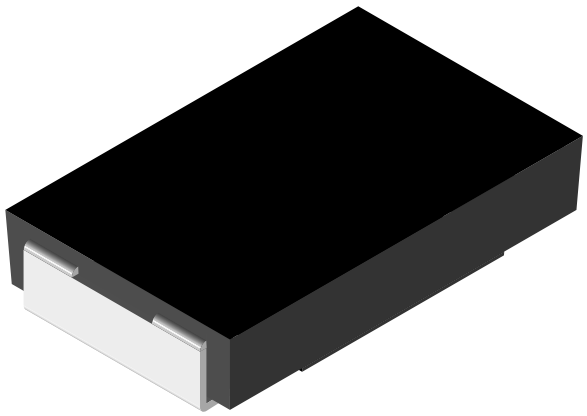
Power Metal Strip® Resistors, Low Value (down to 0.001 Ω), Surface Mount



FEATURES

- Molded high temperature encapsulation
- Ideal for all types of current sensing, voltage division and pulse applications including switching and linear power supplies, instruments, power amplifiers
- Proprietary processing technique produces extremely low resistance values (down to 0.001 Ω)
- All welded construction
- Solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- Solderable terminations
- Very low inductance 0.5 nH to 5 nH
- Excellent frequency response to 50 MHz
- Low thermal EMF (< 3 µV/°C)
- AEC-Q200 qualified (1)
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

Pb-free Available

RoHS* COMPLIANT

GREEN (5-2008) Available

Notes

* Lead (Pb)-containing terminations are not RoHS-compliant. Exemptions may apply.

(1) Flame retardance test may not be applicable to some resistor technologies.

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	SIZE	POWER RATING $P_{70\,°C}$ W	RESISTANCE VALUE RANGE Ω		WEIGHT (typical) g/1000 pieces
			Tol. ± 0.5 %	Tol. ± 1.0 %	
WSR2	4527	2.0	0.005 to 1.0	0.001 to 1.0	440
WSR3	4527	3.0 (2)	0.005 to 0.2	0.001 to 0.2	440

Notes

- Part marking: DALE, model, value, tolerance, date code.

(2) The WSR3 requires a minimum of 1050 sq. mil. circuit traces connecting to the recommended solder pad.

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	WSR2 AND WSR3 RESISTOR CHARACTERISTICS
Temperature coefficient	ppm/°C	± 75 for 0.010 Ω to 1.0 Ω; ± 110 for 0.005 Ω to 0.0099 Ω; ± 300 for 0.004 Ω to 0.0049 Ω; ± 450 for 0.003 Ω to 0.0039 Ω; ± 600 for 0.002 Ω to 0.0029 Ω; ± 750 for 0.001 Ω to 0.0019 Ω
Element TCR	ppm/°C	< 20
Dielectric withstanding voltage	V_{AC}	> 500
Insulation resistance	Ω	$> 10^9$
Operating temperature range	°C	- 65 to + 275
Maximum working voltage	V	$(P \times R)^{1/2}$

GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: WSR25L000FEA

W	S	R	2	5	L	0	0	0	F	E	A		

GLOBAL MODEL	VALUE	TOLERANCE CODE	PACKAGING CODE	SPECIAL
WSR2 **WSR3**	**L** = mΩ* **R** = Decimal **5L000** = 0.005 Ω **R0100** = 0.01 Ω * Use "**L**" for resistance values < 0.01 Ω	**D** = ± 0.5 % **F** = ± 1.0 % **J** = ± 5.0 %	**EA** = Lead (Pb)-free, tape/reel **EK** = Lead (Pb)-free, bulk **TA** = Tin/lead, tape/reel (R86) **BA** = Tin/lead, bulk (B43)	(Dash number) (Up to 2 digits) From **1 to 99** as applicable

Historical Part Numbering example: WSR2 0.005 Ω 1 % EA

WSR2	0.005 Ω	1 %	EA
HISTORICAL MODEL	RESISTANCE VALUE	TOLERANCE CODE	PACKAGING CODE

For technical questions, contact: ww2bresistors@vishay.com

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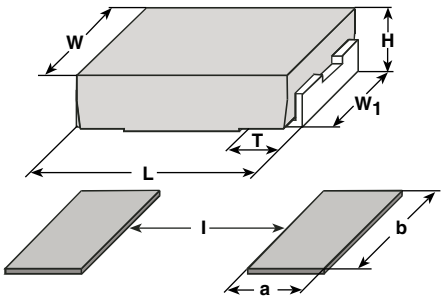
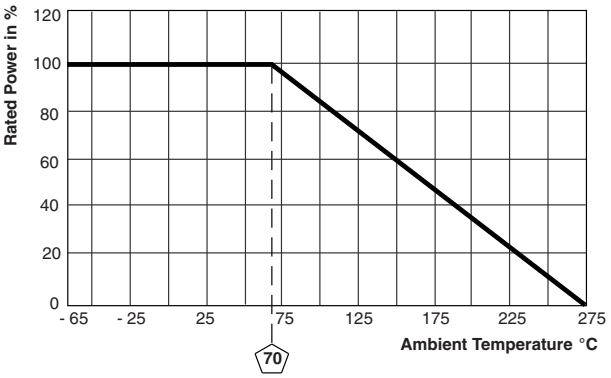
DIMENSIONS



MODEL	DIMENSIONS in inches (millimeters)				
	L	H	T	W	W_1
WSR2 WSR3	0.455 ± 0.032 (11.56 ± 0.813)	0.095 ± 0.005 (2.41 ± 0.127)	0.100 ± 0.010 (2.54 ± 0.254)	0.275 ± 0.005 (6.98 ± 0.127)	0.215 ± 0.005 (5.46 ± 0.127)

MODEL	SOLDER PAD DIMENSIONS in inches (millimeters)		
	a	b	l
WSR2 WSR3	0.155 (3.94)	0.230 (5.84)	0.205 (5.21)

DERATING



PERFORMANCE

TEST	CONDITIONS OF TEST	TEST LIMITS	
		WSR2	WSR3
Thermal shock	- 55 °C to + 150 °C, 1000 cycles, 15 min at each extreme	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR
Short time overload	WSR2: 5 x rated power for 5 s WSR3: 4 x rated power for 5 s	± (0.5 % + 0.0005 Ω) ΔR	± (2.0 % + 0.0005 Ω) ΔR
Low temperature storage	- 65 °C for 24 h	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR
High temperature exposure	1000 h at + 275 °C	± (1.0 % + 0.0005 Ω) ΔR	± (1.0 % + 0.0005 Ω) ΔR
Bias humidity	+ 85 °C, 85 % RH, 10 % bias, 1000 h	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR
Mechanical shock	100 *g*'s for 6 ms, 5 pulses	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR
Vibration	Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR
Load life	1000 h at rated power, + 70 °C, 1.5 h "ON", 0.5 h "OFF"	± (1.0 % + 0.0005 Ω) ΔR	± (2.0 % + 0.0005 Ω) ΔR
Resistance to solder heat	+ 260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR
Moisture resistance	MIL-STD-202, method 106, 0 % power, 7a and 7b not required	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR

PACKAGING

MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE
WSR2 and WSR3	24 mm/embossed plastic	330 mm/13"	1500	EA

Note

- Embossed Carrier Tape per EIA-481.

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Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru

www.lifeelectronics.ru