

Metal Film Resistors

General Type

Normal & Miniature Style [MFR Series]



INTRODUCTION

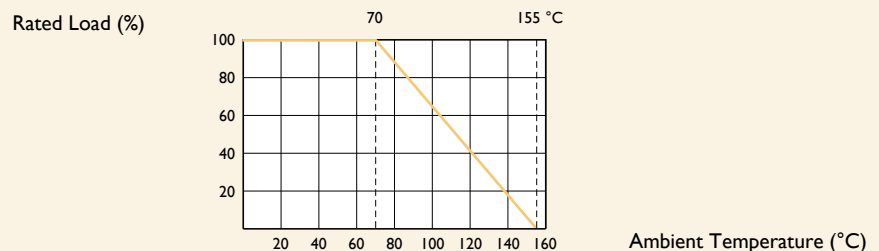
The MFR Series Metal Film Resistors are manufactured using a vacuum sputtering system to deposit multiple layers of mixed metal alloys and passivative materials onto a carefully treated high grade ceramic substrate. After a helical groove has been cut in the resistive layer, tinned connecting leads of 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	$\pm 0.5\%$, $\pm 1\%$, $\pm 5\%$
T.C.R.	$\pm 15\text{ppm}/^{\circ}\text{C}$, $\pm 25\text{ppm}/^{\circ}\text{C}$, $\pm 50\text{ppm}/^{\circ}\text{C}$, $\pm 100\text{ppm}/^{\circ}\text{C}$

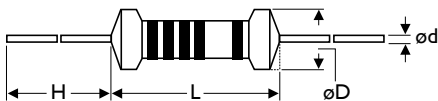
DERATING CURVE

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



DIMENSIONS

Unit: mm



STYLE		DIMENSION			
Normal	Miniature	L	øD	H	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	MFR1WS	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

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		1W		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	1Ω - 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.	>10,000MΩ
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

Note: RCWV(Rated Continuous Working Voltage) = $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$ or Max. working voltage listed above, whichever less.

Revision: 201304



EXPLANATIONS OF ORDERING CODE

MFR	-12	F	T	F	52-	100R
Code 1 - 3 Series Name See Index	Code 4 - 6 Power Rating -05 = $\varnothing$ d0.5mm -06 = $\varnothing$ d0.6mm -07 = $\varnothing$ d0.7mm -08 = $\varnothing$ d0.8mm -10 = $\varnothing$ d1.0mm -14 = $\varnothing$ d1.4mm -12 = 1/6W -25 = 1/4W 25S = 1/4WS -50 = 1/2W 50S = 1/2WS 100 = 1W 1WS = 1WS 200 = 2W 2WS = 2WS 204 = 0.4W 207 = 0.6W 300 = 3W 3WS = 3WS 3WM = 3WM 400 = 4W 500 = 5W 5WS = 5WS 5SS = 5WSS 700 = 7W 7WS = 7WS 10A = 10W 20A = 20W 30A = 30W 40A = 40W 50A = 50W 10S = 10WS 15A = 15W 25A = 25W 10B = 100W 25B = 250W	Code 7 Tolerance P = ± 0.02 % A = ± 0.05 % B = ± 0.1 % C = ± 0.25 % D = ± 0.5 % F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % - = Base on Spec.	Code 8 Packing Style T = Tape/Box R = Tape/Reel B = Bulk	Code 9 Temperature Coef- ficient of Resistance - = Base on Spec. A = ± 5 ppm/ $^{\circ}$ C B = ± 10 ppm/ $^{\circ}$ C C = ± 15 ppm/ $^{\circ}$ C S = ± 20 ppm/ $^{\circ}$ C D = ± 25 ppm/ $^{\circ}$ C E = ± 50 ppm/ $^{\circ}$ C F = ± 100 ppm/ $^{\circ}$ C G = ± 200 ppm/ $^{\circ}$ C H = ± 250 ppm/ $^{\circ}$ C I = ± 300 ppm/ $^{\circ}$ C J = ± 350 ppm/ $^{\circ}$ C	Code 10 - 12 Forming Type 26- = 26mm 52- = 52.4mm 73- = 73mm 81- = 81mm 91- = 91mm F = F Type FK = FK Type FKK = FKK Type FFK = F-form Kink M = M-Type Forming MB = M-form W/flat MT = MT Type Forming MR = MR Type AV = AVIsert PN = PANAsert	Code 13 - 17 Resistance Value 0R1 = 0.1 100R = 100 10K = 10,000 10M = 10,000,000

EXCEPTION:

• Cement series:

<Code 8>: Special packing style code

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: **SQP500JB-10R**

• JPW series:

<Code 13-17>: without resistance value code

Example: **JPW-06-T-52-**

Mouser Electronics

Authorized Distributor

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[MFR25SFRF52-60K4](#) [MFR-25FTF52-332K](#) [MFR100FTE52-12K1](#) [MFR-25FRE52-510K](#) [MFR-25FTF52-137K](#)
[MFR25SFRF52-422R](#) [MFR-25FTF52-215R](#) [MFR-25FTF52-3K16](#) [MFR-25FTF52-52K3](#) [MFR-25FTF52-806K](#) [MFR-](#)
[25FTF52-196K](#) [MFR-25FTF52-243K](#) [MFR25SFRF52-162R](#) [MFR-50FRE52-200K](#) [MFR-50FRE52-4K7](#) [MFR-](#)
[25FTF52-402K](#) [MFR-50FRF52-127K](#) [MFR-25FTF52-78R7](#) [MFR25SFRF52-48K7](#) [MFR25SFRF52-237R](#) [MFR-](#)
[25FTF52-365K](#) [MFR25SFRF52-39K2](#) [MFR25SFTF52-301K](#) [MFR-25FRE52-28K7](#) [MFR100FTF52-200R](#)
[MFR100FTF73-3K](#) [MFR-25FTF52-23K2](#) [MFR-25FTF52-118K](#) [MFR-50FRF52-4K22](#) [MFR-25FTF52-1K87](#) [MFR-](#)
[25FRE52-383R](#) [MFR-25FTF52-57K6](#) [MFR-12FRF52-49R9](#) [MFR-50FRF52-1K24](#) [MFR-25FTF52-1K15](#) [MFR-](#)
[25FTF52-3K57](#) [MFR-12FRF52-15R8](#) [MFR-25FRE52-820R](#) [MFR-25FTF52-820R](#) [MFR-50FRF52-6K49](#)
[MFR25SFTF52-1K3](#) [MFR25SFRF52-4K12](#) [MFR-50FTE52-30K](#) [MFR25SFTF52-100K](#) [MFR25SFTF52-22K](#) [MFR-](#)
[25FTF52-7K15](#) [MFR100FTF52-2K2](#) [MFR-25BTE52-11K5](#) [MFR100FTF73-2K7](#) [MFR-25FTF52-681R](#) [MFR25SFTF52-](#)
[4K3](#) [MFR-25FTF52-523R](#) [MFR-25FRE52-18K7](#) [MFR25SFTF52-6K2](#) [MFR-25FTF52-169K](#) [MFR-25FTF52-1K24](#)
[MFR25SFRF52-549K](#) [MFR1WSCTD52-38K8](#) [MFR-25FTF52-18K](#) [MFR-25FRE52-576K](#) [MFR1WSCTD52-10K](#) [MFR-](#)
[25DTD52-6K04](#) [MFR-50FRF52-47K](#) [MFR100FTF73-1K1](#) [MFR-50FRF52-115K](#) [MFR-12FRF52-768R](#) [MFR-25FRE52-](#)
[237K](#) [MFR25SFRF52-1K5](#) [MFR100FTF52-200K](#) [MFR-25FTF52-107K](#) [MFR-50FRF52-274K](#) [MFR-25FRE52-16K2](#)
[MFR25SFRF52-32K4](#) [MFR-25FRE52-6K19](#) [MFR25SFRF52-45K3](#) [MFR-25FRE52-1K2](#) [MFR-25FTF52-301R](#) [MFR-](#)
[25FRE52-909K](#) [MFR25SFTF52-12K](#) [MFR-25FRE52-13K3](#) [MFR-25FTF52-270K](#) [MFR25SFTF52-118K](#) [MFR-](#)
[50FRE52-43K2](#) [MFR-50FRF52-23K7](#) [MFR-25FRE52-169K](#) [MFR-25FTF52-604K](#) [MFR-50FRF52-3K65](#) [MFR-](#)
[25FRE52-23K2](#) [MFR100FTE52-200K](#) [MFR-50FRF52-3K32](#) [MFR-25FRE52-34K8](#) [MFR25SFTF52-422K](#) [MFR-](#)
[25FRE52-348K](#) [MFR-25FTE52-1M4](#) [MFR25SFTF52-61K9](#) [MFR-50FRF52-301K](#) [MFR25SFTF52-20K5](#)
[MFR25SFTF52-2K1](#) [MFR-25FTF52-21K5](#) [MFR25SFTF52-1K4](#)