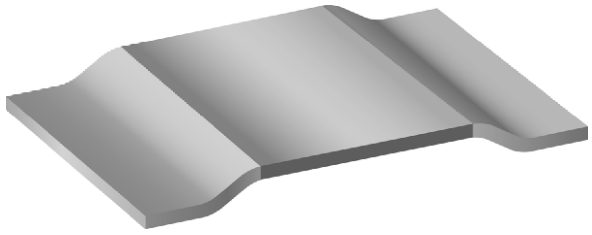
# Power Metal Strip® Resistors, Low Value (down to 0.0002 Ω), Surface Mount



## 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 0.0002 Ω
- All welded construction
- Solid metal iron-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- Very low inductance 0.5 nH to 5 nH
- Low thermal EMF (< 3 µV/°C)
- AEC-Q200 qualified available (1)
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

Pb-free

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

**Note**

(1) Flame retardance test may not be applicable to some resistor technologies

## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | SIZE | POWER RATING $P_{70\,°C}$ W | TOLERANCE % | RESISTANCE VALUE RANGE Ω | RESISTANCE VALUES CURRENTLY AVAILABLE (2) Ω | WEIGHT (typical) g/1000 pieces |
|---|---|---|---|---|---|---|
| WSL3921 | 3921 | 3.0 | 1.0, 5.0 | 0.3m to 4m | 0.3m, 0.5m, 1m, 2m, 3m, 4m | 281 |
| WSL5931 | 5931 | 5.0 | 1.0, 5.0 | 0.2m to 3m | 0.2m, 0.3m, 0.5m, 1m, 2m, 3m | 398 |

**Note**

(2) Other values may be available, contact factory.

## TECHNICAL SPECIFICATIONS

| PARAMETER | UNIT | RESISTOR CHARACTERISTICS |
|---|---|---|
| Temperature coefficient | ppm/°C | ± 225 for 0.2 mΩ, ± 175 for 0.3 mΩ and 0.5 mΩ, ± 75 for 1 mΩ to 4 mΩ |
| Element TCR | ppm/°C | < 20 |
| Operating temperature range | °C | -65 to +170 |
| Maximum working voltage | V | $(P \times R)^{1/2}$ |

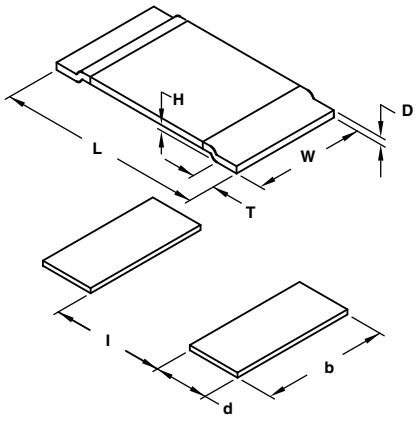
## GLOBAL PART NUMBER INFORMATION

**Global Part Numbering: WSL3921L5000FEA (WSL3921, 0.0005 Ω, ± 1 %)**

| W | S | L | 3 | 9 | 2 | 1 | L | 5 | 0 | 0 | 0 | F | E | A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| GLOBAL MODEL | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING CODE | SPECIAL |
|---|---|---|---|---|
| **WSL3921**<br>**WSL5931** | **L** = mΩ<br>**L5000** = 0.0005 Ω | **F** = ± 1.0 %<br>**J** = ± 5.0 % | **EA** = Lead (Pb)-free, tape/reel<br>**EK** = Lead (Pb)-free, bulk | (Dash number)<br>(Up to 2 digits)<br>From **1 to 99** as applicable |

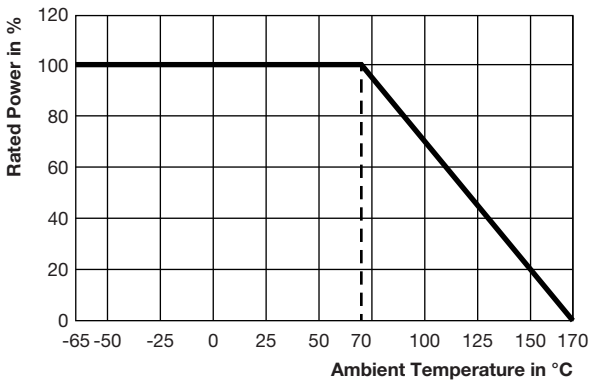
## DIMENSIONS




| MODEL | DIMENSIONS in inches (millimeters) | | | |
|---|---|---|---|---|
| | L | W | H | T |
| WSL3921 | 0.394 ± 0.010 (10.0 ± 0.254) | 0.205 ± 0.010 (5.20 ± 0.254) | 0.020 (0.5) | 0.080 ± 0.010 (2.00 ± 0.254) |
| WSL5931 | 0.591 ± 0.010 (15.0 ± 0.254) | 0.305 ± 0.010 (7.75 ± 0.254) | 0.020 (0.5) | 0.157 ± 0.010 (4.00 ± 0.254) |

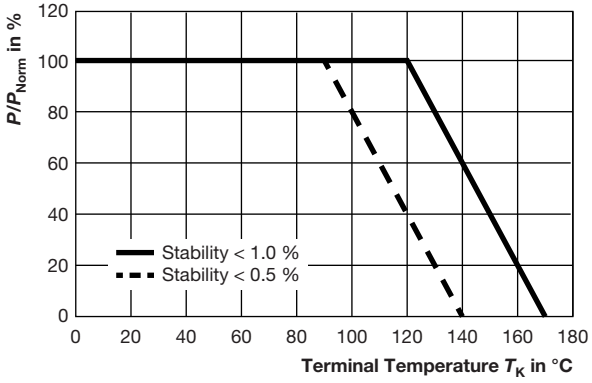
| MODEL | SOLDER PAD DIMENSIONS in inches (millimeters) | | |
|---|---|---|---|
| | d | b | l |
| WSL3921 | 0.106 ± 0.010 (2.70 ± 0.254) | 0.244 ± 0.010 (6.20 ± 0.254) | 0.220 ± 0.005 (5.60 ± 0.13) |
| WSL5931 | 0.205 ± 0.010 (5.20 ± 0.254) | 0.344 ± 0.010 (8.75 ± 0.254) | 0.220 ± 0.005 (5.60 ± 0.13) |

## DERATING - AMBIENT TEMPERATURE

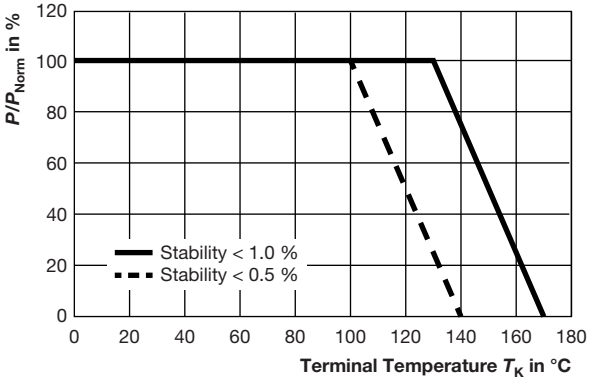



| GLOBAL MODEL | RESISTANCE VALUE (mΩ) | "D" THICKNESS (Inches) | ELEMENT MATERIAL |
|---|---|---|---|
| WSL3921 | 0.3 | 0.0510 | Mn-Cu |
| WSL3921 | 0.5 | 0.0300 | Mn-Cu |
| WSL3921 | 1.0 | 0.0150 | Mn-Cu |
| WSL3921 | 2.0 | 0.0270 | Fe-Cr |
| WSL3921 | 3.0 | 0.0170 | Fe-Cr |
| WSL3921 | 4.0 | 0.0130 | Fe-Cr |
| WSL5931 | 0.2 | 0.0485 | Mn-Cu |
| WSL5931 | 0.3 | 0.0300 | Mn-Cu |
| WSL5931 | 0.5 | 0.0180 | Mn-Cu |
| WSL5931 | 1.0 | 0.0330 | Fe-Cr |
| WSL5931 | 2.0 | 0.0155 | Fe-Cr |
| WSL5931 | 3.0 | 0.0105 | Fe-Cr |

## DERATING - TERMINAL TEMPERATURE




Example: WSL3921 0.0005 Ω




Example: WSL5931 0.0005 Ω

| PERFORMANCE | | |
|---|---|---|
| **TEST** | **CONDITIONS OF TEST** | **TEST LIMITS** |
| Thermal shock | -55 °C to +150 °C, 1000 cycles, 15 min at each extreme | ± (1.0 % + 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 45 min | ± (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 +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** |
| WSL3921 | 16 mm/embossed plastic | 330 mm/13" | 3000 | EA |
| WSL5931 | 24 mm/embossed plastic | 330 mm/13" | 1500 | EA |

**Note**

- Embossed Carrier Tape per EIA-481.

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# Mouser Electronics

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WSL39212L000FEA WSL39211L000FEA WSL39213L000FEA WSL3921L3000FEA WSL3921L5000FEA
WSL59311L000FEA WSL59312L000FEA WSL59313L000FEA WSL5931L2000FEA WSL5931L3000FEA
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