

# Metal Alloy Resistor

## Low-Ohmic Current Sensing Type

MLRE series

**MERITEK**

### FEATURE

- Operating temperature: -55~+150°C
- Compact size
- Low resistance
- Ideal for all types of current sensing, voltage division and pulse application



### PART NUMBERING SYSTEM

MLRE 0603 F R005 J  
 (1) (2) (3) (4) (5)



No	Item	Digit	Description	Series Reference
(1)	Meritek Series	MLRE	Metal Alloy Resistor	Low-Ohmic Current Sensing Type
(2)	Size	0603	0603: 0603 inch	0805, 1206, 0612, 0508
(3)	Power Rating	F	F: 0.33W	C: 0.5W, 1: 1W, E: 0.75W
(4)	Resistance	R005	R005: 5mΩ	R010: 10mΩ
(5)	Tolerance	J	J: ±1%	D: ±0.5%, G: ±2%, J: ±5%, K: ±10%

### ELECTRICAL CHARACTERISTICS

Type	Number of Terminals	Max Rating Power	Max Rating Current	Max Overload Current	T.C.R. (ppm/°C)	Resistance Range(mΩ)		Operating Temperature Range
						D (±0.5%)	F (±1%), G (±2%), J (±5%)	
MLRE0603	2	0.33W	8.1A	16.2A	≤±50	--	5≤R≤75	-55~+150°C
		0.5W	10.0A	20.0A	≤±50	--	5≤R≤10	
MLRE0805	2	0.5W	15.8A	31.6A	≤100	--	2≤R<3	
					≤±75	--	3≤R<5	
		0.75W	19.36A	38.72A	≤±50	5≤R≤70	5≤R≤70	
					≤±100	--	2≤R<3	
MLRE1206	2	0.5W	15.8A	31.6A	≤±75	--	2≤R<4	
					≤±50	10≤R≤75	4≤R≤75	
		1W	22.4A	44.8A	≤±75	--	2≤R≤4	
					≤±50	10	4≤R≤10	
MLRE0508	2	1W	22.3A	44.6A	≤±50	--	2≤R≤14	
					≤±50	22≤R≤75	22≤R≤75	
MLRE0612	2	1W	31.6A	63.2A	≤±125	--	1≤R<2	
					≤±50	10≤R≤16	2≤R≤16	

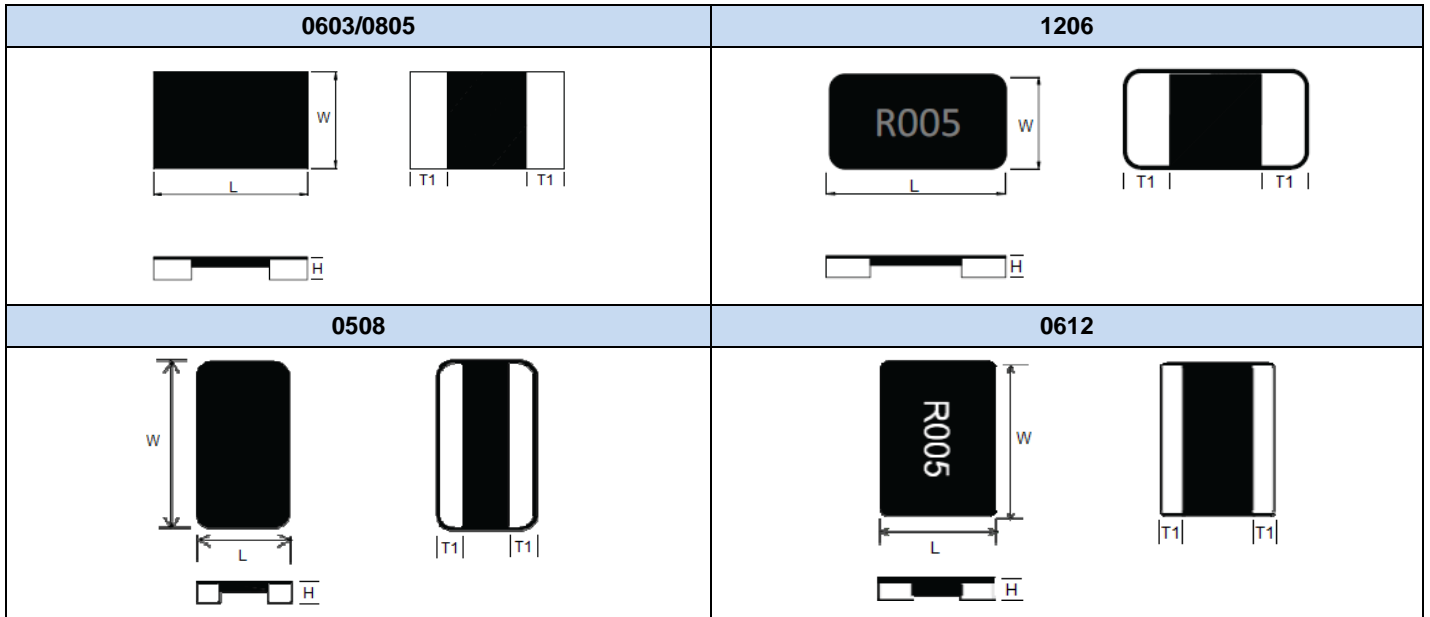
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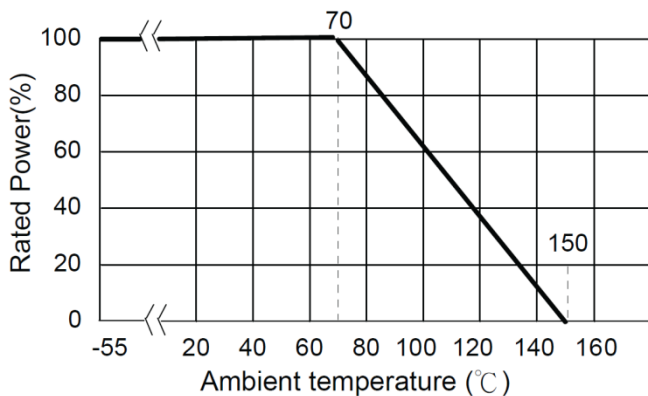
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### DIMENSIONS



Type	Maximum Power Rating(Watts)	Resistance Range(mΩ)	Dimensions-in inches(millimeters)			
			L	W	H	T1
MLRE0603	0.33	5~68	0.063±0.008 (1.60±0.20)	0.031±0.008 (0.80±0.20)	0.012+0.002/-0.004 (0.30+0.05/-0.10)	0.012±0.006 (0.30±0.15)
	0.5	5~10				
MLRE0805	0.5&0.75	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)
	0.5	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)
	0.75	3~10				
MLRE1206	0.5&1	2~3	0.126±0.008 (3.20±0.20)	0.063±0.008 (1.60±0.20)	0.016±0.008 (0.40±0.20)	0.031±0.01 (0.8±0.25)
		4~75				0.014±0.008 (0.35±0.20)
MLRE0508	1	2 ~14	0.05±0.008 (1.270±0.20)	0.08±0.008 (2.032±0.20)	0.012±0.004 (0.30±0.10)	0.014±0.006 (0.35±0.15)
MLRE0612	1	1 ~16	0.063±0.008 (1.60±0.20)	0.126±0.008 (3.20±0.20)	0.012+0.002/-0.004 (0.30+0.05/-0.10)	0.012±0.006 (0.30±0.15)

### DERATING CURVE



Notes:

The following equation may be used to determine the DC or AC currents (RMS) 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.

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

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

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### RELIABILITY

Test Item	Test Conditions	Specifications																														
<b>Temp. Coefficient of Resistance(TCR)</b>	$TCR (ppm/^{\circ}C) = \frac{(R2-R1)}{R1(T2-T1)} \times 10^6$ T1: Room temperature T2: Temperature at 150°C Refer to JIS C 5201-1 4.8 R1: resistance of room temperature R2: resistance of 150°C	Refer to Section of Electrical Specification																														
<b>Short Time Overload</b>	Applied Overload for 5 seconds and release the load for about 30 minutes, the measure its resistance variance rate. (Overload condition refer to below) Refer to JIS C 5201-1 4.13 <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Type</th> <th>Power (W)</th> <th># of Rated Power</th> <th>Type</th> <th>Power (W)</th> <th># of Rated Power</th> </tr> </thead> <tbody> <tr> <td>MLRE0603</td> <td>0.33</td> <td>4 times</td> <td>MLRE1206</td> <td>0.5</td> <td>4 times</td> </tr> <tr> <td>MLRE0603</td> <td>0.5</td> <td>4 times</td> <td>MLRE1206</td> <td>1</td> <td>4 times</td> </tr> <tr> <td>MLRE0805</td> <td>0.5</td> <td>4 times</td> <td>MLRE0508</td> <td>1</td> <td>4 times</td> </tr> <tr> <td>MLRE0805</td> <td>0.75</td> <td>4 times</td> <td>MLRE0612</td> <td>1</td> <td>4 times</td> </tr> </tbody> </table>	Type	Power (W)	# of Rated Power	Type	Power (W)	# of Rated Power	MLRE0603	0.33	4 times	MLRE1206	0.5	4 times	MLRE0603	0.5	4 times	MLRE1206	1	4 times	MLRE0805	0.5	4 times	MLRE0508	1	4 times	MLRE0805	0.75	4 times	MLRE0612	1	4 times	$\leq \pm 0.5\%$ No physical damage
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MLRE0805	0.75	4 times	MLRE0612	1	4 times																											
<b>Insulation Resistance</b>	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	$\geq 10^9 \Omega$																														
<b>Dielectric Withstanding Voltage</b>	Applied 500VAC for 1 minute, and Limit surge current 10 mA (max.) Refer to JIS-C5201-1 4.7	No short or burned on the appearance.																														
<b>Resistance to Solder Heat</b>	The tested resistor is immersed 25 mm/sec into molten solder of 260±5°C 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	$\leq \pm 0.5\%$ No physical damage																														
<b>Solderability</b>	Add flux into tested resistors, immersion into solder bath in temperature 245±5°C for 3±0.5secs. Refer to JIS-C5201-1 4.17	Solder coverage over 95%																														
<b>Resistance to solvent</b>	The tested resistor is immersed into isopropyl alcohol of 20~25°C for 60secs, then the resistor is left in the room for 48 hrs. Refer to JIS-C5201-1 4.29	$\leq \pm 0.5\%$ No physical damage																														
<b>Vibration</b>	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	$\leq \pm 0.5\%$ No physical damage																														
<b>Low Temperature Exposure (Storage)</b>	Put the tested resistor in chamber under temperature -55±2°C 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	$\leq \pm 0.5\%$ No physical damage																														
<b>High Temperature Exposure (Storage)</b>	Put tested resistor in chamber under temperature 150±5°C 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	$\leq \pm 1\%$ No physical damage																														
<b>Temp. Cycling (Rapid Temp. Change)</b>	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 <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Testing Condition</th> <th>-55 +0/-10°C</th> <th>150 +10/-0°C</th> </tr> </thead> <tbody> <tr> <td>Properties</td> <td>Lowest Temp.</td> <td>Highest Temp.</td> </tr> </tbody> </table>	Testing Condition	-55 +0/-10°C	150 +10/-0°C	Properties	Lowest Temp.	Highest Temp.	$\leq \pm 1\%$ No physical damage																								
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Properties	Lowest Temp.	Highest Temp.																														
<b>Moisture Resistance (Climatic Sequence)</b>	Put the tested resistor in chamber and subject to 10 cycles of damp heat and without power. Then leaving the tested resistor in room temp. for 24 hrs, and measure its resistance variance rate. Refer to MIL-STD 202 Method 106	$\leq \pm 0.5\%$ No physical damage																														
<b>Bias Humidity</b>	Put the tested resistor in chamber under 85± 5°C 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	$\leq \pm 1\%$ No physical damage																														

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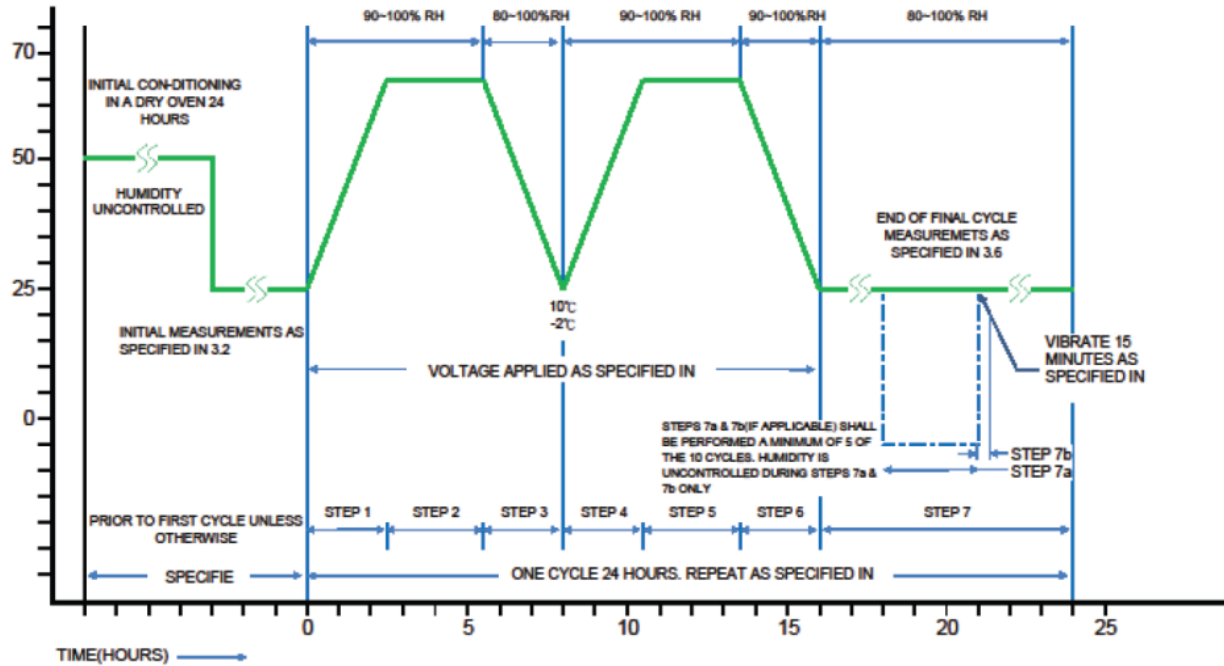
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### LOAD LIFE PERFORMANCE

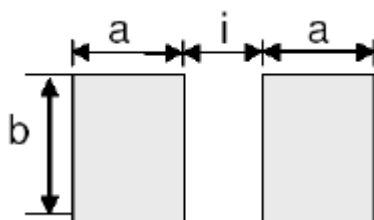
Test Item	Test Conditions	Specifications
Load Life	Put the tested resistor in chamber under temperature $70 \pm 2^{\circ}\text{C}$ and load the rated current for 90 minutes on 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate.	$\leq \pm 1.0\%$ No physical damage



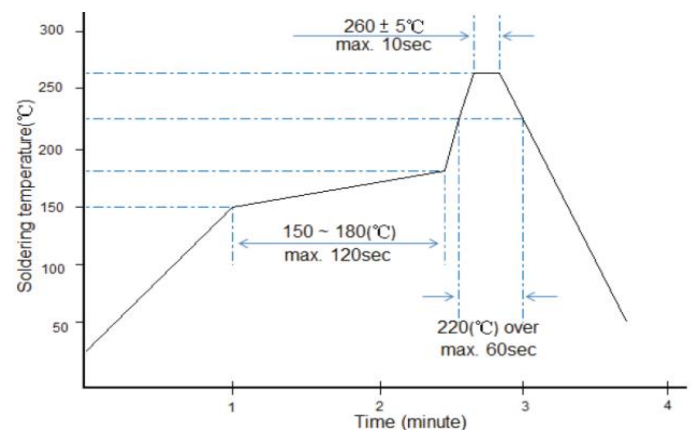
### SOLDERING RECOMMENDATION

#### Land Pattern

Type	Maximum Power Rating (Watts)	Resistance Range (mΩ)	Dimensions in inches (millimeters)		
			a	b	i
MLRE0603	0.33 & 0.5	5-68	1.00	1.27	0.50
MLRE0805	0.5	2-70	1.80	2.18	0.66
	0.75	2-10	1.80	2.18	0.66
MLRE1206	0.5 & 1	2-3	1.65	2.18	0.90
		4-75			1.00
MLRE0508	1	2-14	1.45	2.20	0.50
MLRE0612	1	1-16	1.65	3.50	0.50



#### Reflow Soldering Profile



Surface-mount components are tested for solderability at a temperature of  $245^{\circ}\text{C}$  for 3 seconds.

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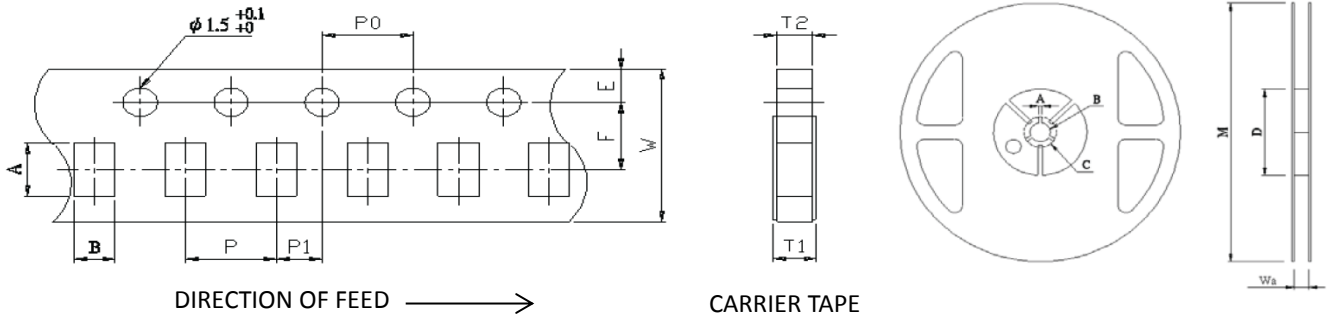
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### PACKAGING SPECIFICATION

#### Tape Dimensions



Unit: mm

Series	A	B	W	E	F	T1	T2	P	P0	10 X P0	P1
<b>MLRE0603</b>	1.80±0.10	1.00±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
<b>MLRE0805</b>	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
<b>MLRE1206</b>	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
<b>MLRE0508</b>	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	8.0±0.10	4.0±0.10	40.0±0.20	2.0±0.05
<b>MLRE0612</b>	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	12.0±0.10	4.0±0.10	40.0±0.20	2.0±0.05

#### Reel Dimensions

Reel Type/ Tape	W	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

\*Specifications subject to change without notice.