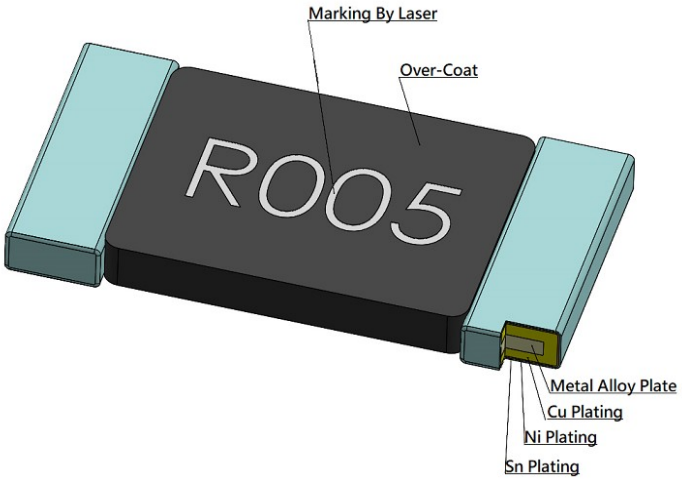
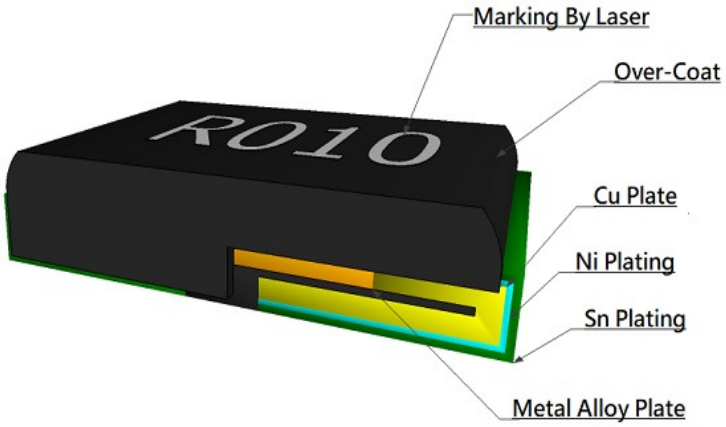
# ■ Metal Alloy Low Resistance Chip Resistor — MR Series




## ■ Application

- Entertainment equipment
- Power Supply
- Measuring instrument
- Industrial equipment
- Battery management system

## ■ Features

- Low Resistance / Low TCR/ Low Inductance(Only *Z)
- Excellent long term stability
- RoHs compliant and halogen free
- Lead free
- High precision current sensing and voltage division
- AEC-Q200 Compliant

## ■ Parts Number Explanation

### ■ Example:

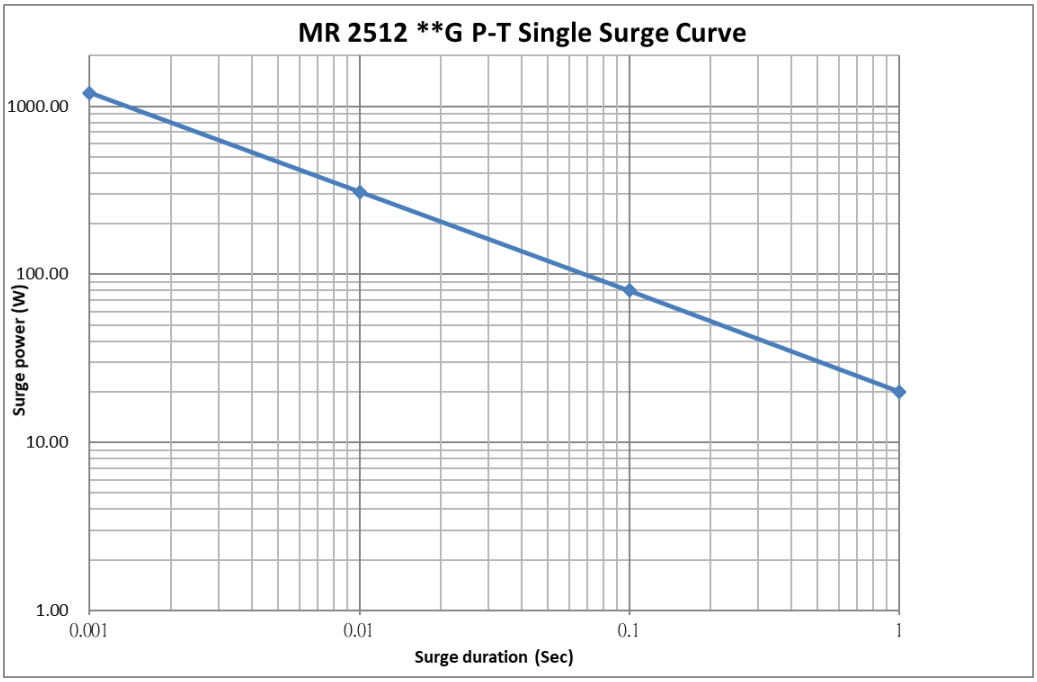
| MR | 2512 | 20 | F | R004 | M | Z |
|---|---|---|---|---|---|---|
| Product Type | Size (Inch) | Rated Power | Tolerance | Resistance | Material | Optional |
| | 2512<br>2818 | 10=1.00W<br>20=2.00W<br>30=3.00W<br>50=5.00W | D：±0.5%<br>F：±1%<br>G：±2%<br>J：±5% | R005=5.0mR<br>R010=10mR | M：MnCu<br>F：FeCrAl<br>R：NiCrAl<br>S：MnCuSn | Z:Normal Type(Low inductance)<br>G:Anti-Surge Type |

## ■ Standard Electrical Specifications

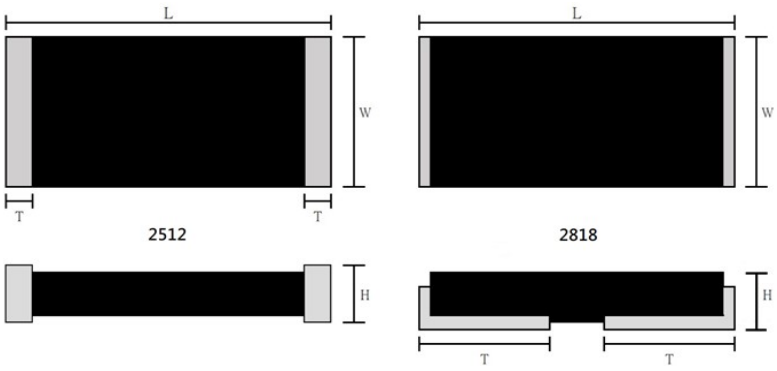
| Type | Rating Power at 70℃ | T.C.R. (ppm/℃) | Max. Rating Current | Max. Overload Current | Resistance Range (mΩ) | | Material | Operating Temperature Range (℃) |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0.5%(D) | 1.0% (F)<br>2.0% (G)<br>5.0% (J) | | |
| MR2512*Z note1 | 1W | ≦±50 | 22.36A | 50A | 6/10/20 | 2~20 | R002~R020：MnCu | - 55 ~ + 170 |
| | 2W | | 31.62A | 70.71A | 6/10/20 | 2~20 | R002~R020：MnCu | |
| | 3W | | 38.73A | 86.60A | 6/10 | 2~10 | R002~R010：MnCu | |
| MR2512*G | 2W | ≦±100 | 44.72A | 100.00A | - | 1 | R001~R004：MnCu<br>R005~R050：FeCrAl | |
| | | ≦±50 | 31.62A | 70.71A | - | 2~50 | | |
| | 3W | ≦±100 | 54.77A | 122.47A | - | 1 | R001~R003：MnCu<br>R004~R050：FeCrAl | |
| | | ≦±50 | 38.73A | 86.60A | - | 2~50 | | |
| MR2818*Z note1 | 5W | ≦±250 | 70.71A | 141.42A | - | 1 | R001~R002：MnCuSn<br>R003~R007：MnCu | - 65 ~ + 170 |
| | | ≦±200 | 50.00A | 100.00A | - | 2~7 | | |
| | | ≦±75 | 25.00A | 50.00A | - | 8~50 | R008~R050：NiCrAl | |

Notes:

1. Inductance characteristics MR 2512*Z, MR 2818*Z≦5nH



## ■ Type Dimension




## ■ Dimension

Unit：mm

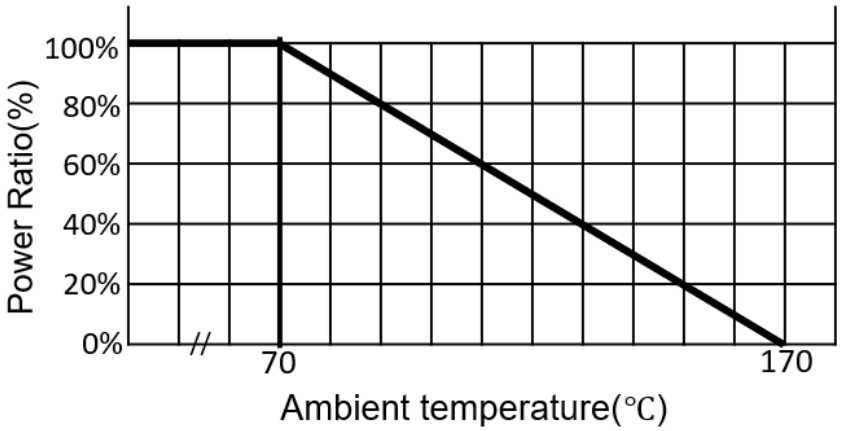
| Type | Power Rating | Resistance Range | L | W | H | T |
|---|---|---|---|---|---|---|
| MR2512*Z | 1W / 2W | 2~20mΩ | 6.35±0.254 | 3.10±0.254 | 0.70±0.254 | 0.95±0.254 |
| | 3W | 2~10mΩ | | | 0.70±0.254 | 0.95±0.254 |
| MR2512*G | 2W | 1mΩ | | | 0.90±0.254 | 1.9±0.254 |
| | 2W | 2mΩ~4mΩ | | | 0.90±0.254 | 0.80±0.254 |
| | 2W | 5mΩ~50mΩ | | | 0.90±0.254 | 0.80±0.254 |
| | 3W | 1mΩ~3mΩ | | | 1.10±0.254 | 0.80±0.254 |
| | 3W | 4mΩ | | | 1.10±0.254 | 0.80±0.254 |
| | 3W | 5mΩ~50mΩ | | | 0.90±0.254 | 0.80±0.254 |
| MR2818*Z | 5W | 1~50mΩ | 7.15±0.30 | 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

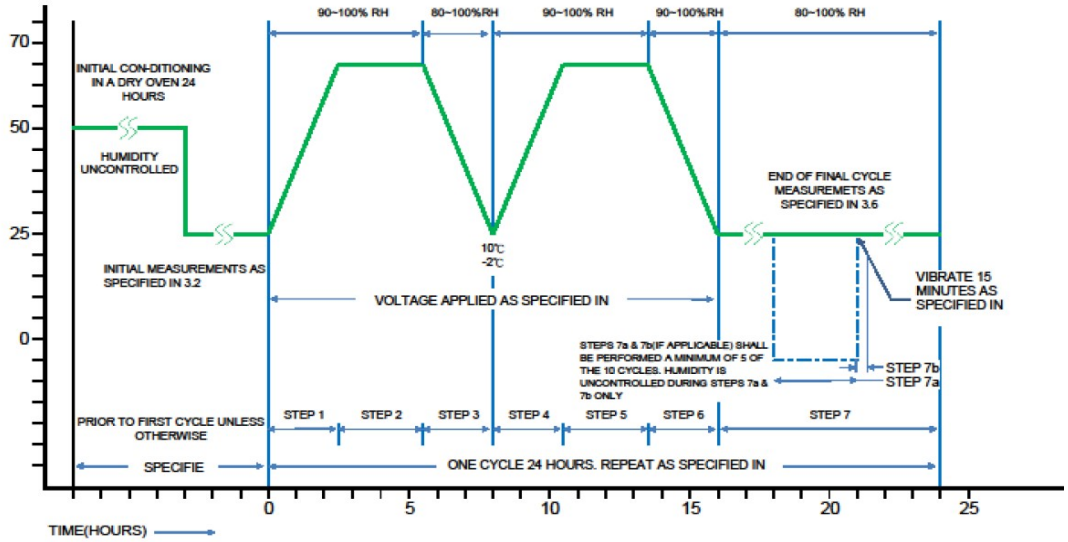
$$I = \sqrt{P/R}$$

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

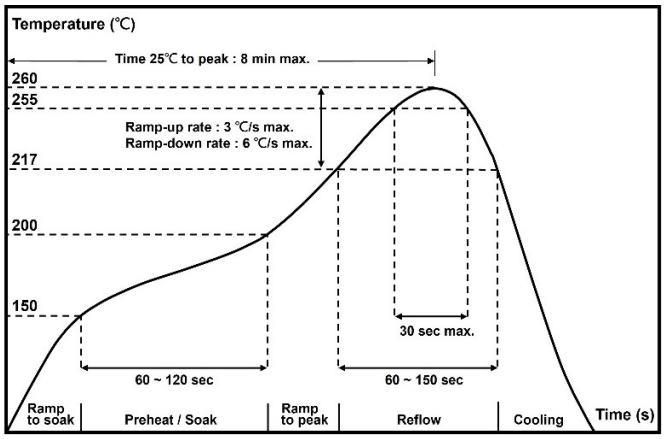
## ■ Reliability Test and Requirement

| Test Item | Test Method | Procedure | Requirements |
|---|---|---|---|
| Temperature Coefficient of Resistance (T.C.R) | JIS-C-5201-1 4.8<br>IEC-60115-1 4.8 | At 25℃ /+125℃, 25℃ is the reference temperature | Refer to Ratings |
| Short Time Overload | JIS-C-5201-1 4.13<br>IEC-60115-1 4.13 | The number of rated power are as follows:<br>● MR2512-1W: 5 times of rated power<br>● MR2512-2W: 5 times of rated power<br>● MR2512-3W: 5 times of rated power<br>● MR2818-5W: 4 times of rated power<br>for 5 seconds. | ΔR/R1≦±1.0% |
| High Temperature Exposure | JIS-C5201-1 4.25<br>IEC 60068-2-2 | At 170℃ for 1000 hours. | ΔR/R1≦±1.0% |
| Resistance to Soldering Heat | JIS-C-5201-1 4.18<br>IEC-60115-1 4.18 | 260±5℃ for 10 seconds. | ΔR/R1≦± 0.5% |
| Temperature Cycling | JESD22 Method JA-104 | 1000 Cycles (-55°C to +155°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme. | ΔR/R1≦±1.0% |
| Biased Humidity | MIL-STD-202 Method 103 | 1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion. | ΔR/R1≦±1.0% |
| Load Life (Endurance) | JIS-C-5201-1 4.25<br>IEC-60115-1 4.25.1 | 70±2℃, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs〝ON〞and 0.5 hr〝OFF〞. | ΔR/R1≦±1.0% |
| Solderability | JIS-C-5201-1 4.17<br>IEC-60115-1 4.17 | 245±5℃ for 3 seconds. | >95% coverage |
| Dielectric Withstanding Voltage | JIS-C5201-1 4.7 | Applied 500VAC for 1 minute. | No short or burned on the appearance. |
| Core Body Strength | JIS-C5201-1 4.15 | Central part pressurizing force：5N , 10 seconds | No broken |
| Terminal Strength (SMD) | AEC Q200-006 | Pressurizing force：17.7N , 60 seconds | No broken |
| Bending Strength | JIS-C-5201-1 4.33<br>IEC-60115-1 4.33 | Bending once for 2mm , 10 seconds | ΔR/R1≦± 0.5%<br>No broken |
| Moisture Resistance | MIL-STD 202 Method 106 | T=24 hours / Cycle ,10 Cycles .<br>Steps 7a& 7b not required. Unpowered .<br>(Figure 1) | ΔR/R1≦± 0.5% |

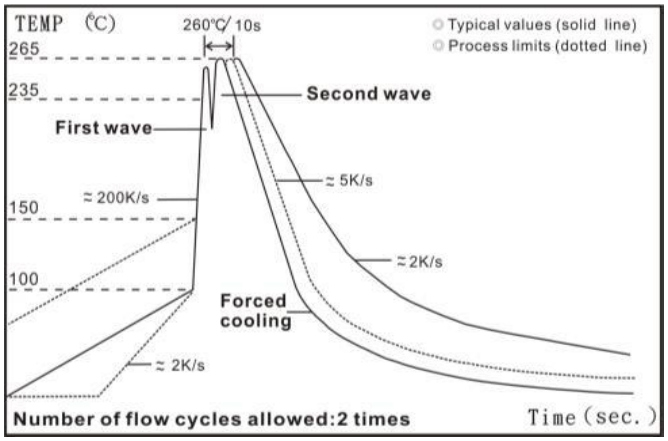
Figure 1




## ■ Soldering Profile

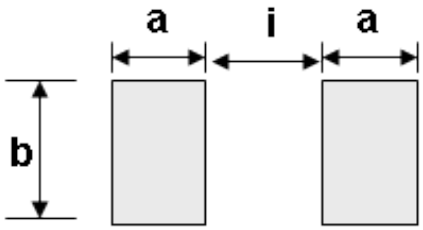



**Reflow Soldering**




**Wave Soldering**

## ■ Recommend Land Pattern Design




## ■ Dimension

Unit: mm

| Type | Resistance Range | a | b | i |
|---|---|---|---|---|
| MR2512*Z – 1W / 2W | 2mΩ~20mΩ | 2.50 | 4.50 | 3.80 |
| MR2512*Z – 3W | 2mΩ~10mΩ | | | |
| MR2512*G – 2W | 1mΩ | 3.00 | 4.50 | 1.45 |
| MR2512*G – 2W | 2mΩ~50mΩ | 2.50 | 4.50 | 3.80 |
| MR2512*G – 3W | 1mΩ~50mΩ | 2.50 | 4.50 | 3.80 |
| MR2818*Z – 5W | 1mΩ~50mΩ | 3.50 | 5.30 | 0.60 |

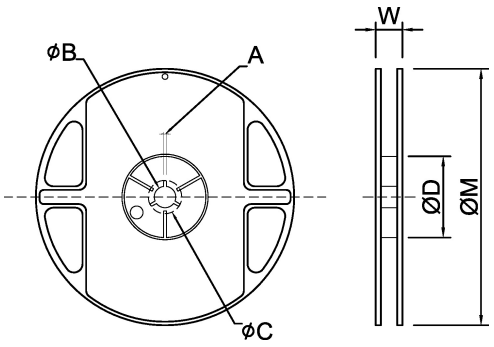
## ■ Packing Quantity

| Type | PCS /Reel |
|---|---|
| MR2512*Z-1W/2W/3W | 4,000 |
| MR2512*G-2W,1m~50mR | 4,000 |
| MR2512*G-3W,1m~4mR | 3,000 |
| MR2512*G-3W,5m~50mR | 4,000 |
| MR2818-5W | 3,500 |

# ■ Appendix For SMD Chip Resistor

## ● Packaging Information

### ■ Reel Dimensions

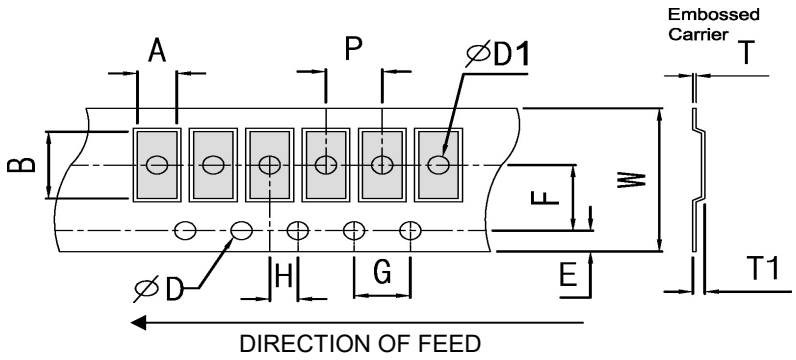



### ■ Dimension

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 | ΦD | ΦD1 | 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±0.20 | 0.20±0.10 |
| MR2512*G 3W,1m~4mR | 12.0±0.30 | 4.0±0.10 | 1.75±0.10 | 5.5±0.10 | | 1.55±0.10 | 4.0±0.10 | 2.0±0.10 | 3.50±0.10 | 6.75±0.10 | 1.30±0.20 | 0.20±0.10 |
| 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

Storage time at the environment temp: 25±5℃& humidity: 60±20% is valid for two years.