**Current Sensing Resistor**

**Wayon Electronics Co., Ltd.**
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## 1. SCOPE

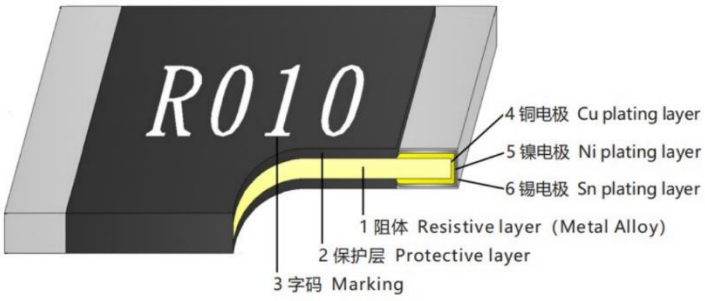
This specification is applicable to lead free and halogen free of RoHS directive for MBR series metal alloy low-resistance resistor.

## 2. Type Designation

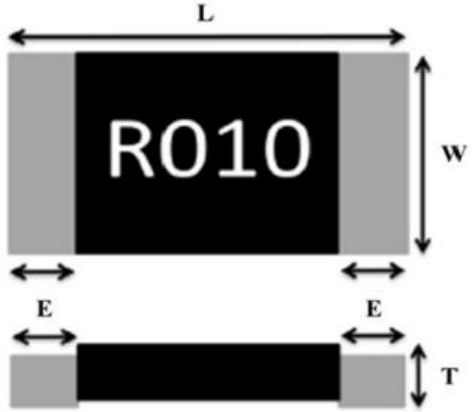
| MBR | 2512 | 03 | F | R004 | S |
|---|---|---|---|---|---|
| **Product Type** | **Size（Inch）** | **Rated Power** | **Tolerance** | **Resistance** | **Electrode** |
| MBR | 2512 | 03=3W | F=±1% | R004=4mΩ | S=Short electrode |

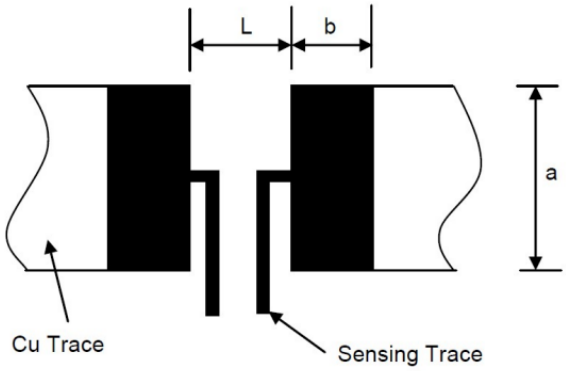
## 3. Construction and Physical Dimensions

### 3.1 Construction




### 3.2 Physical Dimensions



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| Type | Dimensions（mm） | | | | |
|---|---|---|---|---|---|
| | L | W | T | E | Marking |
| MBR251203FR004S | 6.40±0.20 | 3.20±0.20 | 0.80±0.20 | 0.90±0.20 | R004 |

### 3.3 PCB-layout proposal

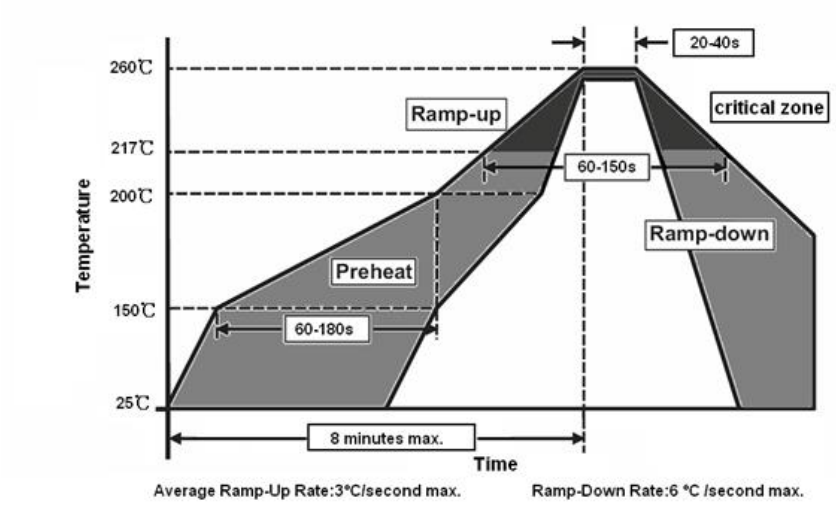
| Type | a | b | L |
|---|---|---|---|
| MBR251203FR004S | 4.00 | 2.10 | 4.10 |

## 4. Product Specifications

| Type | Max. Rating Power（W） | Resistance Value（mΩ） | Resistance Tolerance | TCR（PPM/°C） | Operation Temp. Range（°C） |
|---|---|---|---|---|---|
| MBR251203FR004S | 3 | 4 | ±1% | ±50 | -55 ~ + 170 |

## 5. Recommended Customer Soldering Parameters

### Recommended IR Reflow Profile




## 6. Rating Current

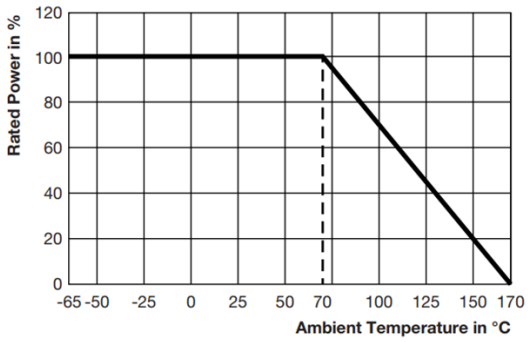
The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards, the highest normal rated power is to be used

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

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

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## 7. Power Derating Curve




## 8. Reliability Performance

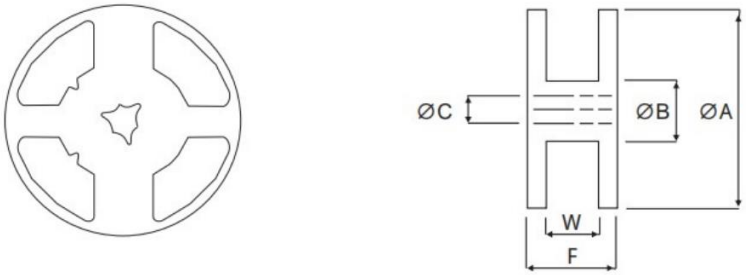
| Test Item | Test Method | Procedure | Requirements |
|---|---|---|---|
| Temperature Coefficient of Resistance (TCR) | MIL-STD-202 Method 304 | TCR (ppm/°C) $=\frac{(R2-R1)}{R1(T2-T1)}\times 10^6$<br>R1: resistance at 25°C (T1)<br>R2: resistance at 125°C (T2) | Refer to Electrical Specification |
| Short Time Overload | JIS C 5201-1 clause 4.13 | The number of rated power are as follows:<br>2 times of rated power<br>Rating power duration: 5secs | ±1.0% |
| High Temperature Exposure | JIS C 5201-1 clause 4.23.2 | 170°C±2°C for 1000hrs | ±1.0% |
| Solderability | JIS C 5201-1 clause 4.17 | 245±5°C for 3 ±0.5secs | The covered area >95% |
| Low Temp. Storage | JIS C 5201-1 clause 4.23.4 | -55°C±2°C for 1000hrs | ±1.0% |
| Soldering Heat | MIL-STD-202 Method 210 | 260±5°C for 10±1 seconds. | ±1.0% |
| Temperature Cycling | JIS C 5201-1 clause 4.19 | -55°C to +155°C, 100 cycles | ±1.0% |
| Load Life | MIL-STD-202 Method 108 | 70°C± 2°C, 1000 hours, at rated power 1.5 hours “ON”, 0.5 hours “OFF | ±1.0% |
| Temperature Humidity Bias Test | MIL-STD-202 Method103 | +85°C，85% RH，10%bias, 1000hours | ±0.5% |
| Mechanical shock | MIL-STD-202 Method 213 | 100 g’sec ,6 msec, 5puls | ±0.5% |
| Vibration | MIL-STD-202 Method 204 | Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h | ±1.0% |
| Moisture resistance | MIL-STD-202 Method 106 | MIL-STD-202,method 106，No power, 7a and 7b not required | ±1.0% |

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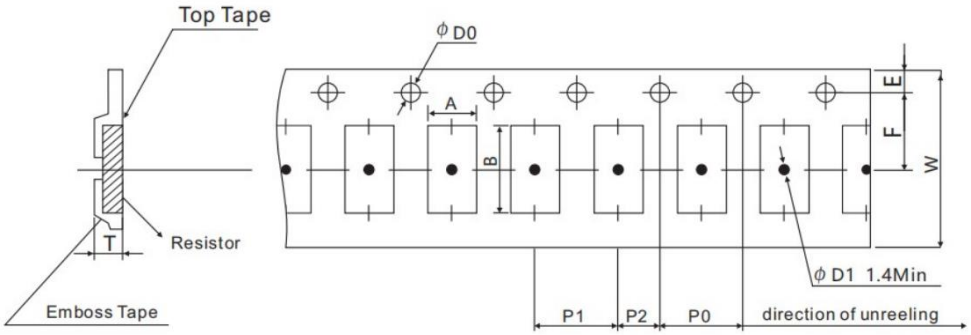
## 9. Packaging Information

### 9.1 Reel Dimensions (mm)




| Type | ΦA | ΦB | ΦC | F | W |
|---|---|---|---|---|---|
| MBR251203FR004S | 178.0±2.0 | 60.0±1.0 | 13.5±0.5 | 15.4±1.0 | 13.0±0.3 |

### 9.2 Carrier Dimensions (mm)




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 3.60±0.20 | B | 6.90±0.20 | W | 12.0±0.20 | F | 5.50±0.05 |
| E | 1.75±0.1 | P0 | 4.00±0.1 | P1 | 4.00±0.1 | P2 | 2.0±0.05 |
| ΦD0 | 1.50+0.1/-0.0 | T | 1.00±0.15 | | | | |

### 9.3 Peeling Strength of Top Cover Tape

Peeling Strength：0.1-1.0N at a peel-off speed of 300 mm/min.

### 9.4 Packaging

| TYPE | PCS/Reel |
|---|---|
| MBR251203FR004S | 4,000 |

## 10. Storage Temperature

Temperature：5~35°C, Humidity：≤75%RH.

Sealed plastic bags with desiccant shall be used to reduce the oxidation of the termination and shall only be opened prior to use.

The products shall not be stored in areas where harmful gases containing sulfur or chlorine are present.

When the product is finally discarded, it can be treated as general electronic waste, and raw material compositions of CSR can be referred to MSDS.