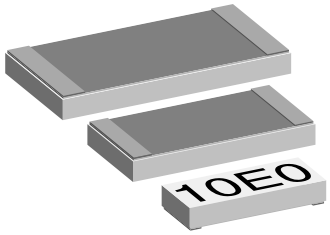
Power Metal Strip® Flip Chip (Extended Range) Patents Pending



FEATURES

- SMD alternative for low power leaded wirewound resistors
- Excellent stability in different environmental conditions (< 0.5 % change in resistance)
- Superior overload and pulse handling capability as compared to thin film (as much as 2 x better)
- Low TCR, down to ± 15 ppm/K
- Low noise: < 0.01 $\mu V_{RMS}/V$
- Very low inductance: < 0.08 µH
- Voltage coefficient: < 0.00001 %/V (< 0.1 ppm/V)
- Compliant to RoHS Directive 2002/95/EC

Pb-free

e3

RoHS COMPLIANT

GREEN (5-2008)** Available

Notes

* Pb containing terminations are not RoHS compliant, exemptions may apply

** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	SIZE	POWER RATING $P_{70\,°C}$ W	LIMITING ELEMENT VOLTAGE (1) V	TEMPERATURE COEFFICIENT ± ppm/K	RESISTANCE VALUE RANGE (2) Ω		E-SERIES
					Tol. ± 0.5 %	Tol. ± 1.0 %	
WSL1506E	1506	0.25	63	15, 25	0.5 to 10K	0.5 to 10K	96
WSL2010E	2010	0.5	100	15, 25	0.5 to 10K	0.5 to 10K	96
WSL2512E	2512	1.0	100	15, 25	0.5 to 10K	0.5 to 10K	96

Notes

- **Ask about further value ranges, tighter tolerances and TCR's.**
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material.
- 4-digit marking, according to MIL-PRF-55342 (except as noted in Ordering Information table), on top side.

(1) Rated voltage: $\sqrt{P \times R}$.

(2) Contact factory using e-mail address at bottom of this page for resistance values available between 0.5 to 10 for 1506 and 0.5 to 100 for 2010 and 2512.

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	WSL1506E	WSL2010E	WSL2512E
Rated dissipation at 70 °C	W	0.25	0.5	1.0
Insulation voltage (1 min)	$V_{DC/AC}$ peak	200	200	200
Thermal resistance	K/W	≤ 220 (3)	≤ 88 (3)	≤ 65 (3)
Insulation resistance	MΩ	> 10^6		
Operating temperature range	°C	- 55 to + 150		
Weight/1000 pieces	g	12	25	35

Note

(3) Depending on solder pad dimensions.

GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: WSL1506E10E0XEA

W	S	L	1	5	0	6	E	1	0	E	0	X	E	A		

GLOBAL MODEL	RESISTANCE VALUE AND TOLERANCE			TCR CODE	PACKAGING CODE	SPECIAL
WSL1506E	**Resistance Tolerance (±)**	**Multiplier**	**Symbol**	**E** = ± 25 ppm/K **X** = ± 15 ppm/K	**EA** = Lead (Pb)-free, tape/reel **TA** = Tape/reel (R86)	(Dash number) (up to 2 digits) From **1 to 99** as applicable
	0.5	X1	W			
	0.5	X1000	X			
	0.5	X1 000 000	Y			
	1.0	X1	D			
	1.0	X1000	E			
	1.0	X1 000 000	F			

For technical questions, contact: ww2bresistors@vishay.com

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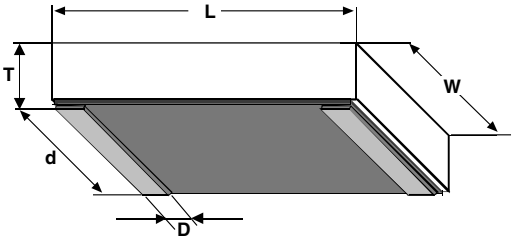
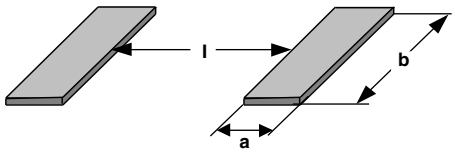
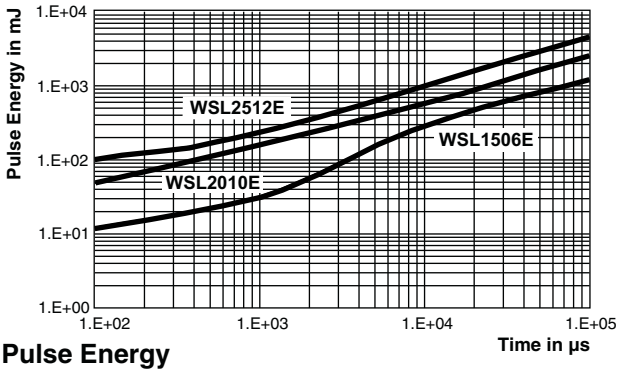
DIMENSIONS in inches (millimeters)

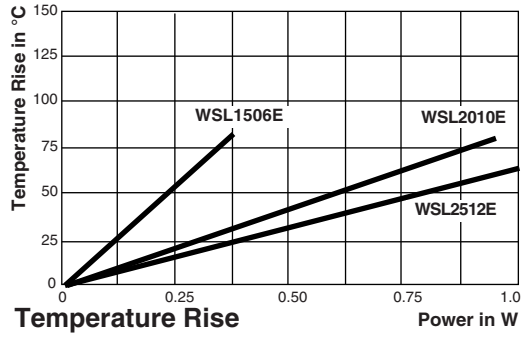




MODEL	DIMENSIONS					SOLDER PAD DIMENSIONS		
	L	W	$T_{max.}$	D	d	a	b	l
WSL1506	0.15 ± 0.005 (3.81 ± 0.13)	0.062 ± 0.003 (1.57 ± 0.08)	0.025 (0.64)	0.012 ± 0.003 (0.30 ± 0.08)	0.059 ± 0.003 (1.50 ± 0.08)	0.015 (0.38)	0.062 (1.57)	0.118 (3.00)
WSL2010	0.200 ± 0.005 (5.08 ± 0.13)	0.100 ± 0.003 (2.54 ± 0.08)	0.025 (0.64)	0.020 ± 0.003 (0.51 ± 0.08)	0.097 ± 0.003 (2.46 ± 0.08)	0.023 (0.58)	0.100 (2.54)	0.153 (3.89)
WSL2512	0.250 ± 0.005 (6.35 ± 0.13)	0.126 ± 0.003 (3.20 ± 0.08)	0.025 (0.64)	0.024 ± 0.003 (0.61 ± 0.08)	0.123 ± 0.003 (3.12 ± 0.08)	0.027 (0.69)	0.126 (3.20)	0.196 (4.98)



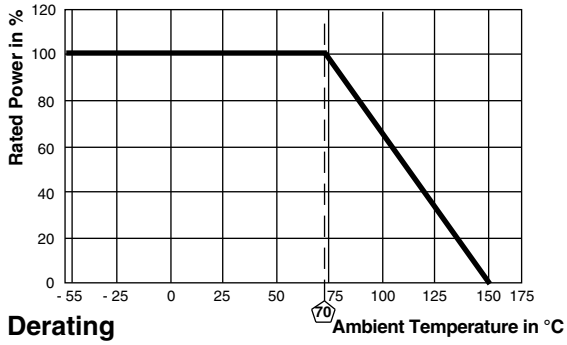
Pulse Energy



Temperature Rise

Pulse Energy Plot:

This represents the energy in each of 50 pulses, with a 1 s rest between pulses, that it takes to shift the WSL....E resistance ± (0.50 % + 0.01 Ω).



Derating

PERFORMANCE		
TEST	CINDITIONS OF TEST	TEST LIMITS
Thermal shock	- 55 °C to + 150 °C, 100 cycles, 15 min at each extreme	± (0.20 % + 0.01 Ω)
Short time overload	5 x rated power for 5 s	± (0.20 % + 0.01 Ω)
Low temperature operation	- 65 °C for 24 h	± (0.20 % + 0.01 Ω)
High temperature exposure	1000 h at +150 °C	± (0.50 % + 0.01 Ω)
Moisture resistance	MIL-STD-202, method 106, 0 % power, 7a and 7b not required	± (0.50 % + 0.01 Ω)
Load life	1000 h at rated power, + 70 °C, 1.5 h "ON", 0.5 h "OFF"	± (0.50 % + 0.01 Ω)
Vibration	MIL-STD-202, method 204D	± (0.10 % + 0.01 Ω)
Mechanical shock	100 *g*'s for 6 ms, 5 pulses	± (0.10 % + 0.01 Ω)
Resistance to solder heat	+ 260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	± (0.50 % + 0.01 Ω)

PACKAGING				
MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE
WSL1506E	12 mm/embossed plastic	178 mm/7"	4000	EA
WSL2010E	12 mm/embossed plastic	178 mm/7"	4000	EA
WSL2512E	12 mm/embossed plastic	178 mm/7"	2000	EA

Note

- Embossed Carrier Tape per EIA-481.

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