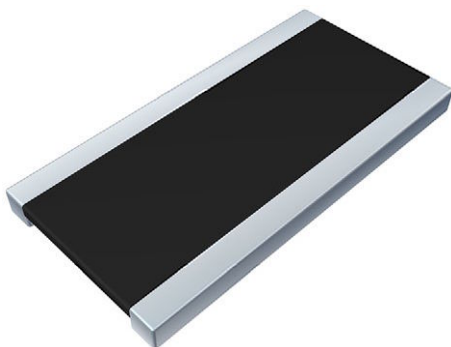




## Power Metal Strip® Resistors, Wide Terminal, Low Inductance (< 1 nH), Surface-Mount



### LINKS TO ADDITIONAL RESOURCES



3D Models



Design Tools



Videos



Calculators

### 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
- <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<br>VALUE RANGE<br>Ω | WEIGHT<br>(typical)<br>g/1000 pieces |
|------------------------|------|-----------------------------------------------|------------------|--------------------------------|--------------------------------------|
| WSL0612 <sup>(1)</sup> | 0612 | 1.0                                           | 1.0, 5.0         | 0.75m to 5m                    | 8.5                                  |
| WSL1020 <sup>(1)</sup> | 1020 | 2.0                                           | 0.5, 1.0, 5.0    | 1m to 6m                       | 38.74                                |

### Note

- <sup>(1)</sup> Qualified to AEC-Q200 rev. D

### GLOBAL PART NUMBER INFORMATION

Global Part Numbering Example: WSL10206L000FEA (visit [www.vishay.net](http://www.vishay.net) Vishay Dale parts numbering manual for all options)

|                            |   |   |                                                                                                                                                                       |   |   |   |                                           |   |                                             |   |   |                                                                                           |   |   |  |  |
|----------------------------|---|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|-------------------------------------------|---|---------------------------------------------|---|---|-------------------------------------------------------------------------------------------|---|---|--|--|
| W                          | S | L | 1                                                                                                                                                                     | 0 | 2 | 0 | 6                                         | L | 0                                           | 0 | 0 | F                                                                                         | E | A |  |  |
| 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)<br>(dash number)<br>From 1 to 99 as applicable |   |   |  |  |
| 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            |   |   |                                                                                           |   |   |  |  |

### 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 | +100 ppm/°C to -10 ppm/°C for 1.5 mΩ to 6 mΩ |
|                                                                       |        | +150 <sup>(4)</sup> for 2 mΩ to 6 mΩ       | +170 ppm/°C to -20 ppm/°C for < 1.5 mΩ       |
| 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**

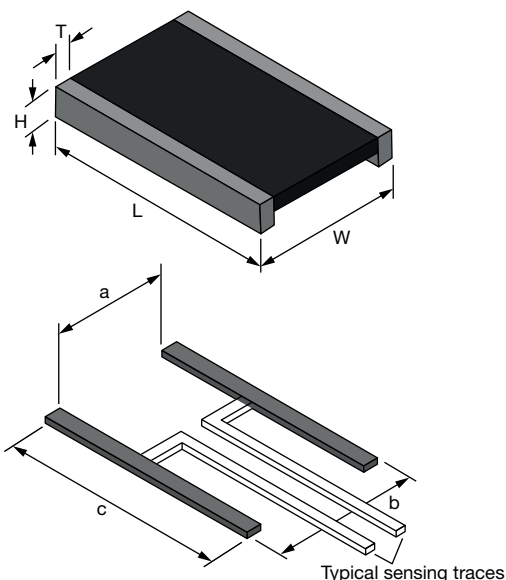
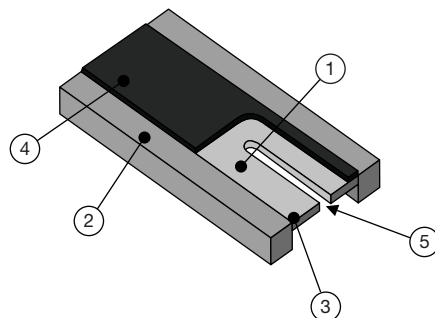
- “Temperature Coefficient of Resistance for Current Sensing” white paper: [www.vishay.com/doc?30405](http://www.vishay.com/doc?30405)

<sup>(1)</sup> Component TCR - total TCR that includes the TCR effects of the resistor element and the copper terminal

<sup>(2)</sup> Element TCR - only applies to the alloy used for the resistor element; refer to item 1 in the construction illustration on the following page

<sup>(3)</sup> Maximum working voltage - the WSL is not voltage sensitive, but is limited by power / energy dissipation and is also not ESD sensitive

<sup>(4)</sup> 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)

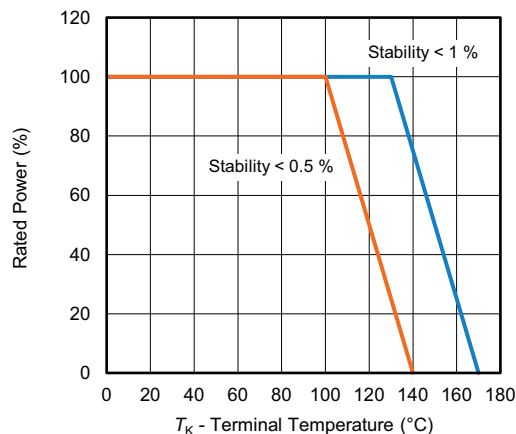
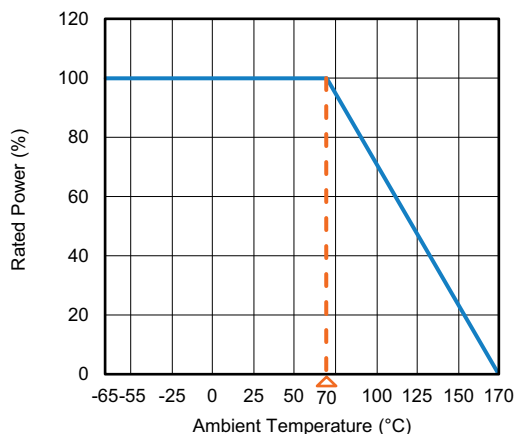
- Surface-mount solder profile recommendations: [www.vishay.com/doc?31052](http://www.vishay.com/doc?31052)

| 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/en/resistors/joulewizard/](http://www.vishay.com/en/resistors/joulewizard/)

| PERFORMANCE               |                                                                |             |
|---------------------------|----------------------------------------------------------------|-------------|
| TEST                      | CONDITIONS OF TEST                                             | TEST LIMITS |
| Thermal shock             | -55 °C to +150 °C, 2000 cycles, 15 min at each extreme         | ± 0.5 %     |
| Low temperature operation | -65 °C for 24 h                                                | ± 0.5 %     |
| High temperature exposure | 2000 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                 | 2000 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)



| LINKS TO RELATED DOCUMENTS                                |                                                                        |
|-----------------------------------------------------------|------------------------------------------------------------------------|
| <b>SELECTOR GUIDE</b>                                     |                                                                        |
| Overview of Automotive Grade Products                     | <a href="http://www.vishay.com/doc?49924">www.vishay.com/doc?49924</a> |
| <b>TECHNICAL NOTES</b>                                    |                                                                        |
| SMD Current Sense: AEC-Q200 vs. Vishay Qualification      | <a href="http://www.vishay.com/doc?30416">www.vishay.com/doc?30416</a> |
| MIL-PRF vs. AEC-Q200: Do You Know What You Are Getting?   | <a href="http://www.vishay.com/doc?11000">www.vishay.com/doc?11000</a> |
| <b>WHITE PAPER</b>                                        |                                                                        |
| Thermal Management for Surface-Mount Devices              | <a href="http://www.vishay.com/doc?30380">www.vishay.com/doc?30380</a> |
| Temperature Coefficient of Resistance for Current Sensing | <a href="http://www.vishay.com/doc?30405">www.vishay.com/doc?30405</a> |



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