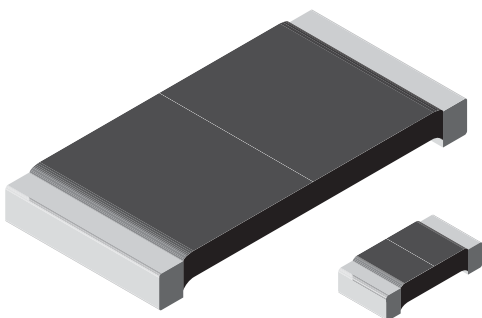


## Power Metal Strip® Resistors, Low Value (Down to 0.001 Ω), Surface Mount



### FEATURES

- Ideal for all types of current sensing, voltage division and pulse applications including switching and linear power supplies, instruments, power amplifiers
- Proprietary processing technique produces extremely low resistance values (down to 0.001 Ω)
- All welded construction
- Solderable terminations
- Very low inductance 0.5 nH to 5 nH
- Excellent frequency response to 50 MHz
- Low thermal EMF (< 3 μV/°C)
- Solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- AEC-Q200 qualified available
- Compliant to RoHS Directive 2002/95/EC

**AUTOMOTIVE  
GRADE**  
Available



**RoHS\***  
COMPLIANT  
**GREEN**  
(5-2009)\*\*  
Available

### STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | SIZE | POWER RATING<br>$P_{70^{\circ}\text{C}}$<br>W | RESISTANCE VALUE RANGE<br>Ω |              | WEIGHT<br>(typical)<br>g/1000 pieces |
|--------------|------|---|-----------------------------|--------------|--------------------------------------|
|              |      |   | Tol. ± 0.5 %                | Tol. ± 1.0 % |                                      |
| WSL0603      | 0603 | 0.1   | 0.01 to 0.1                 | 0.01 to 0.1  | 1.9                                  |
| WSL0805      | 0805 | 0.125   | 0.005 to 0.2                | 0.005 to 0.2 | 4.8                                  |
| WSL1206      | 1206 | 0.25  | 0.005 to 0.2                | 0.001 to 0.2 | 16.2                                 |
| WSL2010      | 2010 | 0.5   | 0.004 to 0.5                | 0.001 to 0.5 | 38.9                                 |
| WSL2512      | 2512 | 1.0 <sup>(1)</sup>                            | 0.003 to 0.5                | 0.001 to 0.5 | 63.6                                 |
| WSL2816      | 2816 | 2.0   | 0.01 to 0.1                 | 0.01 to 0.1  | 118                                  |

#### Notes

- Part marking: Value; tolerance: Due to resistor size limitations some resistors will be marked with only the resistance value.
- <sup>(1)</sup> For values above 0.1 Ω derate linearly to 80 % rated power at 0.5 Ω.

### TECHNICAL SPECIFICATIONS

| PARAMETER                   | UNIT   | WSL RESISTOR CHARACTERISTICS   |
|-----------------------------|--------|--|
| Temperature coefficient     | ppm/°C | ± 275 for 1 mΩ to 2.9 mΩ, ± 150 for 3 mΩ to 4.9 mΩ<br>± 110 for 5 mΩ to 6.9 mΩ, ± 75 for 7 mΩ to 0.5 Ω |
| Operating temperature range | °C     | - 65 to + 170  |
| Maximum working voltage     | V      | $(P \times R)^{1/2}$   |

### GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: WSL25124L000FTA

W S L 2 5 1 2 4 L 0 0 0 F T A

| GLOBAL MODEL   | RESISTANCE VALUE  | TOLERANCE CODE                            | PACKAGING CODE   | SPECIAL   |
|--|---|---|--|---|
| WSL0603<br>WSL0805<br>WSL1206<br>WSL2010<br>WSL2512<br>WSL2816 | 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>EH = Lead (Pb)-free, tape/reel (WSL2816)<br>EK = Lead (Pb)-free, bulk<br><br>TA = Tin/lead, tape/reel (R86)<br>TG = Tin/lead, tape/reel (RT1, for WSL0603 and WSL0805)<br>TH = Tin/lead, tape/reel (R82, WSL2816)<br>BA = Tin/lead, bulk (B43) | (Dash number)<br>(up to 2 digits)<br>From 1 to 99 as applicable |

Historical Part Numbering example: WSL2512 0.004 Ω 1 % R86

|                  |                  |                |           |
|------------------|------------------|----------------|-----------|
| WSL2512          | 0.004 Ω          | 1 %            | R86       |
| HISTORICAL MODEL | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING |

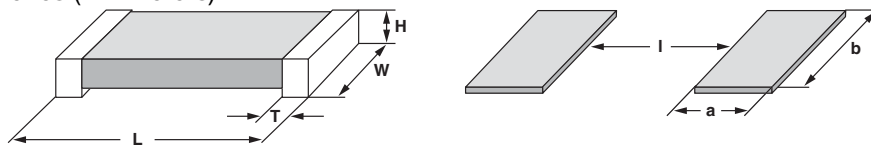
\* Pb containing terminations are not RoHS compliant, exemptions may apply

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

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

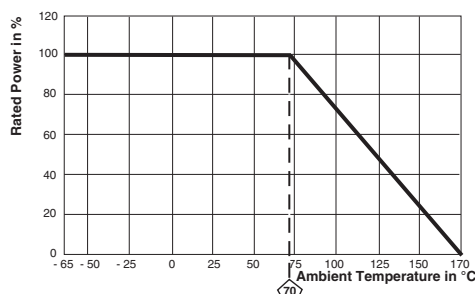
Vishay Dale

## DIMENSIONS in inches (millimeters)



| MODEL   | RESISTANCE RANGE (Ω) | DIMENSIONS                      |                                 |                                  |                                  | SOLDER PAD DIMENSIONS |                 |                 |
|---------|----------------------|---------------------------------|---------------------------------|----------------------------------|----------------------------------|-----------------------|-----------------|-----------------|
|         |                      | L                               | W                               | H                                | T                                | a                     | b               | l               |
| WSL0603 | 0.01 to 0.1          | 0.060 ± 0.010<br>(1.52 ± 0.254) | 0.030 ± 0.010<br>(0.76 ± 0.254) | 0.013 ± 0.005<br>(0.330 ± 0.127) | 0.015 ± 0.010<br>(0.381 ± 0.254) | 0.040<br>(1.01)       | 0.040<br>(1.01) | 0.020<br>(0.50) |
| WSL0805 | 0.005 to 0.2         | 0.080 ± 0.010<br>(2.03 ± 0.254) | 0.050 ± 0.010<br>(1.27 ± 0.254) | 0.013 ± 0.005<br>(0.330 ± 0.127) | 0.015 ± 0.010<br>(0.381 ± 0.254) | 0.040<br>(1.02)       | 0.050<br>(1.27) | 0.020<br>(0.50) |
| WSL1206 | 0.001 to 0.0019      | 0.126 ± 0.010<br>(3.20 ± 0.254) | 0.063 ± 0.010<br>(1.60 ± 0.254) | 0.025 ± 0.010<br>(0.635 ± 0.254) | 0.041 ± 0.010<br>(1.04 ± 0.254)  | 0.062<br>(1.57)       | 0.070<br>(1.78) | 0.030<br>(0.76) |
|         | 0.002 to 0.0059      |                                 |                                 |                                  | 0.025 ± 0.010<br>(0.635 ± 0.254) |                       |                 |                 |
|         | 0.006 to 0.20        |                                 |                                 |                                  | 0.020 ± 0.010<br>(0.508 ± 0.254) |                       |                 |                 |
| WSL2010 | 0.001 to 0.0069      | 0.200 ± 0.010<br>(5.08 ± 0.254) | 0.100 ± 0.010<br>(2.54 ± 0.254) | 0.025 ± 0.010<br>(0.635 ± 0.254) | 0.058 ± 0.010<br>(1.47 ± 0.254)  | 0.093<br>(2.36)       | 0.120<br>(3.05) | 0.055<br>(1.40) |
|         | 0.007 to 0.5         |                                 |                                 |                                  | 0.020 ± 0.010<br>(0.508 ± 0.254) | 0.055<br>(1.40)       | 0.120<br>(3.05) | 0.130<br>(3.30) |
| WSL2512 | 0.001 to 0.0049      | 0.250 ± 0.010<br>(6.35 ± 0.254) | 0.125 ± 0.010<br>(3.18 ± 0.254) | 0.025 ± 0.010<br>(0.635 ± 0.254) | 0.087 ± 0.010<br>(2.21 ± 0.254)  | 0.120<br>(3.05)       | 0.145<br>(3.68) | 0.050<br>(1.27) |
|         | 0.005 to 0.0069      |                                 |                                 |                                  | 0.047 ± 0.010<br>(1.19 ± 0.254)  | 0.083<br>(2.11)       |                 | 0.125<br>(3.18) |
|         | 0.007 to 0.5         |                                 |                                 |                                  | 0.030 ± 0.010<br>(0.762 ± 0.254) | 0.065<br>(1.65)       |                 | 0.160<br>(4.06) |
| WSL2816 | 0.01 to 0.1          | 0.280 ± 0.010<br>(7.1 ± 0.254)  | 0.165 ± 0.010<br>(4.2 ± 0.254)  | 0.025 ± 0.010<br>(0.635 ± 0.254) | 0.062 ± 0.010<br>(1.57 ± 0.254)  | 0.096<br>(2.45)       | 0.185<br>(4.7)  | 0.125<br>(3.20) |

## DERATING



## PERFORMANCE

| 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       | 5 x rated power for 5 s  | ± (0.5 % + 0.0005 Ω) ΔR |
| Low temperature operation | - 65 °C for 24 h   | ± (0.5 % + 0.0005 Ω) ΔR |
| High temperature exposure | 1000 h at + 170 °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 rated power, + 70 °C, 1.5 h "ON", 0.5 h "OFF"        | ± (1.0 % + 0.0005 Ω) ΔR |
| Resistance to solder heat | + 260 °C solder, 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 |
| WSL0603 | 8 mm/punched paper     | 178 mm/7" | 5000        | EA   |
| WSL0805 | 8 mm/punched paper     | 178 mm/7" | 5000        | EA   |
| WSL1206 | 8 mm/embossed plastic  | 178 mm/7" | 4000        | EA   |
| WSL2010 | 12 mm/embossed plastic | 178 mm/7" | 4000        | EA   |
| WSL2512 | 12 mm/embossed plastic | 178 mm/7" | 2000        | EA   |
| WSL2816 | 12 mm/embossed plastic | 178 mm/7" | 2000        | EH   |

### Note

- Embossed Carrier Tape per EIA-481.



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