

## 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](http://www.vishay.com/doc?30282)
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### 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<br>$P_{25^{\circ}\text{C}}$ W | RESISTANCE RANGE $\Omega$<br>$\pm 0.05\%$ , $\pm 0.1\%$ | RESISTANCE RANGE $\Omega$<br>$\pm 0.25\%$ | RESISTANCE RANGE $\Omega$<br>$\pm 0.5\%$ | RESISTANCE RANGE $\Omega$<br>$\pm 1\%$ , $\pm 3\%$ , $\pm 5\%$ | WEIGHT (typical)<br>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/ $^{\circ}\text{C}$ | $\pm 20$ for 10 $\Omega$ and above; $\pm 50$ for 1 $\Omega$ to 9.9 $\Omega$ ; $\pm 100$ for 0.1 $\Omega$ to 0.99 $\Omega$ |
| Maximum Working Voltage     | V                       | $(P \times R)^{1/2}$                                                                                                      |
| Insulation Resistance       | $\Omega$                | 10 000 M $\Omega$ minimum dry, 1000 M $\Omega$ 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

|                                                                                   |   |                                                              |   |   |                                                                                           |   |   |                                                                                                                                                                                                      |   |   |   |   |   |                                                                     |  |  |
|-----------------------------------------------------------------------------------|---|--------------------------------------------------------------|---|---|-------------------------------------------------------------------------------------------|---|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---------------------------------------------------------------------|--|--|
| R                                                                                 | H | 0                                                            | 0 | 5 | 4                                                                                         | R | 1 | 2                                                                                                                                                                                                    | 5 | F | C | 0 | 2 |                                                                     |  |  |
| GLOBAL MODEL                                                                      |   | RESISTANCE VALUE                                             |   |   | TOLERANCE CODE                                                                            |   |   | PACKAGING                                                                                                                                                                                            |   |   |   |   |   | SPECIAL                                                             |  |  |
| RH005<br>(See Standard Electrical Specifications Global Model column for options) |   | R = Decimal<br>K = Thousand<br>15R00 = 15 Ω<br>10K00 = 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 % |   |   | E02 = Lead (Pb)-free, card pack (RH005 - RH050)<br>E01 = Lead (Pb)-free, skin pack (RH100 and RH250)<br><br>C02 = Tin/lead, card pack (RH005 - RH050)<br>J01 = Tin/lead, skin pack (RH100 and RH250) |   |   |   |   |   | (Dash Number)<br>(up to 3 digits)<br>From 1 to 999<br>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<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**


**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<br>NH005 | RH010<br>NH010 | RH025<br>NH025 | RH050<br>NH050 | RH100<br>NH100 | RH250<br>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](http://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                                                                    | $\pm (0.5 \% + 0.05 \Omega) \Delta R$ |
| Short Time Overload             | 5 x rated power for 5 s                                                                                                                            | $\pm (0.5 \% + 0.05 \Omega) \Delta R$ |
| Dielectric Withstanding Voltage | 1000 V <sub>rms</sub> for RH005, RH010 and RH025; 2000 V <sub>rms</sub> for RH050; 4500 V <sub>rms</sub> for RH100 and RH250; duration 1 min       | $\pm (0.2 \% + 0.05 \Omega) \Delta R$ |
| Temperature                     | 250 °C for 2 h                                                                                                                                     | $\pm (0.5 \% + 0.05 \Omega) \Delta R$ |
| Moisture Resistance             | MIL-STD-202 Method 106, 7b not applicable                                                                                                          | $\pm (1.0 \% + 0.05 \Omega) \Delta R$ |
| Shock, Specified Pulse          | MIL-STD-202 Method 213, 100 g's for 6 ms, 10 shocks                                                                                                | $\pm (0.2 \% + 0.05 \Omega) \Delta R$ |
| Vibration, High Frequency       | Frequency varied 10 Hz to 2000 Hz, 20 g peak, 2 directions 6 h each                                                                                | $\pm (0.2 \% + 0.05 \Omega) \Delta R$ |
| Load Life                       | 1000 h at rated power, + 25 °C, 1.5 h "ON", 0.5 h "OFF"                                                                                            | $\pm (1.0 \% + 0.05 \Omega) \Delta R$ |
| 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 | $\pm (0.2 \% + 0.05 \Omega) \Delta R$ |



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