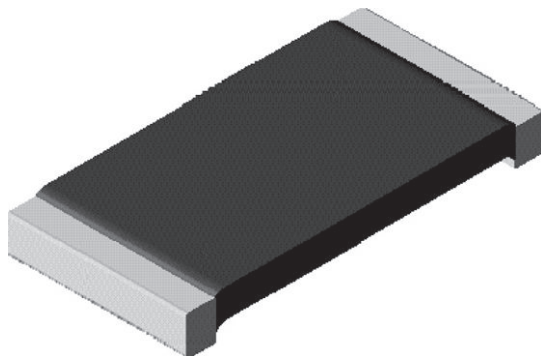


# Power Metal Strip® Resistors, Very High Power (to 3 W), Low Value (down to 0.0005 Ω), Surface Mount



## FEATURES

- Very high power to foot print size ratio (3 W in 2512, 2 W in 2010, 1 W in 1206, 0.5 W in 0805, and 0.4 W in 0603 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 extremely low resistance values (down to 0.0005 Ω)
- Construction is impervious against high sulfur environments (ASTM B 809-95 test method)
- Very low inductance 0.5 nH to 5 nH
- Low thermal EMF (< 3 μV/°C)
- AEC-Q200 qualified available <sup>(1)</sup>
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

## 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 | RESISTANCE VALUE RANGE<br>Ω |                | WEIGHT<br>(typical)<br>g/1000 pieces |
|--------------|------|-----------------------------------------------|-----------------------------|----------------|--------------------------------------|
|              |      |                                               | Tol. ± 0.5 %                | Tol. ± 1.0 %   |                                      |
| WSLP0603     | 0603 | 0.4                                           | 0.015 to 0.1                | 0.01 to 0.1    | 1.9                                  |
| WSLP0805     | 0805 | 0.5                                           | 0.01 to 0.1                 | 0.005 to 0.1   | 4.8                                  |
| WSLP1206     | 1206 | 1.0                                           | 0.005 to 0.05               | 0.001 to 0.05  | 16.2                                 |
| WSLP2010     | 2010 | 2.0                                           | 0.004 to 0.01               | 0.001 to 0.01  | 38.9                                 |
| WSLP2512     | 2512 | 3.0                                           | 0.003 to 0.01               | 0.0005 to 0.01 | 63.6                                 |

## GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: WSLP1206R0100FEA (visit [www.vishay.net](http://www.vishay.net) Vishay Dale parts numbering manual for all options)

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|
| W | S | L | P | 1 | 2 | 0 | 6 | R | 0 | 1 | 0 | 0 | F | E | A |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|

GLOBAL MODEL  
(8 digits)

**WSLP0603**  
**WSLP0805**  
**WSLP1206**  
**WSLP2010**  
**WSLP2512**

RESISTANCE VALUE <sup>(2)</sup>  
(5 digits)

**L** = mΩ\*  
**R** = Decimal  
**4L000** = 0.004 Ω  
**R0100** = 0.01 Ω

\* Use "L" for resistance values &lt; 0.01 Ω

TOLERANCE CODE  
(1 digit)

**D** = ± 0.5 %  
**F** = ± 1.0 %

PACKAGING CODE <sup>(3)</sup>  
(2 digits)

**EA** = Lead (Pb)-free, tape / reel  
**EK** = Lead (Pb)-free, bulk

SPECIAL  
(up to 2 digits)

Reserved for future specials

## Notes

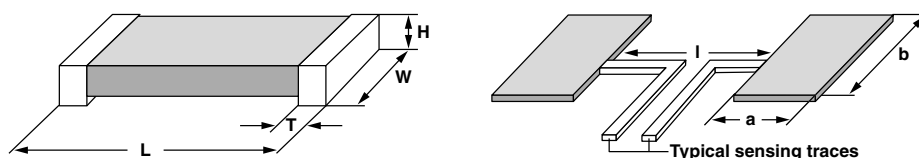
- <sup>(2)</sup> WSL Marking ([www.vishay.com/doc?30327](http://www.vishay.com/doc?30327))
- <sup>(3)</sup> Packaging code: EB (lead (Pb)-free) and TB (tin / lead) are non-standard packaging codes that designate 1000 piece reel quantities. These non-standard packaging codes are identical to our standard EA (lead (Pb)-free) and TA (tin / lead), except that they have a package quantity of 1000 pieces.

**TECHNICAL SPECIFICATIONS**

| PARAMETER                                                             | UNIT   | RESISTOR CHARACTERISTICS                                                                                                          |
|-----------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------|
| Component temperature coefficient (including terminal) <sup>(1)</sup> | 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, ± 110 for 5 mΩ to 6.9 mΩ, ± 75 for 7 mΩ to 0.1 Ω |
| Element TCR <sup>(2)</sup>                                            | ppm/°C | < 20                                                                                                                              |
| Operating temperature range                                           | °C     | -65 to +170                                                                                                                       |
| Maximum working voltage <sup>(3)</sup>                                | V      | $(P \times R)^{1/2}$                                                                                                              |

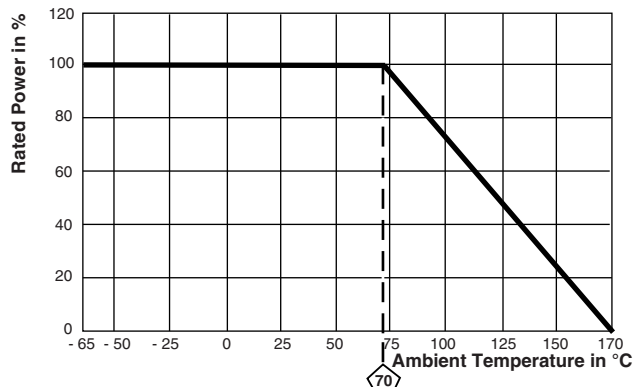
**Notes**

- (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.

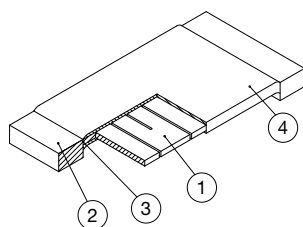
**DIMENSIONS**


| MODEL    | RESISTANCE RANGE (Ω) | DIMENSIONS in inches (millimeters) |                                 |                                  |                                  | SOLDER PAD DIMENSIONS in inches (millimeters) |                 |                 |
|----------|----------------------|------------------------------------|---------------------------------|----------------------------------|----------------------------------|-----------------------------------------------|-----------------|-----------------|
|          |                      | L                                  | W                               | H                                | T                                | a                                             | b               | l               |
| WSLP0603 | 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 ± 0.010<br>(0.381 ± 0.254) | 0.040<br>(1.02)                               | 0.040<br>(1.02) | 0.020<br>(0.50) |
| WSLP0805 | 0.01 to 0.05         | 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 ± 0.010<br>(0.381 ± 0.254) | 0.040<br>(1.02)                               | 0.050<br>(1.27) | 0.020<br>(0.50) |
| WSLP1206 | 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 0.050       |                                    |                                 |                                  | 0.020 ± 0.010<br>(0.508 ± 0.254) |                                               |                 |                 |
| WSLP2010 | 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 0.010       |                                    |                                 |                                  | 0.020 ± 0.010<br>(0.508 ± 0.254) | 0.055<br>(1.40)                               |                 | 0.130<br>(3.30) |
| WSLP2512 | 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) |
|          | 0.006 to 0.01        |                                    |                                 |                                  | 0.030 ± 0.010<br>(0.762 ± 0.254) | 0.065<br>(1.65)                               |                 | 0.160<br>(4.06) |

## DERATING

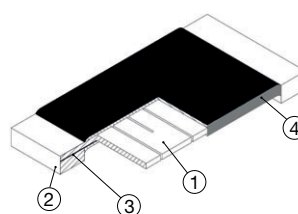


## WELDED CONSTRUCTION 2512, 2010, 1206



- 1) Resistive element: solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- 2) Plated terminal
- 3) Terminal / element weld
- 4) Silicone coating with ink print

## CLAD CONSTRUCTION 0805 and 0603



- 1) Resistive element: Ni-Cr
- 2) Terminal: Solid copper, 100 % Sn (100 μ" min.) with 100 % Ni (20 μ" min.) under layer finish
- 3) Terminal to element weld
- 4) High temperature encapsulant: "siliconized polyester" coating material

| 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 |
| Low temperature operation | -65 °C for 45 min                                              | ± (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 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, 7b not required            | ± (0.5 % + 0.0005 Ω) ΔR |

| PACKAGING |                        |           |             |      |
|-----------|------------------------|-----------|-------------|------|
| MODEL     | REEL                   |           |             |      |
|           | TAPE WIDTH             | DIAMETER  | PIECES/REEL | CODE |
| WSLP0603  | 8 mm/punched paper     | 178 mm/7" | 5000        | EA   |
| WSLP0805  | 8 mm/punched paper     | 178 mm/7" | 5000        | EA   |
| WSLP1206  | 8 mm/embossed plastic  | 178 mm/7" | 4000        | EA   |
| WSLP2010  | 8 mm/embossed plastic  | 178 mm/7" | 4000        | EA   |
| WSLP2512  | 12 mm/embossed plastic | 178 mm/7" | 2000        | EA   |

### Note

- Embossed Carrier Tape per EIA-481.



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