

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



STANDARD ELECTRICAL SPECIFICATIONS

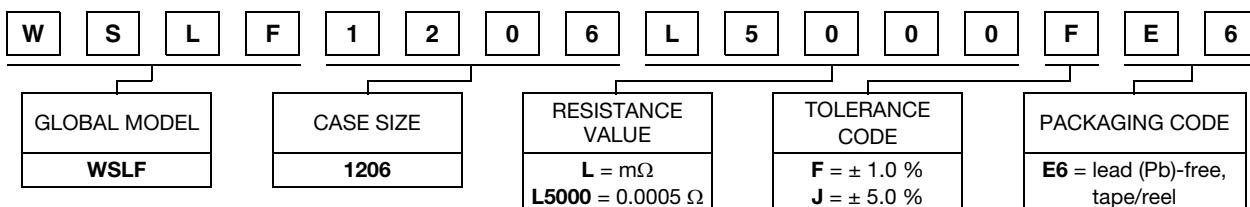
GLOBAL MODEL	SIZE	POWER RATING $P_{70\text{ °C}}$ ⁽¹⁾ W	POWER RATING $P_{100\text{ °C}}$ ⁽²⁾ W	TOLERANCE %	RESISTANCE VALUE RANGE Ω	WEIGHT (typical) g/1000 pieces
WSLF1206	1206	5.0	3.0	± 1, ± 5	0.3m	45
	1206	5.0	3.0	± 1, ± 5	0.5m	30
	1206	4.0	2.0	± 1, ± 5	1m	26
	1206	4.0	2.0	± 1, ± 5	2m	34
	1206	4.0	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?230380
- (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



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 x R) ^{1/2}

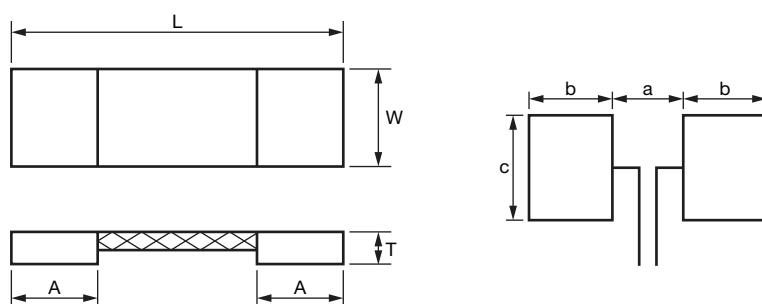
Notes

- 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

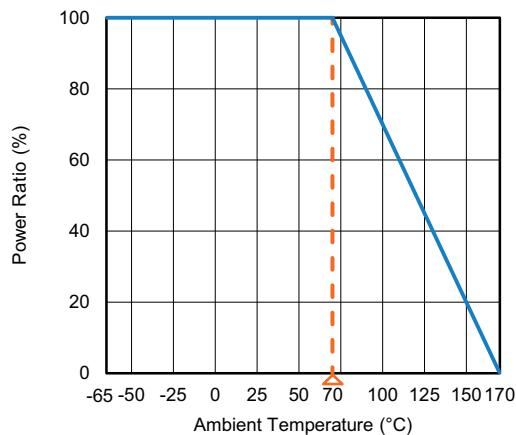
- Surface mount solder profile recommendations: www.vishay.com/doc?31052

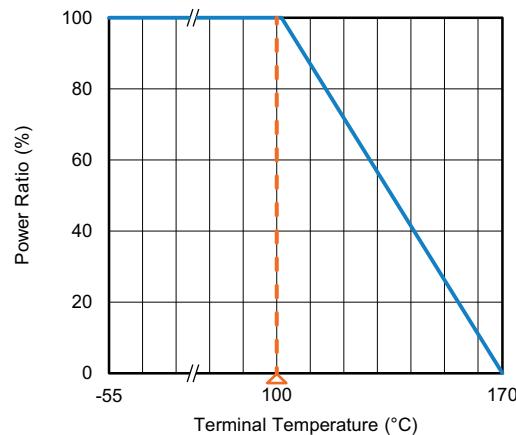
GLOBAL MODEL	RESISTANCE VALUE (mΩ)	DIMENSIONS				SOLDER PAD DIMENSIONS		
		L	W	T	A	a	b	c
WSLF1206	0.3	3.2 ± 0.2	1.65 ± 0.2	1.20 ± 0.15	0.80 ± 0.2	1.55	1.30	1.88
	0.5			0.90 ± 0.15				
	1			0.85 ± 0.15				
	2			0.85 ± 0.15				
	3			0.80 ± 0.15				

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 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)	ELEMENT MATERIAL
WSLF1206	0.3	MnCuSn
	0.5	MnCu
	1	MnCu
	2	FeCrAl
	3	FeCrAl

DERATING - AMBIENT TEMPERATURE

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

DERATING - TERMINAL TEMPERATURE

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

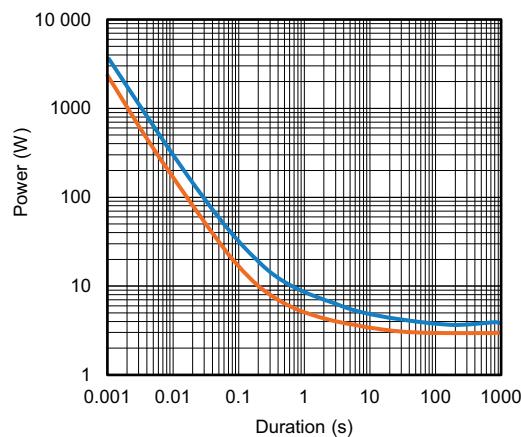
PULSE CAPABILITY


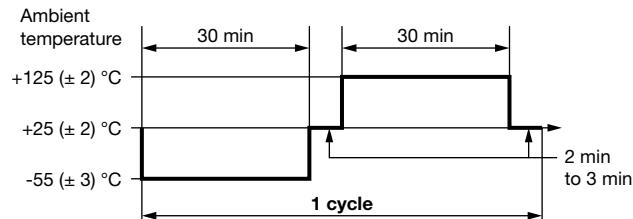
Fig. 3 - Pulsed Power Characteristics

Note

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

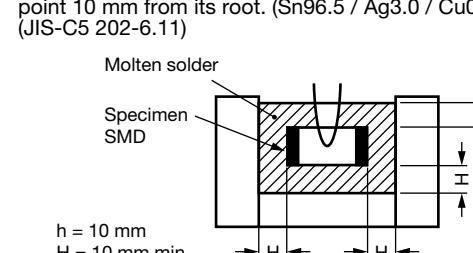
PERFORMANCES

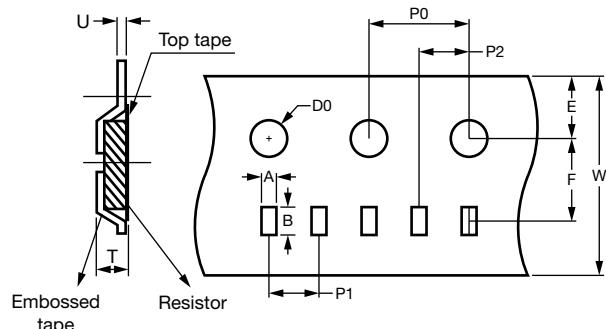
ENVIRONMENTAL PERFORMANCE			
NO.	ITEM	TEST CONDITION	SPECIFICATION
1	Short time overload	Loading 5 times rate power for 5 seconds	$\Delta R: \pm (1 \% + 0.0005 \Omega)$
2	Temperature coefficient of resistance (TCR)	+25 °C / +125 °C (JIS-C5202-5.2) TCR (ppm/°C) = $\frac{\Delta R}{R \times \Delta t} \times 10^6$	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)	$\Delta R: \pm (1 \% + 0.0005 \Omega)$
4	High temperature exposure	The chip (mounted on board) is exposed in the heat chamber 125 °C for 1000 hours. (JIS-C5202-7.2)	$\Delta R: \pm (1 \% + 0.0005 \Omega)$
5	Load life	Apply rated power for 1000 hours with 1.5 hours ON and 0.5 hour OFF. (JIS-C5202-7.10)	$\Delta R: \pm (1 \% + 0.0005 \Omega)$
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)	$\Delta R: \pm (1 \% + 0.0005 \Omega)$


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)	$\Delta R: \pm (1 \% + 0.0005 \Omega)$
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)

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.