

## Power Resistors for Mounting onto a Heatsink Thick Film Technology



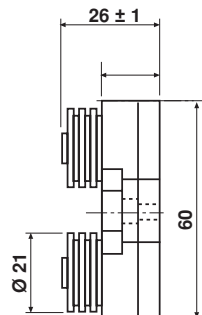
### FEATURES

- High power rating
- High overload capability
- Easy mounting
- Low thermal radiation of the case
- No partial discharge

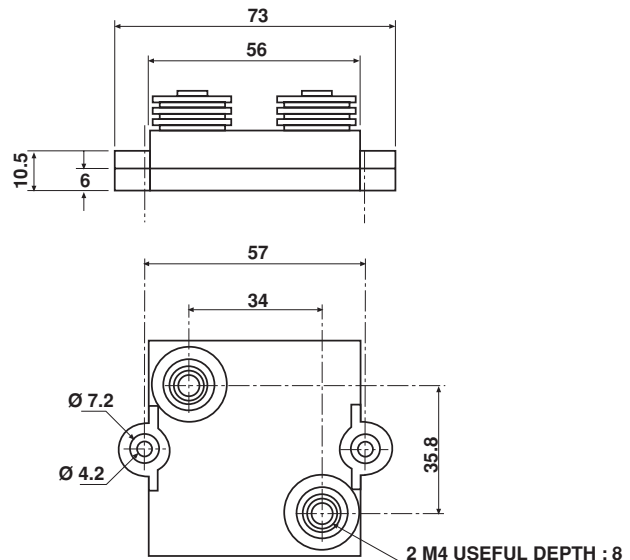
This range has been developed specifically for electrical traction applications and is capable of dissipating 500W at +70°C. The remarkable performance characteristics are evident when used in severe pulse conditions. The copper base allows easy mounting on the heatsink and provides optimal dissipation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

### DIMENSIONS in millimeters

#### RPS 500D



• Tolerance unless stated:  $\pm 0.2\text{mm}$



### MECHANICAL SPECIFICATIONS

#### Mechanical Protection Substrate

Insulated case  
Alumina onto base  
of nickel coated  
copper

#### Resistive Element End Connections

Cermet  
Screws M4 (M5 on  
request)

#### Tightening Torque on Connections

2Nm

#### Tightening Torque on Heatsink

4Nm

#### Weight

250g  $\pm 10\%$

### ENVIRONMENTAL

#### Thermal Resistance

RTH (j-c) 0.11°C/W

#### Temperature Range

- 55°C to + 125°C

#### Climatic Category

55/125/56

### ELECTRICAL SPECIFICATIONS

<b>Resistance Range</b>	0.24 to 1M E24 series
<b>Tolerances</b>	$\pm 1\%$ to $\pm 10\%$
<b>Power Rating</b> <b>Chassis mounted</b>	500W at 70°C continuous 1000W at 25°C for 10 seconds
<b>Temperature Coefficient</b> <b>Standard</b>	$\pm 300\text{ppm}/^\circ\text{C} < 1\Omega$ $\pm 150\text{ppm}/^\circ\text{C} > 1\Omega$
<b>Limiting Element Voltage</b>	5kVRMS
<b>Dielectric Strength</b>	L:7kVRMS - H: 14kVRMS
<b>Partial Discharge</b>	Inception voltage 2.5kVRMS
<b>Insulation Resistance</b>	$> 10^6\text{M}\Omega$
<b>Inductance</b>	$< 50\text{ nH}$

PERFORMANCE		
TESTS	CONDITIONS	TYPICAL DRIFTS
Momentary Overload	2Pn/10 seconds	$< \pm (0.25\% \pm 0.05\Omega)$
Climatic Sequence	5 cycles - 55°C to + 125°C	$< \pm (0.25\% \pm 0.05\Omega)$
Load Life (chassis mounted)	1000 hours 500 W/70°C	$< \pm (0.5\% \pm 0.05\Omega)$
Humidity (steady state)	56 days 95% R.H.	$< \pm (0.5\% \pm 0.05\Omega)$

RESISTANCE VALUE IN RELATION TO TOLERANCE AND TCR		
Ohmic	$< 1\Omega$	$> 1\Omega$
Standard Tolerance	$\pm 5\%$	$\pm 5\%$
Standard T.C.R.	$\pm 300\text{ppm}/^\circ\text{C}$	$\pm 150\text{ppm}/^\circ\text{C}$
Tolerance On Request	$\pm 1\% - \pm 2\% - \pm 10\%$	

## CHOICE OF THE HEATSINK

The user must choose the heatsink 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:

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

P: expressed in W

$\Delta T$ : 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: 0.11°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.

## RECOMMENDATIONS FOR MOUNTING ONTO A HEATSINK

Surfaces in contact must be carefully cleaned.

The heater 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) should be coated with a silicon grease (type SI 340 Rhône-Poulenc or Dow Corning).

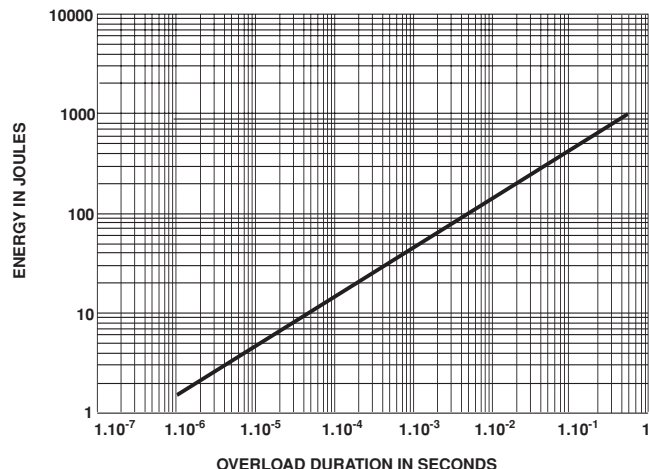
The fastening of the resistor to the heatsink is under pressure control of two screws. Tightening torque: 4Nm.

The following accessories are supplied with each product: 2 off M 4 x 16, 2 off M4 TE 4 x 0.6 and 2 off M4 washers.

**OVERLOADS**

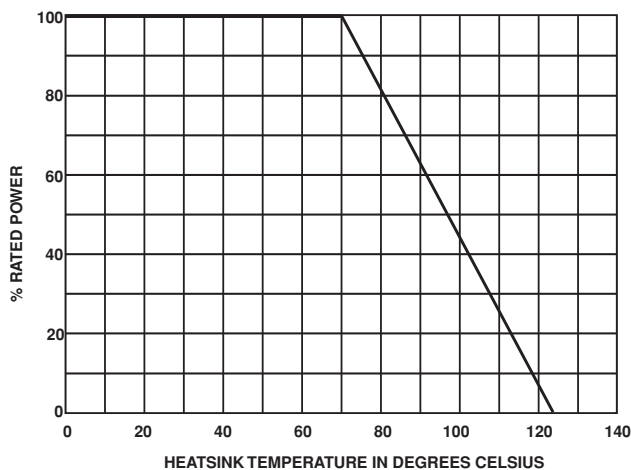
**Short time overload:** 2Pn/10 seconds

**Accidental overload:** The values indicated in the graph below are applicable to resistors in air or mounted onto a heatsink.

**ENERGY CURVE****POWER RATING CHART**

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 4Nm.

**MARKING**

Series, style, ohmic value (in  $\Omega$ ), tolerance (in  $\%$ ), manufacturing date, VISHAY trade mark.

**ORDERING INFORMATION**

RPS	500D	H	100 $\Omega$	$\pm 10\%$	xxx
MODEL	STYLE	CONNECTIONS	RESISTANCE VALUE	TOLERANCE	CUSTOM DESIGN
		Optional		Optional	Options
		H: dielectric strength 14kV		$\pm 1\%$	on request
		L: dielectric strength 7kV		$\pm 2\%$	T.C.R., shape,
				$\pm 5\%$	etc.
				$\pm 10\%$	