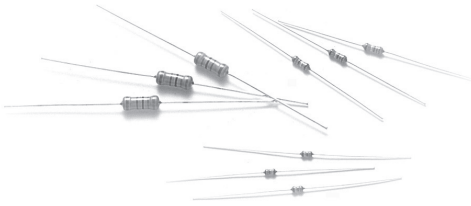


Metal Film Resistors

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.

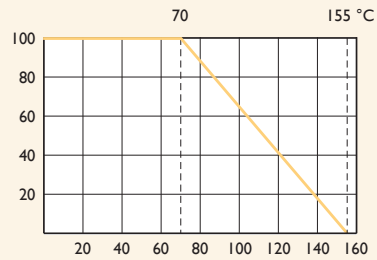
FEATURES

| | |
|----------------------|------------------------------|
| Power Rating | 1/6W, 1/4W, 1/2W, 1W, 2W, 3W |
| Resistance Tolerance | ±0.5%, ±1%, ±2%, ±5% |
| T.C.R. | ±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.

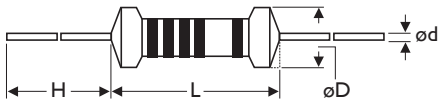
Rated Load (%)



Ambient Temperature (°C)

DIMENSIONS

Unit: mm



| STYLE | | DIMENSION | | | |
|--------|-----------|-----------|---------|--------|-----------|
| Normal | Miniature | L | øD | 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 | MFR1WS | MFR100 | 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 - 4M7Ω & for E24 & E96 series value | | | | | | | | | |
| Operating Temp. Range | -55°C to +155°C | | | | | | | | | |
| Temperature Coefficient | ±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. (Not more than maximum Overload Voltage) | ±0.25%+0.05Ω |
| Voltage Proof on Insulation | IEC 60115-1 4.7 | In V-Block for 60 sec., test voltage as above table | No Breakdown |
| Temperature Coefficient | IEC 60115-1 4.8 | Between -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 | 245±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 (or Umax., Whichever less) for 1,000 Hr. (1.5Hr.on, 0.5Hr. 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.

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