VISHAY	RH, NH
www.vishay.com	Vishay Dale
	ors, Industrial Power, ed, Chassis Mount
DESIGN SUPPORT TOOLS       click logo to get started         Cick logo to get started       Cick logo to get started         Codels       Cick logo to get started         Note       Note	<ul> <li>FEATURES</li> <li>Molded construction for total environmental protection</li> <li>Complete welded construction</li> <li>Meets applicable requirements of MIL-PRF-18546</li> <li>Available in non-inductive styles (type NH) with Ayrton-Perry winding for lowest reactive components</li> <li>Mounts on chassis to utilize heat-sink effect</li> <li>Excellent stability in operation (&lt; 1 % change in resistance)</li> <li>MIL-PRF-18546 qualified, type RE resistors can be found at: www.vishay.com/doc?30282</li> <li>Material categorization: for definitions of compliance please see www.vishay.com/doc?99912</li> </ul>
3D Models Available Note	<ul> <li>be found at: <u>www.vishay.com/doc?30282</u></li> <li>Material categorization: for definitions of compliance please see</li> </ul>

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

STANDA	STANDARD ELECTRICAL SPECIFICATIONS									
GLOBAL HISTORICAL MODEL MODEL		POWER RATING P <sub>25 °C</sub> W	<b>RESISTANCE</b> <b>RANGE</b> Ω ± 0.05 %, ± 0.1 %	<b>ANGE</b> $\Omega$ <b>RANGE</b> $\Omega$		RESISTANCE RANGE Ω ± 1 %, ± 3 %, ± 5 %	WEIGHT (typical) g			
RH005	RH-5	7.5	0.5 to 6.75K	0.1 to 8.6K	± 0.5 % 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			

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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/°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	Ω	10 000 M $\Omega$ minimum dry, 1000 M $\Omega$ minimum after moisture test						
Solderability	-	Meets requirements of ANSI J-STD-002						
Operating Temperature Range	°C	-55 to +250						
GLOBAL PART NUMBER	R INFORM	MATION						
Global Part Numbering example	: RH0054R1	125FC02						
R H 0 0	5 4							
GLOBAL MODEL RESISTANCE	VALUE T	TOLERANCE CODE PACKAGING SPECIAL						
RH005R = decir(see StandardK = thous	and	A = 0.05 %E02 = lead (Pb)-free, card pack (RH005 - RH050)B = 0.1 %E01 = lead (Pb)-free, skin pack (RH100 and RH250)(dash number)						
Electrical <b>15R00</b> = 15 $\Omega$ <b>C</b> = 0.25 %           Specifications <b>10K00</b> = 10 k $\Omega$ <b>D</b> = 0.5 %           Global Model <b>F</b> = 1.0 %		C = 0.25 %         C02 = tin / lead, card pack (RH005 - RH050)         (up to 3 digits)           D = 0.5 %         J01 = tin / lead, skin pack (RH100 and RH250)         from 1 to 999						
column for options)		H = 3.0 % as applicable J = 5.0 %						
Historical Part Numbering example: RH-5 4.125 $\Omega$ 1 % C02								
RH-5		4.125 Ω 1 % C02						
HISTORICAL MODEL RESISTANCE VALUE		STANCE VALUE TOLERANCE CODE PACKAGING						

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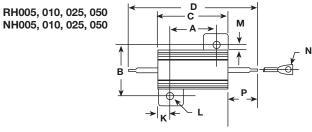
1 For technical questions, contact: ww2aresistors@vishay.com Document Number: 30201

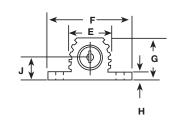
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# Vishay Dale

### **DIMENSIONS** in inches [millimeters]

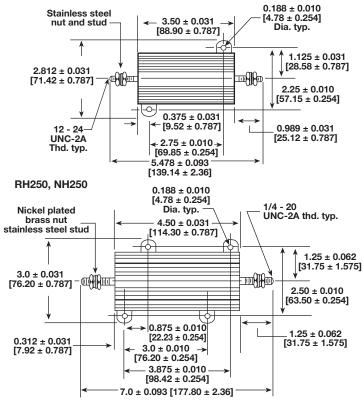


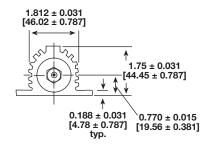


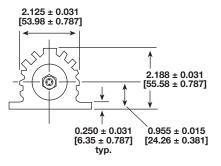
GLOBAL DIMENSIONS in inc									llimeters]					
MODEL	Α	В	С	D	E	F	G	н	J	К	L	м	Ν	Р
RH005 NH005	0.444 ± 0.005 [11.28 ± 0.127]	0.490 ± 0.005 [12.45 ± 0.127]	0.600 ± 0.030 [15.24 ± 0.787]	1.125 ± 0.062 [28.58 ± 1.57]	0.334 ± 0.015 [8.48 ± 0.381]	0.646 ± 0.015 [16.41 ± 0.381]	0.320 ± 0.015 [8.13 ± 0.381]	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]	$0.630 \pm 0.015$ [16.00 $\pm 0.381$ ]	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







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# **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. surf	ace area)
RH025:	5" x 7" x 2'	x 0.040" thick aluminum	chassis (167 sq. in. surf	ace area)
RH050:	12" x 12" x	0.059" thick aluminum p	anel (291 sq. in. surface	area)
RH100 and RH250:	12" x 12" x	0.125" thick aluminum p	anel (294 sq. in. surface	area)

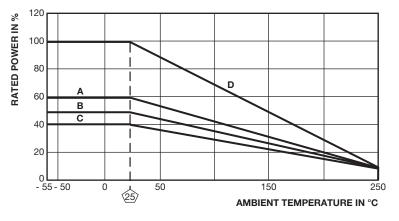
FREE AIR POWER RATING									
GLOBAL         RH005         RH010         RH025         RH050         RH100         RH250           MODEL         NH005         NH010         NH025         NH050         NH100         NH250									
W at 25 °C	4.5	7.5	12.5	20	40	100			

## 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

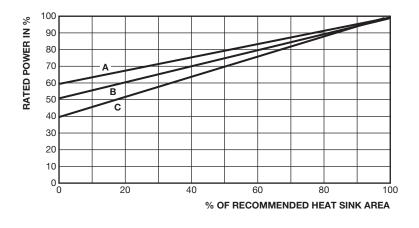
- **B** = RH025 size resistor, unmounted
- **C** = RH050, RH100 and RH250 size resistor, unmounted
- **D** = All types mounted to recommended aluminum heat sink



# **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



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# **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: <u>www.vishay.com/doc?30282</u>

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



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