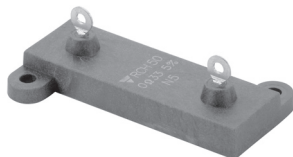


Power Resistors, for Mounting onto a Heatsink Thick Film Technology



Manufactured in cermet thick film technology, these power resistors exhibit remarkable characteristics and the series includes 4 types ranging from 5W to 50W

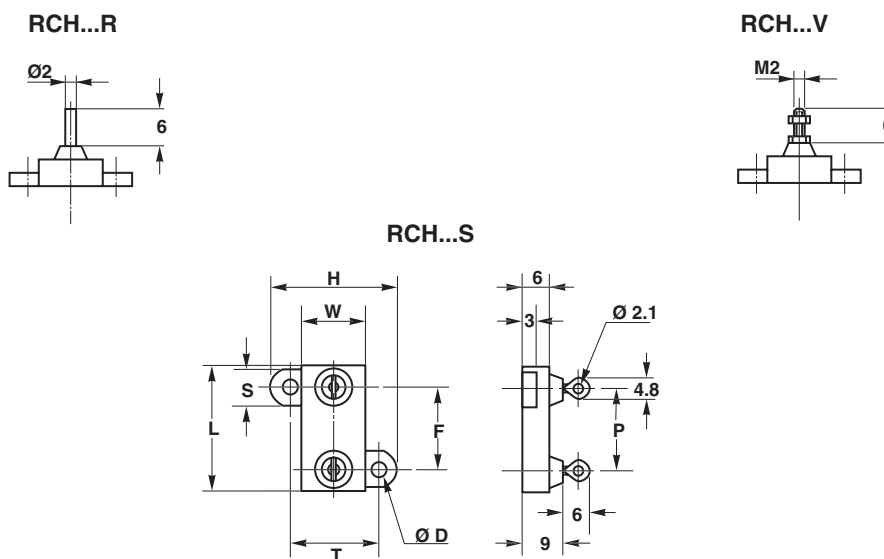
Designed to be mounted onto a heatsink, the resistors can bear high short time overloads and 3 types of terminations are available.

The resistors are non inductive and are particularly suitable for high frequency operation and cut-out circuits.

FEATURES

- 5 Watt to 50W
- High power rating
- High overload capabilities
- High stability at rated power
- Wide resistance range
- High thermal capacity
- Easy mounting
- Reduced size and weight
- High insulation: $10^6 M\Omega$

DIMENSIONS in millimeters



• General Tolerance: $\pm 0.3\text{mm}$

DIMENSIONS				
MODEL	RCH 5	RCH 10	RCH 25	RCH 50
L	16.6	19	28	47.8
W	9	11	14	15.5
H	16.4	20.6	27.5	29.4
P Leads pitch	10.2	12.7	18.3	30.5
F Connections pitch	11.3	14.3	18.3	39.7
T	12.5	15.9	19.8	21.4
S	5.3	5	7.7	8
$\varnothing D$	2.4	2.4	3.2	3.2
	M2	M2	M3	M3
WEIGHT (g)	4	5	7	12



**Power Resistors For Mounting onto a Heatsink
Thick Film Technology**

Vishay Sfernice

MECHANICAL SPECIFICATIONS

Mechanical Protection	Insulated Case
Substrate	Alumina
Resistive Element	Cermet
Connections	Tinned copper alloy

ENVIRONMENTAL SPECIFICATIONS

Temperature Range	- 55°C to + 125°C
Climatic Category	55/125/56

ELECTRICAL SPECIFICATIONS

Resistance Range	0.24Ω to 1MΩ E24 series
Standard Resistance Tolerances	± 1%, ± 2%, ± 5%, ± 10%
Power Rating	
Chassis Mounted	5W to 50W
Unmounted	2W to 5.5W
Temperature Coefficient	± 150ppm/°C (R > 1Ω)
Insulation Resistance	10 ⁶ MΩ
Total Inductance	≤ 0.1μH

PERFORMANCE

TESTS	CONDITIONS	TYPICAL DRIFTS
Momentary Overload	NF EN 140000 CEI 115_1 2Pr/5s Us < 2 UL	< ± (0.25% + 0.05Ω)
Rapid Temperature Change	NF EN 140000 125°C CEI 68215 Test Na 5 cycles - 55°C to + 125°C	< ± (0.25% + 0.05Ω)
Load Life	NF EN 140000 CEI 115_1 1000h Pr at + 25°C	< ± (0.5% + 0.05Ω)
Humidity (Steady State)	56 days R.H. 95% MIL STD 202 Method 103 B Test D	< ± (0.5% + 0.05Ω)

RESISTANCE VALUE IN RELATION TO TOLERANCE AND TCR

Resistance Value	< 1Ω	> 1Ω
Standard Tolerances		± 5% ± 10%
Standard T.C.	± 250ppm/°C	± 150ppm/°C
Tolerance on Request	± 1% to ± 2%	

SPECIAL FEATURES

MODEL	RCH 5	RCH 10	RCH 25	RCH 50
Power Rating-Chassis Mounted	5W	10W	25W	50W
Power Rating-Unmounted	2W	2.5W	4W	5.5W
Thermal Resistance RTH (j-c)	4.8°C/W	3.2°C/W	1.4°C/W	0.8°C/W
Limiting Element Voltage (VRMS)	160V	250V	550V	1285V
Max. Overload Voltage (VRMS)	320V	500V	1100V	2500V
Dielectric Strength (VRMS) 50Hz, 1 minute MIL STD 202 Method 301 10mA Max	2000V	2000V	3500V	3500V
Critical Resistance	5120Ω	6250Ω	12100Ω	33024Ω

RECOMMENDATIONS FOR MOUNTING ONTO A HEATSINK

Surfaces in contact must be carefully cleaned.

The heatsink must have an acceptable flatness: from 0.05mm to 0.1mm/100mm.

Roughness of the heatsink must be around 6.3µm. In order to improve thermal conductivity, surfaces in contact (alumina, heatsink) are coated with a silicone grease (type SI 340 from Rhône-Poulenc or Dow 340 from Dow Corning).

The fastening of the resistor to the heatsink is under pressure control of two screws (not supplied).

Tightening Torque	RCH 5	RCH 10	RCH 25	RCH 50
on heatsink	0.5Nm	0.6Nm	0.7Nm	1Nm

In order to improve the dissipation, either forced-air cooling or liquid cooling may be used.

A low thermal radiation of the case allows several resistors to be mounted onto the same heatsink.

Do not forget to respect an insulation value between two resistors (dielectric strength in dry air 1kV/mm).

In any case the hot spot temperature, measured locally on the case must not exceed 125°C.

Tests should be performed by the user.

CHOICE OF HEATSINK

The user must choose the heatsink according to working conditions of the component (power, room temperature). Maximum working temperature must not exceed 125°C. The dissipated power is simply calculated by the following ratio:

$$P = \frac{\Delta T}{[R_{TH(j-c)} + R_{TH(c-a)}]} \quad (1)$$

P: Expressed in W

ΔT: Difference between maximum working temperature and room temperature.

R_{TH(j-c)}: Thermal resistance value measured between resistance layer and outer side of the resistor.

It is the thermal resistance of the component (See Special Features table).

R_{TH(c-a)}: Thermal resistance value measured between outer side of the resistor and room temperature.

It is the thermal resistance of the heatsink depending on the heatsink itself (type, shape) and the quality of the fastening device.

Example:

R_{TH(c-a)} for RCH 25 power rating 20W at ambient temperature + 50°C.

$$\Delta T \leq 125^\circ\text{C} - 50^\circ\text{C} \leq 75^\circ\text{C}$$

$$R_{TH(j-c)} = 1.4^\circ\text{C/W} \text{ (Special Features)}$$

$$R_{TH(j-c)} + R_{TH(c-a)} = \frac{\Delta T}{P} = \frac{75}{20} = 3.75^\circ\text{C/W}$$

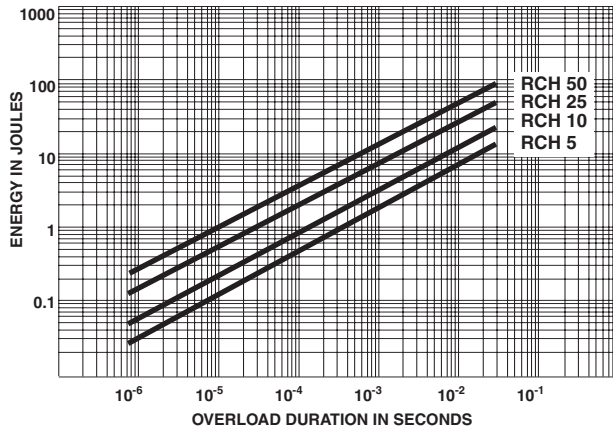
$$R_{TH(c-a)} \leq 3.75^\circ\text{C/W} - 1.4^\circ\text{C/W} \leq 2.35^\circ\text{C/W}$$



OVERLOADS

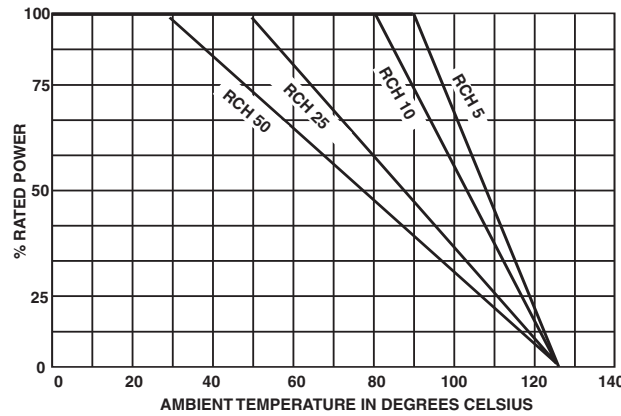
The applied voltage must always be lower than the maximum overload voltage as shown in the special features table. The values indicated on the graph below are applicable to resistors in air or mounted onto a heatsink.

ENERGY CURVE



POWER RATING CHART

For resistors mounted onto heatsink and thermal resistance of 1°C/W. To improve the thermal conductivity, surfaces in contact should be coated with a silicone grease.



MARKING

Model, Style, Resistance Value (in Ω), Tolerance (in %), Manufacturing Date, VISHAY trade mark.

ORDERING INFORMATION					
RCH	25	3.3k	± 5%	R	xxx
MODEL	STYLE	RESISTANCE VALUE	TOLERANCE	CONNECTIONS	CUSTOM DESIGN
			Optional	Optional	Optional
			± 1%	S: Flat with hole	
			± 2%	R: Round lead	
			± 5%	V: M2 screw	
			± 10%		