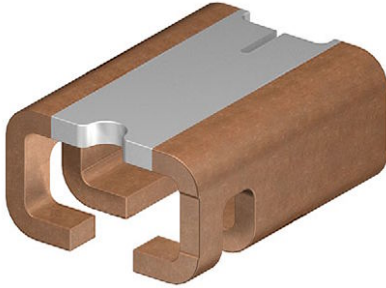


## Power Metal Strip<sup>®</sup> Resistors, Low Value, High Power, Surface-Mount, 4-Terminal


**DESIGN SUPPORT TOOLS**
[click logo to get started](#)

**FEATURES**

- 4-terminal design allows for 1 % tolerance down to 0.0005  $\Omega$
- High power-to-footprint print size ratio
- All welded Power Metal Strip<sup>®</sup> construction is 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
- Solid metal manganese-copper and manganese-copper-tin alloy resistive element with low TCR ( $< 20$  ppm/ $^{\circ}\text{C}$ )
- Very low inductance 0.5 nH to 5 nH
- Low thermal EMF ( $< 3$   $\mu\text{V}/^{\circ}\text{C}$ )
- Maximum solder temperature up to 350  $^{\circ}\text{C}$  for 30 s
- AEC-Q200 qualified <sup>(1)</sup>
- PATENT(S): [www.vishay.com/patents](http://www.vishay.com/patents)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE GRADE


**RoHS COMPLIANT**  
 HALOGEN FREE  
 GREEN (5-2008)

**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	TOLERANCE $\pm$ %	RESISTANCE VALUE RANGE <sup>(1)</sup> $\Omega$	WEIGHT (typical) g/1000 pieces
WSK1216	1216	3.0	1.0	1m	420
WSK1216	1216	5.0	1.0	0.5m	420

**Notes**

- Power rating depends on the max. temperature at the solder point, component placement density and the substrate material
- <sup>(1)</sup> Other values may be available, contact factory

**GLOBAL PART NUMBER INFORMATION**

 Global Part Numbering example: WSK12161L000FEA (WSK1216, 0.001  $\Omega$ ,  $\pm 1$  %)

 (visit [www.vishay.net](http://www.vishay.net) Vishay Dale parts numbering manual for all options)

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

GLOBAL MODEL (7 digits)
<b>WSK1216</b>

RESISTANCE VALUE (5 digits)
L = m $\Omega$
<b>1L000</b> = 0.0010 $\Omega$
<b>L5000</b> = 0.0005 $\Omega$

TOLERANCE CODE (1 digit)
<b>F</b> = $\pm 1.0$ %

PACKAGING CODE <sup>(1)</sup> (2 digits)
<b>EA</b> = lead (Pb)-free, tape/reel
<b>EK</b> = lead (Pb)-free, bulk

SPECIAL (2 digits)
(dash number) (up to 2 digits) from <b>1</b> to <b>99</b> as applicable

**Note**

- <sup>(1)</sup> Packaging code: EB (lead (Pb)-free) is a non-standard packaging code designating 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

**PATENT(S):** [www.vishay.com/patents](http://www.vishay.com/patents)
**This Vishay product is protected by one or more United States and international patents.**

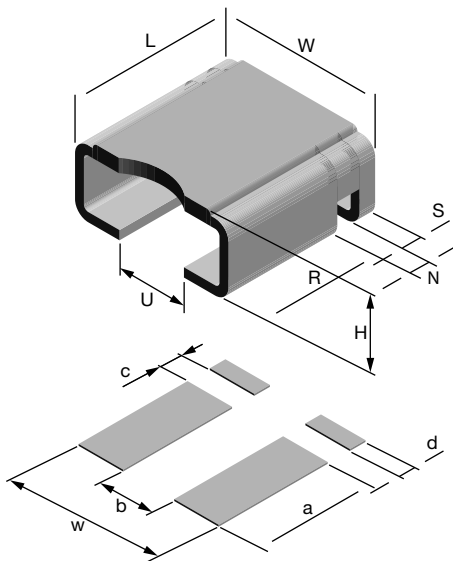
TECHNICAL SPECIFICATIONS		
PARAMETER	UNIT	WSK RESISTOR CHARACTERISTICS
Component temperature coefficient (including terminal) <sup>(1)</sup>	ppm/°C	< 50 ppm over temperature of +20 °C to +60 °C, 1 mΩ < 150 ppm over temperature of +20 °C to +60 °C, 0.5 mΩ
Element TCR <sup>(2)</sup>	ppm/°C	< 20
Operating temperature range	°C	-65 to +170
Maximum working voltage <sup>(3)</sup>	V	$(P \times R)^{1/2}$

**Notes**

- <sup>(2)</sup> Component TCR - total TCR that includes the TCR effects of the resistor element and the copper terminal
- <sup>(3)</sup> Element TCR - only applies to the alloy used for the resistor element
- <sup>(4)</sup> 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)

MODEL	DIMENSIONS in inches (millimeters)						
	W	L	H	R (REF.)	S	U	N
WSK1216	0.122 - 0.014 (3.1 - 0.35)	0.150 ± 0.012 (3.81 ± 0.3)	0.075 - 0.014 (1.9 - 0.35)	0.106 (2.70)	0.020 ± 0.004 (0.5 ± 0.1)	0.031 + 0.012 (0.8 + 0.3)	0.024 + 0.006 (0.6 + 0.15)



MODEL	SOLDER PAD DIMENSIONS				
	a	b	c	d	w
WSK1216	0.116 (2.95)	0.024 (0.61)	0.020 (0.50)	0.028 (0.70)	0.142 (3.60)

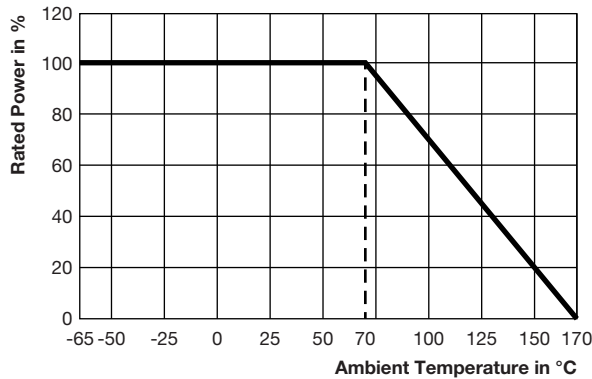
MODEL	RESISTANCE VALUE (mΩ)	THERMAL RESISTANCE	ELEMENT MATERIAL
WSK1216	0.5	14.5	MnCuSn
	1.0	7.3	MnCu

**Notes**

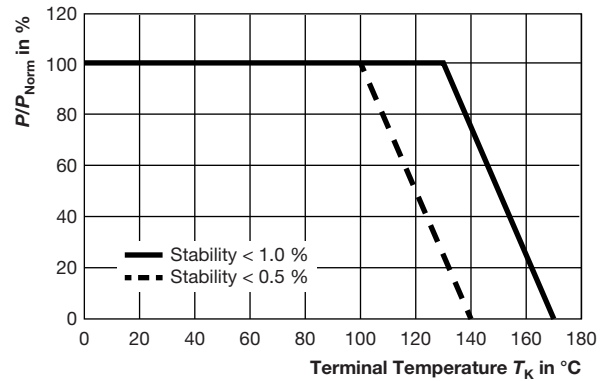
- 3D models available: [www.vishay.com/doc?30334](http://www.vishay.com/doc?30334)
- Surface mount solder profile recommendations: [www.vishay.com/doc?31052](http://www.vishay.com/doc?31052)



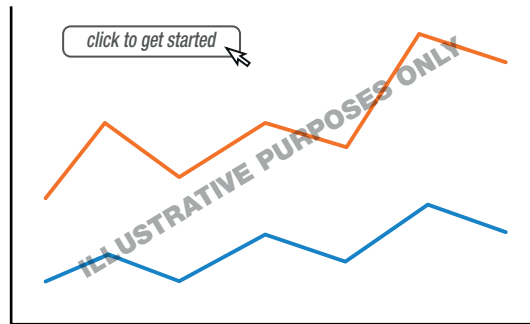
DERATING - AMBIENT TEMPERATURE



DERATING - TERMINAL TEMPERATURE



PULSE CAPABILITY



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

PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST LIMITS
Thermal shock	-55 °C to +150 °C, 1000 cycles, 15 min at each extreme	± 0.5 %
Short time overload	5x rated power for 5 s	± 0.5 %
Low temperature operation	-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	3x at 250 °C ± 5 °C for 30 s ± 5 s	± 0.5 %
Moisture resistance	MIL-STD-202, method 106, 0 % power, 7b not required	± 0.5 %

PACKAGING (1)				
MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE
WSK1216	12 mm/embossed plastic	330 mm/13"	3000	EA

Notes

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



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