

## 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<br>$P_{25^\circ\text{C}}$ W | RESISTANCE RANGE $\Omega$<br>$\pm 0.1\%$ | RESISTANCE RANGE $\Omega$<br>$\pm 0.5\%, \pm 1\%$ | WEIGHT<br>(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                   |

**TECHNICAL SPECIFICATIONS**

| PARAMETER                       | UNIT                  | RWR RESISTOR CHARACTERISTICS   |
|---------------------------------|-----------------------|--|
| Temperature Coefficient         | ppm/ $^\circ\text{C}$ | $\pm 20$ for 10 $\Omega$ and above; $\pm 50$ for 1.1 $\Omega$ to 10 $\Omega$ ; $\pm 400$ for 0.505 $\Omega$ to 1 $\Omega$ ; $\pm 650$ for 0.1 $\Omega$ to 0.499 $\Omega$ |
| Dielectric Withstanding Voltage | $V_{AC}$              | 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,<br>10 x rated power for 5 s for 5 W size and greater   |
| Maximum Working Voltage         | V                     | $(P \times R)^{1/2}$   |
| Insulation Resistance           | .                     | 1000 M $\Omega$ minimum dry, 100 M $\Omega$ 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     | $^\circ\text{C}$      | - 65 to + 250  |

**GLOBAL PART NUMBER INFORMATION**

Global Part Numbering example: RWR74S49R9FSB12



| MIL TYPE   | TERMINAL WIRE AND WINDING  | RESISTANCE VALUE   | TOLERANCE CODE  | FAILURE RATE  | PACKAGING CODE  |
|--|--|--|---|---|---|
| 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 <sup>(1)</sup><br>Z = Weldable, non-inductive <sup>(1)</sup> | 3 digit significant figure,<br>followed by a multiplier<br><br>49R9 = 49.9 $\Omega$<br>1000 = 100 $\Omega$<br>1001 = 1000 $\Omega$ | B = $\pm 0.1\%$<br>D = $\pm 0.5\%$<br>F = $\pm 1.0\%$ | 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<br>(smaller than 5 W)<br>S73 = Tape/reel<br>(5 W and higher)<br>BSL = Bulk pack,<br>single lot date code<br>RSL = Tape/reel,<br>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]       | 0.312 ± 0.031 [7.92 ± 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.

**MATERIAL SPECIFICATIONS**

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

**Core:** Ceramic, beryllium oxide, 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

**DERATING**


| PERFORMANCE                     |  |                                       |
|---------------------------------|--|---------------------------------------|
| TEST                            | CONDITIONS OF TEST   | TEST LIMITS                           |
| Thermal Shock                   | MIL-STD-2.2, method 303  | ± (0.2 % + 0.005 Ω) ΔR                |
| Short Time Overload             | 5 x rated power (RWR71, RWR80, RWR81, RWR89, RWR82),<br>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),<br>1000 V <sub>rms</sub> (RWR71, RWR74, RWR78, RWR84, RWR89), 1 min duration     | ± (0.1 % + 0.005 Ω) ΔR                |
| Low Temperature Storage         | - 65 °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 1   | ± (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<br>5 pound (RWR80, RWR81, RWR82),<br>10 pound (RWR71, RWR74, RWR78, RWR84, RWR89) | ± (0.1 % + 0.005 Ω) ΔR                |

**Note**

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



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