



# Alloy Film Chip Resistors

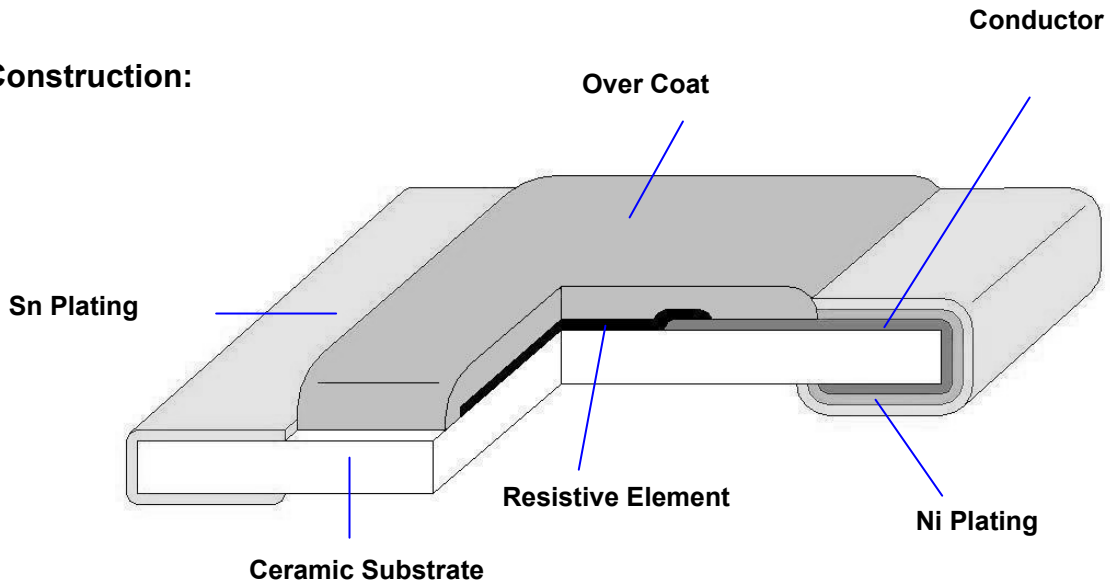
Low Resistance for 1210  
Halogen-Free

Document No.	TRL-130S032D
Issued Date	2012/11/26
page	1 / 9

## 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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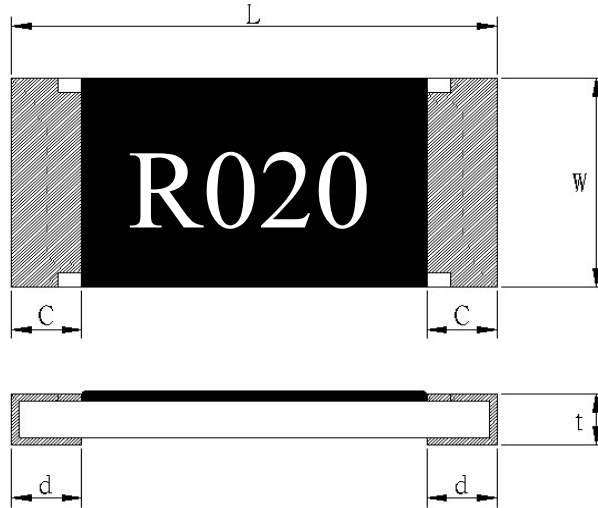
Document No. TRL-130S032D

Issued Date 2012/11/26

page

2 / 9

## 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)	$(P * R)^{1/2}$				



# Alloy Film Chip Resistors

Low Resistance for 1210  
Halogen-Free

Document No. TRL-130S032D

Issued Date 2012/11/26

page 3 / 9

## 5.1 Derating Curve :

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

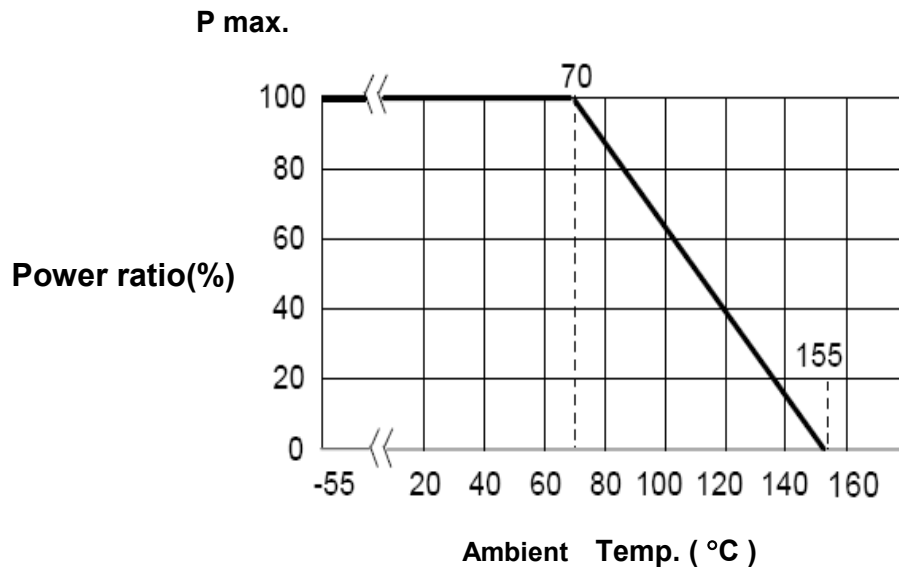


Figure 1

## 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( $\Omega$ )



# Alloy Film Chip Resistors

Low Resistance for 1210  
Halogen-Free

Document No.	TRL-130S032D
Issued Date	2012/11/26
page	4 / 9

## 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%: $\pm$ (1%+0.005 $\Omega$ ) 2%,5%: $\pm$ (3%+0.005 $\Omega$ )
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%: $\pm$ (1%+0.001 $\Omega$ ) 2%,5%: $\pm$ (3%+0.001 $\Omega$ )
Load Life with Humidity	IEC60115-1-4.24 JIS-C5201-1-4.24	1000 hours at rated power, 40 $\pm$ 2°C, 90~95% RH 1.5hours "ON", 0.5hour "OFF"	1%: $\pm$ (1%+0.001 $\Omega$ ) 2%,5%: $\pm$ (3%+0.001 $\Omega$ )
Rapid Change of Temperature	IEC60115-1-4.19 JIS-C5201-1-4.19	-55°C (30 min.) / +155 °C (30 min.) 5 cycles	$\pm$ 1%+0.005 $\Omega$
Resistance to Soldering Heat	IEC60115-1-4.18 JIS-C5201-1-4.18	270 $\pm$ 5°C solder, 10 $\pm$ 1 sec dwell.	$\pm$ 1%+0.005 $\Omega$
Solderability	IEC60115-1-4.17 JIS-C5201-1-4.17	245 $\pm$ 5°C solder, 2 $\pm$ 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	$\pm$ 1%+0.005 $\Omega$
Resistance to Dry Heat	IEC60115-1-4.23.2 JIS-C5201-1-4.23.2	155 $\pm$ 5°C for 96 $\pm$ 4hrs	1%: $\pm$ (1%+0.005 $\Omega$ ) 2%,5%: $\pm$ (2%+0.005 $\Omega$ )

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  $\Omega$ .

e.g., R100 =100 m $\Omega$

### 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  $\Omega$ .

e.g., R10 =100 m $\Omega$



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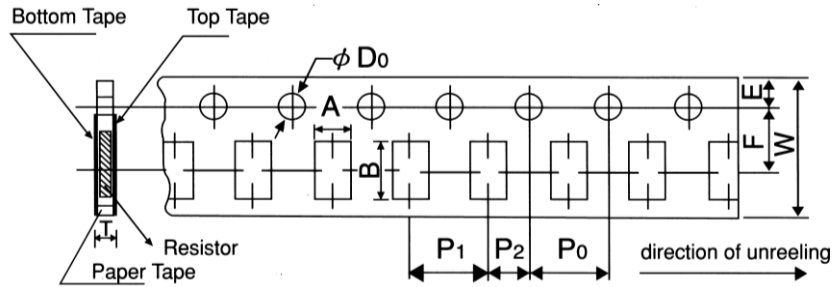
Low Resistance for 1210  
Halogen-Free

Document No.	TRL-130S032D
Issued Date	2012/11/26
page	5 / 9

## 8. Taping & Reel

### 8.1 Taping Dimensions

#### 8.1.1 4 mm pitch paper

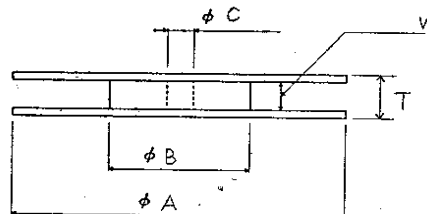
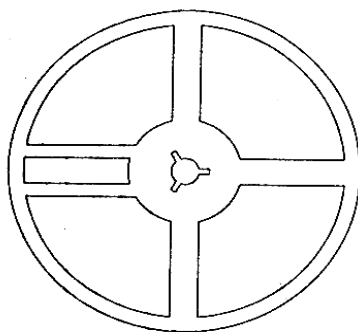


Packing	Type	A	B	W	F	E	$P_1$	$P_2$	$P_0$	$D_0$	T
Paper Tape	RL13	$2.8 \pm 0.2$	$3.6 \pm 0.2$	$8.0 \pm 0.2$	$3.5 \pm 0.05$	$1.75 \pm 0.1$	$4.0 \pm 0.1$	$2.0 \pm 0.05$	$4.0 \pm 0.1$	$\phi 1.5^{+0.1}_{-0}$	$0.84 \pm 0.1$

UNIT: mm

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

### 8.2 Reel Specifications



UNIT: mm

Series	$\phi A$	$\phi B$	$\phi C$	W	T
RL 13	$178 \pm 2.0$	$60 \pm 1.0$	$13.0 \pm 1.0$	$9.0 \pm 1.0$	$11.5 \pm 1.0$



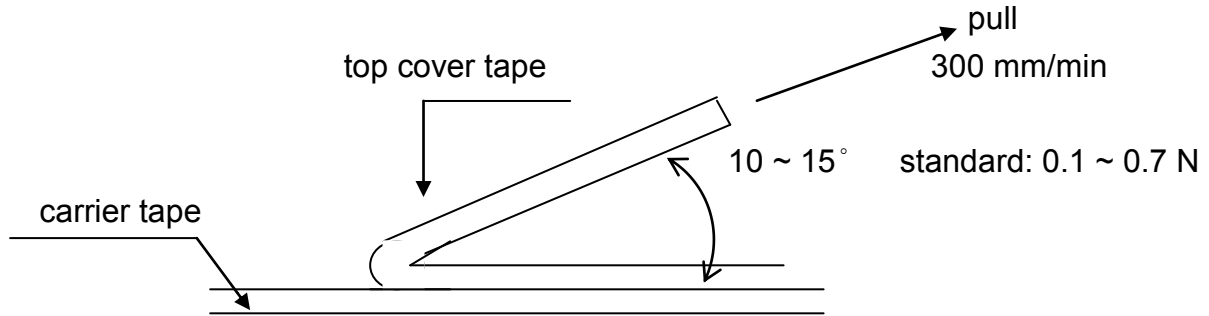
# Alloy Film Chip Resistors

Low Resistance for 1210  
Halogen-Free

Document No.	TRL-130S032D
Issued Date	2012/11/26
page	6 / 9

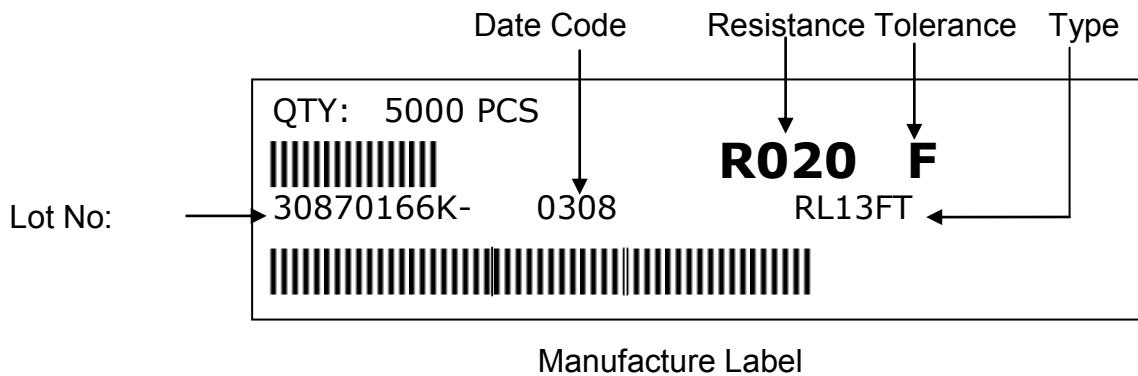
### 8.3 Peel – off force :

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.

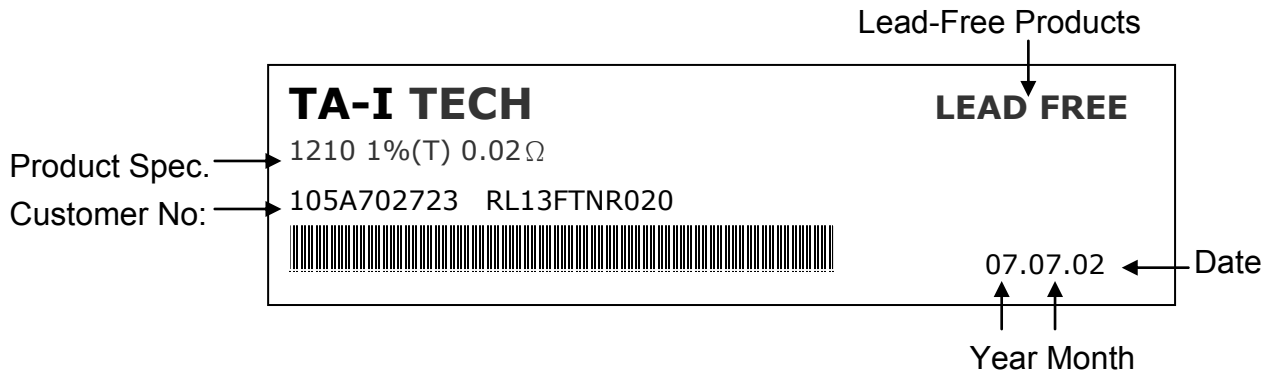


### 9. Label

#### 9.1 Manufacture Label :



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





# Alloy Film Chip Resistors

Low Resistance for 1210  
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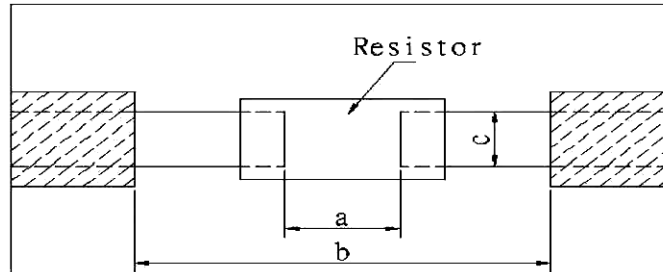
Document No. TRL-130S032D

Issued Date 2012/11/26

page

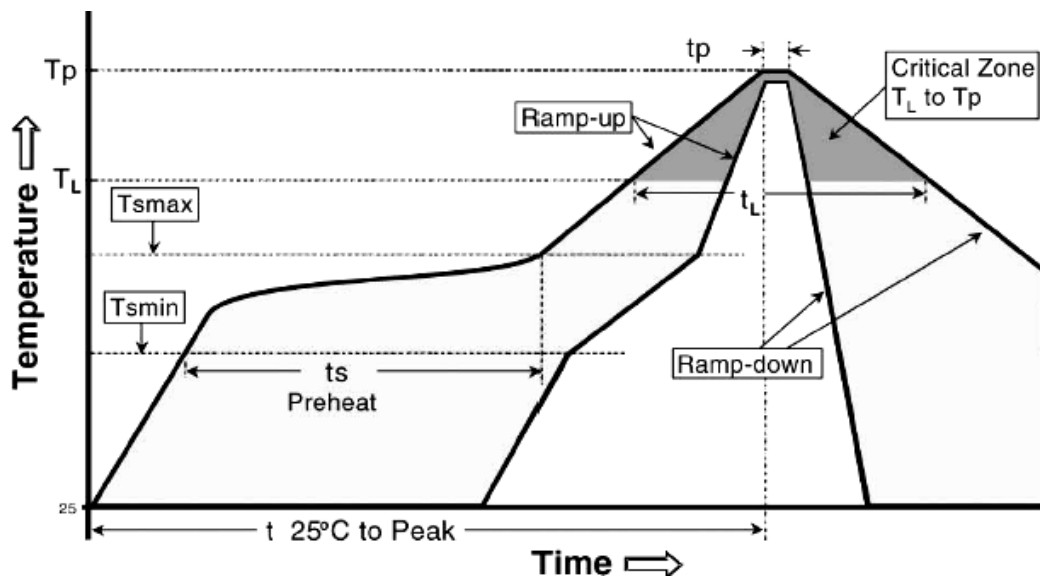
7 / 9

## 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 )





# Alloy Film Chip Resistors

Low Resistance for 1210  
Halogen-Free

Document No.	TRL-130S032D
Issued Date	2012/11/26
page	8 / 9

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> ) (ts)	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.

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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Low Resistance for 1210  
Halogen-Free

Document No.	TRL-130S032D
Issued Date	2012/11/26
page	9 /9

## 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 )  
Tel : (+60)4- 3900480 Fax : (+60)4-3901481
  
- (4) P.T.TAI ELECTRONICS Indonesia ( Indonesia – Jakarta )  
Tel : (+62)21-89830123 Fax : (+62)21-89830703