Features:

- Special lead configurations
- 100% RoHS compliant and lead free without exemption
- Halogen free
- REACH compliant



Electrical Specifications – Lead Style 01

Type / Code	Power Rating (W) @ 70ºC	Maximum Working Voltage (V)	Maximum Overload Voltage (V)	Wirewound Resistance Range (Ω) and Tolerance	Metal Oxide Resistance Range (Ω) and Tolerance
				5%, 10%	5%, 10%
NSZ5…-01	5	350	700	0.22 - 220	240 - 51K
NSZ7…-01	7	500	1000	0.39 - 470	510 - 51K
NSZ10…-01	10	700	1400	0.56 - 680	750 - 51K

Max Voltage Rating = $\sqrt{P*R}$

Electrical Specifications – Lead Style 03

Type / Code	Power Rating (W) @ 70ºC	Maximum Working Voltage (V)	Maximum Overload Voltage (V)	Wirewound Resistance Range (Ω) and Tolerance	Metal Oxide Resistance Range (Ω) and Tolerance
				5%, 10%	5%, 10%
NSZ5…-03	5	350	700	0.22 - 220	240 - 51K
NSZ7…-03	7	500	1000	0.39 - 220	240 - 51K
NSZ10…-03	10	700	1400	0.56 - 220	240 - 51K
NSZ15…-03	15	700	1400	0.62 - 820	-

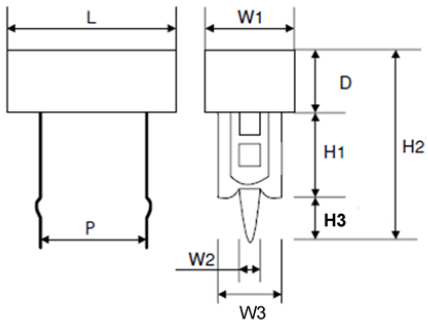
Max Voltage Rating = $\sqrt{P*R}$

Electrical Specifications – Lead Style 04

Type / Code	Power Rating (W) @ 70ºC	Maximum Working Voltage (V)	Maximum Overload Voltage (V)	Wirewound Resistance Range (Ω) and Tolerance	Metal Oxide Resistance Range (Ω) and Tolerance
				5%, 10%	5%, 10%
NSZ5…-04	5	350	700	0.22 - 220	240 - 51K
NSZ7…-04	7	500	1000	0.39 - 470	510 - 51K
NSZ10…-04	10	700	1400	0.56 - 680	750 - 51K
NSZ15…-04	15	700	1400	0.62 - 820	910 - 51K

Max Voltage Rating = $\sqrt{P*R}$

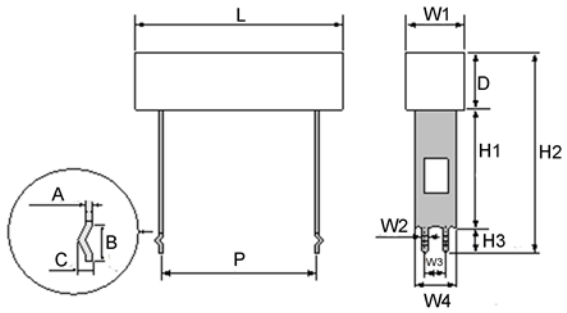
Mechanical Specifications – Lead Style 01



Type / Code	L	P	W1	W2	W3	D	H1	H2	H3	Unit
NSZ5…-01	1.063 ± 0.039 27.00 ± 1.00	0.591 ± 0.079 15.00 ± 2.00	0.374 ± 0.039 9.50 ± 1.00	0.059 ± 0.008 1.50 ± 0.20	0.287 ± 0.012 7.30 ± 0.30	0.374 ± 0.039 9.50 ± 1.00	0.394 ± 0.079 10.00 ± 2.00	0.945 24.00	0.177 ± 0.020 4.50 ± 0.50	inches mm
NSZ7…-01	1.378 ± 0.039 35.00 ± 1.00	0.886 ± 0.079 22.50 ± 2.00	0.374 ± 0.039 9.50 ± 1.00	0.059 ± 0.008 1.50 ± 0.20	0.287 ± 0.012 7.30 ± 0.30	0.374 ± 0.039 9.50 ± 1.00	0.394 ± 0.079 10.00 ± 2.00	0.945 24.00	0.177 ± 0.020 4.50 ± 0.50	inches mm
NSZ10…-01	1.890 ± 0.039 48.00 ± 1.00	1.378 ± 0.079 35.00 ± 2.00	0.374 ± 0.039 9.50 ± 1.00	0.059 ± 0.008 1.50 ± 0.20	0.287 ± 0.012 7.30 ± 0.30	0.374 ± 0.039 9.50 ± 1.00	0.394 ± 0.079 10.00 ± 2.00	0.945 24.00	0.177 ± 0.020 4.50 ± 0.50	inches mm

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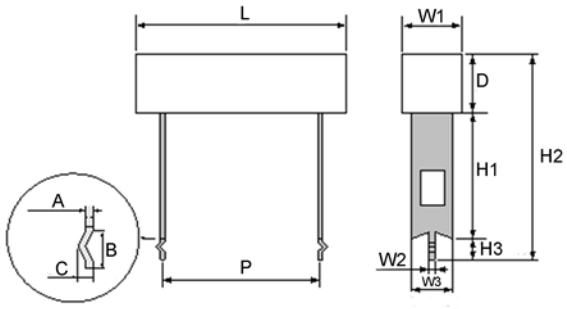
Mechanical Specifications – Lead Style 03



Type / Code	L	P	W1	W2	W3	W4	D	H1	H2	Unit
NSZ5…-03	1.063 ± 0.039 27.00 ± 1.00	0.591 ± 0.079 15.00 ± 2.00	0.374 ± 0.039 9.50 ± 1.00	0.059 ± 0.008 1.50 ± 0.20	0.138 ± 0.020 3.50 ± 0.50	0.287 ± 0.012 7.30 ± 0.30	0.374 ± 0.039 9.50 ± 1.00	0.984 ± 0.079 25.00 ± 2.00	1.535 39.00	inches mm
NSZ7…03	1.378 ± 0.039 35.00 ± 1.00	0.886 ± 0.079 22.50 ± 2.00	0.374 ± 0.039 9.50 ± 1.00	0.059 ± 0.008 1.50 ± 0.20	0.138 ± 0.020 3.50 ± 0.50	0.287 ± 0.012 7.30 ± 0.30	0.374 ± 0.039 9.50 ± 1.00	0.984 ± 0.079 25.00 ± 2.00	1.535 39.00	inches mm
NSZ10…03	1.890 ± 0.039 48.00 ± 1.00	1.378 ± 0.079 35.00 ± 2.00	0.374 ± 0.039 9.50 ± 1.00	0.059 ± 0.008 1.50 ± 0.20	0.138 ± 0.020 3.50 ± 0.50	0.287 ± 0.012 7.30 ± 0.30	0.374 ± 0.039 9.50 ± 1.00	0.984 ± 0.079 25.00 ± 2.00	1.535 39.00	inches mm
NSZ15…03	1.909 ± 0.039 48.50 ± 1.00	1.280 ± 0.079 32.50 ± 2.00	0.492 ± 0.039 12.50 ± 1.00	0.079 ± 0.008 2.00 ± 0.20	0.197 ± 0.039 5.00 ± 1.00	0.394 ± 0.012 10.00 ± 0.30	0.492 ± 0.039 12.50 ± 1.00	1.181 ± 0.079 30.00 ± 2.00	1.870 47.50	inches mm

Type / Code	H3	A	B	C	Unit
NSZ5…-03	0.177 ± 0.020 4.50 ± 0.50	0.020 ± 0.004 0.50 ± 0.10	0.177 ± 0.020 4.50 ± 0.50	0.033 0.85	inches mm
NSZ7…03	0.177 ± 0.020 4.50 ± 0.50	0.020 ± 0.004 0.50 ± 0.10	0.177 ± 0.020 4.50 ± 0.50	0.033 0.85	inches mm
NSZ10…03	0.177 ± 0.020 4.50 ± 0.50	0.020 ± 0.004 0.50 ± 0.10	0.177 ± 0.020 4.50 ± 0.50	0.033 0.85	inches mm
NSZ15…03	0.177 ± 0.020 4.50 ± 0.50	0.020 ± 0.004 0.50 ± 0.10	0.177 ± 0.020 4.50 ± 0.50	0.033 0.85	inches mm

Mechanical Specifications – Lead Style 04



Type / Code	L	P	W1	W2	W3	D	H1	H2	Unit
NSZ5…-04	1.063 ± 0.039 27.00 ± 1.00	0.591 ± 0.079 15.00 ± 2.00	0.374 ± 0.039 9.50 ± 1.00	0.059 ± 0.008 1.50 ± 0.20	0.287 ± 0.012 7.30 ± 0.30	0.374 ± 0.039 9.50 ± 1.00	0.984 ± 0.079 25.00 ± 2.00	1.535 39.00	inches mm
NSZ7…-04	1.378 ± 0.039 35.00 ± 1.00	0.886 ± 0.079 22.50 ± 2.00	0.374 ± 0.039 9.50 ± 1.00	0.059 ± 0.008 1.50 ± 0.20	0.287 ± 0.012 7.30 ± 0.30	0.374 ± 0.039 9.50 ± 1.00	0.984 ± 0.079 25.00 ± 2.00	1.535 39.00	inches mm
NSZ10…-04	1.890 ± 0.039 48.00 ± 1.00	1.378 ± 0.079 35.00 ± 2.00	0.374 ± 0.039 9.50 ± 1.00	0.059 ± 0.008 1.50 ± 0.20	0.287 ± 0.012 7.30 ± 0.30	0.374 ± 0.039 9.50 ± 1.00	0.984 ± 0.079 25.00 ± 2.00	1.535 39.00	inches mm
NSZ15…-04	1.909 ± 0.039 48.50 ± 1.00	1.280 ± 0.079 32.50 ± 2.00	0.492 ± 0.039 12.50 ± 1.00	0.118 ± 0.008 3.00 ± 0.20	0.287 ± 0.012 7.30 ± 0.30	0.492 ± 0.039 12.50 ± 1.00	1.181 ± 0.079 30.00 ± 2.00	1.870 47.50	inches mm

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Mechanical Specifications – Lead Style 04 (cont.)					
Type / Code	H3	A	B	C	Unit
NSZ5…-04	0.177 ± 0.020 4.50 ± 0.50	0.020 ± 0.004 0.50 ± 0.10	0.177 ± 0.020 4.50 ± 0.50	0.033 0.85	inches mm
NSZ7…-04	0.177 ± 0.020 4.50 ± 0.50	0.020 ± 0.004 0.50 ± 0.10	0.177 ± 0.020 4.50 ± 0.50	0.033 0.85	inches mm
NSZ10…-04	0.177 ± 0.020 4.50 ± 0.50	0.020 ± 0.004 0.50 ± 0.10	0.177 ± 0.020 4.50 ± 0.50	0.033 0.85	inches mm
NSZ15…-04	0.177 ± 0.020 4.50 ± 0.50	0.020 ± 0.004 0.50 ± 0.10	0.177 ± 0.020 4.50 ± 0.50	0.033 0.85	inches mm

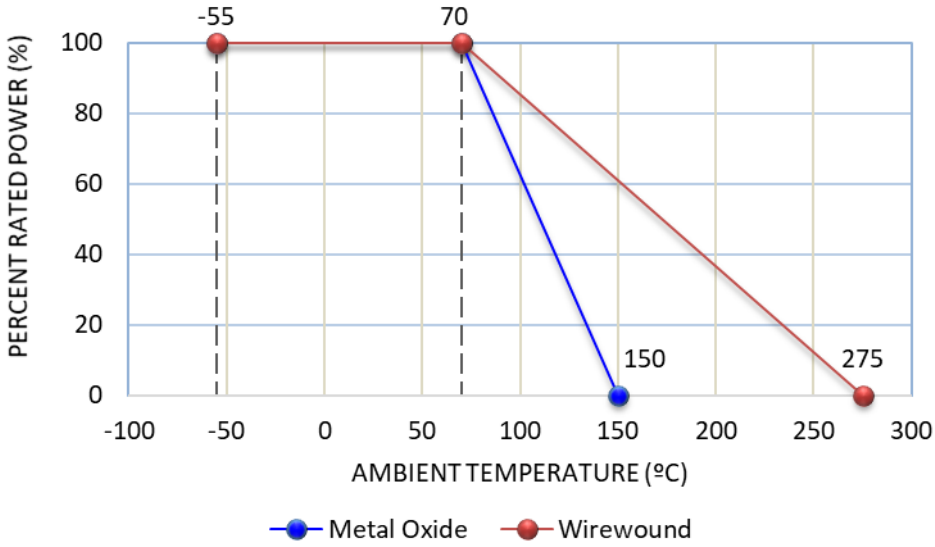
Performance Characteristics

Item	Performance or Quality Acceptance	Test Method
Temperature Coefficient of Resistance	R < 1 Ω ± 700 ppm/ºC R ≥ 1 Ω ± 200 ppm/ºC	Measure resistance (R0) at room temperature (t), after that, measure again the resistance (R) at 100ºC higher than room temperature $TCR = \frac{R - R_0}{R_0} x \frac{10^6}{(t + 100)-t}$ (ppm/ºC)
Overload (Short Time)	Change of resistance ≤ ± (2% + 0.05 Ω)	Apply DC voltage 2.5 times the rated voltage for 5 seconds. Leave it at room temperature for 30 minutes. Then measure.
Voltage Proof	Change of resistance ≤ ± (0.5% + 0.05 Ω) No mechanical damage.	Lay the resistor on the flat metal plate and apply the specified voltage between tied terminals for one minute. Test voltage (AC): 1500 V
Insulation Resistance	≥ 1000 Mohm	Lay the resistor on the 90º angle metal V block and apply 500 Vdc between V block and lead wire for a minute. The insulation resistance shall be measured while applying the voltage.
Vibration	Change of resistance ≤ ± (1% + 0.05 Ω)	Apply 1.5 mm amplitude vibration to three directions perpendicular to each other for 2 hours each, total of 6 hours. Vibrating frequency is 10 Hz - 55 Hz - 10 Hz cycle in 1 minute sweeping and repeat cycle.
Robustness of Terminations	Change of resistance ≤ ± (0.5% + 0.05 Ω) No mechanical damage.	Tensile: The body of the resistor is fixed, a static load is added in the direction of drawing out of the terminal, and it maintains it for 10 ± 1 seconds. Tensile strength: 45 N 0.5 N is applied from any direction for 10 seconds.
Resistance to Soldering Heat	Change of resistance ≤ ± (1% + 0.05 Ω)	Dip the lead into a solder bath having a temperature of 260ºC ± 5ºC up to 1.5 ± 0.5 mm from the body of the resistors and hold it for 10 ± 0.5 seconds and leave in room temperature for 24 hours after test.
Solderability	More than 95% of the surface of the lead shall be covered by new solder.	Dip the lead into a solder bath having a temperature of 245ºC ± 5ºC up to 1.5 ± 0.5 mm from the body of the resistors and hold it for 5 ± 0.5 seconds.
Rapid Change of Temperature	Change of resistance ≤ ± (1% + 0.05 Ω)	The resistor shall be subjected to 5 continuous cycle, each as shown in the table below: 1 – Minimum operating temperature – 30 minunes 2 – Standard atmospheric condition – ≤ 30 seconds 3 – Maximum operating temperature – 30 minunes 4 – Standard atmospheric condition – ≤ 30 seconds
Damp Heat, Steady State	Change of resistance ≤ ± (5% + 0.05 Ω)	In the chamber having temperature 40ºC ± 2ºC and relative humidity 93 ± 3%, apply one percent of the rated power, 1.5 hour ON, 0.5 hour OFF for 1000 hours and leave in room temperature for one hour after test.
Endurance at Room Temperature	Change of resistance ≤ ± (5% + 0.05 Ω)	At room temperature, apply rated DC voltage 1.5 ON, o.5 hour OFF for 1000 hours and leave in room temperature for one hour after test.

Operating Temperature Range: -55ºC to +275ºC wirewound; -55ºC to + 150ºC metal oxide.

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Power Derating Curve:



Recommended Solder Profile

This information is intended as a reference for solder profiles for Stackpole resistive components. These profiles should be compatible with most soldering processes. These are only recommendations. Actual numbers will depend on board density, geometry, packages used, etc., especially those cells labeled with "*".

100% Matte Tin / RoHS Compliant Terminations

Soldering iron recommended temperatures: 330°C to 350°C with minimum duration.
Maximum number of reflow cycles: 3.

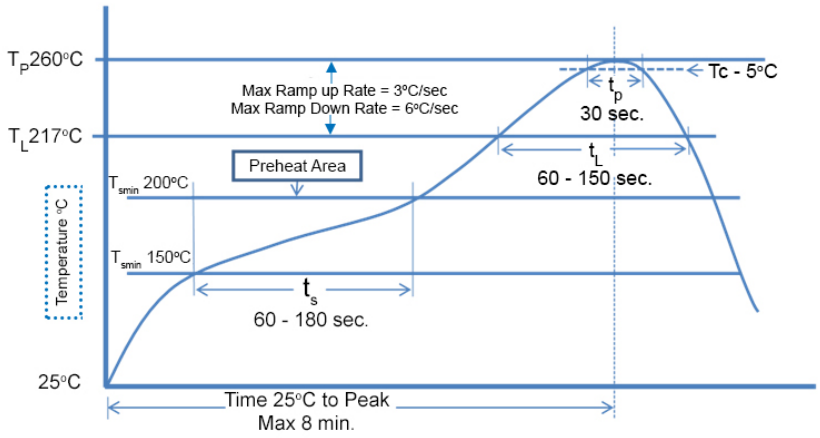
Wave Soldering			
Description	Maximum	Recommended	Minimum
Preheat Time	80 seconds	70 seconds	60 seconds
Temperature Diff.	140°C	120°C	100°C
Solder Temp.	260°C	250°C	240°C
Dwell Time at Max.	10 seconds	5 seconds	*
Ramp DN (°C/sec)	N/A	N/A	N/A

Temperature Diff. = Defference between final preheat stage and soldering stage.

Convection IR Reflow			
Description	Maximum	Recommended	Minimum
Ramp Up (°C/sec)	3°C/sec	2°C/sec	*
Dwell Time > 217°C	150 seconds	90 seconds	60 seconds
Solder Temp.	260°C	245°C	*
Dwell Time at Max.	30 seconds	15 seconds	10 seconds
Ramp DN (°C/sec)	6°C/sec	3°C/sec	*

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Recommended Lead Free Resistor Reflow Profile



RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status

Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
NSZ	Ceramic Housed Wirewound Resistor with Specialty Leads	Radial	YES	99.3 / 0.7 Sn/Cu	Jan-04	04/01

"Conflict Metals" Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the Eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

This specification may be changed at any time without prior notice
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Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

How to Order

1	2	3	4	5	6	7	8	9	10		11	12
N	**S**	**Z**	**7**	**J**	**B**	**1**	**K**	**0**	**0**	-	**0**	**1**

Product Series

Code	Description
NSZ	Ceramic Housed Wirewound with Specialty Leads

Power Rating

Size	W
5	5
7	7
10	10
15	15

Tolerance

Code	Tol	Value
J	5%	E24
K	10%	E12

Packaging

Cod	Description	Size	Quantity
B	Bulk	5, 7, 10	1000
		15	500

Resistance Value

Four characters with the multiplier used as the decimal holder.

1 ohm = 1R00
680 ohm = 680R
51 Kohm = 51K0

Lead Style

Code
01
03
04

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