

Series VHP

180 W Power Resistor according to VDE 0160 und UL 94 V-0

A Miba Group Company

1/2

EBG Resistors's VHP series is rated at 180 W mounted to a heat sink. The increased height of the package makes the resistor ideal in applications where creeping distance must meet the VDE 0160 and UL 94 V-0 standards.

Features

- multiple resistors in 1 package
- Easy mounting using already existing infrastructure
- Non-Inductive design
- ROHS compliant
- Materials in accordance with UL 94 V-0 and VDE 0160
- Resistor is also available with UL certification (ask for details)
- Resistor is also available with preapplied PCM (Phase Change Material) (ask for details)

Technical Specifications

Resistance value	$1\ \Omega \leq 1\ \text{M}\Omega$ (higher values on special request)
Resistance tolerance	$\pm 1\%$ to $\pm 10\%$
Temperature coefficient	$\pm 250\ \text{ppm}/^\circ\text{C}$ (at $+85^\circ\text{C}$ ref. to $+25^\circ\text{C}$) lower TCR on special request for limited ohmic values
Power rating	up to 180 W at 85°C bottom case temperature (see configurations)
Maximum working voltage	500 V (up to 1,000 V DC on special request = "S"-version)
Voltage proof	5,000 V DC, 3,000 V AC
Insulations resistance	$> 10\ \text{G}\Omega$ at 1,000 V DC
Insolation voltage between R1 & R2	500 V DC (1,000 V DC on special request)
Comparative Tracking Index (CTI)	standard $> 200\ \text{V}$ ($> 500\ \text{V}$ on special request = "H"-version)
Heat resistance to cooling plate	$R_{th} < 0.40\ \text{K/W}$
Capacitance/mass	45 pF (typical), measuring frequency 10 kHz
Working temperature range	-55°C to $+155^\circ\text{C}$
Mounting - torque for base plate (static)	1.3 Nm to 1.5 Nm M5 screws
Weight	$\sim 38\ \text{g}$

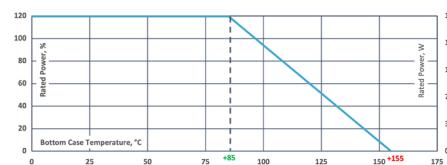
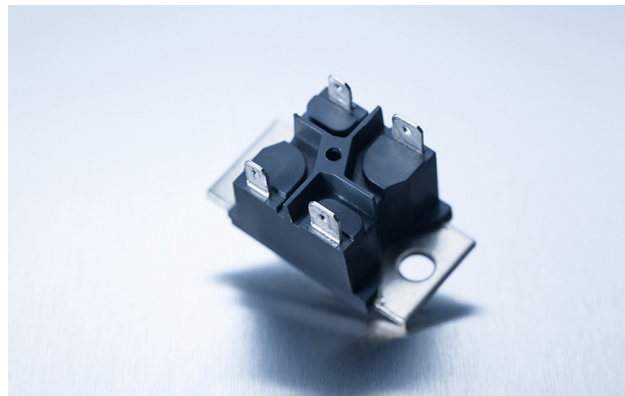
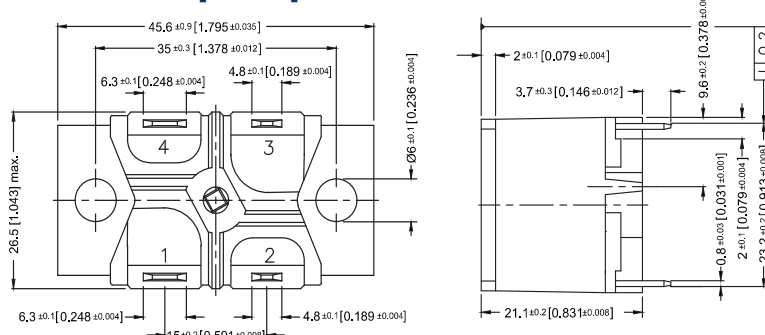
Air distance contact to contact:

- | | | |
|---|--|--------------------|
| ③ | Contacts 1 and 2 resp. 3 and 4
- without fast-on-Plug:
- with fast-on-Plug: | 9.2 mm
8.2 mm |
| ④ | Contacts 1 and 4 resp. 2 and 3
- without fast-on-Plug:
- with fast-on-Plug: | 21.9 mm
20.9 mm |
| ⑤ | Contacts 2 resp. 3 and M5
- mounting screw with washer
- without fast-on-Plug:
- with fast-on-Plug: | 16.3 mm
15.9 mm |
| ⑥ | Contacts 1 resp. 4 and M5
- mounting screw with washer
- without fast-on-Plug:
- with fast-on-Plug: | 15.5 mm
15.0 mm |

Creeping distance:

- | | | |
|---|---|--------------------|
| ③ | Contacts 1 and 2 resp. 3 and 4
- without fast-on-Plug:
- with fast-on-Plug: | 20.2 mm
19.0 mm |
| ④ | Contacts 1 and 4 resp. 2 and 3
- without fast-on-Plug:
- with fast-on-Plug: | 27.4 mm
25.8 mm |
| ⑤ | Contacts 2 resp. 3 to base plate
- without fast-on-Plug:
- with fast-on-Plug: | 20.2 mm
19.8 mm |
| ⑥ | Contacts 1 resp. 4 to base plate
- without fast-on-Plug:
- with fast-on-Plug: | 19.5 mm
18.9 mm |

Dimensions in mm [inches]



Derating (thermal resist.) VHP:
 $2.5\ \text{W/K}$ ($0.40\ \text{K/W}$) (for conf. 3)

Best results can be reached by using a thermal transfer compound with a heat conductivity of at least $1\ \text{W/mK}$. The flatness of the cooling plate must be better than $0.05\ \text{mm}$ overall. Surface roughness should not exceed $6.4\ \mu\text{m}$.

How to make a request

VHP-Configuration_Ohmic Value_Tolerance

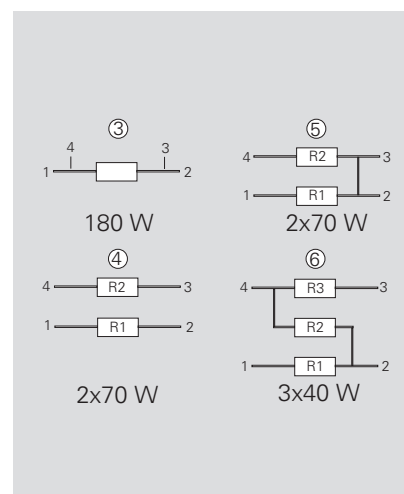
For example:

VHP-5 2x2R 10% or VHP-6 3x8K 5%

Example for higher working voltage:

VHP-5-S 10R 5%

Configurations (P / package)



Version 5: ohmic value between contact 2 and 3 = $3\ \text{m}\Omega$

The above spec. sheet features our standard products. For further options please contact our local EBG representative or contact us directly.

sales@ebg-resistors.com · sales@ebg-us.com

Series VHP

2/2

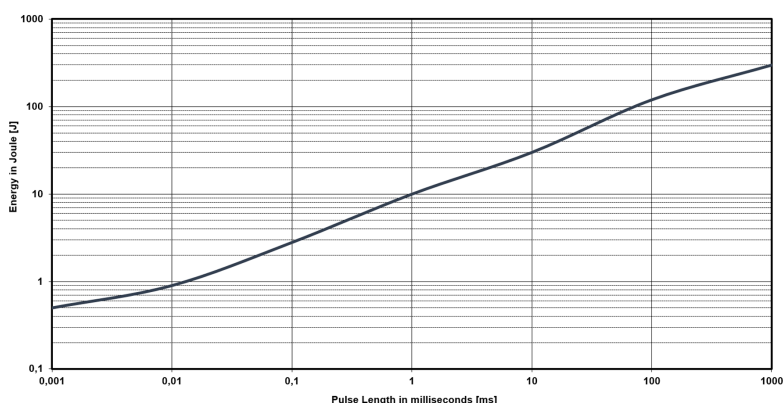
Pulse Energy Curve (typical rating for VHP)

Note: These energy values are reference values → depending on ohmic value e.g. 1 Ω to 10 Ω and used resistive paste, a variation in max. energy load capability is possible

Test procedure

Every test resistor was mounted with thermal compound (0.9 W/mK) on a water cooled heatsink

- Constant inlet water temperature: +50°C
- The test time of each tested resistor: 10min.
- Break time between two pulses: 1sec.
- To determine good / defect parts the ohmic value was measured before and after tests:
a change of tolerance of more than 0.1% means defect



Description of Pulse Energy Curve

- Shape of pulse = e-function
- Time between two pulses = 1 second
- Pulse length = time constant of 1 tau
(1 means ... tau = 1ms)

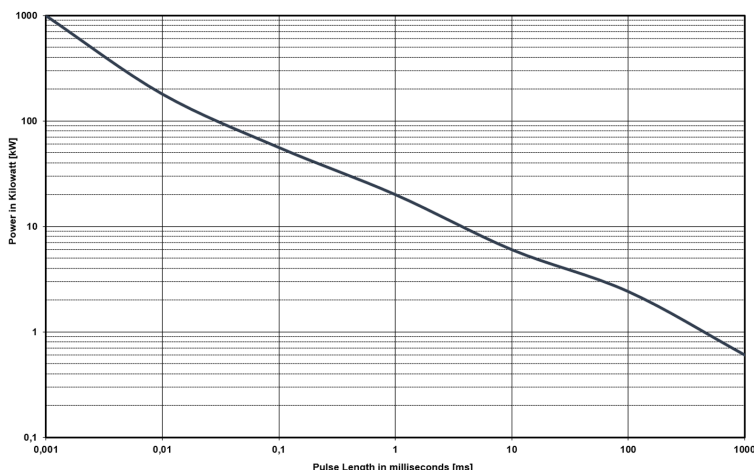
Example

At 1 ms tau the VHP with e.g. 1 Ω to 10 Ω can withstand an energy level of about 10 J, when the pulse pause time is ≥ 1s

**At a symmetrical frequency > 1 kHz at pulse length ≥ 10 μsec. the maximum applied pulse energy for VHP is a result out of the nominal power 180 W divided by the operating frequency
(at 85°C bottom case) ($E = 180 \text{ W} / F$)**

Pulse Power Curve (typical rating for VHP)

The power curve shows the max. possible power which can be applied for a certain duration. Referring to the same test procedure as described above.



Description of Pulse Power Curve

- Shape of pulse = e-function
- Time between two pulses = 1 second
- Pulse length = time constant of 1 tau
(1 means ... tau = 1ms)

Example

For the time-constant of 1 ms you can apply about 20 kW max. ($P_p = 2 \cdot E / T$) →, if the time between two such peaks is ≥ 1s

Disclaimer



A Miba Group Company

The given statements and information herein are recommendations for the use of our products and are based on our experience in combination with applicable technical standards.

They are for guidance only and do not represent any assurance of characteristics or warranty commitments for the products or their suitability for specific applications.

The suitability of the products for the intended use by the user depends on different boundary conditions and influencing factors and is to be assessed exclusively by the user.

DISCLAIMER:

NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, IS MADE WITH RESPECT TO THE PRODUCTS, DESIGNS, DATA, INFORMATION DESCRIBED OR ANY INTELLECTUAL PROPERTY CONTAINED THEREIN. ANY WARRANTY OR GUARANTEE OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS ALSO EXCLUDED.

The given statements and information herein reflect the current status at the time of publication.

Typing or printing errors cannot be excluded.

This publication shall not be reprinted or reproduced in whole or in part in any form or by any means without the express written permission of EBG.