

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



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 $P_{70^{\circ}\text{C}}$ 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

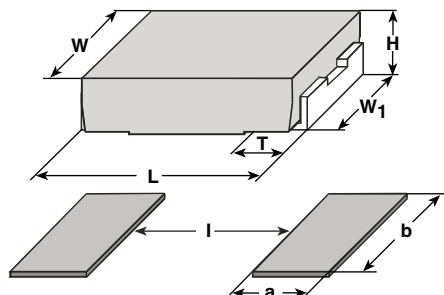
PARAMETER	UNIT	WSR2 AND WSR3 RESISTOR CHARACTERISTICS
Temperature coefficient	ppm/°C	± 75 for 0.010 Ω to 1.0 Ω; ± 110 for 0.005 Ω to 0.0099 Ω; ± 300 for 0.004 Ω to 0.0049 Ω; ± 450 for 0.003 Ω to 0.0039 Ω; ± 600 for 0.002 Ω to 0.0029 Ω; ± 750 for 0.001 Ω to 0.0019 Ω
Element TCR	ppm/°C	< 20
Dielectric 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							

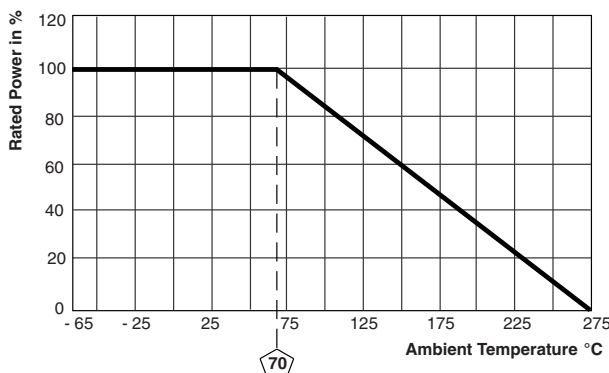
DIMENSIONS



MODEL	DIMENSIONS in inches (millimeters)				
	L	H	T	W	W ₁
WSR2	0.455 ± 0.032	0.095 ± 0.005	0.100 ± 0.010	0.275 ± 0.005	0.215 ± 0.005
WSR3	(11.56 ± 0.813)	(2.41 ± 0.127)	(2.54 ± 0.254)	(6.98 ± 0.127)	(5.46 ± 0.127)

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

Authorized Distributor

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Vishay:

<u>WSR31L350JTA</u>	<u>WSR2R7680FBA</u>	<u>WSR2R0698FBA</u>	<u>WSR2R0806FBA</u>	<u>WSR2R1200FTA</u>	<u>WSR2R1500FTA</u>
<u>WSR2R9100FBA</u>	<u>WSR2R9400FBA</u>	<u>WSR2R3900FTB</u>	<u>WSR2R3300FBA</u>	<u>WSR2R5600FBA</u>	<u>WSR2R5200FBA</u>
<u>WSR2R7500FBA</u>	<u>WSR2R0200FBA</u>	<u>WSR2R0400FBA</u>	<u>WSR2R0100FBA</u>	<u>WSR2R0700FTB</u>	<u>WSR2R0300FBA</u>
<u>WSR2R0600FBA</u>	<u>WSR2R2800FBA</u>	<u>WSR2R6800FBA</u>	<u>WSR2R4700FBA</u>	<u>WSR2R2500FBA</u>	<u>WSR3R1000DBA</u>
<u>WSR2R5000DBA</u>	<u>WSR2R0221FBA</u>	<u>WSR2R0249FBA</u>	<u>WSR3R0120FBA</u>	<u>WSR2R0150FBA</u>	<u>WSR28L000FBA</u>
<u>WSR25L000FBA</u>	<u>WSR31L000FBA</u>	<u>WSR26L000FBA</u>	<u>WSR24L000FBA</u>	<u>WSR22L000FTA</u>	<u>WSR36L000FBA</u>
<u>WSR23L000FBA</u>	<u>WSR21L000JTB</u>	<u>WSR35L000FTB</u>	<u>WSR33L000FBA</u>	<u>WSR27L000FBA</u>	<u>WSR3R0250FBA</u>
<u>WSR2R0250FBA</u>	<u>WSR2R0610FBA</u>	<u>WSR2R0660FBA</u>	<u>WSR2R3650FBA</u>	<u>WSR32L200JBA</u>	<u>WSR31L500JBA</u>
<u>WSR2R4020FEB</u>	<u>WSR2R5200FEB</u>	<u>WSR2R0200FEB</u>	<u>WSR2R0330FEB</u>	<u>WSR2R0400FEB</u>	<u>WSR2R0250FEB</u>
<u>WSR2R3900FEB</u>	<u>WSR2R0125FEB</u>	<u>WSR2R3650FEB</u>	<u>WSR2R0700FEB</u>	<u>WSR2R2210FEB</u>	<u>WSR2R0150FEB</u>
<u>WSR3R0500FEB</u>	<u>WSR3R1500FEA</u>	<u>WSR2R0500FEB</u>	<u>WSR2R7500FEB</u>	<u>WSR2R1500FEB</u>	<u>WSR35L000FEB</u>
<u>WSR21L000JEB</u>	<u>WSR2R1820FEB</u>	<u>WSR27L000FEB</u>	<u>WSR25L000FEB</u>	<u>WSR28L000FEB</u>	<u>WSR5R0500DEK</u>
<u>WSR5R1000DEK</u>	<u>WSR5R0200FBA</u>	<u>WSR2R0250FEK</u>	<u>WSR31L000JEA</u>	<u>WSR2R0330FEA</u>	<u>WSR27L500FEK</u>
<u>WSR2R0500DEA</u>	<u>WSR23L000FEA</u>	<u>WSR26L000FEA</u>	<u>WSR2R0250FEA</u>	<u>WSR2R0300FEK</u>	<u>WSR2R0320FEA</u>
<u>WSR2R0499FEA</u>	<u>WSR2R1500FEA</u>	<u>WSR2R2000FEA</u>	<u>WSR2R3000FEB</u>	<u>WSR2R3300FEB</u>	<u>WSR2R3900FEK</u>
<u>WSR2R4000FEA</u>	<u>WSR2R5000FEA</u>	<u>WSR31L000FEA</u>	<u>WSR32L000FEA</u>	<u>WSR33L000FEA</u>	<u>WSR36L000FEB</u>
<u>WSR3R0120FEB</u>	<u>WSR3R0150FEK</u>	<u>WSR3R0200FEA</u>	<u>WSR3R0300FEB</u>		