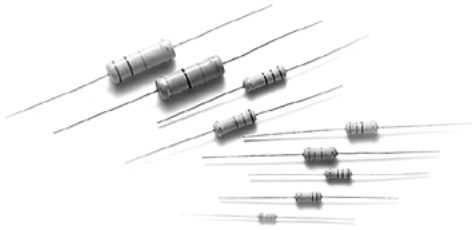


Metal Oxide Film Resistors

Flame-Proof Type

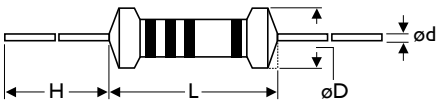
Normal & Miniature Style [RSF Series]



INTRODUCTION

The RSF Series Metal Oxide Film Flame-Proof Resistors offer excellent performance in applications where stability and uniformity of characteristics are desired. They provide lower cost alternatives to Carbon Composition Resistors and General Purpose Metal Films. Metal Oxides also can replace many low power General Purpose wirewound applications, saving both money and time, with shorter delivery cycles. The normal style & 'RSF-WV' style of RSF series are coated with layers of gray flame-proof lacquer, and the miniature style except 'RSF-WV' style are coated with layers of pink colors flame-proof lacquer.

DIMENSIONS



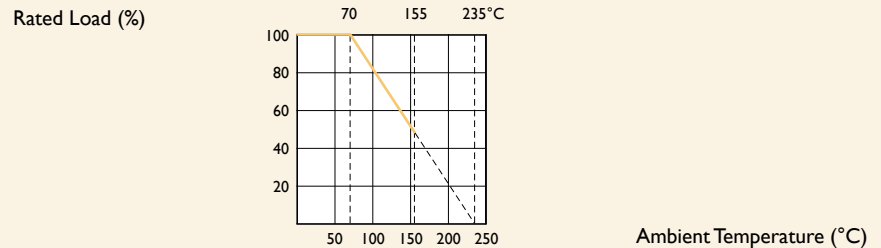
Note: RSF1WS (for MB Type) $\phi d = 0.8 \pm 0.05 \text{mm}$
RSF3WV, RSF4WV: Marking Printed

FEATURES

| | |
|--|-------------------------------------|
| Power Rating | 1/4W, 1/2W, 1W, 2W, 3W, 5W |
| Resistance Tolerance | $\pm 2\%$, $\pm 5\%$ |
| T.C.R. | $\pm 300 \text{ppm}/^\circ\text{C}$ |
| Flameproof Multi-layer Coating Meets | UL-94V-0 |
| Flameproof Feature Meets Overload Test | UL-1412 |

DERATING CURVE

For resistors operated in ambient temperatures above 70°C , power rating must be derated in accordance with the curve below.



Unit: mm

| STYLE | | DIMENSION | | | |
|--------|-----------------|-------------------|------------------|--------------|-----------------|
| Normal | Miniature | L | ϕD | H | ϕd |
| RSF-25 | RSF50S / RSF1WV | 6.3 ± 0.5 | 2.4 ± 0.2 | 28 ± 2.0 | 0.55 ± 0.05 |
| RSF-50 | RSF1WS | 9.0 ± 0.5 | 3.3 ± 0.3 | 26 ± 2.0 | 0.55 ± 0.05 |
| RSF100 | RSF2WS / RSF2WV | 11.5 ± 1.0 | 4.5 ± 0.5 | 35 ± 2.0 | 0.8 ± 0.05 |
| RSF200 | RSF3WS | 15.5 ± 1.0 | 5.0 ± 0.5 | 33 ± 2.0 | 0.8 ± 0.05 |
| - | RSF3WV | $16.5 \pm 0/-1.5$ | $6.0 \pm 0/-0.5$ | 33 ± 2.0 | 0.8 ± 0.05 |
| RSF3WM | RSF5SS | 17.5 ± 1.0 | 6.5 ± 1.0 | 32 ± 2.0 | 0.8 ± 0.05 |
| - | RSF4WV | $20 \pm 0/-1$ | $9.0 \pm 0/-0.5$ | 31 ± 2.0 | 0.8 ± 0.05 |
| RSF300 | RSF5WS | 24.5 ± 1.0 | 8.5 ± 1.0 | 38 ± 2.0 | 0.8 ± 0.05 |
| RSF500 | - | 24.5 ± 1.0 | 8.5 ± 1.0 | 38 ± 2.0 | 0.8 ± 0.05 |

ELECTRICAL CHARACTERISTICS

NORMAL STYLE

| STYLE | RSF-25 | RSF-50 | RSF100 | RSF200 | RSF3WM | RSF300 | RSF500 |
|-----------------------------|------------------------------------|--------|--------|--------|--------|--------|--------|
| Power Rating at 70°C | 1/4W | 1/2W | 1W | 2W | 3W | | 5W |
| Maximum Working Voltage | 200V | 250V | 350V | | 450V | 500V | 750V |
| Maximum Overload Voltage | 300V | 400V | 600V | | 700V | 800V | 1,000V |
| Voltage Proof on Insulation | 250V | 350V | 500V | | | | |
| Resistance Range | 1Ω - 1MΩ & 0Ω for E24 series value | | | | | | |
| Operating Temp. Range | -55°C to +235°C | | | | | | |
| Temperature Coefficient | ±300ppm/°C | | | | | | |

MINIATURE STYLE

| STYLE | RSF50S | RSFI1WV | RSFI1WS | RSF2WS | RSF2WV | RSF3WS | RSF3WV | RSF5SS | RSF4WV | RSF5WS |
|-----------------------------|------------------------------------|---------|---------|--------|--------|--------|--------|--------|--------|--------|
| Power Rating at 70°C | 1/2W | 1W | | 2W | | 3W | | 5W | 4W | 5W |
| Maximum Working Voltage | 250V | 500V | 300V | 350V | 500V | 350V | 750V | 500V | 750V | 700V |
| Maximum Overload Voltage | 400V | 500V | | 600V | | | 750V | 800V | | 900V |
| Voltage Proof on Insulation | 350V | 500V | 400V | 500V | | | | | | |
| Resistance Range | 1Ω - 1MΩ & 0Ω for E24 series value | | | | | | | | | |
| Operating Temp. Range | -55°C to +235°C | | | | | | | | | |
| Temperature Coefficient | ±300ppm/°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. | ±1.0%+0.05Ω for normal style ±2.0%+0.05Ω for miniature style |
| 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. | >1,000MΩ |
| 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 |
| 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) | ±2.0%+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 | ±5.0%+0.05Ω |
| 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) | ±5.0%+0.05Ω |
| Temperature Cycling | IEC 60115-1 4.19 | -55°C ⇄ Room Temp. ⇄ +155°C ⇄ Room Temp. (5 cycles) | ±1.0%+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 | ±1.0%+0.05Ω |
| Accidental Overload Test | IEC 60115-1 4.26 | 4 times RCWV for 1 Min. | No evidence of flaming or arcing |

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



EXPLANATIONS OF ORDERING CODE

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

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