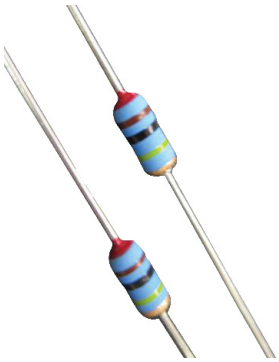
Power Metal Fixed Resistors 2W, 5%

RoHS Compliant



Specifications

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

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 below.

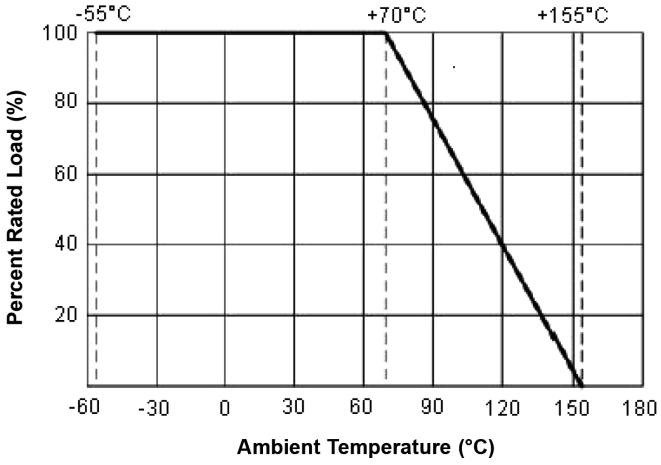
Voltage Rating

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:

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

Were : RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)
P = Power Rating (watt)
R = Nominal Resistance (ohm)

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



Nominal Resistance

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

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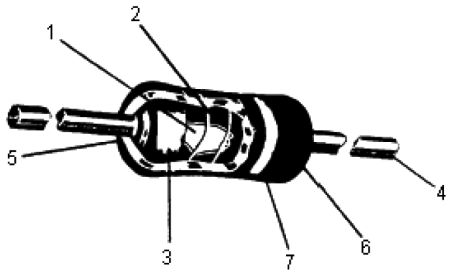
Construction



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

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: 3.9Ω to 100kΩ ≤ ±350 PPM/°C 101kΩ to 680kΩ ≤ ±400 PPM/°C	Natural resistance change per temperature degree centigrade $\frac{R_2 - R_1}{R_1 (t_2 - t_1)} \times 10^6$ (PPM/°C) R1: Resistance value at room temperature (t1) R2 : Resistance value at room temperature plus 100 C (t2) (Sub-clause 4.8)
Short time Overload	Resistance change rate is ± (2% 0.05Ω) 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 5s (Sub-clause 4.13)
Terminal Strength	With no evidence of mechanical damage	Direct load: Resistance to a 2.5 kgs direct load for 10s in the direction of the longitudinal axis of the terminal leads Twist test: Terminal leads shall be bent through 90 at point of about 6mm 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	9% 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 3s (Sub-clause 4.17)

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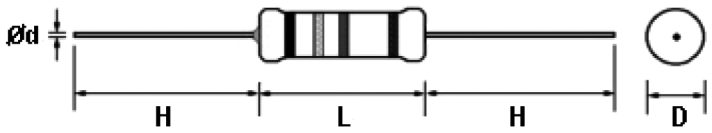
<table>
<tr><th>Characteristics</th><th>Limits</th><th>Test Methods (JIS C 5201-1)</th></tr>
<tr><td>Resistance to soldering Heat</td><td>Resistance change rate is ± (1% 0.05Ω) Max. with no evidence of mechanical damage</td><td>Permanent resistance change when leads immersed to 3.2 mm to 4.8 mm from the body in 350°C ±10°C solder for 3 ±0.5s (Sub-clause 4.18)</td></tr>
<tr><td>Temperature Cycling</td><td>Resistance change rate is ± (2% + 0.05Ω) Max. with no evidence of mechanical damage</td><td>Resistance change after continuous 5 cycles for duty shown below:
<table>
<tr><th>Step</th><th>Temperature</th><th>Time</th></tr>
<tr><td>1</td><td>-55°C ±3°C</td><td>30mins</td></tr>
<tr><td>2</td><td>Room Temperature</td><td>10 to 15mins</td></tr>
<tr><td>3</td><td>+155°C ±3°C</td><td>30mins</td></tr>
<tr><td>4</td><td>Room Temperature</td><td>10 to 15mins</td></tr>
</table>
(Sub-clause 4.19)</td></tr>
<tr><td>Load life in Humidity</td><td><table><tr><th>Resistance Value</th><th>Δ R/R</th></tr><tr><td>Less than 100kΩ</td><td>±5%</td></tr><tr><td>100kΩ or more</td><td>±10%</td></tr></table></td><td>Resistance change after 1,000 hrs (1.5 hrs “on”, 0.5 hr “off”) at RCWV in a humidity chamber controlled at 40°C ±2°C and 90 to 95% relative humidity (Sub-clause 4.24.2.1)</td></tr>
<tr><td>Load Life</td><td><table><tr><th>Resistance Value</th><th>Δ R/R</th></tr><tr><td>Less than 100kΩ</td><td>±5%</td></tr><tr><td>100kΩ or more</td><td>±10%</td></tr></table></td><td>Permanent resistance change after 1,000 hrs operating at RCWV with duty cycle of (1.5 hrs “on”, 0.5 hr “off”) at 70°C ±2°C ambient (Sub-clause 4.25.1)</td></tr>
<tr><td>Resistance to Solvent</td><td>No deterioration of protective coatings and markings</td><td>Specimens shall be immersed in a bath of trichroethane completely for 3 minutes with ultrasonic (Sub-clause 4.3)</td></tr>
<tr><td>Pulse Overload</td><td>Resistance change rate is ±(5% + 0.05Ω) Maximum with no evidence of mechanical damage</td><td>Resistance change after 10,000 cycles (1s “on”, 25s “off”) at 4 times RCWV or the maximum pulse overload voltage (Sub-clause 5.8)</td></tr>
</table>

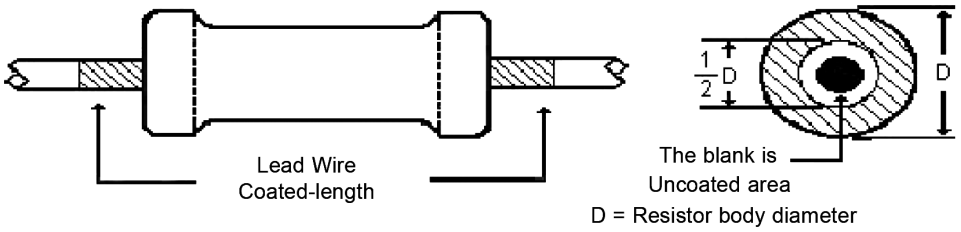
Dimension



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

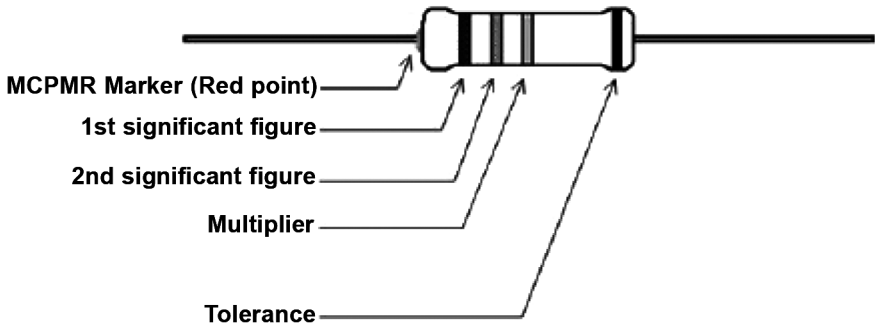
Painting Method

Welding terminal and lead wire, is permissible to be exposed without the outer coated cover.
The extent should be within 1/2 of the are 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	Description	Part Number
Resistor, Axial, Small, 4R7, 5%, 2W	MCPMR02SJ047JA10	Resistor, Axial, Small, 47K, 5%, 2W	MCPMR02SJ0473A10
Resistor, Axial, Small, 6R8, 5%, 2W	MCPMR02SJ068JA10	Resistor, Axial, Small, 56K, 5%, 2W	MCPMR02SJ0563A10
Resistor, Axial, Small, 7R5, 5%, 2W	MCPMR02SJ075JA10	Resistor, Axial, Small, 68K, 5%, 2W	MCPMR02SJ0683A10
Resistor, Axial, Small, 12R, 5%, 2W	MCPMR02SJ0120A10	Resistor, Axial, Small, 100K, 5%, 2W	MCPMR02SJ0104A10
Resistor, Axial, Small, 22R, 5%, 2W	MCPMR02SJ0220A10	Resistor, Axial, Small, 220K, 5%, 2W	MCPMR02SJ0224A10
Resistor, Axial, Small, 6K8, 5%, 2W	MCPMR02SJ0682A10	Resistor, Axial, Small, 240K, 5%, 2W	MCPMR02SJ0244A10
Resistor, Axial, Small, 10K, 5%, 2W	MCPMR02SJ0103A10	Resistor, Axial, Small, 270K, 5%, 2W	MCPMR02SJ0274A10
Resistor, Axial, Small, 15K, 5%, 2W	MCPMR02SJ0153A10	Resistor, Axial, Small, 680K, 5%, 2W	MCPMR02SJ0684A10
Resistor, Axial, Small, 20K, 5%, 2W	MCPMR02SJ0203A10	Resistor, Axial, Small, 1M, 5%, 2W	MCPMR02SJ0105A10

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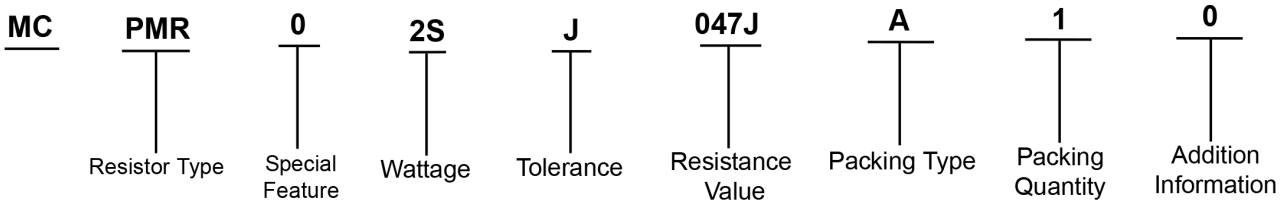
Part Number Explanation



Resistor Type	: PMR = Power Metal Fixed Resistor
Special Feature	: 0 = Standard Product
Wattage	: Small size : 2S = 2W-S
Tolerance	: J to ± 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, 4.7kΩ 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.: 1.33kΩ = 1331
Packing Type	: A = Tape / Box
Packing Quantity	: 1 = 1,000 pieces
Addition Information	: 0 = PT-52 mm