RPH 100

Vishay Sfernice

Power Resistor for Mounting onto a Heatsink Thick Film Technology

FEATURES

- High power rating
- Low thermal radiation of the case
- Wide ohmic value range
- Easy mounting
- High overload capabilities
- Reduced size and weight

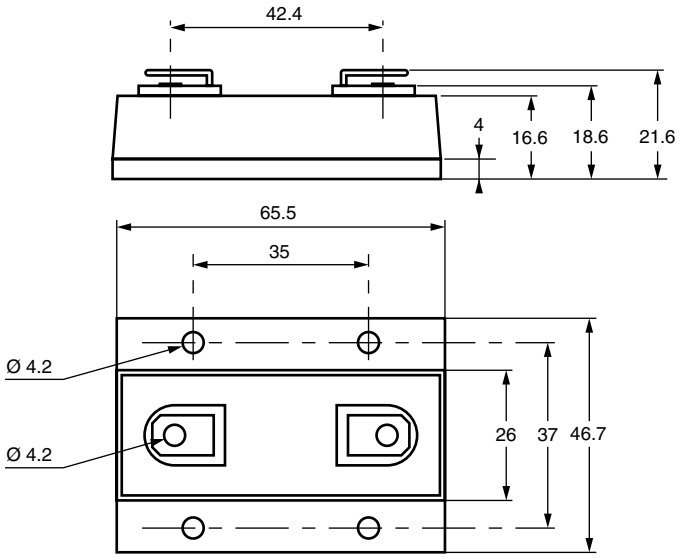
RoHS COMPLIANT

This new style has been developed as an extension to RCH range. Through the use of thick film technology, a non-inductive solution for power resistors is available which are rated up to 100 W at + 25 °C. The terminations position prevents any risk of an electrical arc to the heatsink. This resistor series can replace and offer advantages to standard wirewound devices.

DIMENSIONS in millimeters

RPH 100

V Connections



MECHANICAL SPECIFICATIONS

Mechanical Protection	Insulated case
Substrate	Alumina on metallic base of nickel coated aluminum
Resistive Element	Cermet
End Connections	V connections: Screws M4 x 6
Tightening Torque Connections	1 Nm
Tightening Torque Heatsink	3 Nm
Weight	60 g

ENVIRONMENTAL SPECIFICATIONS

Thermal Resistance	R_{TH} (j-c) 0.55 °C/W
Temperature Range	- 55 °C + 125 °C
Climatic Category	55/125/56

ELECTRICAL SPECIFICATIONS	
Resistance Range	0.092 Ω to 1 MΩ E24 series
Tolerances	± 1 % to ± 10 %
Power Rating:	
Continuous	100 W at 25 °C chassis mounted 0.45 °C/W 10 W at 25 °C Free air
Momentary	400 W at 25 °C for 5 s
Temperature Coefficient Standard	± 300 ppm/°C < 1 Ω ± 150 ppm/°C > 1 Ω
Limiting Element Voltage U_L	1900 V_{RMS}
Dielectric Strength MIL STD 202	5 kV_{RMS} 1 min 10 mA max.
Insulation Resistance	> 10^6 MΩ
Inductance	< 0.1 µH

PERFORMANCE		
TESTS	**CONDITIONS**	**REQUIREMENTS**
Short Time Overload	NF EN 140000 CEI 115_1 4 P_n/5 s $U_S < 2\ U_L$	< ± (0.25 % + 0.05 Ω)
Rapid Temperature Change	NF EN 140000 CEI 68214 Test Na 5 cycles - 55 °C + 125 °C	< ± (0.25 % + 0.05 Ω)
Load Life (Chassis Mounted 0.45 °C/W)	NF EN 140000 P_n at 25 °C 1000 h	< ± (0.5 % + 0.05 Ω)
Humidity (Steady State)	MIL STD 202 Method 103 B Test D 56 days 95 % RH	< ± (0.5 % + 0.05 Ω)

RESISTANCE VALUE IN RELATION TO TOLERANCE AND TCR		
Ohmic Value	< 1 Ω	> 1 Ω
Standard Tolerance	± 5 %	± 5 %
Standard TCR	± 300 ppm/°C	± 150 ppm/°C
Tolerance On Request	± 1 % - ± 2 %	

CHOICE OF THE HEATSINK

The user must choose according to the 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 ratios:

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

P: Expressed in W
T: Difference between maximum working temperature and room temperature.
R_{TH}: (j-c): thermal resistance value measured between resistive layer and outer side of the resistor.
It is the thermal resistance of the component: 0.55 °C/W.
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 itself (type, shape) and the quality of the fastening device.

Example:

R_{TH}: (c-a) for RPH 100 power rating 80 W at ambient temperature + 40 °C.

Thermal resistance R_{TH} (j-c): 0.55 °C/W

Considering equation (1) we have:

$\Delta T \leq 125\ °C - 40\ °C \leq 85\ °C$

$R_{TH}\ (j\text{-}c) + R_{TH}\ (c\text{-}a) = \frac{\Delta T}{P} = \frac{85}{80} = 1.06\ °C/W$

$R_{TH}\ (c\text{-}a) \leq 1.06\ °C/W - 0.55\ °C/W \leq 0.51\ °C/W$

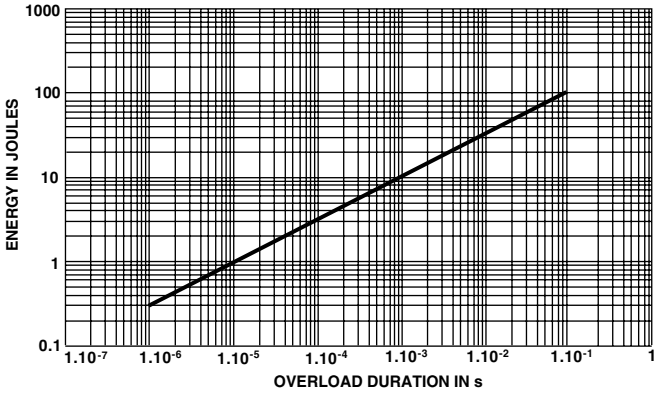
RECOMMENDATIONS FOR MOUNTING ONTO A HEATSINK

Surfaces in contact must be carefully cleaned.
The heatsink must have an acceptable fl atness: 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) should be 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 four screws (not supplied).
Tightening torque: 3 Nm
In order to improve the dissipation, either forced-air cooling or liquid cooling may be used.
Do not forget to respect an insulation value between two resistors (dielectric strength in dry air 1 kV/mm).

OVERLOADS

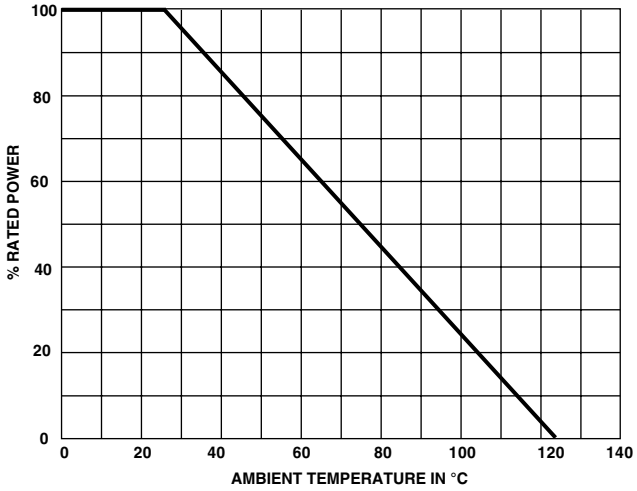
In any case the applied voltage must be lower than 2 U_n.
$U_{max.} < 2\ U_n < 3800$ V.
Short time overload: 4 P_n/5 s.
Accidental overload: The values indicated on the graph below are applicable to resistors in air or mounted onto a heatsink.

ENERGY CURVE



POWER RATING CHART

For resistor mounted onto a heatsink with thermal resistance of 0.45 °C/W.



MARKING

Series. style, ohmic value (in Ω). tolerance (in %), manufacturing date, SFERNICE trade mark.

ORDERING INFORMATION

RCH	25	3.3 kΩ	± 5 %	R	XXX
MODEL	STYLE	RESISTANCE VALUE	TOLERANCE	CONNECTIONS	CUSTOM DESIGN
			Optional ± 1 % ± 2 % ± 5 %	V: M4 screw	Options on request TCR, shape, etc.

GLOBAL PART NUMBER INFORMATION

R	P	H	1	0	0	V	1	0	0	0	2	J	B	

GLOBAL MODEL	SIZE	LEADS	OHMIC VALUE	TOLERANCE	PACKAGING	SPECIAL
RPH	**100**	**F** = Faston type **V** = M4 screw	The firts four digits are significant figures and the last digit specifies the number of zeros to follow. R designates decimal point. **48R70** = 48.7 Ω **48701** = 48 700 Ω **10002** = 100 kΩ **R0100** = 0.01 Ω **R6800** = 0.68 Ω **27000** = 2700 Ω = 2K7 Ω	**F** = 1 % **G** = 2 % **J** = 5 % **K** = 10 %	**B** = Box 5 pieces	As applicable Ex = **XXX**

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M39006/22-0577H Y00892K49000BR13L M8340109M6801GGD03 NTCALUG01A103F291L ITU1341SM3 VS-MBRB1545CTPBF 1KAB100E 1KAB20E IH10EB600K12 CP0005150R0JE1490 562R5GAD47RR S472M69Z5UR84K0R MKP1848C65090JY5L CRCW1210360RFKEA VSMF4720-GS08 TSOP34438SS1V CRCW04024021FRT7 001789X LTO050FR0500JTE3 CRCW08054K00FKTA LVR10R0200FE03 CRCW12063K30FKEAHP 009923A CRCW2010331JR02 CRCW25128K06FKEG CS6600552K000B8768 CSC07A0110K0GPA M34C156K100BZSS M39003/01-2289 M39003/01-2784 M39006/25-0133 M39006/25-0228 M64W101KB40 M64Z501KB40 CW001R5000JS73 CW0055R000JE12 CW0056K800JB12 CW0106K000JE73 672D826H075EK5C CWR06JC105KC CWR06NC475JC MAL219699001E3 MCRL007035R00JHB00 GBU4K-E3/51 GBU8M-E3/51 GF1A-E3/67A PTF56100K00QYEK PTN0805H1502BBTR1K RCWL1210R130JNEA RH005220R0FE02