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Vishay Dale

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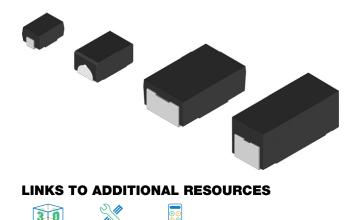
RoHS

HALOGEN

FREE

GREEN (5-2008)

Wirewound Resistors, Precision Power, Surface Mount



FEATURES

- All welded construction
- Molded encapsulation
- Wraparound terminations
- Excellent stability at different environmental conditions
- High power ratings (up to 3 W)
- Superior surge capability
- Available in non-inductive styles with Ayrton-Perry winding (WSN in lieu of WSC, maximum resistance is one-half WSC range)
- AEC-Q200 qualified ⁽¹⁾
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

Notes

3D Mod

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

STANDARD ELECTRICAL SPECIFICATIONS							
GLOBAL MODEL	HISTORICAL MODEL	SIZE	POWER RATING P _{70 °C} W	RESISTANCE RANGE Ω	TOLERANCE ± %	WEIGHT (typical) g/1000 pieces	ENCAPSULATION
WSC01/2	WSC-1/2	2012	0.5	0.1 to 4.99	0.5, 1, 5	90	Ероху
WSC0001 (1)	WSC-1	2515	1	0.1 to 2.77K	0.5, 1, 5	165	Thermoplastic ⁽²⁾
WSC2515	WSC2515	2515	1	0.1 to 2.5K	0.5, 1, 5	165	Thermoplastic
WSC0002	WSC-2	4527	2	0.1 to 4.92K	0.5, 1, 5	760	Thermoplastic ⁽²⁾
WSC4527	WSC4527	4527	2	0.1 to 4.92K	0.5, 1, 5	760	Thermoplastic
WSC6927	WSC6927	6927	3	0.1 to 8K	0.5, 1, 5	1675	Thermoplastic

Notes

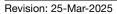
Part marking: 1/2 W - DALE, value; 1 W - model, value, tolerance, date code; 2 W and 3 W - DALE, model, value, tolerance, date code

• Qualified to AEC-Q200 rev. D

(1) As of February 19, 2016, the WSC0001 was obsoleted by PCN-DR-013-2015; the WSC2515 is a drop-in replacement. You may contact your sales representative or submit an inquiry via <u>ww2bresistors@vishay.com</u> for supporting information

(2) As of 1/1/2010, the WSC0001 and WSC0002 are molded with thermoplastic in lieu of epoxy. Reference PCN-DR-002-2009 and PCN-DR-003-2009

TECHNICAL SP	TECHNICAL SPECIFICATIONS					
PARAMETER	UNIT	WSC01/2	WSC2515	WSC0002	WSC4527, WSC6927	
Temperature coefficient measured from -55 °C to +150 °C	ppm/°C	$\begin{array}{l} \pm \ 50 = 1.0 \ \Omega \ \text{to} \ 4.99 \ \Omega; \\ \pm \ 90 = 0.1 \ \Omega \ \text{to} \ 0.99 \ \Omega \end{array} \qquad \begin{array}{l} \pm \ 20 = 26.51 \ \Omega \ \text{and} \ \text{above}; \\ \pm \ 50 = 1.0 \ \Omega \ \text{to} \ 26.5 \ \Omega; \\ \pm \ 90 = 0.31 \ \Omega \ \text{to} \ 0.99 \ \Omega; \\ \pm \ 150 = 0.1 \ \Omega \ \text{to} \ 0.39 \ \Omega; \end{array}$		$\pm 20 = 10.0 \Omega$ and above; $\pm 50 = 1.0 \Omega$ to 9.9 Ω; $\pm 90 = 0.1 \Omega$ to 0.99 Ω	$\begin{array}{l} \pm 20 = 10 \; \Omega \; \text{and above;} \\ \pm 50 = 1.0 \; \Omega \; \text{to} \; 9.9 \; \Omega; \\ \pm \; 90 = 0.31 \; \Omega \; \text{to} \; 0.99 \; \Omega; \\ \pm \; 150 = 0.1 \; \Omega \; \text{to} \; 0.3 \; \Omega \end{array}$	
Dielectric withstanding voltage	V _{AC}	> 500				
Insulation resistance	Ω	> 109				
Operating temperature range	°C	-65 to +175 -65 to +275				
Maximum working voltage	V	(P x R) ^{1/2}				



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WSC, WSN

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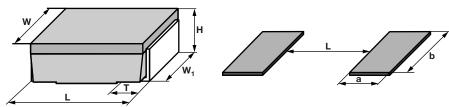
GLOBAL PART NUMBER INFORMATION							
Global Part Number	ring Example: WSC	2515R7000FEA (visit)	<u>www.vishay.net</u> Vish	nay Dale parts numbering manual fo	or all options)		
W S C 2 5 1 5 R 7 0 0 0 F E A .							
GLOBAL MODEL	SIZE	VALUE ⁽¹⁾	TOLERANCE	PACKAGING	SPECIAL		
WSC WSN	01/2 2515 0002 4527 6927	$\label{eq:kappa} \begin{array}{l} \textbf{R} = decimal \\ \textbf{K} = thousand \\ \textbf{R7000} = 0.70 \ \Omega \\ \textbf{1K500} = 1.5 \ k\Omega \end{array}$		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		

Notes

(1) WSC / WSN marking (<u>www.vishay.com/doc?30327</u>)

Packaging code: EB (lead (Pb)-free) and TB (tin / lead) are non-standard packaging codes designating 1000 piece reels. These non-standard ٠ packaging codes are identical to our standard EA (lead (Pb)-free) and TA (tin / lead), except that they have a package quantity of 1000 pieces

DIMENSIONS in inches (millimeters)



GLOBAL	DIMENSIONS					SOLDER PAD DIMENSIONS		
MODEL	L	н	т	w	W 1	а	b	L
WSC01/2	0.200 ± 0.020 (5.08 ± 0.508)	0.096 ± 0.015 (2.44 ± 0.381)	0.040 ± 0.010 (1.02 ± 0.254)	0.125 ± 0.005 (3.18 ± 0.127)	0.050 ± 0.010 (1.27 ± 0.254)	0.085 (2.16)	0.070 (1.78)	0.080 (2.03)
WSC2515	0.250 ± 0.020 (6.35 ± 0.508)	0.110 ± 0.015 (2.79 ± 0.381)	0.045 ± 0.010 (1.14 ± 0.254)	0.150 ± 0.005 (3.81 ± 0.127)	0.098 ± 0.010 (2.49 ± 0.254)	0.090 (2.29)	0.115 (2.92)	0.120 (3.05)
WSC0002	0.455 ± 0.020 (11.56 ± 0.508)	0.167 ± 0.010 (4.24 ± 0.254)	0.100 ± 0.010 (2.54 ± 0.254)	0.275 ± 0.005 (6.98 ± 0.127)	0.215 ± 0.005 (5.46 ± 0.127)	0.155 (3.94)	0.230 (5.84)	0.205 (5.21)
WSC4527	0.455 ± 0.020 (11.56 ± 0.508)	0.167 ± 0.010 (4.24 ± 0.254)	0.100 ± 0.010 (2.54 ± 0.254)	0.275 ± 0.005 (6.98 ± 0.127)	0.215 ± 0.005 (5.46 ± 0.127)	0.155 (3.94)	0.230 (5.84)	0.205 (5.21)
WSC6927	0.690 ± 0.032 (17.53 ± 0.813)	0.280 ± 0.015 (7.11 ± 0.381)	0.100 ± 0.010 (2.54 ± 0.254)	0.275 ± 0.005 (6.98 ± 0.127)	0.215 ± 0.015 (5.46 ± 0.381)	0.155 (3.94)	0.235 (5.97)	0.470 (11.94)

Notes

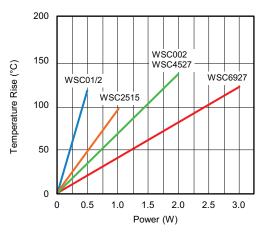
3D models available: www.vishay.com/doc?30328

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

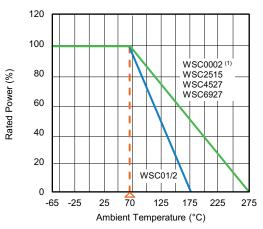
Refer to WSC, WSN conversion guide for detailed construction drawings: <u>www.vishay.com/doc?49616</u> For WSC2515 0.5 % tolerance parts, W₁ terminal dimension will be 0.090" ± 0.015"

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TEMPERATURE RISE



DERATING



Note

(1) As of 1/1/2010, WSC0002 will be molded with thermoplastic and have the higher 275 °C temperature derating

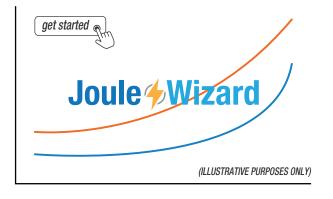
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2 For technical questions, contact: <u>ww2bresistors@vishay.com</u> Document Number: 30102

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PULSE CAPABILITY

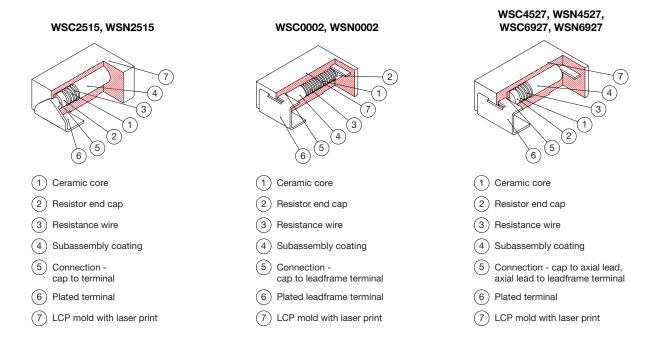


www.vishay.com/en/resistors/joulewizard/

Note

Pulse capability increases based on the amount of wire for the resistance value and construction. The WSC0002 has greater pulse capability
than WSC4527 due to differences in internal construction. The non-inductive WSN has greater pulse capability for the same size WSC
because the second layer of wire increases the wire mass available to withstand pulse energy without exceeding temperature limits.
Follow pulse graphic link for more information regarding capability

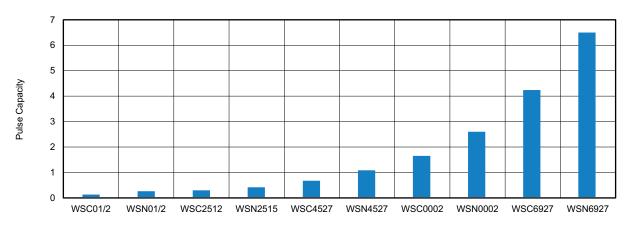
WELDED CONSTRUCTION





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COMPARISON OF PULSE CAPACITY (by series, 2 Ω at 70 °C)



Energy capacity increases with size with more wire mass to achieve the equivalent resistance value. WSN has a second layer of wire that provides higher energy capacity than WSC due to increased wire mass. Lower resistance values have higher pulse capability due to larger diameter wire.

PERFORMANCE					
TEST	CONDITIONS OF TEST	TEST LIMITS			
Thermal shock	-55 °C to +150 °C, 1000 cycles, 15 min at each extreme	\pm 0.5 % + 0.05 Ω			
Short time overload	5 x rated power for 5 s www.vishay.com/en/resistors/SMD-wirewound-pulse-capability-calculator/	\pm 0.2 % + 0.05 Ω			
Low temperature storage	-65 °C for 24 h	\pm 0.2 % + 0.05 Ω			
High temperature exposure	2000 h at +275 °C (WSC01/2 and WSN01/2 at 175 °C)	\pm 2.0 % + 0.05 Ω			
Bias humidity	+85 °C, 85 % RH, 10 % bias, 1000 h	\pm 0.2 % + 0.05 Ω			
Mechanical shock	100 <i>g</i> 's for 6 ms, 5 pulses	\pm 0.1 % + 0.05 Ω			
Vibration	Frequency varied 10 Hz to 500 Hz in 1 min, 3 directions, 9 h	\pm 0.1 % + 0.05 Ω			
Load life	1000 h at rated power, +70 °C, 1.5 h "ON", 0.5 h "OFF"	\pm 1.0 % + 0.05 Ω			
Resistance to solder heat	+260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	\pm 0.5 % + 0.05 Ω			

PACKAGING						
MODEL	REEL					
MODEL	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE		
WSC01/2	12 mm / embossed plastic	330 mm / 13"	2000	EA / TA		
WSC2515	16 mm / embossed plastic	330 mm / 13"	2000	EA / TA		
WSC0002, WSC4527	24 mm / embossed plastic	330 mm / 13"	1200	EA / TA		
WSC6927	32 mm / embossed plastic	330 mm / 13"	725	EA / TA		

Notes

Embossed carrier tape per EIA-481

Additional packaging details at <u>www.vishay.com/doc?20051</u>

LINKS TO RELATED DOCUMENTS	
SELECTOR GUIDE	
Overview of Automotive Grade Products	www.vishay.com/doc?49924
CONVERSION GUIDE	
WSC/WSN Wirewound Surface-Mount Resistors	www.vishay.com/doc?49616
TECHNICAL NOTES	
SMD Current Sense: AEC-Q200 vs. Vishay Qualification	www.vishay.com/doc?30416
MIL-PRF vs. AEC-Q200: Do You Know What You Are Getting?	www.vishay.com/doc?11000
WHITE PAPER	
Thermal Management for Surface-Mount Devices	www.vishay.com/doc?30380
Temperature Coefficient of Resistance for Current Sensing	www.vishay.com/doc?30405

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