

### 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

**RoHS  
Compliant**

### 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:

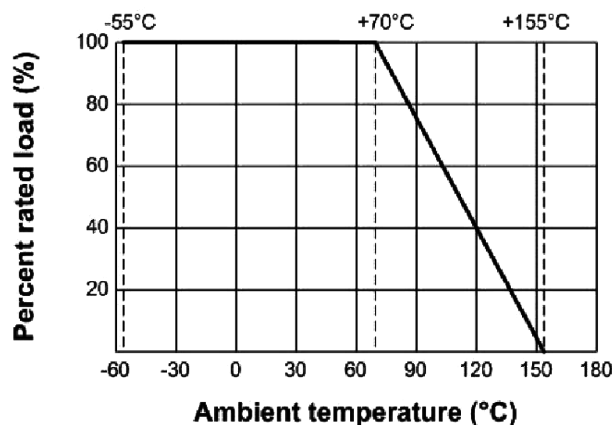
$$RCWV = \sqrt{P \times R}$$

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



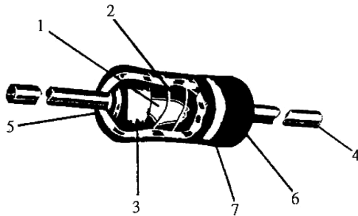
Nominal resistance :

Effective figures of nominal resistance shall be in accordance with E-12 series

# Metal Film Resistor Kit



## 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

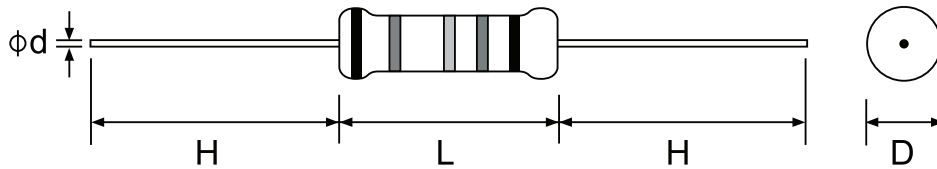
## Characteristics:

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 $\frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6$ (PPM/°C) R <sub>1</sub> : Resistance value at room temperature (t <sub>1</sub> ) R <sub>2</sub> : Resistance value at room temp. plus 100°C (t <sub>2</sub> )
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	<b>Direct load:</b> Resistance to a 2.5 kgs direct load for 10 secs. in the direction of the longitudinal axis of the terminal leads <b>Twist test:</b> 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



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" data-bbox="879 1131 1334 1326"> <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
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															
Vibration	Resistance change rate is ±(1% + 0.05Ω) Max.	55Hz, 3 planes 2hrs each, Total amplitude = 1.5mm															
Load life in Humidity	<b>Resistance value</b>	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	<b>Resistance value</b>	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															

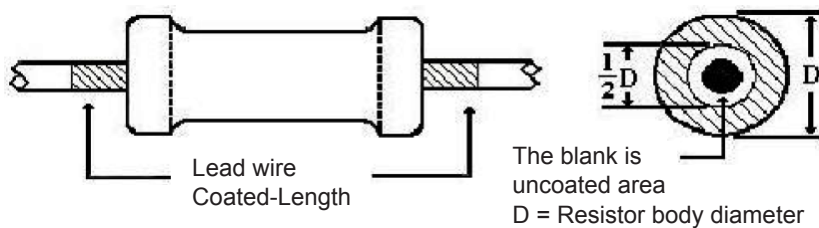
**Dimension:**



Type	Power Rating	Dimension			
		D Max.	L Max.	H $\pm 3$	d $\pm 0.05$
MF	1/2W	3.5mm	10mm	28mm	0.54mm

**Painting method:**

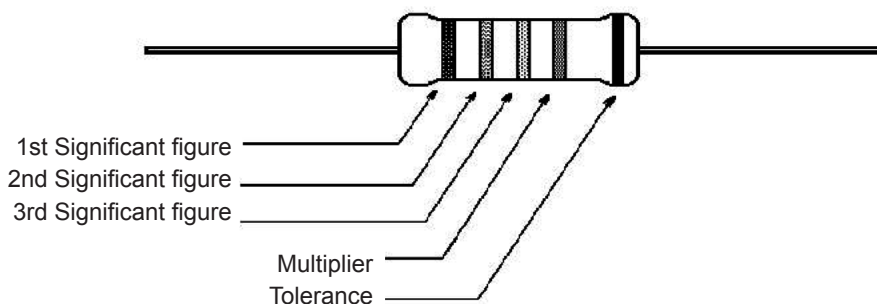
Welding point, terminal and lead wire, is permissible to be exposed without the outer coated cover. The extent should be within 1/2 of the arc angle.



**Marking:**

Resistor:

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

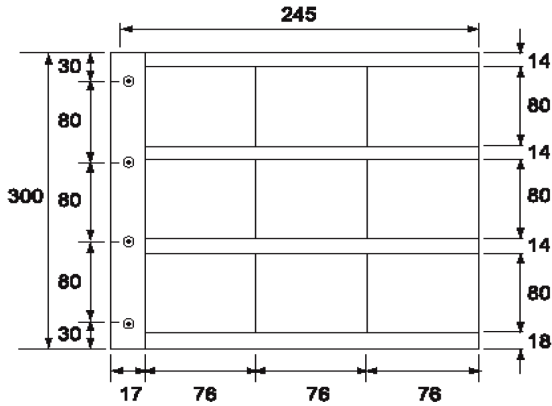


# Metal Film Resistor Kit

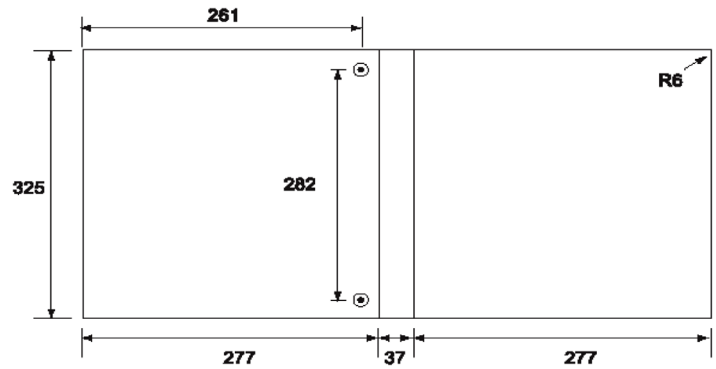


## Kit resistors:

Insert for Chip Kit



## Album for Chip Kit:



Dimensions : Millimetres

## Chip Kit Resistors:

Product : MF 1/2W 1% 50ppm (3.5x10)

E12 Series : (61 Values)

Quantity : 100pcs per value

Total Qty : 6,100pcs.

NO.	Value
1	10R
2	12R
3	15R
4	18R
5	22R
6	27R
7	33R
8	39R
9	47R
10	56R
11	68R
12	82R
13	100R
14	120R
15	150R
16	180R
17	220R
18	270R

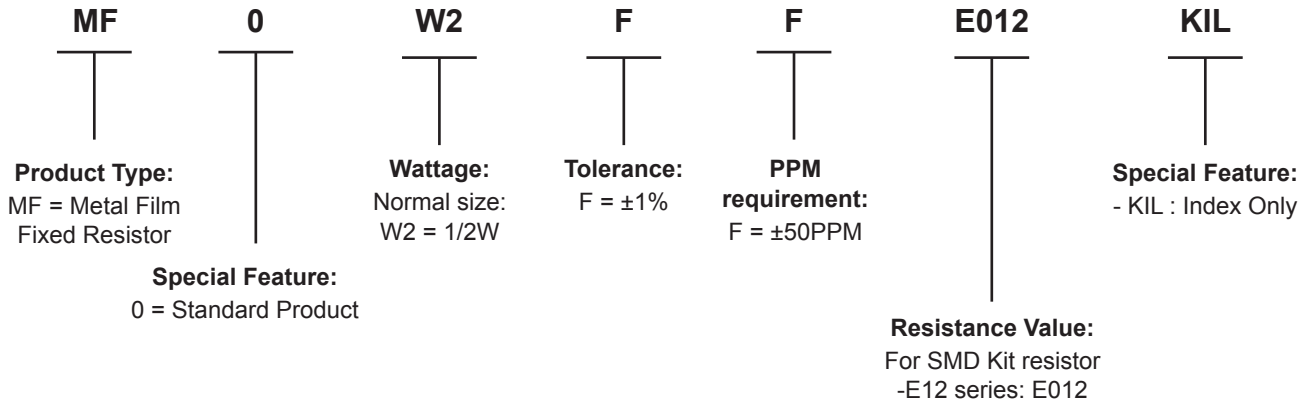
NO.	Value
19	330R
20	390R
21	470R
22	560R
23	680R
24	820R
25	1K
26	1K2
27	1K5
28	1K8
29	2K2
30	2K7
31	3K3
32	3K9
33	4K7
34	5K6
35	6K8
36	8K2

NO.	Value
37	10K
38	12K
39	15K
40	18K
41	22K
42	27K
43	33K
44	39K
45	47K
46	56K
47	68K
48	82K
49	100K
50	120K
51	150K
52	180K
53	220K
54	270K

NO.	Value
55	330K
56	390K
57	470K
58	560K
59	680K
60	820K
61	1M



## Explanation of Part Number



## Part Number Table

Description	Part Number
Resistor, Kit, 0.5W, 1%, E-12	MF0W2FFE012KIL

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