



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

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1. Scope :

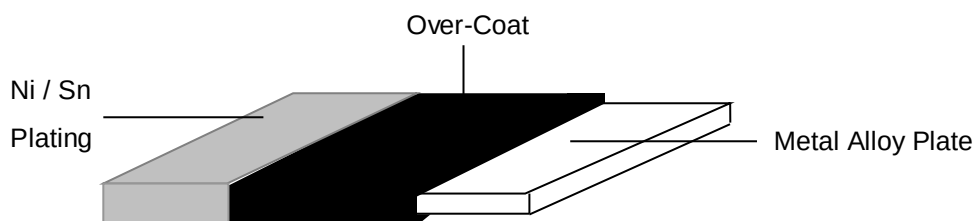
This specification applied to the products of current sensing resistor of metal foil for Lead-Free RLP series manufactured by TA-I TECHNOLOGY CO.,LTD.

2. Type Designation :

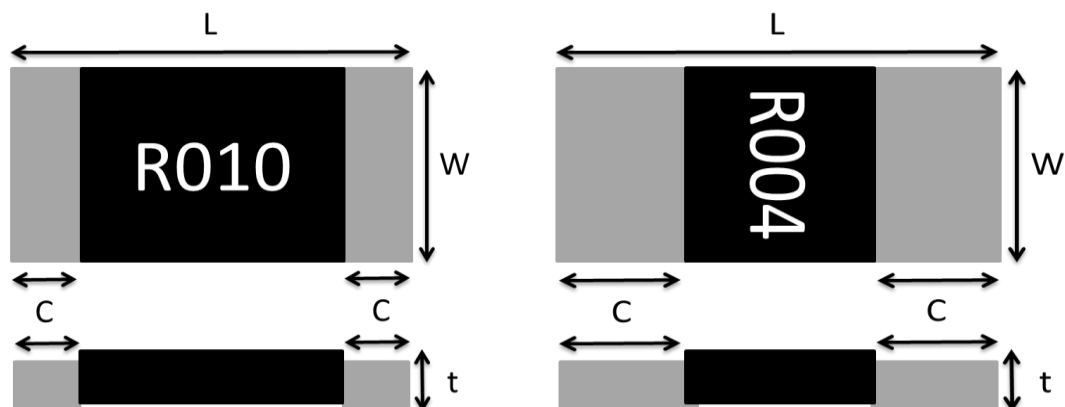
<u>RLP</u> Item	<u>25</u> Series No.	<u>E</u> Resistance tolerance	<u>E</u> Packaging	<u>C</u> Power rating	<u>R010</u> Resistance
	25:2512 (6432)	F:±1% G:±2% J:±5%	E: Embossed Tape	C=1W D=1.5W E=2W G=3W	e.g : R010=10mΩ R100=100mΩ R500=500mΩ

3. Construction and Dimension :

3.1 Construction:



3.2 Dimension:



Unit : mm

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)		



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4. Features:

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

Note: 2&3watts total Solder pad and trace size of 300mm

Thickness does not include protective layer

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 D-Test 3 MIL-STD-202 Method 108	T=170°C ,1000hrs,Measurement at 24hrs after test conclusion.	< ±1%
Temperature Cycling	AEC-Q200-REV D-Test 4 JESD22 Method JA-104	1000Cycle (-55°C to 125°C),Measurement at 24hrs after test conclusion.	< ±0.5%
Short time overload	IEC60115-1 4.13	5 X rated power for 5s	< ±0.5%
Moisture Resistance	AEC-Q200-REV D-Test 6 MIL-STD-202 Method 106	T=24 hours / Cycle ,10 Cycles . Notes : Steps 7a& 7b not required. Unpowered	< ±1%
Biased Humidity	AEC-Q200-REV D-Test 7 MIL-STD-202 Method 103	10% Rated power at 85 °C ,RH:85% ,1000Hrs, Measurement at 24hrs after test conclusion.	< ±0.5%
Operation life	AEC-Q200-REV D-Test 8 MIL-STD-202 Method 108	1000 hours TA=125°C at 45% rated power. Measurement at 24±4 hours after test conclusion.	< ±1%
External Visual	AEC-Q200-REV D-Test 9 MIL-STD-883 Method 2009	Electrical test not required. Inspect device construction, marking and workmanship.	
Physical Dimension	AEC-Q200-REV D-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.	



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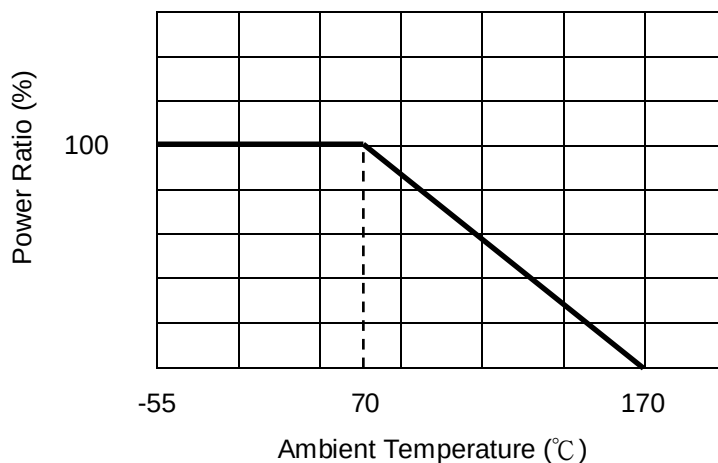
Resistance to Solvents	AEC-Q200-REV D-Test 12 MIL-STD-202 Method 215	a:Isopropyl Alcohol : Mineral Spirits= 1 : 3 b:Terpene Defluxer (Bioact EC-7R) c:Deionized water : Propylene Glycol Monomethyl Ether : monoethanolamine = 42 : 1 : 1	Marking and protective layer can not be detached
Resistance to Soldering Heat	AEC-Q200-REV D-Test 15 MIL-STD-202 Method 210	T=260+/-5°C solder,10+/-1 sec dwell	< ±0.5%
Mechanical Shock	AEC-Q200-REV D-Test 13 MIL-STD-202 Method 213	100g's , Normal duration is 6ms , half sine shock pulse	< ±0.5%
Resistance to vibration	AEC-Q200-REV D-Test 14 MIL-STD-202 Method 204	5g's for 20min.12cycles, 10-2000Hz	<±0.5%
Board Flex	AEC-Q200-REV D-Test 21 AEC-Q200-005	Min 2mm deflection ,60sec.	< ±0.5%
Flammability	AEC-Q200-REV D-Test 20 UL-94	V-0 or V-1are acceptable, Electrical test not required	V-0
Thermal Shock	AEC-Q200-REV D-Test 16 MIL-STD-202 Method 107	-55°C/+155°C. Note: Number of cycles required-300, Maximum transfer time-20 seconds, Dwell time-15 minutes. Air-Air.	< ±1.0%
ESD	AEC-Q200-REV D-Test 17 AEC-Q200-002 or ISO/DIS 10605	verify the voltage setting at 500V	< ±1.0%
Solderability	AEC-Q200-REV D-Test 18 J-STD-002	Method B, 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 D-Test 22 AEC-Q200-006	Force of 1.8kg for 60 seconds Remarks : 0201-NA	< ±1.0%



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5.1 Derating Curve



5.2 Rated Current

The rated current is calculated by the following Formula:

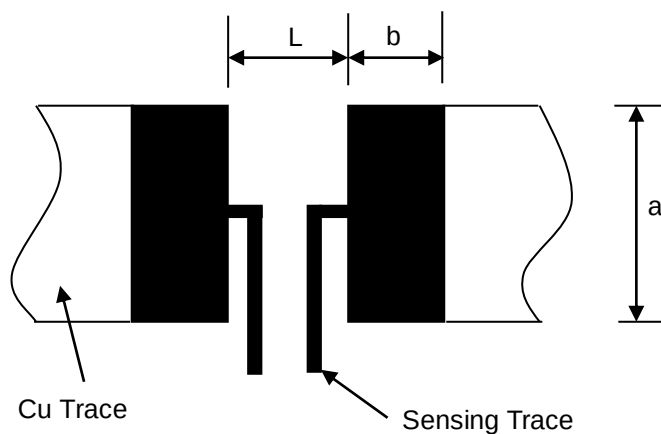
$$I = \sqrt{P/R}$$

I : Rated Current (A)

P: Rated Power (W)

R: Resistance Value (Ω)

6. Recommended Solder Pad Dimension



Resistance Range (Ω)	a	b	L
$R > 0.004$	4.0	2.1	4.1
$R \leq 0.004$	4.0	3.1	1.3

Unit: mm



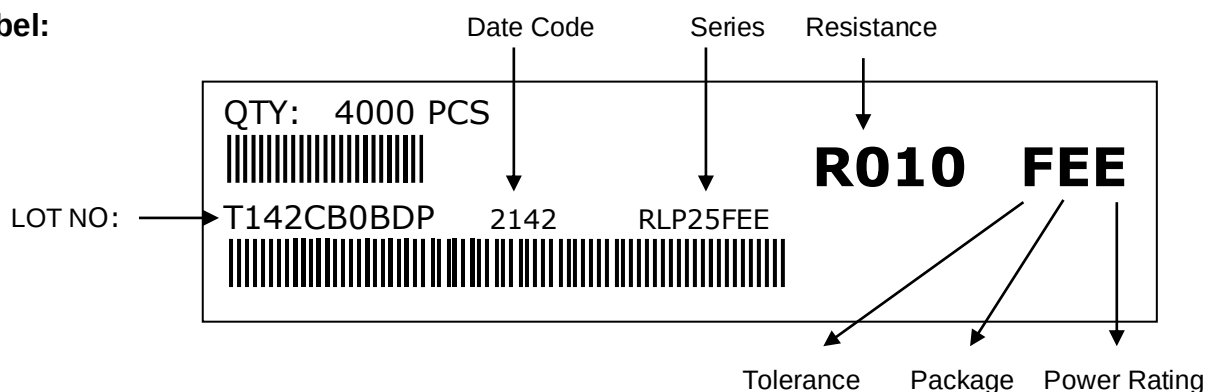
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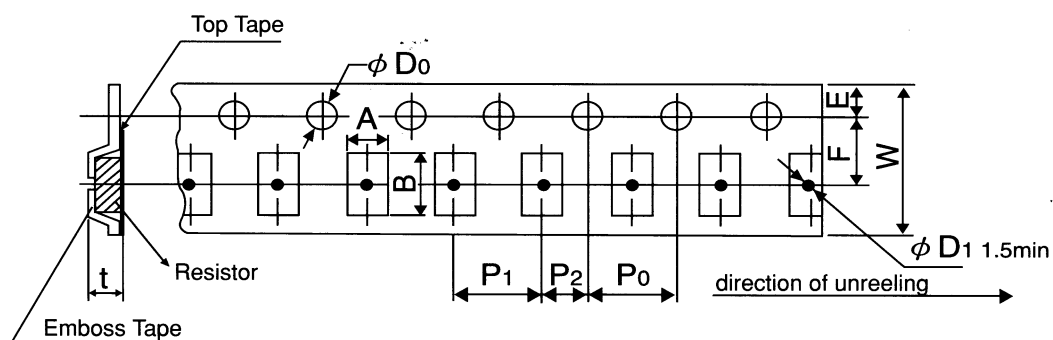
7. Number of Package:

4000 Pieces / package

8. Label:



9. Taping



Packing	Type	A	B	W	F	E	P_1	P_2	P_0	D_0	t
Emboss	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	ϕ 1.5 (+0.1/-0)	1.2±0.15



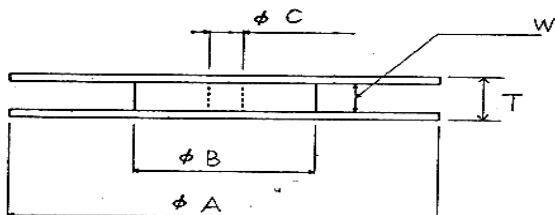
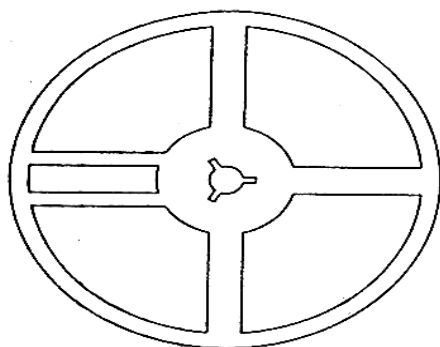
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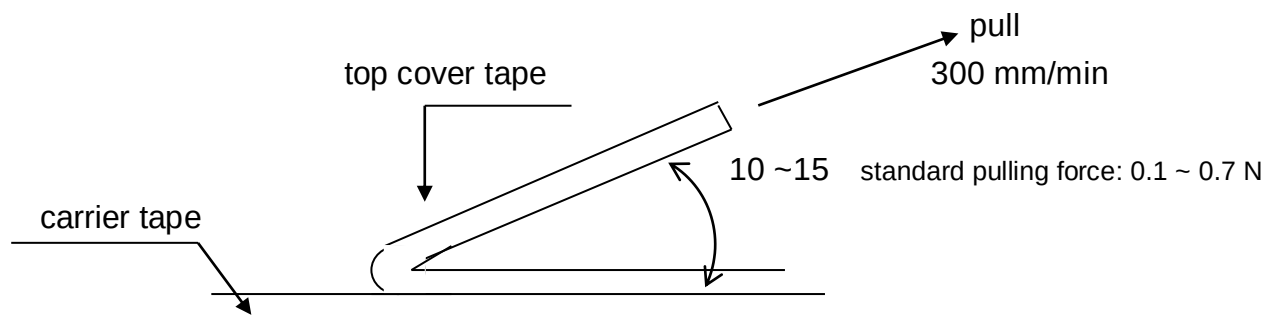
10. Reel Specification



Series	ϕA	ϕB	ϕC	W	T
RLP 25	180^{+0}_{-3}	60 ± 1.0	13.0 ± 1.0	13.0 ± 1.0	15.4 ± 2.0

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%

MSL level 1

13. Shelf Life:

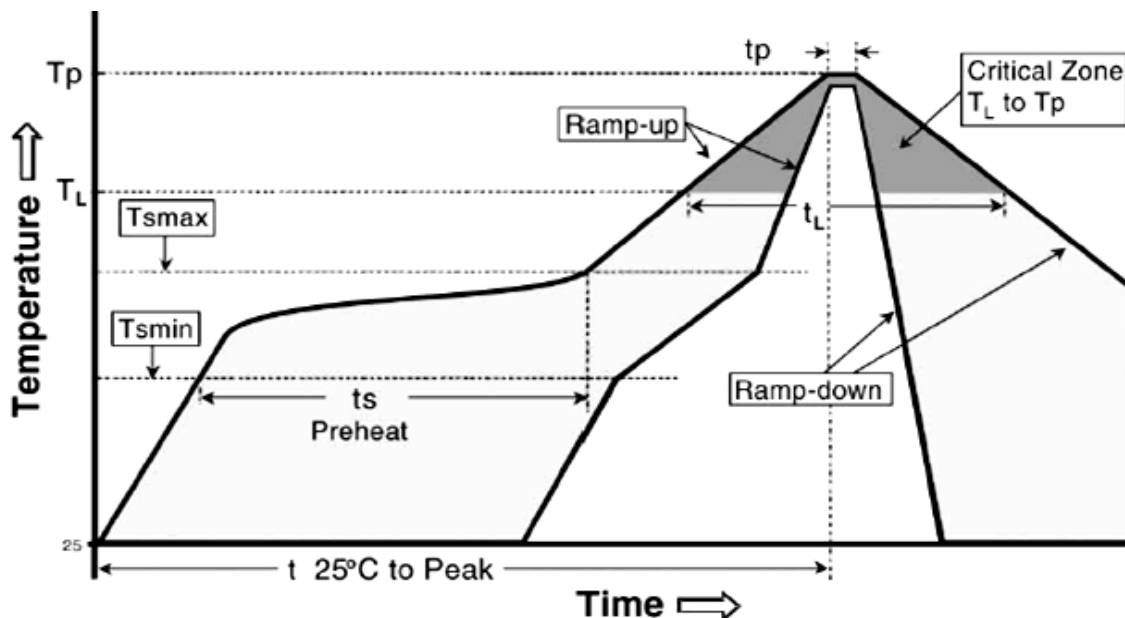
2 years from manufacturing date.



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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: $350 \pm 10^{\circ}\text{C}$, $3 \pm 1/0$ 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 $+0^{\circ}\text{C}$ / -5°C of actual Peak Temperature (tp) ²	10 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8mimutes max.



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15. 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.

16. Manufacturing Country & City :

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

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

Associated companies :

(1)TA-I TECHNOLOGY (SU ZHOU) CO., LTD. (China – Su Zhou)

Tel :(+86) 512-63457879 Fax : (+86) 512-63457869

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

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

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

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

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

Tel :(+60) 4- 3900480 Fax : (+60) 4-3901481

(5) P.T.TAI ELECTRONIC Indonesia (Indonesia – Jakarta)

Tel :(+62) 21-44820254 Fax : (+62) 21-44820256