

Metal Film Resistors, Power, Surface Mount


Note

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details.

FEATURES

- Molded encapsulation
- Wraparound compliant terminations eliminate risk of solder fillet cracking
- Solderable terminations
- Excellent stability at different environmental conditions
- High power ratings (up to 2 W)
- AEC-Q200 qualified available ⁽¹⁾
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


Note

⁽¹⁾ Flame retardance test may not be applicable to some resistor technologies.

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|-----------|---|-----------------------|------------------------------|---|---------------|
| GLOBAL MODEL | SIZE INCH | POWER RATING $P_{70^\circ\text{C}}$ W | TOLERANCE $\pm \%$ | RESISTANCE RANGE Ω | TEMPERATURE COEFFICIENT ⁽⁴⁾ $\pm \text{ppm}/^\circ\text{C}$ | ENCAPSULATION |
| WSF2012 | 2012 | 0.5 | 0.5, 1, 5 | 5.0 to 1.43K ⁽²⁾ | 100 | Epoxy |
| WSF2515 | 2515 | 1.0 | 0.5, 1, 5 | 10 to 10K | 100 | Thermoplastic |
| WSF4527 | 4527 | 2.0 ⁽³⁾ | 0.5, 1, 5 | 10 to 100K | 100 | Thermoplastic |

| TECHNICAL SPECIFICATIONS | | | | |
|---------------------------------|------------------|----------------------|----------------------|-------------------------------------|
| PARAMETER | UNIT | WSF2012 | WSF2515 | WSF4527 |
| Dielectric withstanding voltage | V_{AC} | > 500 | > 500 | > 500 |
| Insulation resistance | Ω | > 10^9 | | |
| Operating temperature range | $^\circ\text{C}$ | - 65/+ 175 | - 65/+ 175 | - 65/+ 150 |
| Maximum working voltage | V | $(P \times R)^{1/2}$ | $(P \times R)^{1/2}$ | $(P \times R)^{1/2}$ ⁽³⁾ |
| Weight/1000 pieces (typical) | g | 90 | 165 | 760 |

Notes

- Part marking: 1/2 W - DALE, value; 1 W - model, value, tolerance, date code; 2 W - DALE, model, value, tolerance, date code.
- ⁽²⁾ E96 values only.
- ⁽³⁾ Resistance values above 31.25 k Ω are limited to 250 V maximum working voltage.
- ⁽⁴⁾ $\pm 50 \text{ ppm}/^\circ\text{C}$ and $\pm 25 \text{ ppm}/^\circ\text{C}$ available.

| GLOBAL PART NUMBER INFORMATION | | | | | |
|---|---|---|---|---|--|
| Global Part Numbering example: WSF25151K500JKTA (preferred numbering format) | | | | | |
| W | S | F | 2 | 5 | 1 |
| 5 | 1 | K | 5 | 0 | 0 |
| J | K | T | A | | |
| GLOBAL MODEL | VALUE | TOLERANCE | TCR | PACKAGING | SPECIAL |
| WSF2012 WSF2515 WSF4527 | R = Decimal K = Thousand 100R0 = 100 Ω 1K000 = 1 k Ω | D = $\pm 0.5 \%$ F = $\pm 1.0 \%$ G = $\pm 2.0 \%$ H = $\pm 3.0 \%$ J = $\pm 5.0 \%$ K = $\pm 10 \%$ | E = $\pm 25 \text{ ppm}/^\circ\text{C}$ H = $\pm 50 \text{ ppm}/^\circ\text{C}$ K = $\pm 100 \text{ ppm}/^\circ\text{C}$ | EA = Lead (Pb)-free, tape/reel EK = Lead (Pb)-free, bulk TA = Tin/lead, tape/reel (R86) BA = Tin/lead, tape/reel, bulk (B43) | (Dash number) (Up to 2 digits) From 1 to 99 as applicable |
| Historical Part Numbering example: WSF2515 1.5 kW 5% 100 ppm/°C R86 (will continue to be accepted for tin/lead product only) | | | | | |
| WSF2515 | 1.5 kΩ | 5% | 100 ppm/°C | R86 | |
| HISTORICAL MODEL | RESISTANCE VALUE | TOLERANCE CODE | TEMPERATURE COEFFICIENT | PACKAGING | |

DIMENSIONS


| MODEL | DIMENSIONS in inches (millimeters) | | | | |
|---------|------------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| | L | H | T | W | W ₁ |
| WSF2012 | 0.200 ± 0.020 (5.08 ± 0.508) | 0.096 ± 0.015 (2.44 ± 0.381) | 0.040 ± 0.010 (1.02 ± 0.254) | 0.125 ± 0.005 (3.18 ± 0.127) | 0.050 ± 0.005 (1.27 ± 0.127) |
| WSF2515 | 0.250 ± 0.020 (6.35 ± 0.508) | 0.110 ± 0.015 (2.79 ± 0.381) | 0.045 ± 0.010 (1.14 ± 0.254) | 0.150 ± 0.005 (3.81 ± 0.127) | 0.098 ± 0.005 (2.49 ± 0.127) |
| WSF4527 | 0.455 ± 0.020 (11.56 ± 0.508) | 0.167 ± 0.010 (4.24 ± 0.254) | 0.100 ± 0.010 (2.54 ± 0.254) | 0.275 ± 0.005 (6.98 ± 0.127) | 0.215 ± 0.005 (5.46 ± 0.127) |

| MODEL | SOLDER PAD DIMENSIONS in inches (millimeters) | | |
|---------|---|--------------|--------------|
| | a | b | l |
| WSF2012 | 0.085 (2.16) | 0.070 (1.78) | 0.080 (2.03) |
| WSF2515 | 0.090 (2.29) | 0.115 (2.92) | 0.120 (3.05) |
| WSF4527 | 0.155 (3.94) | 0.230 (5.94) | 0.205 (5.21) |



| PERFORMANCE | | |
|---------------------------|--|-----------------------|
| TEST | CONDITIONS OF TEST | TEST LIMITS |
| Thermal shock | -55 °C to +150 °C, 1000 cycles, 15 min at each extreme | ± (1.0 % + 0.05 Ω) ΔR |
| Short time overload | 5 x rated power for 5 s | ± (0.5 % + 0.05 Ω) ΔR |
| Low temperature storage | -65 °C for 24 h | ± (0.5 % + 0.05 Ω) ΔR |
| High temperature exposure | 1000 h at +175 °C (150 °C for WSF4527) | ± (1.0 % + 0.05 Ω) ΔR |
| Bias humidity | +85 °C, 85 % RH, 10 % Bias, 1000 h | ± (0.5 % + 0.05 Ω) ΔR |
| Moisture resistance | MIL-STD-202 method 106, 0 % power, 7a and 7b not required | ± (0.5 % + 0.05 Ω) ΔR |
| Mechanical shock | 100 g's for 6 ms, 5 pulses | ± (0.5 % + 0.05 Ω) ΔR |
| Vibration | Frequency varied 10 Hz to 500 Hz in one min, 3 directions, 9 h | ± (0.5 % + 0.05 Ω) ΔR |
| Load life | 1000 h at rated power, +70 °C, 1.5 h "ON", 0.5 h "OFF" | ± (1.0 % + 0.05 Ω) ΔR |
| Resistance to solder heat | +260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence | ± (0.5 % + 0.05 Ω) ΔR |

| PACKAGING | | | | |
|-----------|------------------------|------------|-------------|-------|
| MODEL | REEL | | | |
| | TAPE WIDTH | DIAMETER | PIECES/REEL | CODE |
| WSF2012 | 12 mm/embossed plastic | 330 mm/13" | 2000 | EA/TA |
| WSF2515 | 16 mm/embossed plastic | 330 mm/13" | 2000 | EA/TA |
| WSF4527 | 24 mm/embossed plastic | 330 mm/13" | 1200 | EA/TA |

Note

- Embossed Carrier Tape per EIA-481.



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