

Carbon Film Resistor



Specifications:

Resistor Element Material	: Carbon Film
Resistor Terminals	: Axial Leaded
Resistor Mounting	: Through Hole
Body Diameter	: 1.85mm
Body Length	: 3.5mm
Lead Wire Diameter	: 0.45 ±0.05mm
Pitch of Tape (PT)	: 52mm
Resistance	: 1.2MΩ
Temperature Coefficient	: -1,500ppm/°C to 0ppm/°C
No. of Pins	: 2

Ratings

Type	MCRE
Rated power	0.125W at 70°C
Maximum working voltage	200V
Maximum overload voltage	400V
Dielectric withstanding voltage	
Rated ambient temperature	70°C
Operating temperature range	-55°C to +155°C
Resistance tolerance	±5%
Resistance range	1.1MΩ to 10MΩ

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.

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 :

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

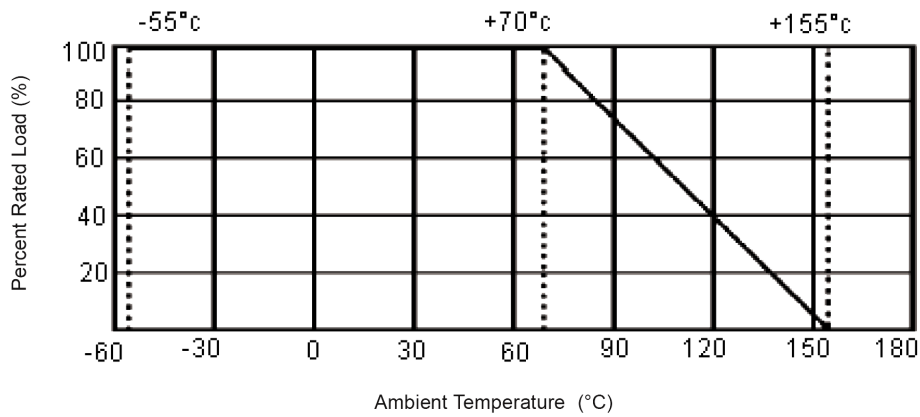
Were: RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

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.

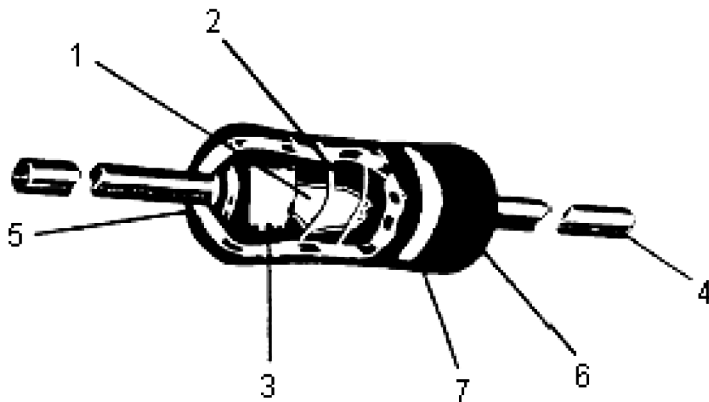
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Nominal Resistance:

Effective figures of nominal resistance shall be in accordance with E-24 series, and resistance tolerance

Construction:

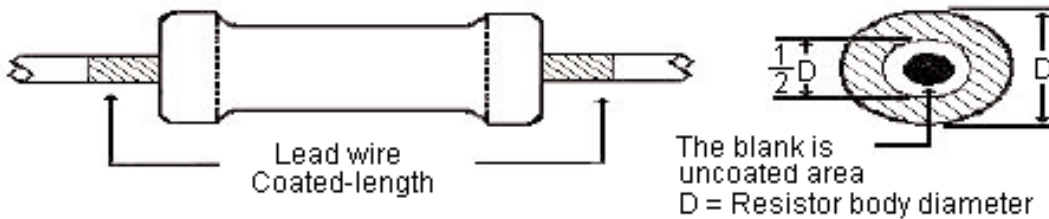


Item Number	Name	Material
1	Basic body	Rod type ceramics
2	Resistance film	Carbon film
3	End cap	Steel (tin plated iron surface)
4	Lead wire	Annealed copper wire coated with tin
5	Joint	By welding
6	Coating	Insulated epoxy resin (colour: beige)
7	Colour code	Epoxy resin

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Painting Method:

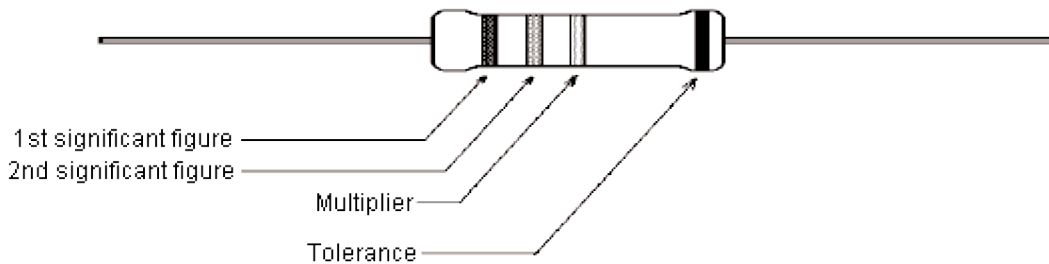
Welding point, terminal and lead wire, is permissible to be exposed without the outer coated cover. The extent should be within 1/2 of the angle.



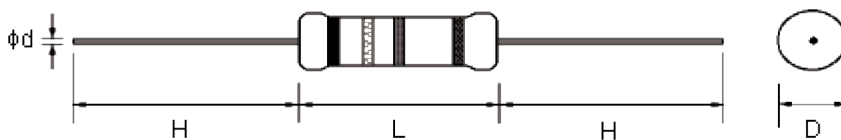
Marking:

Resistor:

Resistor shall be marked with colour coding, colours shall be in accordance with JIS C 0802.



Dimensions



Type	Power Rating (W)	Maximum D	Maximum L	d ±0.05	H ±3
MCRE	1/8	1.85	3.5	0.45	28

Dimensions : Millimetres

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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 5% of resistance tolerance (Sub-clause 4.5)	
Insulation resistance	Insulation resistance is 10,000MΩ Minimum	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 DC potential respectively specified in the above list for 60 +10/-0 seconds (Sub-clause 4.6)	
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 seconds (Sub-clause 4.7)	
Temperature coefficient	Resistance Range	Natural resistance change per temperature degree centigrade. R2-R1/R1(t2-t1) x 106 (PPM/°C) R1: Resistance value at room temperature (t1) R2: Resistance value at room temperature plus 100°C (t2) (Sub-clause 4.8)	
	≤10Ω		0 to ±350
	11Ω to 99K		0 to -450
	100K to 1M		0 to -700
	1.1M to 10M	0 to -1500	
Short time overload	Resistance change rate is ±(1 % + 0.05Ω) maximum with no evidence of mechanical damage	Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds (Sub-clause 4.13)	
Terminal strength	No evidence of mechanical damage	Direct load: Resistance to a 2.5kg direct load for 10 seconds in the direction of the longitudinal axis of the terminal leads. Twist test: Terminal leads shall be bent through 90° at a 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	95% coverage minimum	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 seconds (Sub-clause 4.17)	

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Characteristics

Characteristics	Limits	Test Methods (JIS C 5201-1)															
Soldering temperature reference	Electrical characteristics shall be satisfied. Without distinct deformation in appearance (95% coverage minimum)	The leads immersed into solder bath to 3.2 to 4.8mm from the body. Permanent resistance change shall be checked. Wave soldering condition: (2 cycles maximum) Pre-heat : 100 to 120°C, 30 ±5 seconds. Suggestion solder temperature : 235 to 255°C, 10 sec (max.) Park temperature : 260°C Hand soldering condition: Hand Soldering bit temperature : 380 ± 10°C Dwell time in solder : 3 +1/-0 sec															
Resistance to soldering heat	Resistance change rate is ±(1% + 0.05Ω) maximum with no evidence of mechanical damage	Permanent resistance change when leads immersed to 3.2 to 4.8mm from the body in 350°C ±10°C solder for 3 ±0.5 seconds (Sub-clause 4.18)															
Temperature cycling	Resistance change rate is ±(1% + 0.05Ω) 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 ±3°C</td> <td>30 minutes</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>10 to 15 minutes</td> </tr> <tr> <td>3</td> <td>+155°C ±2°C</td> <td>30 minutes</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>10 to 15 minutes</td> </tr> </tbody> </table> (Sub-clause 4.19)	Step	Temperature	Time	1	-55°C ±3°C	30 minutes	2	Room temperature	10 to 15 minutes	3	+155°C ±2°C	30 minutes	4	Room temperature	10 to 15 minutes
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Vibration	Resistance change rate is ±(1% + 0.05Ω) maximum	55Hz, 3 planes 2 hours each Total amplitude = 1.5mm (Sub-clause 4.22)															
Load life in humidity	<table border="1"> <thead> <tr> <th colspan="2">Resistance value</th> <th>ΔR/R</th> </tr> </thead> <tbody> <tr> <td>Normal Type</td> <td><100kΩ</td> <td>±3%</td> </tr> <tr> <td></td> <td></td> <td>±5%</td> </tr> </tbody> </table>	Resistance value		ΔR/R	Normal Type	<100kΩ	±3%			±5%	Resistance change after 1000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") in a humidity test chamber controlled at 40°C ±2°C and 90 to 95% relative humidity (Sub-clause 4.24.2.1)						
Resistance value		ΔR/R															
Normal Type	<100kΩ	±3%															
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Load life	<table border="1"> <thead> <tr> <th colspan="2">Resistance value</th> <th>ΔR/R</th> </tr> </thead> <tbody> <tr> <td>Normal Type</td> <td><56KΩ</td> <td>±2%</td> </tr> <tr> <td></td> <td></td> <td>±3%</td> </tr> </tbody> </table>	Resistance value		ΔR/R	Normal Type	<56KΩ	±2%			±3%	Permanent resistance change after 1000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") at 70°C ±2°C ambient (Sub-clause 4.25.1)						
Resistance value		ΔR/R															
Normal Type	<56KΩ	±2%															
		±3%															
Resistance to solvent	No deterioration of protective coatings and markings	Specimens shall be immersed in a bath of trichloroethane completely for 3 minutes with ultrasonic (Sub-clause 4.30)															

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Part Number Table

Description	Wattage (mW)	Resistance Value	Part Number
Carbon Film Resistor	125	1M2	MCRE000074
		1M5	MCRE000075
		1M8	MCRE000076
		2M2	MCRE000077
		2M7	MCRE000078
		3M3	MCRE000079
		3M9	MCRE000080
		4M7	MCRE000081
		5M6	MCRE000082
		6M8	MCRE000083
		8M2	MCRE000084
10M	MCRE000085		

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