



# High Power Low Resistance Chip Resistors (RLH12 Series)

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## 1. Scope :

The specification applies for the RLH12 Series of low resistance chip resistors made by TA-I.

## 2. Features:

- ◆ Low Resistance and High Accuracy Resistor for Current Detection
- ◆ Large Electrode (All series)
- ◆ Good Performance for Heat Dissipation
- ◆ High Purity Alumina Substrate for High Power Dissipation
- ◆ Pb-free to Meet RoHS Requirements

## 3. Applications:

- ◆ Power Management Applications
- ◆ Switching Power Supply
- ◆ DC-DC Converter, Battery Pack, Charger, Adaptor
- ◆ Portable Instruments (PDA and Cell Phone)
- ◆ Voltage Regulation Module (VRM)
- ◆ Computer

## 4. Type Designation:

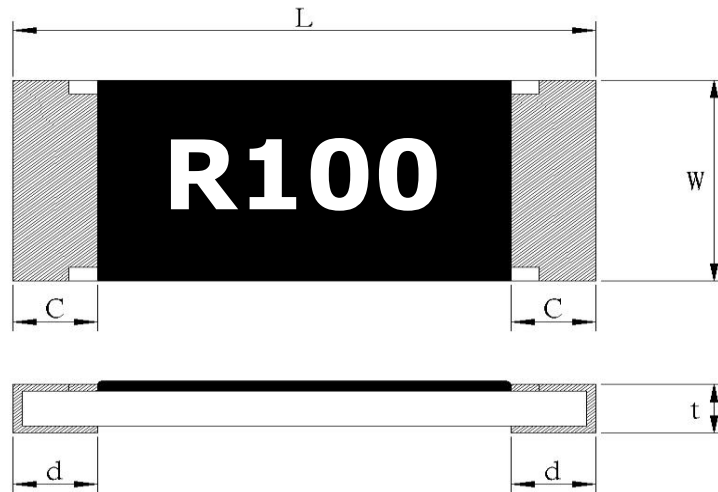
RLH	12	F	T	C	R100
High Power Low Resistance Chip Resistors	Size	Tolerance of Resistance at	Packaging	Power Rating (70°C)	Nominal Resistance
	12:1206	F:±1.0% G:±2.0% J:±5.0%	T: Paper	C=1W	R100 : 100mΩ



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## 5. Dimensions:



Unit: mm

Item	L	w	c	d	t
RLH12	3.10±0.20	1.55±0.20	0.50±0.30	0.40±0.20	0.55±0.10

## 6. Derating Curve :

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

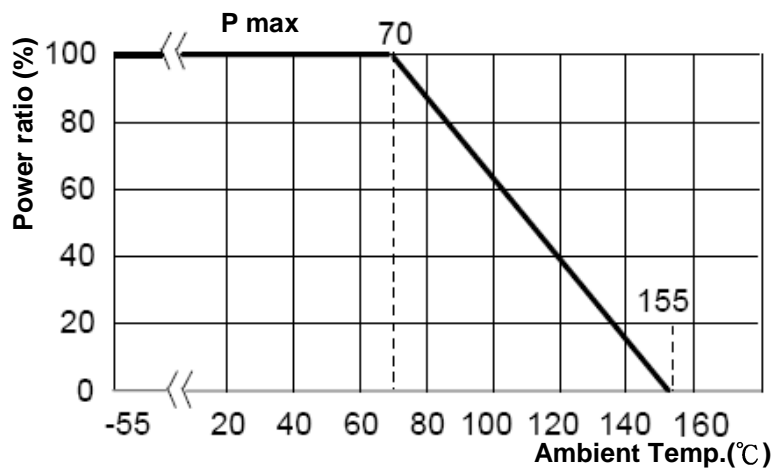


Figure 1



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## 7. Electrical Characteristics

Type	RLH 12
Power Rating	1W
Resistance Value	100m $\Omega$ ~910m $\Omega$
Operation Temperature Range	-55 $^{\circ}$ C ~ +155 $^{\circ}$ C
Temperature Coefficient of Resistance	100ppm/ $^{\circ}$ C
Tolerance	$\pm$ 1% , $\pm$ 2% , $\pm$ 5%
Insulation Resistance	Over 100M $\Omega$
Maximum Working Voltage(V)	(P*R) <sup>1/2</sup>

## 8. Reliability Tests:

Test Item	Reference standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1-4.8 JIS-C5201-1-4.8	25 $^{\circ}$ C ~ 125 $^{\circ}$ C	Refer to paragraph 6
Short Time Overload	IEC60115-1-4.13 JIS-C5201-1-4.13	5 X rated power, 5s	$\pm$ (1.0%+0.5m $\Omega$ )
Load Life	IEC60115-1-4.25.1 JIS-C5201-1-4.25.1	1000 hours at rated power, at 70 $^{\circ}$ C	$\pm$ (5.0%+0.5m $\Omega$ )
Load Life with Humidity	IEC60115-1-4.24 JIS-C5201-1-4.24	1000 hours at rated power , 40 $\pm$ 2 $^{\circ}$ C , 90~95% RH	$\pm$ (5.0%+0.5m $\Omega$ )
Thermal Shock	IEC60115-1-4.19 JIS-C5201-1-4.19	-55 $^{\circ}$ C (15 min. ) / +155 $^{\circ}$ C (15 min.) 5 cycles	$\pm$ (1.0%+0.5m $\Omega$ )
Resistance to Solder Heat	IEC60115-1-4.18 JIS-C5201-1-4.18	270 $\pm$ 5 $^{\circ}$ C solder , 10 $\pm$ 1 sec dwell .	$\pm$ (1.0%+0.5m $\Omega$ )
Solder ability	IEC60115-1-4.17 JIS-C5201-1-4.17	245 $\pm$ 5 $^{\circ}$ 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.
Bending Test	IEC60115-1-4.33 JIS-C5201-1-4.33	1mm deflection	$\pm$ (1.0%+0.5m $\Omega$ )
Resistance to Dry Heat	IEC60115-1-4.23.2 JIS-C5201-1-4.23.2	155 $\pm$ 5 $^{\circ}$ C for 96 $\pm$ 4hrs	$\pm$ (1.0%+0.5m $\Omega$ )



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## 9. Marking:

From 1206:

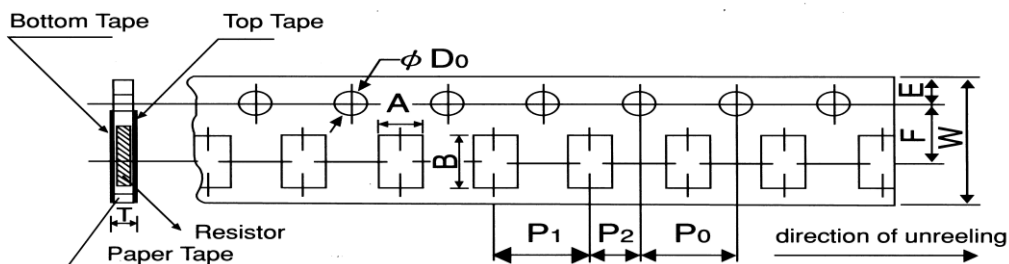
Resistance value is expressed by 4 digits, the first "R" means decimal point and the other digits represent for the normal resistance in  $\Omega$ .

eg.,  $100\text{m}\Omega = \text{R}100$

## 10. Taping & Reel

### 10.1 Taping Dimensions

#### 10.1.1 4 mm pitch paper



UNIT: mm

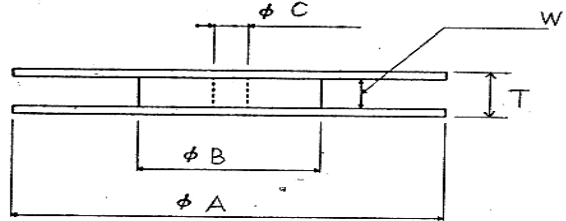
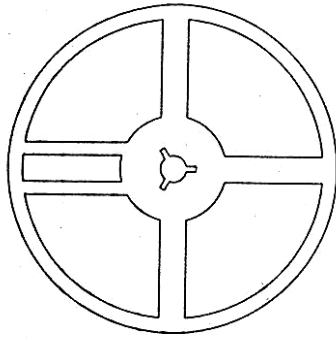
Packing	Type	A	B	W	F	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	D <sub>0</sub>	T
Paper Tape	RLH12	2.0±0.15	3.6±0.2	8.0±0.2	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.1	4.0±0.1	Φ 1.5 +0.1 -0.1	0.84±0.1



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## 10.2 Reel Specifications

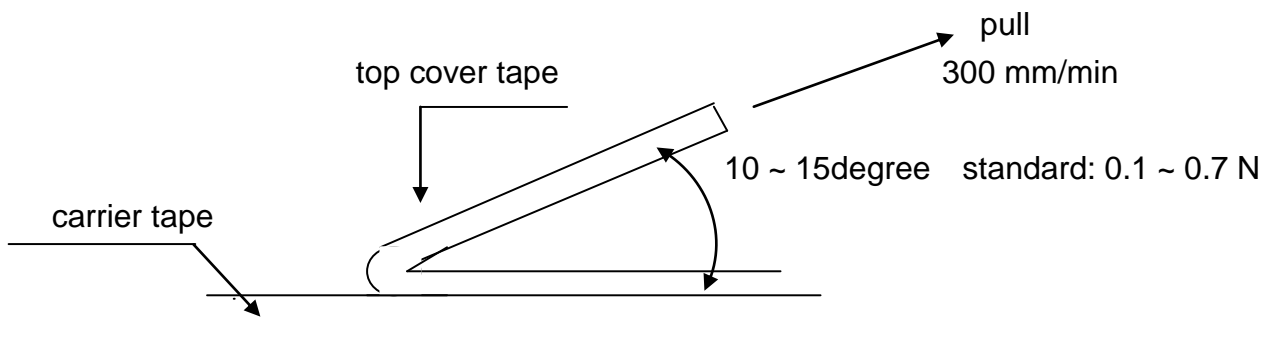


UNIT: mm

Type	ΦA	ΦB	ΦC	W	T
RLH12	178.0 ±2.0	60.0 ±1.0	13.0 ±1.0	9.0 ±1.0	11.4 ±1.0

## 10.3 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.



UNIT: mm

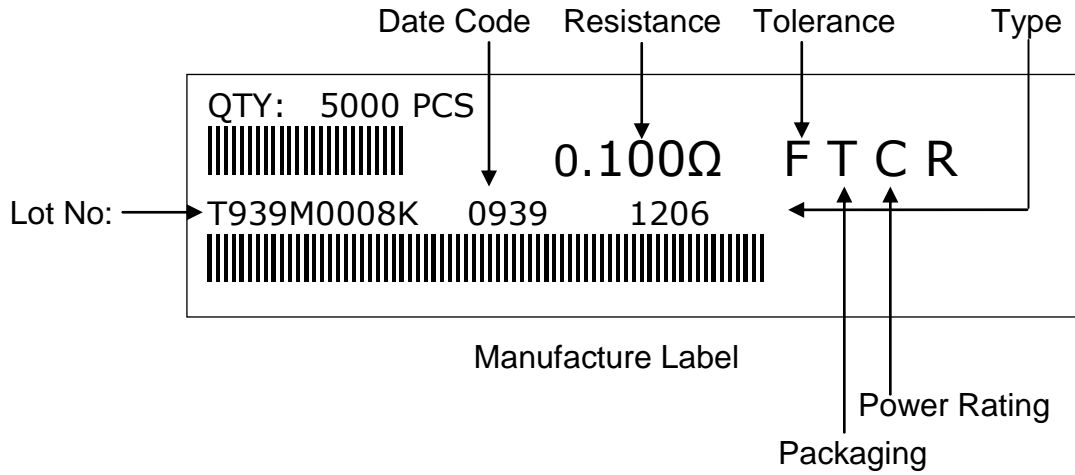


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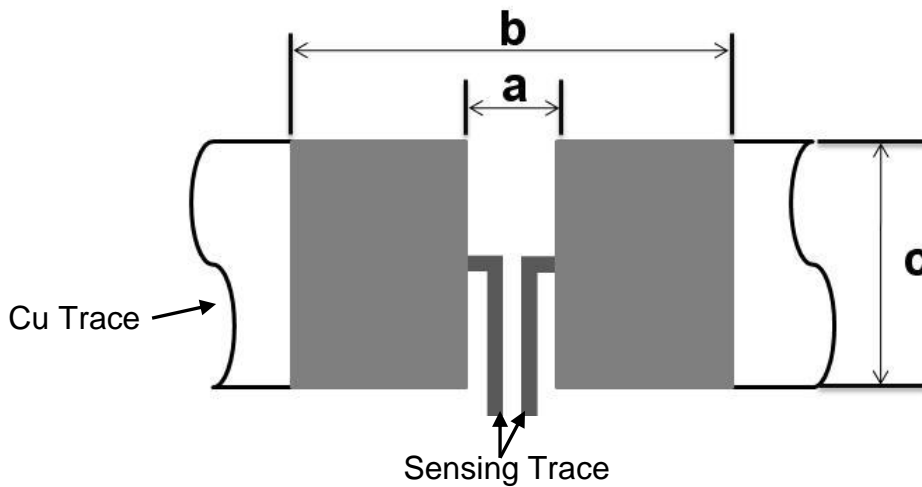
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## 11. Label

### 11.1 Normal Products :



## 12. Recommended land patterns



Land pattern		Dimension ( mm )		
Type	Size	a	b	c
RLH	12 (1206)	0.70±0.20	5.10±0.20	2.50±0.20



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### 13. 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.

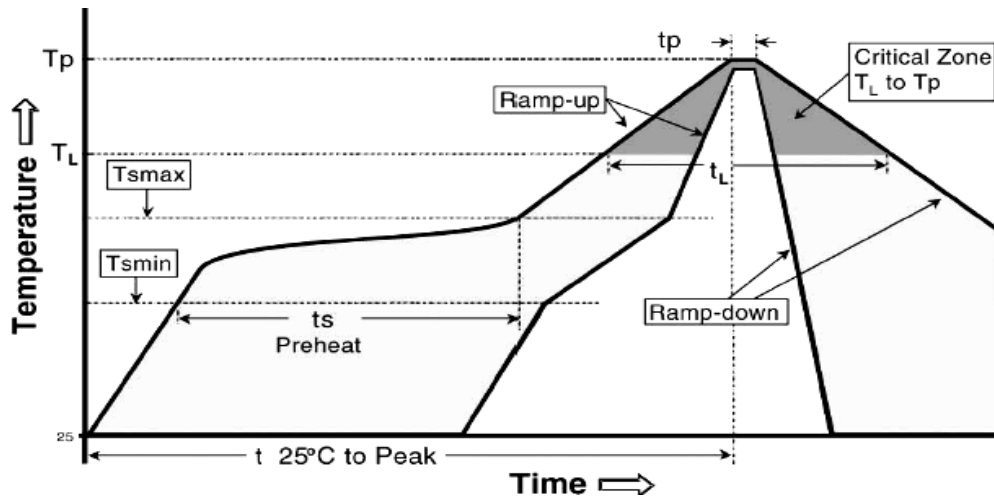
### 14. Storage Conditions:

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

### 15. Shelf Life:

2 years from manufacturing date.

### 16. Recommend IR – Reflow profile : (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.



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### 17. Manufacturing Country & City :

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

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

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