1. Scope

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

2. Type Designation

RLM25	J	E	E	R000
Series No.	**Tolerance**	**Packaging**	**Power**	**Resistance**
10：0805 12：1206 20：2010 25：2512	J= ±5%	T= Paper E= Embossed Tape	A= 0.25W S= 0.5W C= 1.0W D= 1.5W E= 2.0W	R000=Jumper

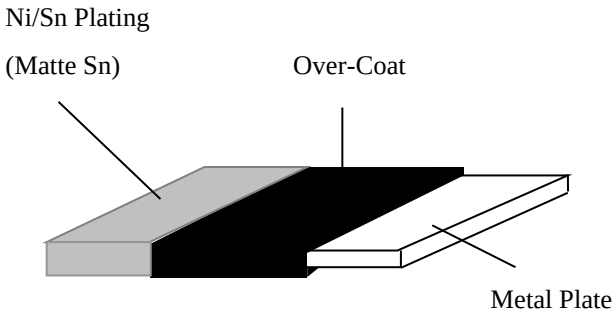
3. Features

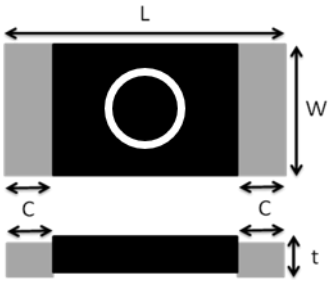
Series	Size	Resistance Value (Max.)	Power (W)	Operation Temperature Range	Max Rated Current	TCR (ppm/℃)
RLM10	0805	≦0.2mΩ	0.5	-55℃~+170℃	50 (A)	3800
RLM12	1206	≦0.2mΩ	1.0	-55℃~+170℃	70 (A)	3800
RLM20	2010	≦0.2mΩ	1.5	-55℃~+170℃	86 (A)	3800
RLM25	2512	≦0.2mΩ	2.0	-55℃~+170℃	100 (A)	3800

*Measurement：Resistance shall be measured with 25℃ in the 4-wire resistance test

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

4. Construction and Dimension





Type	L	W	C	t
RLM 10	2.00±0.20	1.25±0.20	0.40±0.20	0.70±0.20
RLM 12	3.20±0.20	1.60±0.20	0.55±0.20	0.70±0.20
RLM 20	5.00±0.20	2.50±0.20	0.65±0.20	0.70±0.20
RLM 25	6.40±0.20	3.20±0.20	0.90±0.20	0.70±0.20

UNIT: mm

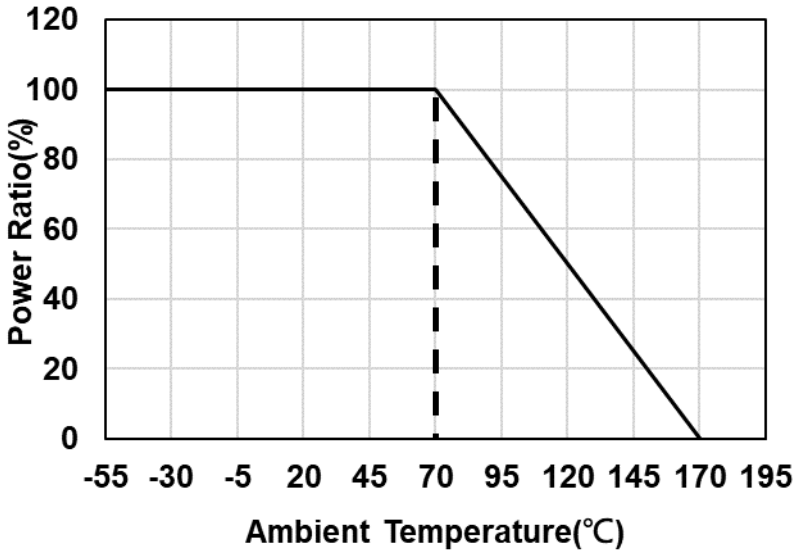
Marking

For RLM Jumper series：

5. Reliability Tests

Test Items	Reference	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1 4.8	+25 ~ 125℃	Refer 4.0
High Temperature Exposure (Storage)	AEC-Q200-REV E-Test 3 MIL-STD202 Method 108	T=170℃,1000hrs, Measurement at 24hrs after test conclusion.	0805≦0.2mΩ 1206≦0.2mΩ 2010≦0.2mΩ 2512≦0.2mΩ
Temperature Cycling	AEC-Q200-REV E-Test 4 JESD22 Method JA-104	1000Cycle (-55℃ to 155℃), Measurement at 24hrs after test conclusion.	
Short time overload	IEC60115-1 4.13	5 X rated power for 5s	
Biased Humidity	AEC-Q200-REV E-Test 7 MIL-STD-202 Method 103	10% Rated power at 85℃, RH:85% ,1000Hrs, Measurement at 24hrs after test conclusion.	
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.	
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℃ solder,10+/-1 sec dwell.	0805≦0.2mΩ 1206≦0.2mΩ 2010≦0.2mΩ 2512≦0.2mΩ
Mechanical Shock	AEC-Q200-REV E-Test 13 MIL-STD-202 Method 213	100g's, Normal duration is 6ms, half sine shock pulse.	
Resistance to vibration	AEC-Q200-REV E-Test 14 MIL-STD-202 Method 204	5g's for 20min.12cycles, 10-2000Hz.	
Board Flex	AEC-Q200-REV E-Test 21 AEC-Q200-005	Min 2mm deflection ,60sec.	
ESD	AEC-Q200-REV E-Test 17 AEC-Q200-002 or ISO/DIS 10605	verify the voltage setting at 500V	
Terminal Strength (SMD)	AEC-Q200-REV E-Test 22 AEC-Q200-006	Force of 1.8kg for 60 seconds Remarks: 0201-NA	
Low Temperature Storage	EC60115-1 4.23.4 JIS C 5201-1 4.23.4	-55℃, 1000hrs	
Flammability	AEC-Q200-REV E-Test 20 UL-94	V-0 or V-1are acceptable, Electrical test not required	V-0
Solderability	AEC-Q200-REV E-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

5.1 Derating Curve



5.2 Rated Current

The rated Current are calculated by the following formula:

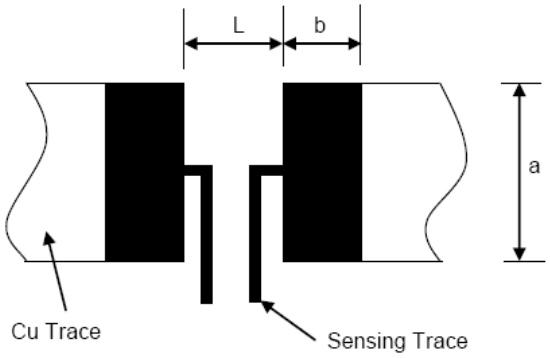
$$I=\sqrt{P \div R}$$

I：Rated Current (A)

P：Rated Power(W)

R：Resistance Value(Ω)

6. Recommended Solder Pad Dimension



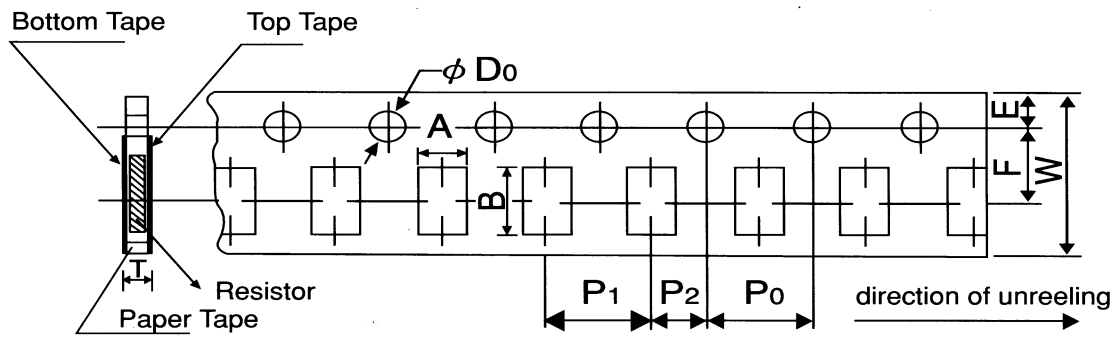
Series	Resistance Range	a	b	L
RLM10	≦0.2mΩ	1.4±0.1	1.2±0.1	1.2±0.1
RLM12	≦0.2mΩ	1.8±0.1	1.7±0.1	1.6±0.1
RLM20	≦0.2mΩ	3.4±0.1	1.5±0.1	3.5±0.1
RLM25	≦0.2mΩ	4.0±0.1	2.1±0.1	4.1±0.1

Unit: mm

7. Number of Package

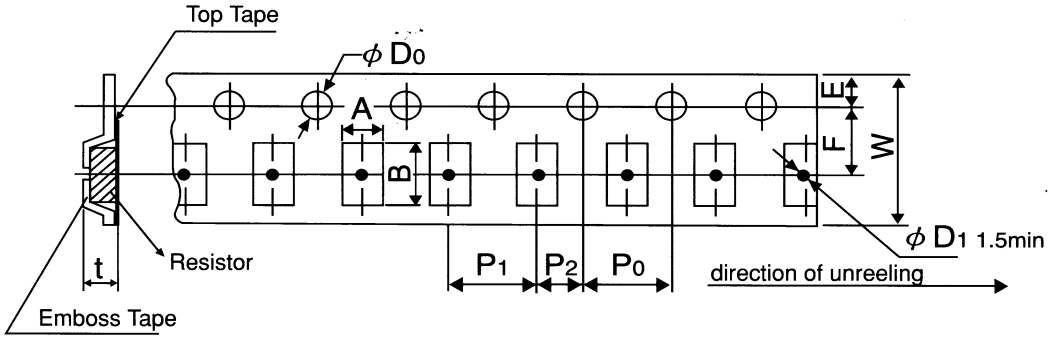
	RLM 10	RLM 12	RLM 20	RLM 25
Pieces/Reel	5000	5000	4000	4000

8. Packaging



Packing	Type	A	B	W	F	E	P_1	P_2	P_0	ψD_0	T
Paper Tape	RLM10	1.6 ±0.15	2.4 ±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	ψ1.5 (+0.1/-0)	0.85 ±0.1
	RLM12	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 ±0.05	4.0 ±0.1	ψ1.5 (+0.1/-0)	0.85 ±0.1

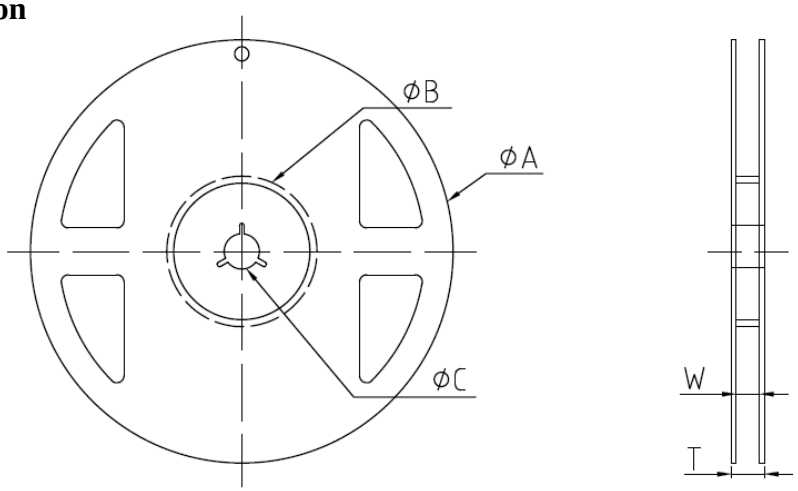
Unit: mm



Packing	Type	A	B	W	F	E	P_1	P_2	P_0	D_0	t
Emboss	RLM20	2.8 ±0.2	5.3 ±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	ψ1.5 (+0.1/-0.1)	0.85 ±0.15
	RLM25	3.6 (+0.2/-0.18)	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	ψ1.5 (+0.1/-0)	1.2 ±0.15

Unit: mm

9. Reel Specification

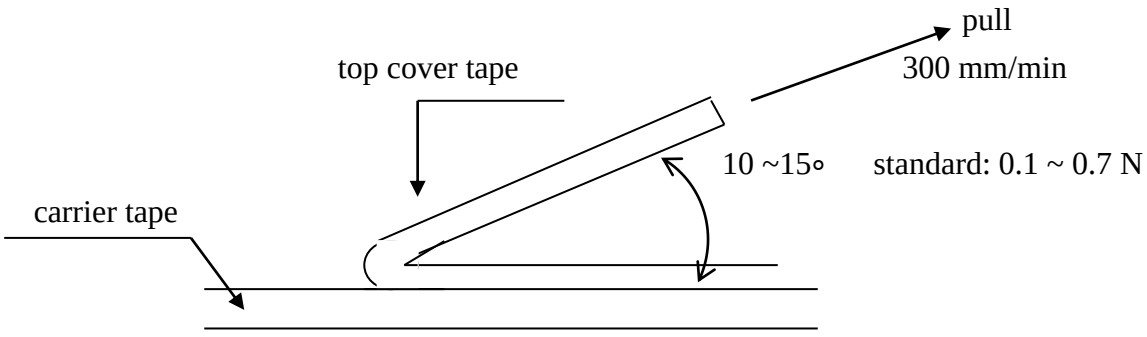


Series	ϕA	ϕB	ϕC	W	T
RLM 10	178.0 ±2.0	60.0 ±1.0	13.0 ±1.0	9.0 ±1.0	11.4 ±1.0
RLM 12	178.0 ±2.0	60.0 ±1.0	13.0 ±1.0	9.0 ±1.0	11.4 ±1.0
RLM 20	178.0 ±2.0	60.0 ±1.0	13.0 ±1.0	13.0 ±1.0	15.5 ±1.0
RLM 25	180.0 (+0/-3)	60.0 ±1.0	13.0±1.0	13.0±1.0	15.4±2.0

Unit: mm

10. Peeling Strength of Top Cover Tape

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.



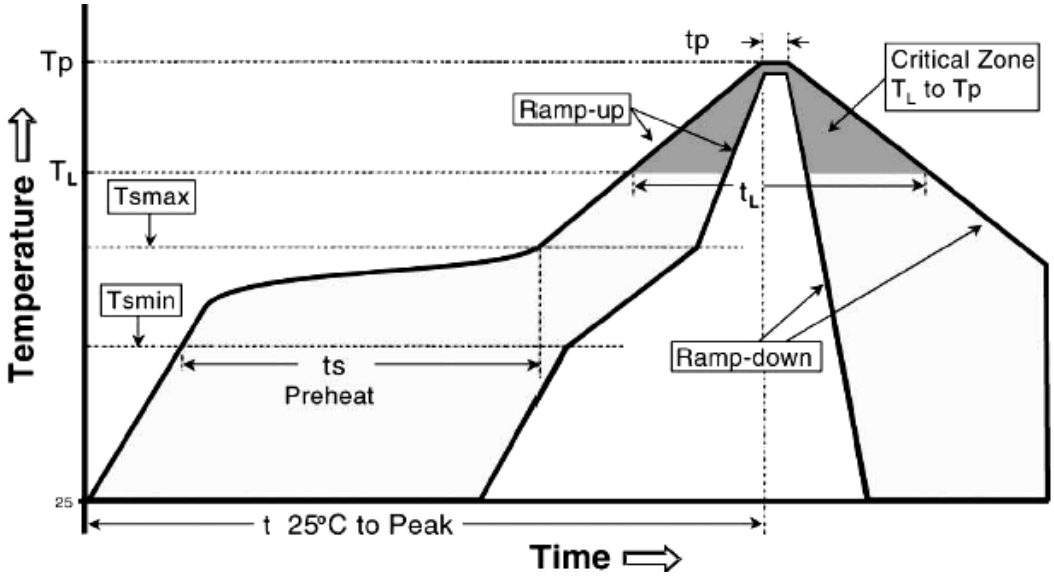
11. Storage Conditions

Temperature: 5℃~35℃, Humidity:40%~75%
Humidity storage level: Level 1

12. Shelf Life

2 years from manufacturing date.

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℃, 3+1/-0 sec

Profile Feature	Lead (Pb)-Free Assembly
Average ramp-up rate (Tsmax to Tp)	3℃ / second max.
Preheat - Temperature Min (Ts_{min}) - Temperature Max (Ts_{max}) - Time (Ts_{min} to Ts_{max}) (ts)	 150℃ 200℃ 60 -120 seconds
Time maintained above: - Temperature (T_L) - Time (T_L)	 217℃ 60-150 seconds
Peak Temperature (Tp)	260℃
Time within $^{+0}_{-5}$ ℃ of actual Peak Temperature $(tp)^2$	10 seconds
Ramp-down Rate	6℃/second max.
Time 25℃ to Peak Temperature	8minutes max.

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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