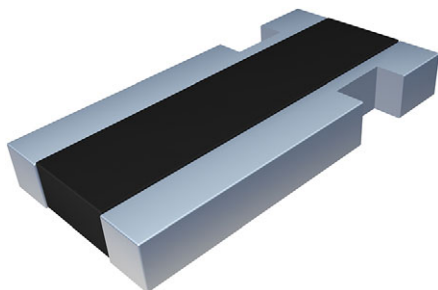


Power Metal Strip® Resistors, High Power, Surface-Mount, 4-Terminal



FEATURES

- 4-terminal design
- All welded construction of the Power Metal Strip® resistors are ideal for all types of current sensing, voltage division, and pulse applications
- Proprietary processing technique produces low resistance values
- Solid metal nickel-chrome and manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- Sulfur resistance by construction that is unaffected by high sulfur environments
- Low thermal EMF (< 3 µV/°C)
- AEC-Q200 qualified ⁽¹⁾
- PATENT(S): www.vishay.com/patents
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



LINKS TO ADDITIONAL RESOURCES



Notes

- * This datasheet provides information about parts that are RoHS-compliant and / or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details
- “SMD Current Sense: AEC-Q200 vs. Vishay Qualification” technical note: www.vishay.com/doc?30416
- ⁽¹⁾ Flame retardance test may not be applicable to some resistor technologies

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	SIZE	POWER RATING $P_{100\text{ }^{\circ}\text{C}}$ ⁽²⁾ W	TOLERANCE ± %	RESISTANCE VALUE RANGE ⁽¹⁾ Ω	WEIGHT (typical) g/1000 pieces
WSKP0612	0612	3.5	1.0, 5.0	5m	8.5
	0612	4.0	1.0, 5.0	1m to 4m	8.5
	0612	5.0	1.0, 5.0	0.5m	8.5

Notes

- “Thermal Management for Surface-Mount Devices” white paper: www.vishay.com/doc?30380
- ⁽¹⁾ Other values may be available, contact factory
- ⁽²⁾ See Derating chart

GLOBAL PART NUMBER INFORMATION

Global Part Numbering Example: WSKP06121L000FEA (visit www.vishay.net Vishay Dale parts numbering manual for all options)

W	S	K	P	0	6	1	2	1	L	0	0	0	F	E	A		
GLOBAL MODEL (8 digits)				RESISTANCE VALUE ⁽¹⁾ (5 digits)					TOLERANCE CODE (1 digit)		PACKAGING CODE ⁽²⁾ (2 digits)			SPECIAL ⁽³⁾ (up to 2 digits)			
WSKP0612				L = mΩ L5000 = 0.0005 Ω 5L000 = 0.005 Ω					F = ± 1.0 % J = ± 5.0 %		EA = lead (Pb)-free, tape / reel EK = lead (Pb)-free, bulk			(dash number) from 1 to 99 as applicable			

Notes

- Per PCN-DR-00009-2022-REV-0, WSL marking will be removed effective March 1st, 2023
- ⁽¹⁾ WSL marking (www.vishay.com/doc?30327)
- ⁽²⁾ Packaging code: EB (lead (Pb)-free) are non-standard packaging codes designating 1000 piece reels. These non-standard packaging codes are identical to our standard EA (lead (Pb)-free), except that they have a package quantity of 1000 pieces
- ⁽³⁾ Follow link for customization capabilities: www.vishay.com/doc?48163

PATENT(S): www.vishay.com/patents

This Vishay product is protected by one or more United States and international patents.

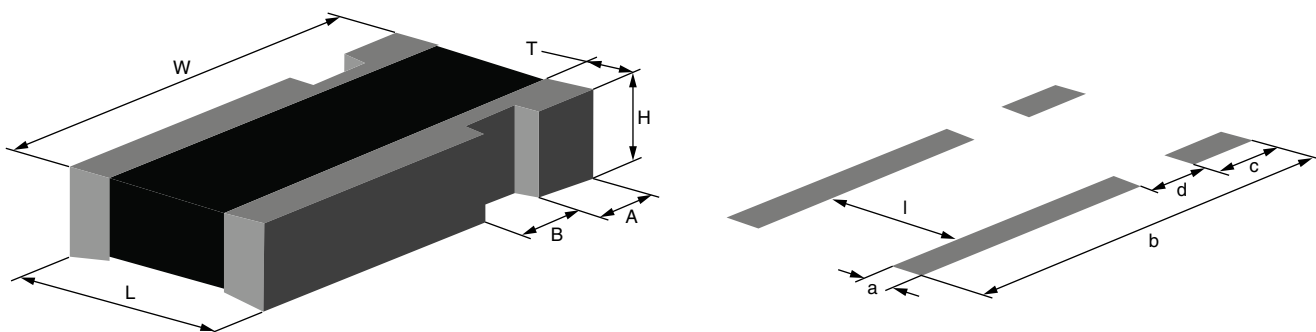
TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	RESISTOR CHARACTERISTICS
Component temperature coefficient (including terminal) ⁽¹⁾ TCR measured from -55 °C to 150 °C	ppm/°C	-300 / +50 for 0.5 mΩ to 0.99 mΩ
		± 150 for 1 mΩ and 2 mΩ
		± 75 for 3 mΩ to 5 mΩ
Element TCR ⁽²⁾	ppm/°C	< 20
Operating temperature range	°C	-65 to +170
Maximum working voltage ⁽³⁾	V	$(P \times R)^{1/2}$

Notes

- TCR 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



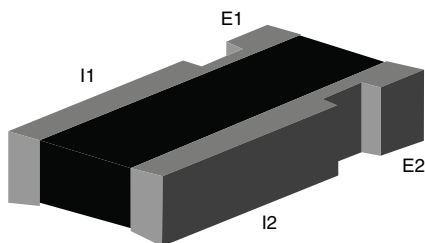
Note

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

MODEL	DIMENSIONS in inches (millimeters)					
	L	W	H	T	A	B
WSKP0612	0.060 ± 0.010 (1.50 ± 0.254)	0.120 ± 0.010 (3.05 ± 0.254)	0.018 ± 0.010 (0.457 ± 0.254)	0.015 ± 0.010 (0.381 ± 0.254)	0.020 ± 0.005 (0.51 ± 0.127)	0.020 ± 0.005 (0.51 ± 0.127)

MODEL	SOLDER PAD DIMENSIONS in inches (millimeters)				
	a	b	c	d	l
WSKP0612	0.040 (1.01)	0.135 (3.43)	0.030 (0.762)	0.015 (0.381)	0.030 (0.76)

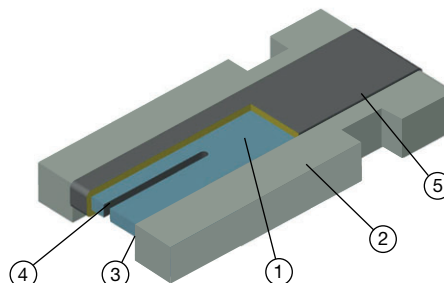
4 TERMINAL KELVIN CONNECTIONS



Notes

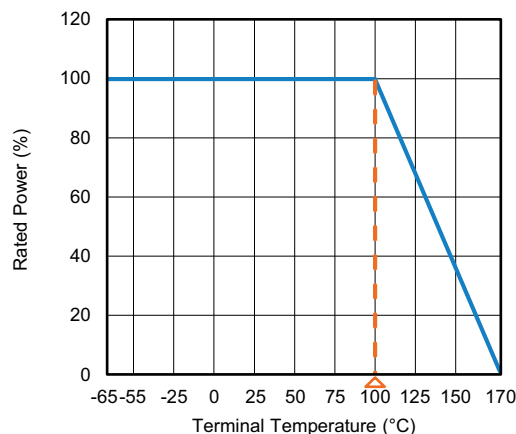
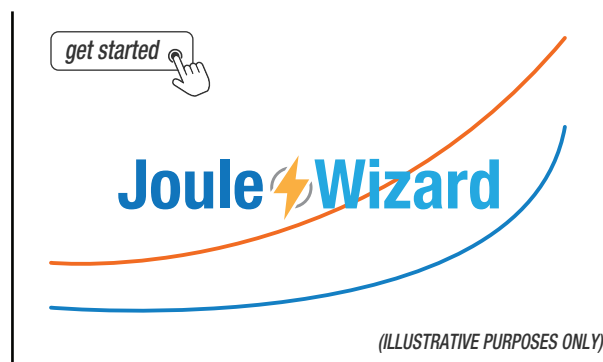
- E1 and E2: voltage sense connection
- I1 and I2: current connection

CONSTRUCTION OUTLINE



Notes

1. Resistive element: Mn-Cu
2. Terminal: solid copper and element with 100 % Sn finish
3. Terminal to element weld
4. Laser calibration
5. High temperature encapsulant: siliconized polyester coating material

DERATING

PULSE CAPABILITY

www.vishay.com/en/resistors/joulewizard/

PERFORMANCES			
DESCRIPTION	AEC TEST NUMBER	TEST CONDITIONS	LIMIT
High temperature exposure (storage)	3	MIL-STD-202, Method 108, 2000 h at T = 170 °C at 0 % power, measurements at 24 h ± 4 h	± (1.0 %)
Temperature cycling	4	JESD22 Method JA-104, -55 °C to 155 °C, dwell time = 15 min, 2000 cycles. 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, no polo, 65 °C. Measurement at 24 h ± 4 h after test.	± (1.0 %)
Biased humidity	7	MIL-STD-202, Method 103, 1000 h 85 °C / 85 % RH. Note: specified conditions: 10 % of operating power. Measurement at 24 h ± 4 h after test.	± (0.5 %)
Operational life ⁽¹⁾	8	MIL-STD 202, Method 108, Condition F; 1.5 h "ON", 0.5 h "OFF"; T _A = 100 °C at rated power from derating curve. Measurements at 24 h ± 4 h after test. Test to 2000 h.	± (1.0 %)
External visual	9	MIL-STD-883 Method 2009; electrical test not required. Inspect device construction, marking, and workmanship	Per MIL-STD-883 2009.15
Physical dimension	10	JESD22 Method JB-100, verify physical dimensions to the standard WSKP0612 datasheet. Note: user(s) and suppliers spec. Electrical test not required.	Per datasheet
Resistance to solvents	12	MIL-STD-202, Method 215 aqueous wash chemical - OKEM clean or equivalent.	Marking remains legible
Mechanical shock	13	MIL-STD-202, Method 213, Condition C	± (0.5 %)
Vibration	14	MIL-STD-202, Method 204, Condition D	± (0.5 %)
Resistance to solder heat	15	MIL-STD-202, Method 210, Condition K	± (0.5 %)
ESD	17	AEC-Q200-002	± (1.0 %)
Solderability	18.1	J-STD-002, Test B1, preconditioning E 4 h at 155 °C dry heat, lead (Pb)-free solder at 245 °C, magnification 50 x.	> 95 % coverage
Solderability	18.2	J-STD-002, Test B (backward compatibility), preconditioning category E, 4 h at 155 °C dry heat, lead (Pb) solder at 215 °C, magnification 50 x.	> 95 % coverage
Solderability	18.3	J-STD-002, Test D (resistance to dissolution), preconditioning category E, 4 h at 155 °C dry heat, lead (Pb)-free solder at 260 °C, magnification 50 x.	> 95 % coverage
Electrical characterization	19	RTC at -65 °C and 175 °C	± 75 ppm/°C
Flammability	20	UL-94	n/a
Board flex	21	AEC-Q200-005 2 mm min.	± (1.0 %)
Terminal strength (SMD)	22	AEC-Q200-006 force of 1.8 kg for 60 s	± (1.0 %)
Flame retardance	24	AEC-Q200-001	0
Short time overload		Refer to link for short time overload performance and pulse capability; www.vishay.com/en/resistors/power-metal-strip-calculator/	± (1.0 %)
Low temperature storage		MIL-PRF-26 Paragraph 4.7.12 -65 °C for 24 h	± (0.5 %)

Note
⁽¹⁾ Ambient temperature performance is derived from terminal temperature qualification and component thermal resistance



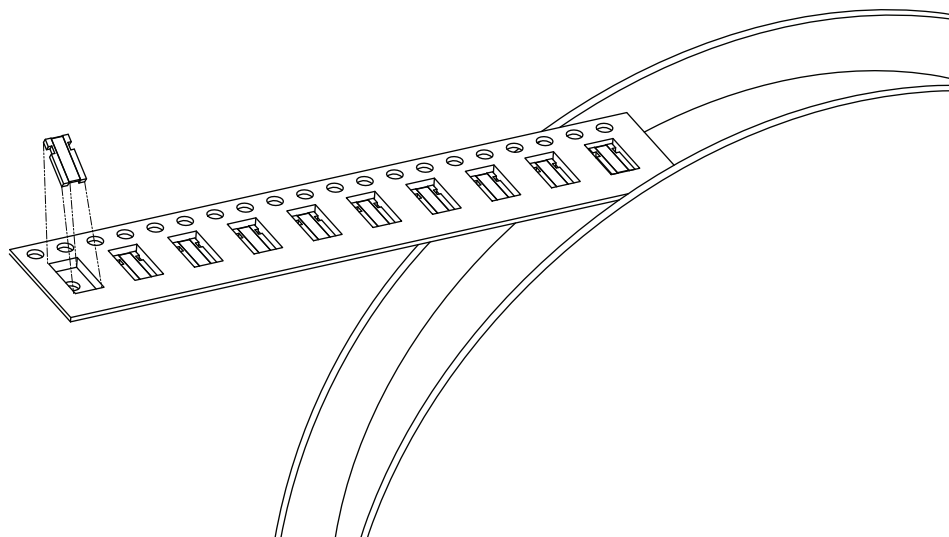
PACKAGING (1)				
MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE
WSKP0612	8 mm / embossed plastic	178 mm / 7"	4000	EA

Notes

- Embossed carrier tape per EIA-481

(1) Additional packaging details at www.vishay.com/doc?20051

REEL ORIENTATION





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