

## Wirewound Resistors, Military, MIL-PRF-18546 Qualified, Type RE, 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 Aryton-Perry winding for lowest reactive components
- Mounts on chassis to utilize heat-sink effect
- Excellent stability in operation (< 1 % change in resistance)
- Compliant to RoHS Directive 2002/95/EC



| STANDARD ELECTRICAL SPECIFICATIONS |                  |                    |   |          |   |               |                |                                       |                       |
|------------------------------------|------------------|--------------------|---|----------|---|---------------|----------------|---------------------------------------|-----------------------|
| GLOBAL MODEL                       | HISTORICAL MODEL | MIL-PRF-18546 TYPE | POWER RATING<br><i>P</i> <sub>25 °C</sub> W |          | RESISTANCE RANGE (MIL. RANGE SHOWN IN BOLD FACE)<br>Ω |               |                |                                       | WEIGHT (typical)<br>g |
|                                    |                  |                    | DALE  | MILITARY | ± 0.05 %, ± 0.1 %                                     | ± 0.25 %      | ± 0.5 %        | ± 1 %, ± 2 %, ± 5 %                   |                       |
| RH005                              | RH-5             | RE60G              | 7.5 (5)                                     | 5        | 0.5 to 6.75K  | 0.1 to 8.6K   | 0.05 to 8.6K   | 0.02 to 24.5K<br><b>0.10 to 3.32K</b> | 3                     |
| NH005                              | NH-5             | RE60N              | 7.5 (5)                                     | 5        | 0.5 to 2.32K  | 0.1 to 3.27K  | 0.05 to 3.27K  | 0.05 to 12.75K<br><b>1.0 to 1.65K</b> | 3.3                   |
| RH010                              | RH-10            | RE65G              | 12.5 (10)                                   | 10       | 0.5 to 12.7K  | 0.1 to 16.69K | 0.05 to 16.69K | 0.01 to 47.1K<br><b>0.10 to 5.62K</b> | 6                     |
| NH010                              | NH-10            | RE65N              | 12.5 (10)                                   | 10       | 0.5 to 4.45K  | 0.1 to 5.54K  | 0.05 to 5.54K  | 0.05 to 23.5K<br><b>1.0 to 2.8K</b>   | 8.8                   |
| RH025                              | RH-25            | RE70G              | 25  | 20       | 0.5 to 25.7K  | 0.1 to 32.99K | 0.05 to 32.99K | 0.01 to 95.2K<br><b>0.10 to 12.1K</b> | 13                    |
| NH025                              | NH-25            | RE70N              | 25  | 20       | 0.5 to 9.09K  | 0.1 to 12.8K  | 0.05 to 12.8K  | 0.05 to 47.6K<br><b>1.0 to 6.04K</b>  | 16.5                  |
| RH050                              | RH-50            | RE75G              | 50  | 30       | 0.5 to 73.4K  | 0.1 to 96K    | 0.05 to 96K    | 0.01 to 273K<br><b>0.10 to 39.2K</b>  | 28                    |
| NH050                              | NH-50            | RE75N              | 50  | 30       | 0.5 to 26K  | 0.1 to 36.7K  | 0.05 to 36.7K  | 0.05 to 136K<br><b>1.0 to 19.6K</b>   | 35                    |
| RH100                              | RH-100           | RE77G              | 100   | 75       | 0.5 to 90K  | 0.1 to 90K    | 0.05 to 90K    | 0.05 to 90K<br><b>0.05 to 29.4K</b>   | 350                   |
| NH100                              | NH-100           | RE77N              | 100   | 75       | 0.5 to 37.5K  | 0.1 to 37.5K  | 0.05 to 37.5K  | 0.05 to 37.5K<br><b>1.0 to 14.7K</b>  | 385                   |
| RH250                              | RH-250           | RE80G              | 250   | 120      | 0.5 to 116K   | 0.1 to 116K   | 0.05 to 116K   | 0.05 to 116K<br><b>0.10 to 35.7K</b>  | 630                   |
| NH250                              | NH-250           | RE80N              | 250   | 120      | 0.5 to 48.5K  | 0.1 to 48.5K  | 0.05 to 48.5K  | 0.05 to 48.5K<br><b>1.0 to 17.4K</b>  | 690                   |

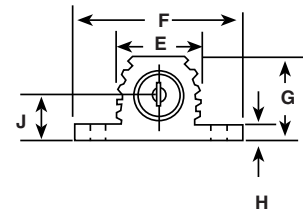
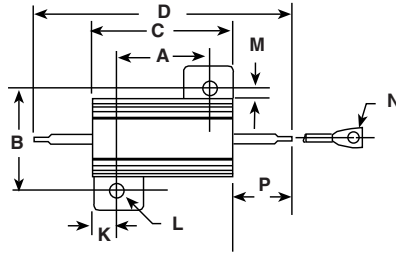
**Note**

- Figures in parentheses on RH005 and RH010 indicate wattage printed on parts, new construction allows these resistors to be rated at higher wattage but will only be printed with the higher wattage on customer request

| GLOBAL PART NUMBER INFORMATION  |   |  |   |   |   |   |  |   |   |   |  |   |   |  |  |  |
|---|---|--|---|---|---|---|--|---|---|---|--|---|---|--|--|--|
| Global Part Numbering example: RH0054R125FC02 (preferred part number format)                |   |  |   |   |   |   |  |   |   |   |  |   |   |  |  |  |
| R   | H | 0  | 0 | 5 | 4   | R | 1  | 2 | 5 | F | C  | 0 | 2 |  |  |  |
| GLOBAL MODEL  |   | RESISTANCE VALUE   |   |   | TOLERANCE CODE  |   | PACKAGING  |   |   |   | SPECIAL  |   |   |  |  |  |
| <b>RH005</b><br>(See "Standard Electrical Specifications" table above for additional P/N's) |   | L = mΩ<br>R = Decimal<br>K = Thousand<br><b>8L000</b> = 0.008 Ω<br><b>15R00</b> = 15 Ω<br><b>10K00</b> = 10 kΩ |   |   | A = 0.05 %<br>B = 0.1 %<br>C = 0.25 %<br>D = 0.5 %<br>F = 1.0 %<br>H = 3.0 %<br>J = 5.0 % |   | <b>E02</b> = Lead (Pb)-free, card pack (RH005 - RH050)<br><b>E01</b> = Lead (Pb)-free, skin pack (RH100 and RH250)<br><b>Lead (Pb)-free is not available on RE military type</b><br>C02 = Tin/lead, card pack (RH005 - RH050)<br>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 (will continue to be accepted)      |   |  |   |   |   |   |  |   |   |   |  |   |   |  |  |  |
| RH-5  |   | 4.125 Ω  |   |   | 1 %   |   | C02  |   |   |   |  |   |   |  |  |  |
| HISTORICAL MODEL  |   | RESISTANCE VALUE   |   |   | TOLERANCE CODE  |   | PACKAGING  |   |   |   |  |   |   |  |  |  |

\* Pb containing terminations are not RoHS compliant, exemptions may apply  
 \*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

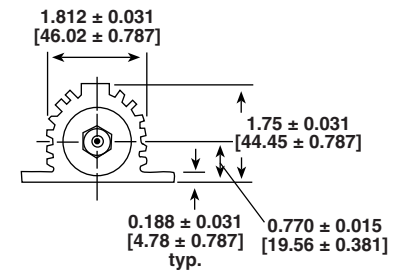
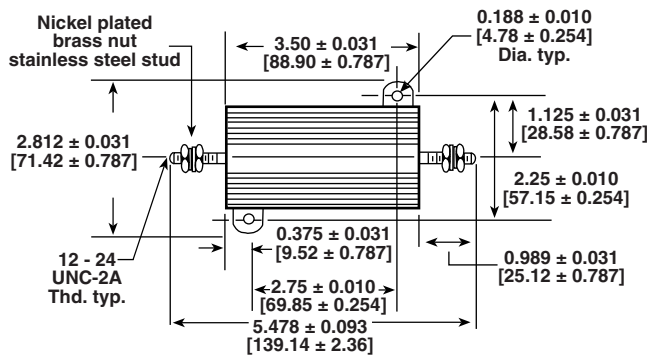
**DIMENSIONS** in inches [millimeters]

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


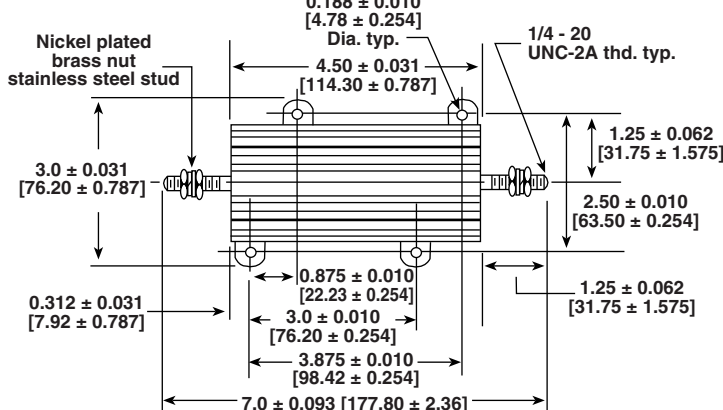
| MODEL          | DIMENSIONS in inches [millimeters]     |  |  |                                       |  |  |  |                                       |                                       |                                       |                                       |                          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

**DIMENSIONS** in inches [millimeters]

RH100, NH100



RH250, NH250



| TECHNICAL SPECIFICATIONS        |                 |   |
|---------------------------------|-----------------|---|
| PARAMETER                       | UNIT            | RH RESISTOR CHARACTERISTICS   |
| Temperature Coefficient         | ppm/°C          | ± 100 for 0.1 Ω to 0.99 Ω, ± 50 for 1 Ω to 9.9 Ω, ± 20 for 10 Ω and above |
| Dielectric Withstanding Voltage | V <sub>AC</sub> | 1000 for RH005, RH010 and RH025, 2000 for RH050, 4500 for RH100 and RH250 |
| Short Time Overload             | -               | 5 × rated power for 5 s   |
| Maximum Working Voltage         | V               | $(P \times R)^{1/2}$  |
| Insulation Resistance           | Ω               | 10 000 MΩ minimum dry, 1000 MΩ minimum after moisture test                |
| Terminal Strength               | lb              | 5 minimum for RH005 and RH010, 10 minimum for all others                  |
| Solderability                   | -               | MIL-PRF-18546 type - meets requirements of ANSI J-STD-002                 |
| Operating Temperature Range     | °C              | - 55 to + 250   |

### 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)

### 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.

**Note:**

Military (RE) parts are only available with tin/lead finish

**Part Marking:** DALE, model, wattage, value, tolerance, date code

**NH NON-INDUCTIVE**

Models of equivalent physical and electrical specifications are available with non-inductive (Aryton-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**

MIL-PRF-18546 is the military specification covering aluminum housed, chassis mount, power resistors. VISHAY RH and NH resistors are listed as qualified on the MIL-PRF-18546 QPL.

| 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             | 5 x rated power for 5 s  | ± (0.5 % + 0.05 Ω) ΔR |
| Dielectric Withstanding Voltage | 1000 V <sub>rms</sub> for RH005, RH010 and RH025; 2000 V <sub>rms</sub> for RH050<br>4500 V <sub>rms</sub> 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 |



## Disclaimer

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