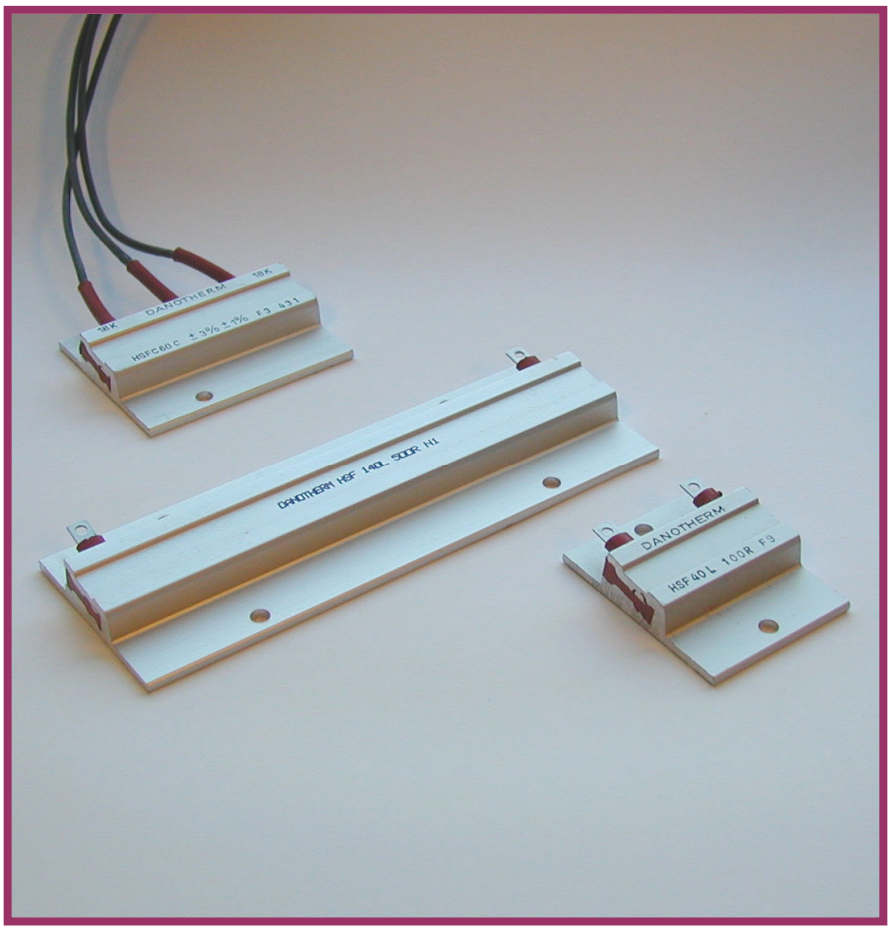
Aluminium Housed Wirewound Power Resistor

Type HSF

Flat 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.

No heat sink compound is required because of large mounting surface.

Solder, Cable and “Fast-On” Termination

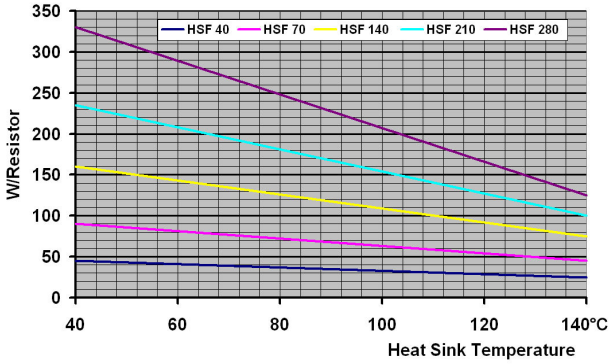
More resistors in one profile possible.

Specifications:

Power rating	12 W – 300 W	
Resistance range (standard)*	HSF 40:	R1 – 3K3
E12 values preferred for	HSF 70:	R22 – 6K8
smaller quantities	HSF 140:	R47 – 18K
	HSF 210:	R82 – 27K
	HSF 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 HSF

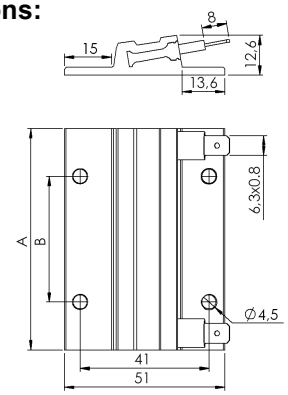
Power Dissipation:



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

Mechanical specifications:

HSF	A	B
40	40	-
70	70	39.7
140	140	80
210	210	2x80
280	280	2x100



Please Order as follows:

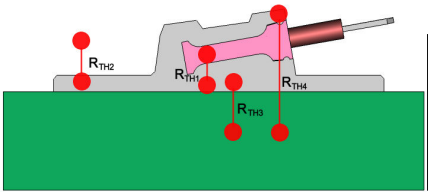
HSF 140 A 47R

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

Insulation

Silicone Rubber + MICA. The Silicone is UL-recognised (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:



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

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

	HSF 40	HSF 70	HSF 140	HSF 210	HSF 280
R_{TH1}	4	2	1	0.75	0.5
R_{TH2}	11	6.8	3.9	2.75	2
R_{TH3}	0.2	0.1	0.05	0.03	0.02
R_{TH4}	0.5	0.3	0.17	0.1	0.085

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 reguired load in resistor
T_{MAX}	:	Maximum hot spot temperature reguested 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. HSF 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:
   $\mathbf{T_{MAX} = W_{MAX} \times (R_{TH1} + R_{TH3}) + T_H < 220°C}$

2. HSF is mounted without a heat sink:
   Check that:
   $\mathbf{T_{MAX} = W_{MAX} \times (R_{TH1} + R_{TH2}) + T_{AMB} < 220°C}$

Last update 07.11.01