



High Power Current Sensing Resistors RLFC Series  
( Halogen-Free )  
AEC-Q 200-Ver E qualified

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TRLFC-250S001B

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## 1. Scope

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

## 2. Type Designation

<u>RLFC</u>	<u>25</u>	<u>F</u>	<u>E</u>	<u>C</u>	<u>M</u>	<u>R001</u>
Item	Series No.	Resistance tolerance	Packaging	Power rating	Metal	Resistance
F : 4 –wire asymmetric	25:2512	F:±1% G:±2% J:±5%	E: Embossed Tape	C=1W	M=Mn/Cu	e.g : R001= 1mΩ R002= 2mΩ

## 3. Features

Series	RLFC25
Size	2512
Power(W)	1W
Resistance Value(mΩ)	$1\text{m}\Omega \leq R \leq 10\text{m}\Omega$
Operation Temperature Range	-55°C~+170°C
TCR (ppm/°C)	±50ppm/°C
Tolerance	±1%, ±2%, ±5%
Insulation Resistance	Over 100MΩ
Maximum Working Voltage(V)	(P*R)1/2

\*Note : The specifications and characteristics of this product are not suitable for series and parallel use.



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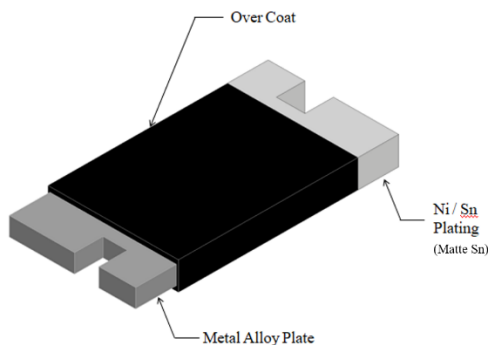
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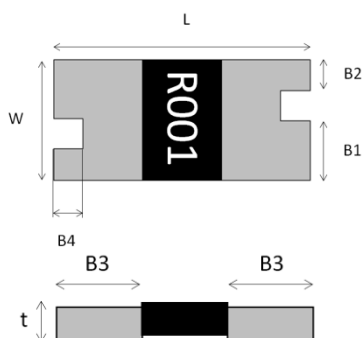
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## 4. Construction and Dimension

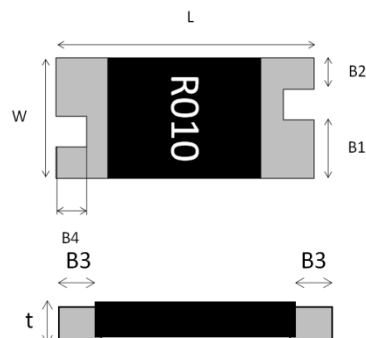
### 4.1 Construction:



### 4.2 Dimension:



$R \leq 3\text{m}\Omega$



$R > 3\text{m}\Omega$

RLFC25	Dimension	L	W	t	B1
	SPEC (mm)	6.4±0.2	3.2±0.2	0.7±0.2	1.6±0.2
	Dimension	B2	B3		B4
	SPEC (mm)	0.9±0.2	2.2±0.2 ( R ≤ 3 mΩ)		0.7±0.2
	1.0±0.2 ( R > 3 mΩ)				

Unit: mm



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**5. Reliability Tests :**

Test Items	Reference	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1 4.8	+25 ~ 125°C	Refer 4.0
High Temperature Exposure (Storage)	AEC-Q200-REV E-Test 3 MIL-STD202 Method 108	T=170°C,1000hrs, Measurement at 24hrs after test conclusion.	< ±(1%+0.0005Ω)
Temperature Cycling	AEC-Q200-REV E-Test 4 JESD22 Method JA-104	1000Cycle (-55°C to 155°C), Measurement at 24hrs after test conclusion.	< ±(0.5%+0.0005Ω)
Short time overload	IEC60115-1 4.13	5 X rated power for 5s.	< ±(0.5%+0.0005Ω)
Biased Humidity	AEC-Q200-REV E-Test 7 MIL-STD-202 Method 103	10% Rated power at 85°C, RH:85% ,1000Hrs, Measurement at 24hrs after test conclusion.	< ±(1%+0.0005Ω)
Operation life	AEC-Q200-REV E-Test 8 MIL-STD-202 Method 108	1000 hours TA=70°C at 100% rated power. 90min ON and 30 min OFF. Measurement at 24±4 hours after test conclusion.	< ±(1%+0.0005Ω)
External Visual	AEC-Q200-REV E-Test 9 MIL-STD-883 Method 2009	Electrical test not required. Inspect device construction, marking and workmanship.	
Physical Dimension	AEC-Q200-REV E-Test 10 JESD22 Method JB-100	Verify physical dimensions to the applicable device detail specification. Note: User(s) and Suppliers spec. Electrical test not required.	
Resistance to Solvents	AEC-Q200-REV E-Test 12 MIL-STD-202 Method 215	a: Isopropyl Alcohol : Mineral Spirits = 1 : 3 b: Terpene Defluxer c: Deionized water : Propylene Glycol Monomethyl Ether : monoethanolamine = 42 : 1 : 1	Marking and protective layer cannot be detached
Resistance to Soldering Heat	AEC-Q200-REV E-Test 15 MIL-STD-202 Method 210	T=260+/-5°C solder,10+/-1 sec dwell.	< ±(0.5%+0.0005Ω)
Mechanical Shock	AEC-Q200-REV E-Test 13 MIL-STD-202 Method 213	100g's, Normal duration is 6ms, half sine shock pulse.	< ±(0.5%+0.0005Ω)
Resistance to vibration	AEC-Q200-REV E-Test 14 MIL-STD-202 Method 204	5g's for 20min.12cycles, 10-2000Hz.	<±(0.5%+0.0005Ω)
Board Flex	AEC-Q200-REV E-Test 21 AEC-Q200-005	Min 2mm deflection ,60sec.	<±(0.5%+0.0005Ω)
Flammability	AEC-Q200-REV E-Test 20 UL-94	V-0 or V-1are acceptable, Electrical test not required.	V-0
ESD	AEC-Q200-REV E-Test 17 AEC-Q200-002 or ISO/DIS 10605	verify the voltage setting at 500V.	< ±(1%+0.0005Ω)
Solderability	AEC-Q200-REV E-Test 18 J-STD-002	aging 4 hours at 155 °C dry heat Lead-free solder bath at 235±3 °C Dipping time: 3±0.5 seconds.	> 95% area covered with tin

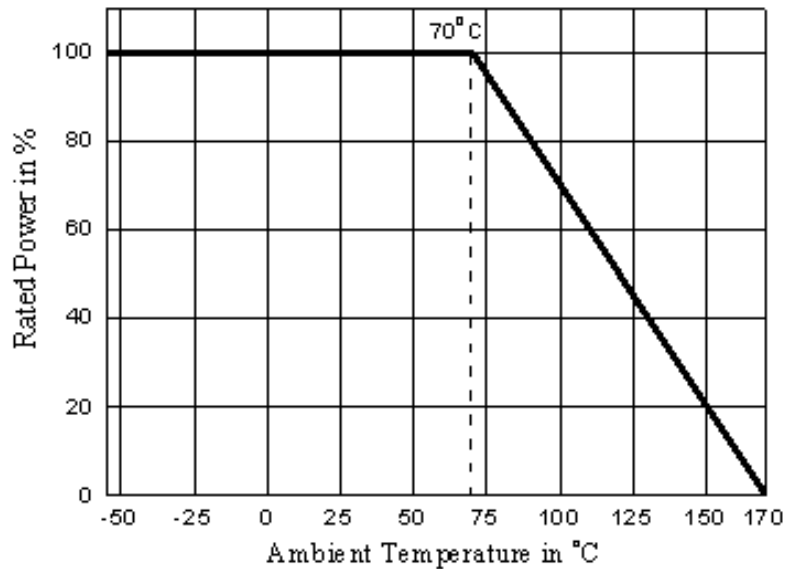


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Terminal Strength (SMD)	AEC-Q200-REV E-Test 22 AEC-Q200-006	Force of 1.8kg for 60 seconds. Remarks: 0201-NA	< ±(1%+0.0005Ω)
Low Temperature Storage	IEC60115-1 4.23.4 JIS C 5201-1 4.23.4	-55°C, 1000hrs	< ±(1%+0.0005Ω)

### 5.1 Derating Curve:



### 5.2 Rated Current:

The rated current is calculated by the following Formula:

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

I: Rated Current(A)

P: Rated Power(W)

R: Resistance Value(Ω)



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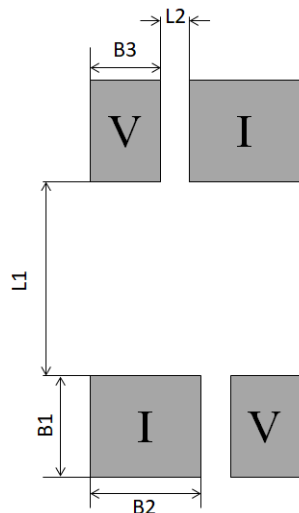
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## 6. Recommended Solder Pad Dimension



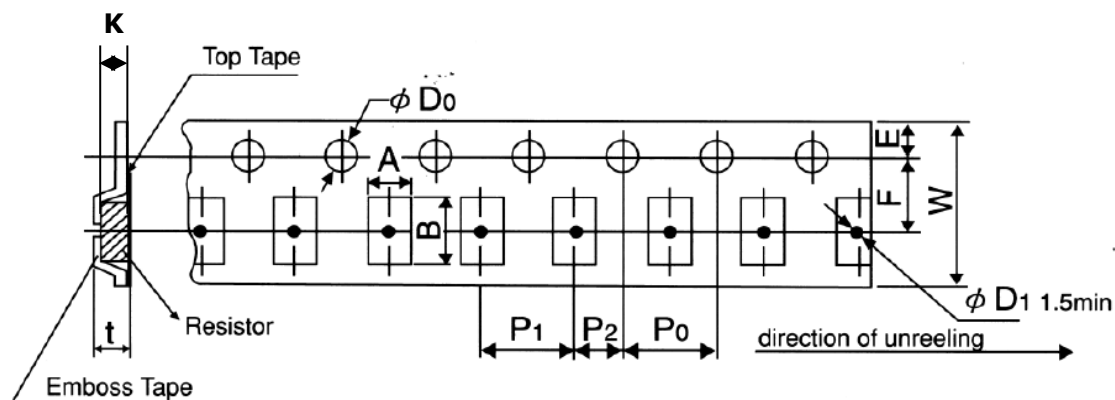
Resistance Range(mΩ)	L1	L2	B1	B2	B3
$R \leq 3\text{m}\Omega$	$1.3 \pm 0.1$	$0.6 \pm 0.1$	$3.1 \pm 0.1$	$2.1 \pm 0.1$	$1.3 \pm 0.1$
$R > 3\text{m}\Omega$	$4.1 \pm 0.1$	$0.6 \pm 0.1$	$2.1 \pm 0.1$	$2.1 \pm 0.1$	$1.3 \pm 0.1$

Unit: mm

## 7. Number of Package

4000 Pieces / package

## 8. Taping



Packing	Type	A	B	W	F	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	$\phi D_0$	t	K <sub>0</sub>
Emboss Tape	RLFC25	$3.6 \pm 0.2$	$6.9 \pm 0.2$	$12 \pm 0.2$	$5.5 \pm 0.05$	$1.75 \pm 0.1$	$4.0 \pm 0.1$	$2.0 \pm 0.05$	$4.0 \pm 0.05$	$\phi 1.5 (+0.1/-0)$	$1.2 \pm 0.15$	$1.0 \pm 0.15$

Unit: mm



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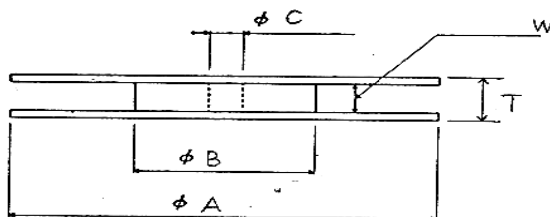
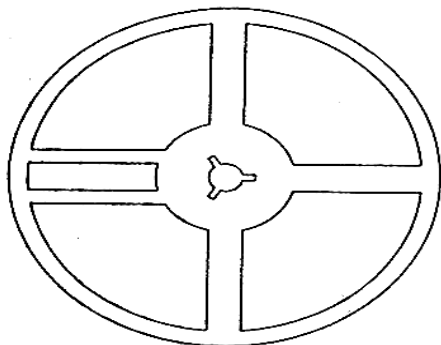
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## 9. Reel Specification:

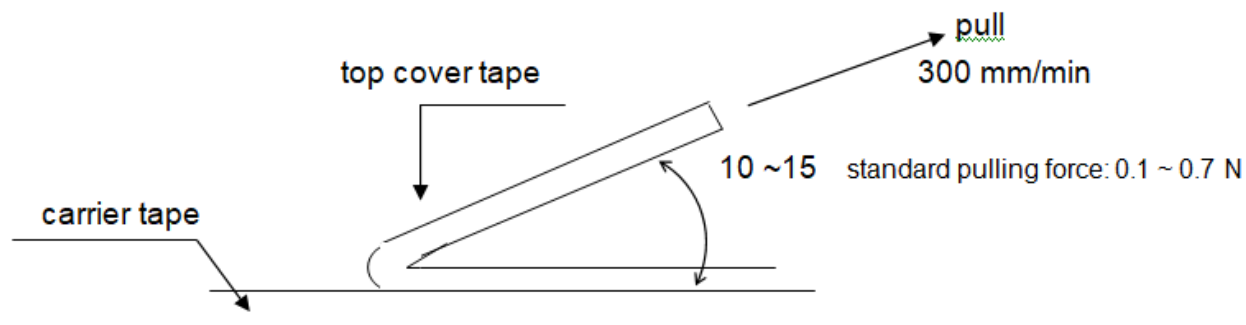


Series	$\phi A$	$\phi B$	$\phi C$	W	T
RLFC25	$180^{+0}_{-3}$	$60 \pm 1.0$	$13.0 \pm 1.0$	$13.0 \pm 1.0$	$15.4 \pm 2.0$

Unit: mm

## 10. Peeling Strength of Top Cover Tape:

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





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**11. Storage Conditions:**

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

MSL level 1

**12. Shelf Life:**

2 years from manufacturing date.



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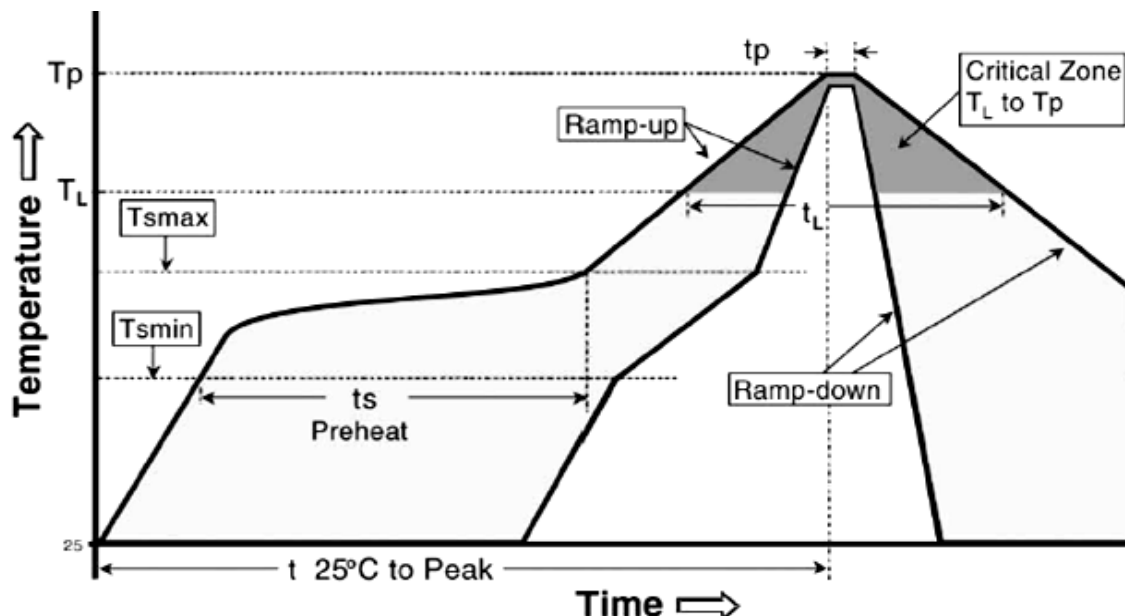
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13. Recommend IR – Reflow profile: (solder: Sn96.5 / Ag3 / Cu0.5)



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





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**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 :**

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

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

**Associated companies :**

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

Tel : (+86) 769-8339-4790~3      Fax : (+86) 769-8339-4794

(3) FORTUNE TASK ENTERPRISES LIMITED ( China – Dongguan )

Tel : (+86) 769-8339-4790~3      Fax : (+86) 769-8339-4794

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

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