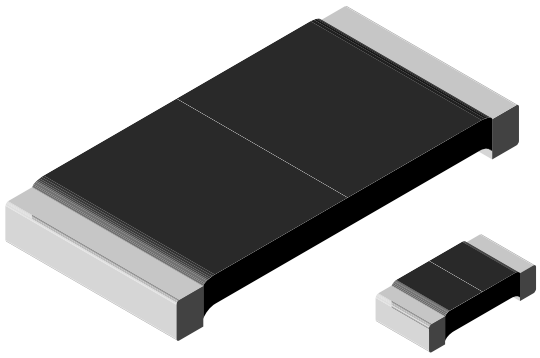
# Power Metal Strip® Resistors, High Power (2 x Standard WSL), Low Value (down to 0.0005 Ω), Surface Mount



## 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)
- Specially selected and stabilized materials allow for high power ratings (2 x standard WSL rating)
- All welded construction
- Solderable terminations
- Very low inductance 0.5 nH to 5 nH
- Excellent frequency response to 50 MHz
- Solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- Low thermal EMF (< 3 µV/°C)
- AEC-Q200 qualified available
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free Available

e3

RoHS* Available

HALOGEN FREE Available

GREEN (5-2008) Available

**Note**

* 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.

## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | SIZE | POWER RATING $P_{70\,°C}$ W | RESISTANCE VALUE RANGE Ω | | WEIGHT (typical) g/1000 pieces |
|---|---|---|---|---|---|
| | | | Tol. ± 0.5 % | Tol. ± 1.0 % | |
| WSL0603...18 | 0603 | 0.20 | 0.01 to 0.1 | 0.01 to 0.1 | 1.9 |
| WSL0805...18 | 0805 | 0.25 | 0.005 to 0.2 | 0.005 to 0.2 | 4.8 |
| WSL1206...18 | 1206 | 0.5 | 0.005 to 0.2 | 0.001 to 0.2 | 16.2 |
| WSL2010...18 | 2010 | 1.0 | 0.004 to 0.5 | 0.001 to 0.5 | 38.9 |
| WSL2512...18 | 2512 | 2.0 | 0.003 to 0.04 | 0.0005 to 0.04 | 63.6 |

**Note**

- Part marking: Value; tolerance: Due to resistor size limitations some resistors will be marked with only the resistance value.

## TECHNICAL SPECIFICATIONS

| PARAMETER | UNIT | RESISTOR CHARACTERISTICS |
|---|---|---|
| Temperature coefficient | 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 0.5 Ω |
| 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: WSL25124L000FTA18**

| W | S | L | 2 | 5 | 1 | 2 | 4 | L | 0 | 0 | 0 | F | T | A | 1 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| GLOBAL MODEL | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING CODE | SPECIAL |
|---|---|---|---|---|
| **WSL0603**<br>**WSL0805**<br>**WSL1206**<br>**WSL2010**<br>**WSL2512** | **L** = mΩ*<br>**R** = Decimal<br>**5L000** = 0.005 Ω<br>**R0100** = 0.01 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<br>**EK** = Lead (Pb)-free, bulk<br>**TA** = Tin/lead, tape/reel (R86)<br>**TG** = Tin/lead, tape/reel (RT1, for WSL0603 and WSL0805)<br>**BA** = Tin/lead, bulk (B43) | **18** = "High power" option |

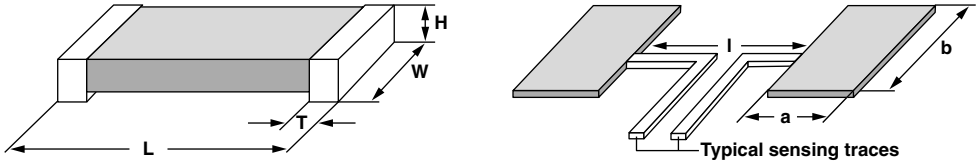
**Historical Part Numbering example: WSL2512-18 0.004 Ω 1 % R86**

| WSL2512-18 | 0.004 Ω | 1 % | R86 |
|---|---|---|---|
| HISTORICAL MODEL | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING CODE |



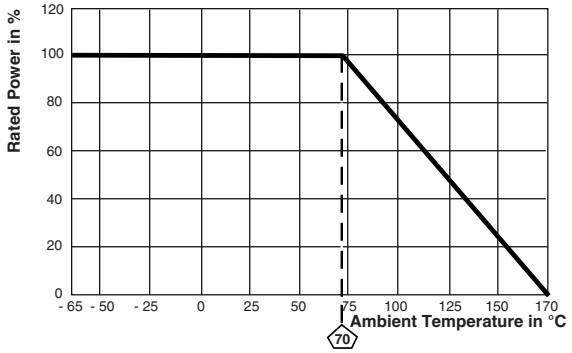
For technical questions, contact: ww2bresistors@vishay.com

## DIMENSIONS in inches (millimeters)




| MODEL | RESISTANCE RANGE (Ω) | DIMENSIONS | | | | SOLDER PAD DIMENSIONS | | |
|---|---|---|---|---|---|---|---|---|
| | | L | W | H | T | a | b | l |
| WSL0603...18 | 0.01 to 0.1 | 0.060 ± 0.010 (1.52 ± 0.254) | 0.030 ± 0.010 (0.76 ± 0.254) | 0.013 ± 0.010 (0.330 ± 0.254) | 0.015 ± 0.005 (0.381 ± 0.127) | 0.040 (1.01) | 0.040 (1.01) | 0.020 (0.50) |
| WSL0805...18 | 0.005 to 0.2 | 0.080 ± 0.010 (2.03 ± 0.254) | 0.050 ± 0.010 (1.27 ± 0.254) | 0.013 ± 0.010 (0.330 ± 0.254) | 0.015 ± 0.005 (0.381 ± 0.127) | 0.040 (1.02) | 0.050 (1.27) | 0.020 (0.50) |
| WSL1206...18 | 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...18 | 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...18 | 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 0.04 | | | | 0.030 ± 0.010 (0.762 ± 0.254) | 0.065 (1.65) | | 0.160 (4.06) |

## 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) Δ*R* |
| Short time overload | 5 x rated power for 5 s | ± (0.5 % + 0.0005 Ω) Δ*R* |
| Low temperature storage | - 65 °C for 24 h | ± (0.5 % + 0.0005 Ω) Δ*R* |
| High temperature exposure | 1000 h at + 170 °C | ± (1.0 % + 0.0005 Ω) Δ*R* |
| Bias humidity | + 85 °C, 85 % RH, 10 % bias, 1000 h | ± (0.5 % + 0.0005 Ω) Δ*R* |
| Mechanical shock | 100 *g*'s for 6 ms, 5 pulses | ± (0.5 % + 0.0005 Ω) Δ*R* |
| Vibration | Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h | ± (0.5 % + 0.0005 Ω) Δ*R* |
| Load life | 1000 h at rated power, + 70 °C, 1.5 h "ON", 0.5 h "OFF" | ± (1.0 % + 0.0005 Ω) Δ*R* |
| Resistance to solder heat | + 260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence | ± (0.5 % + 0.0005 Ω) Δ*R* |
| Moisture resistance | MIL-STD-202, method 106, 0 % power, 7a and 7b not required | ± (0.5 % + 0.0005 Ω) Δ*R* |

## PACKAGING

| MODEL | REEL | | | |
|---|---|---|---|---|
| | TAPE WIDTH | DIAMETER | PIECES/REEL | CODE |
| WSL0603...18 | 8 mm/punched paper | 178 mm/7" | 5000 | EA |
| WSL0805...18 | 8 mm/punched paper | 178 mm/7" | 5000 | EA |
| WSL1206...18 | 8 mm/embossed plastic | 178 mm/7" | 4000 | EA |
| WSL2010...18 | 12 mm/embossed plastic | 178 mm/7" | 4000 | EA |
| WSL2512...18 | 12 mm/embossed plastic | 178 mm/7" | 2000 | EA |

**Note**

- Embossed Carrier Tape per EIA-481.

# Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay’s knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

# Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**