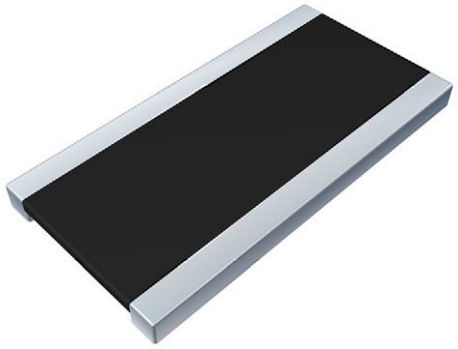
Power Metal Strip® Resistors, Wide Terminal, Low Inductance (< 1 nH), Surface-Mount



FEATURES

- Wide side terminal construction that yields high power to foot print size ratio (2 W in 1020 and 1 W in 0612 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 low resistance values (down to 0.00075 Ω)
- Sulfur resistance by construction that is unaffected by high sulfur environments
- Very low inductance < 1 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

Pb-free Available

e3

RoHS* Available

HALOGEN FREE GREEN (5-2008) Available

LINKS TO ADDITIONAL RESOURCES

3D Models | Design Tools | Videos | Calculators

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

(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	WEIGHT (typical) g/1000 pieces
WSL0612 (1)	0612	1.0	1.0, 5.0	0.75m to 5m	8.5
WSL1020 (1)	1020	2.0	0.5, 1.0, 5.0	1m to 6m	38.74

Note

(1) Qualified to AEC-Q200 rev. D

GLOBAL PART NUMBER INFORMATION

Global Part Numbering Example: WSL10206L000FEA (visit www.vishay.net Vishay Dale parts numbering manual for all options)

W	S	L	1	0	2	0	6	L	0	0	0	F	E	A		

GLOBAL MODEL (7 digits)	RESISTANCE VALUE (1) (5 digits)	TOLERANCE CODE (1 digit)	PACKAGING CODE (2) (2 digits)	SPECIAL (3) (up to 2 digits)
WSL0612 **WSL1020**	**L** = mΩ* **1L000** = 0.001 Ω **2L000** = 0.002 Ω **3L000** = 0.003 Ω **4L000** = 0.004 Ω **5L000** = 0.005 Ω **6L000** = 0.006 Ω * Use "**L**" for resistance values < 0.01 Ω	**D** = ± 0.5 % **F** = ± 1.0 % **J** = ± 5.0 %	**EA** = lead (Pb)-free, tape / reel	(dash number) From **1** to **99** as applicable

Notes

- Per PCN-DR-00009-2022-REV-0, WSL marking will be removed effective March 1st, 2023

(1) WSL marking (www.vishay.com/doc?30327); WSL decade values (www.vishay.com/doc?30117)

(2) EB (lead (Pb)-free) is a non-standard packaging code designated for 1000 piece reels. The non-standard packaging code is identical to our standard EA (lead (Pb)-free), except that it has a package quantity of 1000 pieces

(3) Follow link for customization capabilities: www.vishay.com/doc?48163

For technical questions, contact: ww2bresistors@vishay.com

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	RESISTOR CHARACTERISTICS	
		WSL0612	WSL1020
Component temperature coefficient (including terminal) (1)	ppm/°C	+250 (4) for 0.75 mΩ and 1.9 mΩ	+100 ppm/°C to -10 ppm/°C for 1.5 mΩ to 6 mΩ
		+150 (4) for 2 mΩ to 6 mΩ	+170 ppm/°C to -20 ppm/°C for < 1.5 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

- "Temperature Coefficient of Resistance for Current Sensing" white paper: www.vishay.com/doc?30405

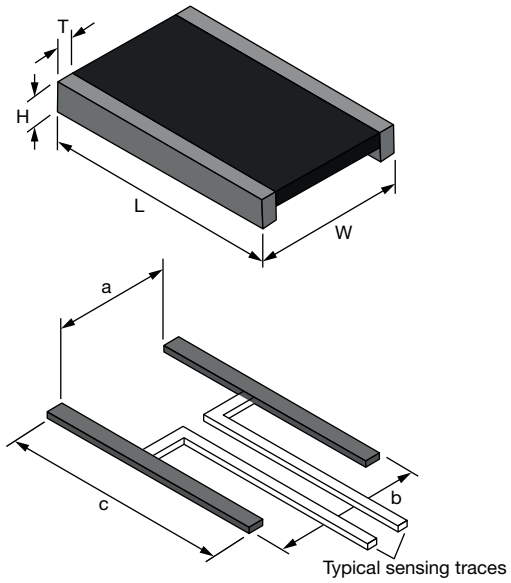
(1) Component TCR - total TCR that includes the TCR effects of the resistor element and the copper terminal

(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

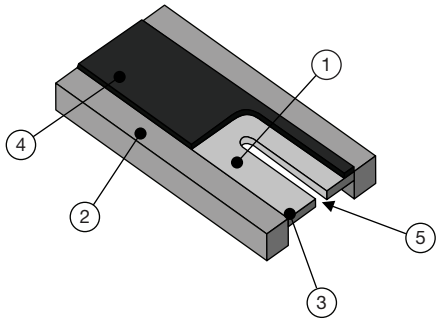
(4) Typical TCR is positive, for more details contact factory

DIMENSIONS



Typical sensing traces

WELDED CONSTRUCTION



1. Resistive element: nickel-chrome or manganese-copper alloy with low TCR (< 20 ppm/°C)
2. Terminal: solid copper with 100 % Sn finish 100 % Sn (100 µ" min.) with 100 % Ni (20 µ" min.) under layer finish
3. Terminal / element weld (electron beam weld)
4. High temperature encapsulant: "siliconized polyester" coating material
5. Laser calibration

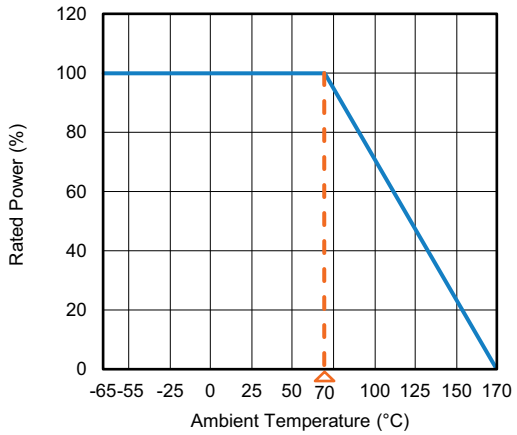
Notes

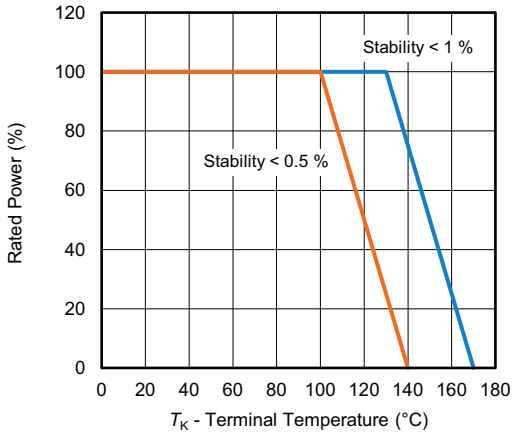
- 3D models available: www.vishay.com/doc?30348
- Surface-mount solder profile recommendations: www.vishay.com/doc?31052

MODEL	DIMENSIONS in inches (millimeters)			
	L	W	H	T
WSL0612	0.120 ± 0.005 (3.05 ± 0.127)	0.060 ± 0.005 (1.50 ± 0.127)	0.018 ± 0.010 (0.457 ± 0.254)	0.015 ± 0.010 (0.381 ± 0.254)
WSL1020	0.200 ± 0.005 (5.08 ± 0.127)	0.100 ± 0.010 (2.54 ± 0.254)	0.025 ± 0.005 (0.635 ± 0.127)	0.022 ± 0.008 (0.558 ± 0.203)

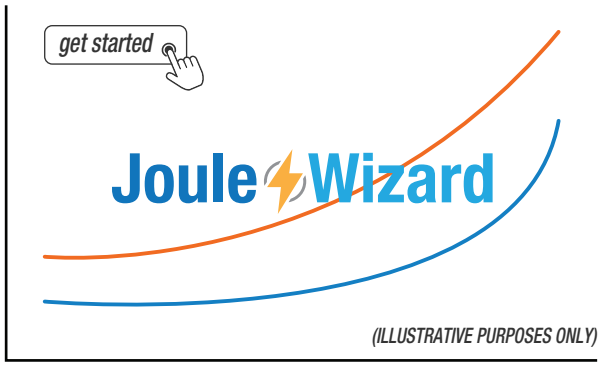
MODEL	SOLDER PAD DIMENSIONS in inches (millimeters)		
	a	b	c
WSL0612	0.030 (0.76)	0.078 (1.98)	0.134 (3.40)
WSL1020	0.039 (1.00)	0.138 (3.50)	0.222 (5.65)

DERATING





PULSE CAPABILITY



www.vishay.com/en/resistors/joulewizard/

PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST LIMITS
Thermal shock	-55 °C to +150 °C, 2000 cycles, 15 min at each extreme	± 0.5 %
Low temperature operation	-65 °C for 24 h	± 0.5 %
High temperature exposure	2000 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	2000 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, 7b not required	± 0.5 %

PACKAGING				
MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE
WSL0612	8 mm / embossed plastic	178 mm / 7"	4000	EA
WSL1020	12 mm / embossed plastic	178 mm / 7"	4000	EA

Notes

- Embossed carrier tape per EIA-481-2

(1) Additional packaging details at www.vishay.com/doc?20051

LINKS TO RELATED DOCUMENTS	
SELECTOR GUIDE	
Overview of Automotive Grade Products	www.vishay.com/doc?49924
TECHNICAL NOTES	
SMD Current Sense: AEC-Q200 vs. Vishay Qualification	www.vishay.com/doc?30416
MIL-PRF vs. AEC-Q200: Do You Know What You Are Getting?	www.vishay.com/doc?11000
WHITE PAPER	
Thermal Management for Surface-Mount Devices	www.vishay.com/doc?30380
Temperature Coefficient of Resistance for Current Sensing	www.vishay.com/doc?30405

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