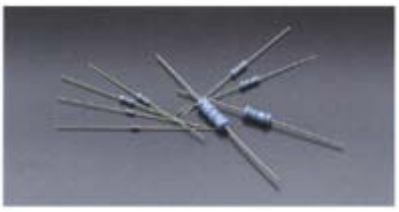
PRECISION METAL FILM FIXED RESISTOR

Features



- EIA standard color-coding
- Non - Flame type available
- Low noise & voltage coefficient
- Low temperature coefficient range
- Wide precision range in small package
- Too low or too high ohmic value can be supplied on a case-to-case basis
- Nichrome resistor element provides stable performance in various environments
- Multiple epoxy coating on vacuum-deposited metal film provides superior moisture protection

Explanation of Part Number & Ordering Procedure:

B	M	S	4	F	1	0	0	0	A	0	0

Resistor Type:
Coated Resistors

Power Rating:
W8~1/8W, S4~1/4W-S,
W4~1/4W, S2~1/2W-S,
W2~1/2W, X6~0.6W-S,
1W~1W, Y4~0.4W-SS
2W~2W, T2~1/2W-SS,
3W~3W

Series Code:
M ~ Precision metal film fixed resistors.
N ~ Non – Flame precision metal film fixed resistor

Tolerance:
B = ±0.1%, C = ±0.25%,
D = ±0.5%, F = ±1%,
G = ±2%, J = ±5%

Resistance Value:

- **E-6, E-12, E-24 series**

a.) Normally for these series, the box No. 6 is "0".
b.) Boxes No. 7 & 8 are for the Ohmic Value.
c.) Box No. 9 is for the multiplier or indication for no. of zeros.

- **E-96 series**

a.) Boxes No. 6 to 8 are for the Ohmic Value.
b.) Box No. 9 is for the multiplier or indication for no. of zeros.

Decimal point is expressed by:
"J"- 0.1, "K"- 0.01, "L"- 0.001
Ex. 2Ω26 ~ 226K, 226Ω ~ 2260

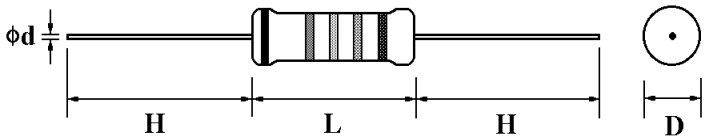
Note:
Special T.C.R. requirements can be supplied on a case-to-case basis. Please indicate when ordering.

Packing Type:
A = Tape / Box
B = Bulk / Box
T = Tape / Reel

Suffix for Special Features:
F ~ F Type, M ~ M Type, P ~ Panasert, T ~ T Type,
V ~ AVI Type,
0 ~ PT-52 mm, 1 ~ PT-26 mm, 8 ~ PT-58 mm, 9 ~ PT-64 mm

Assistance Code:
Usually is "0"
As: F(3) Type = 3
AVI(2) = 2 etc.

Dimension (mm)



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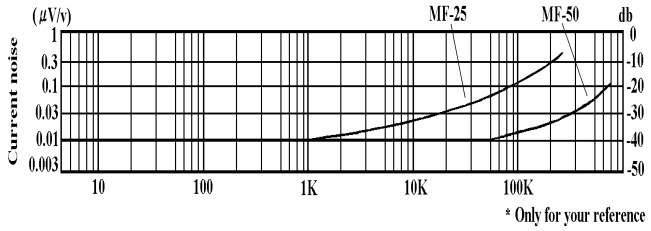
Normal Size

Part No.	Style	Power Rating at 70°C	Dimension (mm)			
			D Max.	L Max.	d +0.02 -0.05	H±3
BMW8	MF-12	1/8W (0.125W)	1.85	3.5	0.5	28
BMW4	MF-25	1/4W (0.25W)	2.5	6.8	0.6	28
BMW2	MF-50	1/2W (0.5W)	3.5	10.0	0.6	28
BM1W	MF-100	1W	5.0	12.0	0.8	28
BM2W	MF-200	2W	5.5	16.0	0.8	28
BM3W	MF-300	3W	6.5	17.5	0.8	28

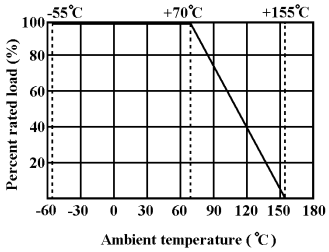
Small Size

Part No.	Style	Power Rating at 70°C	Dimension (mm)			
			D Max.	L Max.	d +0.02 -0.05	H±3
BMS4	MF-25-S	1/4W (0.25W)	1.85	3.5	0.5	28
BNY4	MF-40-SS	0.4W	1.9	3.7	0.5	28
BMS2	MF-50-S	1/2W (0.5W)	3.0	9.0	0.6	28
BNT2	MF-50-SS	1/2W (0.5W)	2.5	6.8	0.6	28
BMX6	MF-60-S	0.6W	2.5	6.8	0.6	28

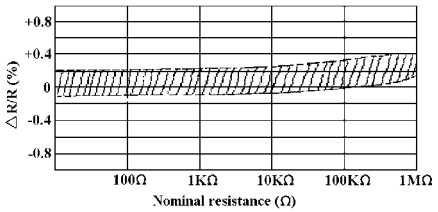
Current Noise Level



Derating Curve



Load Life



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PRECISION METAL FILM FIXED RESISTOR

General Specification

Part No.	Style	Max. Overload Voltage	Max. Working Voltage	Dielectric With - standing V.	Resistance Tolerance	T.C.R.	Resistance Range	Special Order		
								Resistance Tolerance	T. C. R.	Resistance Range
BMW8 BMS4	MF-12 MF-25-S	400V	200V	400V	± 5%	±200PPM/°C	1Ω - 1MΩ	±0.25%	±15PPM/°C	51.1Ω-200KΩ
					± 2%	±100PPM/°C	10Ω - 1MΩ	±0.5%	±25PPM/°C	51.1Ω-511KΩ
BNY4	MF-40-SS	400V	200V	200V	± 1%	±50PPM/°C	10Ω - 1MΩ		±50PPM/°C	
BMW4 BMX6	MF-25 MF-60-S	500V	250V	500V	± 5%	±200PPM/°C	1Ω - 1MΩ	±0.1%	±15PPM/°C	100Ω–100KΩ
					± 2%	±100PPM/°C	10Ω - 1MΩ	±0.25%	±25PPM/°C	51.1Ω-330KΩ
BNT2	MF-50-SS	500V	250V	250V	± 1%	±50PPM/°C	10Ω - 1MΩ	±0.5%	±50PPM/°C	10Ω–1MΩ
BMW2 BMS2	MF-50 MF-50-S	700V	350V	700V	± 5%	±200PPM/°C	1Ω - 1MΩ	±0.1%	±15PPM/°C	100Ω–330KΩ
					± 2%	±100PPM/°C	10Ω - 1MΩ	±0.25%	±25PPM/°C	51.1Ω-511KΩ
					± 1%	±50PPM/°C	10Ω - 1MΩ	±0.5%	±50PPM/°C	10Ω–1MΩ
BM1W BM2W BM3W	MF-100 MF-200 MF-300	1000V	500V	1000V	± 5%	±200PPM/°C	10Ω - 1MΩ	±0.1%	±15PPM/°C	100Ω–330KΩ
					± 2%	±100PPM/°C	51.1Ω - 1MΩ	±0.25%	±25PPM/°C	51.1Ω-511KΩ
					± 1%	±50PPM/°C	51.1Ω - 1MΩ	±0.5%	±50PPM/°C	51.1Ω–1MΩ

Note: MF - xx - ss is Non-Flame coating.

LAUBE

PRECISION METAL FILM FIXED RESISTOR

Performance Specifications:

Characteristics	Test Methods	Limits
Temperature coefficient JIS – C – 5202 5.2	Natural resistance change per temp. degree centigrade $\frac{R_2 - R_1}{R_1 (t_2 - t_1)} \times 10^6$ (PPM / ºC) R_1 : Resistance value at room temperature (t_1) R_2 : Resistance value at room temp. plus 100ºC (t_2)	Within the temperature coefficient specified below: Max. T.C.R. ±15 PPM/°C ±100 PPM/°C ±25 PPM/°C ±200 PPM/°C ±50 PPM/°C
Short – time overload JIS – C – 5202 5.5	Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds.	Resistance change rate is ± (0.5%+0.05 Ω) No evidence of mechanical damage.
Dielectric withstanding voltage JIS – C – 5202 5.7	Resistors shall be clamped in the trough of a 90 ° metallic V- block and shall be tested at AC potential respectively specified in the above list for 60 + 10 / -0 seconds.	No evidence of flashover mechanical damage, arcing or insulation break down.
Pulse Overload JIS – C – 5202 5.8	Resistance change after 10,000 cycles (1 second “on”, 25 seconds “off”) at 4 times RCWV.	Resistance change rate is ± (1.0%+0.05 Ω) No evidence of mechanical damage.
Terminal strength JIS – C – 5202 6.1	**Direct load:** Resistance to a 2.5 kgs. 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° 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.	No evidence of mechanical damage.
Resistance to Soldering Heat JIS – C – 5202 6.4	Permanent resistance change when leads immersed to 3.2 to 4.8 mm from the body in 350°C ± 10°C solder for 3 ± 0.5 seconds	Resistance change rate is ± (1.0%+0.05 Ω) No evidence of mechanical damage.
Solderability JIS – C – 5202 6.5	The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Test temp. of solder: 235°C ± 5°C Dwell time in solder: 3 +0.5/ -0 seconds	95% coverage Min.
Resistance to solvent JIS - C - 5202 6.9	Specimens shall be immersed in a bath of trichroethane completely for 3 mins. with ultrasonic.	No deterioration of protective coating and markings.

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Performance Specifications:

<table>
<tr><th>Characteristics</th><th>Test Methods</th><th>Limits</th></tr>
<tr><td>Temperature cycling
JIS – C – 5202 7.4</td><td>Resistance change after continuous five cycles for duty cycle specified below:
<table><tr><th>Step</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>-55℃±3℃</td><td>30 mins.</td></tr><tr><td>2</td><td>Room temp.</td><td>10 – 15 mins.</td></tr><tr><td>3</td><td>+155 ℃±2 ℃</td><td>30 mins.</td></tr><tr><td>4</td><td>Room temp.</td><td>10 – 15 mins.</td></tr></table></td><td>Resistance change rate is ± (1.0%+0.05 Ω)
No evidence of mechanical damage.</td></tr>
<tr><td>Load life in humidity
JIS - C - 5202 7.9</td><td>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.</td><td><table><tr><th>Resistance Value</th><th>ΔR/R</th></tr><tr><td>Normal type</td><td>± 1.5%</td></tr><tr><td>Non-Flame type</td><td>± 5%</td></tr></table></td></tr>
<tr><td>Load life
JIS - C - 5202 7.10</td><td>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.</td><td><table><tr><th>Resistance Value</th><th>ΔR/R</th></tr><tr><td>Normal type</td><td>± 1.5%</td></tr><tr><td>Non-Flame type</td><td>± 5%</td></tr></table></td></tr>
</table>

* RCWV = Rated Continuous Working Voltage = $\sqrt{\text{Rated Power x Resistance Value}}$