Current Sensing Resistor

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1. SCOPE

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

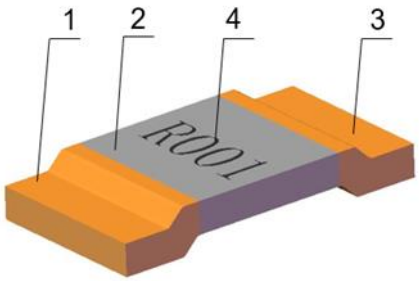
AEC-Q200 qualification

2. Type Designation

MPR	3921	09	F	0M50
Product Type	**Size (Inch)**	**Rated Power**	**Tolerance**	**Resistance**
MPR	3921	9W	±1%	0.5mΩ

3. Construction and Physical Dimensions

3.1 Construction



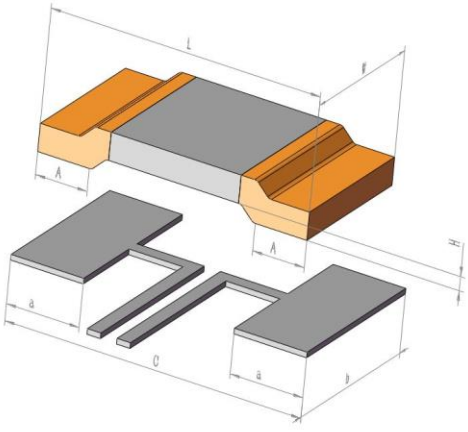
(1) - Terminal electrode: Cu

(2) - Resistor body: MnCu

(3) - Terminal electrode: Cu

(4) - Marking:Laser Marking

3.2 Physical Dimensions



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Type	Dimensions（mm）				Marking
	L	W	H	A	
MPR392109F0M50	10.0±0.2	5.2±0.3	0.50±0.1	2.0±0.2	0M50

3.3 PCB-layout proposal

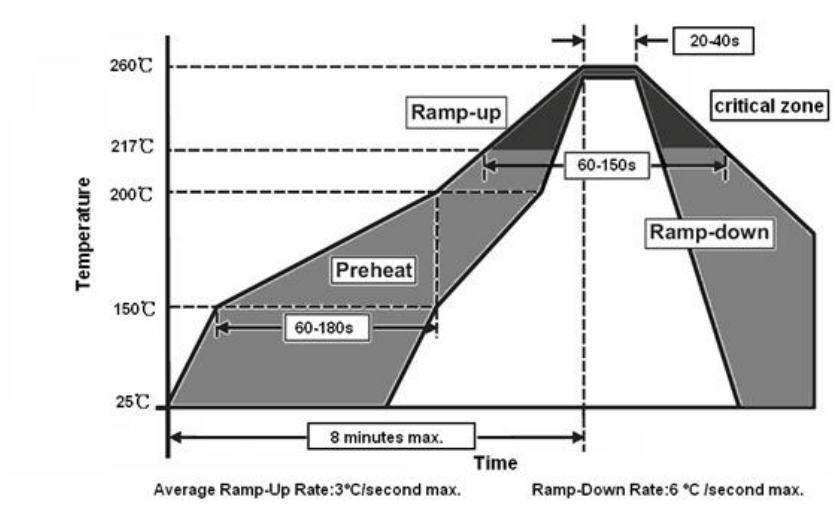
Type	a	b	c
MPR392109F0M50	2.7	6.2	11.0

4. Product Specifications

Type	Max. Rating Power（W）	Resistance Value（mΩ）	Resistance Tolerance	TCR（PPM/°C）	Operation Temp. Range（°C）
MPR392109F0M50	9	0.5	±1%	±100	-55~ + 170

5. Recommended Customer Soldering Parameters

Recommended IR Reflow Profile



6. Rating Current

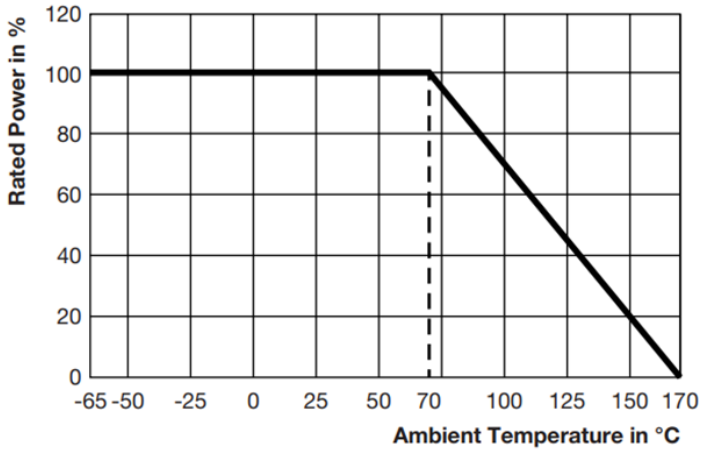
The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards, the highest normal rated power is to be used

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

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

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7. Power Derating Curve



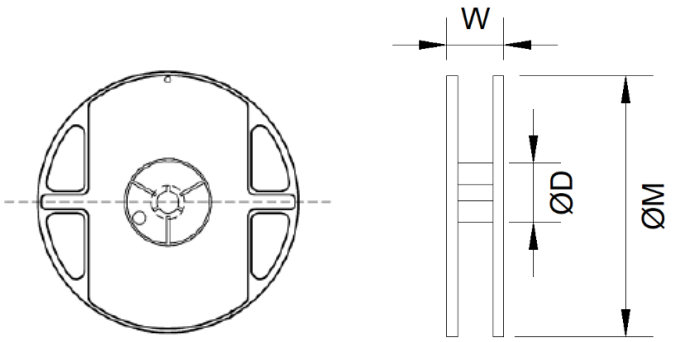
8. Reliability Performance

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (TCR)	MIL-STD-202 Method 304	TCR (ppm/℃) $=\frac{(R2-R1)}{R1(T2-T1)}\times 10^6$ R1: resistance at 25ºC (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: 5 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%
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	70ºC± 2ºC, 1000 hours, at rated power 1.5 hours “ON”, 0.5 hours “OFF	±1.0%
Temperature Humidity Bias Test	MIL-STD-202 Method103	+85ºC，85% RH，10%bias, 1000hrs	±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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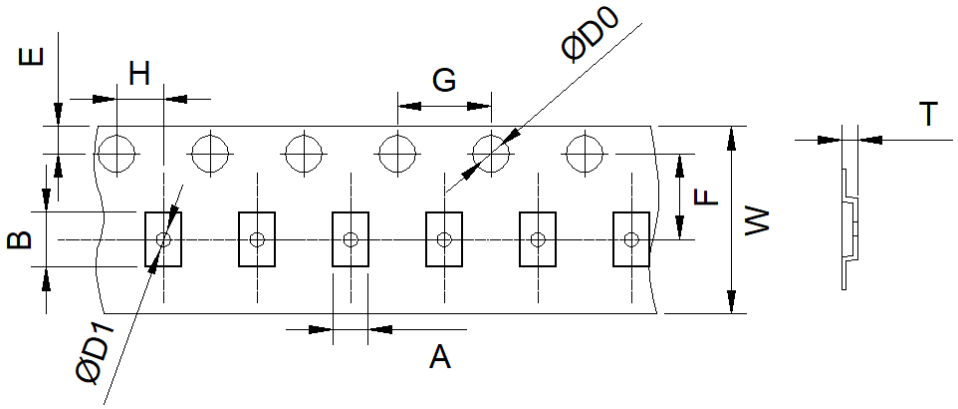
9. Packaging Information

9.1 Reel Dimensions



Type	ΦD （mm）	W（mm）	ΦM（mm）
MPR392109F0M50	100.0±1.0	28.5±1.0	330.0±2.0

9.2 Carrier Dimensions (mm)



Type	W	E	F	ΦD0	ΦD1
MPR392109F0M50	24.0±0.3	1.75±0.1	11.5±0.1	1.5 + 0.1	1.5±0.1
	G	**H**	**A**	**B**	**T**
	4.0±0.1	2.0±0.1	6.0±0.2	10.6±0.2	2.5±0.1

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
MPR392109F0M50	3,000

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.