



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

Document No	TRLP-250S008L
Issued date	2024/12/03
page	1/8

1. Scope

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

2. Type Designation

RLP 25	F	E	C	R010
Series No.	Tolerance	Packaging	Power	Resistance
25 : 2512 (6432)	F= $\pm 1\%$ G= $\pm 2\%$ J= $\pm 5\%$	E= Embossed	C= 1W D= 1.5W E= 2W G= 3W	e.g. R010= 10m Ω

3. Features

Type	RLP25
Power Rating	$1\text{m}\Omega \leq R \leq 100\text{m}\Omega$ (1W、1.5W、2W、3W) $100\text{m}\Omega < R \leq 680\text{m}\Omega$ (1W、1.5W、2W)
Resistance Value	$1\text{m}\Omega \leq R \leq 680\text{m}\Omega$
Operation Temperature Range	-55°C~+170°C
Temperature Coefficient of Resistance	$\pm 50\text{ppm}/^\circ\text{C}$
Tolerance	$\pm 1\%$, $\pm 2\%$, $\pm 5\%$
Insulation Resistance	100 Meg Ohms Minimum
Maximum Working Current (A)	$(P/R)^{1/2}$

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

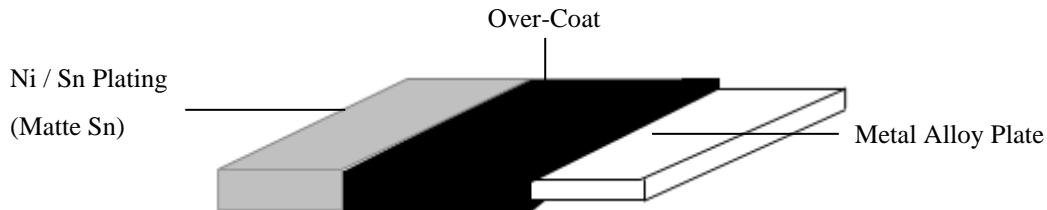


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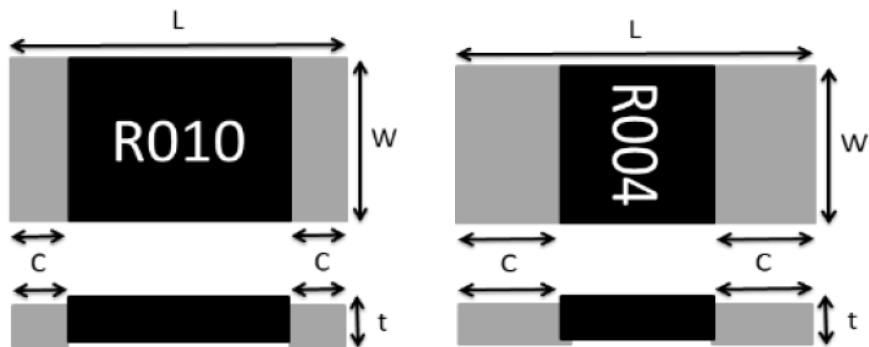
Document No	TRLP-250S008L
Issued date	2024/12/03
page	2/8

4. Construction and Dimension

4.1 Construction



4.2 Dimension



Style	L	W	C	t	Material
RLP25	6.4±0.2	3.2±0.2	2.2±0.2(≤4mΩ)	0.9 ±0.20	Strip : Alloy Over Coating : Polymer Compound UL-94V-0 grade
			0.9±0.2(R>4mΩ)		

Unit: mm

Marking

(1) If $R \leq 4\text{m}\Omega$, the marking pattern is as follows.



Resistance value is expressed by 4 digits.

E.G.:

$$R002 = 0.002\Omega = 2\text{m}\Omega$$

$$R004 = 0.004\Omega = 4\text{m}\Omega$$



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Document No

TRLP-250S008L

Issued date

2024/12/03

page

3/8

(2) If $R > 4\text{m}\Omega$, the marking pattern is as follows.



Resistance value is expressed by 4 digits.

E.G.:

$R010 = 0.010\Omega = 10\text{m}\Omega$

$R020 = 0.020\Omega = 20\text{m}\Omega$

5. Reliability Tests:

Test Items	Reference	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1 4.8	+25 ~ 125°C	Refer 3.0
High Temperature Exposure (Storage)	AEC-Q200-REV E-Test 3 MIL-STD202 Method 108	T=170°C, 1000hrs, Measurement at 24hrs after test conclusion.	$< \pm(1\%+0.0005\Omega)$
Temperature Cycling	AEC-Q200-REV E-Test 4 JESD22 Method JA-104	1000Cycle (-55°C to 155°C), Measurement at 24hrs after test conclusion.	$< \pm(0.5\%+0.0005\Omega)$
Short time overload	IEC60115-1 4.13	5 X rated power for 5s.	$< \pm(0.5\%+0.0005\Omega)$
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.	$< \pm(0.5\%+0.0005\Omega)$
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.	$< \pm(1\%+0.0005\Omega)$
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.	$< \pm(0.5\%+0.0005\Omega)$
Mechanical Shock	AEC-Q200-REV E-Test 13 MIL-STD-202 Method 213	100g's, Normal duration is 6ms, half sine shock pulse.	$< \pm(0.5\%+0.0005\Omega)$



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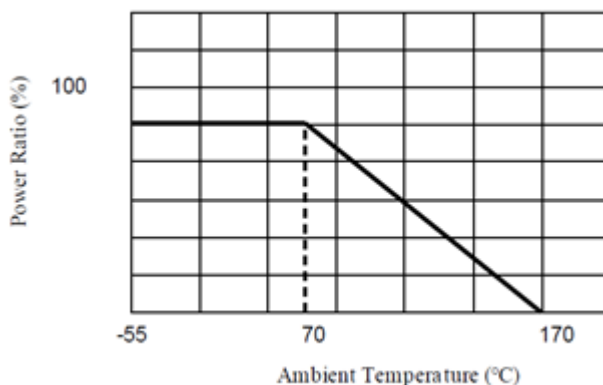
2024/12/03

page

4/8

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-1 are 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
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	EC60115-1 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:

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

I: Rated Current (A)

P: Rated Power (W)

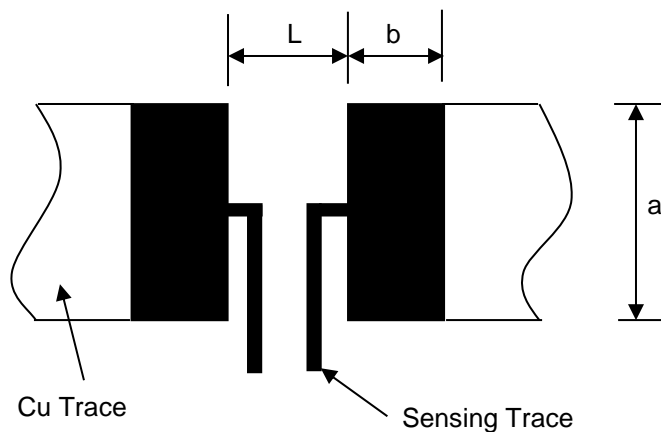
R: Resistance Value (Ω)



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Document No	TRLP-250S008L
Issued date	2024/12/03
page	5/8

6. Recommended Solder Pad Dimension



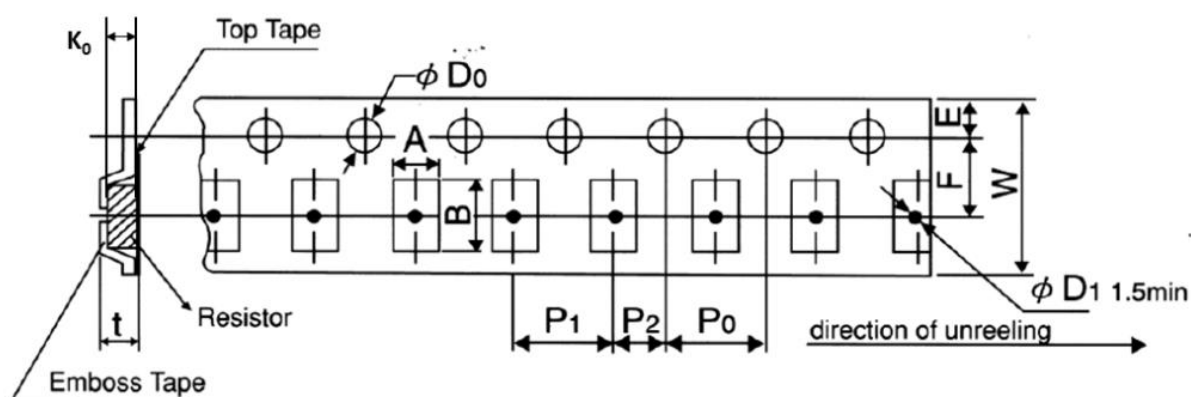
Resistance Range (mΩ)	a	b	L
$R > 4$	4.0 ± 0.1	2.1 ± 0.1	4.1 ± 0.1
$R \leq 4$	4.0 ± 0.1	3.1 ± 0.1	1.3 ± 0.1

Unit: mm

7. Number of Package:

4000 Pieces / package

8. Taping



Packing	Type	A	B	W	F	E	P ₁	P ₂	P ₀	ψD ₀	t	K ₀
Emboss Tape	RLP25	3.6 ± 0.2	6.9 ± 0.2	12 ± 0.2	5.5 ± 0.05	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	4.0 ± 0.05	$\psi 1.5 (+0.1/-0)$	1.2 ± 0.15	1.0 ± 0.15

Unit: mm



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Document No

TRLP-250S008L

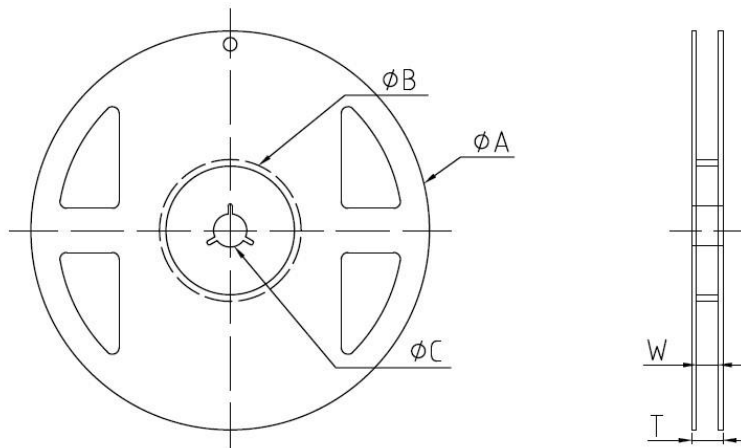
Issued date

2024/12/03

page

6/8

9. Reel Specification

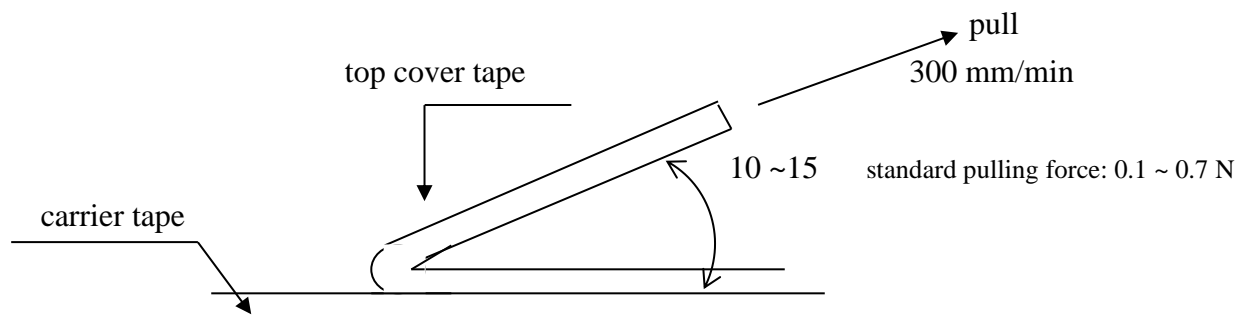


Series	ϕA	ϕB	ϕC	W	T
RLP 25	180(+0/-3)	60 \pm 1.0	13.0 \pm 1.0	13.0 \pm 1.0	15.4 \pm 2.0

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.



11. Storage Conditions:

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

MSL level 1

12. Shelf Life:

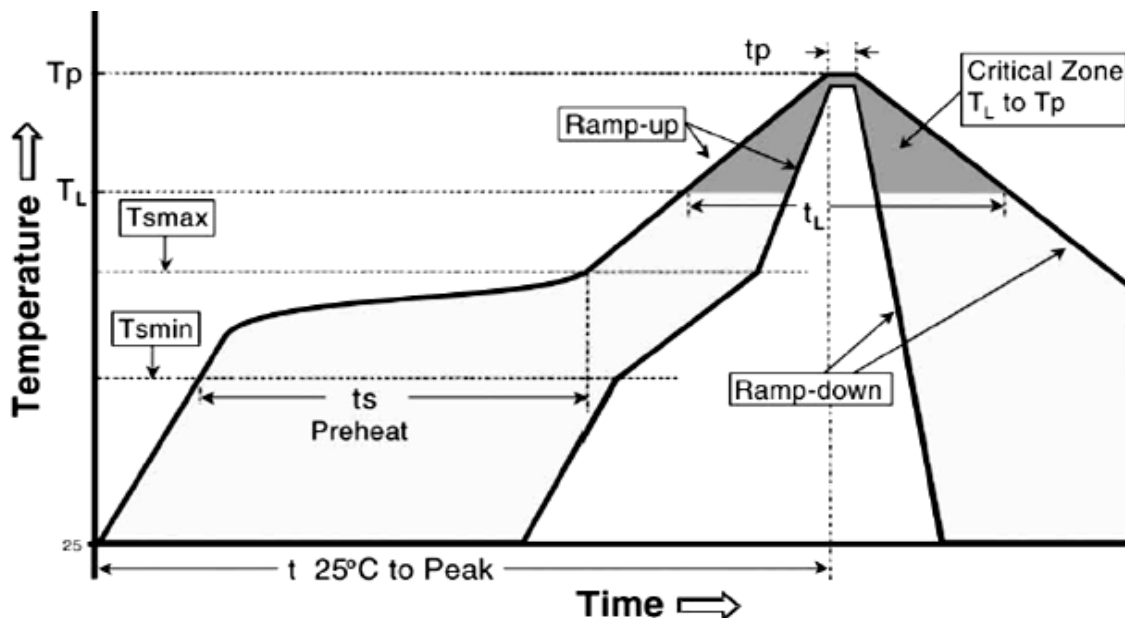
2 years from manufacturing date.



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Document No	TRLP-250S008L
Issued date	2024/12/03
page	7/8

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



Allowed Re-flow times: 3 times

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

Iron Solder: 350±10°C, 3+1/-0 sec, 1 time

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 -120 seconds
Time maintained above: - Temperature (T _L) - Time (T _L)	217°C 60-150 seconds
Peak Temperature (T _p)	260°C
Time within $\begin{matrix} +0 \\ -5 \end{matrix}$ °C of actual Peak Temperature (tp) ²	10 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.



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Document No	TRLP-250S008L
Issued date	2024/12/03
page	8/8

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

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