

General Type

Normal & Miniature Style [MFR Series]



INTRODUCTION

The MFR Series Metal Film Resistors are manufactured using a vacuum sputtering system to deposit multiple layers of mixed metal alloys and passivative materials onto a carefully treated high grade ceramic substrate. After a helical groove has been cut in the resistive layer, tinned connecting leads of electrolytic copper are welded to the end-caps. The resistors are coated with layers of blue color lacquer.

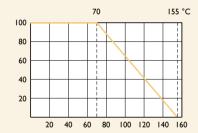
FEATURES

Power Rating	1/6W, 1/4W, 1/2W, 1W, 2W, 3W
Resistance Tolerance	±0.5%, ±1%, ±5%
T.C.R.	±15ppm/°C, ±25ppm/°C, ±50ppm/°C, ±100ppm/°C

DERATING CURVE

For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve below.

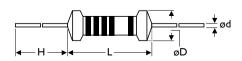
Rated Load (%)



Ambient Temperature (°C)

DIMENSIONS

Unit: mm



STYLE		DIMENSION						
Normal	Miniature	L	øD	н	ød			
MFR-12	MFR25S	3.4±0.3	1.9±0.2	28±2.0	0.45±0.05			
MFR-25	MFR50S	6.3±0.5	2.4±0.2	28±2.0	0.55±0.05			
MFR-50	MFRIWS	9.0±0.5	3.3±0.3	26±2.0	0.55±0.05			
MFR100	MFR2WS	11.5±1.0	4.5±0.5	35±2.0	0.8±0.05			
MFR200	MFR3WS	15.5±1.0	5.0±0.5	33±2.0	0.8±0.05			

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Note:			

ELECTRICAL CHARACTERISTICS

STYLE	MFR-12	MFR25S	MFR-25	MFR50S	MFR-50	MFRIWS	MFRI00	MFR2WS MFR200	MFR3WS
Power Rating at 70°C	1/6W	1/4W		1/2W		IW		2W	3W
Maximum Working Voltage	200V		250V	300V	350V	400V	500V	_	
Maximum Overload Voltage	400V		500V	600V	700V	800V	1,000V		
Voltage Proof on Insulation	300V	400V	500V			700V	1,000V		
Resistance Range	I Ω - 10MΩ & 0Ω for E24 & E96 series value								
Operating Temp. Range	-55°C to +155°C								
Temperature Coefficient	±15ppm/°C, ±25ppm/°C, ±50ppm/°C, ±100ppm/°C								

Note: Special value is available on request

ENVIRONMENTAL CHARACTERISTICS

PERFORMANCE TEST	TEST METHOD	APPRAISE	
Short Time Overload	IEC 60115-1 4.13	2.5 times RCWV for 5 Sec.	±0.25%+0.05Ω
Voltage Proof on Insulation	IEC 60115-1 4.7	in V-block for 60 Sec., test voltage by type	By type
Temperature Coefficient	IEC 60115-1 4.8	-55°C to +155°C	By type
Insulation Resistance	IEC 60115-1 4.6	in V-block for 60 Sec.	>10,000ΜΩ
Solderability	IEC 60115-1 4.17	235±5°C for 3±0.5 Sec.	95% Min. coverage
Solvent Resistance of Marking	IEC 60115-1 4.30	IPA for 5±0.5 Min, with ultrasonic	No deterioration of coatings and markings
Robustness of Terminations	IEC 60115-1 4.16	Direct load for 10 Sec. in the direction of the terminal leads	≥2.5kg (24.5N)
Periodic-pulse Overload	IEC 60115-1 4.39	4 times RCWV 10,000 cycles (1 Sec. on, 25 Sec. off)	±1.0%+0.05Ω
Damp Heat Steady State	IEC 60115-1 4.24	40±2°C, 90-95% RH for 56 days, loaded with 0.1 times RCWV	±1.5%+0.05Ω
Endurance at 70°C	IEC 60115-1 4.25	70±2°C at RCWV for 1,000 Hr. (1.5 Hr. on, 0.5 Hr. off)	±1.5%+0.05Ω
Temperature Cycling	IEC 60115-1 4.19	-55°C ⇒ Room Temp. ⇒ +155°C ⇒ Room Temp. (5 cycles)	±0.75%+0.05Ω
Resistance to Soldering Heat	IEC 60115-1 4.18	260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body	±0.25%+0.05Ω

EXPLANATIONS OF ORDERING CODE

52- $\overline{100}R$ Code I - 3 Code 4 - 6 Code 7 Code 8 Code 9 Code 10 - 12 Code 13 - 17 **Series Name Power Rating Tolerance Packing Style** Temperature Coef-Forming Type Resistance Value ficient of Resistance See Index -05 = ød0.5mm $P = \pm 0.02 \%$ T = Tape/Box26 - 26mm0RI = 0.1R = Tape/Reel - = Base on Spec. -06 = ød0.6mm $A = \pm 0.05 \%$ 52- = 52.4mm 100R = 100-07 = ød0.7mmB = +0.1% $A = \pm 5 \text{ ppm/}^{\circ}\text{C}$ 73 - = 73 mmB = Bulk10K = 10.000 $B = \pm 10 \text{ ppm/}^{\circ}\text{C}$ -08 = ød0.8mmC = +0.25%81 - 81 mm10M = 10,000,000 $C = \pm 15 \text{ ppm/}^{\circ}C$ -10 = ød1.0mm $D = \pm 0.5 \%$ 91 - = 91 mm-14 = ød1.4mm $S = \pm 20ppm/^{\circ}C$ F = ±1 % F = FType $D = \pm 25 \text{ ppm/}^{\circ}C$ -12 = 1/6WFK = FKType $G = \pm 2 \%$ $E = \pm 50 \text{ ppm/}^{\circ}\text{C}$ -25 = 1/4W $1 = \pm 5 \%$ FKK = FKK Type $F = \pm 100 \text{ ppm/°C}$ 25S = 1/4WSFFK = F-form Kink $K = \pm 10 \%$ $G = \pm 200 \text{ ppm/}^{\circ}C$ -50 = 1/2W- = Base on Spec M = M-Type Forming $H = \pm 250 \text{ ppm/°C}$ 50S = 1/2WSMB = M-form W/flat $I = \pm 300 \text{ ppm/°C}$ 100 = 1 WMT = MT Type Forming IWS = IWS $I = \pm 350 \text{ ppm/°C}$ MR = MRType200 = 2WAV = AVIsertPN = PANAsert 2WS = 2WS204 = 0.4W207 = 0.6W300 = 3W3WS = 3WS3WM = 3WM400 = 4W500 = 5W5WS = 5WS5SS = 5WSS700 = 7W7WS = 7WS10A = 10W20A = 20W30A = 30W40A = 40W50A = 50W10S = 10WS

EXCEPTION:

• Cement series:

<Code 8>: Special packing style code

15A = 15W 25A = 25W 10B = 100W25B = 250W

B: Bulk with wirewound or metal oxide sub-assembly for resistance value

W: Bulk with ceramic based wirewound sub-assembly for resistance value

M: Bulk with metal oxide sub-assembly for resistance value

F: Bulk with Fiberglass based wirewound sub-assembly for resistance value

<Code 10-12>: Without forming code

Example: SQP500|B-I0R

• JPW series:

<Code 13-17>: without resistance value code

Example: JPW-06-T-52-