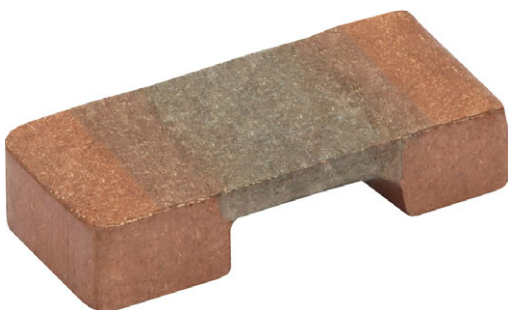


Power Metal Strip® Current Sense Resistors, Low Value (0.3 mΩ to 3 mΩ), Surface-Mount, High Power



LINKS TO ADDITIONAL RESOURCES



FEATURES

- Ideal for all types of current sensing and pulse applications including switching and linear power supplies, instruments, power amplifiers, shunts, power inverters, and battery management
- Proprietary processing technique produces low resistance values (0.3 mΩ to 3 mΩ)
- Solid metal manganese-copper and iron-chromium-aluminum alloy resistive element with low TCR (< 20 ppm/°C)
- Very low inductance 0.5 nH to 5 nH
- Low thermal EMF (< 3 μV/°C)
- Sulfur resistance by construction that is unaffected by high sulfur environments
- AEC-Q200 qualified rev. E
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	SIZE	POWER RATING $P_{70^{\circ}\text{C}}$ (1) W	POWER RATING $P_{100^{\circ}\text{C}}$ (2) W	TOLERANCE %	RESISTANCE VALUE RANGE Ω	WEIGHT (typical) g/1000 pieces
WSLF1206	1206	5.0	3.0	± 1, ± 5	0.3m	45
	1206	5.0	3.0	± 1, ± 5	0.5m	30
	1206	4.0	2.0	± 1, ± 5	1m	26
	1206	4.0	2.0	± 1, ± 5	2m	34
	1206	4.0	2.0	± 1, ± 5	3m	28

Notes

- Part marking: no part marking on these parts
- "Thermal Management for Surface-Mount Devices" white paper: www.vishay.com/doc?30380
- (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

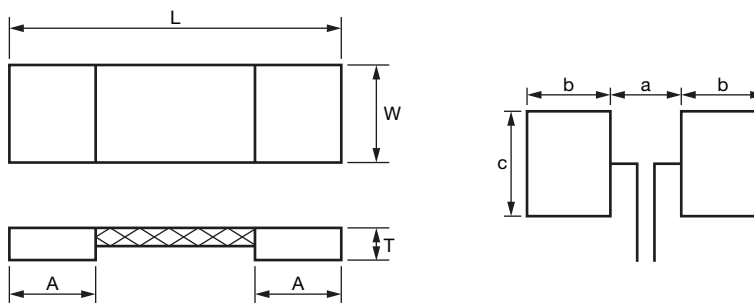
Global Part Numbering Example: WSLF1206L5000FE66

W	S	L	F	1	2	0	6	L	5	0	0	0	F	E	6
GLOBAL MODEL				CASE SIZE				RESISTANCE VALUE				TOLERANCE CODE		PACKAGING CODE	
WSLF				1206				L = mΩ L5000 = 0.0005 Ω				F = ± 1.0 % J = ± 5.0 %		E6 = lead (Pb)-free, tape/reel	

TECHNICAL SPECIFICATIONS		
PARAMETER	UNIT	WSLF1206 RESISTOR CHARACTERISTICS
Temperature coefficient (-65 °C to +170 °C) (complete resistor) ⁽¹⁾	ppm/°C	± 275 for 0.3 mΩ
		± 200 for 0.5 mΩ
		± 100 for 1 mΩ
		± 75 for 2 mΩ to 3 mΩ
Temperature coefficient (20 °C to 60 °C) (only element material) ⁽²⁾	ppm/°C	± 20
Operating temperature range	°C	-55 to +170
Maximum working voltage ⁽³⁾	V	$(P \times R)^{1/2}$

Notes

- Consult factory for detailed TCR performance across full temperature range as performance is resistance value specific
- "Temperature Coefficient of Resistance for Current Sensing" white paper: www.vishay.com/doc?30405
- (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

Note

- Surface mount solder profile recommendations: www.vishay.com/doc?31052

GLOBAL MODEL	RESISTANCE VALUE (mΩ)	DIMENSIONS				SOLDER PAD DIMENSIONS		
		L	W	T	A	a	b	c
WSLF1206	0.3	0.126 ± 0.008 (3.2 ± 0.2)	0.065 ± 0.008 (1.65 ± 0.2)	0.047 ± 0.006 (1.20 ± 0.15)	0.031 ± 0.008 (0.80 ± 0.2)	0.061 (1.55)	0.051 (1.30)	0.074 (1.88)
	0.5			0.035 ± 0.006 (0.90 ± 0.15)				
	1			0.033 ± 0.006 (0.85 ± 0.15)				
	2			0.031 ± 0.006 (0.80 ± 0.15)				
	3			0.031 ± 0.006 (0.80 ± 0.15)				

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 within 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

GLOBAL MODEL	RESISTANCE VALUE (mΩ)	THERMAL RESISTANCE (°C/W)	ELEMENT MATERIAL
WSLF1206	0.3	1.7	MnCuSn
	0.5	4.9	MnCu
	1	10	MnCu
	2	14	FeCrAl
	3	20	FeCrAl

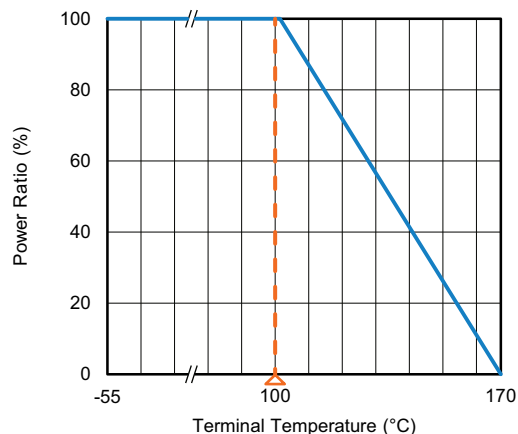
DERATING - TERMINAL TEMPERATURE


Fig. 1 - $P_{100\text{ }^{\circ}\text{C}}$ Rated Power of Standard Electrical Specification Table (Example L5000)

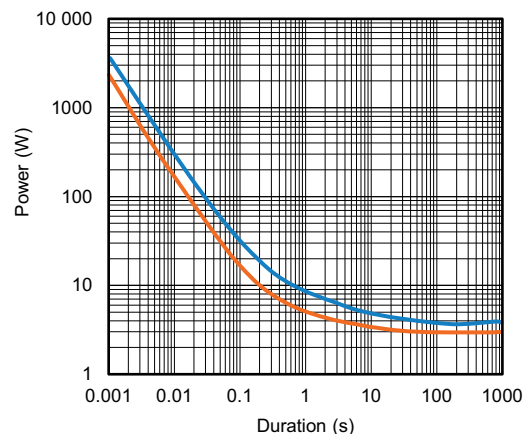
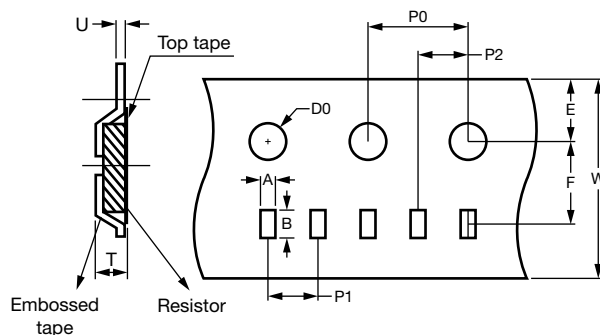
PULSE CAPABILITY


Fig. 2 - Pulsed Power Characteristics

Note

- The curve is valid for resistance value 0.3 mΩ to 1 mΩ. Other pulsed power characteristics on request

PERFORMANCES			
DESCRIPTION	AEC TEST NUMBER	TEST CONDITIONS	LIMIT
High temperature exposure	3	MIL-STD-202 Method 108; 1000 h at +170 °C, no power. Measurement at 24 h ± 4 h after test conclusion	± (1.0 %)
Temperature cycling	4	JESD22 Method JA-104; 1000 cycles (-55 °C to +155 °C) Measurement at 24 h ± 4 h after test conclusion. 15 min. dwell time at each temperature extreme. 1 min maximum transition time	± (1.0 %)
Moisture resistance	6	MIL-STD-202 Method 106; t = 24 h/cycle. Note: Steps 7a and 7b not required, 0 % power, 65 °C	± (1.0 %)
Biased humidity	7	MIL-STD-202 Method 103; 1000 h at 85 °C / 85 % RH. 10 % of operating power. Measurement 24 h ± 4 h after test conclusion	± (1.0 %)
Operational life	8	MIL-STD-202 Method 108; 1000 h test; Condition D; 1.5 h "ON", 0.5 h "OFF"; terminal temperature +100 °C at rated power. Measurement 24 h ± 4 h after test conclusion	± (1.0 %)
Physical dimension	10	JESD22 Method JB-100; verify physical dimensions to the applicable device detail specification. Note: user(s) and suppliers spec. Electrical test not required.	See datasheet
Mechanical shock	13	MIL-STD-202 Method 213; Figure 1 of Method 213. Condition C.	± (1.0 %)
Vibration	14	MIL-STD-202 Method 204; 5 g's for 20 min., 12 cycles each of 3 orientations. Test from 10 Hz to 2000 Hz. Verify transfer load using a laser vibrometer or other adequate measuring device.	± (1.0 %)
Resistance to solder heat	15	The specimen chip shall be immersed in the flux specified in the solder bath 260 °C ± 5 °C for 10 s ± 1 s (MIL-STD-202, Method 210)	± (1.0 %)
ESD	17	AEC-Q200-002 or 25 kV HBM	± (1.0 %)
Functional solderability	18.F1	J-STD-002; Method S1 lead (Pb)-free; 4 h at +155 °C dry heat; max. reflow temp. +260 °C; no electrical test; 50 x mag.	> 95 % coverage
Functional solderability	18.F2	J-STD-002; Method S Sn-Pb; 4 h at +155 °C dry heat; max. reflow temp +230 °C; no electrical test; 50 x mag.	> 95 % coverage
Electrical characterization	19	RTC at -65 °C and 170 °C	Refer to Technical Specifications table
Electrical characterization	19	User spec.; RTC tested at -55 °C, -40 °C, -15 °C, +5 °C, +45 °C, +65 °C, +85 °C, +105 °C, +125 °C, +150 °C, +170 °C. Tref +25 °C	± 175 ppm/°C
Board flex	21	AEC-Q200-005; 60 s minimum holding time	± (1.0 %)
Terminal strength (SMD)	22	AEC-Q200-006; must meet specification, and no evidence of cracking or shearing	± (1.0 %)
Low temperature storage	26	MIL-PRF-26 paragraph 4.7.12; -65 °C; measurement at 24 h and continued for 1000 h	± (0.5 %)
Short time overload	25	MIL-PRF-55342 paragraph 4.8.6; 5 x rated power for 5 s	± (1.0 %)

PAPER TAPE SPECIFICATIONS


TYPE	CARRIER DIMENSIONS (in millimeters)										
	A	B	E	F	W	P0	P1	P2	D0	T (REF.)	U (REF.)
WSLF1206	2.0 ± 0.1	3.6 ± 0.1	1.75 ± 0.1	5.5 ± 0.05	12.0 ± 0.2	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.50 ± 0.05	1.2 ± 0.2	0.25 ± 0.05

PACKAGING				
MODEL	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE
WSLF1206	Embossed paper tape	178 mm / 7"	3000	E66

Note

- Embossed carrier tape per EIA (EIAJ)

LINKS TO RELATED DOCUMENTS	
WHITE PAPER	
Thermal Management for Surface-Mount Devices	www.vishay.com/doc?30380
Temperature Coefficient of Resistance for Current Sensing	www.vishay.com/doc?30405



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