

Power Metal Strip® Resistors, 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)
- 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 ⁽¹⁾
- Material categorization:

For definitions of compliance please see www.vishay.com/doc?99912



Notes

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

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | |
|------------------------------------|------|--|--------------------------|---------------|-----------------------------------|
| GLOBAL MODEL | SIZE | POWER RATING $P_{70\text{ }^\circ\text{C}}$ W | RESISTANCE VALUE RANGE Ω | | WEIGHT (typical) 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 ⁽²⁾ | 0.003 to 0.5 | 0.0005 to 0.5 | 63.6 |
| WSL2816 | 2816 | 2.0 | 0.003 to 0.1 | 0.002 to 0.1 | 118 |

Notes

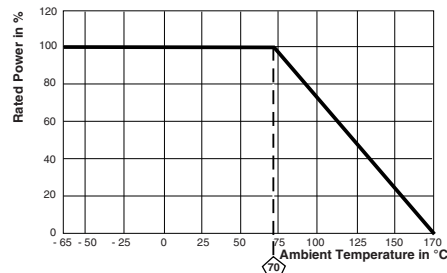
- Part marking: Value; tolerance: Due to resistor size limitations some resistors will be marked with only the resistance value.
- ⁽²⁾ For values above 0.1 Ω derate linearly to 80 % rated power at 0.5 Ω.

| TECHNICAL SPECIFICATIONS | | |
|-----------------------------|--------|---|
| PARAMETER | UNIT | WSL RESISTOR CHARACTERISTICS |
| Temperature coefficient | ppm/°C | ± 75 for 7 mΩ to 0.5 Ω, ± 110 for 5 mΩ to 6.9 mΩ, ± 150 for 3 mΩ to 4.9 mΩ, ± 275 for 1 mΩ to 2.9 mΩ, ± 400 for 0.5 mΩ to 0.99 mΩ |
| Element TCR | ppm/°C | < 20 |
| 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 WSL0805 WSL1206 WSL2010 WSL2512 WSL2816 | L = mΩ* R = Decimal 5L000 = 0.005 Ω R0100 = 0.01 Ω * Use "L" for resistance values < 0.01 Ω | D = ± 0.5 % F = ± 1.0 % J = ± 5.0 % | EA = Lead (Pb)-free, tape/reel EH = Lead (Pb)-free, tape/reel (WSL2816) EK = Lead (Pb)-free, bulk TA = Tin/lead, tape/reel (R86) TG = Tin/lead, tape/reel (RT1, for WSL0603 and WSL0805) TH = Tin/lead, tape/reel (RJ9, WSL2816) BA = Tin/lead, bulk (B43) | (Dash number) (up to 2 digits) 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 | |

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 (1.52 ± 0.254) | 0.030 ± 0.010 (0.76 ± 0.254) | 0.013 ± 0.005 (0.330 ± 0.127) | 0.015 ± 0.010 (0.381 ± 0.254) | 0.040 (1.01) | 0.040 (1.01) | 0.020 (0.50) |
| WSL0805 | 0.005 to 0.2 | 0.080 ± 0.010 (2.03 ± 0.254) | 0.050 ± 0.010 (1.27 ± 0.254) | 0.013 ± 0.005 (0.330 ± 0.127) | 0.015 ± 0.010 (0.381 ± 0.254) | 0.040 (1.02) | 0.050 (1.27) | 0.020 (0.50) |
| WSL1206 | 0.001 to 0.0019 | 0.126 ± 0.010 (3.20 ± 0.254) | 0.063 ± 0.010 (1.60 ± 0.254) | 0.025 ± 0.010 (0.635 ± 0.254) | 0.041 ± 0.010 (1.04 ± 0.254) | 0.062 (1.57) | 0.070 (1.78) | 0.030 (0.76) |
| | 0.002 to 0.0059 | | | | 0.025 ± 0.010 (0.635 ± 0.254) | | | |
| | 0.006 to 0.20 | | | | 0.020 ± 0.010 (0.508 ± 0.254) | | | |
| WSL2010 | 0.001 to 0.0069 | 0.200 ± 0.010 (5.08 ± 0.254) | 0.100 ± 0.010 (2.54 ± 0.254) | 0.025 ± 0.010 (0.635 ± 0.254) | 0.058 ± 0.010 (1.47 ± 0.254) | 0.093 (2.36) | 0.120 (3.05) | 0.055 (1.40) |
| | 0.007 to 0.5 | | | | 0.020 ± 0.010 (0.508 ± 0.254) | 0.055 (1.40) | 0.120 (3.05) | 0.130 (3.30) |
| WSL2512 | 0.0005 to 0.00099 | 0.250 ± 0.010 (6.35 ± 0.254) | 0.125 ± 0.010 (3.18 ± 0.254) | 0.025 ± 0.010 (0.635 ± 0.254) | 0.107 ± 0.010 (2.72 ± 0.254) | 0.120 (3.05) | 0.145 (3.68) | 0.050 (1.27) |
| | 0.001 to 0.0049 | | | | 0.087 ± 0.010 (2.21 ± 0.254) | | | |
| | 0.005 to 0.0069 | | | | 0.047 ± 0.010 (1.19 ± 0.254) | 0.083 (2.11) | | 0.125 (3.18) |
| | 0.007 to 0.5 | | | | 0.030 ± 0.010 (0.762 ± 0.254) | 0.065 (1.65) | | 0.160 (4.06) |
| WSL2816 | 0.002 to 0.00399 | 0.280 ± 0.010 (7.1 ± 0.254) | 0.165 ± 0.010 (4.2 ± 0.254) | 0.025 ± 0.010 (0.635 ± 0.254) | 0.098 ± 0.010 (2.49 ± 0.254) | 0.096 (2.45) | 0.185 (4.7) | 0.125 (3.20) |
| | 0.004 to 0.1 | | | | 0.062 ± 0.010 (1.57 ± 0.254) | | | |

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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