

METAL FILM RESISTORS

MFR-S SERIES

Feature

- Superior electrical performance
- Excellent overall stability
- Extremely low TCR down to $\pm 15\text{PPM}/^\circ\text{C}$
- Standard Value: 10R-1Meg in E24/E96 series
- Very tight tolerance down to $\pm 0.05\%$
- Operating Temperature : $-55^\circ\text{C} \sim +155^\circ\text{C}$

Material

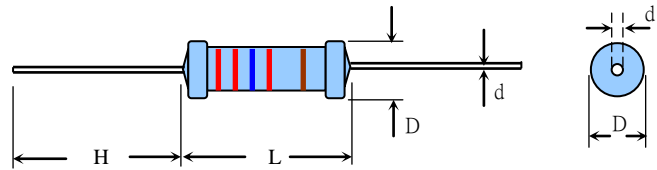
Element: Vacuum-deposited Ni-Cr Alloy

Core: High purity ceramic Al_2O_3

Termination: Standard solder-plated cooper lead

Coating: Epoxy

Dimension



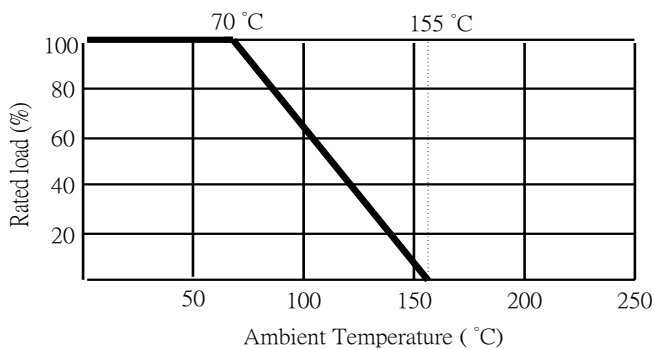
General Specification

| TYPE | DIMENSION(mm) | | | | POWER RATING | MAXIMUM WORKING VOLTAGE | MAXIMUM OVERLOAD VOLTAGE | RESISTANCE RANGE $\pm 1\%$ |
|----------------|---------------|---------------|--------------|--------------|--------------|-------------------------|--------------------------|-------------------------------|
| | L | D | H | $d \pm 0.05$ | | | | |
| MFR025S | 3.2 ± 0.2 | 1.6 ± 0.2 | 27 ± 3.0 | 0.45 | 1/4W | 200V | 400V | $10\Omega - 1\text{M}\Omega$ |
| MFR040S | 3.2 ± 0.2 | 1.6 ± 0.2 | 27 ± 3.0 | 0.45 | 0.4W | 200V | 400V | $10\Omega - 1\text{M}\Omega$ |
| MFR050S | 6.0 ± 0.5 | 2.3 ± 0.3 | 27 ± 3.0 | 0.55 | 1/2W | 250V | 500V | $10\Omega - 1\text{M}\Omega$ |
| MFR060S | 6.0 ± 0.5 | 2.3 ± 0.3 | 27 ± 3.0 | 0.55 | 0.6W | 250V | 500V | $10\Omega - 1\text{M}\Omega$ |
| MFR100S | 9.0 ± 0.5 | 3.0 ± 0.5 | 27 ± 3.0 | 0.59 | 1W | 350V | 700V | $10\Omega - 1\text{M}\Omega$ |
| MFR200S | 11 ± 2.0 | 4.0 ± 0.5 | 33 ± 3.0 | 0.80 | 2W | 500V | 1000V | $10\Omega - 1\text{M}\Omega$ |
| MFR300S | 15 ± 2.0 | 5.0 ± 0.5 | 33 ± 3.0 | 0.80 | 3W | 500V | 1000V | $10\Omega - 1\text{M}\Omega$ |

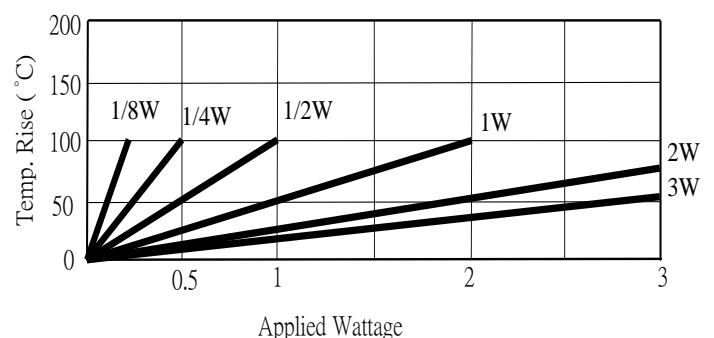
* Maximum Working Voltage determined by $E = \sqrt{P \cdot R}$, where E should not exceed value listed in column above.

**Maximum Overload Voltage equals to 2.5XE, but should not exceed value listed in column above.

Derating Curve



Temperature Rise



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Characteristics

| Item | Requirement | Test Method |
|---------------------------------|---|--|
| Short Time Overload | ±0.5% | JIS-C-5201-1 5.5 RCWV*2.5 or Max. overload voltage for 5 seconds |
| Insulation Resistance | > 10,000MΩ | JIS-C-5201-1 5.6 Apply 100VDC for 1 minute |
| Endurance | ±0.2% | JIS-C-5201-1 7.10 70±2°C, Max. RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5hrs "OFF" |
| Damp Heat with Load | ±0.3% | JIS-C-5201-1 7.9 40±2°C, 90~95% R.H. RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5hrs "OFF" |
| Solderability | 90% min. Coverage | JIS-C-5201-1 6.5 245±5°C for 3 seconds |
| Dielectric Withstanding Voltage | By Type | JIS-C-5201-1 5.7 Apply Max. Overload Voltage for 1 minute |
| Temperature Coefficient | 50ppm 10Ω~1MΩ 100ppm <10Ω ,>1MΩ | Resistance value at room temperature and room Temperature+100°C |
| Pulse Overload | ±0.75% | JIS-C-5201-1 5.8 4 times RCWV for 10000 cycles with 1 second "ON" and 25 seconds "OFF" |
| Resistance To Solvent | No deterioration of coatings and markings | JIS-C-5201-1 6.9 Trichroethane for 1 min. with ultrasonic |
| Terminal Strength | Tensile: ≥2.5 kg | Direct Load for 10 seconds In the direction off the terminal leads |
| Shelf Life | ΔR=±0.1% | 12 months at room temperature 25±3°C, 80%RH Max. |

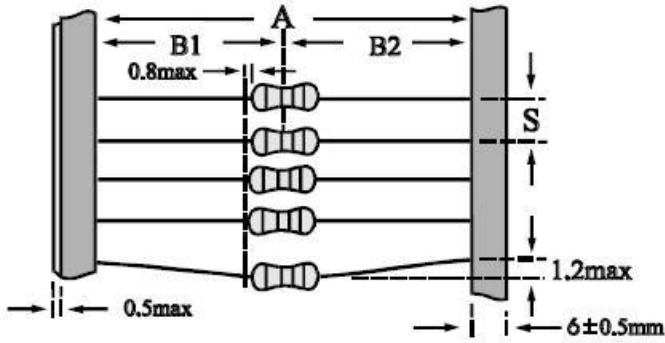
Part Numbering

| | | | | |
|----------------|----------|--------------|--------------------|--------------|
| MFR025S | F | TB | : | 10R |
| ↓ | ↓ | ↓ | ↓ | ↓ |
| Type/Power | Tol. | Package | ppm | Resistance |
| MFR025S | A=±0.05% | B=Bulk | - = Based on spec. | 10R = 10Ω |
| MFR040S | B=±0.1% | TB=Tape/box | E=+/-50ppm | 1K2R = 1.2KΩ |
| MFR050S | C=±0.25% | TR=Tape/reel | D=+/-25ppm | 1MR = 1MΩ |
| MFR060S | D=±0.5% | Lead forming | C=+/-15ppm | |
| MFR100S | F=±1% | M | | |
| MFR200S | J=±5% | F | | |

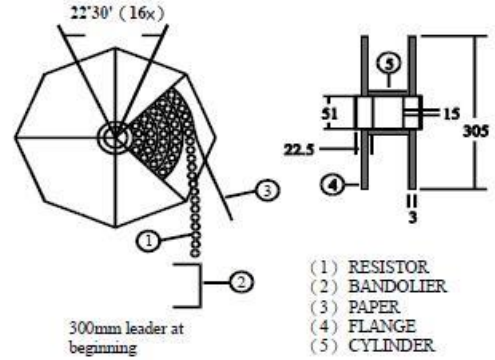
METAL FILM RESISTORS MFR/FMFR SERIES

Taping/Packing Specification

Packing Methods

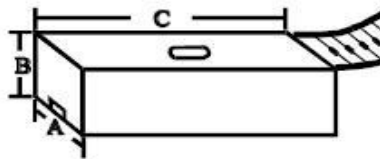


Reel Packing



| TYPE | PACKING METHOD | | | REEL PACKING | |
|-----------------|----------------|-------|----|-------------------|------|
| | A | B1-B2 | S | Across Flange (A) | Q'TY |
| | | Max | | | |
| MFR025S,MFR040S | 52+1/-0 | 1.2 | 5 | 72 | 5000 |
| MFR050S,MFR060S | 52+1/-0 | 1.2 | 5 | 72 | 5000 |
| MFR100S | 52+1/-0 | 1.2 | 5 | 72 | 2000 |
| MFR200S | 52+1/-0 | 1.2 | 5 | 72 | 1000 |
| | 73+1/-0 | 1.5 | 5 | 72 | 1000 |
| MFR300S | 52+1/-0 | 1.2 | 10 | 95 | 1000 |
| | 73+1/-0 | 1.5 | 10 | 95 | 1000 |

Ammo Packing



| TYPE | PACKING METHOD | | | AMMO PACKING | | | |
|-----------------|------------------|----------|----|--------------|--------|-----|------|
| | A | B1-B2 | S | A | B | C | Q'TY |
| | | Max | | | | | |
| MFR025S,MFR040S | 52+1/-0 | 1.2 | 5 | 80 | 68 | 255 | 5000 |
| MFR050S,MFR060S | 52+1/-0 | 1.2 | 5 | 75 | 22 | 267 | 1000 |
| | | 1.2 | 5 | 85 | 103 | 263 | 5000 |
| MFR100S | 52+1/-0 | 1.2 | 5 | 85 | 95 | 263 | 2000 |
| MFR200S | 52+1/-0, 73+1/-0 | 1.2, 1.5 | 5 | 85,103 | 102,85 | 263 | 1000 |
| MFR300S | 52+1/-0, 73+1/-0 | 1.2, 1.5 | 10 | 85, 103 | 102,95 | 265 | 1000 |