MAR251203FR020S

Current Sensing Resistor

1. SCOPE

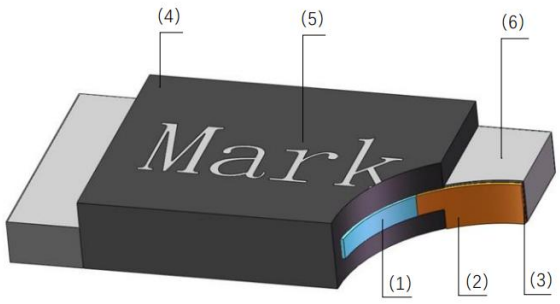
- This specification is applicable to lead free and halogen free of RoHS directive for MAR series metal alloy low-resistance resistor.
- AEC-Q200 Qualified.

2. Type Designation

MAR	2512	03	F	R020	S
Product Type	Size（Inch）	Rated Power	Tolerance	Resistance	Electrode
MAR	2512	3W	±1%	20mΩ	Short Electrode

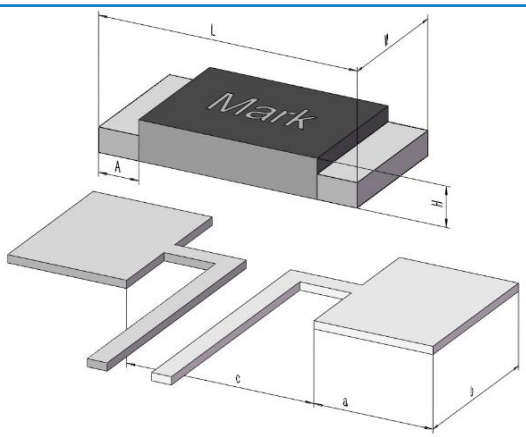
3. Construction and Physical/Pad Layout Dimensions

3.1 Construction



(1) Resistor body : Karma
(2) Terminal Electrode : Cu
(3) Plating Layer : Ni
(4) Protective Coating : Flame-retardant epoxy
(5) Mark : Laser Mark（R020）
(6) Plating Layer : Sn

3.2 Physical/Pad Layout Dimensions



Type	Dimensions（mm）			
	L	W	H	A
MAR251203FR020S	6.40±0.30	3.20±0.30	0.90±0.20	0.95±0.25

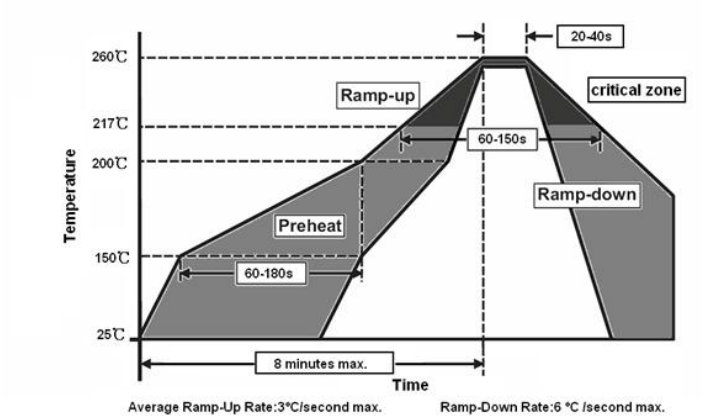
3.3 Recommend Solder Pad Layout

Type	a（mm）	b（mm）	c（mm）
MAR251203FR020S	2.00	3.60	3.20

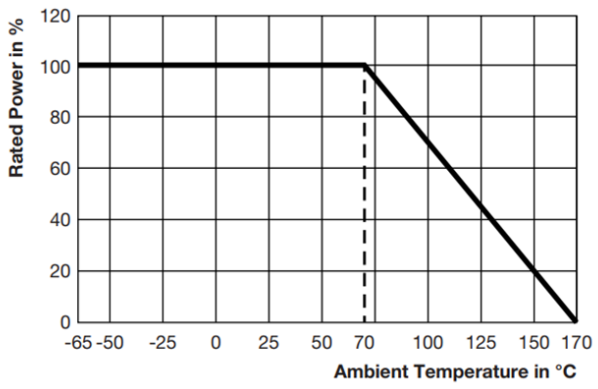
4. Product Specifications

Type	Max. Rating Power（W）	Resistance Range（mΩ）	Resistance Tolerance	T.C.R（PPM/°C）	Operation Temp. Range（°C）
MAR251203FR020S	3	20	±1%	±50	-55~+170

5. Recommended Customer Soldering Parameters



6. Power Derating Curve



7. 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.

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

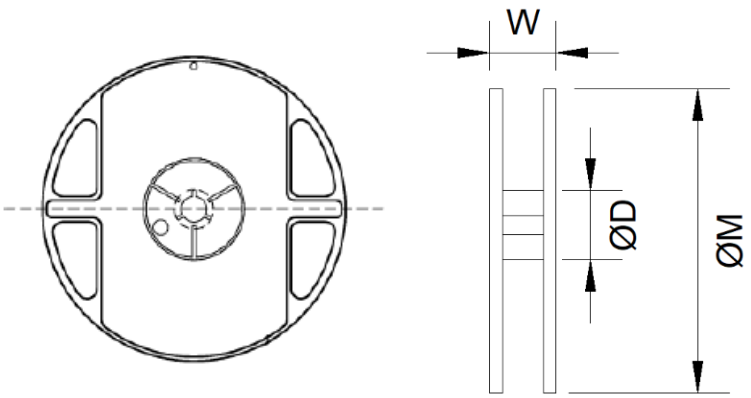
I= Rating current (A)
P= Rating Power (W)
R= Resistance(Ω)

8. Reliability Performance

NO.	Item	Test Method	Test Condition	Specification
1	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
2	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%
3	High Temperature Exposure	JIS C 5201-1 clause 4.23.2	170°C±2°C for 1000hrs	±1.0%
4	Solderability	JIS C 5201-1 clause 4.17	245±5°C for 3 ±0.5secs	The covered area >95%
5	Low Temp. Storage	JIS C 5201-1 clause 4.23.4	-55°C±2°C for 1000hrs	±1.0%
6	Soldering Heat	MIL-STD-202 Method 210	260±5°C for 10±1 seconds.	±1.0%
7	Temperature Cycling	JIS C 5201-1 clause 4.19	-55°C to +155°C, 100 cycles	±1.0%
8	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%
9	Temperature Humidity Bias Test	MIL-STD-202 Method103	+85°C，85% RH，10%bias, 1000hrs	±0.5%
10	Mechanical shock	MIL-STD-202 Method 213	100 g’sec,6 msec, 5puls	±0.5%
11	Vibration	MIL-STD-202 Method 204	Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h	±1.0%
12	Moisture resistance	MIL-STD-202 Method 106	MIL-STD-202,method 106，No power, 7a and 7b not required	±1.0%

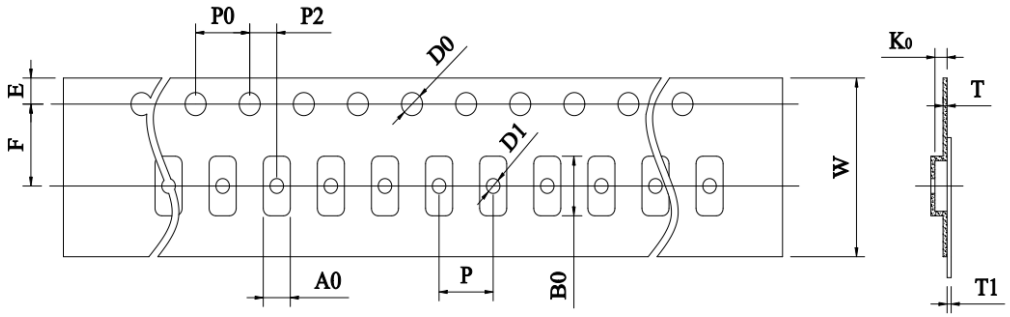
9. Packaging Information

9.1 Reel Dimensions



Type	ΦD （mm）	W（mm）	ΦM（mm）
MAR251203FR020S	60.0±2.0	17.0±1.0	178.0±2.0

9.2 Carrier Dimensions (mm)



Type	W	P0	P	P2	A0	B0
MAR251203FR020S	12.0±0.3	4.0±0.1	4.0±0.1	2.0±0.1	3.4+0.2	6.75±0.2
	D0	F	E	T	T1	K0
	1.55±0.1	5.5±0.1	1.75±0.1	0.2±0.1	Max0.1	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
MAR251203FR020S	4,000

10. Storage Temperature And Life

Temperature：5~30°C, Humidity：≤75%RH.

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.

Contact Information

No.1001, Shiwan(7) Road, Pudong District, Shanghai, P.R.China.201207
Tel: 86-21-50310888 Fax: 86-21-50757680 Email: market@way-on.com
WAYON website: http://www.way-on.com

For additional information, please contact your local Sales Representative.

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Product Specification Statement

1.The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

2.The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.

3.WAYON strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, WAYON cannot guarantee that the information provided in the product specification is entirely accurate and error-free. WAYON shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications. WAYON reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with WAYON to ensure that the product specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult WAYON in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.

4.Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.

5.The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. WAYON shall assume no responsibility for any consequences resulting from such usage.

6.Users should also comply with relevant laws, regulations, policies, and standards when using the product specification. Users are responsible for the risks and liabilities arising from the use of the product specification and must ensure that it is not used for illegal purposes. Additionally, users should respect the intellectual property rights related to the product specification and refrain from infringing upon any third-party legal rights. WAYON shall assume no responsibility for any disputes or controversies arising from the above-mentioned issues in any form.