ROYAL OHM

Precision Metal Film Fixed Resistors

Materials & Features

- EIA standard color-coding
- Flame retardant 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 and Ordering Procedure

1	2	3	4	5	6	7	8	9	10	11	12
B											

Resistor Type

Coated Resistors

Series Code

M ~ Precision metal film fixed resistors.

N ~ Non – Flame precision metal film fixed resistor

Resistance Tolerance

B ~ ±0.1%
C ~ ±0.25%
D ~ ±0.5%
F ~ ±1%
G ~ ±2%
J ~ ±5%

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	

Nominal Resistance Value

2. 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.

3. 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

Packing Type

A ~ Tape/ Box
B ~ Bulk/ Box
T ~ Tape/ Reel

Assistance Code

Usually is "0"

As: F(3) Type = 3

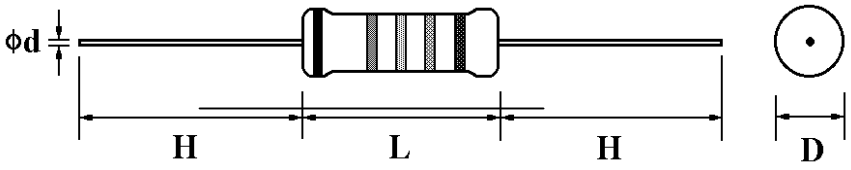
AVI (2) = 2 etc.

Suffix For Special Features

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

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

Dimension



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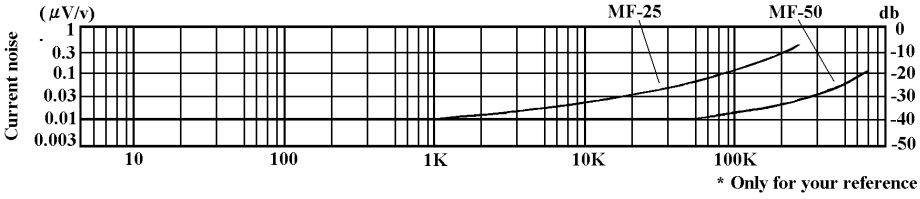
Normal Size							Small Size						
Part No.	Style	Power Rating at 70℃	Dimension (mm)				Part No.	Style	Power Rating at 70℃	Dimension (mm)			
			D Max.	L Max.	d +0.02 -0.05	H ± 3				D Max.	L Max.	d +0.02 -0.05	H ± 3
BMW8	MF-12	1/ 8W (0.125W)	1.85	3.5	0.5	28	BMS4	MF-25-S	1/ 4W (0.25W)	1.85	3.5	0.5	28
BMW4	MF-25	1/ 4W (0.25W)	2.5	6.8	0.6	28	BNY4	MF-40-SS	0.4W	1.9	3.7	0.5	28
BMW2	MF-50	1/ 2W (0.5W)	3.5	10.0	0.6	28	BMS2	MF-50-S	1/ 2W (0.5W)	3.0	9.0	0.6	28
BM1W	MF-100	1W	5.0	12.0	0.8	28	BNT2	MF-50-SS	1/ 2W (0.5W)	2.5	6.8	0.6	28
BM2W	MF-200	2W	5.5	16.0	0.8	28	BMX6	MF-60-S	0.6W	2.5	6.8	0.6	28
BM3W	MF-300	3W	6.5	17.5	0.8	28							

General Specification

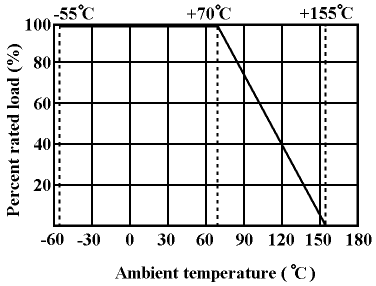
Part No.	Style	Dielectric With -standing V.	Max. Working Voltage	Max. Overload Voltage	Resistance Tolerance	T.C.R.	Resistance Range	Special Order		
								Resistance Tolerance	T.C.R.	Resistance Range
BMW8	MF-12	400V	200V	400V	± 5%	± 200 PPM/ °C	1 Ω ~ 1MΩ	± 0.25%	± 15PPM/ °C	51.1Ω~200KΩ
BMS4	MF-25-S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

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

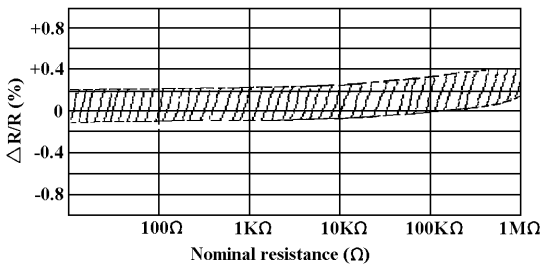
Current Noise Level



Derating Curve



Load Life



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Performance Specifications

<table>
<tr><th>Characteristics</th><th>Test Methods</th><th>Limits</th></tr>
<tr><td>Temperature coefficient
JIS-C-5202 5.2</td><td>Natural resistance change per temp. degree centigrade.
$\frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6$ (PPM/℃)
R_1: Resistance value at room temperature (t_1)
R_2: Resistance value at room temp. plus 100℃ (t_2)</td><td>Within the temperature coefficient specified below
Max. T.C.R.
±15 PPM/℃ ±100 PPM/℃
±25 PPM/℃ ±200 PPM/℃
±50 PPM/℃</td></tr>
<tr><td>Dielectric withstanding voltage
JIS-C-5202 5.7</td><td>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.</td><td>No evidence of flashover mechanical damage, arcing or insulation breaks down.</td></tr>
<tr><td>Temperature cycling
JIS-C-5202 7.4</td><td>Resistance change after continuous five cycles for duty cycle specified
Step | Temperature | Time
1 | –55℃ ±3℃ | 30 mins
2 | Room temp. | 10 - 15 mins
3 | +155℃ ±3℃ | 30 mins
4 | Room temp. | 10 - 15 mins</td><td>Resistance change rate is ±(1%+0.05Ω).
No evidence of mechanical damage.</td></tr>
<tr><td>Short - time overload
JIS-C-5202 5.5</td><td>Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds</td><td>Resistance change rate is ±(0.5%+0.05Ω).
No evidence of mechanical damage.</td></tr>
<tr><td>Pulse overload
JIS-C-5202 5.8</td><td>Resistance change after 10,000cycles (1 second “on”, 25 seconds “off”) at 4 times RCWV.</td><td>Resistance change rate is ±(1%+0.05Ω).
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℃ ±2℃ and 90 to 95%relative humidity.</td><td>Resistance value | △R/R
Normal type | ±1.5%
Non-Flame type | ±5%</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 ℃ ±2℃ ambient</td><td>Resistance value | △R/R
Normal type | ±1.5%
Non-Flame type | ±5%</td></tr>
<tr><td>Terminal strength
JIS-C-5202 6.1</td><td>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.</td><td>No evidence of mechanical damage.</td></tr>
<tr><td>Resistance to soldering heat
JIS-C-5202 6.4</td><td>Permanent resistance change when leads immersed to 3.2 - 4.8mm from the body in 350℃ ±10℃ solder for 3±0.5 seconds</td><td>Resistance change rate is ±(1%+0.05Ω).
No evidence of mechanical damage.</td></tr>
<tr><td>Solderability
JIS-C-5202 6.5</td><td>The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes.
Test temp. of solder: 235℃ ±5℃
Dwell time in solder: 3 +0.5/ -0 seconds</td><td>95%coverage Min.</td></tr>
<tr><td>Resistance to solvent
JIS-C-5202 6.9</td><td>Specimens shall be immersed in a bath of trichroethane completely for 3 mins with ultrasonic.</td><td>No deterioration of protective coating and markings.</td></tr>
</table>

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