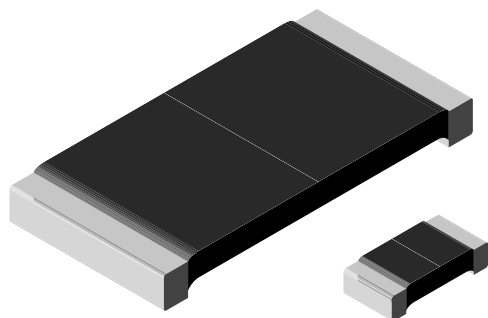


## Power Metal Strip® Resistors, Low Value (down to 0.001 Ω), Surface Mount



### 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
- Solid metal Nickel-Chrome or Manganese-Copper alloy resistive element with low TCR (< 20 ppm/°C)
- Very low inductance 0.5 nH to 5 nH
- Excellent frequency response to 50 MHz
- Low thermal EMF (< 3 μV/°C)
- Compliant to RoHS directive 2002/95/EC



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

### STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | POWER RATING<br>$P_{70^{\circ}\text{C}}$<br>W | RESISTANCE RANGE<br>Ω |              | WEIGHT<br>(typical)<br>g/1000 pieces |
|--------------|-----------------------------------------------|-----------------------|--------------|--------------------------------------|
|              |                                               | ± 0.5 %               | ± 1.0 %      |                                      |
| WSL0603      | 0.1                                           | 0.01 to 0.1           | 0.01 to 0.1  | 1.9                                  |
| WSL0805      | 0.125                                         | 0.01 to 0.2           | 0.01 to 0.2  | 4.8                                  |
| WSL1206      | 0.25                                          | 0.006 to 0.2          | 0.001 to 0.2 | 16.2                                 |
| WSL2010      | 0.5                                           | 0.004 to 0.5          | 0.001 to 0.5 | 38.9                                 |
| WSL2512      | 1.0 <sup>(1)</sup>                            | 0.003 to 0.5          | 0.001 to 0.5 | 63.6                                 |
| WSL2816      | 2.0                                           | 0.01 to 0.1           | 0.01 to 0.1  | 118                                  |

#### Notes

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

### 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

#### NEW GLOBAL PART NUMBERING: WSL25124L000FTA (PREFERRED PART NUMBERING FORMAT)

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

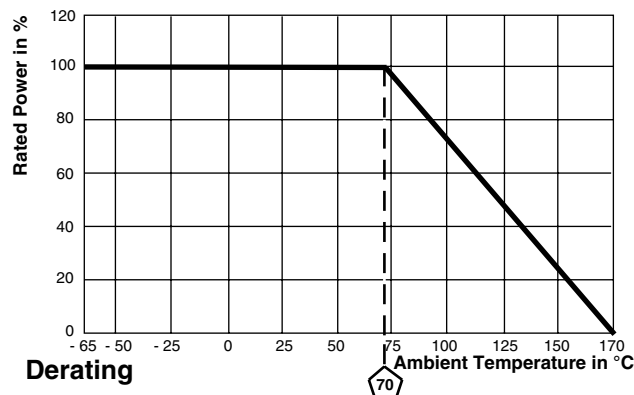
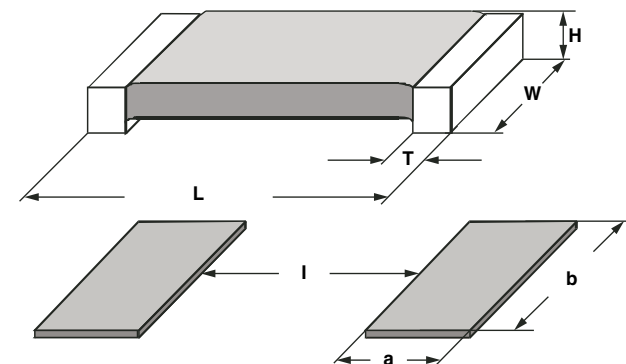
| GLOBAL MODEL                                                   | VALUE                                                                                                   | TOLERANCE CODE                            | PACKAGING                                                                                                                                                        | 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>EK = Lead (Pb)-free, bulk<br><br>TA = Tin/lead, tape/reel (R86)<br>TG = Tin/lead, tape/reel (RT1)<br>BA = Tin/lead, bulk (B43) | (Dash Number)<br>(up to 2 digits)<br>From 1 to 99 as applicable |

#### HISTORICAL PART NUMBER EXAMPLE: WSL2512 0.004 Ω 1 % R86 (WILL CONTINUE TO BE ACCEPTED)

|                  |                  |                |           |
|------------------|------------------|----------------|-----------|
| 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)

**DIMENSIONS**


| MODEL   | DIMENSIONS in inches [millimeters] |                                 |                                 |                                  |                                  |
|---------|------------------------------------|---------------------------------|---------------------------------|----------------------------------|----------------------------------|
|         | RESISTANCE RANGE Ω                 | L                               | W                               | H                                | T                                |
| 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] |
| WSL0805 | 0.01 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] |
| 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]  |
|         | 0.002 to 0.0059                    | 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] | 0.025 ± 0.010<br>[0.635 ± 0.254] |
|         | 0.006 to 0.20                      | 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] | 0.020 ± 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]  |
|         | 0.007 to 0.5                       | 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] | 0.020 ± 0.010<br>[0.508 ± 0.254] |
| 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]  |
|         | 0.005 to 0.0069                    | 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] | 0.047 ± 0.010<br>[1.19 ± 0.254]  |
|         | 0.007 to 0.5                       | 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] | 0.030 ± 0.010<br>[0.762 ± 0.254] |
| 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]  |

| MODEL   | SOLDER PAD DIMENSIONS in inches [millimeters] |              |              |              |
|---------|-----------------------------------------------|--------------|--------------|--------------|
|         | RESISTANCE RANGE Ω                            | a            | b            | l            |
| WSL0603 | 0.01 to 0.1                                   | 0.040 [1.01] | 0.040 [1.01] | 0.020 [0.50] |
| WSL0805 | 0.01 to 0.2                                   | 0.040 [1.02] | 0.050 [1.27] | 0.020 [0.50] |
| WSL1206 | 0.001 to 0.2                                  | 0.062 [1.57] | 0.070 [1.78] | 0.030 [0.76] |
| WSL2010 | 0.001 to 0.0069                               | 0.093 [2.36] | 0.120 [3.05] | 0.055 [1.40] |
|         | 0.007 to 0.5                                  | 0.055 [1.40] | 0.120 [3.05] | 0.130 [3.30] |
| WSL2512 | 0.001 to 0.0049                               | 0.120 [3.05] | 0.145 [3.68] | 0.050 [1.27] |
|         | 0.005 to 0.0069                               | 0.083 [2.11] | 0.145 [3.68] | 0.125 [3.18] |
|         | 0.007 to 0.5                                  | 0.065 [1.65] | 0.145 [3.68] | 0.160 [4.06] |
| WSL2816 | 0.01 to 0.1                                   | 0.096 [2.45] | 0.185 [4.7]  | 0.125 [3.20] |

**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 | 16 mm/Embossed Plastic | 330 mm/13" | 5000        | EA   |

**Note**

- Embossed carrier tape per EIA-481-1A



### Disclaimer

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