

Power Metal Strip[®] Resistors, Low Value (Down to 0.0003 Ω), Surface-Mount

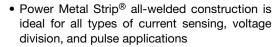


DESIGN SUPPORT TOOLS AVAILABLE





FEATURES





AUTOMOTIVE

 Solid metal nickel-chrome, manganese-copper, or manganese-copper-tin alloy resistive element with low TCR (< 20 ppm/°C)



 Proprietary processing technique produces extremely low resistance values, down to 0.0003 Ω



 Sulfur resistance by construction that is unaffected by high sulfur environments GREEN (5-2008)

- Very low inductance (< 2 nH)
- Low thermal EMF (< 3 μV/°C)
- AEC-Q200 qualified (1)
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

Notes

- 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 MODEL	SIZE	POWER RATING P _{70 °C} ⁽¹⁾ W	POWER RATING P _{100 °C} (2) W	TOLERANCE %	RESISTANCE VALUE RANGE	RESISTANCE VALUES CURRENTLY AVAILABLE (3)	WEIGHT (typical) g/1000 pieces	
	2512	6.0	3.0	1.0, 5.0	0.3m to 0.5m	0.3m, 0.5m	258	
WSLF2512	2512	5.0	3.0	1.0, 5.0	1m to 2m	1m, 1.3m, 2m	212	
	2512	4.0	2.0	1.0, 5.0	3m	3m	267	

Notes

- · Part marking: no part marking on these parts
- (1) See "Ambient Temperature Derating" on next page, Fig. 1
- (2) See "Terminal Temperature Derating" on next page, Fig. 2
- (3) Other values may be available, contact factory

GLOBAL PART NUMBER INFORMATION Global Part Numbering: WSLF25121L000FEA (WSLF2512, 0.001 Ω , ± 1 %) (visit www.vishay.net Vishay Dale parts numbering manual for all options) W 5 0 0 GLOBAL MODEL RESISTANCE VALUE TOLERANCE CODE PACKAGING CODE (1) SPECIAL (2) (8 digits) (5 digits) (1 digit) (2 digits) (2 digits) EA = lead (Pb)-free, tape/reel WSLF2512 $F = \pm 1.0 \%$ $\mathbf{L} = \mathbf{m}\Omega$ Reserved for future **L5000** = 0.0005Ω $J = \pm 5.0 \%$ EK = lead (Pb)-free, bulk specials **1L000** = 0.0010Ω

Notes

Revision: 03-May-2019

- (1) Packaging code: EB (lead (Pb)-free) are non-standard packaging codes designating 1000 piece reels. These non-standard packaging codes are identical to our standard EA (lead (Pb)-free), except that they have a package quantity of 1000 pieces
- (2) Follow link for customization capabilities: www.vishay.com/doc?48163

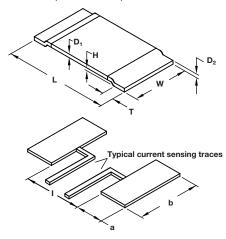


TECHNICAL SPECIFICATIONS					
PARAMETER	UNIT	WSLF RESISTOR CHARACTERISTICS			
Component temperature coefficient		\pm 200 for 0.3 m Ω and 0.5 m Ω			
(including terminal) (1)	ppm/°C	± 170 for 1.0 m			
TCR measured from -55 °C to 150 °C		\pm 70 for 2 m Ω and 3 m Ω			
Element TCR (2)	ppm/°C	< 20			
Operating temperature range	°C	-65 to +170			
Maximum working voltage (3)	V	$(P \times R)^{1/2}$			

Notes

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





- Resistive element: element material used is dependent on resistance value.
 Refer to Element Material in table)
- 2) Terminal: solid copper
- 3) Terminal / element weld

Notes

- 3D models available: www.vishav.com/doc?30335
- Surface mount solder profile recommendations: www.vishay.com/doc?31052

MODEL		DIMEN	ISIONS	SOLDER PAD DIMENSIONS			
	L	w	Н	Т	а	b	1
WSLF2512	0.250 ± 0.006 (6.35 ± 0.15)	0.120 ± 0.008 (3.02 ± 0.2)	0.0138 ± 0.0012 (0.35 ± 0.03)	0.045 - 0.016 (1.14 - 0.4)	0.71 (1.80)	0.13 (3.40)	0.13 (3.40)

GLOBAL MODEL	RESISTANCE	THERMAL	THICKNESS in In		
	VALUE (mΩ)	RESISTANCE (°C/W)	D ₁	D ₂	ELEMENT MATERIAL
WSLF2512	0.3	3.8	0.040 (1.02)	0.040 (1.02)	Mn-Cu-Sn
	0.5	6.7	0.033 (0.84)	0.033 (0.84)	Mn-Cu
	1.0	12.1	0.017 (0.43)	0.017 (0.43)	Mn-Cu
	1.3	14.6	0.013 (0.33)	0.013 (0.33)	Mn-Cu
	2.0	17.1	0.028 (0.71)	0.028 (0.71)	Ni-Cr
	3.0	18.2	0.019 (0.48)	0.019 (0.48)	Ni-Cr

Note

⁽¹⁾ The full power rating of Power Metal Strip resistors are dependent upon the ability of the circuit board to dissipate the heat energy created in the resistance element. It is recommended to follow common design practices for power semiconductors that ensure the junction temperature is maintained with in thermal limits by using large pad surfaces, thermal vias, heavier copper weights, internal layers as well as other thermal spreading features. The Thermal resistance values provided function in the same manner as junction to terminal temperature



DERATING

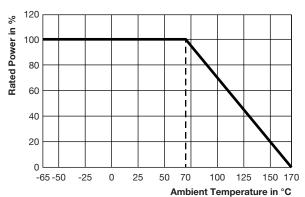


Fig. 1 - Ambient Temperature Derating ($P_{70~^{\circ}\text{C}}$ of Standard Electrical Specification Table)

DERATING - TERMINAL TEMPERATURE

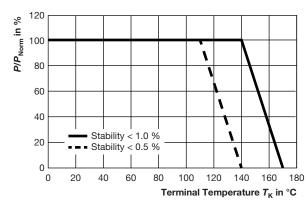
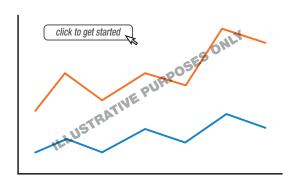


Fig. 2 - $P_{100\,^{\circ}\mathrm{C}}$ Rated Power; of Standard Electrical Specification Table Example L5000

PULSE CAPABILITY



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

PERFORMANCE					
TEST	CONDITIONS OF TEST	TEST LIMITS			
Thermal shock	-55 °C to +150 °C, 2000 cycles, 15 min at each extreme	± 0.5 %			
Short time overload	5x rated power for 5 s	± 0.5 %			
Low temperature storage	-65 °C for 24 h	± 0.1 %			
High temperature exposure	2000 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	± 0.2 %			
Vibration	Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h	± 0.2 %			
Load life	2000 h at +70 °C, 1.5 h "ON", 0.5 h "OFF"	± 1.0 %			
Resistance to solder heat	+260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	± 0.5 %			
Moisture resistance	MIL-STD-202, method 106, 0 % power, 7a and 7b not required	± 0.1 %			

PACKAGING (1)							
MODEL	REEL						
MODEL	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE			
WSLF2512	12 mm/embossed plastic	330 mm / 13"	4000	EA			

Notes

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



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