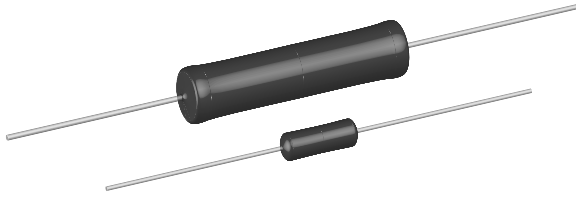


## Wirewound Resistors, Military/Established Reliability, MIL-PRF-39007 Qualified, Type RWR, R Level, Axial Lead


**FEATURES**

- High temperature silicone coated
- Complete welded construction
- Qualified to MIL-PRF-39007
- Available in non-inductive styles (type N) with Aryton-Perry winding for lowest reactive components
- “S” level failure rate available

**Note**

- “Terminal Wire and Winding” type “W” and “Z” are not listed below but are available upon request. Please reference MIL-PRF-39007 QPL for approved “failure rate” and “resistance tolerance/ranges”

STANDARD ELECTRICAL SPECIFICATIONS					
MILITARY MODEL	VISHAY REFERENCE MODEL	POWER RATING $P_{25^{\circ}\text{C}}$ W	RESISTANCE RANGE $\Omega$ $\pm 0.1\%$	RESISTANCE RANGE $\Omega$ $\pm 0.5\%, \pm 1\%$	WEIGHT (typical) g
RWR81S	EGS-1-80	1	0.499 to 1K	0.1 to 1K	0.21
RWR81N	EGN-1-80	1	0.499 to 499	0.1 to 499	0.21
RWR82S	EGS-2	2	0.499 to 1.3K	0.1 to 1.3K	0.23
RWR82N	EGN-2	2	0.499 to 649	0.1 to 649	0.23
RWR80S	EGS-3-80	2	0.499 to 3.16K	0.1 to 3.16K	0.34
RWR80N	EGN-3-80	2	0.499 to 1.58K	0.1 to 1.58K	0.34
RWR71S	ESS-2A	2	0.499 to 12.1K	0.1 to 12.1K	0.90
RWR71N	ESN-2A	2	0.499 to 6.04K	0.1 to 6.04K	0.90
RWR89S	ESS-2B	3	0.499 to 4.12K	0.1 to 4.12K	0.70
RWR89N	ESN-2B	3	0.499 to 2.05K	0.1 to 2.05K	0.70
RWR74S	ESS-5	5	0.499 to 12.1K	0.1 to 12.1K	4.2
RWR74N	ESN-5	5	0.499 to 6.04K	0.1 to 6.04K	4.2
RWR84S	EGS-10-80	7	0.499 to 12.4K	0.1 to 12.4K	3.6
RWR84N	EGN-10-80	7	0.499 to 6.19K	0.1 to 6.19K	3.6
RWR78S	ESS-10	10	0.499 to 39.2K	0.1 to 39.2K	9.0
RWR78N	ESN-10	10	0.499 to 19.6K	0.1 to 19.6K	9.0

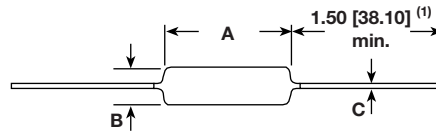
**Note**

- RWR82S and RWR82N: Core consists of beryllium oxide ceramic

GLOBAL PART NUMBER INFORMATION														
Global Part Numbering example: <b>RWR74S49R9FSB12</b>														
R	W	R	7	4	S	4	9	R	9	F	S	B	1	2
MIL TYPE (5 digits)	TERMINAL WIRE AND WINDING (1 digit)		RESISTANCE VALUE (4 digits)			TOLERANCE CODE (1 digit)		FAILURE RATE (1 digit)			PACKAGING CODE (3 digits)			
RWR71 RWR74 RWR78 RWR80 RWR81 RWR82 RWR84 RWR89	S = Solderable, inductive N = Solderable, non-inductive W = Weldable, inductive <sup>(1)</sup> Z = Weldable, non-inductive <sup>(1)</sup>		3 digit significant figure, followed by a multiplier  49R9 = 49.9 $\Omega$ 1000 = 100 $\Omega$ 1001 = 1000 $\Omega$			B = $\pm 0.1\%$ D = $\pm 0.5\%$ F = $\pm 1.0\%$		M = 1.0 %/1000 h P = 0.1 %/1000 h R = 0.01 %/1000 h S = 0.001 %/1000 h			B12 = Bulk pack S70 = Tape/reel (smaller than 5 W) S73 = Tape/reel (5 W and higher) BSL = Bulk pack, single lot date code RSL = Tape/reel, single lot date code			

**Note**

- <sup>(1)</sup> Note that “W” and “Z” are not listed above but are available, see MIL-PRF-39007 QPL for available resistance values.

**DIMENSIONS** in inches [millimeters]


MILITARY MODEL	DIMENSIONS in inches [millimeters]		
	A	B	C
RWR81	0.250 ± 0.031 [6.35 ± 0.787]	0.085 ± 0.020 [2.16 ± 0.508]	0.020 ± 0.0015 [0.508 ± 0.038]
RWR82	0.312 ± 0.016 [7.92 ± 0.406]	0.078 + 0.016 - 0.031 [1.98 + 0.406 - 0.787]	0.020 ± 0.0015 [0.508 ± 0.038]
RWR80	0.406 ± 0.031 [10.31 ± 0.787]	0.094 ± 0.031 [2.39 ± 0.787]	0.020 ± 0.0015 [0.508 ± 0.038]
RWR71	0.812 ± 0.062 [20.62 ± 1.58]	0.187 ± 0.031 [4.75 ± 0.787]	0.032 ± 0.002 [0.813 ± 0.051]
RWR89	0.560 ± 0.062 [14.22 ± 1.58]	0.187 ± 0.031 [4.75 ± 0.787]	0.032 ± 0.002 [0.813 ± 0.051]
RWR74	0.875 ± 0.062 [22.23 ± 1.58]	0.312 ± 0.031 [7.92 ± 0.787]	0.040 ± 0.002 [1.02 ± 0.051]
RWR84	0.875 ± 0.062 [22.23 ± 1.58]	0.312 ± 0.031 [7.92 ± 0.787]	0.040 ± 0.002 [1.02 ± 0.051]
RWR78	1.780 ± 0.062 [45.21 ± 1.58]	0.375 ± 0.031 [9.525 ± 0.787]	0.040 ± 0.002 [1.02 ± 0.051]

**Note**

(1) On some standard reel pack methods, the leads may be trimmed to a shorter length than shown.

TECHNICAL SPECIFICATIONS		
PARAMETER	UNIT	RWR RESISTOR CHARACTERISTICS
Dielectric Withstanding Voltage	V <sub>AC</sub>	500 minimum for 2 W and smaller, 1000 minimum for 3 W and larger
Short Time Overload	-	5 x rated power for 5 s for 3 W size and smaller, 10 x rated power for 5 s for 5 W size and greater
Maximum Working Voltage	V	(P x R) <sup>1/2</sup>
Insulation Resistance	.	1000 MΩ minimum dry, 100 MΩ minimum after moisture test
Terminal Strength	lb	5 minimum for 2 W and smaller, 10 minimum for 3 W and larger
Solderability	-	Meets requirements of ANSI J-STD-002
Operating Temperature Range	°C	- 55 to + 250

RESISTANCE TEMPERATURE COEFFICIENT								
TEMPERATURE COEFFICIENT (ppm/°C)	RWR71	RWR74	RWR78	RWR80	RWR81	RWR82	RWR84	RWR89
	RESISTANCE RANGE (Ω)	RESISTANCE RANGE (Ω)	RESISTANCE RANGE (Ω)	RESISTANCE RANGE (Ω)	RESISTANCE RANGE (Ω)	RESISTANCE RANGE (Ω)	RESISTANCE RANGE (Ω)	RESISTANCE RANGE (Ω)
± 650	0.1 to 0.499	0.1 to 0.499	0.1 to 0.499	0.1 to 0.499	0.1 to 0.499	0.1 to 0.499	0.1 to 0.499	0.1 to 0.499
± 400	0.505 to 1.0	0.505 to 1.0	0.505 to 1.0	0.505 to 1.0	0.505 to 1.0	0.505 to 1.0	0.505 to 1.0	0.505 to 1.0
± 50	1.01 to 10	1.01 to 10	1.01 to 10	1.01 to 10	1.01 to 10	1.01 to 10	1.01 to 10	1.01 to 10
± 30	10.1 to 73.2	10.1 to 158	10.1 to 453	-	-	-	10.1 to 158	10.1 to 42.2
± 20	74.1 and above	160 and above	459 and above	10.1 and above	10.1 and above	10.1 and above	160 and above	42.7 and above



**MATERIAL SPECIFICATIONS**

**Element:** Copper-nickel alloy or nickel-chrome alloy, depending on resistance value

**Core:** Ceramic, beryllium oxide <sup>(1)</sup>, steatite or alumina, depending on power requirement

**Coating:** Special high temperature silicone

**Terminal and Winding:** The terminal and the winding are identified by a letter symbol in the military type designation.

Military symbol:

**S** = Solderable, inductively wound

**W** = Weldable, inductively wound

**N** = Solderable, non-inductively wound

**Z** = Weldable, non-inductively wound

**Terminals:** Solderable - Tinned Copperweld®

Weldable - bare nickel per MIL-STD-1276, Type N-1

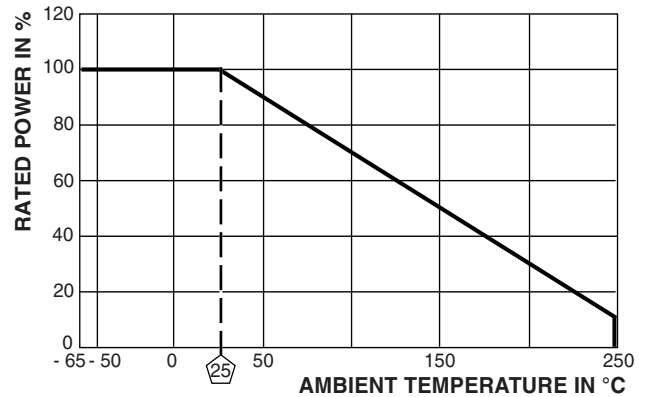
**End Caps:** Stainless steel

**Part Marking:** Source code, JAN, military PIN, date/lot code

**Note**

<sup>(1)</sup> RWR82S and RWR82N: Core consists of beryllium oxide ceramic

**DERATING**



PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST LIMITS
Thermal Shock	MIL-STD-202, method 107	± (0.2 % + 0.005 Ω) ΔR
Short Time Overload	5 x rated power (RWR71, RWR80, RWR81, RWR89, RWR82), 10 x rated power (RWR74, RWR78, RWR84) for 5 s	± (0.2 % + 0.005 Ω) ΔR
Dielectric Withstanding Voltage	500 V <sub>rms</sub> (RWR80, RWR81, RWR82), 1000 V <sub>rms</sub> (RWR71, RWR74, RWR78, RWR84, RWR89), 1 min duration	± (0.1 % + 0.005 Ω) ΔR
Low Temperature Storage	- 55 °C for 24 h	± (0.1 % + 0.005 Ω) ΔR
High Temperature Exposure	250 °C for 2000 h	± (1.0 % + 0.005 Ω) ΔR <sup>(2)</sup>
Moisture Resistance	MIL-STD-202, method 106	± (0.2 % + 0.005 Ω) ΔR
Shock, Specified Pulse	MIL-STD-202, method 213, condition I	± (0.1 % + 0.005 Ω) ΔR
Vibration, High Frequency	MIL-STD-202, method 204, condition D	± (0.1 % + 0.005 Ω) ΔR
Load Life	2000 h at rated power, + 25 °C, 1.5 h "ON", 0.5 h "OFF"	± (0.5 % + 0.005 Ω) ΔR
Extended Life	10 000 h at rated power, + 25 °C, 1.5 h "ON", 0.5 h "OFF"	± (1.0 % + 0.005 Ω) ΔR
Terminal Strength	MIL-STD-202, method 211, condition A and C 5 pound (RWR80, RWR81, RWR82), 10 pound (RWR71, RWR74, RWR78, RWR84, RWR89)	± (0.1 % + 0.005 Ω) ΔR

**Note**

<sup>(2)</sup> For resistance values above 100 Ω, test limit is ± 1.0 %.



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**