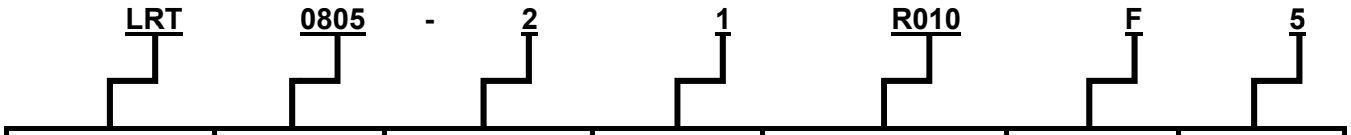
1 Scope:

1.1 This specification is applicable to lead free and halogen free for LRT Series metal alloy low-resistance resistor.

1.2 The product is for general purpose.

2 Explanation Of Part Numbers:



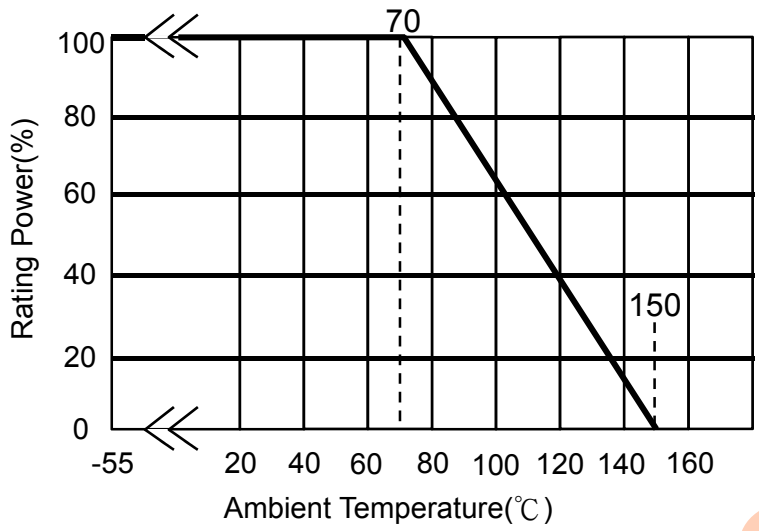
Type	Size (inch)	Number of Terminals	Rated Power	Resistance (4~6 Digits)	Tolerance	Packaging
Metal Alloy Low Resistance Resistor	• 0805 • 1206	2: 2 terminals	• C=0.5W • 1=1.0W	EX: R001 = 1mΩ R010 = 10mΩ R0005 = 0.5mΩ	D=± 0.5% F=± 1.0% G=± 2.0% J=± 5.0%	5=5,000pcs

3 Product Specifications:

Type	# of Terminals	Max. Rating Power	Max. Rating Current	Max. Overload Current	T.C.R. (ppm/°C)	Resistance Range (mΩ) F (±1%); G (±2%); J (±5%)	Operating Temperature Range
LRT0805	2	0.5W	15.8A	31.6A	≦±100	2≦R＜3	-55~+150°C
					≦±75	3≦R＜5	
					≦±50	5≦R≦70	
LRT1206	2	0.5W	22.3A	44.6A	≦±400	1≦R＜2	
					≦±75	2≦R＜4	
					≦±50	4≦R≦56	
		1W	31.6A	63.2A	≦±400	1≦R＜2	
					≦±75	2≦R＜4	
					≦±50	4≦R≦56	

3.1 Power Derating Curve: Operating Temperature Range： - 55 ~+150 ℃

For resistors operated in ambient temperatures 70°C, power rating shall be derated in accordance with the curve below:



3.2 Rating Current:

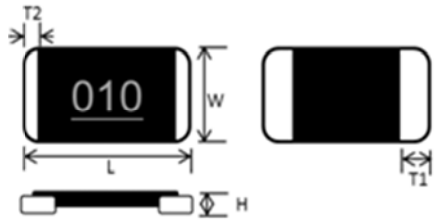
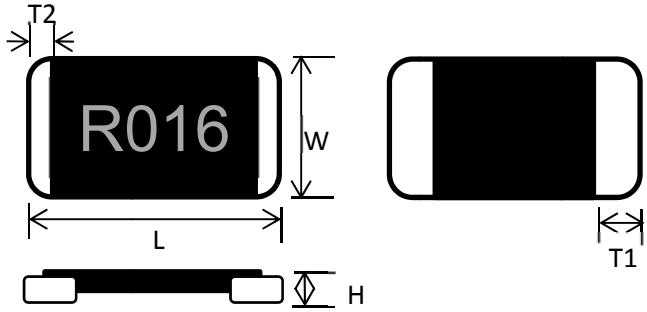
The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) currents (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards, the highest normal rated power is to be used.

Remark:

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

I=Rating Current(A)
P= Rating Power(W)
R=Resistance(Ω)

4 Physical Dimensions:

LRT0805	LRT1206
	

Type	Maximum Power Rating (Watts)	Resistance Range (mΩ)	Dimensions - in inches (millimeters)				
			L	W	H	T1	T2
LRT0805	0.5W	2	0.08±0.008 (2.032±0.20)	0.05±0.008 (1.270±0.20)	0.014+0.002/-0.004 (0.35+0.05/-0.10)	0.02±0.006 (0.50±0.15)	0.008±0.006 (0.20±0.15)
		3 ~ 70	0.08±0.008 (2.032±0.20)	0.05±0.008 (1.270±0.20)	0.012+0.002/-0.004 (0.30+0.05/-0.10)	0.014±0.008 (0.35±0.20)	0.008±0.006 (0.20±0.15)
LRT1206	0.5 / 1	1≦R<3	0.126±0.008 (3.20±0.20)	0.063±0.008 (1.60±0.20)	0.012+0.002/-0.004 (0.30+0.05/-0.1)	0.035±0.008 (0.90±0.20)	0.008±0.006 (0.20±0.15)
		3≦R<4				0.024±0.008 (0.60±0.20)	
		4≦R≦56				0.014±0.008 (0.35±0.20)	

5 Reliability Performance:

5.1 Electrical Performance:

Test Item	Conditions of Test	Test Limits
Temperature Coefficient of Resistance (TCR)	• TCR (ppm/℃) = $\frac{(R2-R1)}{R1\ (T2-T1)}$ X 10^6 • R1: resistance of room temperature • R2: resistance of 150 °C • T1: Room temperature • T2: Temperature at 150 °C • Refer to JIS C 5201-1 4.8	Refer to Paragraph 3. general specifications
Short Time Overload	Applied Overload for 5 seconds and release the load for about 30 minutes, then measure its resistance variance rate. (Overload condition refer to below): Type / Power (W) / # of rated power LRT0805 / 0.5 / 4 times LRT1206 / 0.5 / 1 / 5 times Refer to JIS C 5201-1 4.13	≦±0.5% No evidence of mechanical damage
Insulation Resistance	Put the resistor in the fixture, add 100 VDC in + ,- terminal for 60secs then measured the insulation resistance between electrodes and insulating enclosure or between electrodes and base material. Refer to JIS-C5201-1 4.6	≧$10^9\Omega$
Dielectric Withstanding Voltage	Applied 500VAC for 1 minute, and Limit surge current 50 mA (max.) Refer to JIS-C5201-1 4.7	No short or burned on the appearance.

5.2 Mechanical /Constructional Performance:

Test Item	Conditions of Test	Test Limits
Resistance to Solder Heat	The tested resistor be immersed 25 mm/sec into molten solder of 260±5℃ for 10±1secs. Then the resistor is left in the room for 1 hour, and measured its resistance variance rate. Refer to JIS-C5201-1 4.18	≦±0.5% No evidence of mechanical damage
Solderability	Add flux into tested resistors, immersion into solder bath in temperature 245±5℃ for 3±0.5secs. Refer to JIS-C5201-1 4.17	Solder coverage over 95%
Resistance to solvent	The tested resistor be immersed into isopropyl alcohol of 20~25℃ for 60secs, then the resistor is left in the room for 48 hrs. Refer to JIS-C5201-1 4.29	≦±0.5% No evidence of mechanical damage
Vibration	The resistor shall be mounted by its terminal leads to the supporting terminals on the solid table. The entire frequency range :from 10 Hz to 55 Hz and return to 10 Hz, shall be transferred in 1 min. Amplitude : 1.5mm This motion shall be applied for a period of 4 hours in each 3 mutually perpendicular directions (a total of 12hrs) Refer to JIS-C5201-1 4.22	≦±0.5% No evidence of mechanical damage

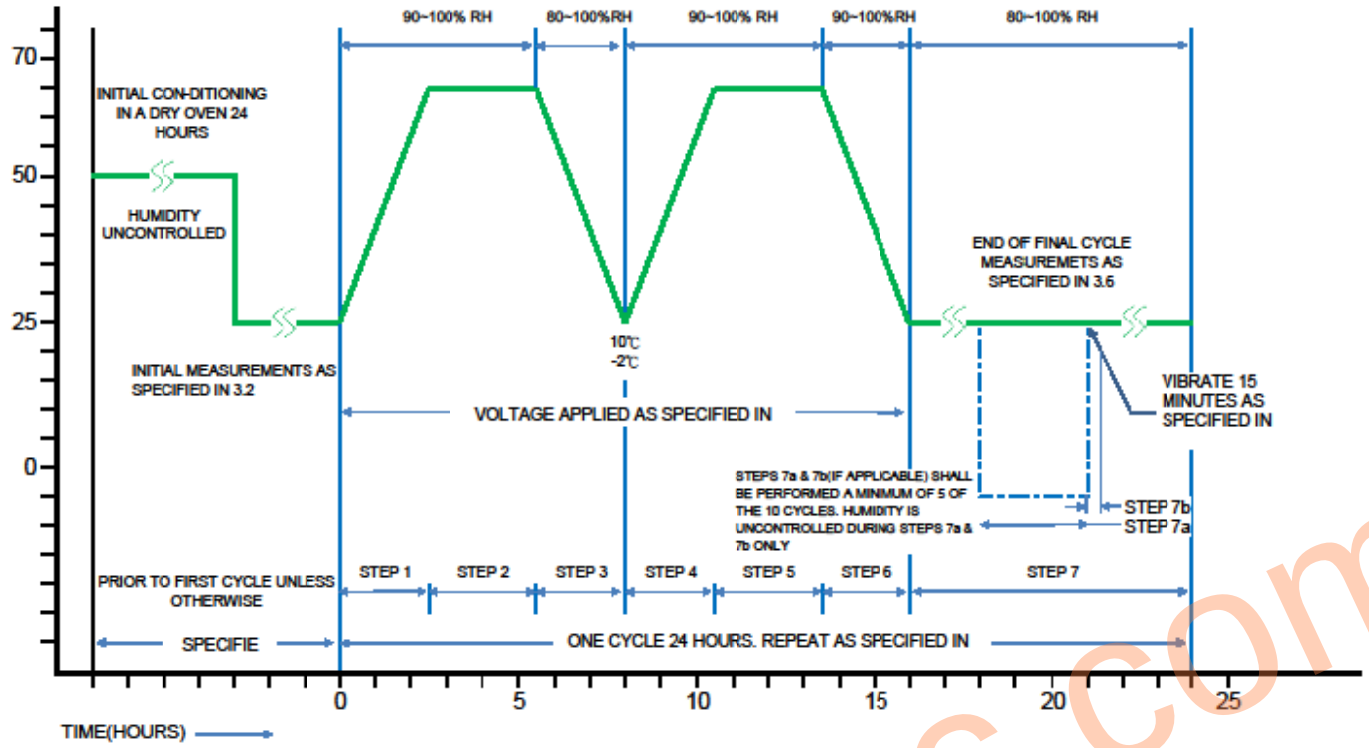
5.3 Environmental Performance:

Test Item	Conditions of Test	Test Limits
Low Temperature Exposure (Storage)	Put the tested resistor in chamber under temperature -55±2℃ for 1,000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.23.4	≦±0.5% No evidence of mechanical damage
High Temperature Exposure (Storage)	Put tested resistor in chamber under temperature 150±5℃ for 1,000 hours. Then leaving the tested resistor in room temperature for 60 minutes , and measure its resistance variance rate. Refer to JIS-C5201-1 4.23.2	≦±1.0% No evidence of mechanical damage
Temperature Cycling (Rapid Temperature Change)	Put the tested resistor in the chamber under the temperature cycling which shown in the following table shall be repeated 1,000 times consecutively. Then leaving the tested resistor in the room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.19	≦±0.5% No evidence of mechanical damage
Moisture Resistance (Climatic Sequence)	Put the tested resistor in chamber and subject to 10 cycles of damp heat and without power. Each one of which consists of the steps 1 to 7 (Figure 1). Then leaving the tested resistor in room temperature for 24 hr, and measure its resistance variance rate. Refer to MIL-STD 202 Method 106	≦±0.5% No evidence of mechanical damage
Bias Humidity	Put the tested resistor in chamber under 85± 5℃ and 85± 5%RH with 10% bias and load the rated current for 90 minutes on, 30 minutes off, total 1,000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.24	≦±0.5% No evidence of mechanical damage

	Testing Condition
Lowest Temperature	-55 +0/-10℃
Highest Temperature	150 +10/-0℃

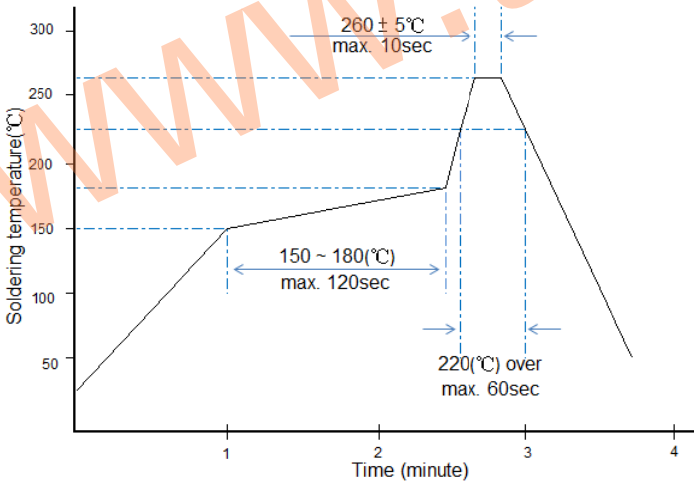
5.4 Operational Life Endurance:

Test Item	Conditions of Test	Test Limits
Load Life	Put the tested resistor in chamber under temperature 70± 2℃ and load the rated current for 90 minutes on 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	≦±1.0% No evidence of mechanical damage

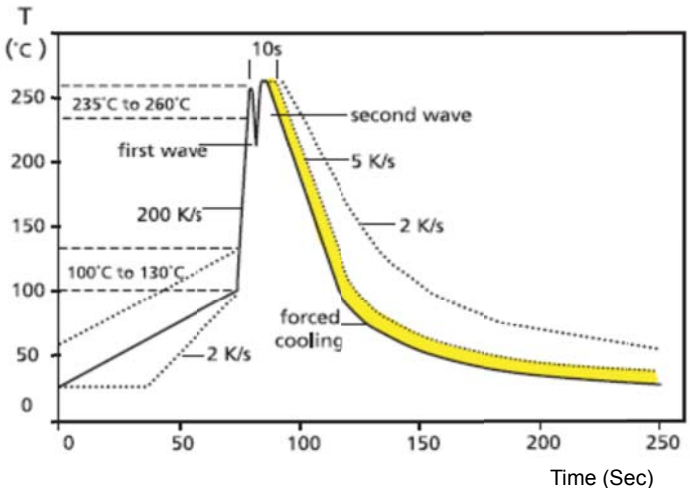


6 Technical note (This is for recommendation, please customer perform adjustment according to actual application)

6.1 Surface-mount components are tested for solderability at a temperature of 245 °C for 3 seconds. Typical examples of soldering processes that provide reliable joints without any damage are given in below:

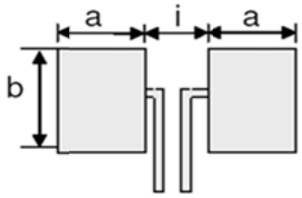


Recommended IR Reflow Soldering Profile



Recommended double-wave Soldering Profile
Typical values (solid line)
Process limits (dotted line)

7 Recommend Land Pattern:



Type	Maximum Power Rating (Watts)	Resistance Range (mΩ)	Dimensions - in millimeters		
			a	b	i
LRT0805	0.5	2 ~ 70	1.45	1.78	0.66
LRT1206	0.5 / 1	1≦R < 3	1.65	2.18	0.60
		3≦R < 4			0.90
		4≦R≦56			1.00

8 Marking Format: (All the products marking are 4 digits)

8.1 Product resistance is indicated by using two marking notation styles:

8.2 LRT0805 Type:

a. **Integer** : 3 digit, later two digits are significant figures, first digit is multiplier(10^{-3})

- <EX> 10mΩ the product marking is 010;

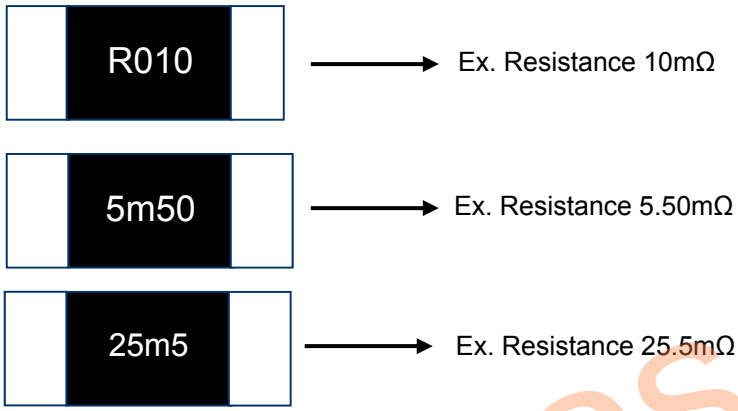
b. **Non-integer** : R<10mR "**m**" designates the decimal location in milliohms

- <EX> 9.5mΩ the product marking is 9m5;

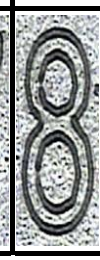
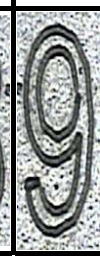
8.3 LRT1206 Type:

a. "**R**" designates the decimal location in ohms, e.g.
- For 1mΩ the product marking is R001;
- For 25mΩ the product marking is R025;

b. "**m**" designates the decimal location in milliohms, e.g.
- For 0.25mΩ the product marking is 0m25;
- For 0.5mΩ the product marking is 0m50;
- For 5.5mΩ the product marking is 5m50;
- For 25.5mΩ the product marking is 25m5.



8.4 Marking Style by Laser:

Type \ Marking	R	m	1	2	3	4	5	6	7	8	9	0
LRT0805 LRT1206												

《EX》Marking→R016 = 16 mΩ

9 Plating Thickness:

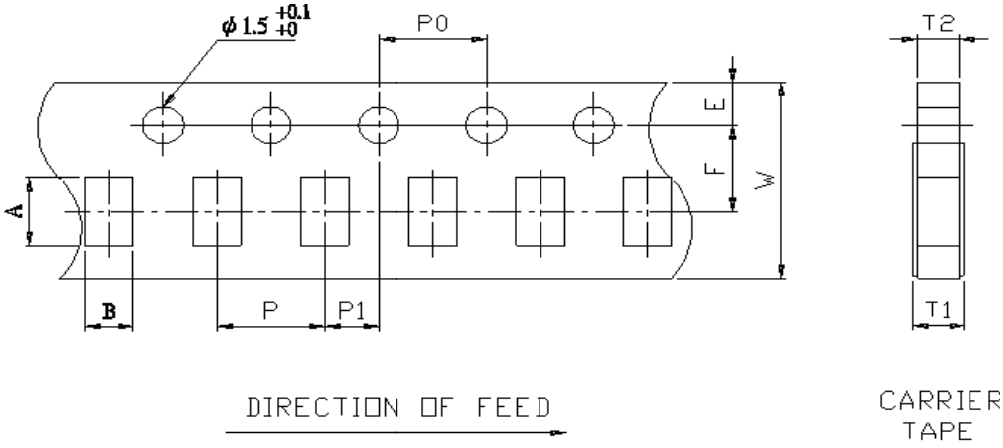
9.1 Ni：≧2μm

9.2 Sn(Tin)：≧3μm

9.3 Sn(Tin)：Matte Sn

10 Taping specifications:

10.1 Tape Dimensions:



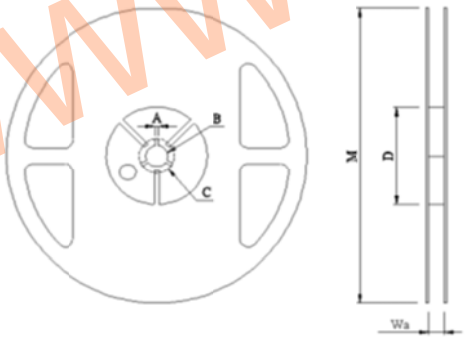
Unit: mm

DIM / Item	A	B	W	E	F	T1	T2	P	P0	10*P0	P1
LRT0805	2.30±0.10	1.55±0.10	8.0±0.20	1.75±0.10	3.5±0.05	0.40+0.2/-0	0.40±0.05	4.0±0.10	4.0±0.10	40.0±0.20	2.0±0.05
LRT1206	3.50±0.20	1.90±0.20	8.0±0.20	1.75±0.10	3.5±0.05	0.60+0.2/-0	0.60±0.05	4.0±0.10	4.0±0.10	40.0±0.20	2.0±0.05

10.2 Packaging model:

Type	Tape width	Max. Packaging Quantity (pcs/reel)
		4mm pitch
LRT0805	8mm	5,000pcs
LRT1206		

10.3 Reel Dimensions:



Unit: mm

Reel Type / Tape	Wa	M	A	B	C	D
7” reel for 8 mm tape	12.00± 0.5	178 ± 1.0	2.0 ± 0.5	13.2 ± 0.5	17.7 ± 0.5	60.0 ± 1.0

11 Attachments

11.1 Document Revise Record (QA-QR-027)