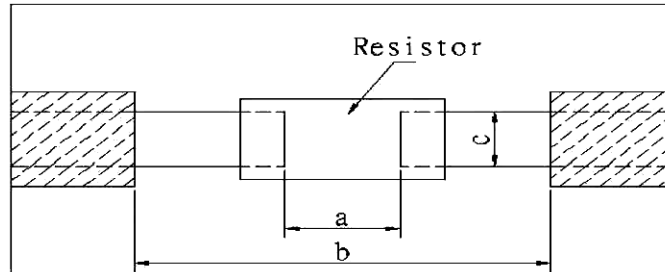
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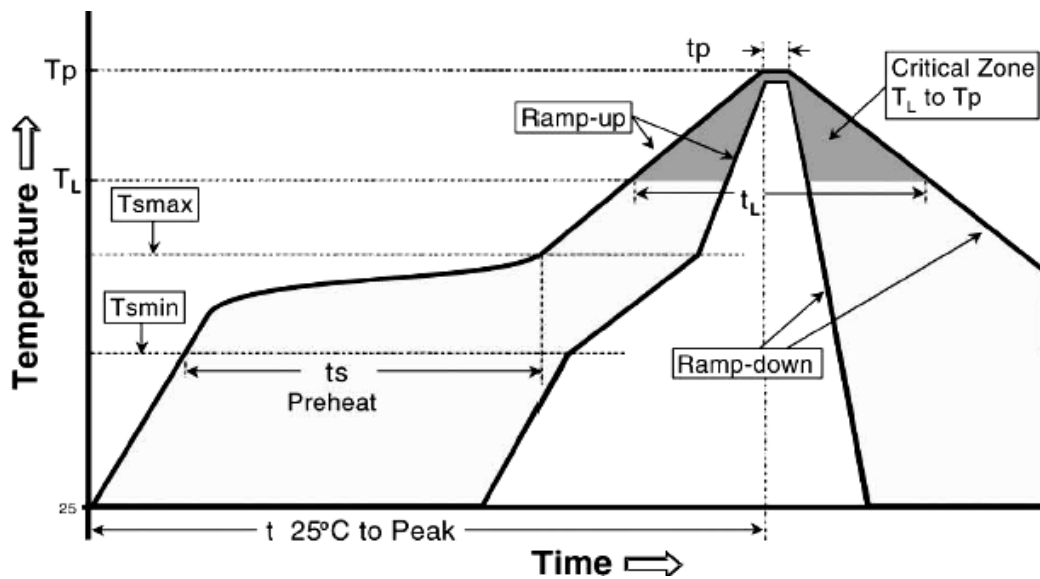
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10. Recommended land patterns



Land pattern		Dimension (mm)		
Type	Size	a	b	c
RL	13 (1210)	2.0~2.4	4.4~5.0	2.3~3.5

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





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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}) (ts)	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	8mimutes max.

Alloyed 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%

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 :

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

Tel: (+886)3-3246169 Fax : (+886)3-3246167

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

Tel : (+86)512-63457879 Fax : (+86)512-63457869



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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) TAI OHM ELECTRONICS (M) SDN. BHD. (Malaysia – Penang)
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- (4) P.T.TAI ELECTRONICS Indonesia (Indonesia – Jakarta)
Tel : (+62)21-89830123 Fax : (+62)21-89830703