Power Resistor for Mounting onto a Heatsink Thick Film Technology

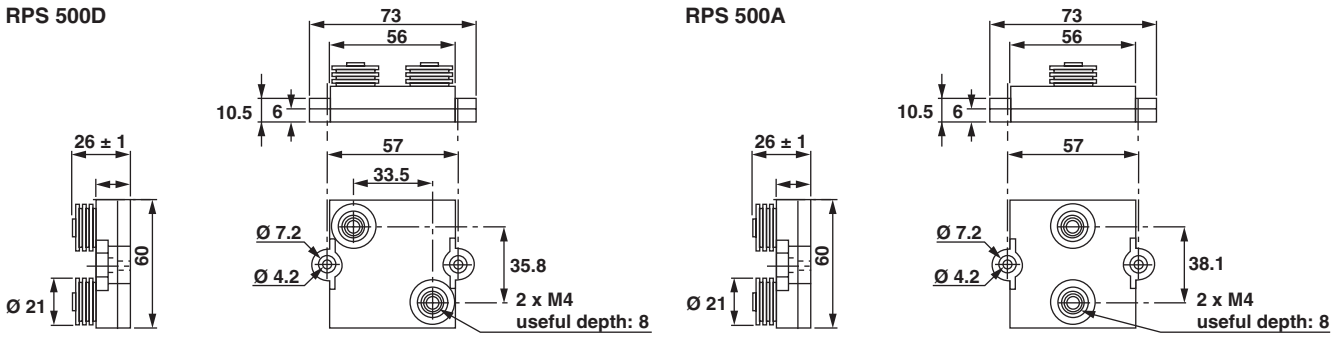
FEATURES

- High power rating: 500 W
- High overload capability up to 2 times rated Power (see energy curve)
- Heatsink mounting
- Low thermal radiation of the case
- Compliant to RoHS directive 2002/95/EC

RoHS COMPLIANT

This range has been developed specifically for electrical traction applications and is capable of dissipating 500 W at + 70 °C. The remarkable performance characteristics are evident when used in severe pulse conditions. The copper base allows easy mounting on the heatsink and provides optimal dissipation conditions.

DIMENSIONS in millimeters



Note

• Tolerances unless stated: ± 0.2 mm

MECHANICAL SPECIFICATIONS

Mechanical Protection	Insulated case
Substrate	Alumina onto base of nickel coated copper
Resistive Element	Cermet
End Connections	Screws M4 (M5 on request)
Tightening Torque on Connections	2 Nm
Tightening Torque on Heatsink	4 Nm
Weight	250 g ± 10 %

ENVIRONMENTAL SPECIFICATIONS

Temperature Range	- 55 °C to + 125 °C
Flammability	IEC 60695-11-5 2 applications 30 s separated by 60 s

ELECTRICAL SPECIFICATIONS

Resistance Range	0.24 Ω to 1 MΩ E24 series
Tolerances	± 1 % to ± 10 %
Rated Power ($P_{r\,70}$) Chassis Mounted at 70 °C (Case Temperature)	500 W continuous load
Thermal Resistance of the Component	$R_{TH\,(j-c)}$: 0.11 °C/W
Temperature Coefficient	± 300 ppm/°C < 1 Ω ± 150 ppm/°C > 1 Ω
Limiting Element Voltage U_L	5 kV_{RMS}
Dielectric Strength	L: 7 kV_{RMS} - H: 12 kV_{RMS} MIL STD 202 Method 301: 1 min/10 mA max.
Insulation Resistance	> 10^6 MΩ under U_{ins} = 500 V_{DC} IEC 60115-1
Inductance	< 50 nH

PERFORMANCE		
TESTS	**CONDITIONS**	**REQUIREMENTS**
Momentary Overload	IEC 60115-1 2 P_r/10 s U_L = 5000 V	< ± (0.25 % + 0.05 Ω)
Rapid Temperature Change	IEC 60115-1/IEC60068-2-14 Test Na 5 cycles - 55 °C to + 125 °C	< ± (0.25 % + 0.05 Ω)
Load Life (Chassis Mounted)	IEC 60115-1 P_r (i.e. 500 W)/1000 h/70 °C (no cycling) (1)	< ± (0.5 % + 0.05 Ω)
Humidity (Steady State)	MIL STD 202 Method 103 B and D 56 days 95% RH/40 °C	< ± (0.5 % + 0.05 Ω)

Note

(1) Resistors are not tested and guaranteed in cycling conditions

RESISTANCE VALUE IN RELATION TO TOLERANCE AND TCR		
Ohmic	< 1 Ω	> 1 Ω
Standard Tolerance	± 5 %	± 5 %
Standard TCR (- 55 °C to + 125 °C)	± 300 ppm/°C	± 150 ppm/°C
Tolerance on Request	± 1 %, ± 2 %, ± 10 %	

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) 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 two screws tightened at 4 Nm for full power availability.

Tightening Torque on Heatsink	RPS 500
	4 Nm

- The following accessories are supplied with each product: 2 off CHC M4 x 16/16 class 8.8 for heatsink mounting,
  2 off TH M4 x 6/6 and 2 M4 contact lock washers for connections.

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 ratio:

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

P: Expressed in W

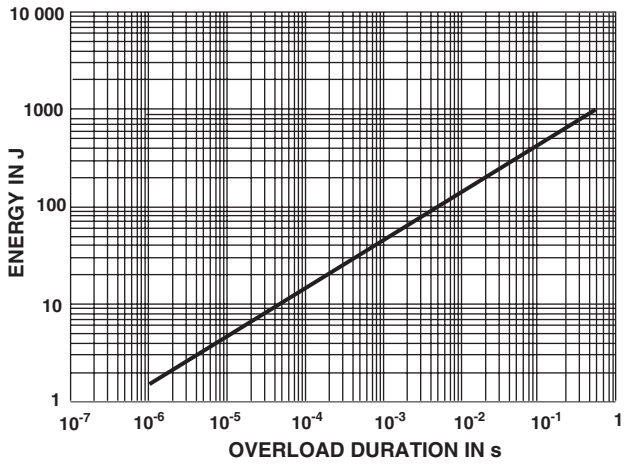
ΔT: Difference between maximum working temperature and room temperature.

$R_{TH\ (j\ -\ c)}$: Thermal resistance value measured between resistive layer and outer side of the resistor. It is the thermal resistance of the component: 0.11 °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, depending on the heatsink itself (type, shape) and the quality of the fastening device.

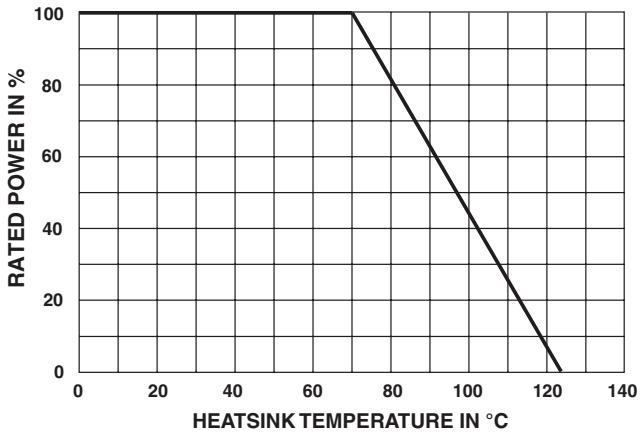
OVERLOADS

Short time overload: 2 P_n/10 s
Accidental overload: The values indicated in the graph below are applicable to resistors in air or mounted onto a heatsink.



POWER RATING

The heatsink temperature should be maintained at the values specified in fig. 2.
To optimise the thermal conduction, contacting surfaces should be coated with silicone grease and heatsink mounting screws tightened to 4 Nm.



MARKING

Series, style, ohmic value (in Ω), tolerance (in %), manufacturing date, Vishay Sfernice trademark.

PACKAGING

Box of 15 units

ORDERING INFORMATION

RPS	500	DH	100 Ω	10 %	XXX	BO15	e
MODEL	STYLE	CONNECTIONS Optional H: Dielectric strength 12 kV L: Dielectric strength 7 kV	RESISTANCE VALUE	TOLERANCE ± 1 % ± 2 % ± 5 % ± 10 %	CUSTOM DESIGN Options on request TCR, shape, etc.	PACKAGING	LEAD (Pb)-FREE

SAP PART NUMBERING GUIDELINES

R	P	S	0	5	0	0	D	H	4	7	R	0	J	B	

GLOBAL MODEL	STYLE	DIELECTRIC	OHMIC VALUE	TOLERANCE	PACKAGING	SPECIAL
RPS500	**D** = Diagonal connections **A** = Straight connections	**H** = Dielectric strength 12 kV **L** = Dielectric strength 7 kV	The first four digits are significant figures and the last digit specifies the number of zeros to follow. R designates decimal point. **48R70** = 48.7 Ω **47R0** = 47 Ω **1001** = 1 kΩ **4R70** = 4.7 Ω **R240** = 0.24 Ω	**F** = 1 % **G** = 2 % **J** = 5 % **K** = 10 %	**B** = Box 15 pieces **N** = Box 15 pieces N/A (1 to 14 pieces by Box)	As applicable ZAx.

Disclaimer

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