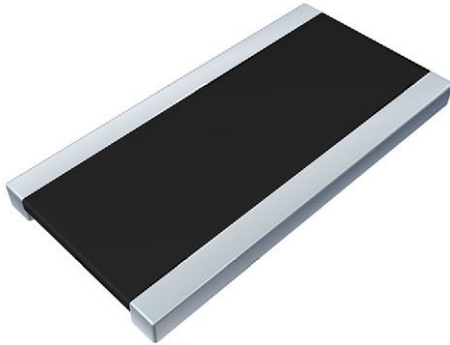


## Power Metal Strip® Resistors, Wide Terminal, Low Inductance (< 1 nH), Surface-Mount



### LINKS TO ADDITIONAL RESOURCES



### FEATURES

- Wide side terminal construction that yields high power to foot print size ratio (2 W in 1020 and 1 W in 0612 package)
- 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 low resistance values (down to 0.00075 Ω)
- Sulfur resistance by construction that is unaffected by high sulfur environments
- Very low inductance < 1 nH
- Low thermal EMF (< 3 μV/°C)
- AEC-Q200 qualified <sup>(1)</sup>
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://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](http://www.vishay.com/doc?49924)
- “SMD Current Sense: AEC-Q200 vs. Vishay Qualification” technical note: [www.vishay.com/doc?30416](http://www.vishay.com/doc?30416)
- <sup>(1)</sup> Flame retardance test may not be applicable to some resistor technologies

| STANDARD ELECTRICAL SPECIFICATIONS |      |   |                  |                             |                                   |
|------------------------------------|------|---|------------------|-----------------------------|-----------------------------------|
| GLOBAL MODEL                       | SIZE | POWER RATING<br>$P_{70^\circ\text{C}}$<br>W | TOLERANCE<br>± % | RESISTANCE VALUE RANGE<br>Ω | WEIGHT (typical)<br>g/1000 pieces |
| WSL0612                            | 0612 | 1.0   | 1.0, 5.0         | 0.75m to 5m                 | 8.5                               |
| WSL1020                            | 1020 | 2.0   | 0.5, 1.0, 5.0    | 1m to 6m                    | 38.74                             |

### Note

- “Thermal Management for Surface-Mount Devices” white paper: [www.vishay.com/doc?30380](http://www.vishay.com/doc?30380)

| GLOBAL PART NUMBER INFORMATION  |          |          |   |          |          |   |          |   |          |          |          |   |          |          |  |  |
|---|----------|----------|---|----------|----------|---|----------|---|----------|----------|----------|---|----------|----------|--|--|
| Global Part Numbering Example: <b>WSL10206L000FEA</b> (visit <a href="http://www.vishay.net">www.vishay.net</a> Vishay Dale parts numbering manual for all options) |          |          |   |          |          |   |          |   |          |          |          |   |          |          |  |  |
| <b>W</b>  | <b>S</b> | <b>L</b> | <b>1</b>  | <b>0</b> | <b>2</b> | <b>0</b>                                  | <b>6</b> | <b>L</b>                                    | <b>0</b> | <b>0</b> | <b>0</b> | <b>F</b>                                    | <b>E</b> | <b>A</b> |  |  |
| GLOBAL MODEL<br>(7 digits)  |          |          | RESISTANCE VALUE <sup>(1)</sup><br>(5 digits)   |          |          | TOLERANCE CODE<br>(1 digit)               |          | PACKAGING CODE <sup>(2)</sup><br>(2 digits) |          |          |          | SPECIAL <sup>(3)</sup><br>(up to 2 digits)  |          |          |  |  |
| WSL0612<br>WSL1020  |          |          | L = mΩ*<br>1L000 = 0.001 Ω<br>2L000 = 0.002 Ω<br>3L000 = 0.003 Ω<br>4L000 = 0.004 Ω<br>5L000 = 0.005 Ω<br>6L000 = 0.006 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            |          |          |          | (dash number)<br>From 1 to 99 as applicable |          |          |  |  |

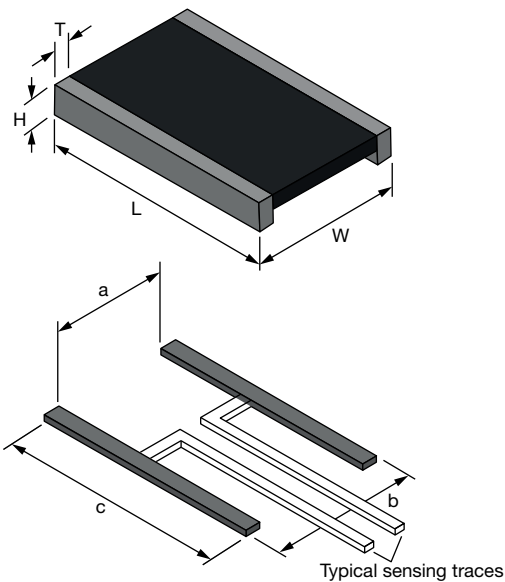
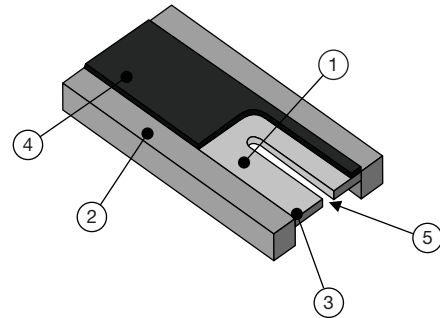
### Notes

- Per PCN-DR-00009-2022-REV-0, WSL marking will be removed effective March 1st, 2023
- <sup>(1)</sup> WSL marking ([www.vishay.com/doc?30327](http://www.vishay.com/doc?30327)); WSL decade values ([www.vishay.com/doc?30117](http://www.vishay.com/doc?30117))
- <sup>(2)</sup> EB (lead (Pb)-free) is a non-standard packaging code designated for 1000 piece reels. The non-standard packaging code is identical to our standard EA (lead (Pb)-free), except that it has a package quantity of 1000 pieces
- <sup>(3)</sup> Follow link for customization capabilities: [www.vishay.com/doc?48163](http://www.vishay.com/doc?48163)

| TECHNICAL SPECIFICATIONS  |        |  |         |
|---|--------|--|---------|
| PARAMETER   | UNIT   | RESISTOR CHARACTERISTICS   |         |
|   |        | WSL0612  | WSL1020 |
| Component temperature coefficient (including terminal) <sup>(1)</sup> | ppm/°C | +250 <sup>(4)</sup> for 0.75 mΩ and 1.9 mΩ<br>+150 <sup>(4)</sup> for 2 mΩ to 6 mΩ | < 50    |
| Element TCR <sup>(2)</sup>  | ppm/°C | < 20   |         |
| Operating temperature range   | °C     | -65 to +170  |         |
| Maximum working voltage <sup>(3)</sup>                                | V      | $(P \times R)^{1/2}$   |         |

**Notes**

- “Temperature Coefficient of Resistance for Current Sensing” white paper: [www.vishay.com/doc?30405](http://www.vishay.com/doc?30405)
- (1) Component TCR - total TCR that includes the TCR effects of the resistor element and the copper terminal
- (2) Element TCR - only applies to the alloy used for the resistor element; refer to item 1 in the construction illustration on the following page
- (3) Maximum working voltage - the WSL is not voltage sensitive, but is limited by power / energy dissipation and is also not ESD sensitive
- (4) Typical TCR is positive, for more details contact factory

**DIMENSIONS**

**WELDED CONSTRUCTION**


- 1 Resistive element: nickel-chrome or manganese-copper alloy with low TCR (< 20 ppm/°C)
- 2 Terminal: solid copper with 100 % Sn finish  
100 % Sn (100 μ" min.) with 100 % Ni (20 μ" min.)  
under layer finish
- 3 Terminal / element weld (electron beam weld)
- 4 High temperature encapsulant:  
"siliconized polyester"  
coating material
- 5 Laser calibration

**Notes**

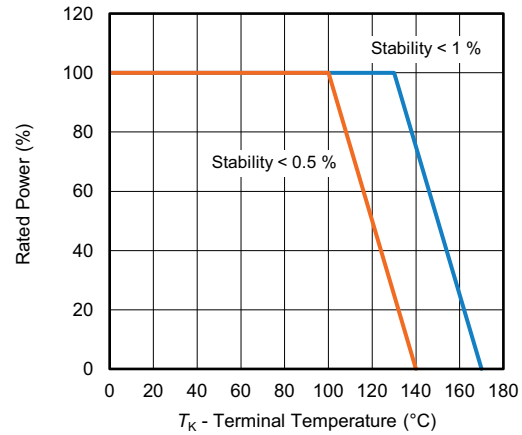
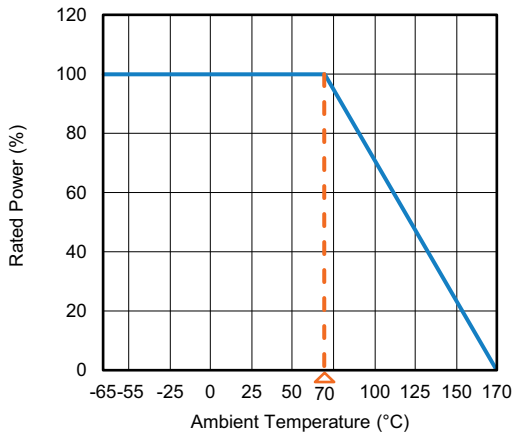
- 3D models available: [www.vishay.com/doc?30348](http://www.vishay.com/doc?30348)
- Surface-mount solder profile recommendations: [www.vishay.com/doc?31052](http://www.vishay.com/doc?31052)

| MODEL   | DIMENSIONS in inches (millimeters) |                                 |                                  |                                  |
|---------|------------------------------------|---------------------------------|----------------------------------|----------------------------------|
|         | L                                  | W                               | H                                | T                                |
| WSL0612 | 0.120 ± 0.005<br>(3.05 ± 0.127)    | 0.060 ± 0.005<br>(1.50 ± 0.127) | 0.018 ± 0.010<br>(0.457 ± 0.254) | 0.015 ± 0.010<br>(0.381 ± 0.254) |
| WSL1020 | 0.200 ± 0.005<br>(5.08 ± 0.127)    | 0.100 ± 0.010<br>(2.54 ± 0.254) | 0.025 ± 0.005<br>(0.635 ± 0.127) | 0.022 ± 0.008<br>(0.558 ± 0.203) |

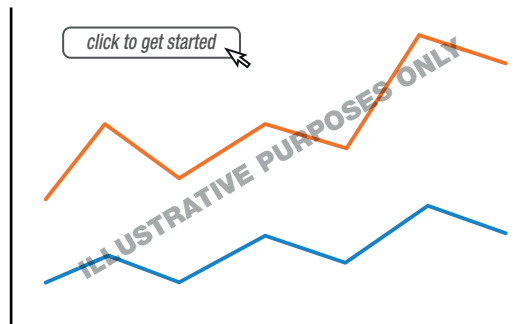
| MODEL   | SOLDER PAD DIMENSIONS in inches (millimeters) |                 |                 |
|---------|---|-----------------|-----------------|
|         | a   | b               | c               |
| WSL0612 | 0.030<br>(0.76)                               | 0.078<br>(1.98) | 0.134<br>(3.40) |
| WSL1020 | 0.039<br>(1.00)                               | 0.138<br>(3.50) | 0.222<br>(5.65) |



## DERATING



## PULSE CAPABILITY



[www.vishay.com/resistors/power-metal-strip-calculator](http://www.vishay.com/resistors/power-metal-strip-calculator)

| PERFORMANCE               |  |             |
|---------------------------|--|-------------|
| TEST                      | CONDITIONS OF TEST   | TEST LIMITS |
| Thermal shock             | -55 °C to +150 °C, 1000 cycles, 15 min at each extreme         | ± 0.5 %     |
| Low temperature operation | -65 °C for 24 h  | ± 0.5 %     |
| High temperature exposure | 1000 h at +170 °C  | ± 1.0 %     |
| Bias humidity             | +85 °C, 85 % RH, 10 % bias, 1000 h                             | ± 0.5 %     |
| Mechanical shock          | 100 g's for 6 ms, 5 pulses                                     | ± 0.5 %     |
| Vibration                 | Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h | ± 0.5 %     |
| Load life                 | 1000 h at 70 °C, 1.5 h "ON", 0.5 h "OFF"                       | ± 1.0 %     |
| Resistance to solder heat | +260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence          | ± 0.5 %     |
| Moisture resistance       | MIL-STD-202, method 106, 0 % power, 7b not required            | ± 0.5 %     |

| PACKAGING |                          |             |             |      |
|-----------|--------------------------|-------------|-------------|------|
| MODEL     | REEL                     |             |             |      |
|           | TAPE WIDTH               | DIAMETER    | PIECES/REEL | CODE |
| WSL0612   | 8 mm / embossed plastic  | 178 mm / 7" | 4000        | EA   |
| WSL1020   | 12 mm / embossed plastic | 178 mm / 7" | 4000        | EA   |

### Notes

- Embossed carrier tape per EIA-481-2
- (1) Additional packaging details at [www.vishay.com/doc?20051](http://www.vishay.com/doc?20051)



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