

Wirewound Resistors, Industrial Power, Aluminum Housed, Chassis Mount


FEATURES

- Molded construction for total environmental protection
- Complete welded construction
- Meets applicable requirements of MIL-PRF-18546
- Available in non-inductive styles (type NH) with Ayrton-Perry winding for lowest reactive components
- Mounts on chassis to utilize heat-sink effect
- Excellent stability in operation (< 1 % change in resistance)
- MIL-PRF-18546 qualified, type RE resistors can be found at: www.vishay.com/doc?30282
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS*
Available

HALOGEN FREE
Available

GREEN
(5-2008)
Available

Note

* This datasheet provides information about parts that are RoHS-compliant and/or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details.

STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | HISTORICAL MODEL | POWER RATING $P_{25^{\circ}\text{C}}$ W | RESISTANCE RANGE Ω $\pm 0.05\%$, $\pm 0.1\%$ | RESISTANCE RANGE Ω $\pm 0.25\%$ | RESISTANCE RANGE Ω $\pm 0.5\%$ | RESISTANCE RANGE Ω $\pm 1\%$, $\pm 3\%$, $\pm 5\%$ | WEIGHT (typical) g |
|--------------|------------------|--|---|---|--|--|-----------------------|
| RH005 | RH-5 | 7.5 | 0.5 to 6.75K | 0.1 to 8.6K | 0.05 to 8.6K | 0.02 to 24.5K | 3 |
| NH005 | NH-5 | 7.5 | 0.5 to 2.32K | 0.1 to 3.27K | 0.05 to 3.27K | 0.05 to 12.75K | 3 |
| RH010 | RH-10 | 12.5 | 0.5 to 12.7K | 0.1 to 16.69K | 0.05 to 16.69K | 0.01 to 47.1K | 5 |
| NH010 | NH-10 | 12.5 | 0.5 to 4.45K | 0.1 to 5.54K | 0.05 to 5.54K | 0.05 to 23.5K | 5 |
| RH025 | RH-25 | 25 | 0.5 to 25.7K | 0.1 to 32.99K | 0.05 to 32.99K | 0.01 to 95.2K | 12 |
| NH025 | NH-25 | 25 | 0.5 to 9.09K | 0.1 to 12.8K | 0.05 to 12.8K | 0.05 to 47.6K | 12 |
| RH050 | RH-50 | 50 | 0.5 to 73.4K | 0.1 to 96K | 0.05 to 96K | 0.01 to 273K | 28 |
| NH050 | NH-50 | 50 | 0.5 to 26K | 0.1 to 36.7K | 0.05 to 36.7K | 0.05 to 136K | 28 |
| RH100 | RH-100 | 100 | 0.5 to 90K | 0.1 to 90K | 0.05 to 90K | 0.05 to 90K | 353 |
| NH100 | NH-100 | 100 | 0.5 to 37.5K | 0.1 to 37.5K | 0.05 to 37.5K | 0.05 to 37.5K | 353 |
| RH250 | RH-250 | 250 | 0.5 to 116K | 0.1 to 116K | 0.05 to 116K | 0.05 to 116K | 637 |
| NH250 | NH-250 | 250 | 0.5 to 48.5K | 0.1 to 48.5K | 0.05 to 48.5K | 0.05 to 48.5K | 637 |

Note

- RH005 and NH005 printed with 5 W power rating. RH010 and NH010 printed with 10 W power rating. New construction allows these resistors to be rated at higher wattage but will only be printed with the higher wattage upon customer request

TECHNICAL SPECIFICATIONS

| PARAMETER | UNIT | RH RESISTOR CHARACTERISTICS |
|-----------------------------|-------------------------|---|
| Temperature Coefficient | ppm/ $^{\circ}\text{C}$ | ± 20 for 10 Ω and above; ± 50 for 1 Ω to 9.9 Ω , ± 100 for 0.1 Ω to 0.99 Ω |
| Maximum Working Voltage | V | $(P \times R)^{1/2}$ |
| Insulation Resistance | Ω | 10 000 M Ω minimum dry, 1000 M Ω minimum after moisture test |
| Solderability | - | Meets requirements of ANSI J-STD-002 |
| Operating Temperature Range | $^{\circ}\text{C}$ | -55 to +250 |

GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: RH0054R125FC02

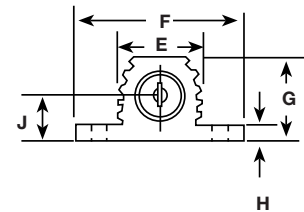
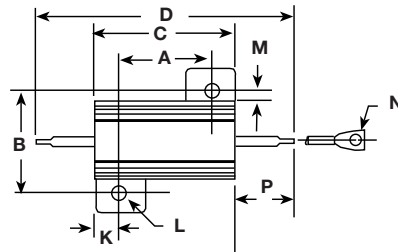
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|
| R | H | 0 | 0 | 5 | 4 | R | 1 | 2 | 5 | F | C | 0 | 2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|

| GLOBAL MODEL | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING | SPECIAL |
|--|---|--|--|--|
| RH005 (see Standard Electrical Specifications Global Model column for options) | R = decimal K = thousand 15R00 = 15 Ω 10K00 = 10 k Ω | A = 0.05 % B = 0.1 % C = 0.25 % D = 0.5 % F = 1.0 % H = 3.0 % J = 5.0 % | E02 = lead (Pb)-free, card pack (RH005 - RH050) E01 = lead (Pb)-free, skin pack (RH100 and RH250) C02 = tin / lead, card pack (RH005 - RH050) J01 = tin / lead, skin pack (RH100 and RH250) | (dash number) (up to 3 digits) from 1 to 999 as applicable |

 Historical Part Numbering example: RH-5 4.125 Ω 1 % C02

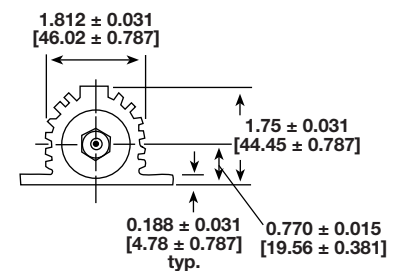
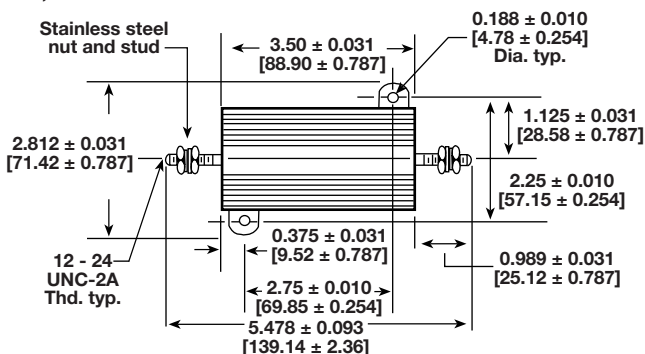
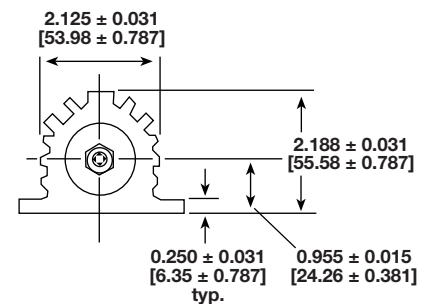
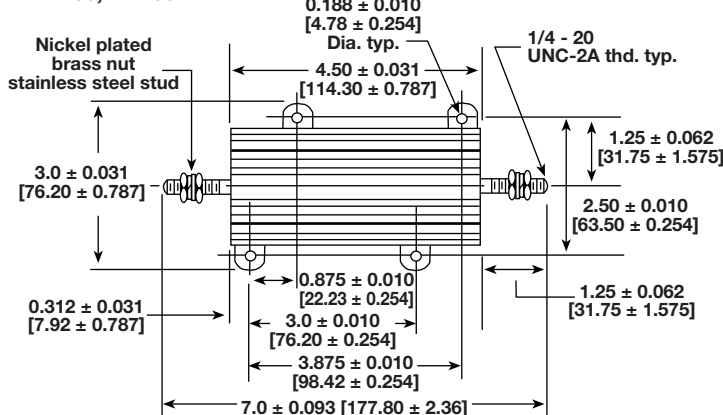
| | | | |
|------------------|------------------|----------------|-----------|
| RH-5 | 4.125 Ω | 1 % | C02 |
| HISTORICAL MODEL | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING |

DIMENSIONS in inches [millimeters]

 RH005, 010, 025, 050
 NH005, 010, 025, 050


| GLOBAL MODEL | DIMENSIONS in inches [millimeters] | | | | | | | | | | | | | |
|----------------|--|--|--|---------------------------------------|--|--|--|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| | A | B | C | D | E | F | G | H | J | K | L | M | N | P |
| RH005 NH005 | 0.444 ± 0.005 [11.28 ± 0.127] | 0.490 ± 0.005 [12.45 ± 0.127] | 0.600 ± 0.030 [15.24 ± 0.787] | 1.125 ± 0.062 [28.58 ± 1.57] | 0.334 ± 0.015 [8.48 ± 0.381] | 0.646 ± 0.015 [16.41 ± 0.381] | 0.320 ± 0.015 [8.13 ± 0.381] | 0.065 ± 0.010 [1.65 ± 0.254] | 0.133 ± 0.010 [3.38 ± 0.254] | 0.078 ± 0.010 [1.98 ± 0.254] | 0.093 ± 0.005 [2.36 ± 0.127] | 0.078 ± 0.015 [1.98 ± 0.381] | 0.050 ± 0.005 [1.27 ± 0.127] | 0.266 ± 0.062 [6.76 ± 1.57] |
| RH010 NH010 | 0.562 ± 0.005 [14.27 ± 0.127] | 0.625 ± 0.005 [15.88 ± 0.127] | 0.750 ± 0.031 [19.05 ± 0.787] | 1.375 ± 0.062 [34.93 ± 1.57] | 0.420 ± 0.015 [10.67 ± 0.381] | 0.800 ± 0.015 [20.32 ± 0.381] | 0.390 ± 0.015 [9.91 ± 0.381] | 0.075 ± 0.010 [1.91 ± 0.254] | 0.165 ± 0.010 [4.19 ± 0.254] | 0.093 ± 0.010 [2.36 ± 0.254] | 0.094 ± 0.005 [2.39 ± 0.127] | 0.102 ± 0.015 [2.59 ± 0.381] | 0.085 ± 0.005 [2.16 ± 0.127] | 0.312 ± 0.062 [7.92 ± 1.57] |
| RH025 NH025 | 0.719 ± 0.005 [18.26 ± 0.127] | 0.781 ± 0.005 [19.84 ± 0.127] | 1.062 ± 0.031 [26.97 ± 0.787] | 1.938 ± 0.062 [49.23 ± 1.57] | 0.550 ± 0.015 [13.97 ± 0.381] | 1.080 ± 0.015 [27.43 ± 0.381] | 0.546 ± 0.015 [13.87 ± 0.381] | 0.075 ± 0.010 [1.91 ± 0.254] | 0.231 ± 0.010 [5.87 ± 0.254] | 0.172 ± 0.010 [4.37 ± 0.254] | 0.125 ± 0.005 [3.18 ± 0.127] | 0.115 ± 0.015 [2.92 ± 0.381] | 0.085 ± 0.005 [2.16 ± 0.127] | 0.438 ± 0.062 [11.13 ± 1.57] |
| RH050 NH050 | 1.562 ± 0.005 [39.67 ± 0.127] | 0.844 ± 0.005 [21.44 ± 0.127] | 1.968 ± 0.031 [49.99 ± 0.787] | 2.781 ± 0.062 [70.64 ± 1.57] | 0.630 ± 0.015 [16.00 ± 0.381] | 1.140 ± 0.015 [28.96 ± 0.381] | 0.610 ± 0.015 [15.49 ± 0.381] | 0.088 ± 0.010 [2.24 ± 0.254] | 0.260 ± 0.010 [6.60 ± 0.254] | 0.196 ± 0.010 [4.98 ± 0.254] | 0.125 ± 0.005 [3.18 ± 0.127] | 0.107 ± 0.015 [2.72 ± 0.381] | 0.085 ± 0.005 [2.16 ± 0.127] | 0.438 ± 0.062 [11.13 ± 1.57] |

DIMENSIONS in inches [millimeters]

RH100, NH100

RH250, NH250




POWER RATING

Vishay RH resistor wattage ratings are based on mounting to the following heat sink:

- RH005 and RH010: 4" x 6" x 2" x 0.040" thick aluminum chassis (129 sq. in. surface area)
- RH025: 5" x 7" x 2" x 0.040" thick aluminum chassis (167 sq. in. surface area)
- RH050: 12" x 12" x 0.059" thick aluminum panel (291 sq. in. surface area)
- RH100 and RH250: 12" x 12" x 0.125" thick aluminum panel (294 sq. in. surface area)

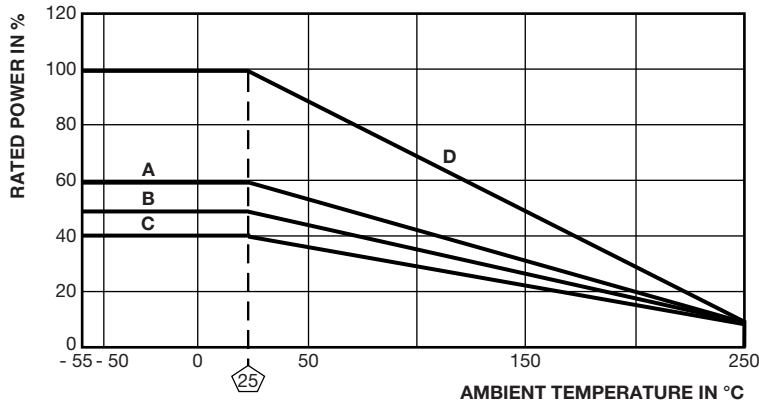
| FREE AIR POWER RATING | | | | | | |
|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| GLOBAL MODEL | RH005 NH005 | RH010 NH010 | RH025 NH025 | RH050 NH050 | RH100 NH100 | RH250 NH250 |
| W at 25 °C | 4.5 | 7.5 | 12.5 | 20 | 40 | 100 |

AMBIENT TEMPERATURE DERATING

Derating is required for ambient temperatures above 25 °C, see the following graph.

Curves A, B, C apply to operation of unmounted resistors. Curve D applies to all types when mounted to specified heat sink.

- A = RH005 and RH010 size resistor, unmounted
- B = RH025 size resistor, unmounted
- C = RH050, RH100 and RH250 size resistor, unmounted
- D = All types mounted to recommended aluminum heat sink



REDUCED HEAT SINK DERATING

Derating is also required when recommended heat sink area is reduced.

- A = RH005 and RH010 size resistor
- B = RH025 size resistor
- C = RH050, RH100 and RH250 size resistor





MATERIAL SPECIFICATIONS

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

Core: ceramic, steatite or alumina, depending on physical size

Encapsulant: silicone molded construction

Housing: aluminum with hard anodic coating

End Caps: stainless steel

Standard Terminals: For RH005 through RH050 size terminal finish - tin / lead is 60/40 Sn/Pb w/Nickel underplate and lead (Pb)-free is Ni/Pd/Au, finish is on copper clad steel core terminal. For RH100 and RH250 terminals are threaded stainless steel.

Part Marking: Dale, model, wattage, value, tolerance, date code

NH NON-INDUCTIVE

Models of equivalent physical and electrical specifications are available with non-inductive (Ayrton-Perry) winding. They are identified by substituting the letter N for R in the model number (NH005, for example).

SPECIAL MODIFICATIONS

A number of special modifications to the aluminum housed resistor style are available upon request. Special modifications include:

- Terminal configurations and materials
- Resistance values and tolerances
- Low resistance temperature coefficient (RTC)
- Housing configuration
- Threaded mounting holes
- Preconditioning and other additional testing

APPLICABLE MIL SPECIFICATIONS

Vishay RH and NH resistors are listed as qualified on the MIL-PRF-18546 QPL. MIL-PRF-18546 qualified, type RE resistors can be found at: www.vishay.com/doc?30282

| PERFORMANCE | | |
|---------------------------------|--|-----------------------|
| TEST | CONDITIONS OF TEST | TEST LIMITS |
| Thermal Shock | Rated power applied until thermally stable, then a minimum of 15 min at -55 °C | ± (0.5 % + 0.05 Ω) ΔR |
| Short Time Overload | 5x rated power for 5 s | ± (0.5 % + 0.05 Ω) ΔR |
| Dielectric Withstanding Voltage | 1000 V _{RMS} for RH005, RH010 and RH025; 2000 V _{RMS} for RH050; 4500 V _{RMS} for RH100 and RH250; duration 1 min | ± (0.2 % + 0.05 Ω) ΔR |
| Temperature | 250 °C for 2 h | ± (0.5 % + 0.05 Ω) ΔR |
| Moisture Resistance | MIL-STD-202 Method 106, 7b not applicable | ± (1.0 % + 0.05 Ω) ΔR |
| Shock, Specified Pulse | MIL-STD-202 Method 213, 100 g's for 6 ms, 10 shocks | ± (0.2 % + 0.05 Ω) ΔR |
| Vibration, High Frequency | Frequency varied 10 Hz to 2000 Hz, 20 g peak, 2 directions 6 h each | ± (0.2 % + 0.05 Ω) ΔR |
| Load Life | 1000 h at rated power, +25 °C, 1.5 h "ON", 0.5 h "OFF" | ± (1.0 % + 0.05 Ω) ΔR |
| Terminal Strength | 30 s, 5 pound pull test for RH005 and RH010, 10 pound pull test for other sizes; torque test - 24 pound inch for RH100 and 32 pound inch for RH250 | ± (0.2 % + 0.05 Ω) ΔR |



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