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## Melf Metal Film Resistors

## General Type

## Normal &amp; Miniature Style [ MMF Series ]



## INTRODUCTION

The MMF Series Melf 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. SMD enabled structure. The resistors are coated with layers of blue color lacquer.

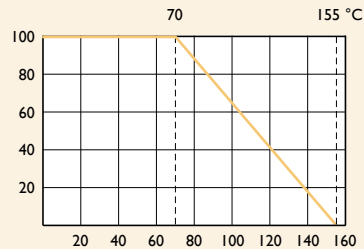
## FEATURES

Power Rating	1/6W, 1/4W, 0.4W, 1/2W, 0.6W, 1W
Resistance Tolerance	±0.1%, ±0.25%, ±0.5%, ±1%, ±2%, ±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.

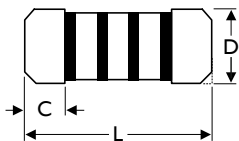
Rated Load (%)



Ambient Temperature (°C)

## DIMENSIONS

Unit: mm



## STYLE

## DIMENSION

Normal	Miniature	L	D	C Min.
MMF-12	MMF25S / MMF204	3.50±0.2	1.40±0.15	0.5
MMF-25	MMF50S / MMF207	5.90±0.2	2.20±0.1	0.5
MMF-50	MMF1WS	8.50±0.2	3.20±0.2	0.5

Note:

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### ELECTRICAL CHARACTERISTICS

STYLE	MMF-12	MMF25S	MMF204	MMF-25	MMF50S	MMF207	MMF-50	MMFIWS
Power Rating at 70°C	1/6W	1/4W	0.4W	1/4W	1/2W	0.6W	1/2W	1W
Maximum Working Voltage	150V	200V		250V			350V	
Maximum Overload Voltage	300V	400V		500V			700V	
Voltage Proof on Insulation	300V			500V			700V	
Resistance Range	1Ω - 1MΩ & 0Ω for E24 & E96 series value, 100Ω - 100KΩ for E192 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.	±0.5%+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
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	±2.0%+0.1Ω
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)	±2.0%+0.1Ω
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	±0.5%+0.05Ω

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



## EXPLANATIONS OF ORDERING CODE

<b>MFR</b>	<b>-12</b>	<b>F</b>	<b>T</b>	<b>F</b>	<b>52-</b>	<b>100R</b>
Code 1 - 3 <b>Series Name</b> See Index	Code 4 - 6 <b>Power Rating</b> -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 <b>Tolerance</b> P = $\pm 0.02$ % A = $\pm 0.05$ % B = $\pm 0.1$ % C = $\pm 0.25$ % D = $\pm 0.5$ % F = $\pm 1$ % G = $\pm 2$ % J = $\pm 5$ % K = $\pm 10$ % - = Base on Spec.	Code 8 <b>Packing Style</b> T = Tape/Box R = Tape/Reel B = Bulk	Code 9 <b>Temperature Coefficient of Resistance</b> - = Base on Spec. A = $\pm 5$ ppm/ $^{\circ}$ C B = $\pm 10$ ppm/ $^{\circ}$ C C = $\pm 15$ ppm/ $^{\circ}$ C S = $\pm 20$ ppm/ $^{\circ}$ C D = $\pm 25$ ppm/ $^{\circ}$ C E = $\pm 50$ ppm/ $^{\circ}$ C F = $\pm 100$ ppm/ $^{\circ}$ C G = $\pm 200$ ppm/ $^{\circ}$ C H = $\pm 250$ ppm/ $^{\circ}$ C I = $\pm 300$ ppm/ $^{\circ}$ C J = $\pm 350$ ppm/ $^{\circ}$ C	Code 10 - 12 <b>Forming Type</b> 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 <b>Resistance Value</b> 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-**