

## Power Metal Strip® Resistors, Low Value (down to 0.001 Ω), Surface Mount



### FEATURES

- Molded high temperature encapsulation
- Improved thermal management incorporated into design
- Ideal for all types of current sensing, voltage division and pulse applications including switching and linear power supplies, instrumentation, power amplifiers
- Proprietary processing technique produces extremely low resistance values (down to 0.001 Ω)
- All welded construction
- Solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- Solderable terminations
- Very low inductance 0.5 nH to 5 nH
- Excellent frequency response to 50 MHz
- Low thermal EMF (< 3 μV/°C)
- Integral heat sink not utilized for resistance values less than 0.0075 Ω
- AEC-Q200 qualified <sup>(1)</sup>
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS\***  
COMPLIANT


### Notes

- \* Lead (Pb)-containing terminations are not RoHS-compliant. Exemptions may apply.
- <sup>(1)</sup> Flame retardance test may not be applicable to some resistor technologies.

### STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | SIZE | POWER RATING<br>$P_{70\text{ }^\circ\text{C}}$<br>W | RESISTANCE VALUE RANGE<br>Ω |              | WEIGHT<br>(typical)<br>g/1000 pieces |
|--------------|------|---|-----------------------------|--------------|--------------------------------------|
|              |      |   | Tol. ± 0.5 %                | Tol. ± 1.0 % |                                      |
| WSR5         | 4527 | 5.0 <sup>(1)</sup>                                  | 0.01 to 0.3                 | 0.001 to 0.3 | 476                                  |

### Notes

- Part marking: DALE, model, value, tolerance, date code.
- <sup>(2)</sup> The WSR5 is rated at 5 W with terminal temperature maintained ≤ 120 °C.

### TECHNICAL SPECIFICATIONS

| PARAMETER                       | UNIT     | WSR5 RESISTOR CHARACTERISTICS   |
|---------------------------------|----------|---|
| Temperature coefficient         | ppm/°C   | ± 75 for 0.01 Ω to 0.3 Ω; ± 110 for 0.005 Ω to 0.0099 Ω;<br>± 300 for 0.004 Ω to 0.0049 Ω; ± 450 for 0.003 Ω to 0.0039 Ω;<br>± 600 for 0.002 Ω to 0.0029 Ω; ± 750 for 0.001 Ω to 0.0019 Ω |
| Element TCR                     | ppm/°C   | < 20  |
| Dielectric withstanding voltage | $V_{AC}$ | > 500   |
| Insulation resistance           | Ω        | > 10 <sup>9</sup>   |
| Operating temperature range     | °C       | - 65 to + 275   |
| Maximum working voltage         | V        | $(P \times R)^{1/2}$  |

### GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: WSR5R0100FEA (preferred part numbering format)



| GLOBAL MODEL | VALUE   | TOLERANCE CODE                            | PACKAGING  | SPECIAL   |
|--------------|---|---|--|---|
| WSR5         | L = mΩ*<br>R = Decimal<br>5L000 = 0.005 Ω<br>R0100 = 0.01 Ω<br>* use "L" for resistance values < 0.01 Ω | D = ± 0.5 %<br>F = ± 1.0 %<br>J = ± 5.0 % | EA = Lead (Pb)-free, tape/reel<br>EK = Lead (Pb)-free, bulk<br><br>TA = Tin/lead, tape/reel (R86)<br>BA = Tin/lead, bulk (B43) | (Dash number)<br>(Up to 2 digits)<br>From 1 to 99 as applicable |

**DIMENSIONS**


| MODEL | DIMENSIONS in inches (millimeters) |                                 |                                 |                                 |                                 |
|-------|------------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
|       | L                                  | H                               | T                               | W                               | W <sub>1</sub>                  |
| WSR5  | 0.455 ± 0.032<br>(11.56 ± 0.813)   | 0.095 ± 0.005<br>(2.41 ± 0.127) | 0.100 ± 0.010<br>(2.54 ± 0.254) | 0.275 ± 0.005<br>(6.98 ± 0.127) | 0.215 ± 0.005<br>(5.46 ± 0.127) |

| MODEL | SOLDER PAD DIMENSIONS in inches (millimeters) |                 |                 |
|-------|---|-----------------|-----------------|
|       | a   | b               | l               |
| WSR5  | 0.155<br>(3.94)                               | 0.230<br>(5.84) | 0.205<br>(5.21) |

**DERATING**


| PERFORMANCES              |  |                         |
|---------------------------|--|-------------------------|
| TEST                      | CONDITIONS OF TEST   | TEST LIMITS             |
| Thermal shock             | - 55 °C to + 150 °C, 1000 cycles, 15 min at each extreme       | ± (0.5 % + 0.0005 Ω) ΔR |
| Short time overload       | 3 x rated power for 5 s  | ± (2.0 % + 0.0005 Ω) ΔR |
| Low temperature storage   | - 65 °C for 24 h   | ± (0.5 % + 0.0005 Ω) ΔR |
| High temperature exposure | 1000 h at + 275 °C   | ± (1.0 % + 0.0005 Ω) ΔR |
| Bias humidity             | + 85 °C, 85 % RH, 10 % bias, 1000 h                            | ± (0.5 % + 0.0005 Ω) ΔR |
| Mechanical shock          | 100 g's for 6 ms, 5 pulses                                     | ± (0.5 % + 0.0005 Ω) ΔR |
| Vibration                 | Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h | ± (0.5 % + 0.0005 Ω) ΔR |
| Load life                 | 1000 h at 70 °C  | ± (2.0 % + 0.0005 Ω) ΔR |
| Resistance to solder heat | 260 ± 3 °C 10 s to 12 s dwell, 25 mm/s emergence               | ± (0.5 % + 0.0005 Ω) ΔR |
| Moisture resistance       | MIL-STD-202, method 106, 0 % power, 7a and 7b not required     | ± (0.5 % + 0.0005 Ω) ΔR |

| PACKAGING |                        |            |             |      |
|-----------|------------------------|------------|-------------|------|
| MODEL     | REEL                   |            |             |      |
|           | TAPE WIDTH             | DIAMETER   | PIECES/REEL | CODE |
| WSR5      | 24 mm/embossed plastic | 330 mm/13" | 1500        | EA   |

**Note**

- Embossed Carrier Tape per EIA-481.



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