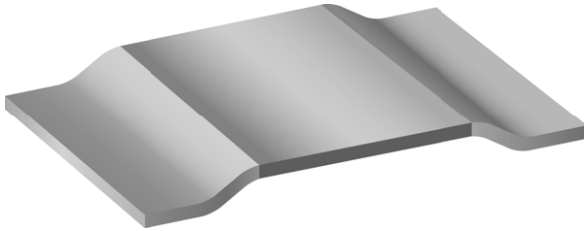


Power Metal Strip® Resistors, Low Value (down to 0.0002 Ω), Surface Mount



DESIGN TOOLS (click logo to get started)



FEATURES

- 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 0.0002 Ω
- Construction is impervious against a high sulfur environment (ASTM B 809-95 test method)
- 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 ⁽¹⁾
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE
GRADE
Available



RoHS
COMPLIANT

HALOGEN
FREE

GREEN
(5-2008)

Notes

- Follow link to Overview of Automotive Grade Products for more details: www.vishay.com/doc?49924
- ⁽¹⁾ Flame retardance test may not be applicable to some resistor technologies

STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | SIZE | POWER RATING $P_{70^\circ\text{C}}$ W | TOLERANCE % | RESISTANCE VALUE RANGE Ω | RESISTANCE VALUES CURRENTLY AVAILABLE ⁽¹⁾ Ω | WEIGHT (typical) g/1000 pieces |
|--------------|------|---|----------------|--------------------------------|--|--------------------------------------|
| WSL3921 | 3921 | 3.0 | 1.0, 5.0 | 0.2m to 4m | 0.2m, 0.3m, 0.5m, 0.7m, 1m, 2m, 2.5m, 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

- ⁽¹⁾ Other values may be available, contact factory

TECHNICAL SPECIFICATIONS

| PARAMETER | UNIT | RESISTOR CHARACTERISTICS | |
|--|--------|----------------------------|-----------------------------|
| | | WSL3921 | WSL5931 |
| Component temperature coefficient (including terminal) ⁽¹⁾ | ppm/°C | ± 175 for 0.2 mΩ to 0.7 mΩ | ± 225 for 0.2 mΩ |
| | | ± 75 for 1 mΩ to 4 mΩ | ± 175 for 0.3 mΩ and 0.5 mΩ |
| Element TCR ⁽²⁾ | ppm/°C | < 20 | |
| Operating temperature range | °C | -65 to +170 | |
| Maximum working voltage ⁽³⁾ | 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

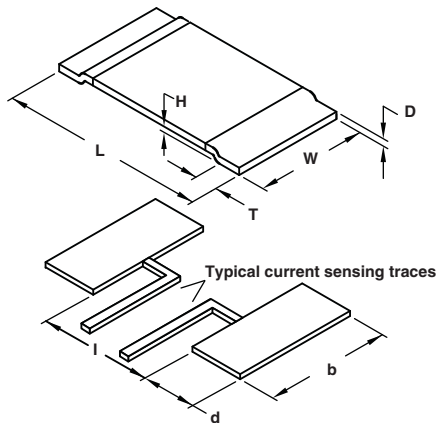
GLOBAL PART NUMBER INFORMATION

GLOBAL PART NUMBERING: WSL3921L5000FEA (WSL3921, 0.0005 Ω, ± 1 %)
(visit www.vishay.net Vishay Dale parts numbering manual for all options)

| | | | | | | | | | | | | | | | | |
|--------------------|---|---|----------------------------|---|---|----------------------------|---|---|---|---|---|---|---|---|--|--|
| W | S | L | 3 | 9 | 2 | 1 | L | 5 | 0 | 0 | 0 | F | E | A | | |
| GLOBAL MODEL | | | RESISTANCE VALUE | | | TOLERANCE CODE | | PACKAGING CODE ⁽¹⁾ | | | | SPECIAL | | | | |
| WSL3921 WSL5931 | | | L = mΩ L5000 = 0.0005 Ω | | | F = ± 1.0 % J = ± 5.0 % | | EA = lead (Pb)-free, tape/reel EK = lead (Pb)-free, bulk | | | | (dash number) (up to 2 digits) from 1 to 99 as applicable | | | | |

Note

- ⁽¹⁾ Packaging code: EB (lead (Pb)-free) and TB (tin / lead) are non-standard packaging codes designating 1000 piece reels. 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

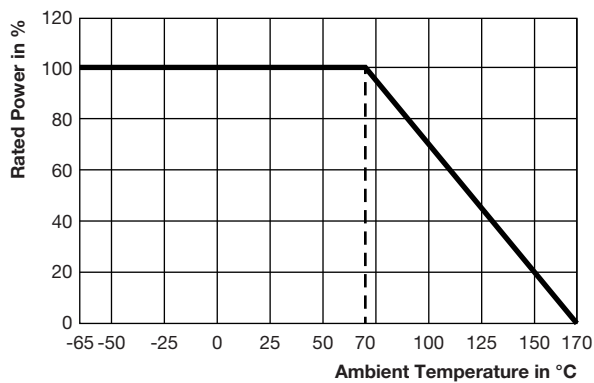
DIMENSIONS


| 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) |

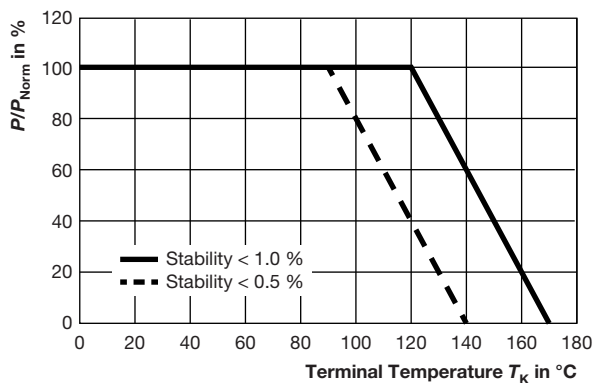
| MODEL | SOLDER PAD DIMENSIONS in inches (millimeters) | | |
|---------|---|---------------------------------|--------------------------------|
| | d | b | l |
| WSL3921 | 0.106 ± 0.010 (2.70 ± 0.254) | 0.244 ± 0.010 (6.20 ± 0.254) | 0.220 ± 0.005 (5.60 ± 0.13) |
| WSL5931 | 0.205 ± 0.010 (5.20 ± 0.254)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

Note

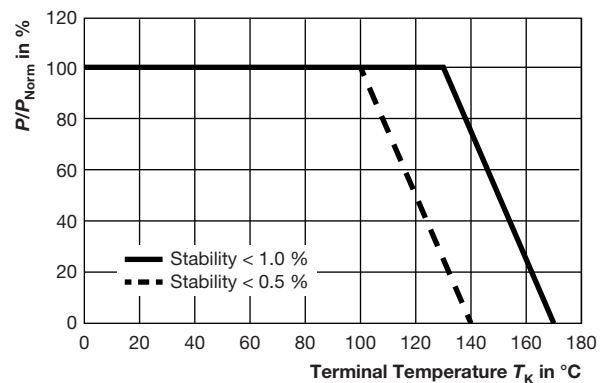
- 3D models available:
 3921 model www.vishay.com/doc?30310
 5931 model www.vishay.com/doc?30312

DERATING - AMBIENT TEMPERATURE


| GLOBAL MODEL | RESISTANCE VALUE (mΩ) | "D" THICKNESS (Inches) | ELEMENT MATERIAL |
|--------------|-----------------------|------------------------|------------------|
| WSL3921 | 0.2 | 0.0560 | Mn-Cu |
| 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 % |
| Short time overload | 5x rated power for 5 s | ± 0.5 % |
| Low temperature storage | -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, 7a and 7b not required | ± 0.5 % |

| 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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