

Metal Film Resistor Kit

**RoHS
Compliant**



Ratings:

Rated Power	0.5W at 70°C
Max. Working Voltage	350V
Max. Overload Voltage	700V
Dielectric Withstanding Voltage	700V
Rated Ambient Temp.	70°C
Operating Temp. Range	-55°C to +155°C
Resistance Tolerance	±1%
Resistance Range	10Ω to 1MΩ

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

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:

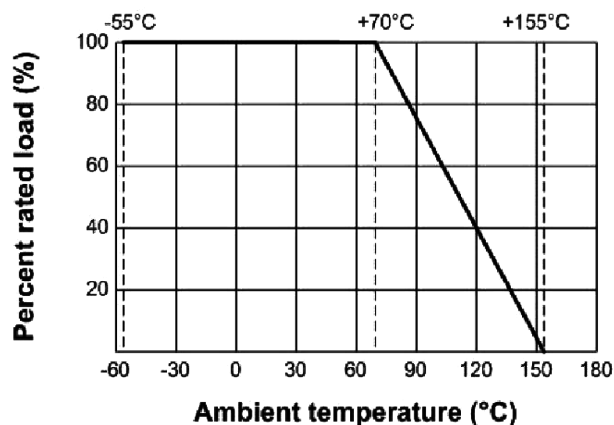
$$RCWV = \sqrt{P \times R}$$

Where : 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

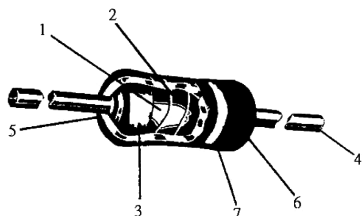


Nominal resistance :

Effective figures of nominal resistance shall be in accordance with E-96, E-192

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Construction:



No.	Name	Material
1	Basic Body	Rod Type Ceramics
2	Resistance Film	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 epoxy resin (Colour : Sky blue)
7	Colour Code	Epoxy Resin

Characteristics:

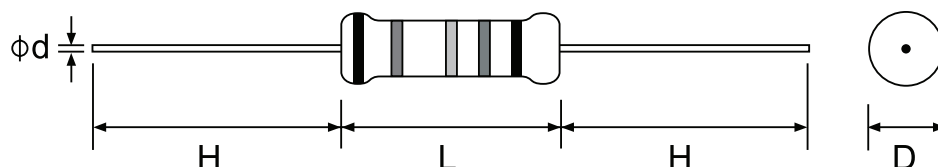
Characteristics	Limits	Test Methods (JIS C 5201-1)
DC. Resistance	Must be within the specified tolerance	The limit of error of measuring apparatus shall not exceed allowable range or 1% of resistance tolerance
Insulation Resistance	Insulation resistance is 10,000MΩ Min.	Resistors shall be clamped in 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 secs.
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 secs.
Temperature Coefficient	Within the temperature coefficient specified below : ±50 PPM/°C Max	Natural resistance change per temp. 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 temp. plus 100°C (t ₂)
Short Time Overload	Resistance change rate is ±(0.5% +0.05Ω) Max. with no evidence of mechanical damage	Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds
Terminal Strength	No evidence of mechanical damage	Direct load: Resistance to a 2.5 kgs direct load for 10 secs. 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

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Characteristics	Limits	Test Methods (JIS C 5201-1)															
Solderability	95 % coverage Min.	The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Test temp. of solder : 245°C ± 3°C Dwell time in solder : 2 ~ 3 seconds															
Soldering Temperature Reference	Electrical characteristics shall be satisfied. Without distinct deformation in appearance. (95 % coverage Min.)	The leads immersed into solder bath to 3.2 to 4.8mm. from the body. Permanent resistance change shall be checked. <u>Wave soldering condition: (2 cycles Max.)</u> Pre-heat : 100 ~ 120°C, 30 ± 5 sec. Suggestion solder temp.: 235 ~ 255°C, 10 sec.(Max.) Peak temp.: 260°C <u>Hand soldering condition:</u> Hand Soldering bit temp. : 380 ± 10°C Dwell time in solder : 3 +1/-0 sec.															
Resistance to Soldering Heat	Resistance change rate is ±(1% +0.05Ω) Max. 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 ± 0.5seconds															
Temperature Cycling	Resistance change rate is ±(1% +0.05Ω) Max. 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>30mins</td></tr> <tr> <td>2</td><td>Room temp.</td><td>10 to 15mins</td></tr> <tr> <td>3</td><td>+155°C ± 2°C</td><td>30mins</td></tr> <tr> <td>4</td><td>Room temp.</td><td>10 to 15 mins</td></tr> </tbody> </table>	Step	Temperature	Time	1	-55°C ± 3°C	30mins	2	Room temp.	10 to 15mins	3	+155°C ± 2°C	30mins	4	Room temp.	10 to 15 mins
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1	-55°C ± 3°C	30mins															
2	Room temp.	10 to 15mins															
3	+155°C ± 2°C	30mins															
4	Room temp.	10 to 15 mins															
Vibration	Resistance change rate is ±(1% + 0.05Ω) Max.	55Hz, 3 planes 2hrs each, Total amplitude = 1.5mm															
Load life in Humidity	Resistance value	Resistance change after 1,000 hours (1.5 hours "on", 0.5 hour "off") at RCWV in a humidity test chamber controlled at 40°C ± 2°C and 90 to 95 % relative humidity															
	Normal type	±1.5%															
Load Life	Resistance value	7.10 Permanent resistance change after 1,000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") at 70°C ± 2°C ambient															
	Normal type	±1.5%															
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															
Pulse overload	Resistance change rate is ±(1% + 0.05Ω) Max. with no evidence of mechanical damage	Resistance change after 10,000 cycles (1 sec. "on", 25 secs. "off") at 4 times RCWV															

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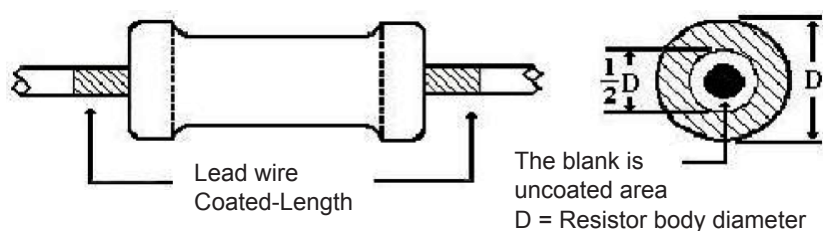
Dimension:



Type	Power Rating	Dimension			
		D Max.	L Max.	H ±3	d ±0.05
MF	1/2W	3.5mm	10mm	28mm	0.6mm

Painting method:

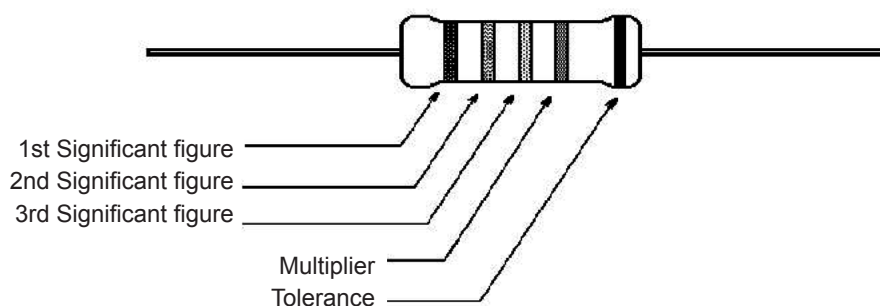
Welding point, terminal and lead wire, is permissible to be exposed without the outer coated cover. The extent should be within 1/2 of the arc angle.



Marking:

Resistor:

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



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Chip Kit Resistors:

Product : MF 1/2W 1% (3.5x10)
E-6 Series : (31 Values)
Quantity : 100pcs per value
Total Qty : 3,100pcs.

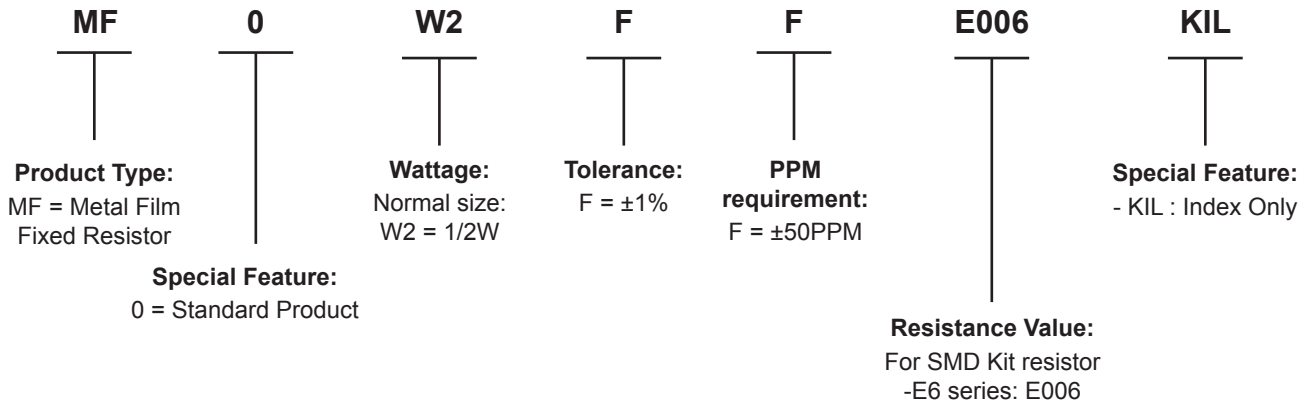
NO.	Value
1	10R
2	15R
3	22R
4	33R
5	47R
6	68R
7	100R
8	150R

NO.	Value
9	220R
10	330R
11	470R
12	680R
13	1K
14	1K5
15	2K2
16	3K3

NO.	Value
17	4K7
18	6K8
19	10K
20	15K
21	22K
22	33K
23	47K
24	68K

NO.	Value
25	100K
26	150K
27	220K
28	330K
29	470K
30	680K
31	1M

Explanation of Part Number



Part Number Table

Description	Part Number
Resistor, Kit, 0.5W, 1%, E- 6	MF0W2FFE006KIL

