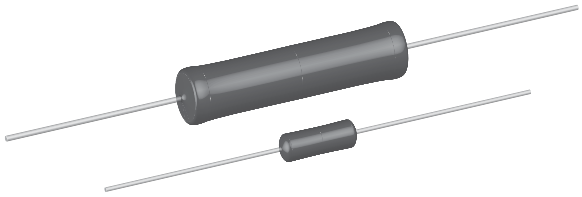
# Wirewound Resistors, Military/Established Reliability, MIL-PRF-39007 Qualified, Type RWR, Up to S Level, Axial Lead



## DESIGN SUPPORT TOOLS

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3D Models Available

## 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 $P_{25\,°C}$ W | RESISTANCE RANGE Ω ± 0.1 % | RESISTANCE RANGE Ω ± 0.5 %, ± 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**

| 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**<br>**RWR74**<br>**RWR78**<br>**RWR80**<br>**RWR81**<br>**RWR82**<br>**RWR84**<br>**RWR89** | **S** = solderable, inductive<br>**N** = solderable, non-inductive<br>**W** = weldable, inductive (1)<br>**Z** = weldable, non-inductive (1) | 3 digit significant figure, followed by a multiplier<br><br>**49R9** = 49.9 Ω<br>**1000** = 100 Ω<br>**1001** = 1000 Ω | **B** = ± 0.1 %<br>**D** = ± 0.5 %<br>**F** = ± 1.0 % | **M** = 1.0 %/1000 h<br>**P** = 0.1 %/1000 h<br>**R** = 0.01 %/1000 h<br>**S** = 0.001 %/1000 h | **B12** = bulk pack<br>**S70** = tape/reel (smaller than 5 W)<br>**S73** = tape/reel (500 pieces)<br>**BSL** (2) = bulk pack, single lot date code<br>**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



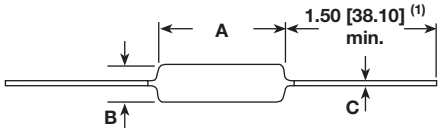
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| MAXIMUM ORDER SIZE FOR SINGLE LOT DATE CODE PACKAGE CODES | |
|---|---|
| **MODEL** | **MAXIMUM ORDER SIZE (PIECES)** |
| RWR81 | 1000 |
| RWR82 | 1000 |
| RWR80 | 1000 |
| RWR71 | 500 |
| RWR89 | 1000 |
| RWR74 | 500 |
| RWR84 | 300 |
| RWR78 | 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,<br>10x rated power for 5 s for 5 W size and greater |
| Maximum Working Voltage | V | $(P \times R)^{1/2}$ |
| 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 |



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## 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

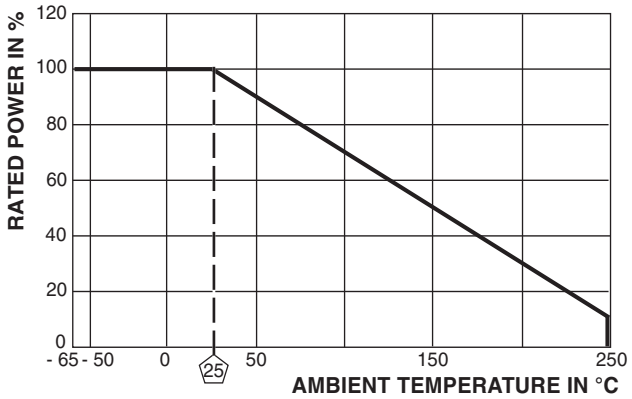
**End Caps:** stainless steel

**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 | ± (0.2 % + 0.005 Ω) Δ*R* |
| Short Time Overload | 5x rated power (RWR71, RWR80, RWR81, RWR89, RWR82),<br>10 x rated power (RWR74, RWR78, RWR84) for 5 s | ± (0.2 % + 0.005 Ω) Δ*R* |
| Dielectric Withstanding Voltage | 500 $V_{RMS}$ (RWR80, RWR81, RWR82),<br>1000 $V_{RMS}$ (RWR71, RWR74, RWR78, RWR84, RWR89), 1 min duration | ± (0.1 % + 0.005 Ω) Δ*R* |
| Low Temperature Storage | -55 °C for 24 h | ± (0.1 % + 0.005 Ω) Δ*R* |
| High Temperature Exposure | 250 °C for 2000 h | ± (1.0 % + 0.005 Ω) Δ*R* [1] |
| Moisture Resistance | MIL-STD-202, method 106 | ± (0.2 % + 0.005 Ω) Δ*R* |
| Shock, Specified Pulse | MIL-STD-202, method 213, condition I | ± (0.1 % + 0.005 Ω) Δ*R* |
| Vibration, High Frequency | MIL-STD-202, method 204, condition D | ± (0.1 % + 0.005 Ω) Δ*R* |
| Load Life | 2000 h at rated power, +25 °C, 1.5 h “ON”, 0.5 h “OFF” | ± (0.5 % + 0.005 Ω) Δ*R* |
| Extended Life | 10 000 h at rated power, +25 °C, 1.5 h “ON”, 0.5 h “OFF” | ± (1.0 % + 0.005 Ω) Δ*R* |
| Terminal Strength | MIL-STD-202, method 211, condition A and C<br>5 pound (RWR80, RWR81, RWR82),<br>10 pound (RWR71, RWR74, RWR78, RWR84, RWR89) | ± (0.1 % + 0.005 Ω) Δ*R* |

**Note**

(1) For resistance values above 100 Ω, test limit is ± 1.0 %



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