

Power Metal Fixed Resistors



2W, 5%

Type Designation:

(EX.)

The type designation shall be in the following form:

Type	Power Rating	Resistance Tolerance	Nominal Resistance
MCPMR	2W-S	J	100 KΩ

Ratings:

Ratings shall be shown in the table 1

Table 1

Type	MCPMR
Rated Power	< 2 W at 70°C
Maximum Working Voltage	500 V
Maximum Overload Voltage	600 V
Dielectric Withstanding Voltage	350 V
Rated Ambient Temperature	70°C
Operating Temperature Range	-55°C to +155°C
Resistance Tolerance	±5%
Resistance Range	3.9 Ω to 680 KΩ

Power Rating:

Resistors shall have a power rating based on continuous full load operation at an ambient temperature of 70°C. For temperature in excess of 70°C, the load shall be derated as shown in the figure 1.

Voltage Rating:

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform corresponding to the power rating, as determined from the following formula:

$$RCWW = \sqrt{P \times R}$$

Were : RCWW = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

P = Power Rating (watt)

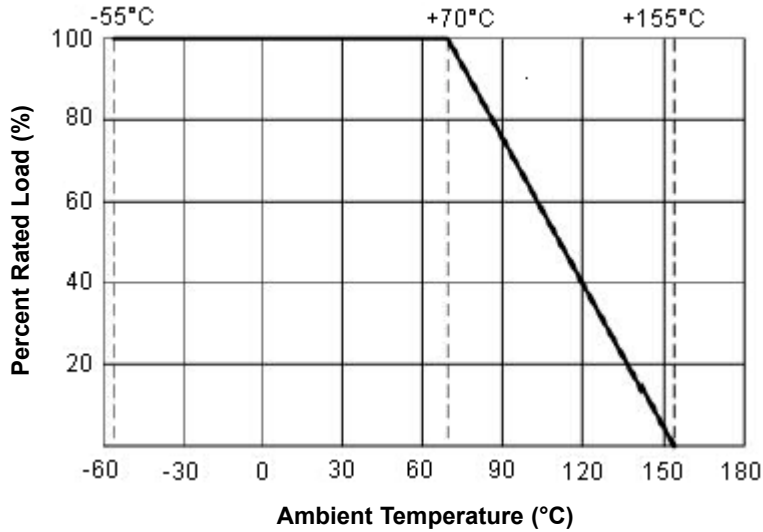
R = Nominal Resistance (ohm)

Power Metal Fixed Resistors

2W, 5%

In no case shall the rated DC or RMS AC continuous working voltage be greater than the applicable maximum value

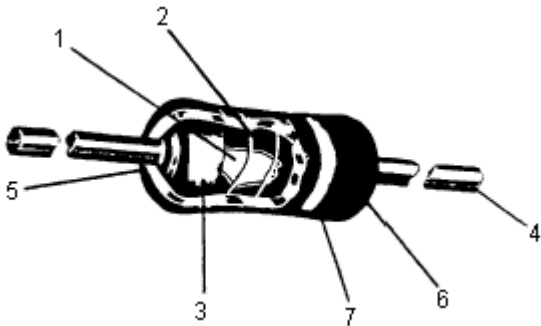
Figure 1



Nominal Resistance :

Effective figures of nominal resistance shall be in accordance with E-96, E-24 series, and resistance tolerance shall be shown by table 1

Construction :



No.	Name	Material
1	Basic Body	Rod Type Ceramics
2	Resistance Film	Special Metal Film
3	End Cap	Steel (Tin Plated Iron Surface)
4	Lead Wire	Annealed Copper Wire Coated With Tin
5	Joint	By Welding
6	Coating	Insulated and Non-Flame Paint (Colour : Sea-Blue)
7	Colour Code	Non-Flame Epoxy Resin

Power Metal Fixed Resistors



2W, 5%

Characteristics

Characteristics	Limits	Test Methods (JIS C 5201-1)
DC Resistance	Must be within the specified tolerance	The limit of error of measuring apparatus shall not exceed allowable range or resistance tolerance of specification (Sub-clause 4.5)
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down	Resistors shall be clamped in the trough of a 90° metallic V-block or foil method use a metal foil shall be wrapped closely around the body of the resistor. After that shall be tested at AC potential respectively specified in the table 1. for 60 +10/-0 s (Sub-clause 4.7)
Temperature coefficient	Within the temperature coefficient specified below: 3.9 Ω to 100 KΩ ≤ ±350 PPM/°C 101 KΩ to 680 KΩ ≤ ±400 PPM/°C	Natural resistance change per temperature degree centigrade $\frac{R_2 - R_1}{R_1 (t_2 - t_1)} \times 10^6 \text{ (PPM/°C)}$ R ₁ : Resistance value at room temperature (t ₁) R ₂ : Resistance value at room temperature plus 100°C (t ₂) (Sub-clause 4.8)
Short time overload	Resistance change rate is ± (2% + 0.05 Ω) Maximum with no evidence of mechanical damage	Permanent resistance change after the application of a potential of 2.5 times RCWV or the maximum overload voltage respectively specified in the above list, whichever less for 5 s (Sub-clause 4.13)
Terminal strength	With no evidence of mechanical damage	Direct load: Resistance to a 2.5 kgs direct load for 10 s in the direction of the longitudinal axis of the terminal leads Twist test: Terminal leads shall be bent through 90° at point of about 6 mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations (Sub-clause 4.16)
Solderability	95% coverage Min.	The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Test temperature of solder : 245°C ±3°C Dwell time in solder : 2 to 3 s (Sub-clause 4.17)
Resistance to soldering heat	Resistance change rate is ± (1% + 0.05 Ω) Max. with no evidence of mechanical damage	Permanent resistance change when leads immersed to 3.2 mm to 4.8 mm from the body in 350°C ±10°C solder for 3 ±0.5 s (Sub-clause 4.18)

Power Metal Fixed Resistors

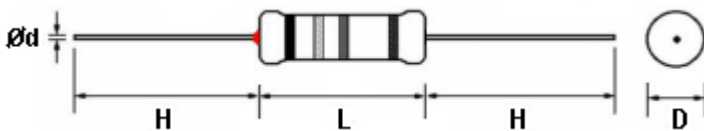


2W, 5%

Characteristics

Characteristics	Limits	Test Methods (JIS C 5201-1)															
Temperature cycling	Resistance change rate is $\pm (2\% + 0.05 \Omega)$ Maximum with no evidence of mechanical damage	Resistance change after continuous 5 cycles for duty shown below: <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C $\pm 3^\circ\text{C}$</td> <td>30 mins</td> </tr> <tr> <td>2</td> <td>Room Temperature</td> <td>10 to 15 mins</td> </tr> <tr> <td>3</td> <td>+155°C $\pm 3^\circ\text{C}$</td> <td>30 mins</td> </tr> <tr> <td>4</td> <td>Room Temperature</td> <td>10 to 15 mins</td> </tr> </tbody> </table> (Sub-clause 4.19)	Step	Temperature	Time	1	-55°C $\pm 3^\circ\text{C}$	30 mins	2	Room Temperature	10 to 15 mins	3	+155°C $\pm 3^\circ\text{C}$	30 mins	4	Room Temperature	10 to 15 mins
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Load life in humidity	<table border="1"> <thead> <tr> <th>Resistance Value</th> <th>$\Delta R/R$</th> </tr> </thead> <tbody> <tr> <td>Less than 100 KΩ</td> <td>$\pm 5\%$</td> </tr> <tr> <td>100 KΩ or more</td> <td>$\pm 10\%$</td> </tr> </tbody> </table>	Resistance Value	$\Delta R/R$	Less than 100 K Ω	$\pm 5\%$	100 K Ω or more	$\pm 10\%$	Resistance change after 1,000 hrs (1.5 hrs "on", 0.5 hr "off") at RCWV in a humidity chamber controlled at 40°C $\pm 2^\circ\text{C}$ and 90 to 95% relative humidity (Sub-clause 4.24.2.1)									
Resistance Value	$\Delta R/R$																
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Resistance Value	$\Delta R/R$																
Less than 100 K Ω	$\pm 5\%$																
100 K Ω or more	$\pm 10\%$																
Resistance to solvent	No deterioration of protective coatings and markings	Specimens shall be immersed in a bath of trichroethane completely for 3 minutes with ultrasonic (Sub-clause 4.3)															
Pulse overload	Resistance change rate is $\pm (5\% + 0.05\Omega)$ Maximum with no evidence of mechanical damage	Resistance change after 10,000 cycles (1 s "on", 25 s "off") at 4 times RCWV or the maximum pulse overload voltage (Sub-clause 5.8)															

Dimension:



Type	Power Rating	D (Maximum)	L (Maximum)	d ± 0.05	H ± 3
MCPMR	2 W-S	4 mm	11 mm	0.75 mm	25 mm

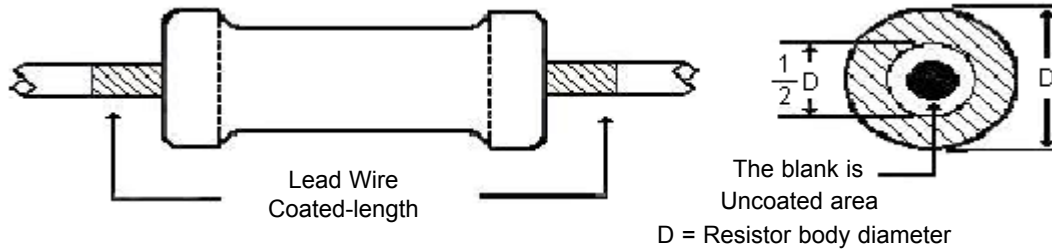
Dimensions : Millimetres

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Painting Method:

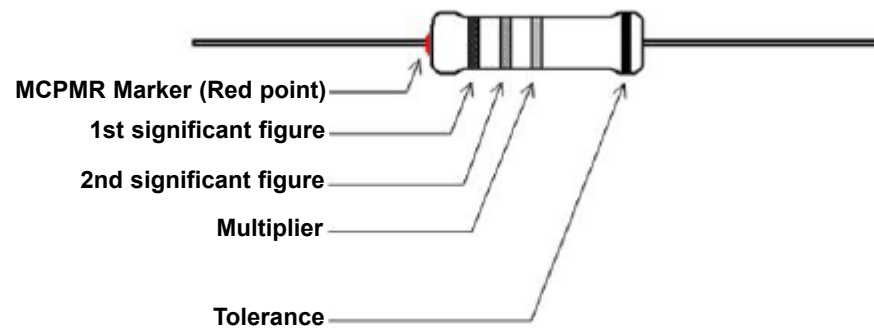
Welding terminal and lead wire, is permissible to be exposed without the outer coated cover. The extent should be within 1/2 of the arc angle.



Marking:

Resistor:

Resistors shall be marked with colour coding colour shall be in accordance with JIS C 0802



Part Number Table

Description	Part Number
Resistor, Axial, Small, 4R7, 5%, 2W	MCPMR02SJ047JA10
Resistor, Axial, Small, 6R8, 5%, 2W	MCPMR02SJ068JA10
Resistor, Axial, Small, 7R5, 5%, 2W	MCPMR02SJ075JA10
Resistor, Axial, Small, 12R, 5%, 2W	MCPMR02SJ0120A10
Resistor, Axial, Small, 22R, 5%, 2W	MCPMR02SJ0220A10
Resistor, Axial, Small, 6K8, 5%, 2W	MCPMR02SJ0682A10
Resistor, Axial, Small, 10K, 5%, 2W	MCPMR02SJ0103A10
Resistor, Axial, Small, 15K, 5%, 2W	MCPMR02SJ0153A10
Resistor, Axial, Small, 20K, 5%, 2W	MCPMR02SJ0203A10
Resistor, Axial, Small, 47K, 5%, 2W	MCPMR02SJ0473A10

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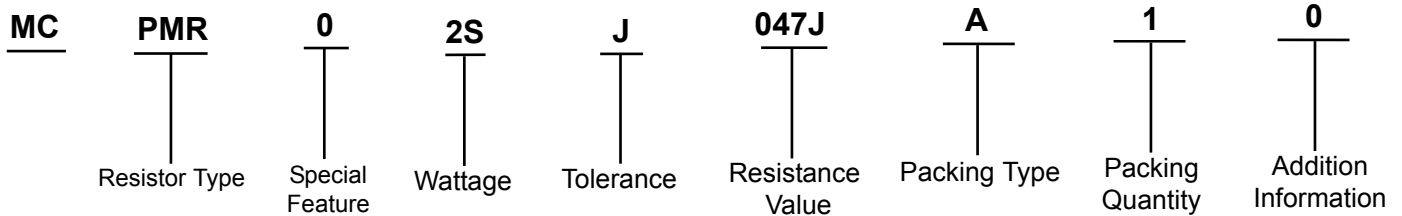


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Part Number Table

Description	Part Number
Resistor, Axial, Small, 56K, 5%, 2W	MCPMR02SJ0563A10
Resistor, Axial, Small, 68K, 5%, 2W	MCPMR02SJ0683A10
Resistor, Axial, Small, 100K, 5%, 2W	MCPMR02SJ0104A10
Resistor, Axial, Small, 220K, 5%, 2W	MCPMR02SJ0224A10
Resistor, Axial, Small, 240K, 5%, 2W	MCPMR02SJ0244A10
Resistor, Axial, Small, 270K, 5%, 2W	MCPMR02SJ0274A10
Resistor, Axial, Small, 680K, 5%, 2W	MCPMR02SJ0684A10
Resistor, Axial, Small, 1M, 5%, 2W	MCPMR02SJ0105A10

Part Number Explanation:



- Resistor Type** : PMR = Power Metal Fixed Resistor
- Special Feature** : 0 = Standard Product
- Wattage** : Small size : 2S = 2W-S
- Tolerance** : J to $\pm 5\%$
- Resistance Value** : **E-24** series: the 1st digit is "0", the 2nd and 3rd digits are for the significant figures of the resistance and the 4th indicate the number of zeros following:
"J" to 0.1 "K" to 0.01
Ex.: 4.7 Ω to 47J, 4.7 K Ω to 472
E-96 Series: the 1st to 3rd digits are significant figures of resistance and the fourth one denotes number of zeros following:
Ex.: 1.33 K Ω = 1331
- Packing Type** : A = Tape / Box
- Packing Quantity** : 1 = 1,000 pieces
- Addition Information** : 0 = PT-52 mm

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