Current Sensing Resistor

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1. SCOPE

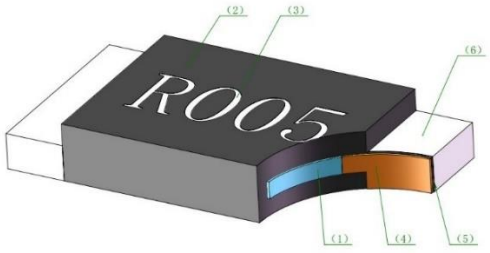
This specification is applicable to lead free and halogen free of RoHS directive for MAR series metal alloy low-resistance resistor.

2. Type Designation

MAR	2512	03	F	R003	S
Product Type	Size（Inch）	Rated Power	Tolerance	Resistance	Electrode
MAR	2512	03=3W	F=±1%	R003=3mΩ	S=Short electrode

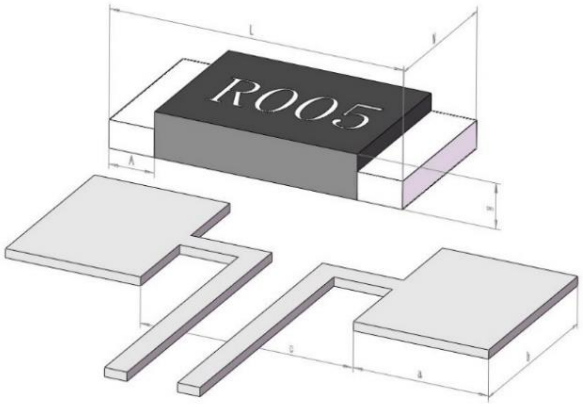
3. Construction and Physical Dimensions

3.1 Construction



(1) - Resistor body: MnCu
(2) – Protective Coating : Flame-retardant epoxy
(3) - Marking : Laser Marking
(4) - Terminal electrode : Cu
(5) – Plating layer : Ni
(6) - Plating layer : Sn

3.2 Physical Dimensions



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Type	Dimensions（mm）				
	L	W	H	A	Marking
MAR251203FR003S	6.4±0.3	3.2±0.3	0.90±0.2	0.8±0.25	R003

3.3 PCB-layout proposal

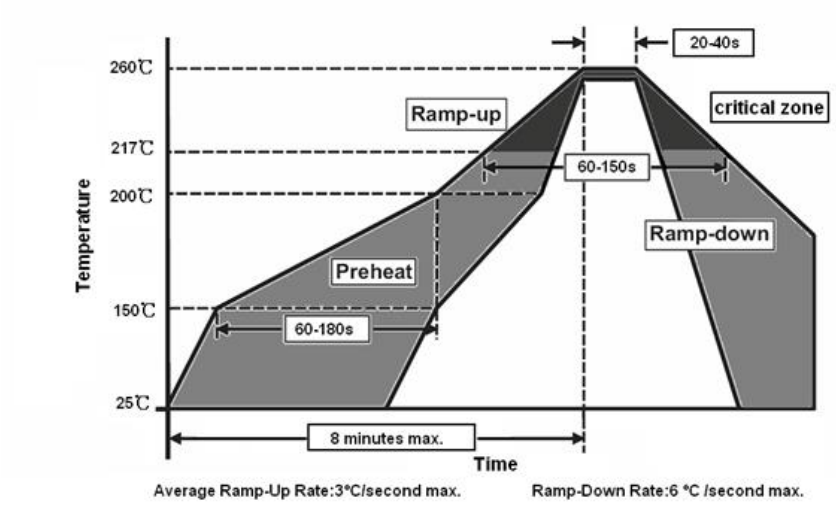
Type	a	b	c
MAR251203FR003S	2.11	3.57	3.18

4. Product Specifications

Type	Max. Rating Power（W）	Resistance Value（mΩ）	Resistance Tolerance	TCR（PPM/°C）	Operation Temp. Range（°C）
MAR251203FR003S	3	3	±1%	±50	-55~ + 170

5. Recommended Customer Soldering Parameters

Recommended IR Reflow Profile



6. Rating Current

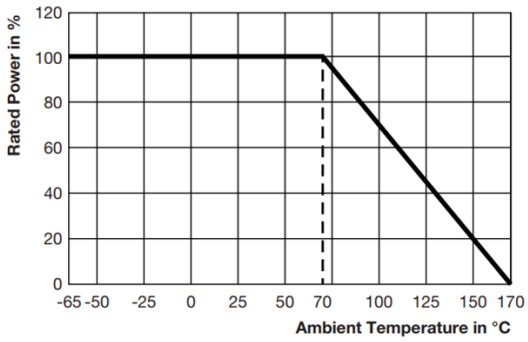
The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards, the highest normal rated power is to be used

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

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

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7. Power Derating Curve



8. Reliability Performance

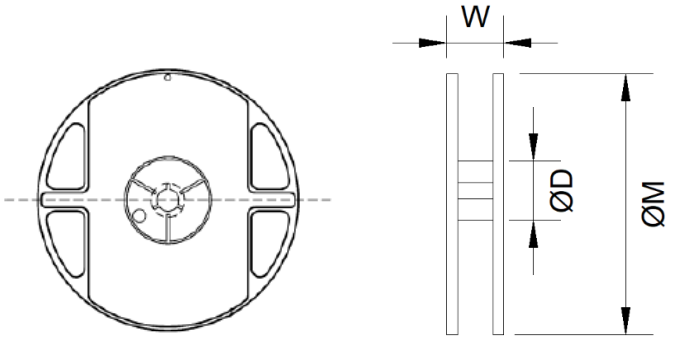
Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (TCR)	MIL-STD-202 Method 304	TCR (ppm/°C) $=\frac{(R2-R1)}{R1(T2-T1)}\times 10^6$ R1: resistance at 25°C (T1) R2: resistance at 125°C (T2)	Refer to Electrical Specification
Short Time Overload	JIS C 5201-1 clause 4.13	The number of rated power are as follows: 2 times of rated power 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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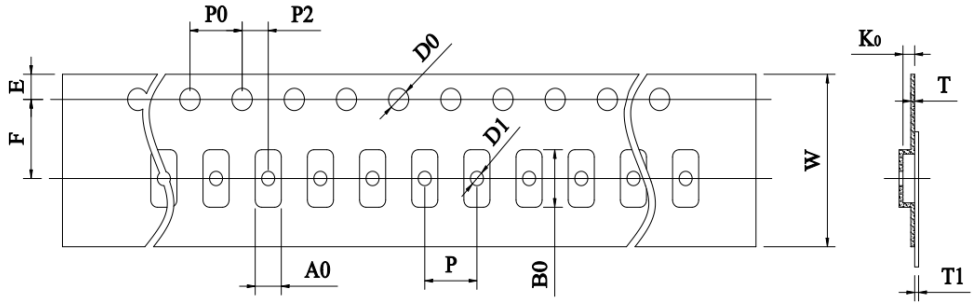
9. Packaging Information

9.1 Reel Dimensions



Type	ΦD （mm）	W（mm）	ΦM（mm）
MAR251203FR003S	60.0±2.0	17.0±1.0	178.0±2.0

9.2 Carrier Dimensions (mm)



W	12.0±0.3	P0	4.0±0.1	P	4.0±0.1	P2	2.0±0.1
A0	3.4±0.2	B0	6.75±0.2	D0	1.55±0.1	F	5.5±0.1
E	1.75±0.1	T	0.2±0.1	T1	Max 0.1	K0	1.0±0.2

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
MAR251203FR003S	4,000

10. Storage Temperature

Temperature：5~30°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.