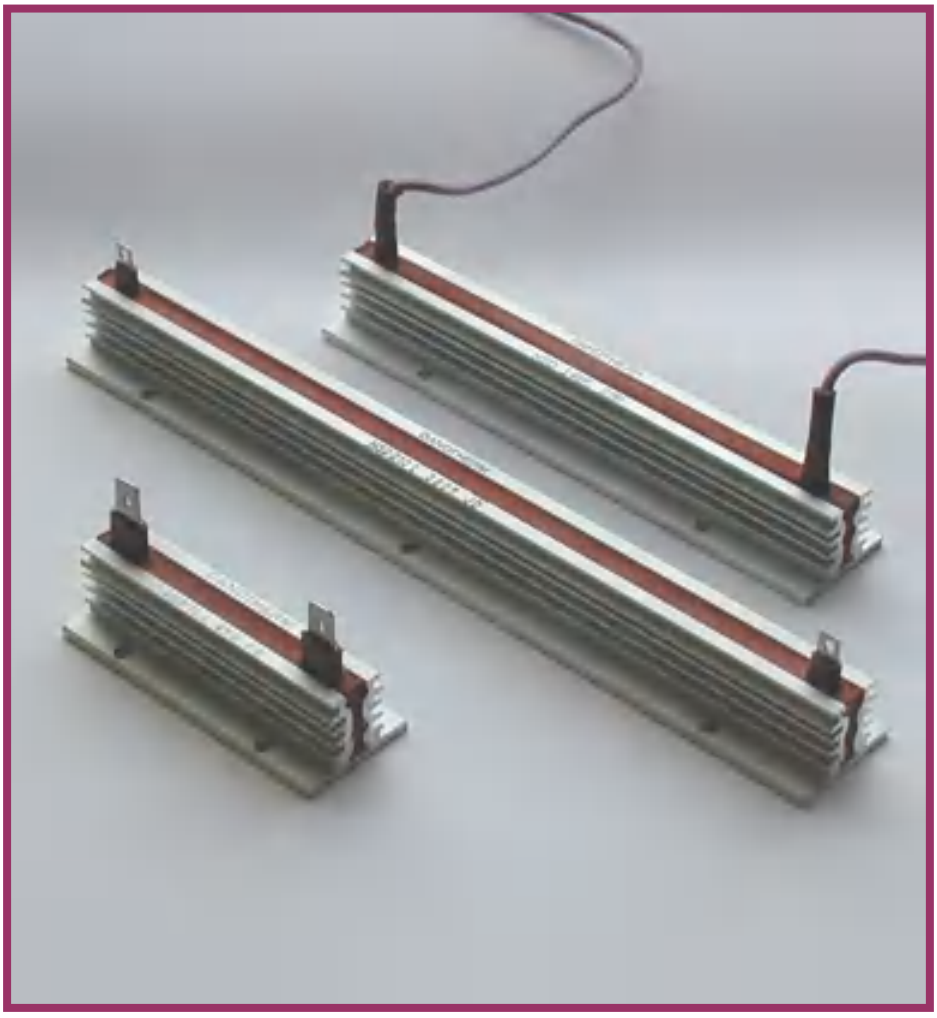
Aluminium Housed Wirewound Power Resistor

Type HSD

All-purpose Heat Sink Resistor for mounting on a Heat Sink chassis.



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For compact construction:
Close mounting of heat sensitive components is possible due to only a slight rise of the temperature on the aluminium profile.

Solder, Cable and “Fast-On” Termination

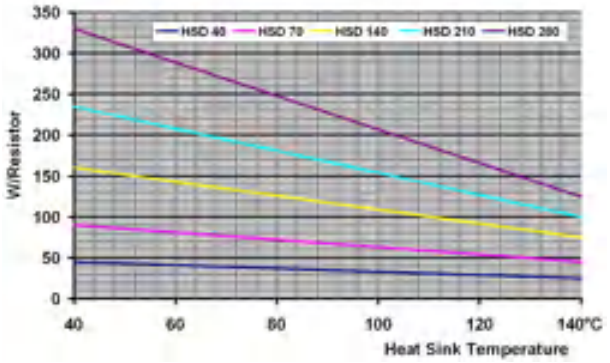
More resistors in one profile possible.

Specifications:

Power rating	12 W – 300 W	
Resistance range (standard)*	HSD 40:	R1 – 3K3
E12 values preferred for	HSD 70:	R22 – 6K8
smaller quantities	HSD 140:	R47 – 18K
	HSD 210:	R82 – 27K
	HSD 280:	1R – 39K
Resistance tolerance	± 5%/ ±10%	
Temperature Coefficients		
Normal	50 ppm–150 ppm	
Low ohmic values	400 ppm	
Dielectric strength	2500 VAC peak	
Working voltage	1200 VAC	
Test voltage	6000 VDC	

* Low-ohmic values on request # Type HSD

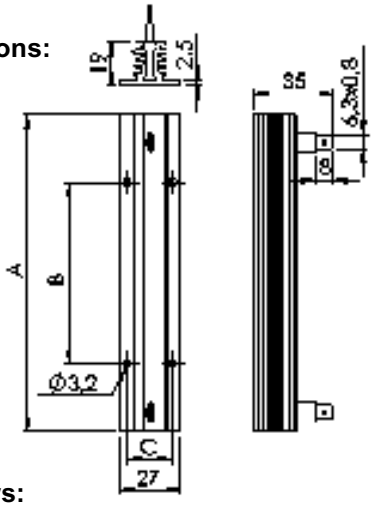
Power Dissipation:



This graph shows the maximum wattage rating for each of the five possible resistors of standard size corresponding to the heat sin temperature.
It is assumed that all resistors are equally loaded.

Mechanical specifications:

HSD	A	B	C
30	30	20	20
40	40	18.3	20
70	70	39.7	21.4
140	140	80	20
210	210	2x80	20
280	280	2x100	20



Please Order as follows:

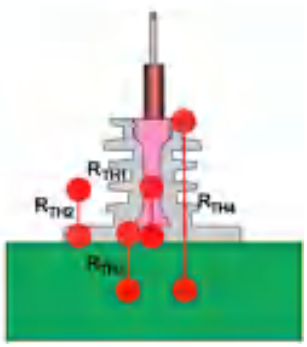
HSD 140 A 47R

- 47R: Ohmic values
- A: AMP terminals; L: Tinned lugs; S: Screw-on terminals; C: Cable (specified)
- 140: Size in mm.

Insulation

Silicone Rubber + MICA. The Silicone is UL-recognized (UL 94 HB) to a working temperature of 220°C. Temperatures of up to 300°C can be endured for shorter periods. This may however cause an expansion of the silicone rubber with a possibility of reducing the dielectric strength.

Thermal Resistances:



Showing the Thermal Resistance (°C / W) between different measuring points.

R_{TH1}: Wire to Alu-house
R_{TH2}: Alu-house to air per resistor
R_{TH3}: Alu-house to heat sink per resistor
R_{TH4}: Resistor surface to heat sink per resistor

	HSD 40	HSD 70	HSD 140	HSD 210	HSD 280
R_{TH1}	4	2	1	0.75	0.5
R_{TH2}	13	8	4.6	3.3	2.9
R_{TH3}	0.2	0.1	0.05	0.03	0.02
R_{TH4}	0.4	0.28	0.14	0.09	0.075

Designing

The following equations are applied by the dimensioning of the resistors at stationary load.
If more information is required please consult Danotherm.

It’s assumed that the air around the resistors is stationary. (Worst case).

Symbols employed:

W_{MAX} :	Maximum required load in resistor
T_{MAX} :	Maximum hot spot temperature requested in resistor (T_{MAX} < 220°C) The lower T_{MAX} the higher reliability and lifetime.
T_{AMB} :	Ambient temperature
R_{TH} :	Thermal resistance. Refer to table Thermal resistances
T_H :	Heat sink temperature (chassis).
T :	Temperature on top of the Aluminium profile.

Following conditions are possible:

1. HSD is mounted on a heat sink:
   A. The thermal resistance R_{TH} of the heat sink is known,
   $\mathbf{T = W_{MAX} \times (R_{TH4} + R_{TH})}$
   Check that:
   $\mathbf{T_{MAX} = W_{MAX} \times (R_{TH} + R_{TH3} + R_{TH1}) + T_{AMB} < 220°C}$

   B. The Temperature of the Heat Sink is known,
   $\mathbf{T = W_{MAX} \times R_{TH4} + T_H}$
   Check that:
   $\mathbf{T_{MAX} = W_{MAX} \times (R_{TH1} + R_{TH3}) + T_H < 220°C}$
   When the HSD is used close to maximum values heat sink compound should be applies.
2. HSD is mounted without a heat sink:
   Check that:
   $\mathbf{T_{MAX} = W_{MAX} \times (R_{TH1} + R_{TH2}) + T_{AMB} < 220°C}$

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