



# Power Metal Strip® Resistors, High Power (2 x Standard WSL), Low Value (Down to 0.0005 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 0.0005 Ω)
- Specially selected and stabilized materials allow for high power ratings (2 x standard WSL rating)
- All welded construction
- Solderable terminations
- Very low inductance 0.5 nH to 5 nH
- Excellent frequency response to 50 MHz
- Solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- Low thermal EMF (< 3 μV/°C)
- AEC-Q200 qualified available
- Compliant to RoHS Directive 2002/95/EC



### Notes

- \* 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)

| 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...18                       | 0603 | 0.20  | 0.01 to 0.1                 | 0.01 to 0.1    | 1.9                                  |
| WSL0805...18                       | 0805 | 0.25  | 0.005 to 0.2                | 0.005 to 0.2   | 4.8                                  |
| WSL1206...18                       | 1206 | 0.5   | 0.005 to 0.2                | 0.001 to 0.2   | 16.2                                 |
| WSL2010...18                       | 2010 | 1.0   | 0.004 to 0.5                | 0.001 to 0.5   | 38.9                                 |
| WSL2512...18                       | 2512 | 2.0   | 0.003 to 0.04               | 0.0005 to 0.04 | 63.6                                 |

### Note

- Part marking: Value; tolerance: Due to resistor size limitations some resistors will be marked with only the resistance value.

| TECHNICAL SPECIFICATIONS    |        |   |
|-----------------------------|--------|---|
| PARAMETER                   | UNIT   | RESISTOR CHARACTERISTICS  |
| Temperature coefficient     | ppm/°C | ± 400 for 0.5 mΩ to 0.99 mΩ, ± 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: WSL25124L000FTA18              |  |   |   |                                |
| W   | S  | L   | 2   | 5                              |
| 1   | 2  | 4   | L   | 0                              |
| 0   | 0  | F   | T   | A                              |
| 1   | 8  |   |   |                                |
| GLOBAL MODEL  | RESISTANCE VALUE   | TOLERANCE CODE                            | PACKAGING CODE  | SPECIAL                        |
| WSL0603<br>WSL0805<br>WSL1206<br>WSL2010<br>WSL2512           | L = mΩ*<br>R = Decimal<br>5L000 = 0.0005 Ω<br>R0100 = 0.01 Ω<br><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, for WSL0603 and WSL0805)<br>BA = Tin/lead, bulk (B43) | 18 =<br>"High power"<br>option |
| Historical Part Numbering example: WSL2512-18 0.004 Ω 1 % R86 |  |   |   |                                |
| WSL2512-18  | 0.004 Ω  | 1 %                                       | R86   |                                |
| HISTORICAL MODEL  | RESISTANCE VALUE   | TOLERANCE CODE                            | PACKAGING CODE  |                                |



**DIMENSIONS** in inches (millimeters)



| MODEL        | RESISTANCE RANGE (Ω) | DIMENSIONS                      |                                 |                                  |                                  | SOLDER PAD DIMENSIONS |                 |                 |
|--------------|----------------------|---------------------------------|---------------------------------|----------------------------------|----------------------------------|-----------------------|-----------------|-----------------|
|              |                      | L                               | W                               | H                                | T                                | a                     | b               | l               |
| WSL0603...18 | 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 ± 0.010<br>(0.330 ± 0.254) | 0.015 ± 0.005<br>(0.381 ± 0.127) | 0.040<br>(1.01)       | 0.040<br>(1.01) | 0.020<br>(0.50) |
| WSL0805...18 | 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 ± 0.010<br>(0.330 ± 0.254) | 0.015 ± 0.005<br>(0.381 ± 0.127) | 0.040<br>(1.02)       | 0.050<br>(1.27) | 0.020<br>(0.50) |
| WSL1206...18 | 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...18 | 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) |                       |                 |                 |
| WSL2512...18 | 0.0005 to 0.00099    | 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) | 0.107 ± 0.010<br>(2.72 ± 0.254)  | 0.120<br>(3.05)       | 0.145<br>(3.68) | 0.050<br>(1.27) |
|              | 0.001 to 0.0049      |                                 |                                 |                                  | 0.087 ± 0.010<br>(2.21 ± 0.254)  |                       |                 |                 |
|              | 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 0.04        |                                 |                                 |                                  | 0.030 ± 0.010<br>(0.762 ± 0.254) | 0.065<br>(1.65)       |                 | 0.160<br>(4.06) |

**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 storage   | - 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...18 | 8 mm/punched paper     | 178 mm/7" | 5000        | EA   |
| WSL0805...18 | 8 mm/punched paper     | 178 mm/7" | 5000        | EA   |
| WSL1206...18 | 8 mm/embossed plastic  | 178 mm/7" | 4000        | EA   |
| WSL2010...18 | 12 mm/embossed plastic | 178 mm/7" | 4000        | EA   |
| WSL2512...18 | 12 mm/embossed plastic | 178 mm/7" | 2000        | EA   |

**Note**

- Embossed Carrier Tape per EIA-481.



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