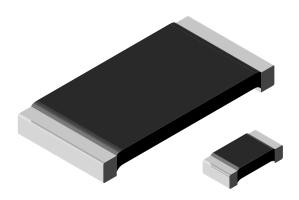




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# Power Metal Strip<sup>®</sup> Resistors, High Power (2 x Standard WSL), Low Value (Down to 0.0005 $\Omega$ ), Surface-Mount



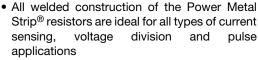
#### **LINKS TO ADDITIONAL RESOURCES**

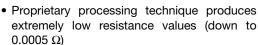






#### **FEATURES**





- 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 (1)
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>









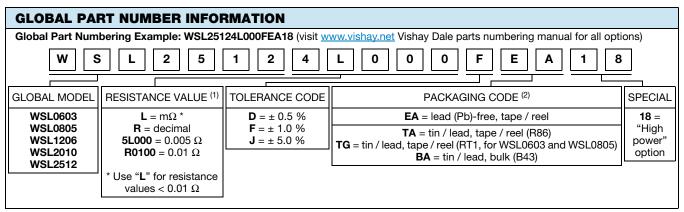
#### Notes

- 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
- 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	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
- (1) WSL1206...18 0.0005  $\Omega$  to 0.00099  $\Omega$  is only available with 2 % tolerance (G tolerance code)



#### Notes

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

(2) 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**

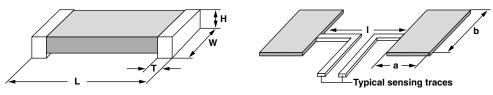
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TECHNICAL SPECIFICATIONS								
		RESISTOR CHARACTERISTICS						
PARAMETER	UNIT	WSL060318 <sup>(1)</sup>	WSL0805 18	WSL1206 18	WSL2010 18	WSL2512 18	WSL2816 18	
		$\pm$ 75 for 50 m $\Omega$ to 100 m $\Omega$		$\pm$ 75 for 7 m $\Omega$ to 500 m $\Omega$				
Component temperature coefficient	ppm/°C	$\pm$ 110 for 10 m $\Omega$ to 49 m $\Omega$	$\pm$ 110 for 5 m $\Omega$ to 6.9 m $\Omega$					
(including terminal) <sup>(2)</sup> TCR measured from -55 °C to +155 °C		-	$\pm$ 150 for 3 m $\Omega$ to 4.9 m $\Omega$					
		-	$\pm$ 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 associated with PCN-DR-00003-2020 for WSL0603...18. TCR performance is improved for +25 °C to +155 °C
- (2) Component TCR total TCR that includes the TCR effects of the resistor element and the copper terminal
- (3) Element TCR only applies to the alloy used for the resistor element; refer to item 1 in the construction illustration on the following page
- (4) 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.vishav.com/doc?30307
- Surface mount solder profile recommendations: <a href="https://www.vishay.com/doc?31052">www.vishay.com/doc?31052</a>

MODEL	RESISTANCE	DIMENSIONS SOLDER PAD DIMENSIO				INSIONS			
MODEL	RANGE ( $\Omega$ )	L	W	Н	Т	а	b	I	
WSL060318 <sup>(1)</sup>	0.01 to 0.1	$0.060 \pm 0.010$ (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)	0.013 ± 0.010 (0.330 ± 0.254)	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			0.041 ± 0.010	0.089 (2.26)	0.076 (1.93)	0.023 (0.58)	
WSL120618	0.001 to 0.0019			0.063 ± 0.010   0./	0.025 ± 0.010	$(1.04 \pm 0.254)$	0.086 (2.18)	0.076 (1.93)	0.029 (0.74)
W3L120010	0.002 to 0.0059	$(3.20 \pm 0.254)$		$(0.635 \pm 0.254)$	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 ± 0.010 (0.508 ± 0.254)	0.055 (1.40)	0.120 (3.05)	0.130 (3.30)	
	0.0005 to 0.00099				0.107 ± 0.010 (2.72 ± 0.254)	0.120		0.050	
WSL251218	0.001 to 0.0049		0.250 ± 0.010	0.125 ± 0.010	0.025 ± 0.010	0.087 ± 0.010 (2.21 ± 0.254)	(3.05)	0.145	(1.27)
VVOL251210	0.005 to 0.0069		(3.18 ± 0.254)	(0.635 ± 0.254)	0.047 ± 0.010 (1.19 ± 0.254)	0.083 (2.11)	(3.68)	0.125 (3.18)	
	0.007 to 0.04				0.030 ± 0.010 (0.762 ± 0.254)	0.065 (1.65)		0.160 (4.06)	

#### Note

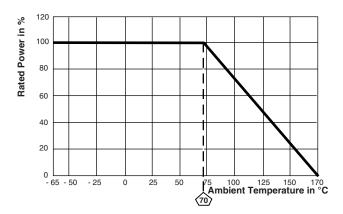
<sup>(1)</sup> PCN-DR-00003-2020 changed terminal height for WSL0603...18 from 0.013" ± 0.005" for clad construction to 0.016" ± 0.005" for welded construction



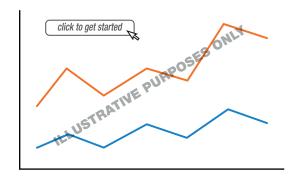
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#### **DERATING**

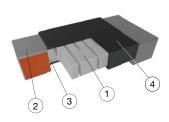


#### **PULSE CAPABILITY**



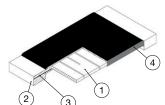
www.vishay.com/resistors/power-metal-strip-calculator

#### **WELDED CONSTRUCTION 2512, 2010, 1206, 0603**



- 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

#### **CLAD CONSTRUCTION 0805**



- 1 Resistive element: Ni-Cr
- (2) Terminal: solid copper, 100 % Sn (100 μ" min.) with 100 % Ni (20 μ" min.) under layer finish
- (3) Terminal to element weld
- 4 High temperature encapsulant: "siliconized polyester" coating material

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/resistors/power-metal-strip-calculator/	± 0.5 % + 0.0005 Ω			
Low temperature storage	-65 °C for 24 h	± 0.5 % + 0.0005 Ω			
High temperature exposure	1000 h at + 170 °C	± 1.0 % + 0.0005 Ω			
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	± 0.5 % + 0.0005 Ω			
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	+260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	± 0.5 % + 0.0005 Ω			
Moisture resistance	MIL-STD-202, method 106, 0 % power, 7a and 7b not required	± 0.5 % + 0.0005 Ω			

PACKAGING (1)								
MODEL		REEL						
	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 <a href="https://www.vishay.com/doc?20051">www.vishay.com/doc?20051</a>



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