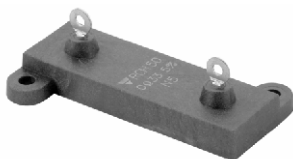


## Power Resistor, for Mounting onto a Heatsink Thick Film Technology



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

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

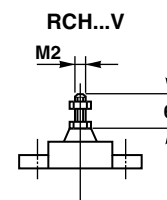
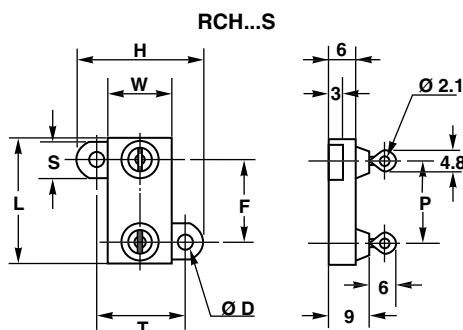
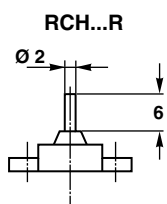
The resistors are non inductive and are particularly suitable for high frequency operation and cut-out circuits.

### FEATURES

- 5 W to 50 W
- High power rating
- High overload capabilities up to 2500 V<sub>RMS</sub>
- Wide resistance range from 0.24 M $\Omega$  to 1 M $\Omega$
- High thermal capacity up to 0.8 °C/W
- Easy mounting
- Reduced size and weight
- High insulation: 10<sup>6</sup> M $\Omega$
- Compliant to RoHS directive 2002/95/EC



### DIMENSIONS in millimeters



General tolerance:  $\pm 0.3$  mm

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 Connection 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
Ø D	2.4	2.4	3.2	3.2
Weight (g)	4	5	7	12

**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 RSPECIFICATIONS**

Resistance Range	0.24 $\Omega$ to 1 M $\Omega$ E24 series
Standard Resistance Tolerances	$\pm 1 \%$ , $\pm 2 \%$ , $\pm 5 \%$ , $\pm 10 \%$
Power Rating:	
Chassis Mounted	5 W to 50 W
Unmounted	2 W to 5.5 W
Temperature Coefficient	$\pm 150$ ppm/°C ( $R > 1 \Omega$ )
Insulation Resistance	10 <sup>6</sup> M $\Omega$
Total Inductance	$\leq 0.1 \mu\text{H}$

**PERFORMANCE**

TESTS	CONDITIONS	TYPICAL DRIFTS
Momentary Overload	NF EN140000 CEI 115_1 2 $P_T/5$ s $U_S < 2 U_L$	$< \pm (0.25 \% + 0.05 \Omega)$
Rapid Temperature Change	NF EN140000 125 °C CEI 68215 Test Na 5 cycles - 55 °C to + 125 °C	$< \pm (0.25 \% + 0.05 \Omega)$
Load Life	NF EN140000 CEI 115_1 1000 h $P_T$ at + 25 °C	$< \pm (0.5 \% + 0.05 \Omega)$
Humidity (Steady State)	56 days RH 95 % MIL-STD-202 Method 103 B and C	$< \pm (0.5 \% + 0.05 \Omega)$

**RESISTANCE VALUE IN RELATION TO TOLERANCE AND TCR**

Resistance Value	$< 1 \Omega$	$> 1 \Omega$
Standard Tolerances	$\pm 5 \%$ $\pm 10 \%$	
Standard TCR	$\pm 250$ ppm/°C	$\pm 150$ ppm/°C
Tolerance on Request	$\pm 1 \%$ to $\pm 2 \%$	

**SPECIAL FEATURES**

MODEL	RCH 5	RCH 10	RCH 25	RCH 50
Power Rating-Chassis Mounted	5 W	10 W	25 W	50 W
Power Rating-Unmounted	2 W	2.5 W	4 W	5.5 W
Thermal Resistance $R_{TH}$ (j - c)	4.8 °C/W	3.2 °C/W	1.4 °C/W	0.8 °C/W
Limiting Element Voltage ( $V_{RMS}$ )	160 V	250 V	550 V	1285 V
Max. Overload Voltage ( $V_{RMS}$ )	320 V	500 V	1100 V	2500 V
Dielectric Strength ( $V_{RMS}$ ) 50 Hz, 1 min MIL-STD-202 Method 301 10 mA Max.	2000 V	2000 V	3500 V	3500 V
Critical Resistance	5120 $\Omega$	6250 $\Omega$	12 100 $\Omega$	33 024 $\Omega$

## RECOMMENDATIONS FOR MOUNTING ONTO A HEATSINK

- Surfaces in contact must be carefully cleaned.
- The heatsink must have an acceptable flatness: From 0.05 mm to 0.1 mm/100 mm.
- Roughness of the heatsink must be around 6.3 µm. 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 on heatsink	RCH 5	RCH 10	RCH 25	RCH 50
	0.5 Nm	0.6 Nm	0.7 Nm	1 Nm

- 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 1 kV/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 THE 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:

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

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 20 W at ambient temperature + 50 °C.

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

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

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

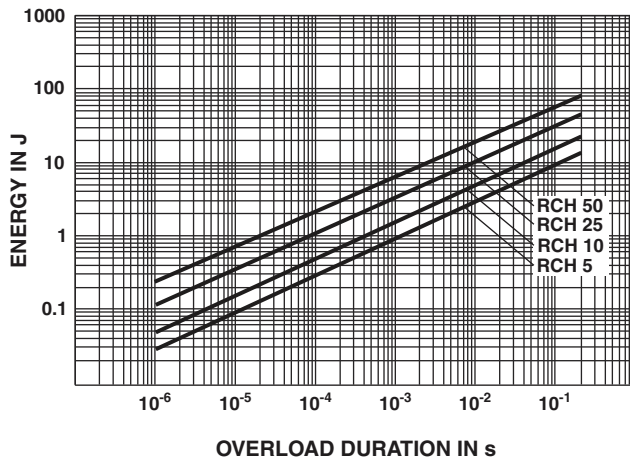
$$R_{TH(c-a)} \leq 3.75\text{ °C/W} - 1.4\text{ °C/W} \leq 2.35\text{ °C/W}$$

## 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.

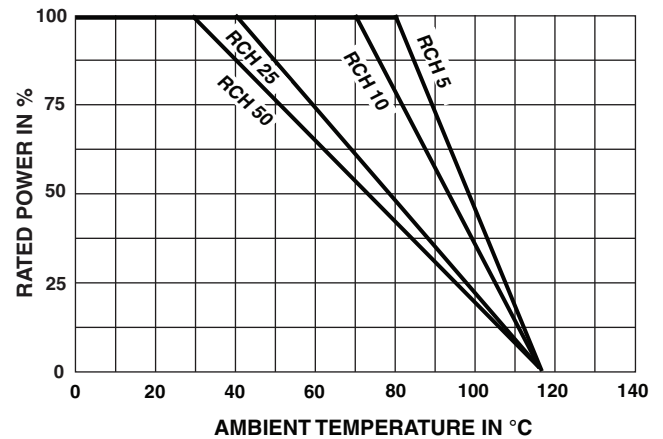
## ENERGY CURVE



## POWER RATING

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 Sfernice trademark.

## ORDERING INFORMATION

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

## GLOBAL PART NUMBER INFORMATION

R	C	H	1	0	S	3	3	0	0	0	J	S	0	6	
GLOBAL MODEL	SIZE	LEADS	OHMIC VALUE	TOLERANCE	PACKAGING	SPECIAL									
RCH	05 10 25 50	R = Round lead V = M2 screw S = Flat with hole	The first four digits are significant figures and the last digit specifies the number of zeros to follow. R designates decimal point.  4R700 = 4.7 Ω 48701 = 48 700 Ω R0100 = 0.01 Ω R6800 = 0.68 Ω 27000 = 2700 Ω = 2.7 kΩ	F = 1 % G = 2 % J = 5 % K = 10 %	S06 = Bag 25 pieces	As applicable Ex = XXX									



### Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.