



# Lead-Free Current Sensing Resistors RLS Series ( Halogen-Free )

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## 1. Scope :

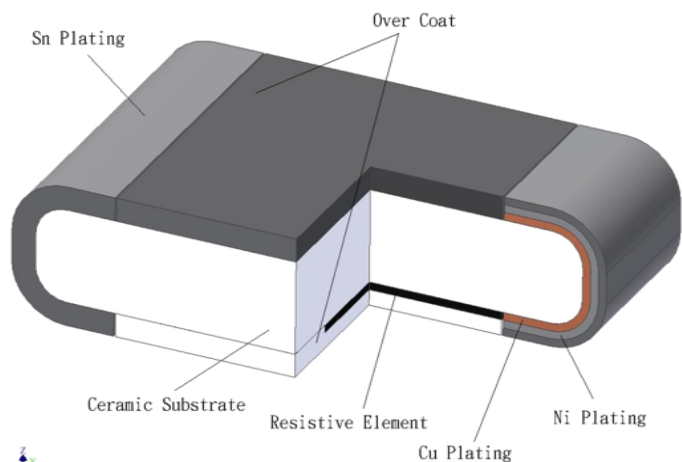
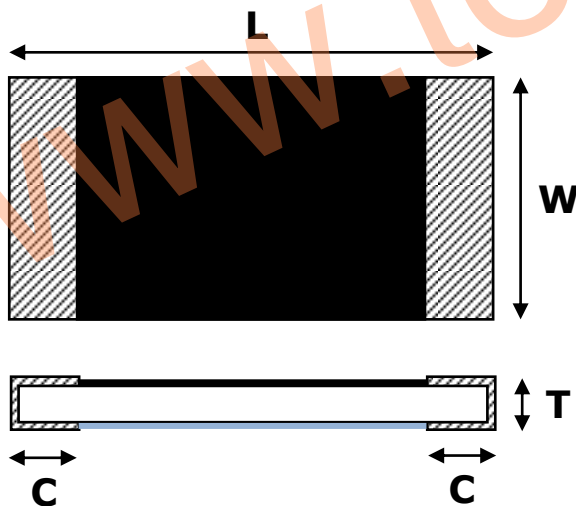
This specification applied to the products of Lead-Free current sensing resistor of metal foil for Lead-Free RLS series manufactured by TA-I TECHNOLOGY CO.,LTD.

## 2. Type Designation :

<b>RLS04</b>	<b>F</b>	<b>T</b>	<b>K</b>	<b>R010</b>
<b>Series No.</b>	<b>Tolerance</b>	<b>Packaging</b>	<b>Power</b>	<b>Resistance</b>
<b>04→0402</b>	<b>F = ± 1%</b> <b>G = ± 2%</b> <b>J = ± 5%</b>	<b>T=Paper</b>	<b>K = 0.2 W</b>	<b>R010=10mΩ</b>

## 3. Dimension :

3.1 Marking : For 0402: No Marking.



Series	L	W	C	T
RLS04	1.00±0.10	0.50±0.10	0.25±0.10	0.45±0.10

UNIT : mm



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#### 4. Features:

Series	Size	Power (W)	Resistance Value	Operation Temperature Range	TCR	Tolerance
RLS04	0402	0.2	10 mΩ	-55°C ~+125°C	±100ppm/°C	±1% ±2% ±5%

#### 5. Reliability Tests:

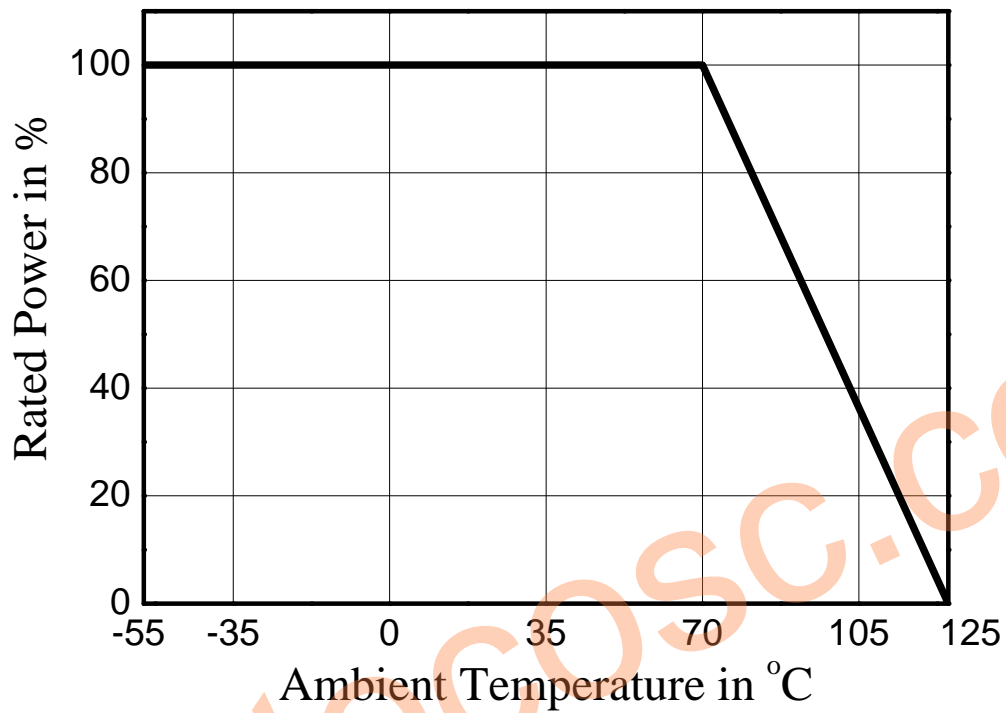
Test Items	Reference standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1-4.8 JIS-C5201-4.8	+25°C ~ +125°C	Refer 4.0
Load Life	IEC60115-1-4.25.1 JIS-C5201-4.25.1	1000hours at rated power, 70°C, 1.5hours "ON", 0.5hour "OFF"	< ±1%
Short Time Overload	IEC60115-1-4.13 JIS-C5201-4.13	5 X rated power for 5s	< ±1%
Moisture no Load	IEC60115-1- 4.24.2.1a) JIS-C5201- 4.24.2.1a)	85°C , 85%RH, 1000hrs	< ±1%
Temperature cycle	IEC60115-1-4.19 JIS-C5201-4.19	-55°C & +125°C, 100 cycle, 15min per extreme condition	< ±1%
Resistance to Soldering Heat	IEC60115-1-4.18 JIS-C5201-4.18	260±5°C for 10±1 sec	< ±1%
Solderability	IEC60115-1-4.17 JIS-C5201-4.17	245±5°C , 2±0.5sec	At least 95% of surface area of electrode shall be covered with new solder
High Temperature Exposure	IEC60115-1- 4.23.2 JIS-C5201-4.23.2	125°C , 1000hrs	< ±1%
Low Temperature Storage	IEC60115-1- 4.23.4 JIS-C5201-4.23.4	-55°C , 1000hrs	<±1%
Substrate Bending	IEC60115-1-4.33 JIS-C5201-4.33	Bending width 2mm	< ±1%
Insulation Resistance	IEC60115-1-4.6 JIS-C5201-4.6	100V DC for 1 minute	>100 MΩ



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## 5.1 Derating Curve



## 5.2 Rated Current & Voltage

The rated Current and Voltage are calculated by the following formula:

$$I = \sqrt{P \div R}$$

$$V = \sqrt{P \times R}$$

I: Rated Current(I)

V: Rated Voltage(V)

P: Rated Power(W)

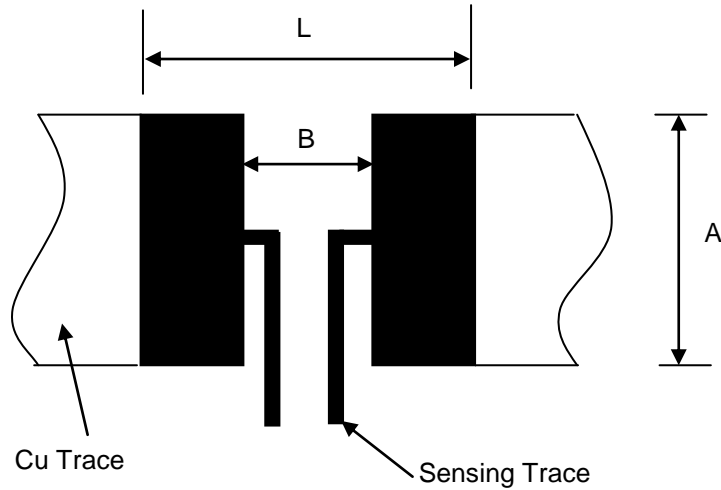
R: Resistance Value( $\Omega$ )



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## 6. Recommended Solder Pad Dimension



Unit: mm

Series	Resistance (mΩ)	A	L	B
RLS04	$R = 10$	0.7	1.2	0.5

Note: \*The copper foil minimum thickness of PCB needs 3 oz



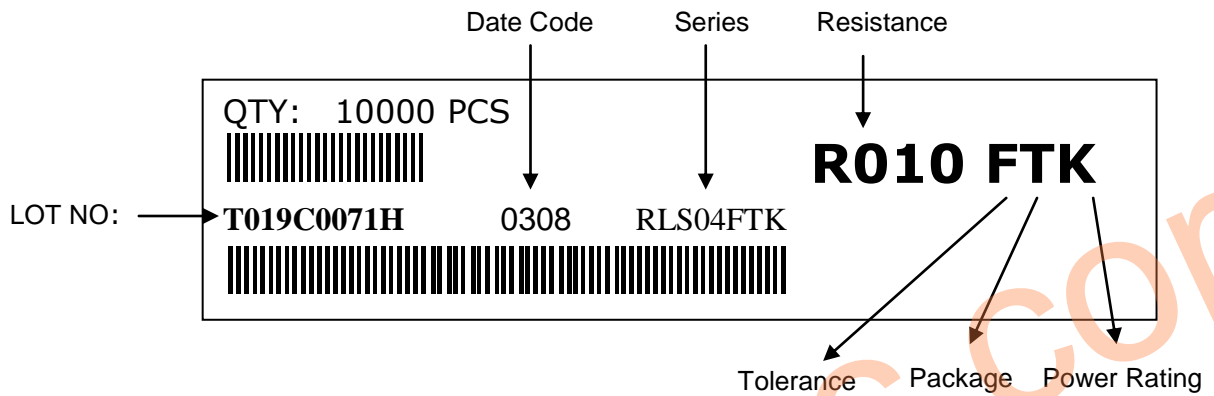
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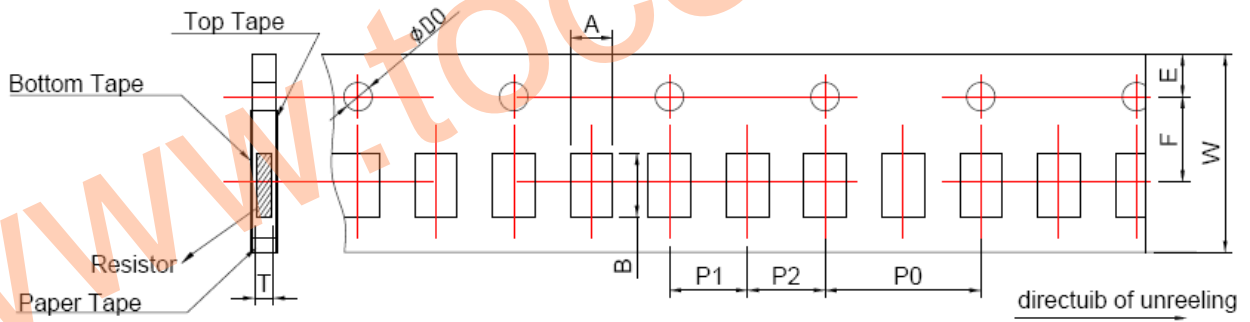
## 7. Number of Package:

Series	RLS04
Pieces/Package	10000

## 8. Label:



## 9. Packaging



**Tape packaging dimension**

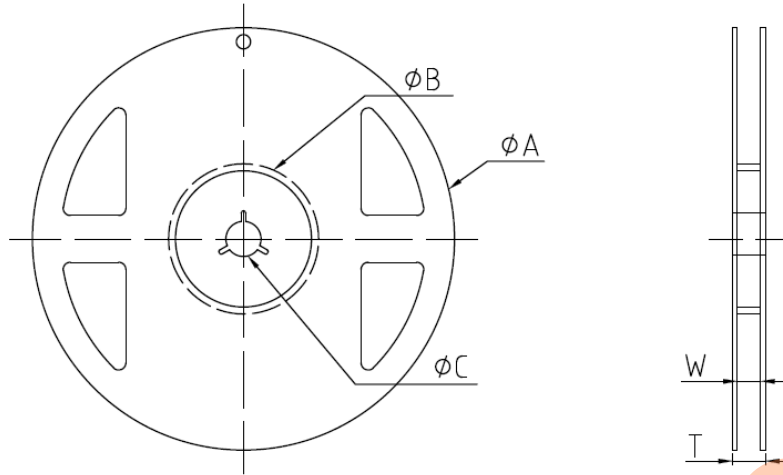
Packing	Type	A	B	W	F	E	P1	P2	P0	D0	T
Paper Tape	RLS04	0.70	1.20	8.00	3.50	1.75	2.00	2.00	4.00	1.55	0.65
Tolerance		±0.05	±0.05	±0.20	±0.05	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10



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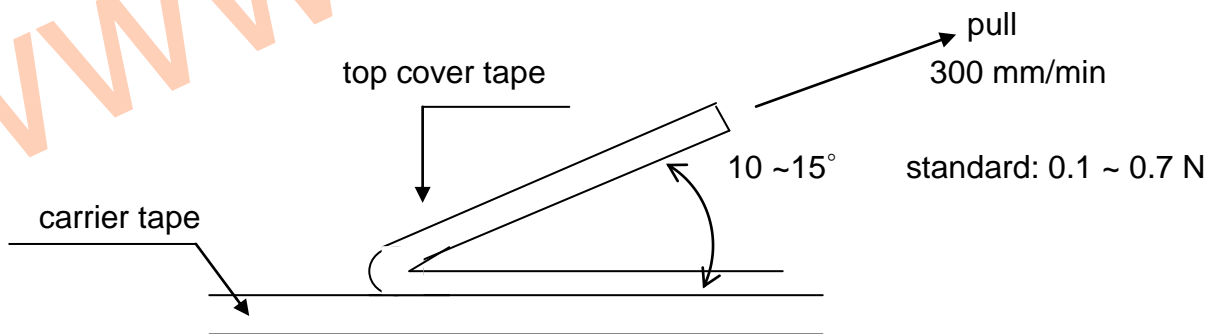
## 10. Reel Specification



Series	$\phi A$	$\phi B$	$\phi C$	W	T
RLS04	178 $\pm$ 2.0	60 $\pm$ 1.0	13.0 $\pm$ 1.0	9.0 $\pm$ 1.0	11.4 $\pm$ 1.0

## 11. Peeling Strength of Top Cover Tape

Test Condition: 0.1 to 0.7 N at a peel-off speed of 300 mm / min.



## 12. Storage Conditions:

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

## 13. Shelf Life:

2 years from manufacturing date.



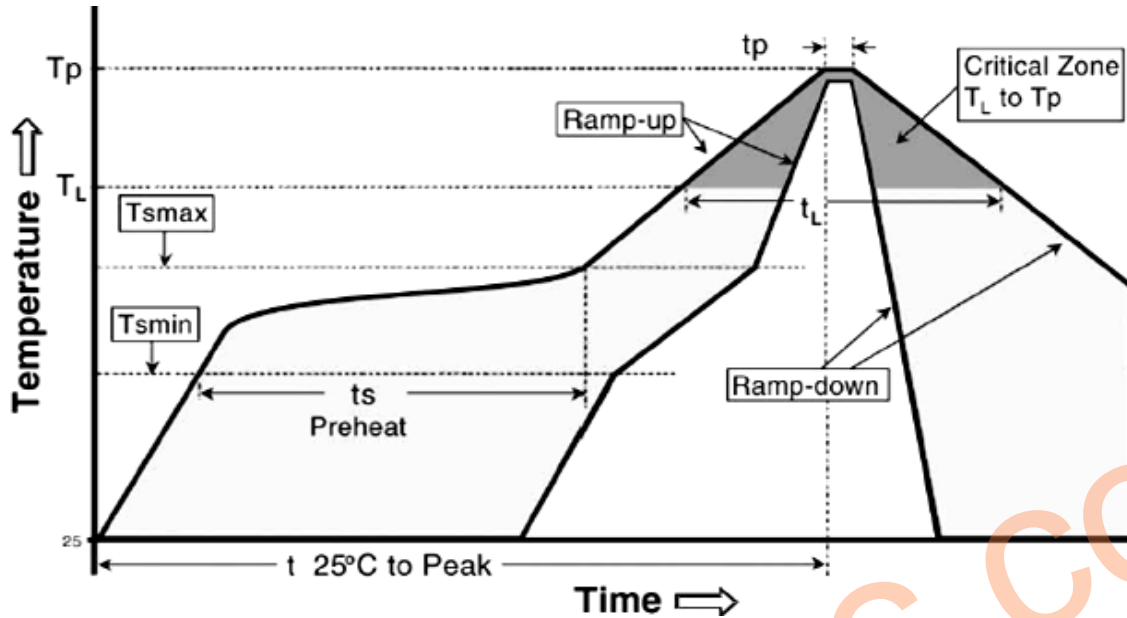
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#### 14. Recommend IR – Reflow profile : (solder : Sn96.5 / Ag3 / Cu0.5)



Alloyed Re-flow times : 3 times

Remark : To avoid discoloration phenomena of chip on terminal electrodes, please use N2 Re-flow furnace .

Iron Solder:  $350 \pm 10^\circ\text{C}$  ,  $3 + 1 / - 0$  sec, 1 time

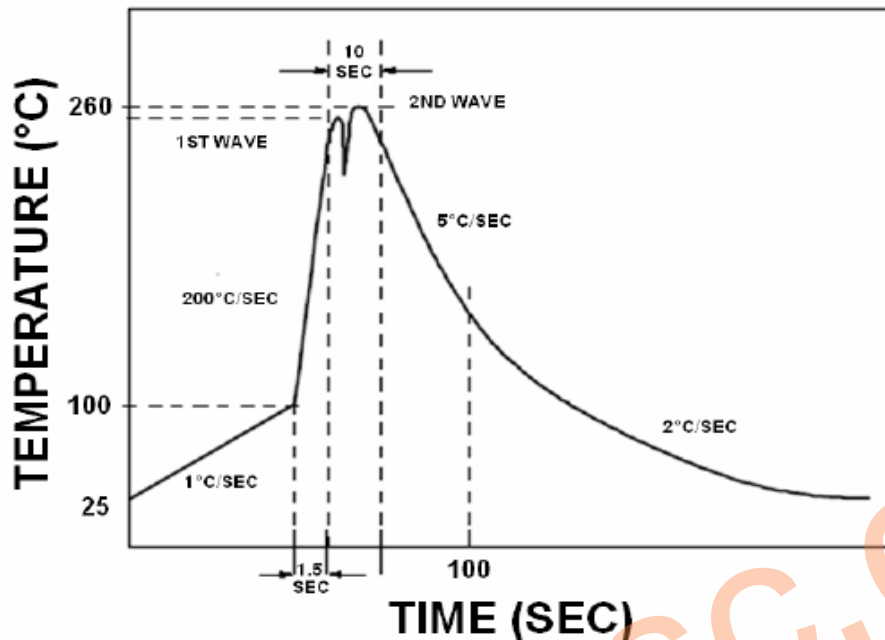
Profile Feature	Lead (Pb )-Free Assembly
Average ramp-up rate (T Amin to Tp)	$3^\circ\text{C} / \text{second max.}$
Preheat - Temperature Min (T Amin) - Temperature Max (Tsmax) - Time (T Amin to Tsmax) (ts)	$150^\circ\text{C}$ $200^\circ\text{C}$ 60 -150 seconds
Time maintained above : - Temperature (Tl) - Time (Tl)	$217^\circ\text{C}$ 60-120 seconds
Peak Temperature (Tp)	$260^\circ\text{C}$
Time within $+0$ to $-5^\circ\text{C}$ of actual Peak Temperature (tp) <sup>2</sup>	10 seconds
Ramp-down Rate	$6^\circ\text{C}/\text{second max.}$
Time $25^\circ\text{C}$ to Peak Temperature	8minutes max.



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## 15. Recommend Wave-Solder profile : (solder : Sn96.5 / Ag3 / Cu0.5)



## 16. 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.

## 17. Manufacturing Country & City :

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### Associated companies :

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(2) TA-I TECHNOLOGY ELECTRONIC (DONGGUAN) CO., LTD. ( China –Dongguan )

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

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