Power Metal Strip® Resistors, Low Value
(Down to 0.0005 Ω), Surface-Mount

FEATURES

• All welded construction of the Power Metal Strip® resistors are ideal for all types of current sensing, voltage division and pulse applications
• Proprietary processing technique produces extremely low resistance values (down to 0.0005 Ω)
• Sulfur resistance by construction that is unaffected by high sulfur environments
• Very low inductance 0.5 nH to 5 nH
• Low thermal EMF (< 3 μV/°C)
• AEC-Q200 qualified (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
• Follow link to Overview of Automotive Grade Products for more details: www.vishay.com/doc?49924
(1) Flame retardance test may not be applicable to some resistor technologies

STANDARD ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>GLOBAL MODEL</th>
<th>SIZE</th>
<th>POWER RATING $P_{70,^{\circ}C}$ W</th>
<th>RESISTANCE VALUE RANGE $\Omega$ (2)</th>
<th>WEIGHT (typical) g/1000 pieces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TOL. ± 0.5 %</td>
<td>TOL. ± 1.0 %</td>
<td></td>
</tr>
<tr>
<td>WSL0603</td>
<td>0603</td>
<td>0.1</td>
<td>0.01 to 0.1</td>
<td>1.9</td>
</tr>
<tr>
<td>WSL0805</td>
<td>0805</td>
<td>0.125</td>
<td>0.005 to 0.2</td>
<td>4.8</td>
</tr>
<tr>
<td>WSL1206</td>
<td>1206</td>
<td>0.25</td>
<td>0.005 to 0.2</td>
<td>16.2</td>
</tr>
<tr>
<td>WSL2010</td>
<td>2010</td>
<td>0.5</td>
<td>0.004 to 0.5</td>
<td>38.9</td>
</tr>
<tr>
<td>WSL2512</td>
<td>2512</td>
<td>1.0 (1)</td>
<td>0.003 to 0.5</td>
<td>63.6</td>
</tr>
<tr>
<td>WSL2816</td>
<td>2816</td>
<td>2.0</td>
<td>0.003 to 0.1</td>
<td>118</td>
</tr>
</tbody>
</table>

Notes
* Part marking: value; tolerance: due to resistor size limitations some resistors will be marked with only the resistance value
(1) For values above 0.1 Ω derate linearly to 80 % rated power at 0.5 Ω
(2) WSL1206 0.0005 Ω to 0.00099 Ω is only available with 2 % tolerance (G tolerance code)

GLOBAL PART NUMBER INFORMATION

Global Part Numbering Example: WSL2512L000F0EA (visit www.vishay.net Vishay Dale parts numbering manual for all options)

Global Model (7 digits) | Resistance Value (1) (5 digits) | Tolerance Code (1 digit) | Packaging Code (2) (2 digits) | Special (3) (up to 2 digits) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>WSL0603</td>
<td>L = mΩ²</td>
<td>D = ± 0.5 %</td>
<td>EA = lead (Pb)-free, tape / reel</td>
<td>(dash number) from 1 to 99 as applicable</td>
</tr>
<tr>
<td>WSL0805</td>
<td>R = decimal</td>
<td>F = ± 1.0 %</td>
<td>EH = lead (Pb)-free, tape / reel</td>
<td></td>
</tr>
<tr>
<td>WSL1206</td>
<td>5L000 = 0.005 Ω</td>
<td>J = ± 5.0 %</td>
<td>TA = tin / lead, tape / reel (R86)</td>
<td></td>
</tr>
<tr>
<td>WSL2010</td>
<td>R0100 = 0.01 Ω</td>
<td></td>
<td>TG = tin / lead, tape / reel (RT1, for WSL0603 and WSL0805)</td>
<td></td>
</tr>
<tr>
<td>WSL2512</td>
<td></td>
<td></td>
<td>TH = tin / lead, tape / reel (RJ9, WSL2816)</td>
<td></td>
</tr>
<tr>
<td>WSL2816</td>
<td></td>
<td></td>
<td>SB = tin / lead, tape / reel for DLA drawings</td>
<td></td>
</tr>
</tbody>
</table>

Notes
* WSL marking (www.vishay.com/doc?300322); WSL decade values (www.vishay.com/doc?30117)
(1) Packaging code: EB (lead (Pb)-free) and TB (tin / lead) are non-standard packaging codes designating 1000 piece reels. These non-standard packaging codes are identical to our standard EA (lead (Pb)-free) and TA (tin / lead), except that they have a package quantity of 1000 pieces
(2) Follow link for customization capabilities: www.vishay.com/doc?48163
For Higher Power Upgrade to WSLP

TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>UNIT</th>
<th>WSL RESISTOR CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component temperature coefficient (including terminal)</td>
<td>ppm/°C</td>
<td>WSL0603 (1)</td>
</tr>
<tr>
<td>(including terminal)</td>
<td>ppm/°C</td>
<td>± 75 for 50 mΩ to 100 mΩ</td>
</tr>
<tr>
<td>TCR measured from -55 °C to +155 °C</td>
<td>ppm/°C</td>
<td>± 110 for 10 mΩ to 49 mΩ</td>
</tr>
<tr>
<td>-</td>
<td>ppm/°C</td>
<td>± 150 for 3 mΩ to 4.9 mΩ</td>
</tr>
<tr>
<td>-</td>
<td>ppm/°C</td>
<td>± 400 for 0.5 mΩ to 0.99 mΩ</td>
</tr>
<tr>
<td>Element TCR</td>
<td>ppm/°C</td>
<td>&lt; 20</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>°C</td>
<td>-65 to +170</td>
</tr>
<tr>
<td>Maximum working voltage</td>
<td>V</td>
<td></td>
</tr>
</tbody>
</table>

Notes
1. Consult factory for detailed TCR performance across temperature range associated with PCN-DR-00003-2020 for WSL0603. TCR performance is improved for +25 °C to +155 °C.
2. Component TCR - total TCR that includes the TCR effects of the resistor element and the copper terminal.
3. Element TCR - only applies to the alloy used for the resistor element; refer to item 1 in the construction illustration on the following page.
4. Maximum working voltage - the WSL is not voltage sensitive, but is limited by power / energy dissipation and is also not ESD sensitive.

DIMENSIONS in inches (millimeters)

Notes
- 3D models available: www.vishay.com/doc?30306
- Surface mount solder profile recommendations: www.vishay.com/doc?31052

<table>
<thead>
<tr>
<th>MODEL</th>
<th>RESISTANCE RANGE (Ω)</th>
<th>L</th>
<th>W</th>
<th>H</th>
<th>T</th>
<th>a</th>
<th>b</th>
<th>l</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSL0603 (1)</td>
<td>0.01 to 0.1</td>
<td>0.060 ± 0.010 (1.52 ± 0.254)</td>
<td>0.030 ± 0.010 (0.76 ± 0.254)</td>
<td>0.016 ± 0.005 (0.406 ± 0.127)</td>
<td>0.015 ± 0.010 (0.381 ± 0.254)</td>
<td>0.040 (1.01)</td>
<td>0.040 (1.01)</td>
<td>0.020 (0.50)</td>
</tr>
<tr>
<td>WSL0805</td>
<td>0.005 to 0.2</td>
<td>0.080 ± 0.010 (2.03 ± 0.254)</td>
<td>0.050 ± 0.010 (1.27 ± 0.254)</td>
<td>0.013 ± 0.005 (0.330 ± 0.127)</td>
<td>0.015 ± 0.010 (0.381 ± 0.254)</td>
<td>0.040 (1.02)</td>
<td>0.050 (1.27)</td>
<td>0.020 (0.50)</td>
</tr>
<tr>
<td>WSL1206</td>
<td>0.005 to 0.0099</td>
<td>0.126 ± 0.010 (3.20 ± 0.254)</td>
<td>0.063 ± 0.010 (1.60 ± 0.254)</td>
<td>0.025 ± 0.010 (0.635 ± 0.254)</td>
<td>0.041 ± 0.010 (1.04 ± 0.254)</td>
<td>0.089 (2.26)</td>
<td>0.076 (1.93)</td>
<td>0.023 (0.58)</td>
</tr>
<tr>
<td>WSL2010</td>
<td>0.001 to 0.0019</td>
<td>0.126 ± 0.010 (3.20 ± 0.254)</td>
<td>0.063 ± 0.010 (1.60 ± 0.254)</td>
<td>0.025 ± 0.010 (0.635 ± 0.254)</td>
<td>0.025 ± 0.010 (0.635 ± 0.254)</td>
<td>0.076 (1.93)</td>
<td>0.076 (1.93)</td>
<td>0.029 (0.74)</td>
</tr>
<tr>
<td>WSL2512</td>
<td>0.005 to 0.0059</td>
<td>0.200 ± 0.010 (5.08 ± 0.254)</td>
<td>0.100 ± 0.010 (2.54 ± 0.254)</td>
<td>0.025 ± 0.010 (0.635 ± 0.254)</td>
<td>0.055 (1.40)</td>
<td>0.120 (3.05)</td>
<td>0.130 (3.30)</td>
<td></td>
</tr>
<tr>
<td>WSL2816</td>
<td>0.007 to 0.5</td>
<td>0.280 ± 0.010 (7.11 ± 0.254)</td>
<td>0.165 ± 0.010 (4.21 ± 0.254)</td>
<td>0.025 ± 0.010 (0.635 ± 0.254)</td>
<td>0.020 ± 0.010 (0.508 ± 0.254)</td>
<td>0.105 (2.67)</td>
<td>0.105 (2.67)</td>
<td>0.090 (2.29)</td>
</tr>
</tbody>
</table>

Note
1. PCN-DR-00003-2020 changed terminal height for WSL0603 from 0.013” ± 0.005” for clad construction to 0.016” ± 0.005” for welded construction.
For Higher Power Upgrade to WSLP

DERATING

PULSE CAPABILITY

WELDED CONSTRUCTION

2816, 2512, 2010, 1206, 0603

CLAD CONSTRUCTION

0805

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
Short time overload | Refer to link for short time overload performance and pulse capability; www.vishay.com/resistors/power-metal-strip-calculator/ | ± 0.5 % + 0.0005 Ω
Low temperature operation | -65 °C for 24 h | ± 0.5 % + 0.0005 Ω
High temperature exposure | 1000 h at +170 °C | ± 1.0 % + 0.0005 Ω
Bias humidity | +85 °C, 85 % RH, 10 % bias, 1000 h | ± 0.5 % + 0.0005 Ω
Mechanical shock | 100 g’s for 6 ms, 5 pulses | ± 0.5 % + 0.0005 Ω
Vibration | Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h | ± 0.5 % + 0.0005 Ω
Load life | 1000 h at rated power, +70 °C, 1.5 h “ON”, 0.5 h “OFF” | ± 1.0 % + 0.0005 Ω
Resistance to solder heat | +260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence | ± 0.5 % + 0.0005 Ω
Moisture resistance | MIL-STD-202, method 106, 0 % power, 7a and 7b not required | ± 0.5 % + 0.0005 Ω

PACKAGING (1)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>TAPE WIDTH</th>
<th>DIAMETER</th>
<th>PIECES/REEL</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSL0603</td>
<td>8 mm / punched paper</td>
<td>178 mm / 7&quot;</td>
<td>5000</td>
<td>EA</td>
</tr>
<tr>
<td>WSL0805</td>
<td>8 mm / punched paper</td>
<td>178 mm / 7&quot;</td>
<td>5000</td>
<td>EA</td>
</tr>
<tr>
<td>WSL1206</td>
<td>8 mm / embossed plastic</td>
<td>178 mm / 7&quot;</td>
<td>4000</td>
<td>EA</td>
</tr>
<tr>
<td>WSL2010</td>
<td>12 mm / embossed plastic</td>
<td>178 mm / 7&quot;</td>
<td>4000</td>
<td>EA</td>
</tr>
<tr>
<td>WSL2512</td>
<td>12 mm / embossed plastic</td>
<td>178 mm / 7&quot;</td>
<td>2000</td>
<td>EA</td>
</tr>
<tr>
<td>WSL2816</td>
<td>12 mm / embossed plastic</td>
<td>178 mm / 7&quot;</td>
<td>2000</td>
<td>EH</td>
</tr>
</tbody>
</table>

Notes

- Embossed carrier tape per EIA-481
- Additional packaging details at www.vishay.com/doc?20051

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