



MRE Series Metal Alloy Low-Resistance Resistor Product Specifications

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■ Metal Alloy Low Resistance Chip Resistor — MRE Series

■ Application

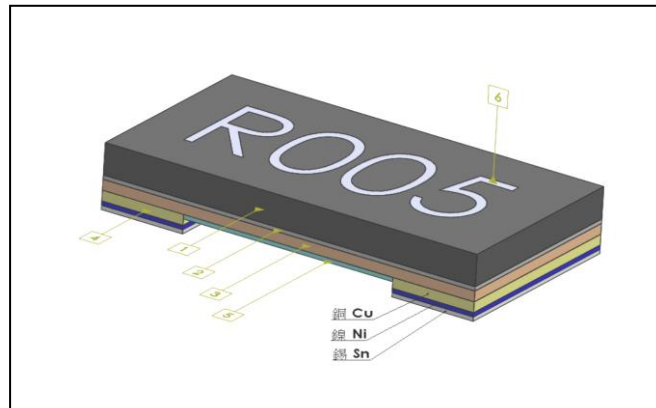
- Computer
- Power supply
- Measuring instrument
- Industrial
- Battery management system

■ Features

- Low Resistance / TCR / EMF(Only for MnCu) / Inductance
- Excellent long term stability
- RoHs compliant and halogen free.
- Lead free.
- High precision current sensing and voltage division.
High Current Jumper

■ Product structure

- (1) - Substrate : epoxy
- (2) - Adhesive : epoxy
- (3) - Resistive element : Cu – alloy
- (4) - Terminal electrode : Sn、Ni、Cu
- (5) - Protective coating : Flame-retardant epoxy, meets UL- 94-V0 requirements
- (6) - Marking coating : Flame-retardant epoxy, meets UL- 94-V0 requirements (white)



■ Parts number explanation:

Example:

MRE	1206	10	F	R002	M	Z
Product Type	Size (Inch)	Rated Power	Tolerance	Resistance	Material	Optional
	0402 0603 0805 1206	Standard 03=0.33W 05=0.50W 10=1.00W Jumper 01 02 0A 03	F : $\pm 1\%$ *J : $\pm 5\%$ (*for Jumper)	2M50=2.5mR R005=5.0mR R020=20mR *R000=Jumper	M : MnCu *C : Cu (*for Jumper)	



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Standard Electrical Specifications

Type	Rating Power at 70℃	T.C.R. (ppm/℃)	Max. Rating Current	Max. Overload Current	Resistance Range (mΩ)	Material	Operating Temperature Range (℃)
					1.0% (F)		
MRE0402	0.33W	±150	11.48A	18.16A	2.5	MnCu	- 55 ~ + 155
		±100	8.12A	12.84A	5~20		
MRE0603	0.33W	±100	12.84A	20.31A	2~5		
		±75	7.41A	11.72A	6~20		
MRE0805	0.5W	±75	18.25A	28.86A	1.5~5		
		±50	9.12A	14.43A	6~20		
MRE1206	1W	±75	31.62A	50A	1~4		
		±50	14.14A	22.36A	5~20		

Jumper Specifications

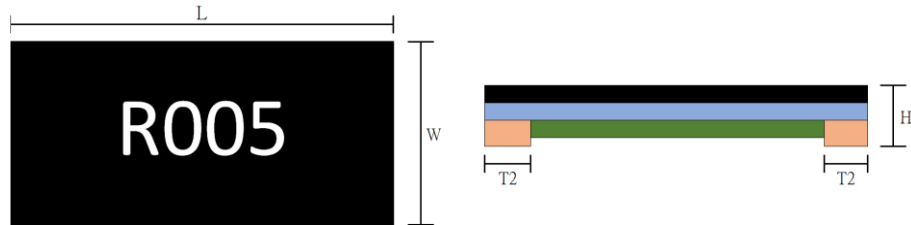
Type	Max. Rating Current	Max. Overload Current	Max Resistance (mΩ)	Operating Temperature Range (℃)
MRE0402	20A	31.62A	0.5	- 55 ~ + 155
MRE0603	26A	41.07A	0.2	
MRE0805	35A	55.33A	0.2	
MRE1206	40A	64.22A	0.2	



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Type Dimension



Standard Electrical Dimension

Unit : mm

	Power Rating	Resistance Range	L	W	H	T ₂
MRE0402	0.33W	2.5mΩ	1.00±0.10	0.55±0.10	0.30±0.05	0.30±0.10
		5~20mΩ				0.23±0.10
MRE0603	0.33W	2mΩ	1.60±0.25	0.80±0.25	0.40±0.25	0.45±0.20
		2.5~3mΩ				0.35±0.20
		4~20mΩ				0.30±0.20
MRE0805	0.5W	1.5~2mΩ	2.00±0.25	1.25±0.25	0.40±0.25	0.60±0.20
		3~20mΩ				0.40±0.20
MRE1206	1W	1mΩ	3.20±0.25	1.60±0.25	0.40±0.25	1.25±0.30
		2mΩ				1.05±0.30
		3mΩ				0.80±0.30
		4~20mΩ				0.60±0.30

Jumper Dimension

Unit : mm

	Max Resistance	L	W	H	T ₂
MRE0402	0.5mΩ	1.00±0.20	0.50±0.20	0.35±0.20	0.20±0.15
MRE0603	0.2mΩ	1.60±0.25	0.80±0.25	0.35±0.25	0.35±0.20
MRE0805	0.2mΩ	2.00±0.25	1.25±0.25	0.35±0.25	0.35±0.20
MRE1206	0.2mΩ	3.20±0.25	1.60±0.25	0.50±0.25	0.50±0.20

※Rmax= Max Resistance



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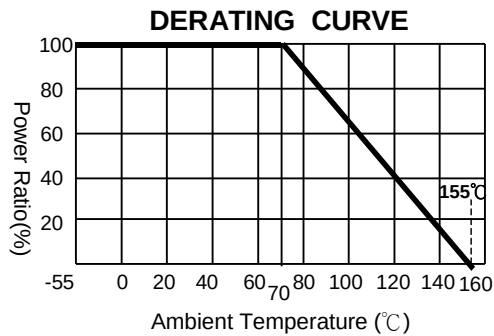
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■ Performance Characteristics

Power Derating Curve

The Operating Temperature Range: -55°C ~+155°C.

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



■ Rating Current

The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards (paragraph 5), the highest normal rated power is to be used

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

I = Rating current (A)

P= Rating Power (W)

R= Resistance(Ω)

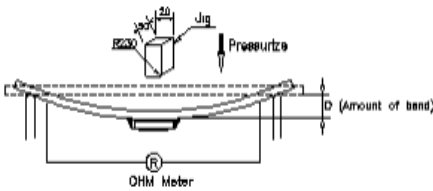
■ Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS C 5201-1 clause 4.8	$\bullet \text{ T.C.R. (ppm/}^\circ\text{C)} = \frac{(R_2 - R_1)}{R_1(T_2 - T_1)} \times 10^6$ R1: resistance at room temperature (T1) R2: resistance at 125°C (T2)	Refer to Ratings
Short Time Overload	JIS C 5201-1 clause 4.13	The number of rated power are as follows: 2.5 times of rated power Rating power duration: 5secs	±1.0%+0.5mΩ
High Temperature Exposure	JIS C 5201-1 clause 4.23.2	1,000hrs at + 155 °C±2°C	±1.0%+0.5mΩ Jumper : < Rmax
Low Temp. Storage	JIS C 5201-1 clause 4.23.4	1,000hrs at -55 °C±2°C	±1.0%+0.5mΩ Jumper : < Rmax



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Soldering Heat	JIS C 5201-1 clause 4.18	260±5℃ for 10±1 seconds.	±1.0%+0.5mΩ Jumper : < Rmax
Moisture Load Life	JIS C 5201-1 clause 4.24	T=40±2℃, RH=90~95% ,Load with Rated Current 1.5hrs "ON", 0.5hrs "OFF", 1000h	±2.0%+0.5mΩ Jumper : < Rmax
Temperature Cycling	JIS C 5201-1 clause 4.19	-55℃ to +155℃, 100 cycles	±1.0%+0.5mΩ Jumper : < Rmax
Load Life	JIS C 5201-1 clause 4.25	T=70±2 °C, Load with Rated Current 1.5hrs "ON", 0.5hrs "OFF" , 1000h	±2.0%+0.5mΩ Jumper : < Rmax
Solderability	JIS C 5201-1 clause 4.17	245±5℃ for 3±0.5secs	The covered area >95%
Mechanical Shock	JIS C 5202 clause 6.7	a =100G , t =11ms, 5 times shock	±1.0%+0.5mΩ
Substrate Bending	JIS-C5201-1 clause 4.33	Span between fulcrums : 90mm Bend Width : 2mm 	±1.0%+0.5mΩ

Marking Format:

- 0402 type no marking
- 0603 type products marking are 2 or 3 digits
 - e.g. 2 digits
 - 10mΩ the product marking is 10.
 - 15mΩ the product marking is 15
 - e.g. 3 digits
 - "M" designates the decimal location in milli-ohms
 - 2.5mΩ the product marking is 2M5
- 0805 type products marking are 3 digits.
 - "M" designates the decimal location in milli-ohms
 - e.g. 10mΩ the product marking is 010.
 - 1.5mΩ the product marking is 1M5
- 1206 type products marking are 4 digits.
 - "R" designates the decimal location in ohms
 - e.g. 1mΩ the product marking is R001.
 - 20mΩ the product marking is R020.
 - "M" designates the decimal location in milli-ohms
 - e.g. 0.25mΩ the product marking is 0M25.
 - 0.5mΩ the product marking is 0M50.
 - 5.5mΩ the product marking is 5M50.
- The criteria to distinguishing the mark on the surface of products are that characters can be identified.
- Jumper NO Marking



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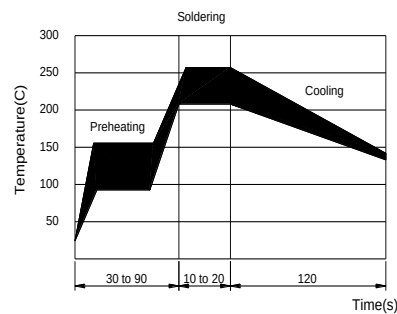
● Recommended Customer Soldering Parameters

■ Solder reflow Temperature condition

Preheating : $145 \pm 15^{\circ}\text{C}$, max.120 sec.

Soldering : min. 220°C , max. 60 sec.

Maximum temperature : $260 \pm 5^{\circ}\text{C}$, max. 10sec.



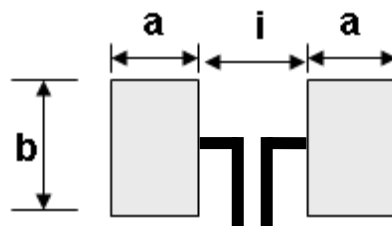
■ Rework temperature (hot air equipment) : 350°C , 3~5seconds

■ Recommended reflow methods

IR, vapor phase oven, hot air oven

If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

■ Recommend Land Pattern Design



■ Standard Electrical Dimension

Unit: mm

TYPE	Resistance Range	a	b	i
MRE0402 – 0.33W	2.5mΩ~20mΩ	0.60	0.60	0.40
MRE0603 – 0.33W	2mΩ	1.35	0.92	0.50
	2.5mΩ~20mΩ	1.30	0.92	0.60
MRE0805 – 0.5W	1.5~2mΩ	1.55	1.44	0.50
	3mΩ~20mΩ	1.40	1.44	0.80
MRE1206 – 1W	1mΩ	2.15	1.84	0.50
	2mΩ	2.10	1.84	0.60
	3mΩ~20mΩ	1.80	1.84	1.20



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Jumper Dimension

Unit: mm

TYPE	Max Resistance	a	b	i
MRE0402 – 0.2W	0.5mΩ	0.60	0.60	0.40
MRE0603 – 0.135W	0.2mΩ	1.30	0.92	0.60
MRE0805 – 0.245W	0.2mΩ	1.40	1.44	0.80
MRE1206 – 0.33W	0.2mΩ	1.80	1.84	1.20

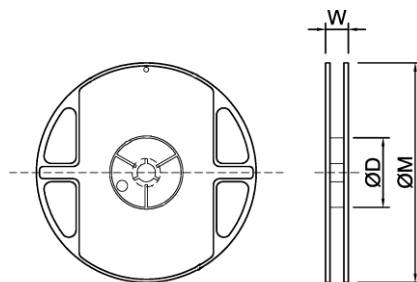
Packing Quantity

TYPE	PCS /Reel
MRE0402	10,000
MRE0603	5,000
MRE0805	5,000
MRE1206	5,000

Appendix For SMD Chip Resistor

Packaging Information

Reel Dimensions



Dimension

Unit: mm

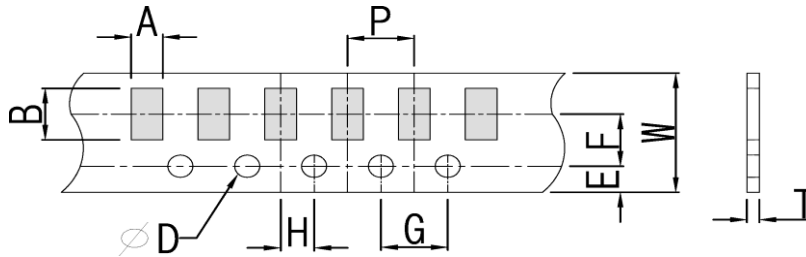
Type	φ D	W	φ M
MRE0402	60±2	9.0±1	178±5
MRE0603			
MRE0805			
MRE1206			



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Carrier Dimensions



Dimension

Unit: mm

Item	W	P	E	F	∅D	G	H	A	Bo	T	
										Standard	Jumper
MRE0402	8.0±0.30	2.0±0.10	1.75±0.10	3.5±0.10	1.50 ^{+0.1} ₀	4.0±0.10	2.0±0.10	0.75±0.20	1.25±0.20	0.5±0.05	0.50±0.05
MRE0603		4.0±0.10						1.18±0.20	1.98±0.20	0.75±0.10	0.58±0.10
MRE0805								1.55±0.20	2.30±0.20	0.75±0.20	0.58±0.20
MRE1206								2.05±0.20	3.65±0.20		0.75±0.20

Peeling Strength of Seal Tape

Peeling Strength: 0.1 – 1.0N (10 - 100gf)

Storage Temperature

Temperature : 25±5°C, Humidity : 60±20%