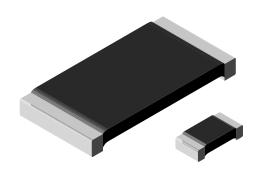




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Vishay Dale

# Power Metal Strip<sup>®</sup> Resistors, High Power (2 x Standard WSL), Low Value (Down to 0.0005 $\Omega$ ), Surface-Mount



#### **LINKS TO ADDITIONAL RESOURCES**









#### **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  $0.0005 \Omega$ )
- Sulfur resistance by construction that is unaffected by high sulfur environments
- Very low inductance 0.5 nH to 5 nH
- Low thermal EMF (< 3 μV/°C)</li>
- AEC-Q200 qualified <sup>(1)</sup>
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

**(5-2008** Available



AUTOMOTIVE

#### Notes

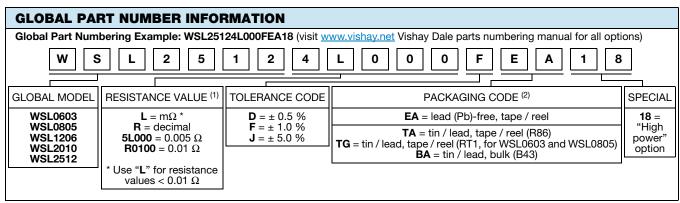
• This datasheet provides information about parts that are RoHS-compliant and / or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

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

STANDARD ELECTRICAL SPECIFICATIONS						
GLOBAL MODEL	SIZE	POWER RATING P <sub>70 °C</sub>	RESISTANCE VALUE RANGE (1) $\Omega$		WEIGHT (typical)	
MODEL		w	TOL. ± 0.5 %	TOL. ± 1.0 %	g/1000 pieces	
WSL060318	0603	0.20	0.01 to 0.1	0.01 to 0.1	1.9	
WSL080518	0805	0.25	0.005 to 0.2	0.005 to 0.2	4.8	
WSL120618	1206	0.5	0.005 to 0.2	0.0005 to 0.2	16.2	
WSL201018	2010	1.0	0.004 to 0.5	0.001 to 0.5	38.9	
WSL251218	2512	2.0	0.003 to 0.04	0.0005 to 0.04	63.6	

#### Notes

- Part marking: value: tolerance: due to resistor size limitations some resistors will be marked with only the resistance value
- Qualified to AEC-Q200 rev. D
- (1) WSL1206...18 0.0005  $\Omega$  to 0.00099  $\Omega$  is only available with 2 % tolerance (G tolerance code)



#### Notes

- Per PCN-DR-00009-2022-REV-0, WSL marking will be removed effective March 1st, 2023
- (1) WSL marking (<u>www.vishay.com/doc?30327</u>); WSL decade values (<u>www.vishay.com/doc?30117</u>)
- Packaging code: EB (lead (Pb)-free) and TB (tin / lead) are non-standard packaging codes that designate 1000 piece reel quantities. 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



## **WSL...18 High Power**

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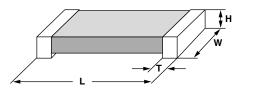
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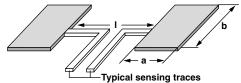
TECHNICAL SPECIFICATIONS							
PARAMETER	UNIT	RESISTOR CHARACTERISTICS					
		WSL060318 (1)	WSL080518 \	WSL120618	WSL201018	WSL251218	
	ppm/°C	$\pm$ 75 for 50 m $\Omega$ to 100 m $\Omega$	$\pm$ 75 for 7 m $\Omega$ to 500 m $\Omega$				
Component temperature		$\pm$ 110 for 10 m $\Omega$ to 49 m $\Omega$	$\pm$ 110 for 5 m $\Omega$ to 6.9 m $\Omega$				
coefficient (including terminal) (2) TCR measured from		-	$\pm$ 150 for 3 m $\Omega$ to 4.9 m $\Omega$				
-55 °C to +155 °C		-	$\pm$ 275 for 1 m $\Omega$ to 2.9 m $\Omega$				
		- $\pm$ 400 for 0.5 m $\Omega$ to 0.99 m $\Omega$					
Element TCR (3)	ppm/°C	< 20					
Operating temperature range	°C	-65 to +170					
Maximum working voltage (4)	V	$(P \times R)^{1/2}$					

#### Notes

- Consult factory for detailed TCR performance across temperature range as performance can vary by resistance value Component TCR total TCR that includes the TCR effects of the resistor element and the copper terminal
- Element TCR only applies to the alloy used for the resistor element; refer to item 1 in the construction illustration on the following page
- Maximum working voltage the WSL is not voltage sensitive, but is limited by power / energy dissipation and is also not ESD sensitive

#### **DIMENSIONS** in inches (millimeters)





#### Notes

- 3D models available: www.vishay.com/doc?30307
- Surface mount solder profile recommendations: www.vishav.com/doc?31052

MODEL	RESISTANCE	DIMENSIONS				SOLDER PAD DIMENSIONS		
MODEL	RANGE ( $\Omega$ )	L	W	Н	Т	а	b	I
WSL060318 <sup>(1)</sup>	0.01 to 0.1	0.060 ± 0.010 (1.52 ± 0.254)	0.030 ± 0.010 (0.76 ± 0.254)	0.016 ± 0.005 (0.406 ± 0.127)	0.015 ± 0.005 (0.381 ± 0.127)	0.040 (1.01)	0.040 (1.01)	0.020 (0.50)
WSL080518	0.005 to 0.2	$0.080 \pm 0.010$ (2.03 ± 0.254)	0.050 ± 0.010 (1.27 ± 0.254)	0.016 ± 0.005 (0.406 ± 0.127)	0.015 ± 0.005 (0.381 ± 0.127)	0.040 (1.02)	0.050 (1.27)	0.020 (0.50)
	0.0005 to 0.00099	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)	0.089 (2.26)	0.076 (1.93)	0.023 (0.58)
WSL120618	0.001 to 0.0019					0.086 (2.18)	0.076 (1.93)	0.029 (0.74)
W3L120016	0.002 to 0.0059				0.025 ± 0.010 (0.635 ± 0.254)	0.070 (1.78)	0.076 (1.93)	0.061 (1.55)
	0.006 to 0.20				0.020 ± 0.010 (0.508 ± 0.254)	0.065 (1.65)	0.076 (1.93)	0.071 (1.80)
WSL201018	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)
W3L201010	0.007 to 0.5				$0.020 \pm 0.010$ $(0.508 \pm 0.254)$	0.055 (1.40)	0.120 (3.05)	0.130 (3.30)
	0.0005 to 0.00099		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
WSL251218	0.001 to 0.0049	$0.250 \pm 0.010$ (6.35 ± 0.254)			0.087 ± 0.010 (2.21 ± 0.254)			(1.27)
VVOL251210	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				$0.030 \pm 0.010$ (0.762 ± 0.254)	0.065 (1.65)		0.160 (4.06)

#### Note

<sup>(1)</sup> PCN-DR-00003-2020 changed terminal height for WSL0603...18 from 0.013" ± 0.005" for clad construction to 0.016" ± 0.005" for welded construction

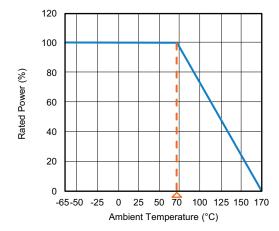




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#### **DERATING**

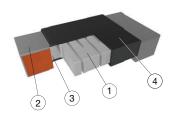


#### **PULSE CAPABILITY**



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

#### **WELDED CONSTRUCTION**



- (1) Resistive element: solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- 2 Plated terminal
- (3) Terminal / element weld
- (4) Silicone coating with ink print

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		
Short time overload	Refer to link for short time overload performance and pulse capability; www.vishay.com/en/resistors/power-metal-strip-calculator/ ± 0.5 % + 0.0			
Low temperature storage	ow temperature storage -65 °C for 24 h			
High temperature exposure	igh temperature exposure 1000 h at + 170 °C			
Bias humidity +85 °C, 85 % RH, 10 % bias, 1000 h		± 0.5 % + 0.0005 Ω		
Mechanical shock	100 g's for 6 ms, 5 pulses	$\pm$ 0.5 % + 0.0005 $\Omega$		
Vibration	Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h	± 0.5 % + 0.0005 Ω		
Load life 1000 h at rated power, + 70 °C, 1.5 h "ON", 0.5 h "OFF"		± 1.0 % + 0.0005 Ω		
Resistance to solder heat	esistance to solder heat +260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence			
Moisture resistance MIL-STD-202, method 106, 0 % power, 7a and 7b not required		± 0.5 % + 0.0005 Ω		

#### Note

 Contact <u>ww2bresistors@vishay.com</u> for application specific performance requirements or qualification data. Typical performance is better than stated test limits

PACKAGING (1)						
MODEL	REEL					
MODEL	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE		
WSL060318	8 mm / punched paper	178 mm / 7"	5000	EA		
WSL080518	8 mm / punched paper	178 mm / 7"	5000	EA		
WSL120618	8 mm / embossed plastic	178 mm / 7"	4000	EA		
WSL201018	12 mm / embossed plastic	178 mm / 7"	4000	EA		
WSL251218	12 mm / embossed plastic	178 mm / 7"	2000	EA		

#### **Notes**

- Embossed carrier tape per EIA-481
- (1) Additional packaging details at www.vishay.com/doc?20051

## Upgrade for Higher Current to WSLF



# WSL...18 High Power

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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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