# WSK2512



Vishay Dale

## **Power Metal Strip<sup>®</sup> Resistors,** Low Value (Down to 0.0005 $\Omega$ ), Surface-Mount, 4-Terminal



## LINKS TO ADDITIONAL RESOURCES



## **FEATURES**

- 4-terminal design allows for 1 % tolerance down to 0.0005  $\Omega$  and 0.5 % tolerance down to 0.001  $\Omega$
- All welded construction of the Power Metal Strip<sup>®</sup> 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
- (e3) RoHS\* Available HALOGEN FREE Available GREEN (5-2008)

- Solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- Very low inductance 0.5 nH to 5 nH
- AEC-Q200 qualified <sup>(1)</sup>
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

#### 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: <u>www.vishay.com/doc?49924</u>
- "SMD Current Sense: AEC-Q200 vs. Vishay Qualification" technical note: <u>www.vishay.com/doc?30416</u>
- <sup>(1)</sup> Flame retardance test may not be applicable to some resistor technologies

STANDARD ELECTRICAL SPECIFICATIONS								
GLOBAL MODEL	SIZE	POWER RATING P <sub>70 °C</sub> W	RES	WEIGHT (typical)				
			TOL. ± 0.1 %	TOL. ± 0.5 %	TOL. ± 1.0 %	g/1000 pieces		
WSK2512	2512	1.0	0.01 to 0.2	0.001 to 0.2	0.0005 to 0.2	63.6		

#### Note

- · Part marking: value, tolerance; due to resistor size limitations some resistance values will be marked with only the resistance value
- "Thermal Management for Surface-Mount Devices" white paper: <u>www.vishav.com/doc?30380</u>



#### Notes

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

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TECHNICAL SPECIFICATIONS					
PARAMETER	UNIT	RESISTOR CHARACTERISTICS			
Temperature coefficient	ppm/°C	$\pm$ 350 for 0.5 mΩ to 0.99 mΩ, $\pm$ 250 for 0.001 Ω to 0.0029 Ω, $\pm$ 75 for 0.003 Ω to 0.0049 Ω, $\pm$ 35 for 0.005 Ω to 0.2 Ω			
Operating temperature range	°C	-65 to +170			
Maximum working voltage	V	$(P \times R)^{1/2}$			

Note

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• "Temperature Coefficient of Resistance for Current Sensing" white paper: <u>www.vishay.com/doc?30405</u>

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



#### Notes

• 3D models available: www.vishay.com/doc?30323

• Surface-mount solder profile recommendations: <u>www.vishay.com/doc?31052</u>

	DIMENSIONS								
MODEL	RESISTANCE RANGE Ω	L	w	н	т	А	В		
	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)	0.105 ± 0.010 [2.66 ± 0.254]	0.030 ± 0.010 (0.762 ± 0.254)	0.020 ± 0.010 (0.508 ± 0.254)		
WSK2512	0.001 to 0.0049				0.087 ± 0.010 (2.21 ± 0.254)				
	0.005 to 0.2				0.047 ± 0.010 (1.19 ± 0.254)				

	SOLDER PAD DIMENSIONS								
MODEL	RESISTANCE RANGE Ω	а	b	С	d	e	I		
WSK2512	0.0005 to 0.0049	0.130 (3.30)	0 100 (2 20)	0.030 (0.76)	0.020 (0.51)	0.067 (1.70)	0.065 (1.65)		
W3K2512	0.005 to 0.2	0.090 (2.29)	0.130 (3.30)				0.145 (3.68)		

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## **ELECTRICAL CONNECTION**



#### Notes

- E1 and E2: voltage sense connections
- I1 and I2: current connection

### DERATING



## **PULSE CAPABILITY**



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 % + 0.0005 Ω				
Short time overload	5 x rated power for 5 s	$\pm$ 0.5 % + 0.0005 $\Omega$				
Low temperature operation	-65 °C for 24 h	$\pm$ 0.5 % + 0.0005 $\Omega$				
High temperature exposure	1000 h at +170 °C	± 1.0 % + 0.0005 Ω				
Bias humidity	+85 °C, 85 % RH, 10 % bias, 1000 h	$\pm$ 0.5 % + 0.0005 $\Omega$				
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"	$\pm$ 1.0 % + 0.0005 $\Omega$				
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 <sup>(1)</sup>							
MODEL	REEL						
MODEL	TAPE WIDTH	DIAMETER	PIECES / REEL	CODE			
WSK2512	12 mm / embossed plastic	178 mm / 7"	2000	EA			

#### Notes

Embossed carrier tape per EIA-481

<sup>(1)</sup> Additional packaging details at <u>www.vishay.com/doc?20051</u>

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