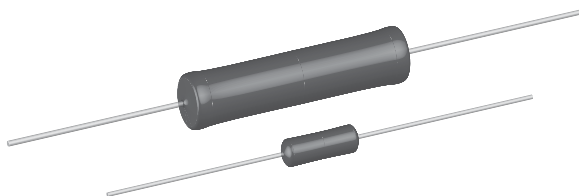


Wirewound Resistors, Military/Established Reliability, MIL-PRF-39007 Qualified, Type RWR, Up to S Level, Axial Lead



DESIGN SUPPORT TOOLS

[click logo to get started](#)


FEATURES

- High temperature silicone coated
- Complete welded construction
- Qualified to MIL-PRF-39007
- Available in non-inductive styles (type N) with Ayrton-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 Ω $\pm 0.1\%$ | RESISTANCE RANGE Ω $\pm 0.5\%, \pm 1\%$ | 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 | 1.5 | 0.499 to 1.3K | 0.1 to 1.3K | 0.23 |
| RWR82N | EGN-2 | 1.5 | 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: **RWR74S49R9FSB12**

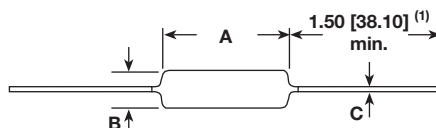
| MIL TYPE (5 digits) | TERMINAL WIRE AND WINDING (1 digit) | RESISTANCE VALUE (4 digits) | TOLERANCE CODE (1 digit) | FAILURE RATE (1 digit) | PACKAGING CODE (3 digits) |
|--|--|---|--|---|--|
| RWR71 RWR74 RWR78 RWR80 RWR81 RWR82 RWR84 RWR89 | S = solderable, inductive N = solderable, non-inductive W = weldable, inductive ⁽¹⁾ Z = weldable, non-inductive ⁽¹⁾ | 3 digit significant figure, followed by a multiplier 49R9 = 49.9 Ω 1000 = 100 Ω 1001 = 1000 Ω | 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 (500 pieces) BSL ⁽²⁾ = bulk pack, single lot date code RSL ⁽²⁾ = tape/reel, single lot date code |

Notes

- (1) Note that “W” and “Z” are not listed above but are available, see MIL-PRF-39007 QPL for available resistance values
- (2) Maximum order sizes apply for single lot date code package codes, please see table below

MAXIMUM ORDER SIZE FOR SINGLE LOT DATE CODE PACKAGE CODES

| MODEL | MAXIMUM ORDER SIZE (PIECES) |
|-------|-----------------------------|
| RWR81 | 1000 |
| RWR82 | 1000 |
| RWR80 | 1000 |
| RWR71 | 500 |
| RWR89 | 1000 |
| RWR74 | 500 |
| RWR84 | 300 |
| RWR78 | 300 |

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 _{AC} | 500 minimum for 2 W and smaller, 1000 minimum for 3 W and larger |
| Short Time Overload | - | 5x rated power for 5 s for 3 W size and smaller, 10x rated power for 5 s for 5 W size and greater |
| Maximum Working Voltage | V | (P × R) ^{1/2} |
| 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 max. | 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 max. | 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 ⁽¹⁾, 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®

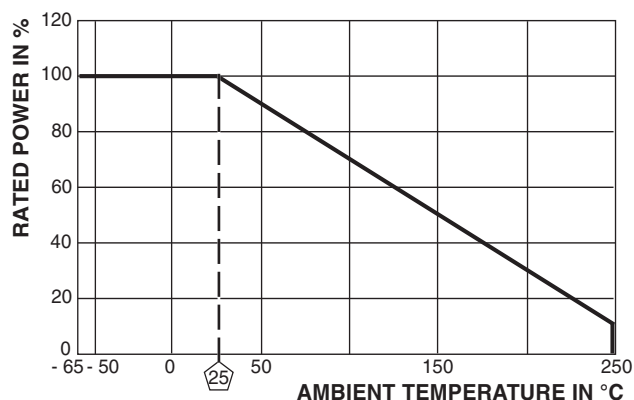
Weldable - bare nickel per MIL-STD-1276, Type N-1

End Caps: stainless steel

Part Marking: source code, JAN, military PIN, date/lot code

Note

⁽¹⁾ RWR82S and RWR82N: Core consists of beryllium oxide ceramic

DERATING

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

Note

⁽¹⁾ For resistance values above 100 Ω , test limit is $\pm 1.0 \%$



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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

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.