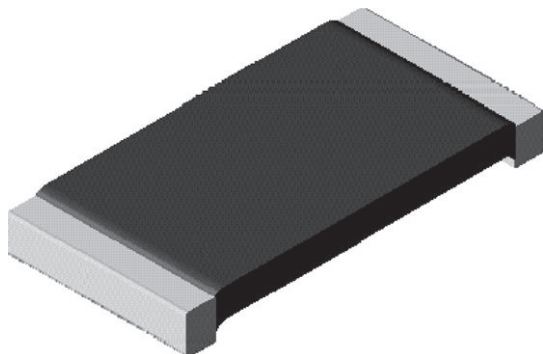




# Power Metal Strip® Resistors, Very High Power (to 3 W), Low Value (Down to 0.0005 Ω), Surface-Mount



## FEATURES

- Very high power to foot print size ratio (3 W in 2512, 2 W in 2010, 1 W in 1206, 0.5 W in 0805, and 0.4 W in 0603 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 extremely low resistance values (down to 0.0005 Ω)
- Sulfur resistance by construction that is unaffected by high sulfur environments
- Very low inductance 0.5 nH to 5 nH
- Low thermal EMF (<math>< 3 \mu\text{V}/^\circ\text{C}</math>)
- 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)



## LINKS TO ADDITIONAL RESOURCES



### 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](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	RESISTANCE VALUE RANGE <sup>(1)</sup> Ω		WEIGHT (typical) g/1000 pieces
			TOL. ± 0.5 %	TOL. ± 1.0 %	
WSLP0603	0603	0.4	0.015 to 0.1	0.01 to 0.1	1.9
WSLP0805	0805	0.5	0.005 to 0.1	0.005 to 0.1	4.8
WSLP1206	1206	1.0	0.005 to 0.05	0.0005 to 0.05	16.2
WSLP2010	2010	2.0	0.004 to 0.03	0.001 to 0.03	38.9
WSLP2512	2512	3.0	0.003 to 0.01	0.0005 to 0.01	63.6

### Notes

- Part marking: value; tolerance: due to resistor size limitations some resistors will be marked with only the resistance value
- <sup>(1)</sup> WSLP1206 0.0005 Ω to 0.00099 Ω is only available with 2 % tolerance (G tolerance code)

GLOBAL PART NUMBER INFORMATION																	
Global Part Numbering Example: WSLP1206R0100FEA (visit <a href="http://www.vishay.net">www.vishay.net</a> Vishay Dale parts numbering manual for all options)																	
W	S	L	P	1	2	0	6	R	0	1	0	0	F	E	A		
GLOBAL MODEL (8 digits)		RESISTANCE VALUE <sup>(1)</sup> (5 digits)					TOLERANCE CODE (1 digit)			PACKAGING CODE <sup>(2)</sup> (2 digits)		SPECIAL <sup>(3)</sup> (up to 2 digits)					
WSLP0603 WSLP0805 WSLP1206 WSLP2010 WSLP2512		L = mΩ* R = decimal 4L000 = 0.004 Ω R0100 = 0.01 Ω					D = ± 0.5 % F = ± 1.0 % G = ± 2.0 %			EA = lead (Pb)-free, tape / reel		Reserved for future specials					
* Use "L" for resistance values < 0.01 Ω																	

### Notes

- <sup>(1)</sup> WSL marking ([www.vishay.com/doc?30327](http://www.vishay.com/doc?30327)); WSL decade values ([www.vishay.com/doc?30117](http://www.vishay.com/doc?30117))
- <sup>(2)</sup> 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
- <sup>(3)</sup> Follow link for customization capabilities: [www.vishay.com/doc?48163](http://www.vishay.com/doc?48163)

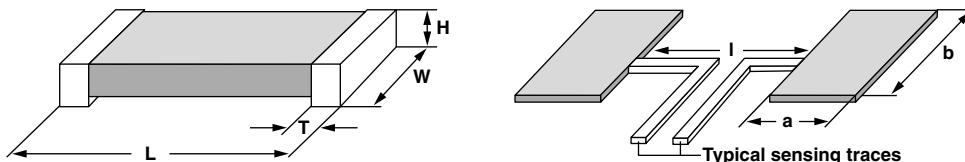


TECHNICAL SPECIFICATIONS					
PARAMETER	UNIT	RESISTOR CHARACTERISTICS			
		WSLP0603 <sup>(1)</sup>	WSLP0805	WSLP1206	WSLP2010
Component temperature coefficient (including terminal) <sup>(2)</sup> TCR measured from -55 °C to +155 °C	ppm/°C	± 75 for 50 mΩ to 100 mΩ	± 75 for 7 mΩ to 500 mΩ		
		± 110 for 10 mΩ to 49 mΩ	± 110 for 5 mΩ to 6.9 mΩ		
		-	± 150 for 3 mΩ to 4.9 mΩ		
		-	± 275 for 1 mΩ to 2.9 mΩ		
		-	± 400 for 0.5 mΩ to 0.99 mΩ		
Element TCR <sup>(3)</sup>	ppm/°C	< 20			
Operating temperature range	°C	-65 to +170			
Maximum working voltage <sup>(4)</sup>	V	$(P \times R)^{1/2}$			

**Notes**

- (1) Consult factory for detailed TCR performance across temperature range associated with PCN-DR-00003-2020 for WSLP0603. 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**



**Notes**

- 3D models available. WSLP models: [www.vishay.com/doc?30313](http://www.vishay.com/doc?30313)
- Surface-mount solder profile recommendations: [www.vishay.com/doc?31052](http://www.vishay.com/doc?31052)

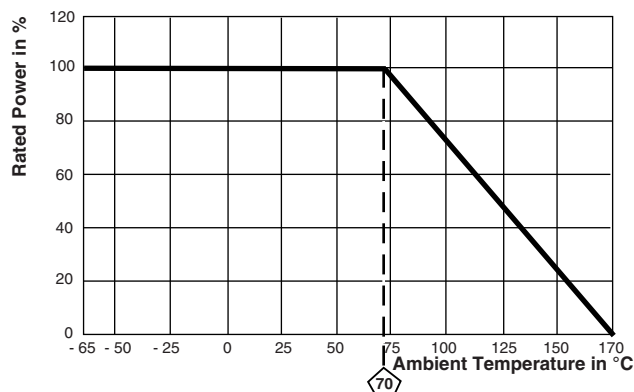
MODEL	RESISTANCE RANGE (Ω)	DIMENSIONS in inches (millimeters)				SOLDER PAD DIMENSIONS in inches (millimeters)		
		L	W	H	T	a	b	l
WSLP0603 <sup>(1)</sup>	0.01 to 0.1	0.060 ± 0.010 (1.52 ± 0.254)	0.030 ± 0.010 (0.76 ± 0.254)	0.016 ± 0.005 (0.406 ± 0.127)	0.015 ± 0.010 (0.381 ± 0.254)	0.040 (1.02)	0.040 (1.02)	0.020 (0.50)
WSLP0805	0.005 to 0.1	0.080 ± 0.010 (2.03 ± 0.254)	0.050 ± 0.010 (1.27 ± 0.254)	0.013 ± 0.010 (0.330 ± 0.254)	0.015 ± 0.010 (0.381 ± 0.254)	0.040 (1.02)	0.050 (1.27)	0.020 (0.50)
WSLP1206	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)
	0.001 to 0.0019				0.086 (2.18)	0.076 (1.93)	0.029 (0.74)	
	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 0.050				0.020 ± 0.010 (0.508 ± 0.254)	0.065 (1.65)	0.076 (1.93)	0.071 (1.80)
WSLP2010	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)
	0.007 to 0.03				0.020 ± 0.010 (0.508 ± 0.254)	0.055 (1.40)		0.130 (3.30)
WSLP2512	0.0005 to 0.00099	0.250 ± 0.010 (6.35 ± 0.254)	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 (1.27)
	0.001 to 0.0049				0.087 ± 0.010 (2.21 ± 0.254)			0.125 (3.18)
	0.005 to 0.0069				0.047 ± 0.010 (1.19 ± 0.254)	0.083 (2.11)		0.160 (4.06)
	0.007 to 0.01				0.030 ± 0.010 (0.762 ± 0.254)	0.065 (1.65)		

**Note**

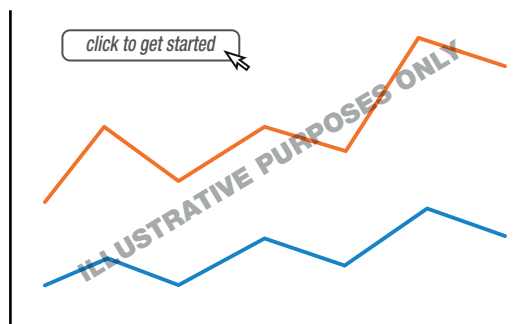
- (1) PCN-DR-00003-2020 changed terminal height for WSLP0603 from 0.013" ± 0.005" for clad construction to 0.016" ± 0.005" for welded construction



**DERATING**

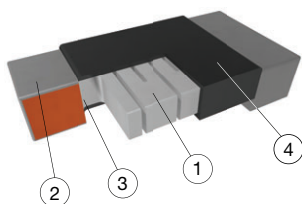


**PULSE CAPABILITY**



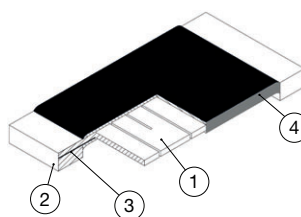
[www.vishay.com/resistors/power-metal-strip-calculator](http://www.vishay.com/resistors/power-metal-strip-calculator)

**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 Terminal: solid copper, 100 % Sn (200 μ" min.) with 100 % Ni (40 μ" min.) under layer finish
- ③ Terminal / element weld
- ④ Silicone coating with ink print

**CLAD CONSTRUCTION 0805**



- ① Resistive element: Ni-Cr
- ② Terminal: solid copper, 100 % Sn (200 μ" min.) with 100 % Ni (40 μ" min.) under layer finish
- ③ Terminal to element cladding
- 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; <a href="http://www.vishay.com/resistors/power-metal-strip-calculator/">www.vishay.com/resistors/power-metal-strip-calculator/</a>	± 0.5 % + 0.0005 Ω
Low temperature operation	-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 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, 7b not required	± 0.5 % + 0.0005 Ω

PACKAGING (1)				
MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES / REEL	CODE
WSLP0603	8 mm / punched paper	178 mm / 7"	5000	EA
WSLP0805	8 mm / punched paper	178 mm / 7"	5000	EA
WSLP1206	8 mm / embossed plastic	178 mm / 7"	4000	EA
WSLP2010	12 mm / embossed plastic	178 mm / 7"	4000	EA
WSLP2512	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](http://www.vishay.com/doc?20051)



## **Disclaimer**

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.