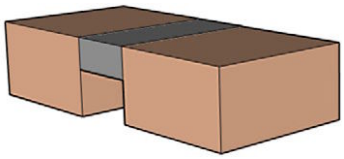
Power Metal Strip® Current Sense Resistors, Low Value (0.3 mΩ to 3 mΩ), Surface-Mount, High Power



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 nickel-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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

HALOGEN FREE

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	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

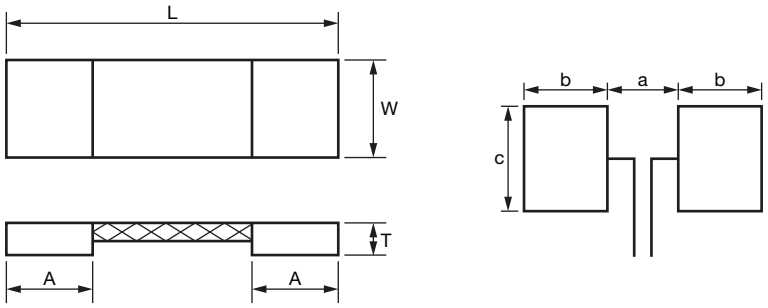
TECHNICAL SPECIFICATIONS		
PARAMETER	**UNIT**	**WSLF1206 RESISTOR CHARACTERISTICS**
Temperature coefficient (-65 °C to +170 °C) WFMA (complete resistor) (1)	ppm/°C	± 275 for 0.3 mΩ
		± 200 for 0.5 mΩ
		± 100 for 1 mΩ
		± 75 for 2 mΩ to 3 mΩ
Temperature coefficient (20 °C to 60 °C) (only element material) (2)	ppm/°C	± 20
Operating temperature range	°C	-65 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	3.2 ± 0.2	1.65 ± 0.2	1.20 ± 0.15	0.80 ± 0.2	1.55	1.30	1.88
	0.5			0.90 ± 0.15				
	1			0.85 ± 0.15				
	2			0.85 ± 0.15				
	3			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 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

GLOBAL MODEL	RESISTANCE VALUE (mΩ)	ELEMENT MATERIAL
WSLF1206	0.3	MnCuSn
	0.5	MnCu
	1	MnCu
	2	FeCrAl
	3	FeCrAl

DERATING - AMBIENT TEMPERATURE

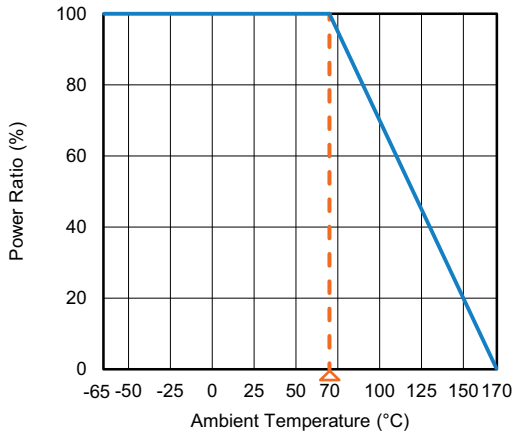


Fig. 1 - $P_{70\ °C}$ of Standard Electrical Specification Table

DERATING - TERMINAL TEMPERATURE

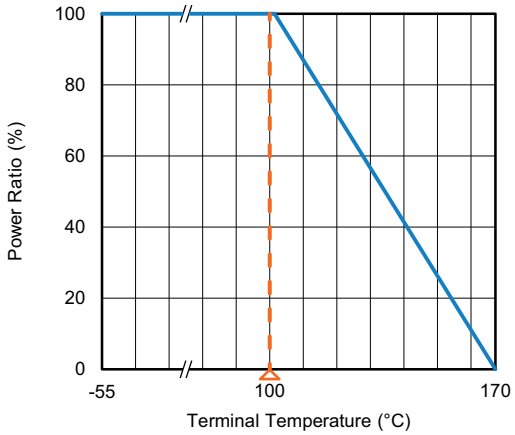


Fig. 2 - $P_{100\ °C}$ Rated Power of Standard Electrical Specification Table (Example L5000)

PULSE CAPABILITY

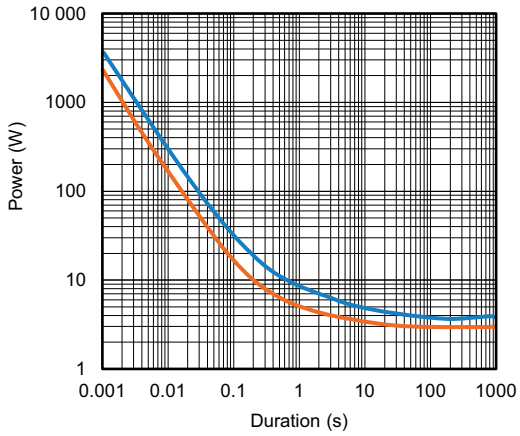
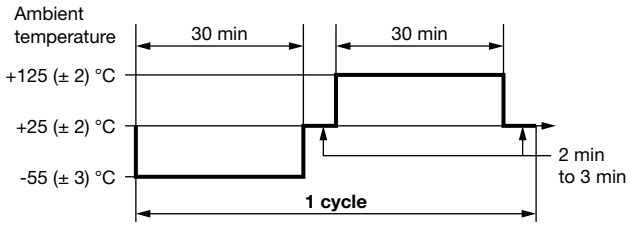


Fig. 3 - Pulsed Power Characteristics

Note

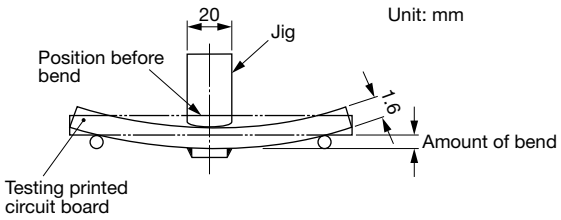
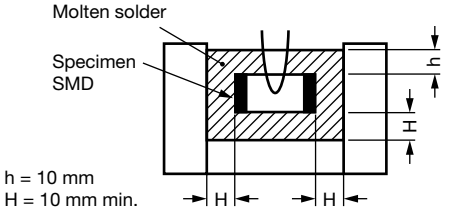
- The curve is valid for resistance value 0.3 mΩ to 1 mΩ. Other pulsed power characteristics on request

PERFORMANCES

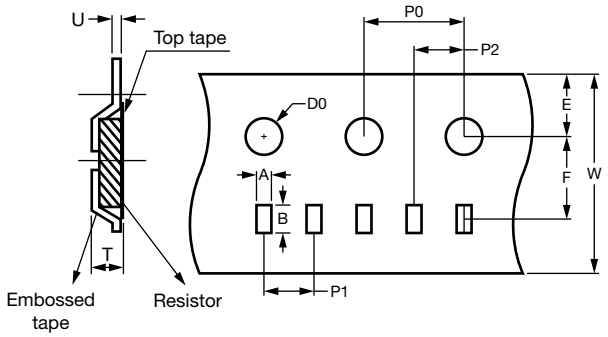
ENVIRONMENTAL PERFORMANCE			
NO.	**ITEM**	**TEST CONDITION**	**SPECIFICATION**
1	Short time overload	Loading 5 times rate power for 5 seconds	ΔR: ± (1 % + 0.0005 Ω)
2	Temperature coefficient of resistance (TCR)	+25 °C / +125 °C (JIS-C5202-5.2) TCR (ppm/°C) = $\frac{\Delta R}{R \times \Delta t} \times 10^6$	Refer to Electrical Specification
3	Moisture resistance	The specimens shall be placed in a chamber and subjected to a relative humidity of 90 % to 98 % and a temperature of 25 °C / 65 °C, 10 cycles (MIL-STD-202, method 106)	ΔR: ± (1 % + 0.0005 Ω)
4	High temperature exposure	The chip (mounted on board) is exposed in the heat chamber 125 °C for 1000 hours. (JIS-C5202-7.2)	ΔR: ± (1 % + 0.0005 Ω)
5	Load life	Apply rated power for 1000 hours with 1.5 hours ON and 0.5 hour OFF. (JIS-C5202-7.10)	ΔR: ± (1 % + 0.0005 Ω)
6	Rapid change of temperature	The chip (mounted on board) is exposed, -55 °C ± 3 °C (30 min.) / +125 °C ± 2 °C (30 min.) for 5 cycles. The following conditions as the following figure. (JIS-C5202-7.4) 	ΔR: ± (1 % + 0.0005 Ω)

Notes

- Surface temperature of component should be below 100 °C
- "*" Not include soldering deviation causing

FUNCTION PERFORMANCE			
NO.	**ITEM**	**TEST CONDITION**	**SPECIFICATION**
1	Bending strength	Mount the chip to test 90 mm (L) x 40 mm (W) FR4 printed circuit board substrate. Apply pressure in direction of arrow unit band width reaches 2 mm (+0.2 mm / -0 mm) illustrated in the figure below and hold for 10 s ± 1 s (JIS-C5202-6.1) 	ΔR: ± (1 % + 0.0005 Ω)
8	Solderability	The specimen chip shall be immersed into the flux specified in the solder bath 235 °C ± 5 °C for 2 s ± 0.5 s. It shall be immersed to a point 10 mm from its root. (Sn96.5 / Ag3.0 / Cu0.5) (JIS-C5 202-6.11) 	Solder shall be covered 95 % or more of the electrode area.

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)

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