Wirewound Resistors, Industrial Power, Flat (HL), Miniature Flat (HLM)

TYPE HL FLAT STYLE

FEATURES

- High temperature silicon coating
- Mounting accommodations ideally suited to high density packaging
- Self-stacking hardware for horizontal or vertical placement
- Withstands high vibrations without loosening
- Mounting hardware functions as a heat sink allowing greater heat dissipation and less derating of stacked units
- Available in non-inductive styles (type NHL & NHLM) with Aryton-Perry winding

Pb-free Available

e3

RoHS* COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	HISTORICAL MODEL	POWER RATING $P_{25\ °C}$ W	RESISTANCE RANGE Ω		WEIGHT (Typical) g
			± 5 %	± 10 %	
HL024 NHL024	HL-24 NHL-24	30	1.0 - 11K 1.0 - 1.2K	0.10 - 11K 1.0 - 1.2K	20.14
HL035 NHL035	HL-35 NHL-35	40	1.0 - 26K 1.0 - 3K	0.10 - 26K 1.0 - 3K	30.07
HL055 NHL055	HL-55 NHL-55	55	1.0 - 54K 1.0 - 6.8K	0.10 - 54K 1.0 - 6.8K	51.25
HL070 NHL070	HL-70 NHL-70	70	1.0 - 77K 1.0 - 9.4K	0.10 - 77K 1.0 - 9.4K	60.48
HL095 NHL095	HL-95 NHL-95	95	1.0 - 99.9K 1.0 -12.4K	0.10 - 99.9K 1.0 - 12.4K	76.51

TYPE HLM MINIATURE FLAT STYLE

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	HISTORICAL MODEL	POWER RATING $P_{25\ °C}$ W	RESISTANCE RANGE Ω		WEIGHT (Typical) g
			± 5 %	± 10 %	
HLM010 NHLM010	HLM-10 NHLM-10	10	1.0 - 15K 1.0 - 1.8K	0.10 - 15K 1.0 - 1.8K	0.41
HLM015 NHLM015	HLM-15 NHLM-15	15	1.0 - 26K 1.0 - 3.6K	0.10 - 26K 1.0 - 3.6K	0.47
HLM020 NHLM020	HLM-20 NHLM-20	20	1.0 - 71K 1.0 - 9.8K	0.10 - 71K 1.0 - 9.8K	0.74

GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: NHLM01010Z10R00JJ (preferred part number format)

N	H	L	M	0	1	0	1	0	Z	1	0	R	0	0	J	J		

GLOBAL MODEL	TERMINAL DESIGNATION	TERMINAL FINISH	RESISTANCE VALUE	TOLERANCE	PACKAGING CODE	SPECIAL
NHLM010 (See "Standard Electrical Specifications" table above for additional P/N's)	**09** **10** **16**	**E** = Lead (Pb)-free **Z** = Tin/Lead **N** = Nickel	**R** = Decimal **K** = Thousand **10R00** = 10.0 Ω **1K000** = 1 kΩ	**J** = ± 5.0 % **K** = ± 10.0 %	**E** = Lead (Pb)-free skin pack **J*** = Skin pack (J01)	(Dash Number) (up to 2 digits) From **1 - 99** as applicable

* Tin/Lead for type "Z", lead (Pb)-free for type "N"

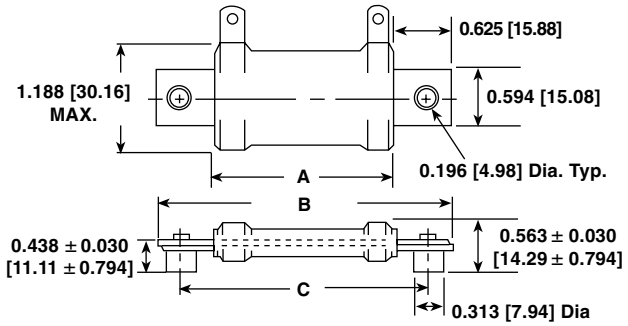
Historical Part Number example: NHLM-10-10Z 10 Ω 5 % J01 (will continue to be accepted)

NHLM-10	10Z	10 Ω	5 %	J01
HISTORICAL MODEL	TERMINAL/FINISH	RESISTANCE VALUE	TOLERANCE	PACKAGING

* Pb containing terminations are not RoHS compliant, exemptions may apply

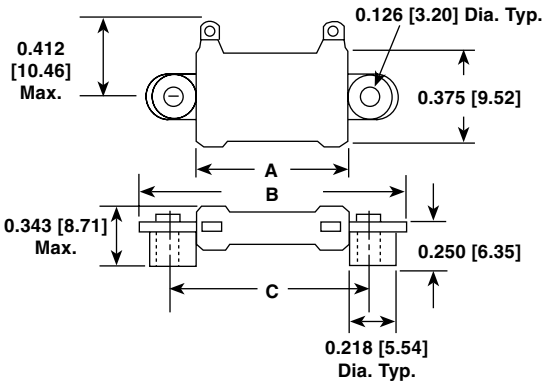
DIMENSIONS

TYPE HL FLAT STYLE



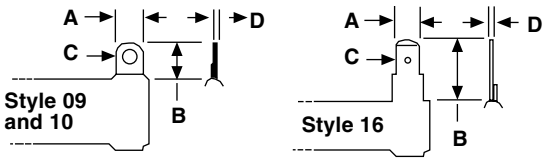
MODEL	DIMENSIONS in inches [millimeters]					
	A ± 0.063 [1.59]	B ± 0.063 [1.59]	C ± 0.031 [0.79]	DISTANCE BETWEEN TERMINALS (Ref.)	TERMINAL DESIGNATION	
					STANDARD	OPTIONAL
HL024	1.250	2.500	2.000	0.718	09Z	16N
NHL024	[31.75]	[63.50]	[50.80]	[18.24]		
HL035	2.000	3.250	2.750	1.468	09Z	16N
NHL035	[50.80]	[82.55]	[69.85]	[37.29]		
HL055	3.500	4.750	4.250	2.968	09Z	16N
NHL055	[88.90]	[120.65]	[107.95]	[75.39]		
HL070	4.750	6.000	5.500	4.218	09Z	16N
NHL070	[120.65]	[152.40]	[139.70]	[107.14]		
HL095	6.000	7.250	6.750	5.468	09Z	16N
NHL095	[152.40]	[184.15]	[171.45]	[138.89]		

TYPE HLM MINIATURE FLAT STYLE



MODEL	DIMENSIONS in inches [millimeters]				
	A ± 0.063 [1.59]	B ± 0.063 [1.59]	C ± 0.031 [0.79]	DISTANCE BETWEEN TERMINALS (Ref.)	STANDARD TERMINAL DESIGNATION
HLM010	0.750	1.312	1.000	0.406	10Z
NHLM010	[19.05]	[33.32]	[25.40]	[10.31]	
HLM015	1.000	1.562	1.250	0.656	10Z
NHLM015	[25.40]	[39.67]	[31.75]	[16.66]	
HLM020	2.062	2.625	2.313	1.718	10Z
NHLM020	[52.37]	[66.68]	[58.75]	[43.64]	

TERMINAL DIMENSIONS



DIMENSION	DIMENSIONS in inches [millimeters]		
	TERMINAL TYPE		
	TERM 09	TERM 10	TERM 16
A	0.188 [4.76]	0.125 [3.18]	0.188 [4.76]
B	0.500 [12.70]	0.188 [4.76]	0.563 [14.29]
C	0.104 [2.64]	0.063 [1.60]	0.050 [1.27]
D	0.020 [0.51]	0.020 [0.51]	0.020 [0.51]

TERMINAL FINISH

"E" Finish - 100 % Sn coated steel. "Z" Finish - 60/40 Sn/Pb coated steel. "N" Finish - Nickel coated steel. Finish for terminal style 16 is limited to nickel plated steel (N).

TECHNICAL SPECIFICATIONS		
PARAMETER	**UNIT**	**HL, HLM RESISTOR CHARACTERISTICS**
Temperature Coefficient	ppm/°C	± 90 for 0.1 Ω to 0.99 Ω; ± 50 for 1 Ω to 9.9 Ω; ± 30 for 10 Ω and above
Dielectric Withstanding Voltage	V_{AC}	1000, from terminal to mounting hardware
Short Time Overload	-	10 × rated power for 5 seconds
Maximum Working Voltage	V	$(P \times R)^{1/2}$
Insulation Resistance	Ω	1000 Megohms minimum dry, 100 Megohm minimum after moisture test
Operating Temperature Range	°C	- 55/+ 350

POWER RATING

Vishay HL flat and HLM resistor wattage ratings are based on mounting horizontally to 10" x 10" x 0.04" [254.0 mm x 254.0 mm x 1.02 mm] steel plate in 25 °C ambient with no air flow.

EXCLUSIVE BRACKET DESIGN

Mounting strap fits snugly through resistor core and is bound against unit by two eccentric spacers. The bracket eliminates expensive cements and improves heat transfer and power handling capabilities.

MATERIAL SPECIFICATIONS

Element: Copper-nickel alloy of nickel-chrome alloy, depending on resistance value

Core: Ceramic, steatite

Coating: Special high temperature silicone

Standard Terminals: Model “Z” terminals are tinned steel

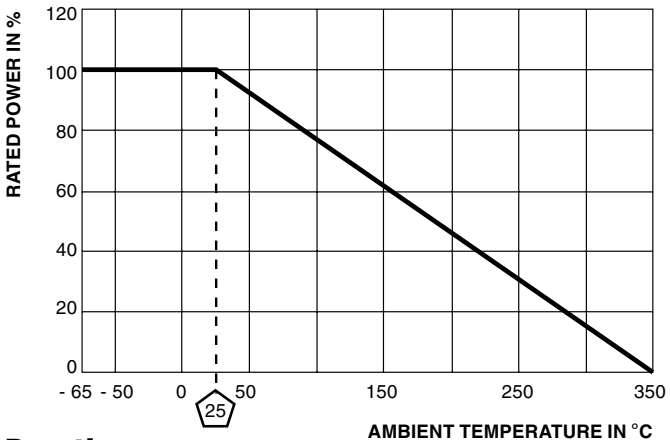
Terminal Bands: Steel

Part Marking: DALE, Model, Wattage, Value, Tolerance, Date Code

NHL, NHLM NON-INDUCTIVE

Models of equivalent physical and electrical specifications are available with non-inductive (Aryton-Perry) winding. They are identified by adding the letter N to the front of the HL and HLM type designation (NHLM020, for example). For NHL and NHLM models maximum resistance values are lower, see STANDARD ELECTRICAL SPECIFICATIONS table.

Derating is required for ambient temperatuires above 25 °C per the following graph.



Derating

PERFORMANCE		
TEST	**CONDITIONS OF TEST**	**TEST LIMITS**
Thermal Shock	Rated power applied until thermally stable, then a minimum of 15 minutes at - 55 °C	± (2.0 % + 0.05 Ω) Δ*R*
Short Time Overload	10 x rated power for 5 seconds	± (2.0 % + 0.05 Ω) Δ*R*
Dielectric Withstanding Voltage	1000 V_{rms}, 1 minute	± (0.1 % + 0.05 Ω) Δ*R*
Low Temperature Storage	- 55 °C for 24 hours	± (2.0 % + 0.05 Ω) Δ*R*
High Temperature Exposure	250 hours at + 350 °C	± (2.0 % + 0.05 Ω) Δ*R*
Moisture Resistance	MIL-STD-202 Method 106, 7b not applicable	± (2.0 % + 0.05 Ω) Δ*R*
Shock, Specified Pulse	MIL-STD-202 Method 213, 100 g's for 6 milliseconds, 10 shocks	± (0.2 % + 0.05 Ω) Δ*R*
Vibration, High Frequency	Frequency varied 10 to 2000 Hz, 20 g peak, 2 directions 6 hours each	± (0.2 % + 0.05 Ω) Δ*R*
Load Life	1000 hours at rated power, + 25 °C, 1.5 hours “ON”, 0.5 hours “OFF”	± (3.0 % + 0.05 Ω) Δ*R*

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