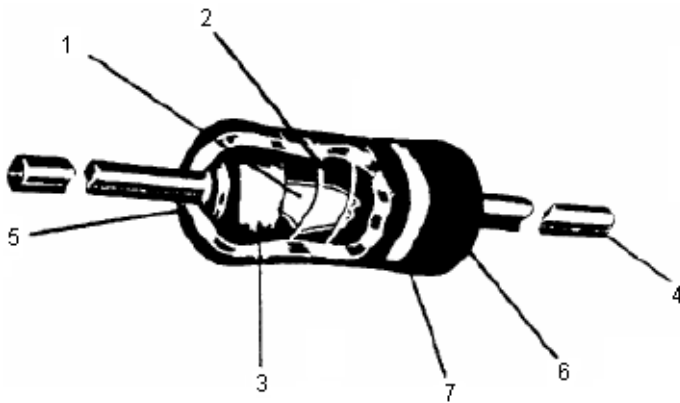


Metal Film Fixed Resistors

MCMFOW4 Series

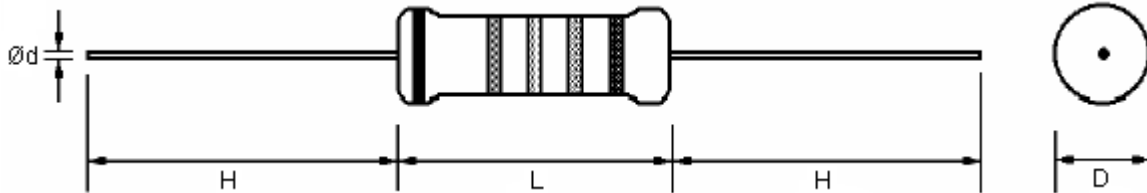


Construction:



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	Epoxy insulated resin (colour : sky blue)
7	Colour Code	Epoxy resin

Dimensions:

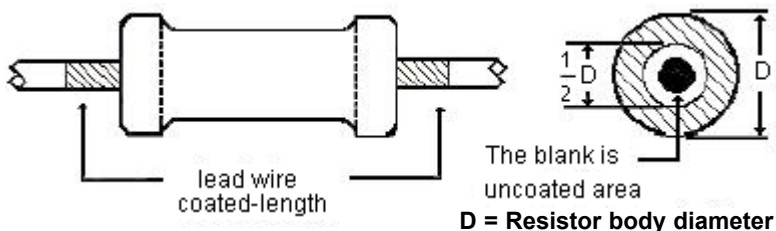


Type	Power Rating	D (Maximum)	L (Maximum)	d ±0.05	H ±3
MF	1/4 W	2.5	6.8	0.54	28

Dimensions : Millimetres

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 are angle



Metal Film Fixed Resistors

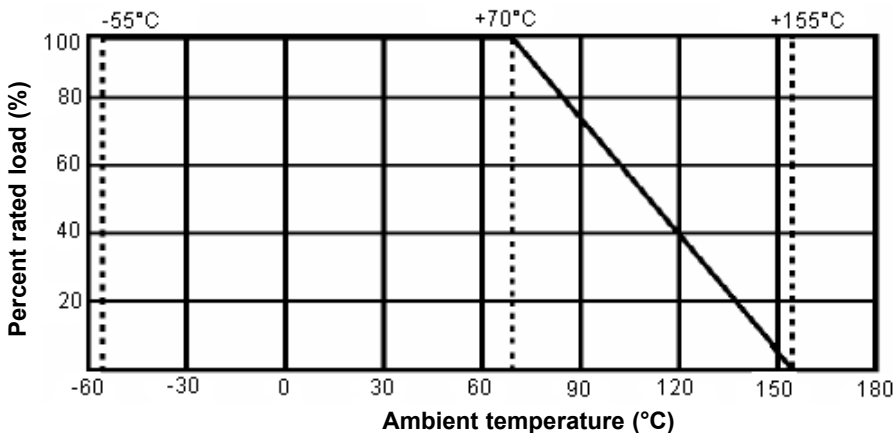
MCMFOW4 Series

Ratings:

Type	MF
Rated Power	0.25 W at 70°C
Maximum Working Voltage	250 V
Maximum Overload Voltage	500 V
Dielectric Withstanding Voltage	500 V
Rated Ambient Temperature	70°C
Operating Temperature Range	- 55 °C to + 155 °C
Resistance Tolerance	±0.5%
Resistance Range	10 Ω to 1 MΩ

Power Rating and Dimensions

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 :

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

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

P = Power rating (W)

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 series, and resistance tolerance

Marking:

Resistor :

Resistors shall be marked with color coding colors shall be in accordance with JIS C 0802

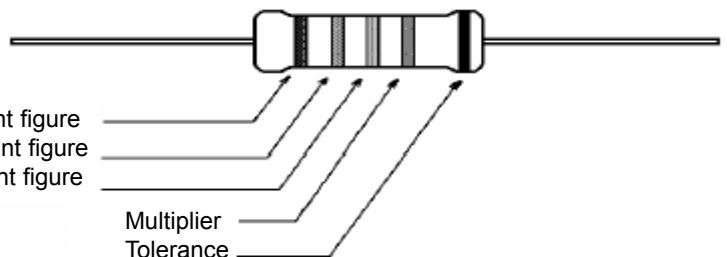
1st significant figure

2nd significant figure

3rd significant figure

Multiplier

Tolerance



Metal Film Fixed Resistors



MCMFOW4 Series

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 0.5% of resistance tolerance															
Temperature Coefficient	Within the temperature coefficient specified below : $\pm 50\text{PPM}/^{\circ}\text{C}$ maximum	Natural resistance change per temperature degree centigrade $R2 - R1 / R1 (t2 - t1) \times 10^6$ (PPM / $^{\circ}\text{C}$) R1 : Resistance value at room temperature (t1) R2 : Resistance value at room temperature plus 100 $^{\circ}\text{C}$ (t2)															
Short Time Overload	Resistance change rate is $\pm(0.5\% + 0.05 \Omega)$ maximum with no evidence of mechanical damage	Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 s															
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down	Resistors shall be clamped in the trough of a 90 $^{\circ}$ metallic V-block and shall be tested at AC potential respectively															
Pulse Overload	Resistance change rate is $\pm(1\% + 0.05 \Omega)$ maximum with no evidence of mechanical damage	Resistance change after 10,000 cycles 1 second "on", 25 seconds "off" at 4 times RCWV															
Terminal Strength	No evidence of mechanical damage	Direct load : Resistance to a 2.5 kg 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 $^{\circ}$ at point of about 6mm from the body of the resistor and shall be rotated through 360 $^{\circ}$ about the original axis of the bent terminal in alternating direction for a total of 3 rotations															
Resistance to Soldering Heat	Resistance change rate is $\pm(1\% + 0.05 \Omega)$ maximum with no evidence of mechanical damage	Permanent resistance change when leads immersed to 3.2 to 4.8 mm from the body in 350 $^{\circ}\text{C} \pm 10^{\circ}\text{C}$ solder for 3 ± 0.5 seconds															
Solderability	Minimum 95% coverage	The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes Test temperature of solder : 245 $^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Dwell time in solder : 2 to 3 s															
Resistance to Solvent	No deterioration of protective coatings and markings	Specimens shall be immersed in bath of trichroethane completely for 3 minutes with ultrasonic															
Temperature Cycling	Resistance change rate is $\pm(1\% + 0.05 \Omega)$ maximum with no evidence of mechanical damage	Resistance change after continuous 5 cycles for duty cycle specified below: <table border="1" data-bbox="916 1720 1477 1944"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55$^{\circ}\text{C} \pm 3^{\circ}\text{C}$</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$^{\circ}\text{C} \pm 2^{\circ}\text{C}$</td> <td>30 minutes</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>10 to 15 minutes</td> </tr> </tbody> </table>	Step	Temperature	Time	1	-55 $^{\circ}\text{C} \pm 3^{\circ}\text{C}$	30 minutes	2	Room temperature	10 to 15 minutes	3	+155 $^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30 minutes	4	Room temperature	10 to 15 minutes
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4	Room temperature	10 to 15 minutes															

Metal Film Fixed Resistors



MCMFOW4 Series

Characteristics	Limits		Test Methods (JIS C 5201-1)
Load Life in Humidity	Resistance Value	Δ R / R	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	Δ R / R	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 Preferred Value Range

E6	E12	E24	E96	E6	E12	E24	E96	E6	E12	E24	E96
10	10	10	10				21.5				46.4
			10.2	22	22	22	22.1	47	47	47	47.5
			10.5				22.6				48.7
			10.7				23.2				49.9
		11	11				23.7			51	51.1
			11.3			24	24.3				52.3
			11.5				24.9				53.6
			11.8				25.5				54.9
	12	12	12.1				26.1	56	56	56	56.2
			12.4				27.7				57.6
			12.7		27	27	27.4				59
		13	13				28				60.4
			13.3				28.7			62	61.9
			13.7				29.4				63.4
			14			30	30.1				64.9
			14.3				30.9				66.5
			14.7				31.6	68	68	68	68.1
15	15	15	15				32.4				69.8
			15.4	33	33	33	33.2				71.5
			15.8				34				73.2
		16	16.2				34.8			75	75
			16.5				35.7				76.8
			16.9			36	36.5				78.7
			17.4				37.4				80.6
			17.8				38.3	82	82	82	82.5
	18	18	18.2		39	39	39.2				84.5
			18.7				40.2				86.6
			19.1				41.2				88.7
			19.6				42.2			91	90.9
		20	20			43	43.2				93.1
			20.5				44.2				95.3
			21				45.3				97.6

Above values in accordance with IEC Publication 63 (1963) and BS2488

Metal Film Fixed Resistors

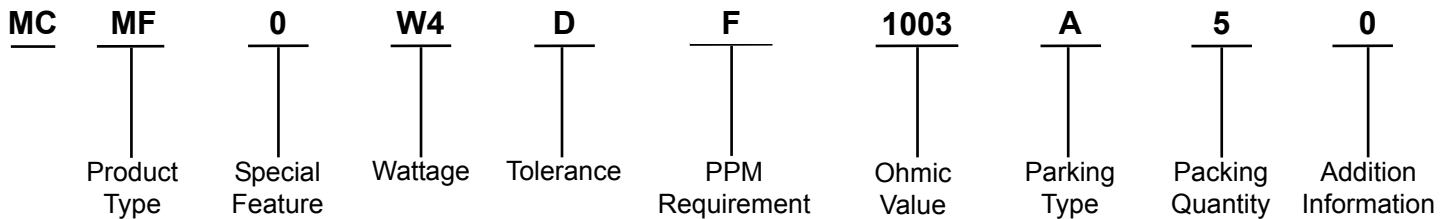


MCMFOW4 Series

Part Number Table

Description	Part Number
Resistor, 100 K , 0.25 W 0.5% 50 PPM	MCMFOW4DF1003A50

Part Number Explanation:



Product Type : MF = Metal Film Fixed Resistor

Special Feature : 0 = Standard Product

Wattage : W4 = 1/4 W

Tolerance : D = $\pm 0.5\%$

PPM Requirement : F = ± 50 PPM

Ohmic Value : Where R = Ohms = Ω

K = Kilo ohms = $K\Omega$

M = Megaohms = $M\Omega$

And replaces the decimal point

eg: 1R5 = 1.5 Ω

4K7 = 4.7 $K\Omega$

6M8 = 6.8 $M\Omega$

Parking Type : A = Tape / Box

Packing Quantity : 5 = 5,000 pieces

Addition Information : 0 = PT - 52 mm

Stocked Values

Tolerance	Wattage (W)	Preferred Value Range	Range Value
5%	0.125	E24	10 R - 1 M

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