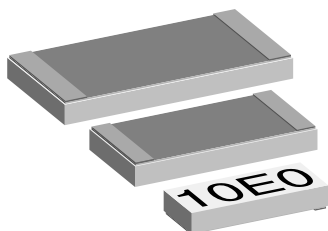




Power Metal Strip® Flip Chip Resistors (Extended Range)

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: $< 0.01 \mu\text{V}_{\text{RMS}}/\text{V}$
- Very low inductance: $< 0.08 \mu\text{H}$
- Voltage coefficient: $< 0.00001 \%/\text{V}$ (< 0.1 ppm/V)
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | SIZE | POWER RATING $P_{70^\circ\text{C}}$ W | LIMITING ELEMENT VOLTAGE ⁽¹⁾ V | RESISTANCE VALUE RANGE ⁽²⁾ Ω | | E-SERIES |
|--------------|------|---|--|---|-------------------|----------|
| | | | | TOL. $\pm 0.5 \%$ | TOL. $\pm 1.0 \%$ | |
| WSL1506E | 1506 | 0.25 | 63 | 0.5 to 10K | 0.5 to 10K | 96 |
| WSL2010E | 2010 | 0.5 | 100 | 0.5 to 10K | 0.5 to 10K | 96 |
| WSL2512E | 2512 | 1.0 | 100 | 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 | RESISTOR CHARACTERISTICS | | |
|-----------------------------|-------------------------|---------------------------|--------------------------|--------------------------|
| | | WSL1506E | WSL2010E | WSL2512E |
| Rated dissipation at 70 °C | W | 0.25 | 0.5 | 1.0 |
| Temperature coefficient | ppm/K | $\pm 15, \pm 25$ | $\pm 15, \pm 25$ | $\pm 15, \pm 25$ |
| Insulation voltage (1 min) | $V_{\text{DC/AC peak}}$ | 200 | 200 | 200 |
| Thermal resistance | K/W | ≤ 220 ⁽³⁾ | ≤ 88 ⁽³⁾ | ≤ 65 ⁽³⁾ |
| Insulation resistance | M Ω | $> 10^6$ | | |
| Operating temperature range | °C | -55 to +150 | | |
| Weight/1000 pieces | g | 12 | 25 | 35 |

Note

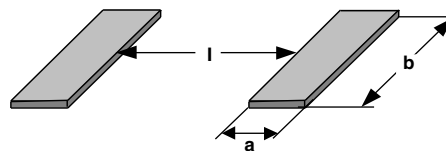
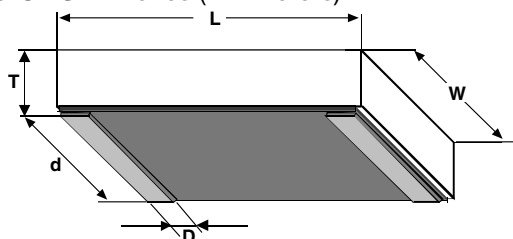
⁽³⁾ Depending on solder pad dimensions.

GLOBAL PART NUMBER INFORMATION

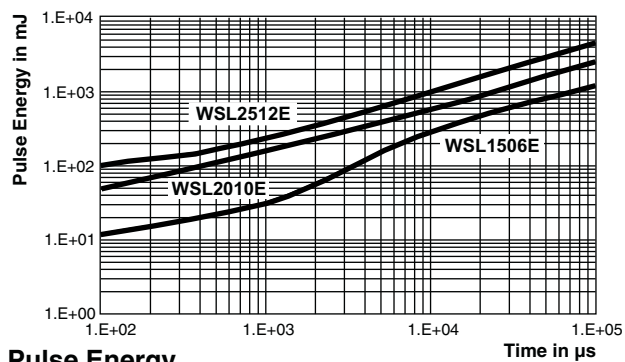
Global Part Numbering example: WSL1506E10E0XEA

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

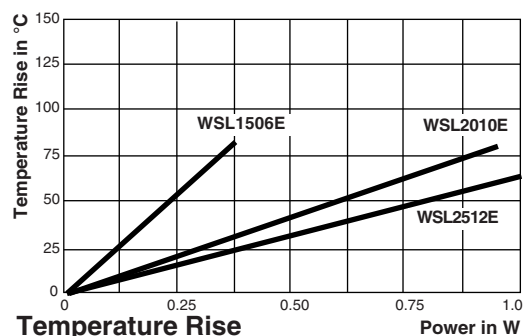
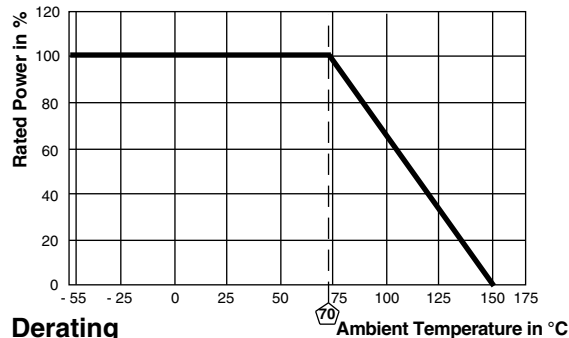
| GLOBAL MODEL | RESISTANCE VALUE AND TOLERANCE | | | TCR CODE | PACKAGING CODE | SPECIAL |
|--------------|-----------------------------------|------------|--------|--|----------------------------------|--|
| WSL1506E | Resistance Tolerance (\pm) | Multiplier | Symbol | E = ± 25 ppm/K X = ± 15 ppm/K | EA = lead (Pb)-free, tape / reel | (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 | | | |

**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****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 $\pm (0.50 \% + 0.01 \Omega)$.

**Temperature Rise****Derating**

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

| 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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