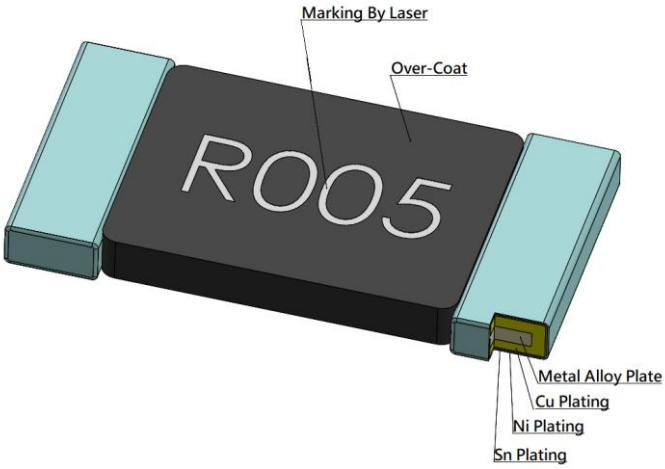
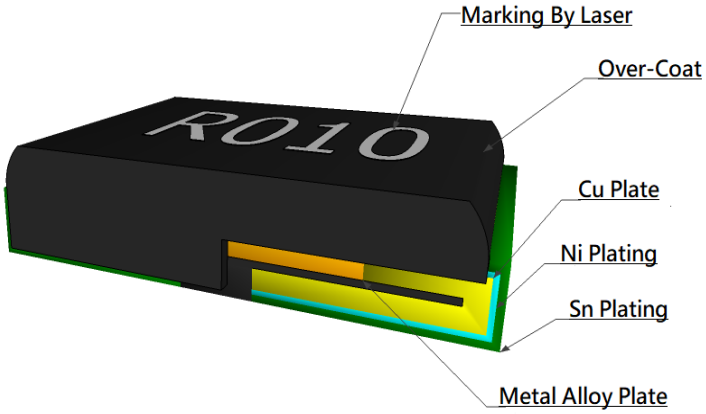
■ Metal Alloy Low Resistance Chip Resistor — MR Series





■ Application

— Entertainment equipment

— Power Supply

— Measuring instrument

— Industrial equipment

— Battery management system

■ Features

— Low Resistance / TCR

— Excellent long term stability

— RoHs compliant and halogen free.

— Lead free.

— High precision current sensing and voltage division.

■ Parts Number Explanation

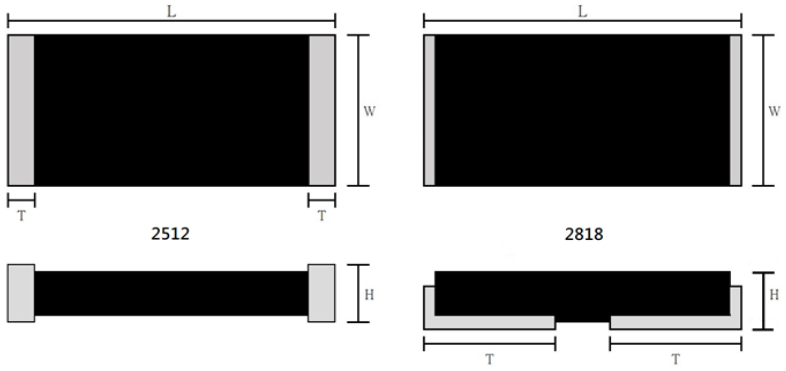
■ Example:

MR	2512	20	F	R004	M	Z
Product Type	Size (Inch)	Rated Power	Tolerance	Resistance	Material	Optional
	2512 2818	20=2.00W 30=3.00W 50=5.00W	F：±1% G：±2% J：±5%	R005=5.0mR R010=10mR	M：MnCu F：FeCrAl	

■ Standard Electrical Specifications

Type	Rating Power at 70℃	T.C.R. (ppm/℃)	Max. Rating Current	Max. Overload Current	Resistance Range (mΩ) 1.0% (F) 2.0% (G) 5.0% (J)	Material	Operating Temperature Range (℃)
MR2512	2W	≦±75	44.72A	100.00A	1~3	R001~R010：MnCu R011~R050：FeCrAl	- 55 ~ + 170
		≦±50	22.36A	50A	4~50		
	3W	≦±75	54.77A	122.47A	1~3	R001~R010：MnCu	
		≦±50	27.38A	61.23A	4~10		
MR2818	5W	≦±200	35.35A	70.71A	4~5	R004~R005：MnCu R006~R020：FeCrAl	- 55 ~ + 170
		≦±75	28.86A	57.73A	6~20		

■ Type Dimension



■ Dimension

Unit：mm

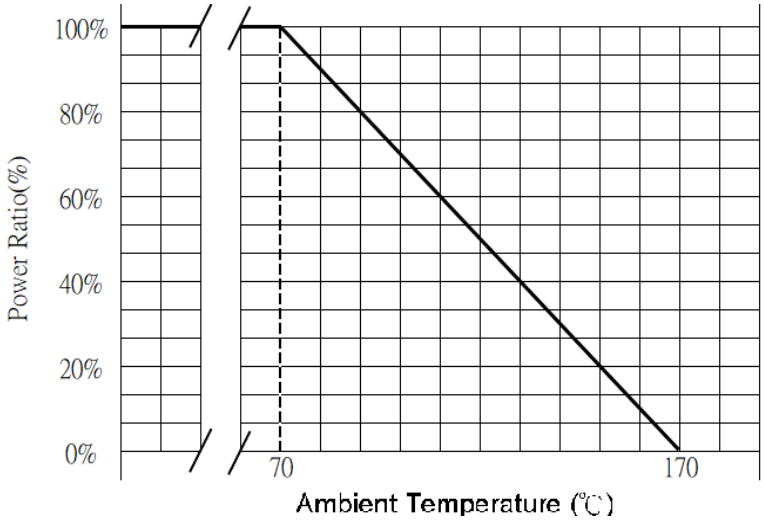
	Power Rating	Resistance Range	L	W	H	T
MR2512	2W	1mΩ(MnCu)	6.35±0.254	3.10±0.254	0.70±0.254	2.1±0.254
		2~10mΩ(MnCu)				0.95±0.254
		11~50mΩ(FeCrAl)			0.90±0.254	0.80±0.254
	3W	1mΩ(MnCu)			0.70±0.254	2.1±0.254
		2~10mΩ(MnCu)				0.95±0.254
MR2818	5W	4~20mΩ	7.15±0.254	4.95±0.254	1.65±0.254	2.90±0.254

■ Performance Characteristics

Power Derating Curve

The Operating Temperature Range: -55°C ~+170°C.

For resistors operated in ambient temperatures above 70°C, power rating must be derating in accordance with the curve as 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, the highest normal rated power is to be used

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

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

■ Marking Format:

- All the products marking are 4 digits.
- “R” designates the decimal location in ohms

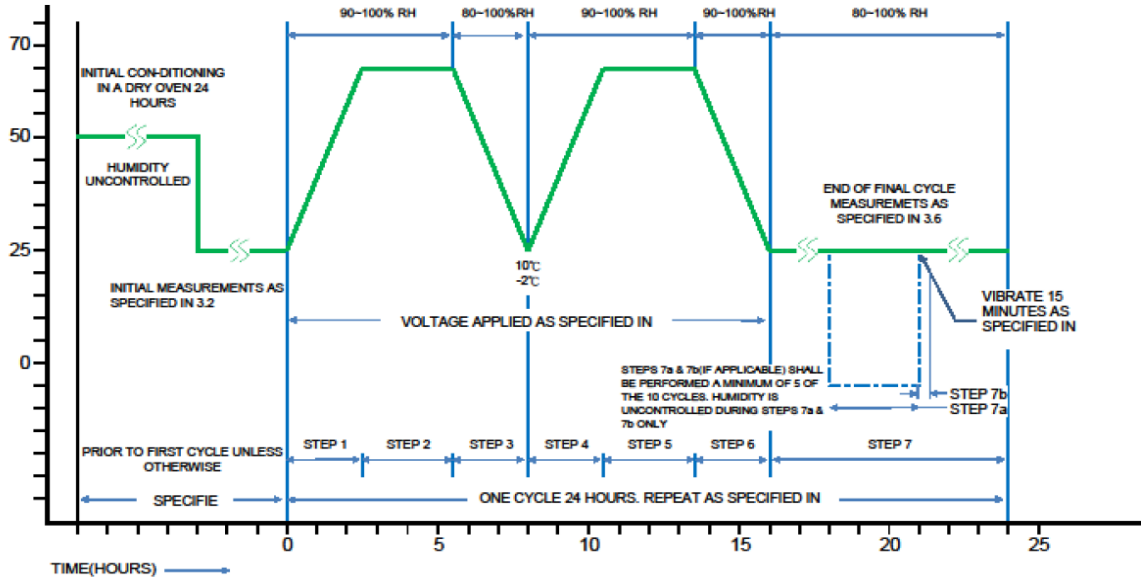
  e.g. 3mΩ the product marking is R003.

  10mΩ the product marking is R010.
- The criteria to distinguishing the mark on the surface of products are that characters can be identified.

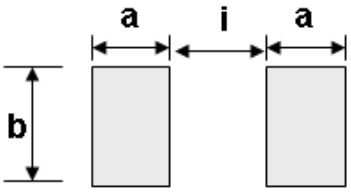
■ Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS C 5201-1 clause 4.8	• T.C.R. (ppm/℃) = $\frac{(R2-R1)}{R1\ (T2-T1)} \times 10^6$ 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: • MR2512-2W: 5 times of rated power • MR2512-3W: 5 times of rated power • MR2818-5W: 4 times of rated power Rating power duration: 5secs	ΔR/R1≦±1.0%
High Temperature Exposure	JIS C 5201-1 clause 4.23.2	1,000hrs at + 170 °C	ΔR/R1≦±1.0%
Soldering Heat	JIS C 5201-1 clause 4.18	260±5℃ for 10 seconds.	ΔR/R1≦± 0.5%
Temperature Cycling	JIS C 5201-1 clause 4.19	-55°C to +150°C, 1,000cycles, 15min at each extreme	ΔR/R1≦±1.0%
Bias Humidity	JIS C 5201-1 clause 4.24	1,000hrs@+85°C/85%RH, 10%Bias 1.5hrs “ON”, 0.5hrs “OFF”	ΔR/R1≦±1.0%
Load at Rated Power	JIS C 5201-1 clause 4.25	1,000hrs@70 °C, 1.5hrs “ON”, 0.5hrs “OFF”	ΔR/R1≦±1.0%
Solderability	JIS C 5201-1 clause 4.17	245±5°C for 2±0.5secs	>95% coverage
Dielectric Withstanding Voltage	JIS-C5201-1 clause 4.7	Applied 500VAC for 1 minute, and Limit surge current 50 mA (max.)	No short or burned on the appearance.
Core Body Strength	JIS-C5201-1 clause 4.15	Central part pressurizing force：5N , 10 seconds	No broken
Terminal Strength	JIS-C5201-1 clause 4.32	Pressurizing force：17.7N , 10 seconds	No broken
Terminal Bending Strength	JIS-C5201-1 clause 4.33	Bending once for 2mm , 10 seconds	ΔR/R1≦± 0.5% No broken
Moisture Resistance (Climatic Sequence)	MIL-STD 202 Method 106	T=24 hours / Cycle ,10Cycles . Steps 7a& 7b not required. Unpowered . (Figure 1)	ΔR/R1≦± 0.5%

Figure 1



■ Recommend Land Pattern Design



■ Dimension

Unit: mm

TYPE	Resistance Range	a	b	i
MR2512 – 2W/3W	1mΩ (MnCu)	3.10	4.53	1.30
	2mΩ~10mΩ (MnCu)	2.64	4.53	3.83
MR2512 – 2W	11mΩ~50mΩ (FeCrAl)	2.64	4.53	3.83
MR2818 – 5W	4mΩ~20mΩ	3.50	5.30	0.60

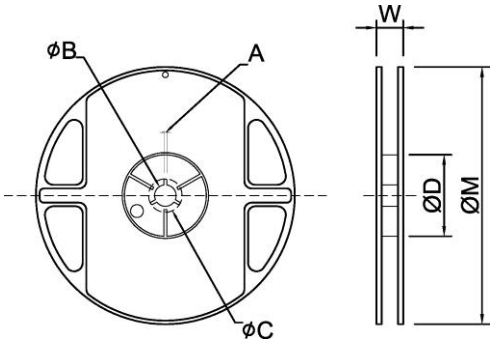
■ Packing Quantity

TYPE	PCS /Reel
MR2512-2W/3W	4,000
MR2818-5W	3,500

■ Appendix For SMD Chip Resistor

● Packaging Information

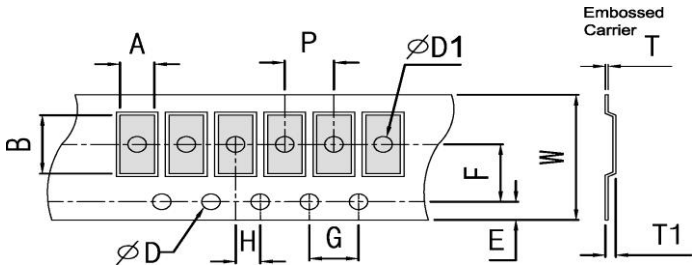
■ Reel Dimensions



■ **Dimension** **Unit: mm**

Reel Type / Tape	A	ϕB	ϕC	ϕD	W	ϕM
7" reel for 12 mm embossed	2.5±0.5	13.5±0.5	17.7±0.5	60.0±0.5	16.2±0.5	178±1.0
13" reel for 16 mm embossed	2.3±0.5	13.5±0.5	17.7±0.5	99.0±0.5	20.7±0.5	330±1.0

■ Embossed Dimensions



■ **Dimension** **Unit: mm**

Item	W	P	E	F	∅D	∅D1	G	H	A	B	T1	T
MR2512	12.0±0.30	4.0±0.10	1.75±0.10	5.5±0.10	$1.50^{+0.1}_{-0}$	1.55±0.10	4.0±0.10	2.0±0.10	3.50±0.10	6.75±0.10	0.90±0.10	0.20±0.05
MR2818	16.0±0.30	8.0±0.10	1.75±0.10	7.5±0.10		$1.50^{+0.1}_{-0}$	4.0±0.10	2.0±0.10	5.21±0.10	7.69±0.10	1.97±0.10	0.30±0.05

■ Storage Temperature

Temperature：25±5℃, Humidity：60±20%