

## 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 <sup>(1)</sup>
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE  
GRADE  
Available



**RoHS**  
COMPLIANT

HALOGEN  
**FREE**

**GREEN**  
(5-2009)

### Notes

- Follow link to Overview of Automotive Grade Products for more details: [www.vishay.com/doc?49924](http://www.vishay.com/doc?49924)
- <sup>(1)</sup> 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 <sup>(1)</sup> 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

- <sup>(1)</sup> Other values may be available, contact factory

### TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	RESISTOR CHARACTERISTICS	
		WSL3921	WSL5931
Component temperature coefficient (including terminal) <sup>(1)</sup>	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 <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

- <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

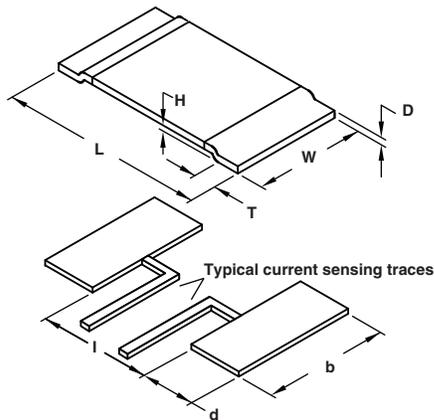
### GLOBAL PART NUMBER INFORMATION

**GLOBAL PART NUMBERING: WSL3921L5000FEA (WSL3921, 0.0005 Ω, ± 1 %)**  
(visit [www.vishay.net](http://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 <sup>(1)</sup>			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

- <sup>(1)</sup> 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

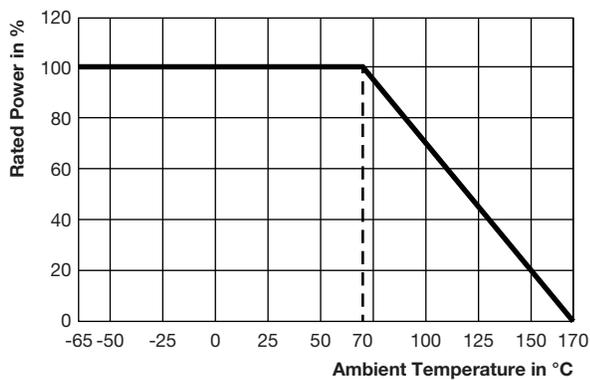
**DIMENSIONS**


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)

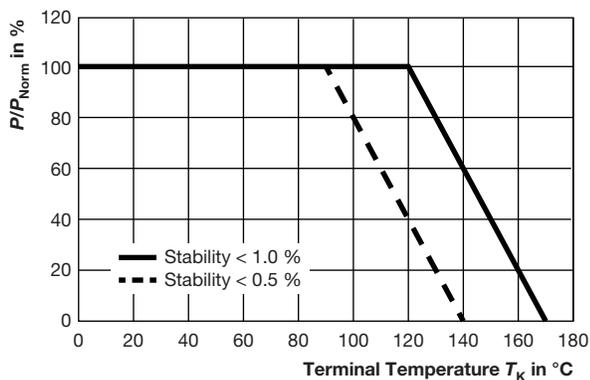
MODEL	SOLDER PAD DIMENSIONS in inches (millimeters)		
	d	b	l
WSL3921	0.106 ± 0.010 (2.70 ± 0.254)	0.244 ± 0.010 (6.20 ± 0.254)	0.220 ± 0.005 (5.60 ± 0.13)
WSL5931	0.205 ± 0.010 (5.20 ± 0.254)	0.344 ± 0.010 (8.75 ± 0.254)	0.220 ± 0.005 (5.60 ± 0.13)

**Note**

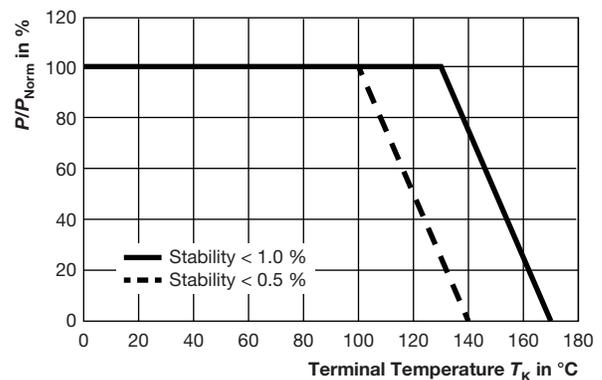
- 3D models available:  
 3921 model [www.vishay.com/doc?30310](http://www.vishay.com/doc?30310)  
 5931 model [www.vishay.com/doc?30312](http://www.vishay.com/doc?30312)

**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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