WSLF



Vishay Dale

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



LINKS TO ADDITIONAL RESOURCES



FEATURES

• Power Metal Strip[®] all-welded construction is ideal for all types of current sensing, voltage division, and pulse applications



RoHS

COMPLIANT

- Solid metal nickel-chrome, manganese-copper, or manganese-copper-tin alloy resistive element with low TCR (< 20 ppm/°C)
- HALOGEN FREE Proprietary processing technique produces GREEN extremely low resistance values, down to (5-2008) 0.0003 Ω
- Sulfur resistance by construction that is unaffected by high sulfur environments
- Very low inductance (< 2 nH)
- Low thermal EMF (< 3 µV/°C)
- AEC-Q200 qualified (1)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Notes

- Follow link to "Overview of Automotive Grade Products" for more details: www.vishav.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 Ω	E RESISTANCE VALUES CURRENTLY AVAILABLE ⁽³⁾ (typic Ω g/1000 μ		
	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	
	2512	3.0	2.0	1.0, 5.0	4m	4m	267	

Notes

- Part marking: no part marking on these parts
- ⁽¹⁾ See Fig. 1 Ambient Temperature Derating
- ⁽²⁾ See Fig. 2 Terminal Temperature Derating
- ⁽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 S L F 2 5 2 1 L 0 0 Е 1 0 F Δ SPECIAL (2) RESISTANCE VALUE GLOBAL MODEL TOLERANCE CODE PACKAGING CODE (1) (5 digits) (8 digits) (1 digit) (2 digits) (2 digits) WSLF2512 EA = lead (Pb)-free, tape / reel $L = m\Omega$ **F** = ± 1.0 % Reserved for future $L5000 = 0.0005 \ \Omega$ **J** = ± 5.0 % specials **1L000** = 0.0010 Ω

Notes

(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

Follow link for customization capabilities: www.vishay.com/doc?48163

Revision: 30-Jun-2020

For technical questions, contact: <u>ww2bresistors@vishay.com</u>

Document Number: 30193

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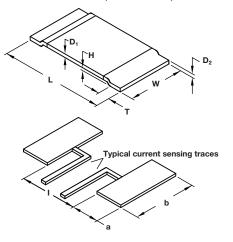
TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS				
UNIT	WSLF RESISTOR CHARACTERISTICS			
	\pm 200 for 0.3 m Ω and 0.5 m Ω			
ppm/°C	\pm 170 for 1.0 m Ω and 1.3 m Ω			
	\pm 70 for 2 m $\Omega,$ 3 m $\Omega,$ and 4 m Ω			
ppm/°C	< 20			
°C	-65 to +170			
V	(P x R) ^{1/2}			
	UNIT			

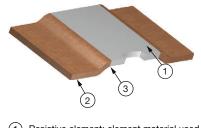
Notes

- (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)



CONSTRUCTION OUTLINE



- (1) 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: <u>www.vishay.com/doc?30335</u>

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

MODEL		DIMEN	ISIONS	SOLDER PAD DIMENSIONS			
	L	w	н	т	а	b	I
WSLF2512	0.250 ± 0.006 (6.35 ± 0.15)	0.120 ± 0.008 (3.02 ± 0.2)	$\begin{array}{c} 0.0138 \pm 0.0012 \\ (0.35 \pm 0.03) \end{array}$	0.045 - 0.016 (1.14 - 0.4)	0.071 (1.80)	0.13 (3.40)	0.13 (3.40)

GLOBAL	RESISTANCE	THERMAL	THICKNESS in inc		
MODEL	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
	4.0	18.5	0.014 (0.36)	0.014 (0.36)	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

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F	For technical questions, contact:	

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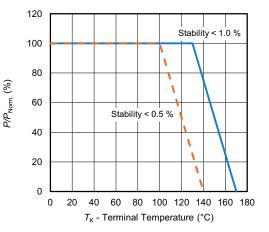


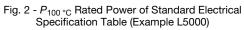
DERATING- AMBIENT TEMPERATURE

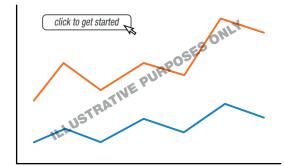
Fig. 1 - P70 °C of Standard Electrical Specification Table

PULSE CAPABILITY









www.vishay.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	5 x 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 <u>www.vishay.com/doc?20051</u>

Revision: 30-Jun-2020

Document Number: 30193



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