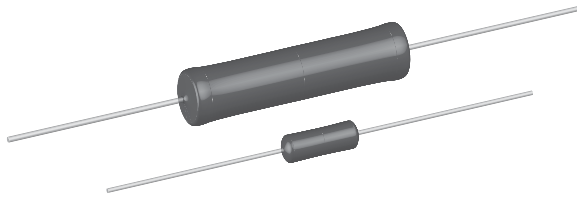




# Wirewound Resistors, Military/Established Reliability, MIL-PRF-39007 Qualified, Type RWR, Up to S Level, Axial Lead



### DESIGN SUPPORT TOOLS

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### 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<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                  | 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<br>(5 digits)   | TERMINAL WIRE AND WINDING<br>(1 digit)   | RESISTANCE VALUE<br>(4 digits)  | TOLERANCE CODE<br>(1 digit)                           | FAILURE RATE<br>(1 digit)   | PACKAGING CODE<br>(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 <sup>(1)</sup><br>Z = weldable, non-inductive <sup>(1)</sup> | 3 digit significant figure, 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 (smaller than 5 W)<br>S73 = tape/reel (500 pieces)<br>BSL <sup>(2)</sup> = bulk pack, single lot date code<br>RSL <sup>(2)</sup> = 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 <sub>AC</sub> | 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) <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 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

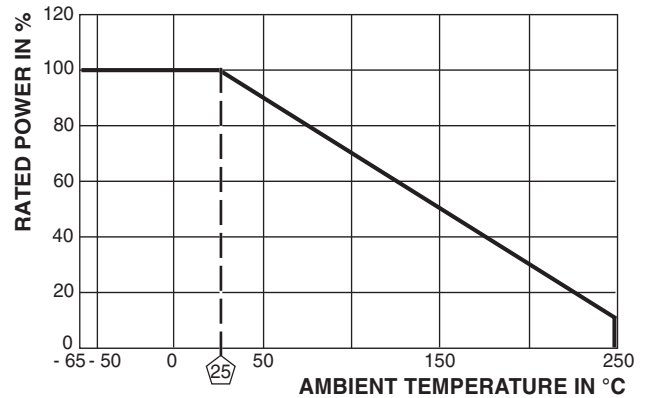
End Caps: stainless steel

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  | ± (0.2 % + 0.005 Ω) ΔR     |
| 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) 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         | -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 (1) |
| 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<br>5 pound (RWR80, RWR81, RWR82),<br>10 pound (RWR71, RWR74, RWR78, RWR84, RWR89) | ± (0.1 % + 0.005 Ω) ΔR     |

Note

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



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