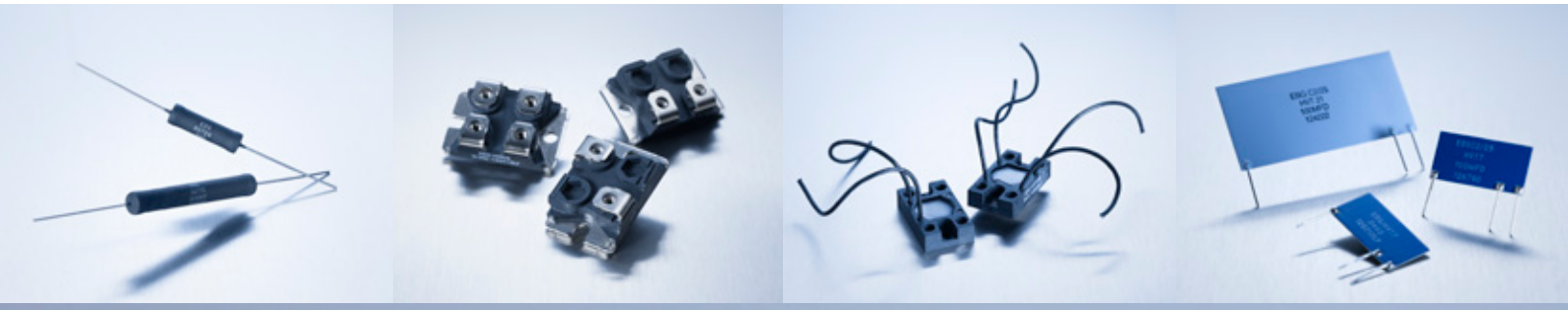
EBG RESISTORS

A Miba Group Company

High-Voltage - High Power - Non-Inductive Resistors
Product Catalog 2016





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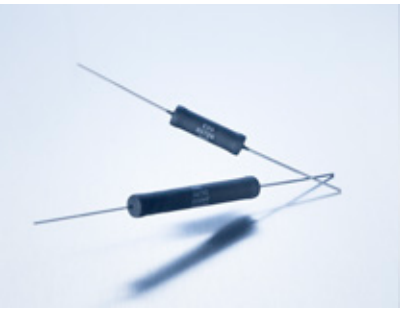
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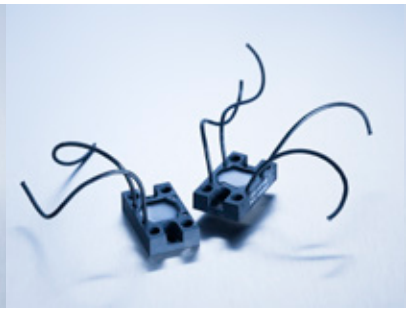
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For further information please visit www.miba.com

EBG RESISTORS

A Miba Group Company

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The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

About our Company - An Introduction to EBG

EBG is a leading international electronic components manufacturer concentrating on highly specialized electronic resistive components. EBG's corporate headquarters is located in Austria. In addition, we have operational facilities throughout Europe, the USA and East Asia.

Since 1977, EBG has been adding numerous quality electronic components to its product portfolio. From its Austrian plant, EBG exports more than 85% of its production to customers all over the world.

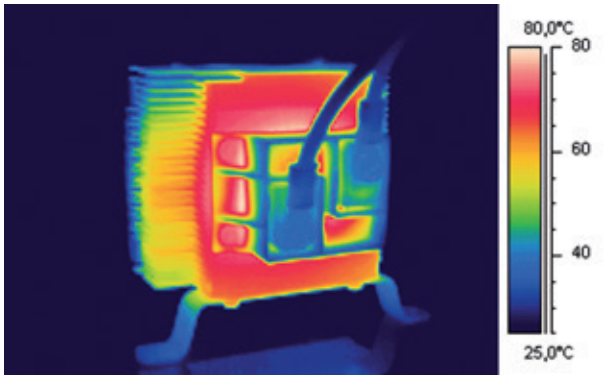
EBG specializes in high-technology electronic components rather than in run-of-the-mill products. EBG's resistive components offer such characteristics as very low and controlled temperature and voltage coefficients, high stability, high-temperature operations and very tight tolerances. All products meet applicable environmental requirements according to European and US military specifications.

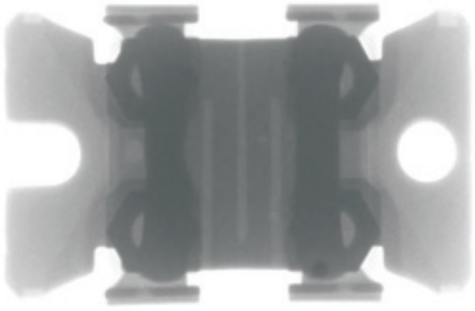
The EBG resistor product lines consist of an extensive variety of metal oxide products made with our exclusive METOXFILM formulation. We offer different style options such as flats, cylindricals, dividers and networks.

EBG is EN ISO 9001:2008 certified. Our customer base consists of many of the top FORTUNE 500 companies around the world.

We encourage you to contact our technical staff to help assist you in the development/design of your individual resistor needs. EBG's research and evaluation capabilities include but are not limited to operation of sophisticated X-ray facilities as well as thermal imaging systems.

Example of EBG's new X-Ray and thermal imaging capabilities:





Tolerances:	
± 20%	- M
± 10%	- K
± 5%	- J
± 1%	- F
± 0.5%	- D
± 0.25 %	- C
± 0.1 %	- B
± 0.05 %	- A5
± 0.02 %	- A2

TCR:	EBG	MTX
± 250 ppm/°C	- B7	- P
± 200 ppm/°C	- B8	- L
± 150 ppm/°C	- B9	- M
± 100 ppm/°C	- C1	- S
± 50 ppm/°C	- C2	- F
± 25 ppm/°C	- C3	- E
± 15 ppm /°C	- C5	- A
± 10 ppm /°C	- C6	- T
± 5 ppm /°C	- C7	- U

The EBG Customer Relationship

EBG focuses on cutting-edge electronic components technology. Avoiding mass-produced commodity items with less exacting requirement, EBG develops highly reliable product lines to fill the creative requirements of the design and development engineer in today's fast moving world. Our company has always welcomed the opportunity to participate in new product development for engineers with imagination and vision. If it is within the scope of our know-how of thick film technology, thin film technology, computer programming, laser isolation and processing, our engineers will be delighted to work with you ... and for you to help solve your resistor needs now and in the future.

EBG is EN ISO 9001:2008 certified

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

High-Voltage Resistors

Series SGT LowTCR • U.S. Patent-No. 4,859,981

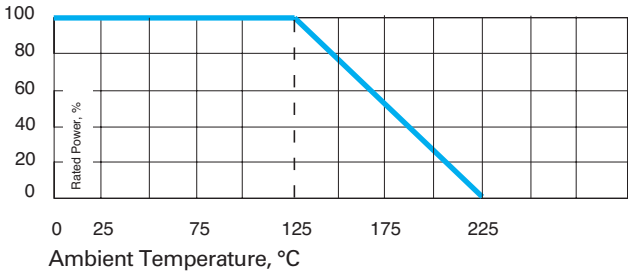
TC of 25 ppm/°C combined with precision tolerances (0.1%–1%), ohmic range (100 KΩ–1 GΩ)

The models in the SGT series meet the most stringent requirements regarding temperature coefficient in connection with high stability performance at high operating voltages. The low temperature coefficient minimizes ohmic value change generated through the warm-up due to power dissipation. The SGT series is produced using EBG's patented Non-Inductive Design. Typical applications are medical systems like X-ray, nuclear spin tomography as well as power supplies or instruments.



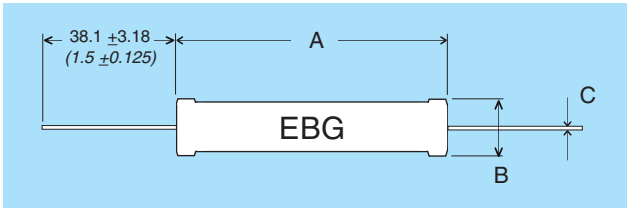
General Characteristics

- Resistance range: from100 KΩ to 1 GΩ (others on request)
- Resistance tolerance: from ±0.1% to ±1.0%
- Standard Temperature coefficient: 25ppm/°C
- Load life stability: 0.25% per 1,000 hours at +125°C.
- Patented NON-INDUCTIVE DESIGN
- Max. cont. operating temperature: +225°C.
- Voltages up to 60% higher than the values listed may be specially ordered by adding "S" to the model designation.



Specifications

- Resistance tolerance: standard: ±1% to ±10% (tolerances down to ±0.1% upon special request) **
- Temperature coefficient: ±25 ppm/°C referenced to 25°C, ΔR taken at –15°C and +85°C (other temperatures on request).
- Voltage coefficient: –0.2 ppm/V max. as to MIL-Std-202, Method 309, 10 kV DC max.
- Dielectric strength: 1,000 V DC
- Insulation resistance: 10 GΩ min.
- Overload/overvoltage: 5 times rated power with applied voltage not to exceed 1.5 times maximum continuous operating voltage for 5 seconds. ΔR 0.20% max.
- Load life: 1,000 hours at rated voltage not exceeding rated power, typical ΔR (2 s) = 0.1%, ΔR=0.25% max.
- Moisture resistance: MIL-Std-202, Method 106, ΔR 0.4% max.
- Thermal shock: MIL-Std-202, Method 107, Cond. B, ΔR 0.20% max.
- Encapsulation: silicone conformal
- Lead material: OFHC copper, tin-plated
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!



Model no.	Watt-age	Max. cont. oper. Volt	Min. Ω	Min. "S" Ω	Max. (1% Tol.) Ω	Dimensions in millimeters Dimensions in inches		
						A ±0.50 ±0.02	B ±0.50 ±0.02	C ±0.50 ±0.002
SGT 26	1.0	4,000	100K	40M	250M	26.90 *1.059*	8.20 *0.323*	1.00 *0.040*
SGT 32	1.25	5,000	120K	50M	300M	33.00 *1.300*	8.20 *0.323*	1.00 *0.040*
SGT 39	1.5	6,000	150K	60M	400M	39.50 *1.555*	8.20 *0.323*	1.00 *0.040*
SGT 52	2.0	10,000	200K	80M	500M	52.10 *2.051*	8.20 *0.323*	1.00 *0.040*
SGT 78	3.0	15,000	300K	120M	700M	77.70 *3.059*	8.20 *0.323*	1.00 *0.040*
SGT 103	4.0	20,000	400K	160M	1G	102.90 *4.051*	8.20 *0.323*	1.00 *0.040*
SGT 124	5.0	25,000	500K	190M	1G	123.70 *4.870*	8.20 *0.323*	1.00 *0.040*
SGT 154	6.0	30,000	600K	250M	1G	153.70 *6.051*	8.20 *0.323*	1.00 *0.040*

** If you need very close tolerances (±0.1% to ±0.5%), we recommend not to use the full power rating but rather to select the next larger size to achieve ultimate stability.
For details, please contact your nearest EBG representative.

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

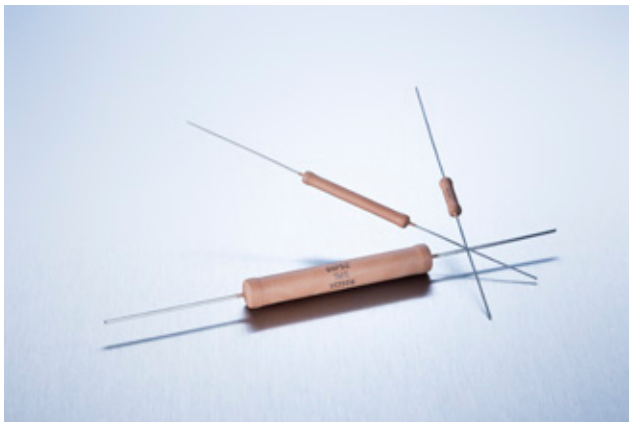
A Miba Group Company

High-Voltage Resistors

Series SGP/OGP • U.S. Patent-No. 4,859,981

TC of 80 ppm/°C combined with precision tolerances (0.1%-10%) and wide ohmic range (100 Ω – 10 GΩ)

The SGP series meets the requirements of high resistance values in combination with very high voltage. It is produced using EBG's patented Non-Inductive Design complete with in-process digital trimming to exact value. This series employs our special METOXFILM, which demonstrates excellent stability while covering resistance ranges from 100 Ω to 10 GΩ – all at high operating temperatures of up to 225°C. Power ratings and voltage ratings are for continuous operation and have all been pretested for steady-state performance as well as momentary overload conditions.

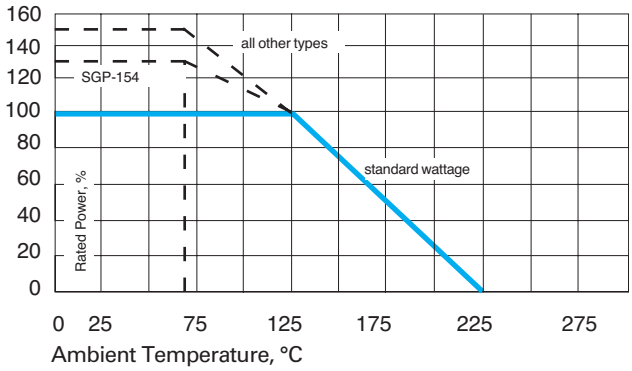


General Characteristics

- Resistance values: up to 10 GΩ
- Resistance tolerance: from ± 0.1% to ± 10%
- Standard Temperature coefficient: 80ppm/°C (others on request)
- Maximum continuous operating voltage: 48,000 V
- Load life stability: typical ±0.02% per 1,000 hours
- Maximum operating temperature: +225°C

Specifications

- Resistance tolerance: standard: ±1% to ±10% (±1% to ±10% above 1 GΩ) (tolerances down to ±0,1% upon special request)
- Temperature coefficient: standard ±80 ppm/°C from –15°C to +105°C, referenced to +25°C (other TCR or other temperatures on request)
- Voltage coefficient: see page 7
- Dielectric strength: 1,000 V DC max. (25°C, 75% relative humidity)
- Insulation resistance: 10 GΩ min.
- Overload/overvoltage: 5 times rated power 125°C with applied voltage not to exceed 1.5 times maximum continuous operating voltage for 5 seconds. ΔR 0.5% max.
- Load life: 1,000 hours at 125°C and rated power, components with 1% tol. ΔR 0.2% max., extended range ("S") ΔR = 0.5% max.
- Moisture resistance: MIL-Std-202, Method 106, ΔR 0.4% max.
- Thermal shock: MIL-Std-202, Method 107, Cond. C, ΔR 0.25% max.
- Encapsulation: silicone conformal
- Lead material: OFHC copper, tin-plated
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!



Voltages up to 60% higher than the values listed may be specially ordered by adding "S" to the model designation.

EBG's special patented (U.S. Patent-No. 4,859,981) Non-Inductive Design offers an outstanding advantage over other techniques. The design incorporates a unique method of DIGITAL TRIMMING to value. Other less desirable methods include an "analog" method of abrading and removing the resistive material, which frequently results in a weak section. EBG's patented process avoids this potential problem.

** Our resistors are designed for operation in air and non-aggressive atmospheres. For special applications (i.e., oil, casting, molding, SF6, etc.), please contact our nearest EBG representative.
The above spec sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

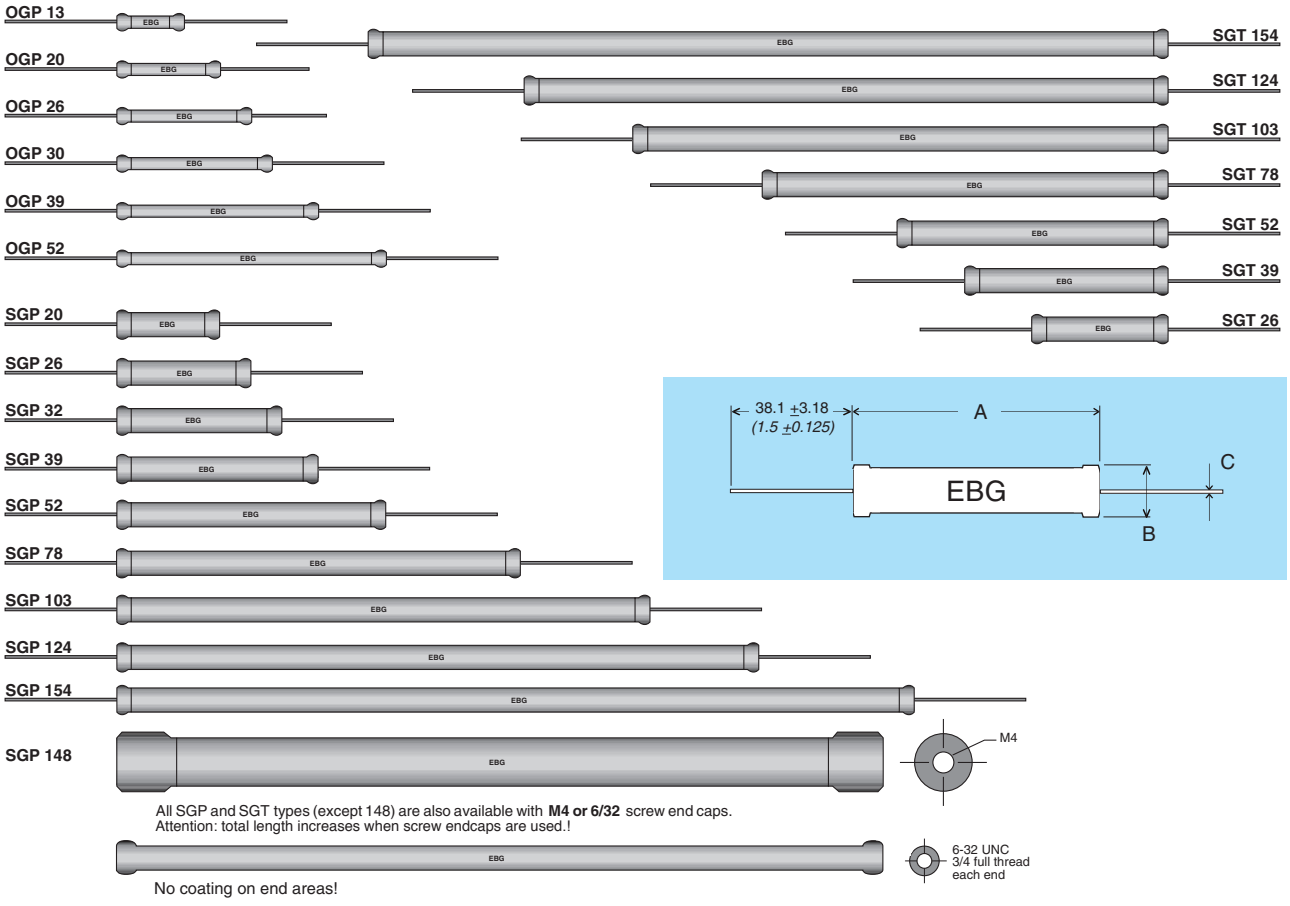
Model no.	Wattage 25°C	Wattage 75°C	Wattage 125°C	Max. cont. oper. V (kV)	Max. KV "S" **	Resistance F (=1%) Min.	Resistance F (=1%) Max.	s-Resistance max. (2% Tol.)	Dimensions in millimeters / Dimensions in inches A ±0.50 ±0.02	B ±0.50 ±0.02	C ±0.50 ±0.002
						ohmic values					
OGP 13	1.0	1.0	0.60	1.5	2.4	100	50M	500M	13.30 *0.524*	4.20 *0.165*	0.60 *0.024*
OGP 20	1.5	1.5	1.00	2.0	3.2	200	100M	1G	19.70 *0.776*	4.20 *0.165*	0.60 *0.024*
OGP 26	1.9	1.9	1.25	4.0	6.4	300	150M	2G	26.20 *1.031*	4.20 *0.165*	0.60 *0.024*
OGP 30	2.5	2.5	1.50	5.0	8.0	500	250M	3G	32.30 *1.272*	4.20 *0.165*	0.60 *0.024*
OGP 39	3.0	3.0	2.00	6.0	9.6	700	300M	5G	39.40 *1.551*	4.20 *0.165*	0.60 *0.024*
OGP 52	3.3	3.3	2.50	10.0	12.0	400	2G	-	49.50 *1.949*	4.20 *0.165*	0.60 *0.024*
SGP 20	2.5	2.5	1.50	3.0	4.8	200	250M	1G	20.20 *0.795*	8.20 *0.323*	1.00 *0.040*
SGP 26	3.7	3.7	2.50	4.0	6.4	250	300M	1G	26.90 *1.059*	8.20 *0.323*	1.00 *0.040*
SGP 32	4.5	4.5	3.00	5.0	8.0	300	400M	1.5G	33.00 *1.3*	8.20 *0.323*	1.00 *0.040*
SGP 39	5.2	5.2	3.50	8.0	12.8	400	500M	1.5G	39.50 *1.555*	8.20 *0.323*	1.00 *0.040*
SGP 52	7.5	7.5	5.00	10.0	16.0	500	750M	2.5G	52.10 *2.051*	8.20 *0.323*	1.00 *0.040*
SGP 78	11	11	7.50	15.0	24.0	900	1G	4G	77.70 *3.059*	8.20 *0.323*	1.00 *0.040*
SGP 103	12	12	8.00	20.0	32.0	1K2	1G	2G	102.90 *4.051*	8.20 *0.323*	1.00 *0.040*
SGP 124	15	15	10.00	25.0	40.0	1K5	1G	8G	123.70 *4.870*	8.20 *0.323*	1.00 *0.040*
SGP 148	30	30	20.00	45.0	-	10K	3G	10G	148.00 *5.83*	16.00 *0.63*	- -
SGP 154	20	20	15.00	30.0	48.0	2K0	2G	10G	153.70 *6.051*	8.20 *0.323*	1.00 *0.040*

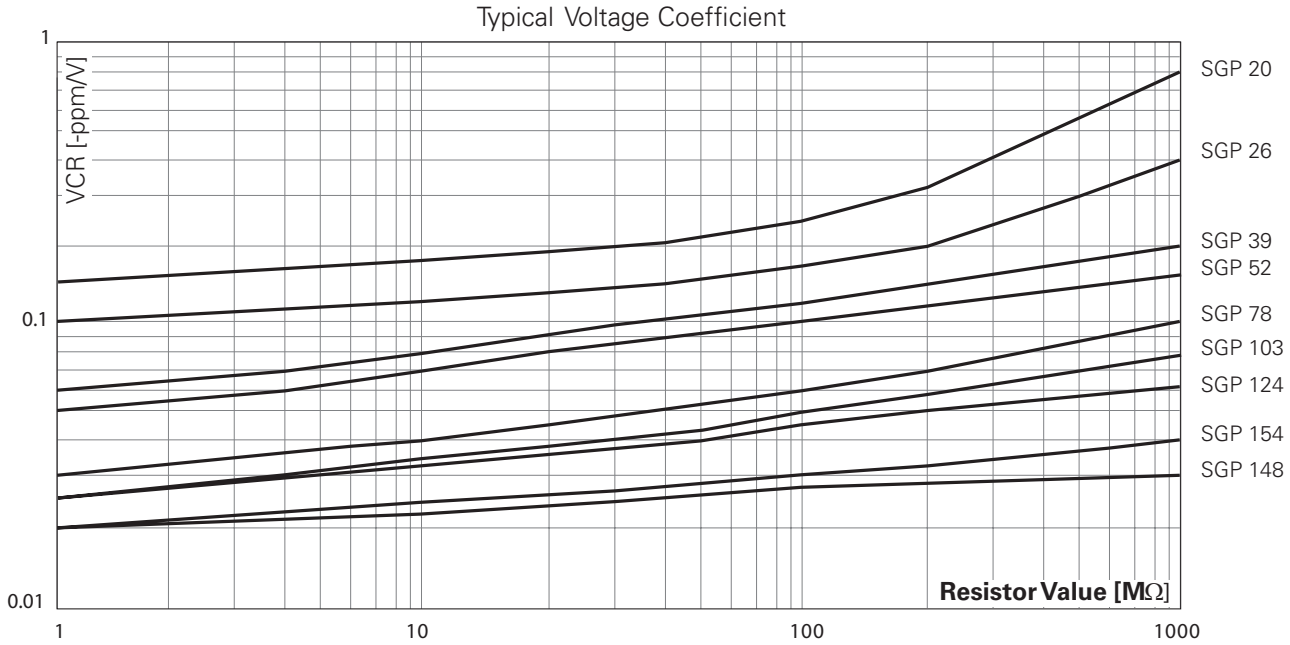
The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

High-Voltage Resistors - Overview





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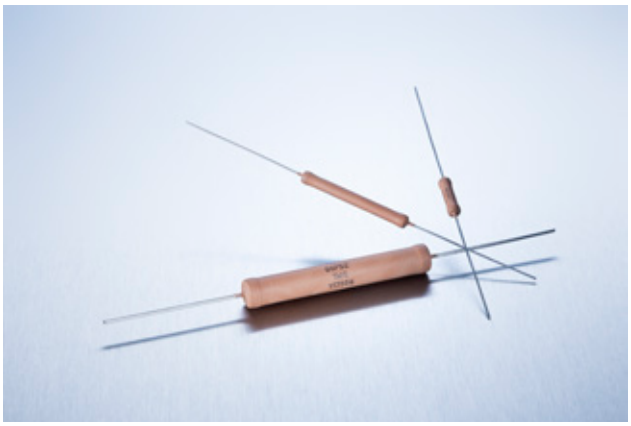
A Miba Group Company

Cylindrical Power Resistors

Series SSP/OSP

Power- and High-Voltage Resistors with high temperature operation, standard TC of 50 ppm/°C and ohmic range from 0R1 to 30M.

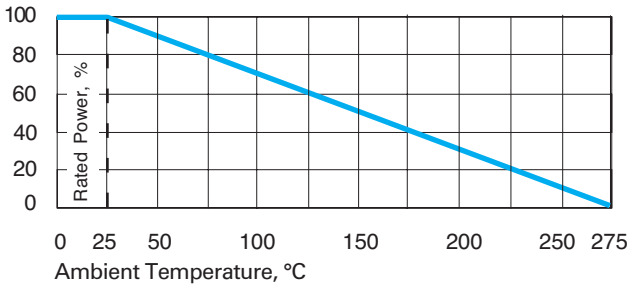
The SSP series meets the requirements of power ratings of up to 40 W while at the same time offering voltage ratings of up to 6,000 V.
These Power Film Resistors cover a wide resistance range and operate at up to 275°C in axial lead construction.



General Characteristics

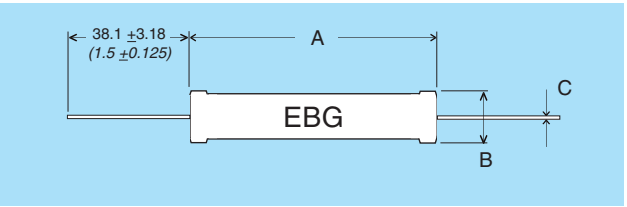
- Non-Inductive Performance (EBG's patented process)
- Full power and voltage ratings (derating not required)
- Very high resistance values (see table) up to 30 MΩ

To accomplish this objective of high stability, high value, high voltage and high power in the SSP series, EBG employs a special variation of its METOXFILM formulations. These films are annealed on special ceramic bodies at temperatures above 1,400°F/800°C and become an inherent part of the ceramic surface, which brings about their unusual performance characteristics. As a result of EBG's unique Non-Inductive patented process, these resistors are ideally suited for high-frequency applications and result in less "ringing" with minimum distortion of the signals and faster settling times.



Specifications

- Resistance tolerance: standard: ±1% to ±10%**
- Temperature coefficient: for 10 Ω and above 50 ppm/°C (other TCR on request). TC referenced to 25°C, ΔR taken at –15°C and +105°C (other TCR on request) (other temperatures on request).
- Dielectric strength: 1,000 VDC
- Insulation resistance: 10 GΩ min.
- Overload/overvoltage: 5 times rated power with applied voltage not to exceed 1.5 times maximum continuous operating voltage for 5 seconds. ΔR 0.5% max. or 0.5 Ω max., whichever is greater (not applicable to SSP 148!)
- Load life: 1,000 hours at rated power, ΔR 0.5% max. or 0.5 Ω max., whichever is greater.
- Thermal shock: MIL-Std-202, Method 107, Cond. C, ΔR 0.5% max. or 0.5 Ω max., whichever is greater.
- Max. operating temperature: +275°C
- Encapsulation: silicone conformal
- Lead material: OFHC copper, tin-plated
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!

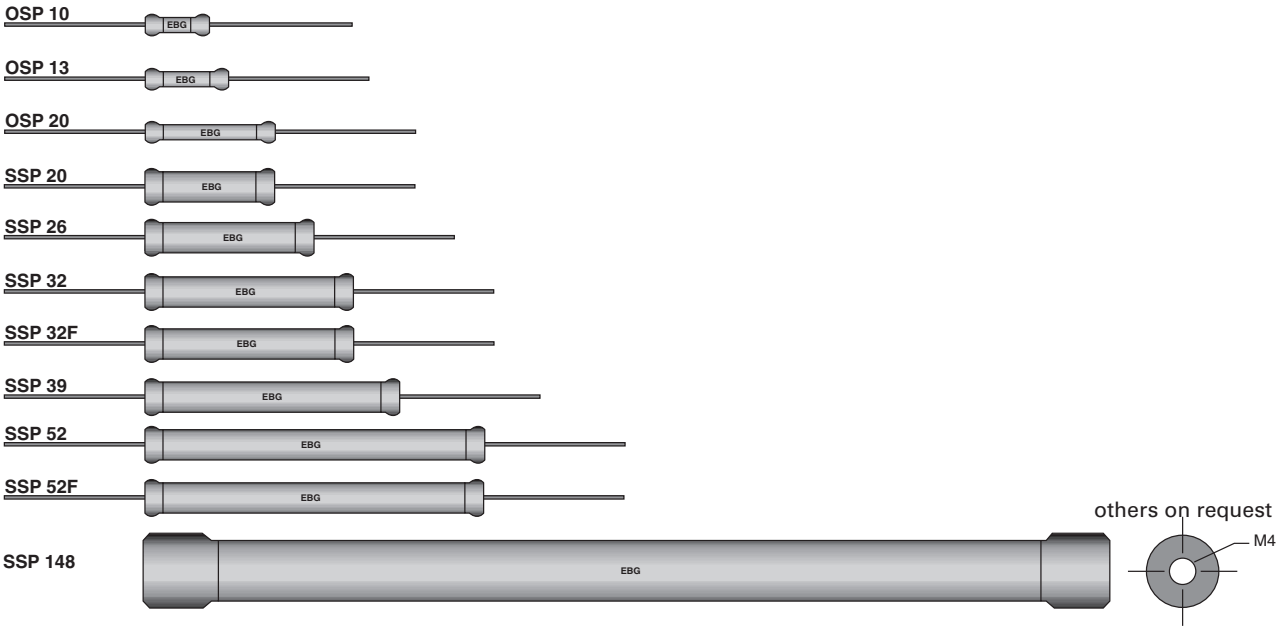


Model no.	Wattage	Max. voltage	Resistance		Dimensions in millimeters Dimensions in inches		
			Min. Ω	Max. Ω	A ±0.50 ±0.02	B ±0.50 ±0.02	C ±0.50 ±0.002
OSP 10	2.00	1,000	0.1	10M	10.90 *0.429*	4.20 *0.165*	0.60 *0.024*
OSP 13	2.40	1,000	0.1	12M	13.70 *0.539*	4.20 *0.165*	0.60 *0.024*
OSP 20	3.00	1,000	0.1	15M	19.70 *0.776*	4.20 *0.165*	0.60 *0.024*
SSP 20	4.00	800	0.1	15M	20.20 *0.795*	8.20 *0.323*	1.00 *0.040*
SSP 26	6.00	2,000	0.1	15M	26.90 *1.059*	8.20 *0.323*	1.00 *0.040*
SSP 32	8.00	4,500	0.1	20M	33.00 *1.3*	8.20 *0.323*	1.00 *0.040*
SSP 32 F*	10.00	4,500	1	10M	33.00 *1.3*	8.20 *0.323*	1.00 *0.040*
SSP 39	10.00	4,500	0.1	20M	39.50 *1.555*	8.20 *0.323*	1.00 *0.040*
SSP 52	12.50	6,000	0.1	30M	52.10 *2.051*	8.20 *0.323*	1.00 *0.040*
SSP 52 F*	15.00	6,000	1	30M	52.10 *2.051*	8.20 *0.323*	1.00 *0.040*
SSP 148	40.00	6,000	1	100K	148.00 *5.83*	16.00 *0.63*	M4

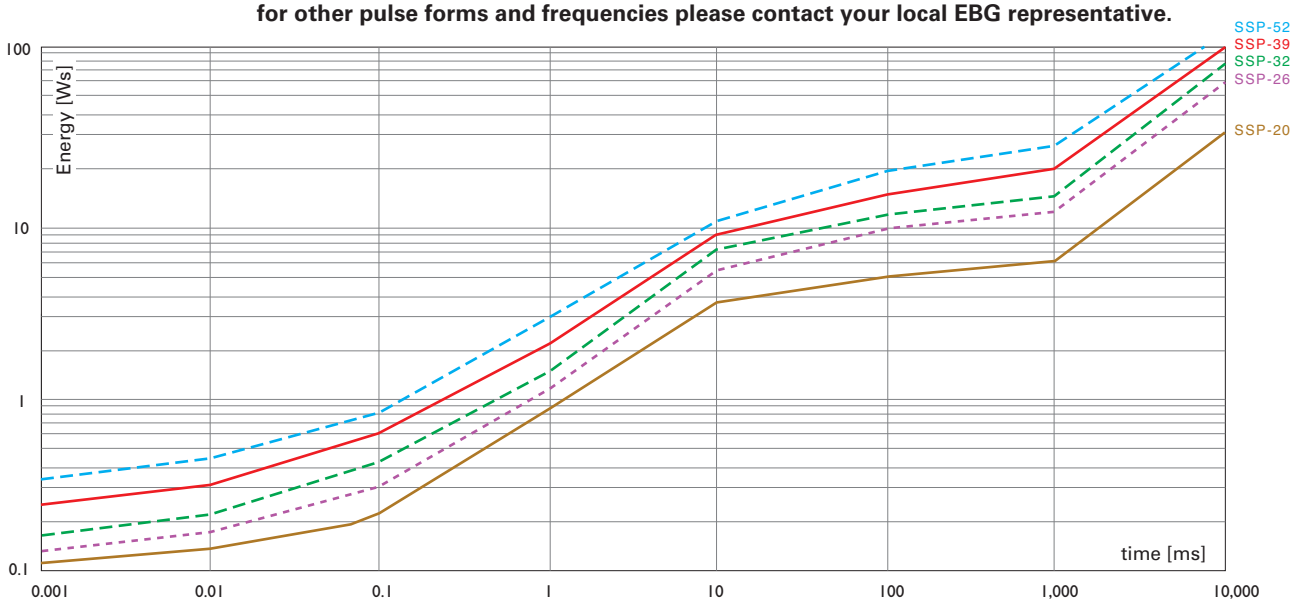
F*: enforced cooling
- Resistor in open air position, air flow >1.5 m/sec. at ≤25°C ambient temperature
- Resistor in case, air flow >2m/sec. at ≤25°C ambient temperature

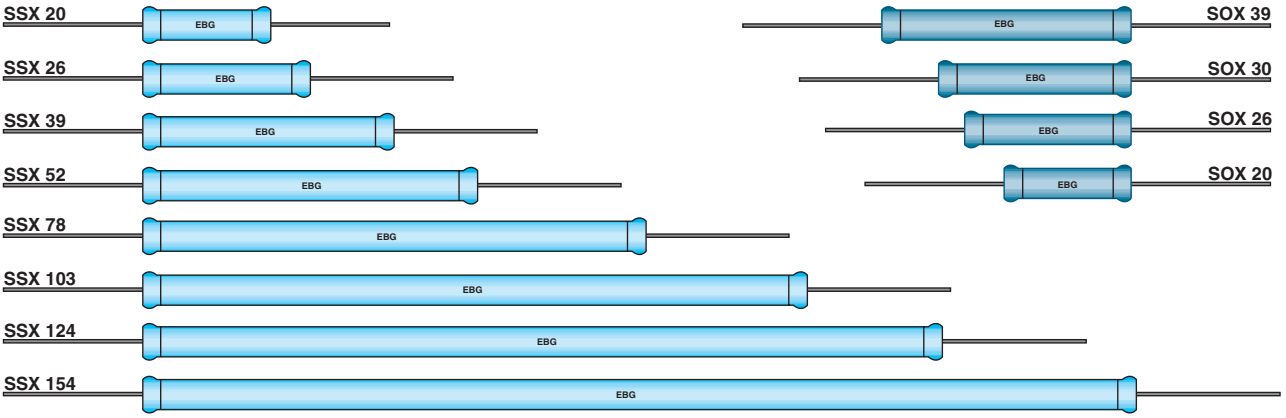
**Version L:
Resistance tolerances down to ±0.5% or ±0.1%, lower max. power (like SGP Series)

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!



Typical pulse load ratings: e-function pulse, time between two pulses: 1 sec., for other pulse forms and frequencies please contact your local EBG representative.





The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

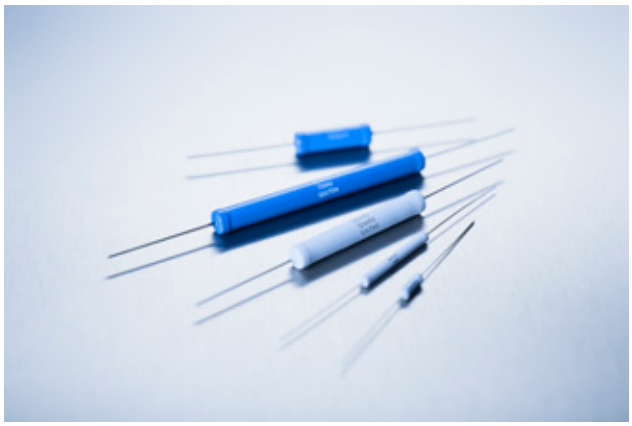
A Miba Group Company

Precision High-Voltage Resistors

Precision High-Voltage Resistor Series OSX/SSX/SOX

Power- and Precision High-Voltage Resistors, standard TC of 100 ppm/°C and wide ohmic range (100 Ω-10 GΩ)

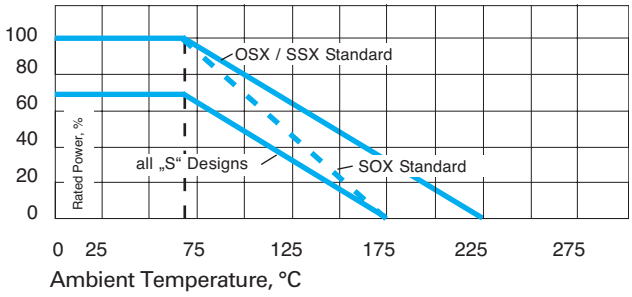
The low-cost OSX/SSX/SOX series meets a general set of requirements. These products are available with a silicone or epoxy coating and feature a wide range of tolerances and temperature coefficients of resistance.



General Characteristics

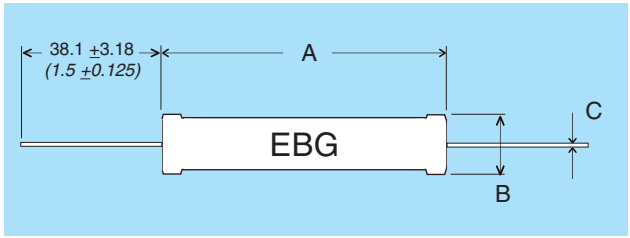
- Silicone coating for ambient temperatures up to 225°C
- Epoxy coating for excellent humidity protection available under the label SOX
- Resistance tolerances: from ±0.1% to ±10%
- Standard temperature coefficient: ±100 ppm/°C
- Power ratings: up to 19.4 W
- 16 models with voltage ratings: from 1,5 KV to 60 KV
- Load life stability: 0.20% per 1,000 hours at 70°C
- Resistance range: from 100 Ω to 10 GΩ
- Full encapsulation over the entire resistor length.

All SSX types are also available with **M4 or 6/32** screw end caps.



Specifications

- Resistance tolerance: ±1%, ±2%, ±5%, or ±10% (tolerance to ±0.1%, ±0.25%, ±0.5% upon special request *) (typically measured at room-temperature about +25°C, typical measuring voltage of 20 Volts)
- Temperature coefficient: standard: 100 ppm/°C referenced to 25°C, ΔR taken at +85°C, other TCR upon request.
- Load life: 1,000 hours at rated power at 70°C, ΔR 0.20% max.
- Thermal shock: MIL-Std-202, Method 107, Cond. A, ΔR 0.20% max.
- Moisture resistance: MIL-Std-202, Method 106, ΔR 0.40% max.
- Encapsulation: silicone or epoxy coating
- Lead material: OFHC copper, tin-plated
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!



Model no.	Watt-age at 70°C	Max. cont. oper. KV	Max. KV „S“ **	Resistance		Dimensions in millimeters Dimensions in inches		
				Min. Ω	Max. Ω	A ±0.50 ±0.02	B ±0.50 ±0.02	C ±0.50 ±0.002
OSX 10	0.80	1.5	1.9	100	1G	10.80 *0.425*	4.00 *0.157*	0.60 *0.024*
OSX 13	1.00	1.5	1.9	100	5G	13.40 *0.528*	4.00 *0.157*	0.60 *0.024*
OSX 20	1.50	3.0	3.7	100	10G	19.70 *0.776*	4.00 *0.157*	0.60 *0.024*
OSX 26	1.95	4.0	5.0	100	10G	26.00 *1.024*	4.00 *0.157*	0.60 *0.024*
OSX 30	2.30	6.0	7.5	100	10G	32.40 *1.276*	4.00 *0.157*	0.60 *0.024*
OSX 39	3.10	6.0	7.5	100	10G	39.40 *1.551*	4.00 *0.157*	0.60 *0.024*
SOX 20	1.20	5.0	6.2	300	10G	21.30 *0.839*	8.60 *0.339*	1.00 *0.040*
SOX 26	1.60	7.5	9.4	450	10G	27.50 *1.083*	8.60 *0.339*	1.00 *0.040*
SOX 39	2.50	11.0	13.8	500	10G	40.20 *1.583*	8.60 *0.339*	1.00 *0.040*
SOX 52	3.40	16.0	20.0	400	10G	52.50 *2.067*	8.60 *0.339*	1.00 *0.040*
SOX 78	5.00	24.0	30.0	600	10G	78.70 *3.098*	8.60 *0.339*	1.00 *0.040*
SOX 103	6.50	32.0	40.0	800	10G	104.10 *4.098*	8.60 *0.339*	1.00 *0.040*
SOX 124	8.20	40.0	50.0	1M	10G	124.20 *4.890*	8.60 *0.339*	1.00 *0.040*
SOX 154	10.60	48.0	60.0	1M	10G	154.50 *6.083*	8.60 *0.339*	1.00 *0.040*
SSX 20	2.30	5.0	6.2	600	10G	20.20 *0.795*	8.20 *0.323*	1.00 *0.040*
SSX 26	3.90	7.5	9.4	600	10G	27.20 *1.071*	8.20 *0.323*	1.00 *0.040*
SSX 32	4.20	8.5	11.0	550	10G	33.00 *1.299*	8.20 *0.323*	1.00 *0.040*
SSX 39	4.60	11.0	13.8	500	10G	39.50 *1.555*	8.20 *0.323*	1.00 *0.040*
SSX 52	7.80	16.0	20.0	400	10G	52.00 *2.047*	8.20 *0.323*	1.00 *0.040*
SSX 78	11.70	24.0	30.0	600	10G	77.60 *3.055*	8.20 *0.323*	1.00 *0.040*
SSX 103	12.50	32.0	40.0	800	10G	103.20 *4.063*	8.20 *0.323*	1.00 *0.040*
SSX 124	15.50	40.0	50.0	1M	10G	123.70 *4.870*	8.20 *0.323*	1.00 *0.040*
SSX 154	19.40	48.0	60.0	1M	10G	153.70 *6.051*	8.20 *0.323*	1.00 *0.040*

* In case you need very tight tolerances (±0.1% to ±0.5%), we suggest not to use the full power rating, but rather the next larger size to achieve ultimate stability.
For details, please contact your nearest EBG representative.

** Our resistors are designed for operation in air and non-aggressive atmospheres. For special applications (i.e., oil, casting, molding, SF_6, etc.) please contact your nearest EBG representative.

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

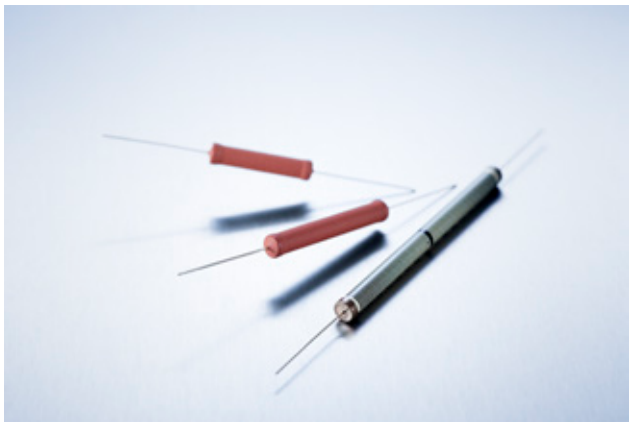
Precision High-Voltage Resistors

Series MTX 968

Precision High-Voltage Resistors with wide ohmic range (400 Ω–100 GΩ)

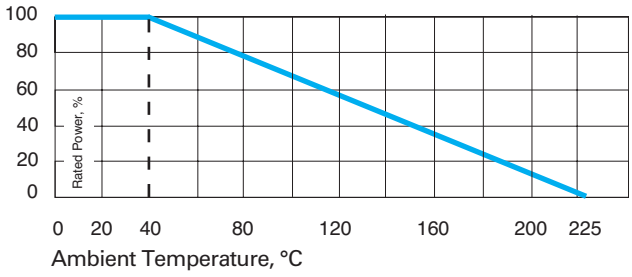
The MTX 968 resistor series is designed for use in voltage dividers, medical equipment, electrostatic devices, measuring equipment and current limiting devices where high stability, low TCR, high ohmic values and high short-term loads are required.

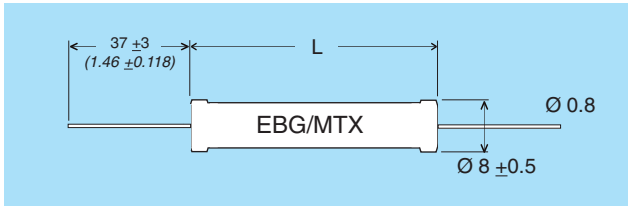
For use in oil- or potted applications, EBG recommends the use of polyimide coating instead of silicone conformal coating. Please ask for details!



Specifications

- Resistance tolerance: ±0.1% to ±10%
- Temperature coefficient: ±15 ppm/°C to ±200 ppm/°C. Specified TCR granted at +85°C related to room temp. +25°C! (others upon special request!)
- Load life: ΔR/R 0.5% max., 1,000 hours at rated power
- Dielectric strength: 1,000 V max. (25°C, 75% relative humidity)
- Thermal shock: ΔR/R 0.25% max.
- Moisture resistance: ΔR/R 0.25% max.
- Operating temperature: –55°C to +225°C
- Encapsulation: silicone conformal (A), polyimide coating (P) (suggested for oil- and potted applications) Please ask for details!
- Lead material: copper wire, gold-plated
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!





Type	P 40 °C Watt	U KVdc A in air	U KVdc P in air	U KVdc P in oil	Standard Resistance ranges (other on request) Tolerance 1 – 10% TC ppm / °C 200	Tolerance 0.5 – 10% TC ppm / °C 100	Tolerance 0.25 – 10% TC ppm / °C 50	Tolerance 0.1 – 10% TC ppm / °C 25, 15	L mm
968.2	3.8	9	5.4	2 to 5 times voltage (A), depending on quality of isolation oil	400 R – 10 G	400 R – 1 G	400 R – 1 G	60 K – 500 M	27 ± 1
968.3	5	12	7.2		500 R – 15 G	500 R – 1.5 G	500 R – 1.5 G	80 K – 750 M	37 ± 1
968.5	7.5	18	11		900 R – 20 G	900 R – 2 G	900 R – 2 G	120 K – 1 G	52 ± 1
968.7	10	24	14.4		1.2 K – 30 G	1.2 K – 3 G	1.2 K – 3 G	180 K – 1.5 G	78 ± 1.5
968.10	12.5	36	21.6		1.7 K – 30 G	1.7 K – 4 G	1.7 K – 3 G	240 K – 2 G	103 ± 1.5
968.12	15	42	25.2		2.6 K – 30 G	2.6 K – 5 G	2.6 K – 3 G	300 K – 2 G	128 ± 2
968.15	17	54	32.4		3.2 K – 100 G	3.2 K – 6 G	3.2 K – 3 G	350 K – 2 G	153 ± 2

Our resistors are designed for operation in air and non-aggressive atmospheres.
For special applications (i.e. oil, casting, molding, SF6, etc.), please contact our nearest EBG representative.

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

Precision High-Voltage / High-Power Resistors

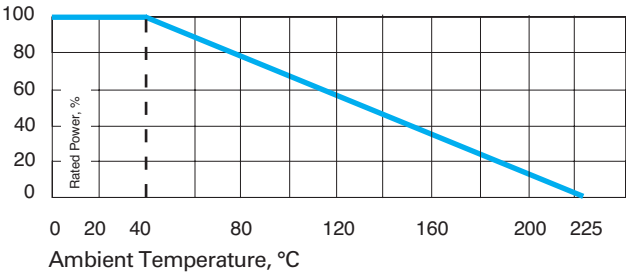
Series MTX 969

High-Power and High-Voltage Resistors up to 96 kV and 105 W

The MTX 969 resistor series is designed for use in voltage dividers, medical equipment, electrostatic devices, measuring equipment and current limiting devices where high stability, low TCR, high ohmic values and high short-term loads are required.

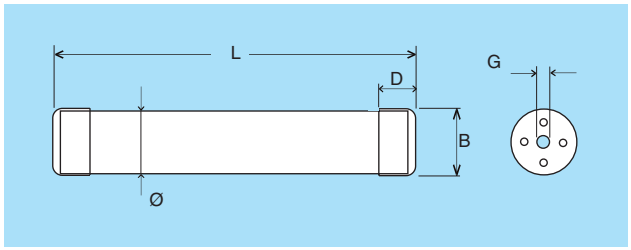
For use in oil- or potted applications, EBG recommends the polyimide coating instead of the silicone conformal coating. Please ask for details!





Specifications

- Resistance tolerance: ±0.1% to ±10%
- Temperature coefficient: ±10 ppm/°C to ±200 ppm/°C. Specified TCR granted at +85°C related to room temperature +25°C! (others upon special request!)
- Load life: ΔR/R 0.5% max., 1,000 hours at rated power
- Dielectric strength: 1,000 V max. (25°C, 75% relative humidity)
- Thermal shock: ΔR/R 0.25% max.
- Moisture resistance: ΔR/R 0.25% max.
- Operating temperature: –55°C to +225°C
- Encapsulation: silicone conformal, polyimide coating (suggested for oil and potted applications) Please ask for details!
- Lead material: caps, nickel-plated
- Max. torque: 2Nm for M4, 4Nm for M8
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!



Specifications

Dimensions (mm)

Type	L	B	Ø	D	G
969.11	81 ± 1	14.5 ± 0.2	13.5 ± 0.5	10 ± 0.2	M4
969.23	156 ± 2	14.5 ± 0.2	13.5 ± 0.5	10 ± 0.2	M4
969.54	160 ± 2	31.5 ± 0.2	30.5 ± 0.5	18 ± 0.2	M8
969.71	210 ± 2.5	31.5 ± 0.2	30.5 ± 0.5	18 ± 0.2	M8
969.105	308 ± 3.5	31.5 ± 0.2	30.5 ± 0.5	18 ± 0.2	M8

			Standard Resistance ranges (other on request)		
			Tolerance 2 – 10%	Tolerance 0.5 – 10%	Tolerance 0.1 – 10%
Type	P 40 °C Watt	U KVdc	TC ppm / °C 150, 200	TC ppm / °C 50, 100	TC ppm / °C 15, 25
969.11	11	24	500 R – 5 G	500 R – 1 G	50 K – 500 M
969.23	23	48	700 R – 10 G	700 R – 1 G	100 K – 1 G
969.54	54	48	2 R – 10 G	2 R – 1 G	100 K – 1 G
969.71	71	64	20 R – 15 G	20 R – 1.5 G	100 K – 1.5 G
969.105	105	96	80 R – 25 G	80 R – 2 G	100 K – 2 G

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

Precision High-Voltage Divider

Series MTX 2000

High-Power/High-Voltage Dividers up to 50 W

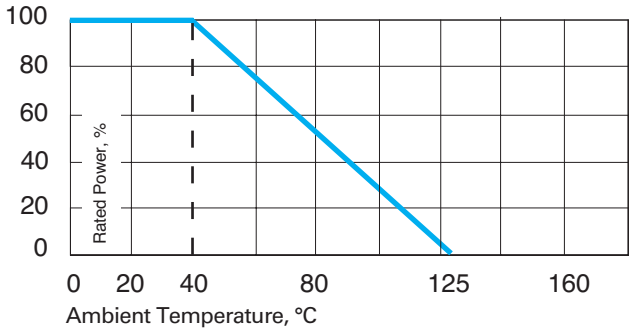
The MTX 2000 series consists of high-quality, high-precision, high-power, high-voltage dividers for use in sophisticated resistor networks. These custom designs support a wide range of resistance values, tight voltage ratios, close tolerances and low TCRs.

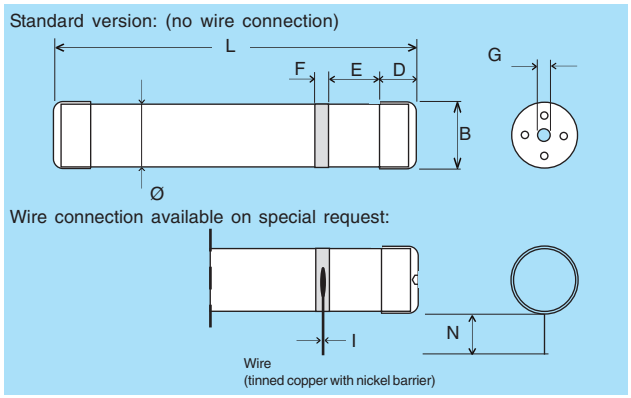
For use in oil or potted applications, EBG recommends polyimide coating instead of silicone conformal coating. Please ask for details!

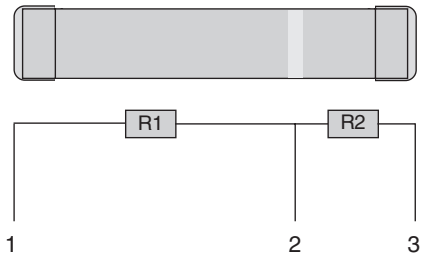


Specifications

- Resistance tolerance: ±0.1% to ±1%
- Ratio tolerance: 0.1% to 1%
- Temperature coefficient: ±25 ppm/°C to ±50 ppm/°C. Specified TCR granted at +85°C related to room temperature of +25°C! (others upon special request!)
- Ratio temperature coefficient: 10 ppm/°C to 15 ppm/°C
- Load life: ΔR/R 0.15% max., 1,000 hours at rated power
- Dielectric strength: >1,000 V (25°C, 75% relative humidity)
- Thermal shock: ΔR/R 0.2% max.
- Moisture resistance: ΔR/R 0.25% max.
- Operating temperature: –55°C to +125°C
- Encapsulation: silicone conformal, polyimide coating
- Lead material: caps, nickel-plated
- Max. torque: 2Nm for M4, 4Nm for M8
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!







$$\text{Ratio} = \frac{R1+R2}{R2}$$

Specifications

Dimensions (mm)

Type	L	B	Ø	D	E	F	G	I	N
2000.23	156 ± 2	14.5 ± 0.2	13.5 ± 0.5	10 ± 0.2	8.5 ± 0.2	5 ± 0.5	M4	1.0 ± 0.1	30.0 ± 1
2000.105	308 ± 2.5	31.8 ± 0.3	30.5 ± 0.5	18 ± 0.2	40 ± 2	7 ± 0.5	M8	1.0 ± 0.1	30.0 ± 1

	Pwatt 40°C	U kVDC				
			TK abs.	50 ppm / °C	25 ppm / °C	15 ppm / °C
			Tol. abs	1% – 0.25%	1% – 0.1%	1% – 0.1%
			TK Ratio	25 ppm / °C	15 ppm / °C	15 / 10 ppm / °C
			Tol. Ratio	0.5% – 0.25%	0.5% – 0.1%	0.5% – 0.1%
2000.23	10	40	R1 + R2 Ratio	2 M – 2 G 1 : 1000 – 1:20 000	20 M – 1 G 1 : 1000 – 1:20 000	20 M – 500 M 1 : 1000 – 1 : 10 000
2000.105	50	80	R1 + R2 Ratio	20 M – 3 G 1 : 1000 – 1:20 000	20 M – 2 G 1 : 1000 – 1:20 000	20 M – 1 G 1 : 1000 – 1 : 10 000

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

A Miba Group Company

High-Power Water-Cooled Resistor

Series MTX 969W

High-Power Water-Cooled Single Resistors and Voltage Dividers up to 1,700 W!

Our resistor series 969W is designed for use in high-power applications. Direct water cooling renders these resistors suitable for a very high continuous power load.

Easy M4 mounting, wide ohmic range, precise tolerance and temperature coefficient values as well as high dielectric strength capability are only some of the features of this resistor series. There is also an option for voltage dividers!

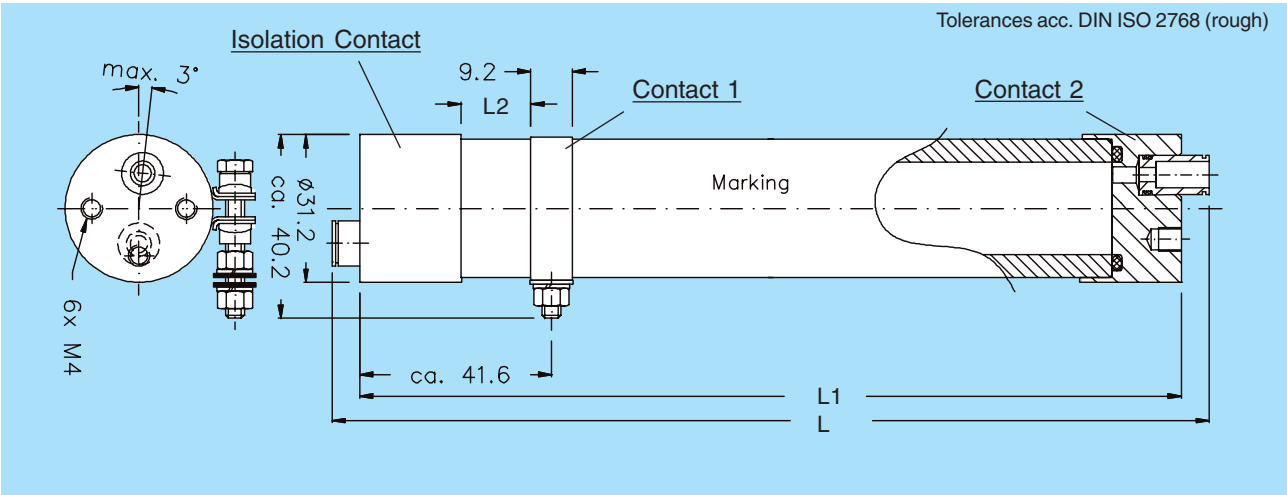


Specifications

- Standard resistance values: 0.5 Ω to 10 MΩ
- Resistance tolerance: ±5%, ±10% (standard)
- Temperature coefficient: ±100 ppm/°C (standard) ≤10 R: + 250 ppm/°C. Specified TCR granted at +85°C related to room temp. +25°C! (Others upon special request!)
- Inductivity: 80–100 nH typical
- Isolation voltage: 10 kV DC (between Contact 1 and Isolation Contact) - for 969-W and 969-W-L; 3 kV DC for 969 W-S
- Cooling medium: must be non-conductive (e.g., distilled water or distilled water-glycol mixture)
- Connecting type of cooling medium: 6 mm-tube (other connections upon request)
- Max. cooling medium pressure: 10 bar
- Contact material: CrNi (stainless)
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!

Type	P max	U max	L	L1	L2
969 W-S	500 W	5 kV DC	117	100	5
969 W	1000 W	7 kV DC	195	178	15
969 W-L	1700 W	10 kV DC	337	320	15

(max. Power at cooling medium temp. < 50°C, flow > 7 l / min.)
If (power-) resistors are used in an enforced cooling application, coolant flow may not be interrupted!



The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

A Miba Group Company

High-Voltage Resistors

High-Voltage Flat Style Resistor Series FSX, FEX, and FBX

TC of 80 ppm/°C combined with precision tolerances (±0.5% to ±10%) and wide ohmic range (200 Ω–2 GΩ)

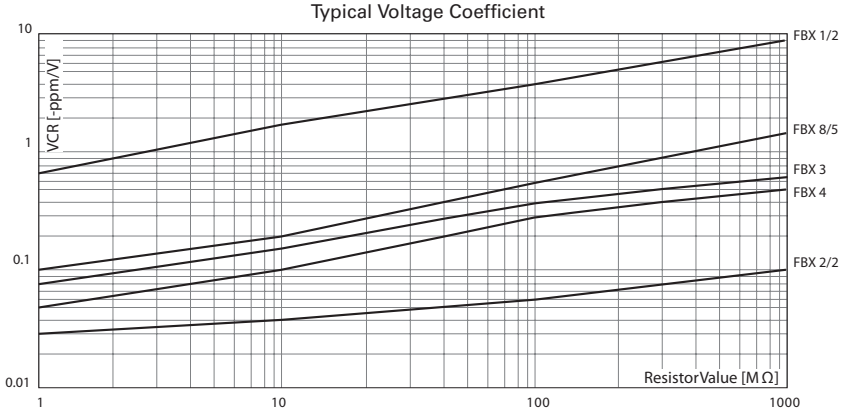
Low-cost, high-voltage resistors that provide high-density packaging in large volume applications.

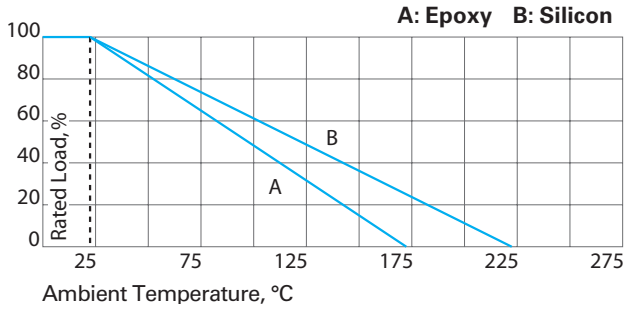
- Three different coatings available
  - Series FSX; silicone conformal for high-temperature operation (225°C)
  - Series FEX with epoxy coating for maximum moisture protection
  - Series FBX with surface silicone print as an inexpensive alternative
- High voltage withstanding up to 24,000 V
- Six different sizes
- Thickness max. 3 mm (0.118 inch) only for high-density packaging
- Non-Inductive Design

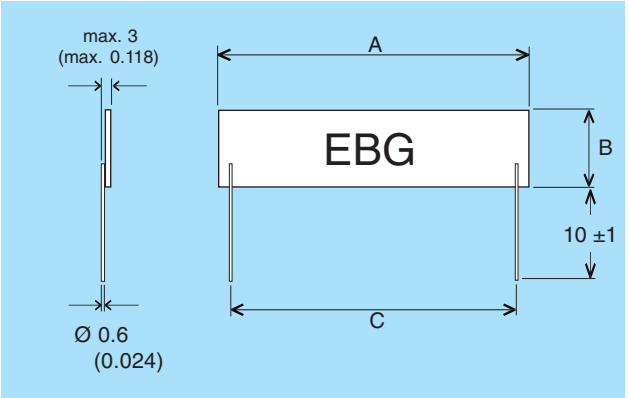
Specifications

- Resistance range: 200 Ω to 2 GΩ
- Resistance tolerance: ±0.5% to ±10%
- Temperature coefficient (up to 100 MΩ): ±80 ppm/°C from –5°C to +105°C referenced to +25°C R > 100 MΩ : 150 ppm/°C
- Max. operating voltage: "S"; upon request up to 35% higher than listed (please contact our local representative)
- Voltage coefficient (typically): see below
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!

Typical Voltage Coefficient







	Model no.	Wattage at 70°C	Max. continuous oper. KV	Dimensions in millimeters Dimensions in inches		
				A (max.) ±0.50 ±0.02	B (max.) ±0.50 ±0.02	C ±0.50 ±0.02
Series FBX with Surface Silicone Print	FBX1/2	0.50	3,000*	12.90 *0.51*	3.40 *0.13*	10.20 *0.40*
	FBX5/5	0.65	4,500*	17.15 *0.68*	3.40 *0.13*	15.24 *0.60*
	FBX8/5	1.60	6,000*	25.60 *1.01*	5.30 *0.21*	22.90 *0.90*
	FBX3	3.00	9,000*	38.30 *1.51*	6.60 *0.26*	35.50 *1.4*
	FBX4	4.00	11,500*	51.00 *2.01*	6.60 *0.26*	48.20 *1.9*
	FBX2/2	5.00	16,500*	51.00 *2.01*	12.90 *0.51*	48.20 *1.9*
Series FEX with Epoxy Protection	FEX1/4	0.25	4,000	13.80 *0.54*	5.00 *0.20*	10.20 *0.40*
	FEX5/5	0.35	7,000	19.05 *0.75*	5.08 *0.20*	15.24 *0.60*
	FEX4/5	0.80	9,000	26.10 *1.03*	6.70 *0.26*	22.90 *0.9*
	FEX3/2	1.50	13,000	38.90 *1.53*	7.90 *0.31*	35.50 *1.40*
	FEX2	2.00	17,000	51.50 *2.03*	8.10 *0.32*	48.20 *1.90*
	FEX2/2	3.00	24,000	51,50 *2.03*	14.40 *0.57*	48.20 *1.90*
Series FSX with Conformal Silicone Protection	FSX1/2	0.50	4,000	13.60 *0.54*	4.50 *0.18*	10.2 *0.40*
	FSX5/5	0.65	6,000	17.85 *0.70*	4.50 *0.18*	15.24 *0.60*
	FSX8/5	1.60	8,000	25.90 *1.02*	6.30 *0.25*	22.90 *0.90*
	FSX3	3.00	12,000	38.70 *1.52*	7.50 *0.30*	35.50 *1.40*
	FSX4	4.00	15,000	51.3 *2.02*	7.50 *0.30*	48.20 *1.90*
	FSX2/2	5.00	22,000	51.30 *2.02*	14.20 *0.56*	48.2 *1.90*

* when used in clean air

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

High-Voltage Resistors

High-Voltage Flat Style Resistors Series FPX and FLX

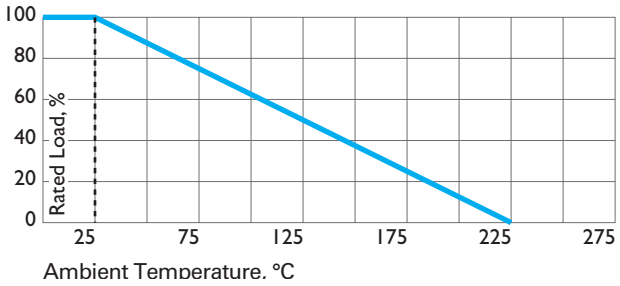
TC of 100 ppm/°C combined with precision tolerances (0.5%–10%) and wide ohmic range

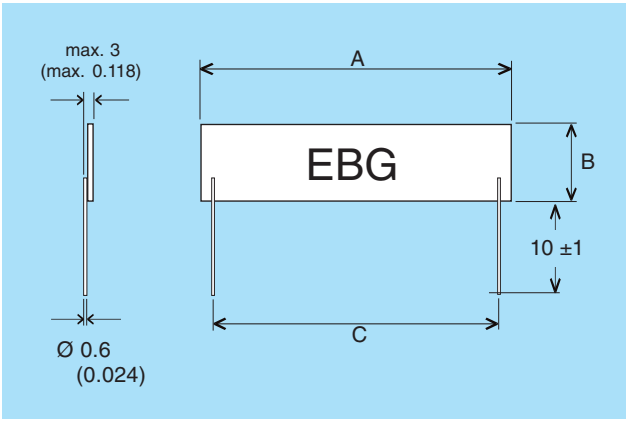
Low-cost power resistors that provide high-density packaging in large volume applications.

- Series FPX and FLX printed on surface with silicone conformal black coating for high-temperature operation (225°C)
- High voltage withstanding up to 16,500 V
- Five different sizes
- Thickness max. 3 mm (0.118 inch) for high-density packaging
- Non-Inductive Design

Specifications

- Resistance range: FPX: 200 Ω to 2 GΩ, FLX: 10Ω to 1 GW
- Resistance tolerance: FPX: ±1% to 10%, FLX: ±0.5% to 10%
- Temperature coefficient: ±100 ppm/°C , measured at +85°C, referenced to +25°C (other TCR or temperatures on request)
- Voltage coefficient (typically): Resistance range – ppm/V
  200 R – 1 M: 0.1–1.0, 1 M – 100 M: 0.2–3.0, 100 M – 2,000 M: 0.5–10.0
- Max. operating voltage: "S"; upon request up to 35% higher than listed
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!





	Model no.	Wattage	Max. continuous oper. Volt	Dimensions in millimeters Dimensions in inches		
				A (max.) ±0.50 ±0.02	B (max.) ±0.50 ±0.02	C ±0.50 ±0.02
Series FPX with Surface Silicone Print	FPX1/2	1.50	3,000*	12.90 *0.51*	3.40 *0.13*	10.20 *0.40*
	FPX8/5	2.50	6,000*	25.60 *1.01*	5.30 *0.21*	22.90 *0.90*
	FPX3	4.00	9,000*	38.30 *1.51*	6.60 *0.26*	35.50 *1.40*
	FPX4	5.00	11,500*	51.00 *2.01*	6.60 *0.26*	48.20 *1.90*
	FPX2/2	7.50	16,500*	51.00 *2.01*	12.90 *0.51*	48.20 *1.90*
Series FLX with Conformal Silicone Protection	FLX1/2	1.50	300	12.90 *0.51*	3.40 *0.13*	10.20 *0.40*
	FLX8/5	2.50	500	25.60 *1.01*	5.30 *0.21*	22.90 *0.90*
	FLX3	4.00	800	38.30 *1.51*	6.60 *0.26*	35.50 *1.40*
	FLX4	5.00	1,000	51.00 *2.01*	6.60 *0.26*	48.20 *1.90*
	FLX2/2	7.50	1,000	51.00 *2.01*	12.90 *0.51*	48.20 *1.90*

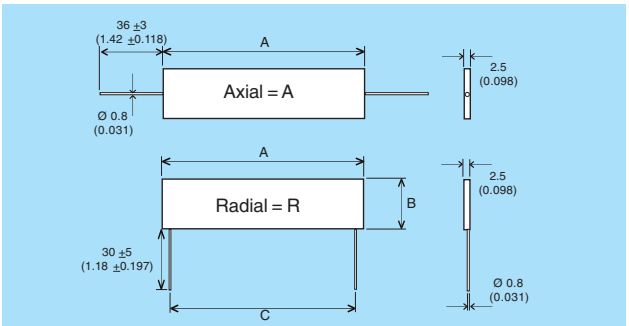
* when used in clean air

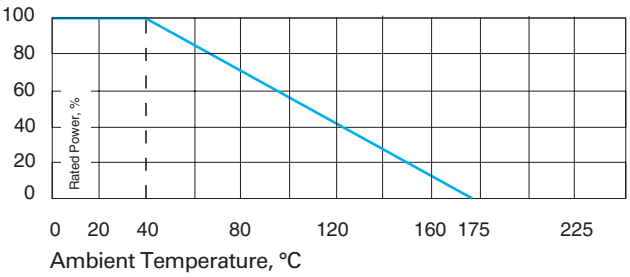
High-Voltage Flat Style Resistors Series MTX 967

Type	P_{Watt}	U_{kvDC}	A	B	C
967.3.25 967.3.38	1 1.5	8 10	25.4 38	3.8 3.8	22.9 35.7
967.5.13* 967.5.51	1 2	5 20	12.7 50.8	5 5	10.2 48.3
967.10.25 967.10.51	2 3	10 30	25.4 50.8	10 10	22.9 48.3
967.15.38 967.15.51	3 4.5	15 30	38 50.8	15 15	35.7 48.3
967.15.76 967.25.99	5.5 10	35 35	76.2 101.6	15 24	73.4 98.6

* Pins: L = 9 + 1mm ⏥ = 0.6 x 0.35mm

Operating temperature:	–55 to +175°C
Resistance range:	10 Ω to 30 GΩ (depending on type)
Temperature coefficient:	±10 to ±200 ppm/°C measured at +85°C, referenced to +25°C (other TCR or temperatures on request)
Tolerance:	±10% to ±0.1%
Insulation resistance:	>10,000 MΩ (500 V, 25°C, 75% relative humidity)
Dielectric strength:	>1000 V (25°C, 75% relative humidity)
Thermal shock:	ΔR/R 0.2% max
Overload:	ΔR/R 0.25% max 1.5 x Pnom, 5 sec (do not exceed 1.5 x V max.)
Moisture resistance:	ΔR/R 0.25% max.
Load life:	ΔR/R 0.25% max.
Encapsulation:	silicone conformal (other coatings with different dielectric strengths upon request!)
Lead material:	tinned copper





The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

Precision High-Voltage Divider

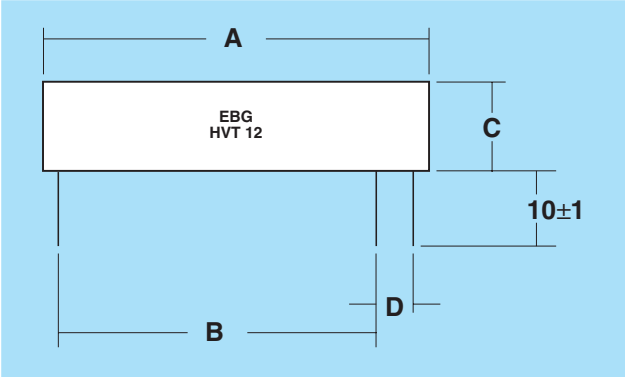
Series HVT

The new HVT series of high-voltage dividers is available in six different sizes from 5 KV to 20 KV voltage rating. In these highly reliable components, EBG combines its state-of-the-art high-voltage technology with the unique METOXFILM stability. The HVT components provide tight ratio tolerance, TCR tracking, and custom-designed values.

- Voltage ratings from 5 KV to 20 KV
- Ratio TCR 25 ppm/°C (10 ppm/°C upon request)
- Typical voltage coefficient 0.4 ppm/V
- Voltage division: 1,000:1 or 100:1 (others upon request)

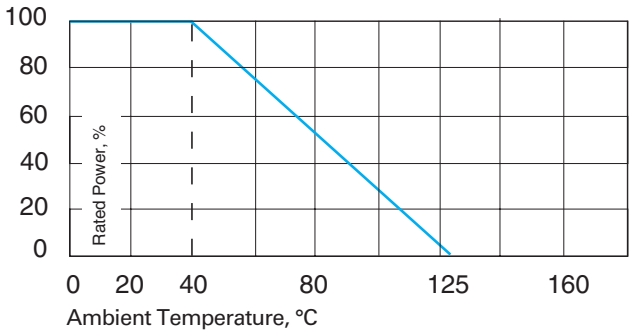
Specifications

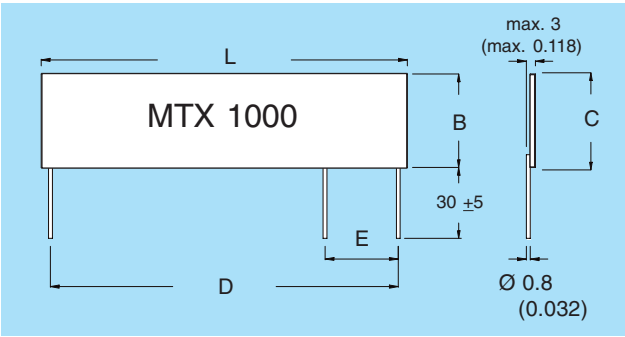
- Absolute tolerance: ±1.0% for all resistors
- Overvoltage: 1.5 times rated voltage for 5 seconds ΔR ratio 0.5% max.
- Abs. TCR: ± 100 ppm/°C TCR measured between +25°C and +85°C, referenced to +25°C
- Load life: ratio ΔR with rated voltage applied for 1,000 hours 0.4% max.
- Moisture resistance: Mil-Std-202, Method 106, ratio ΔR 0.5% max.
- Thermal shock: Mil-Std-202, Method 107, Cond. C, ratio ΔR 0.25% max.
- Encapsulation: silicone conformal with dielectric withstanding voltage of 1,000 V on HVT 11, 16, 21. HVT 5, 7, and 12 have a printed silicone coating
- Other resistance values upon request.
  Please do not hesitate to contact our local representative.
- Lead material: OFHC copper, tin-plated, 0.60 mm
- Operating temperature: –55°C to 155°C

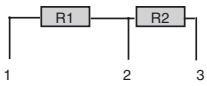


Type	Voltage	Resist. (MΩ)	Pmax	Dim. in mm ±0.4 (inches ±0.016)			
				A	B	C	D
HVT 5	5 KV	100	0.3	25.40 *1.00*	18.00 *0.709*	7.62 *0.300*	5.08 *0.200*
HVT 7	7 KV	100	0.5	25.40 *1.00*	18.00 *0.709*	12.70 *0.500*	5.08 *0.200*
HVT 11	10 KV	100	1.0	38.10 *1.500*	28.00 *1.102*	26.40 *1.039*	5.08 *0.200*
HVT 12	12 KV	200	1.0	52.00 *2.047*	33.00 *1.299*	12.70 *0.500*	15.24 *0.600*
HVT 16	15 KV	200	1.5	52.00 *2.047*	42.00 *1.654*	18.00 *0.709*	5.08 *0.200*
HVT 21	20 KV	200	2.0	52.00 *2.047*	42.00 *1.654*	25.40 *1.00*	5.08 *0.200*

Series MTX 1000







$$\text{Ratio} = \frac{R1+R2}{R2}$$

Specifications

Operating temperature:	–55 to +125°C	
Abs. temperature coefficient:	50 to 15 ppm/°C	depending on ohmic value
Ratio temperature coefficient:	15 to 5 ppm/°C	depending on ohmic value
Absolute tolerance:	±1% to ±0.1%	depending on ohmic value
Ratio tolerance:	1% to 0.1%	depending on ohmic value
Insulation resistance:	>10,000 MΩ (500 V, 25°C, 75% relative humidity)	
Dielectric strength:	1000 V (25°C, 75% relative humidity)	
Thermal shock:	ΔR/R 0.2% max	
Overload:	ΔR/R 0.25% max 1.5 x Pnom, 5 sec (do not exceed 1.5 x Vmax)	
Moisture resistance:	ΔR/R 0.25% max	
Load life:	ΔR/R 0.15% max., 1,000 hours at rated power	
Encapsulation:	silicone conformal (U), glass coating (G), or polyimide coating	
Lead material:	tinned copper	

Dimensions (mm)

Type	P_{Watt}	U_{kvDC}	L	B	C	D	E
1000.2	0.5	8*	26	8	9.1	22.9	5.08
1000.3	1.2	15*	38.5	13	14.2	35.6	7.62
1000.4	1.8	24*	51.5	15.5	16.6	48.3	10.16
1000.5	2.4	32*	77.5	15.5	16.6	73.4	10.16

* for glass coating and polyimide coating, when used in open air, please use max. voltage x 0.6 (standard ratings valid when parts used in clean air)

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

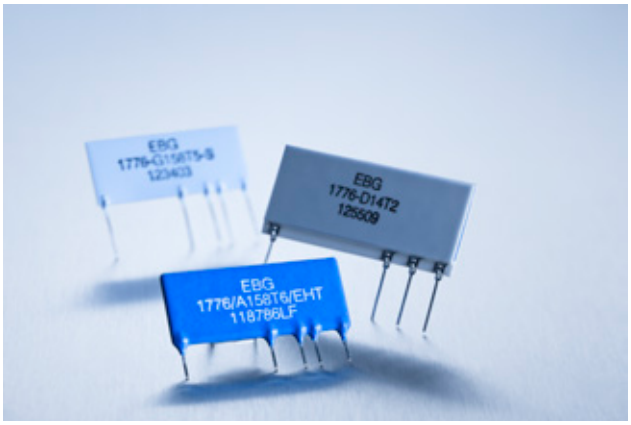
A Miba Group Company

Precision Decade Voltage Dividers

Series 1776-X

Input Voltage Dividers for multimeters and other instruments

Series 1776 – ceramic-protected X Precision Decade Voltage Divider; family of input voltage dividers for multimeters and other instruments. EBG offers a family of voltage dividers for a variety of applications, including digital multimeters, multi-range instrumentation and other range-switching devices. This line of products uses the special EBG METOXFILM.



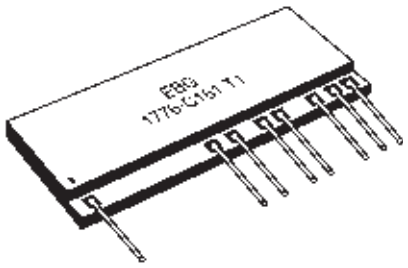
General Characteristics

- Compact precision resistor networks
- Easy-to-install package
- Absolute tolerances to ±0.1, ±0.25 and ±0.5%
- Relative tolerances to 0.05, 0.10 and 0.25%
- Ratio temperature coefficients from 10 to 50 ppm/°C
- High stability under load <0.02%
- Excellent shelf life: <0.02%

Many special combinations of ratios, absolute tolerances, relative tolerances and absolute temperature coefficients of resistance are available. For special requirements, please ask your EBG representative or directly at EBG.

Specifications

- Ratio tolerance: 0.05% to 0.25%
- Absolute tolerance: ±0.1% to ±0.5%
- Ratio temperature coefficient: 10 ppm/°C to 50 ppm/°C
- Absolute temperature coefficient: ±25 ppm/°C to ±50 ppm/°C
- Voltage coefficient: <0.05 ppm/V
- Storage temperature: –55°C to +165°C
- Load life (ratio stability): <0.04%
- Shelf life (ratio stability): <0.02% (six months)
- Number of decades: 3 to 6
- Values of single resistors: 900 Ω to 10 MΩ



Model no.	Resistance values					Figure	Voltage rating	Absolute tol. %	Ratio tol. %	Absol. TCppm/°C	Ratio TC ppm/°C	Vol. coef. ppm/V	Ratio stability % change in ratio			
	R1 Ω	R2 Ω	R3 Ω	R4 Ω	R5 Ω								Load life	Shelf life	Over-Voltage	
B169 T3-X	9M	900K	90K	9K	900	1	1200	0.1	0.1	30	10	0.1	0.02	0.01	0.01	C
B168 T3-X	9M	900K	90K	9K	1K	1	1200	0.1	0.1	30	10	0.1	0.02	0.01	0.01	C
E167 T1-X	9M	900K	90K	9K	900	2	1200	0.25	0.25	50	50	0.5	0.04	0.02	0.04	C
B167 T1-X	9M	900K	90K	9K	900	2	1200	0.1	0.1	50	50	0.5	0.04	0.02	0.04	C
E166 T1-X	9M	900K	90K	9K	1K	2	1200	0.25	0.25	50	50	0.5	0.04	0.02	0.04	C
B166 T1-X	9M	900K	90K	9K	1K	2	1200	0.1	0.1	50	50	0.5	0.04	0.02	0.04	C
E16 T1-X	9M	900K	90K	9K	900	3	1200	0.25	0.25	50	50	0.3	0.04	0.02	0.04	C
B16 T1-X	9M	900K	90K	9K	900	3	1200	0.1	0.1	50	50	0.2	0.02	0.01	0.02	C
A16 T1-X	9M	900K	90K	9K	900	3	1200	0.1	0.05	50	50	0.2	0.02	0.01	0.02	C
E161 T1-X	9M	900K	90K	9K	1K	3	1200	0.25	0.25	50	50	0.3	0.04	0.02	0.04	C
D161 T1-X	9M	900K	90K	9K	1K	3	1200	0.25	0.1	50	50	0.2	0.02	0.01	0.02	C
C161 T1-X	9M	900K	90K	9K	1K	3	1200	0.25	0.05	50	50	0.2	0.02	0.01	0.02	C
F37 T3-X	9M	900K	90K	10K	N/A	4	1200	+0-0.5	0.1	30	10	0.02	0.02	0.01	0.01	
F379 T3-X	9M	900K	90K	10K	N/A	5	1200	+0-0.5	0.1	30	10	0.02	0.02	0.01	0.01	
C15 T3-X	9M	900K	90K	10K	N/A	6	1200	0.25	0.05	30	10	0.02	0.02	0.01	0.01	
D15 T3-X	9M	900K	90K	10K	N/A	6	1200	0.25	0.1	30	10	0.02	0.02	0.01	0.01	
D14 T2-X	9.9M	90K	10K	N/A	N/A	7	1200	0.25	0.1	30	25	0.2	0.02	0.01	0.02	C
D14 T3-X	9.9M	90K	10K	N/A	N/A	7	1200	0.25	0.1	30	10	0.02	0.02	0.01	0.01	C
E39 T3-X	10M	1.111M	101.01K	10.01K	1.0001K	8	1200	0.25	0.25	30	10	0.1	0.02	0.01	0.01	C
B39 T3-X	10M	1.111M	101.01K	10.01K	1.0001K	8	1200	0.1	0.1	30	10	0.1	0.02	0.01	0.01	C
G39 T1-X	10M	1.111M	101.01K	10.01K	1.0001K	8	1200	0.5	0.5	50	50	0.5	0.04	0.02	0.04	C
E39 T1-X	10M	1.111M	101.01K	10.01K	1.0001K	8	1200	0.25	0.25	50	50	0.5	0.04	0.02	0.04	C
E159 T5-X	900K	90K	9K	900	N/A	9	750	0.25	0.25	25	25	0.4	0.02	0.01	0.02	C
B159 T6-X	900K	90K	9K	900	N/A	9	750	0.1	0.1	25	15	0.3	0.02	0.01	0.02	C
A159 T6-X	900K	90K	9K	900	N/A	9	750	0.1	0.05	25	15	0.3	0.02	0.01	0.02	C
G158 T5-X	900K	90K	9K	1K	N/A	9	750	0.25	0.25	25	25	0.4	0.02	0.01	0.02	C
B158 T6-X	900K	90K	9K	1K	N/A	9	750	0.1	0.1	25	15	0.3	0.02	0.01	0.02	C
A158 T6-X	900K	90K	9K	1K	N/A	9	750	0.1	0.05	25	15	0.3	0.02	0.01	0.02	C

for **„X"** in model no., please select (surface finish): **B** - printed silicone, **E** - epoxy encapsulation, **C** - ceramic cover plate (if available), **S** - silicone conformal

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

A Miba Group Company

Thick Film Precision Resistors Networks

Custom-designed elements available

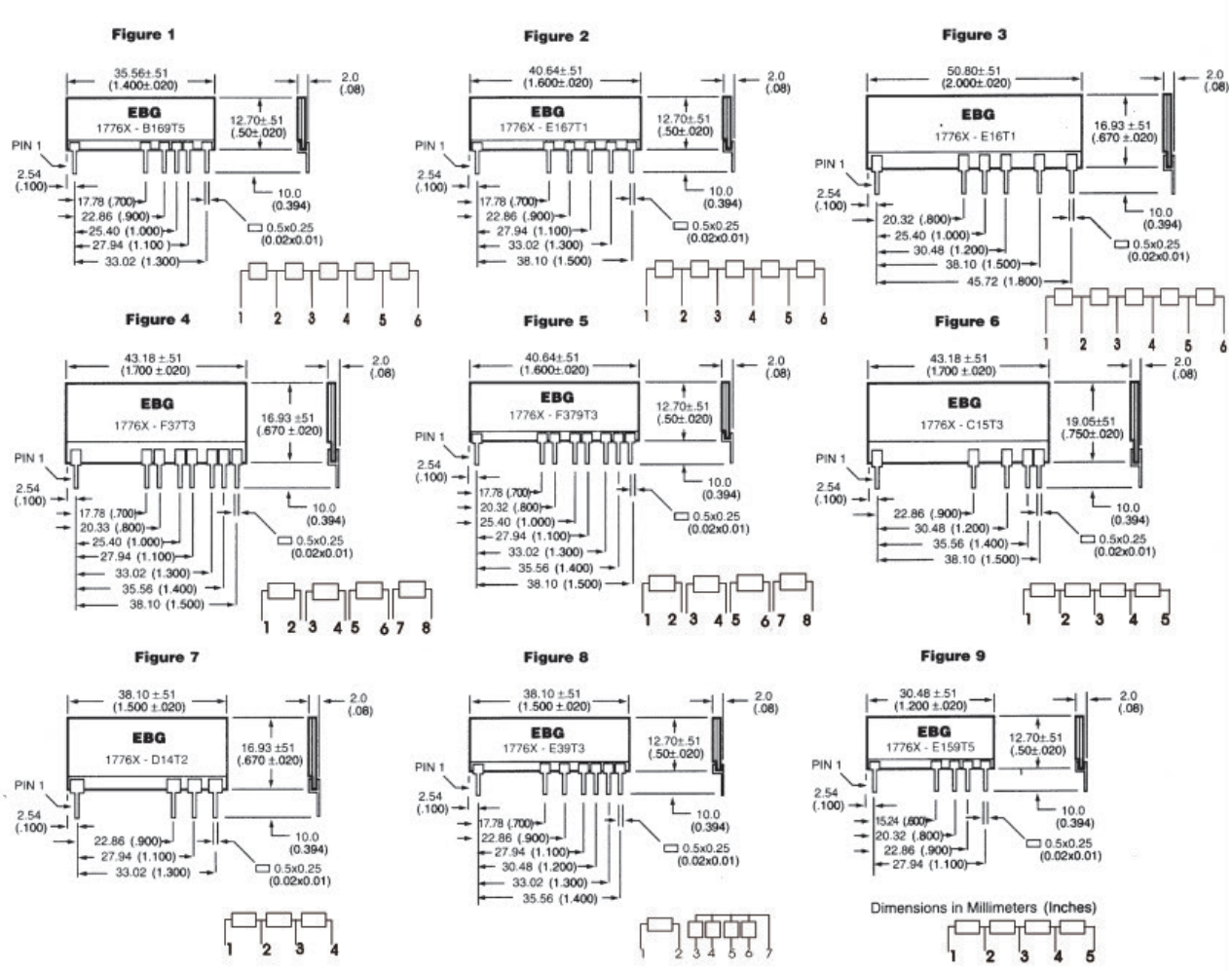
The various types of multiple METOXFILM circuits feature the same excellent performance characteristic of other EBG metal oxide devices. Careful attention is devoted to the individual customer's design so as to comply not only with the requirements of resistance value, tolerance and TCR, but also power handling and stability during life, even under adverse conditions.

Most of EBG's multiple component designs are computer-generated and thus avoid any possibility of "hot spot" long-term deterioration. In addition, trimming is accomplished in digital step fashion by computer-controlled lasers.

EBG owns several US- and European-manufactured lasers, which enable us to meet a wide range of requirements.

While EBG has developed a standard product line of voltage divider models as shown here, we are also well-suited to develop an exact custom-designed circuit for you, employing high precision, high stability, low TCR and wide resistance range coverage without neglecting your important requirements.

We encourage you to consult our Applications Engineering Department about your special requirements.



The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

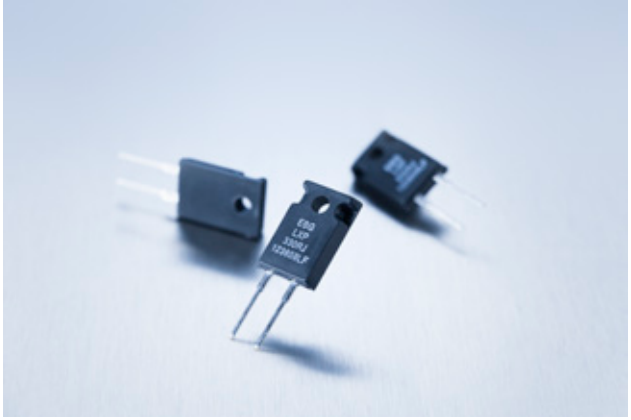
A Miba Group Company

Power Resistors

Series LXP 18 TO-220

18 W Thick Film Power Resistors for high-frequency and pulse-loading applications

EBG offers the completely encapsulated and insulated TO-220 package for low ohmic value and Non-Inductive Design for high-frequency and pulse-loading applications. Ideal use for power supplies. This series is rated at 18 W mounted to a heat sink.

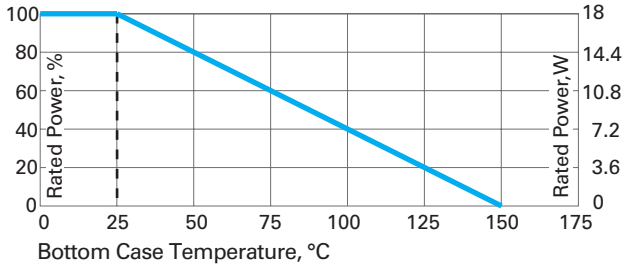


General Characteristics

- 18 W power rating at 25°C case temperature
- TO-220 package configuration
- Single-screw mounting simplifies attachment to the heat sink.
- A fully molded housing for environmental protection.
- Non-Inductive Design
- Resistor package completely insulated from heat sink.
- Housing material acc. to UL94-V0

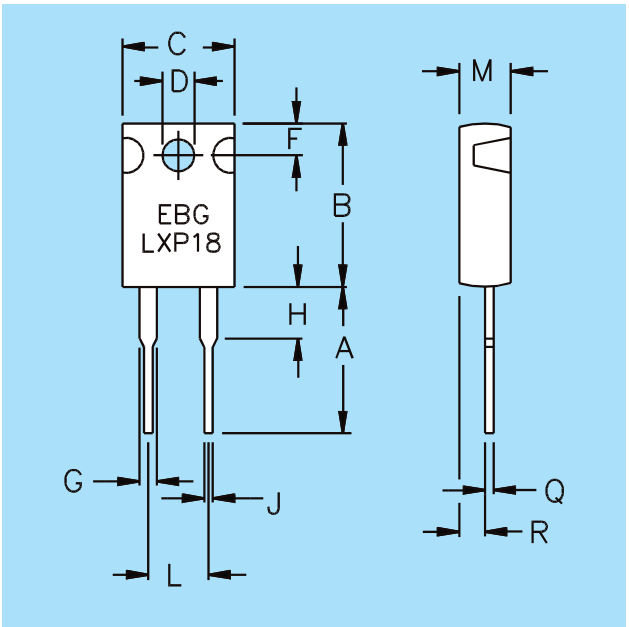
Specifications

- Resistance range: 0.05 Ω to 1 MΩ, other values upon request
- Resistance tolerance: ±1%, ±2%, ±5%, ±10% (0.5% upon request)
- Temperature coefficient: 10 Ω and above, ±50 ppm/°C, referenced to 25°C, ΔR taken at +105°C. Between 1 Ω and 10 Ω, ± (100 ppm+0.002 Ω)/°C, referenced to 25°C, ΔR taken at +105°C
- Max. operating voltage: 350 V
- Dielectric strength: 1,800 V AC
- Power rating: 18 W at 25°C. Depends upon case temperature. See derating curve.
- Insulation resistance: 10 GΩ min.
- Momentary overload: 2 times rated power with applied voltage not to exceed 1.5 times maximum continuous operating voltage for 5 seconds, ΔR ± (0.3% + 0.001 Ω) max.
- Load life: MIL-R-39009, 2,000 hours at rated power, ΔR ±(1.0% + 0.001 Ω).
- Moisture resistance: MIL-Std-202, Method 106, ΔR ±(0.5% + 0.001 Ω) max.
- Thermal shock: MIL-Std-202, Method 107, Cond. F, ΔR ±(0.3%+ 0.001 Ω) max.
- Terminal strength: MIL-Std-202, Method 211, Cond. A (Pull Test) 2.4 N., ΔR ±(0.2% +0.001 Ω) max.
- Vibration, high frequency: MIL-Std-202, Method 204, Cond. D, ΔR ±(0.2% + 0.001 Ω) max.
- Lead material: tinned copper
- Mounting - max. torque: 0.9 Nm using a screw and a compression washer mounting technique
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!



Derating (thermal resistance): 0.144 W/°K (6.94 K/W). Without a heat sink, when in open air at 25°C, the LXP18 is rated for 2.25 W. Derating for temperature above 25°C is 0.018 W/°K.

Case temperature must be used for definition of the applied power limit. Case temperature measurement must be made with a thermocouple contacting the center of the component mounted on the designed heat sink. Thermal grease should be applied properly.



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	11.43	13.97	0.450	0.550
B	16.00	16.52	0.630	0.650
C	10.15	10.67	0.400	0.420
D	3.08	3.28	0.121	0.129
F	2.92	3.44	0.115	0.135
G	1.14	1.40	0.045	0.055
H	2.54	4.06	0.100	0.160
J	0.66	0.86	0.026	0.034
L	4.82	5.34	0.190	0.210
M	2.92	3.44	0.115	0.135
Q	0.40	0.60	0.016	0.024
R	1.52	2.04	0.060	0.080

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

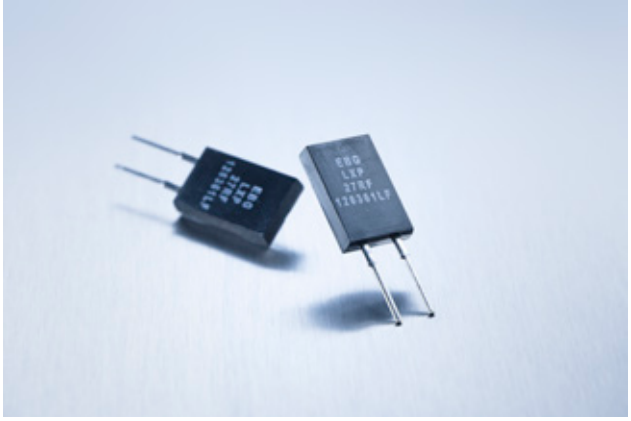
A Miba Group Company

Power Resistors

Series LXP 20 TO-220

20 W Film Power Resistors for high-frequency and pulse-loading applications

EBG offers the completely encapsulated and insulated TO-220 package for low ohmic value and Non-Inductive Design for high-frequency and pulse-loading applications. Ideal use for power supplies. This series is rated at 20 W mounted to a heat sink.

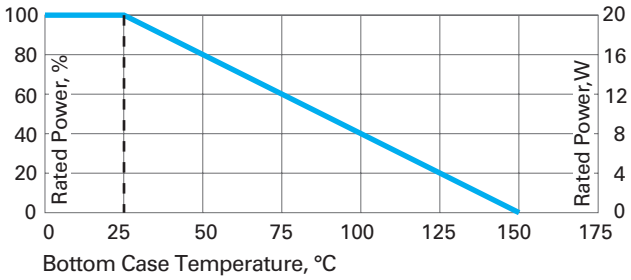


General Characteristics

- 20 W power rating at 25°C case temperature
- High pulse tolerant design
- TO-220 package configuration
- Snap-on style TO-220 heat sink required
- A fully molded housing for environmental protection.
- Non-Inductive Design
- Resistor package completely insulated from heat sink.
- Housing material acc. to UL94-V0

Specifications

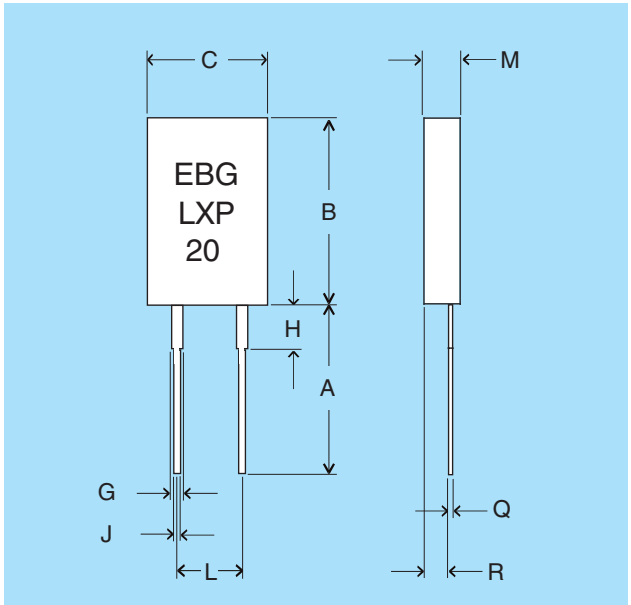
- Resistance range: 0.05 Ω to 1 MΩ other values upon request
- Resistance tolerance: ±1%, ±2%, ±5%, ±10% (0.5% upon request)
- Temperature coefficient: 10 Ω and above, ±50 ppm/°C, referenced to 25°C, ΔR taken at +105°C. Between 1 Ω and 10 Ω, ±(100 ppm + 0.002 Ω)/°C, referenced to 25°C, ΔR taken at +105°C
- Max. operating voltage: 350 V
- Dielectric strength: 1,800 V AC
- Power rating: 20 W at 25°C. Depends on case temperature. See derating curve.
- Insulation resistance: 10 GΩ min.
- Momentary overload: 2 times rated power with applied voltage not to exceed 1.5 times maximum continuous operating voltage for 5 seconds, ΔR ± (0.3% + 0.001 Ω) max.
- Load life: MIL-R-39009, 2,000 hours at rated power, ΔR ±(1.0% + 0.001 Ω).
- Moisture resistance: MIL-Std-202, Method 106, ΔR ±(0.5% + 0.001 Ω) max.
- Thermal shock: MIL-Std-202, Method 107, Cond. F, ΔR ±(0.3% + 0.001 Ω) max.
- Terminal strength: MIL-Std-202, Method 211, Cond. A (Pull Test) 2.4 N, ΔR±(0.2%+ 0.001 Ω) max.
- Vibration, high frequency: MIL-Std-202, Method 204, Cond. D, ΔR ±(0.2% + 0.001 Ω) max.
- Lead material: tinned copper
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!



Derating (thermal resistance): 0.16 W/°K (6.25°K/W). Without a heat sink, when in open air at 25°C, the LXP20 is rated for 3 W. By using the element with a snap-on heat sink, the resistor is rated for 5 W. Derating for temperature above 25°C is 0.018 W/°K.

Case temperature must be used for definition of the applied power limit. Case temperature measurement must be made with a thermocouple contacting the center of the component mounted on the designed heat sink. Thermal grease should be applied properly.

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	11.43	13.97	0.450	0.550
B	16.00	16.52	0.630	0.650
C	10.15	10.67	0.400	0.420
G	1.14	1.40	0.045	0.055
H	2.54	4.06	0.100	0.160
J	0.66	0.86	0.026	0.034
L	4.82	5.34	0.190	0.210
M	2.92	3.44	0.115	0.135
Q	0.40	0.60	0.016	0.024
R	1.52	2.04	0.060	0.080



The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

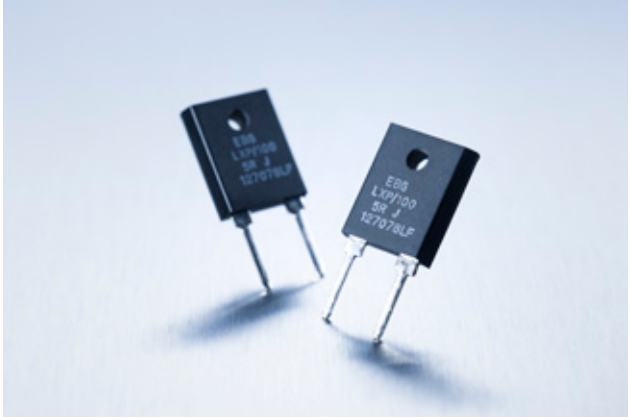
A Miba Group Company

Power Resistors

Series LXP 100 TO-247

100 W Thick Film Power Resistor for high-frequency and pulse-loading applications, version B for enforced mechanical stability

EBG offers the completely encapsulated and insulated TO-247 package for low ohmic value and Non-Inductive Design for high-frequency and pulse-loading applications. Ideal use for power supplies. This series is rated at 100 W mounted to a heat sink.

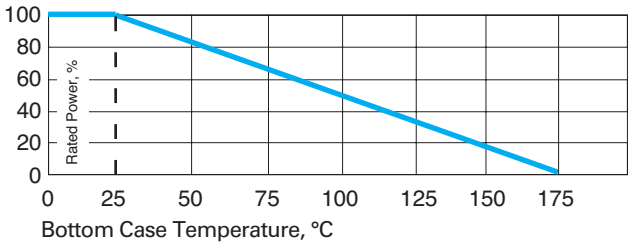


General Characteristics

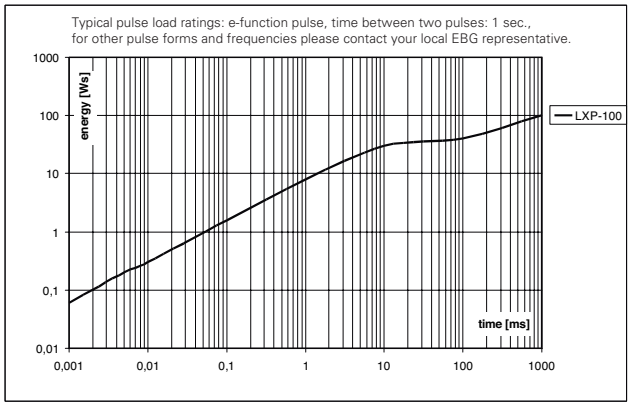
- 100 W power rating at 25°C case temperature
- TO-247 package configuration
- Single-screw mounting simplifies attachment to the heat sink
- Fully molded housing for environmental protection.
- Non-Inductive Design
- Resistor package completely insulated from heat sink.
- Tube packing available! (packing unit: 35 pcs./tube)
- For perfect heat dissipation, the use of mounting clamps is suggested. Please ask for details!
- Housing material acc. to UL94-V0

Specifications

- Resistance range: 0.05 Ω to 1 MΩ other values upon request
- Resistance tolerance: ±1% ±2% ±5% ±10%
- Temperature coefficient: >10 Ω: ±50 ppm/°C, referenced to 25°C, ΔR taken at +105°C, others upon request
- Max. operating voltage: 350 V max. 500 V upon request
- Dielectric strength: 1,800 V AC
- Insulation resistance: 10 GΩ min.
- Power rating: 100 W at 25°C case temperature derated to 0 W at 175°C
- Short time overload: 1.5x rated power with applied voltage not to exceed 1.5x V max. for 5 seconds. ΔR < ± (0.50% + 0.0005 Ω)
- Dielectric strength: Mil-Std-202 method 301 (1,800 V AC, 60 s) ΔR < ± (0.15% + 0.0005 Ω)
- Load life: MIL-R-39009D 4.8.13, 2,000 hours at rated power ΔR < ±(1.0% + 0.0005 Ω)
- Moisture resistance: –10°C to +65°C, RH>90% cycle 240 h ΔR < ±(0.50% + 0.0005 Ω)
- Thermal shock: Mil-Std-202, Method 107, Cond. F ΔR < ±(0.50% + 0.0005 Ω)
- Terminal strength: Mil-Std-202, Method 211, Cond. A (Pull Test) 2.4 N ΔR < ±(0.20% + 0.0005 Ω)
- Vibration, high frequency: Mil-Std-202, Method 204, Cond. D ΔR < ±(0.40% + 0.0005 Ω)
- Lead material: tinned copper
- Mounting - max. torque: 0.9 Nm using a M3 screw and a compression washer mounting technique
- Inductance (serial): typical 20nH
- Standard storage conditions: 0 to 85°C at 80% RH max. formin. 12 months. For different conditions please contact your local EBG representative!

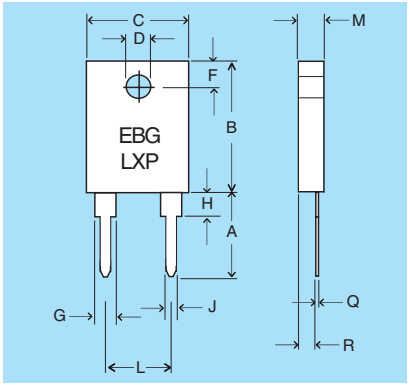


*This value is only applicable when using thermal conduction to heat sink Rth-cs<0.025 K/W. This value can be attained by using a thermal transfer compound with a heat conductivity of 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A*	13.21	15.75	0.520	0.620
B	20.44	20.96	0.805	0.825
C	15.49	16.01	0.610	0.630
D	3.53	3.73	0.139	0.147
F	5.07	5.59	0.200	0.220
G	3.45	3.81	0.136	0.150
H	2.03	3.55	0.080	0.140
J	1.37	1.67	0.054	0.066
L	9.90	10.42	0.390	0.410
M	4.69	5.21	0.185	0.205
Q	0.55	1.07	0.310	0.330
R	2.15	2.67	0.085	0.105

* longer contacts available



Derating (thermal resistance): 0.66 W/K (1.5 K/W). Without a heat sink, when in open air at 25°C, the LXP 100 is rated for 3 W. Derating for temperature above 25°C is 0.023 W/°K.

Case temperature must be used for definition of the applied power limit. Case temperature measurement must be done with a thermo-couple contacting the center of the component mounted on the designed heat sink.
Thermal grease should be applied properly.

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

Power Resistors

Series MXP 35 TO 220

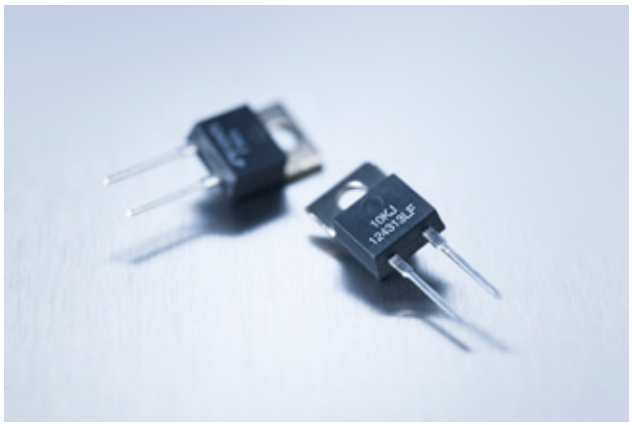
35 W Thick Film Power Resistors for high-frequency and pulse-loading applications

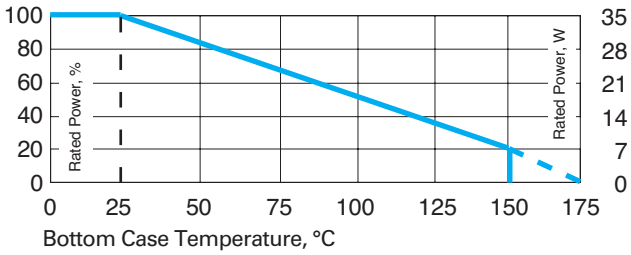
General Characteristics

- 35 W power rating at 25°C
- TO-220 package configuration
- Single-screw mounting simplifies attachment to heat sink
- Heat resistance to cooling plate: Rth< 4.28 °K/W
- Molded case for environmental protection.
- Resistor element is electrically insulated from the metal sink tab.
- Standard lead form for easier fit.
- Housing material acc. to UL94-V0

Specifications

- Resistance range: 0.05 Ω to 1 MΩ, other values upon request
- Resistance tolerance: ±1% to ±10% (0.5% upon request)
- Temperature coefficient: 10 Ω and above, ±50 ppm/°C, referenced to 25°C, ΔR taken at +105°C.
  Between 3 Ω and 10 Ω, ±(100 ppm+0.002 Ω)/°C, referenced to 25°C, ΔR taken at +105°C., < 3 Ω please ask for details.
- Max. operating voltage: 350 V
- Dielectric strength: 1,800 V AC
- Insulation resistance: 10 GΩ min.
- Momentary overload: 2 times rated power with applied voltage not to exceed 1.5 times maximum continuous operating voltage for 5 seconds, ΔR ±(0.3% + 0.01 Ω) max.
- Load life: MIL-R-39009, 2,000 hours at rated power, ΔR ±(1.0% + 0.01 Ω).
- Power rating: depends on case temperature. See derating curve.
- Moisture resistance: MIL-Std-202, Method 106, ΔR = (0.5% + 0.01 Ω) max.
- Thermal shock: MIL-Std-202, Method 107, Cond. F, ΔR = (0.3% + 0.01 Ω) max.
- Working temperature range: –55°C to +175°C
- Terminal strength: MIL-Std-202, Method 211, Cond. A (Pull Test) 2.4N, ΔR = (0.2% + 0.01 Ω) max.
- Vibration, high frequency: MIL-Std-202, Method 204, Cond. D, ΔR = (0.2% + 0.01 Ω) max.
- Lead material: tinned copper
- Maximum torque: 0.9 Nm
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!



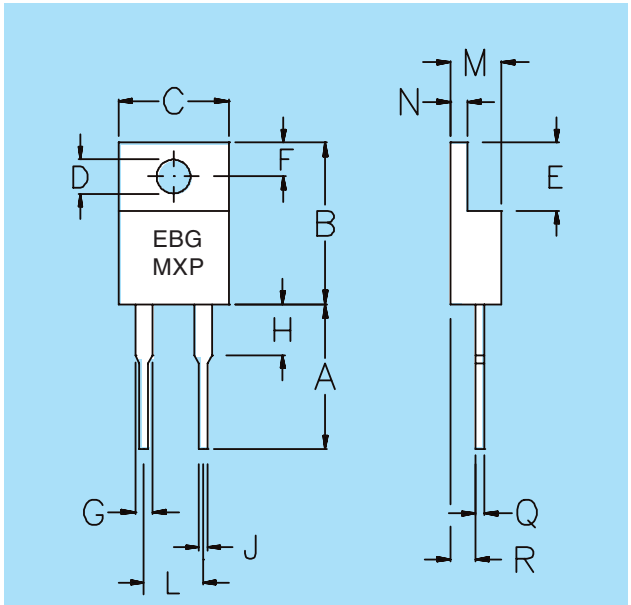


Derating (thermal resistance): 0.23 W/°K (4.28°K/W)

Without a heat sink, when in open air at 25°C, the MXP is rated for 2.50 W. Derating for temperature above 25°C is 0.02 W/°K.

Case temperature must be used for definition of the applied power limit. Case temperature measurement must be made with a thermocouple contacting the center of the component mounted on the designed heat sink. Thermal grease should be applied properly.

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	12.70	14.70	0.500	0.579
B	14.50	15.00	0.571	0.591
C	9.91	10.41	0.390	0.410
D	3.55	3.75	0.139	0.148
E	5.85	6.35	0.230	0.250
F	2.85	3.05	0.112	0.120
G	1.17	1.37	0.046	0.054
H	-.--	4.00	-.--	0.157
J	0.70	0.86	0.027	0.034
L	4.83	5.33	0.190	0.210
M	4.06	4.82	0.159	0.190
N	1.20	1.40	0.047	0.055
Q	0.55	0.70	0.022	0.028
R	2.05	2.25	0.080	0.089



The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

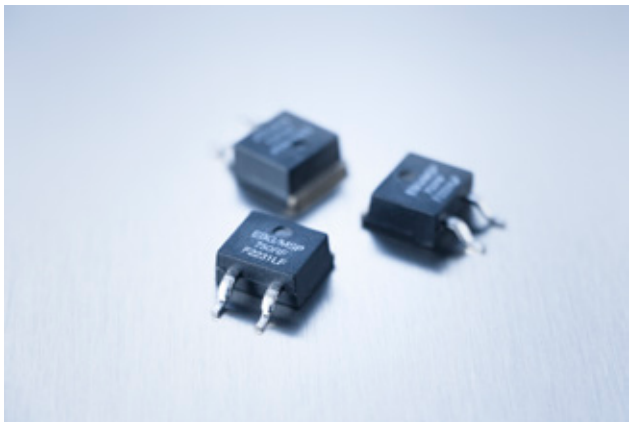
A Miba Group Company

Power Resistors

Series MSP 35 SMD (MHP 35 for high temperature soldering) – TO 220

35 Watt Thick Film Power Resistors for Surface Mount including Metal Tab

35 W Thick Film Power Resistors for surface mount including metal tab

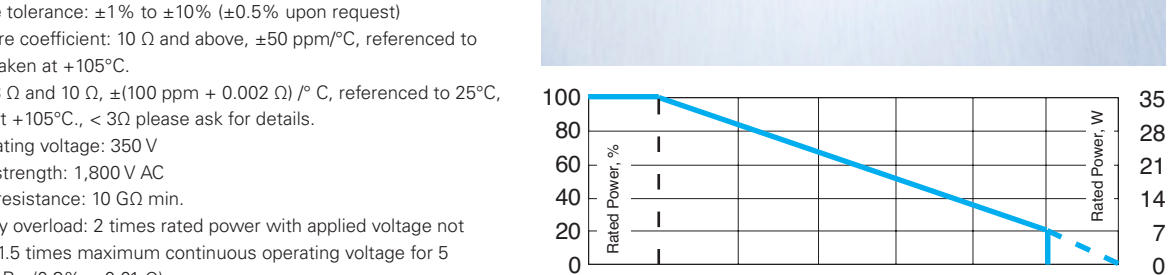


General Characteristics

- 35 W power rating at 25°C
- **SMD – TO-220** package configuration
- Heat resistance to cooling plate: Rth< 4.28 °K/W
- Molded case for environmental protection.
- Resistor element is electrically insulated from the metal sink tab.
- Housing material acc. to UL94-V0

Specifications

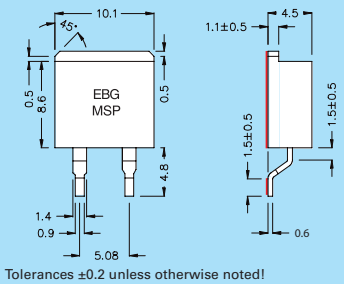
- Resistance range: 0.1 Ω to 1 MΩ, other values upon request
- Resistance tolerance: ±1% to ±10% (±0.5% upon request)
- Temperature coefficient: 10 Ω and above, ±50 ppm/°C, referenced to 25°C, ΔR taken at +105°C.
  Between 3 Ω and 10 Ω, ±(100 ppm + 0.002 Ω) /° C, referenced to 25°C, ΔR taken at +105°C., < 3Ω please ask for details.
- Max. operating voltage: 350 V
- Dielectric strength: 1,800 V AC
- Insulation resistance: 10 GΩ min.
- Momentary overload: 2 times rated power with applied voltage not to exceed 1.5 times maximum continuous operating voltage for 5 seconds, ΔR ±(0.3% + 0.01 Ω) max.
- Load life: MIL-R-39009, 2,000 hours at rated power, ΔR ±(1.0% + 0.01Ω).
- Power rating: depends on case temperature. See derating curve.
- Moisture resistance: MIL-Std-202, Method 106, ΔR = (0.5% + 0.01 Ω) max.
- Thermal shock: MIL-Std-202, Method 107, Cond. F, ΔR = (0.3% + 0.01 Ω) max.
- Working temperature range: –55°C to +175°C
- Terminal strength: MIL-Std-202, Method 211, Cond. A (Pull Test) 2.4N, ΔR = (0.2% + 0.01 Ω) max.
- Vibration, high frequency: MIL-Std-202, Method 204, Cond. D, ΔR = (0.2% + 0.01 Ω) max.
- Lead material: nickel-plated copper, dip-tinned
- Ground plate material: German silver
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!



Derating (thermal resistance): 0.23 W/°K (4.28°K/W)

Case temperature must be used for definition of the applied power limit. Case temperature measurement must be made with a thermocouple contacting the center of the component mounted on the designed heat sink. Thermal grease should be applied properly.

Dimensions:

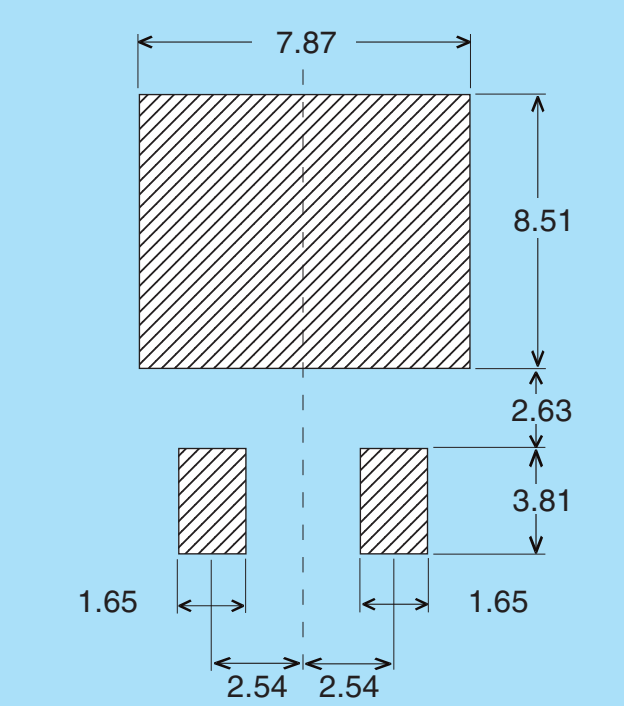


Tolerances ±0.2 unless otherwise noted!
TO 220 style power package for SMD applications
35 W power rating at 25°C case temperature.
Flatness of ground plate to contacts <0.1 mm

Soldering Note:

During surface mount soldering, the soldering temperature profile must not cause the metal tab of this device to exceed 215°C.
If the solder profile is higher than 215°C (up to 260°C), please use our alternative type **MHP-35 SMD TO 220**. Please contact us for further information!

Soldering Template



The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

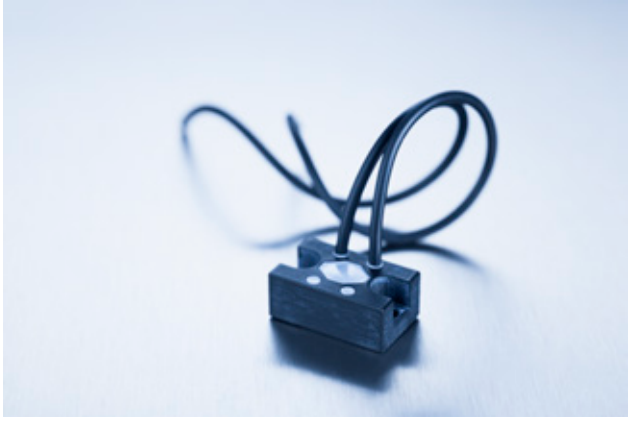
Power Resistors

Series AXP 50

50 W Power Resistor with four wire terminals

The new design with its non-inductive thick film Metal Oxide Technology prevents potential problems with clearance and creepage distance from terminal to base plate by means of flexible connecting leads.

This unique design will allow you to use this element in the following areas: variable speed drives; power supplies; control devices; telecommunications; robotics; motor controls and other switching devices.

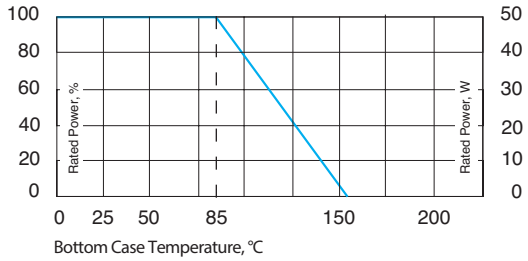


Specifications

- Resistance range: 1 Ω to 1 MΩ
- Standard tolerance: ±1% to ±10%
- Temperature coefficient: ±50, ±100 ppm, ±250 ppm (at +105°C ref. to +25°C)
- Max. work. voltage: 500 V (up to 1,000 VDC upon special request)
- Power rating: at 85°C BCT
- Standard wire length: L = 100 mm (other lengths available upon special request)
- Electric strength: 5 kV DC (3 kV AC, higher values upon request)
- Internal electric strength between R1 and R2: 5kV DC
- Mounting - max. torque: 1.2 Nm
- Working temperature range: –55 up to 155 °C
- Standard cable: 4GKW, 0,5mm², black, length = 100mm (others on request)
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!

Suggested Mounting Procedure:

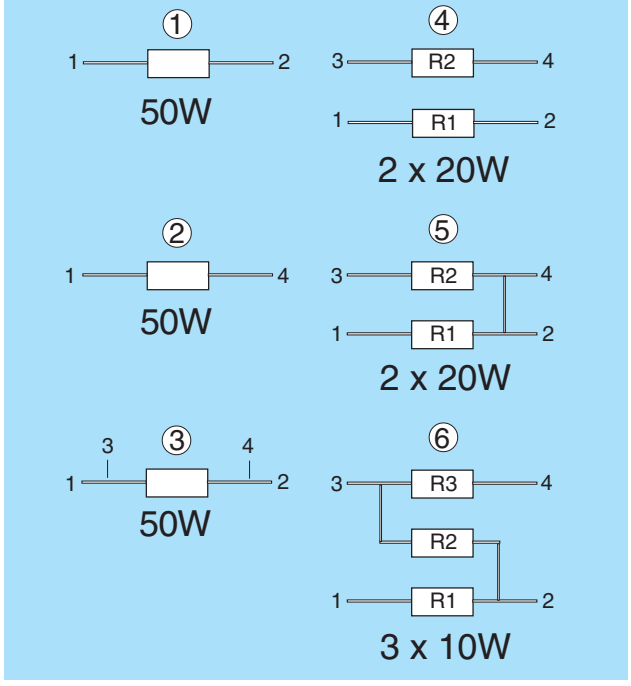
1) Position component and press down by hand.
2) Fix both mounting screws (M3) with 0.1 to 0.2 Nm torque.
3) Apply final torque to mounting screws of 1.0 to 1.2 Nm max.



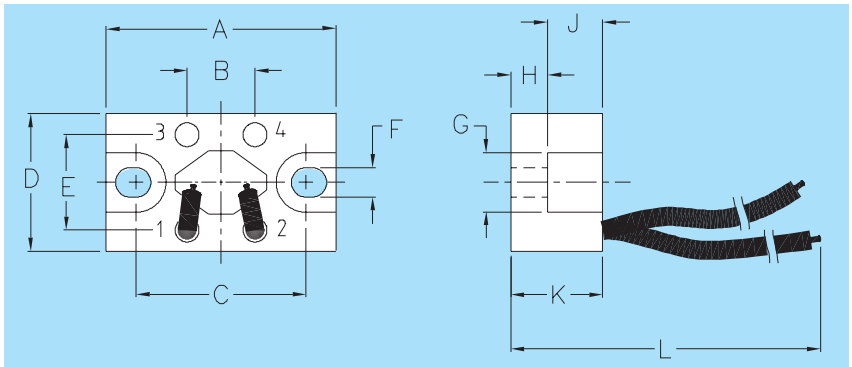
Best results can be reached by using a thermal transfer compound with a heat conductivity of better than 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.

Derating (thermal resistance): 0.995 W/°K (1.005°K/W). (for conf. 1, 2 and 3)

Configurations (P/package)



Version 5: ohmic value between contact 2 and 4 = 3 mΩ



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	24.8	25.2	1.764	1.779
B	6.9	7.9	0.642	0.681
C	18.3	18.7	1.169	1.185
D	14.8	15.2	1.031	1.047
E	9.9	10.9	0.866	0.906
F	3.0	3.4	0.161	0.169
G	6.3	6.7	0.315	0.331
H	3.8	4.2	0.161	0.173
J	5.8	6.2	0.228	0.244
K	10.0	10.5	0.394	0.413
L	100.0	105.0	3.937	4.134

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

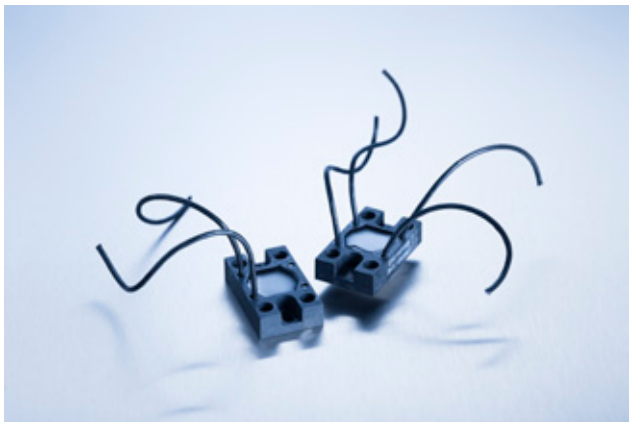
Power Resistors

Series AXP 100

100 W Power Resistor with four wire terminals, version B for enforced mechanical stability

The new design with its non-inductive thick film Metal Oxide Technology prevents potential problems with clearance and creepage distance from terminal to base plate by means of flexible connecting leads.

This unique design will allow you to use this element in the following areas: variable speed drives; power supplies; control devices; telecommunications; robotics; motor controls and other switching devices.

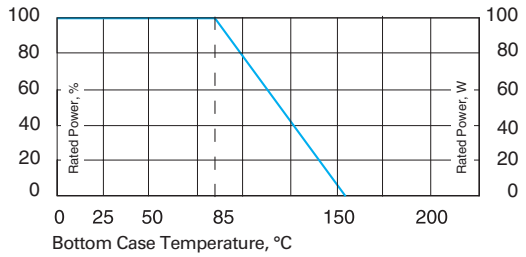


Specifications

- Resistance range: 1 Ω to 1 MΩ
- Standard tolerance: ±1% to ±10%
- Temperature coefficient: ±50, ±100 ppm, ±250 ppm (at +105°C ref. to +25°C)
- Max. work. voltage: 500 V (up to 1,500 V DC upon special request)
- Power rating: at 85°C BCT
- Short time overload: 1.5 x rated power for 10 sec, ΔR = 0.4% max. (for conf. 1, 2 and 3)
- Standard wire length: L = 100mm (other lengths are available upon special request)
- Electric strength: 5kV DC (3 kV AC, higher values upon request)
- Internal electric strength between R1 and R2: 5kV DC
- Mounting- max. torque: 1.2 Nm
- Working temperature range: –55 up to 155 °C
- Standard cable: PVC 0,75 mm², 20-AWG black, length = 100mm (others on request)
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!

Suggested Mounting Procedure:

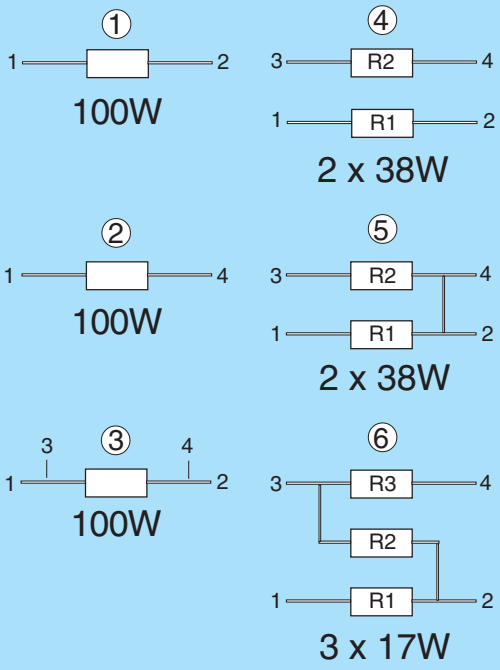
1) Position component and press down by hand.
2) Fix both mounting screws (M4) with 0.1 to 0.2 Nm torque.
3) Apply final torque to mounting screws of 1.0 to 1.2 Nm max.



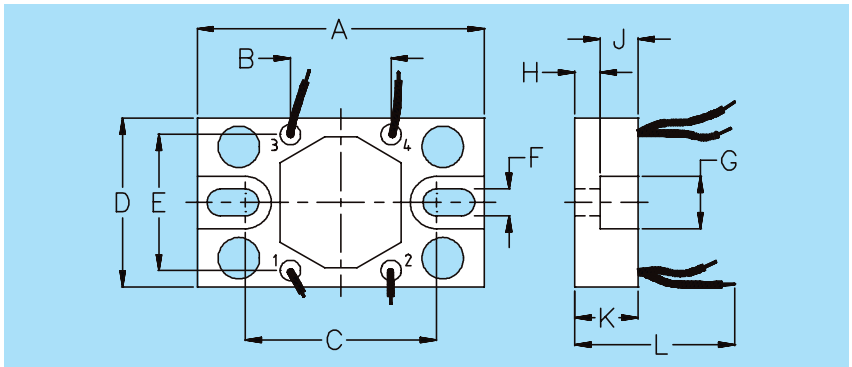
Best results can be obtained by using a thermal transfer compound with a heat conductivity of better than 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm

Derating (thermal resistance): 1.42 W/°K (0.70°K/W). (for conf. 1, 2 and 3)

Configurations (P/package)



Version 5: ohmic value between contact 2 and 4 = 3mΩ



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	44.8	45.2	1.764	1.779
B	16.3	17.3	0.642	0.681
C	29.7	30.1	1.169	1.185
D	26.2	26.6	1.031	1.047
E	22.0	23.0	0.866	0.906
F	4.1	4.3	0.161	0.169
G	8.0	8.4	0.315	0.331
H	4.1	4.4	0.161	0.173
J	5.8	6.2	0.228	0.244
K	10.0	10.5	0.394	0.413
L	100.0	105.0	3.937	4.134

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

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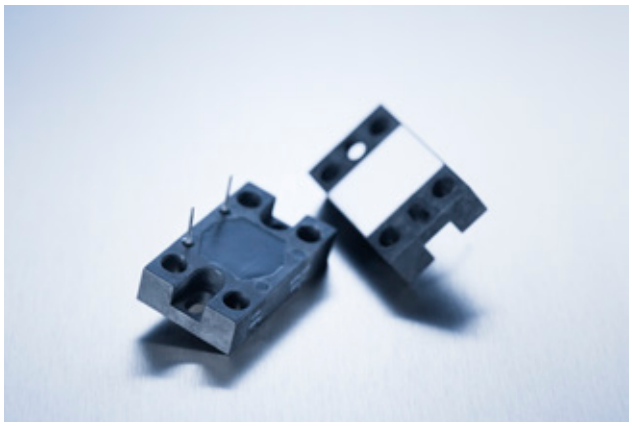
Power Resistors

Series AXM

100 W Low Ohm Pulse Power Resistor

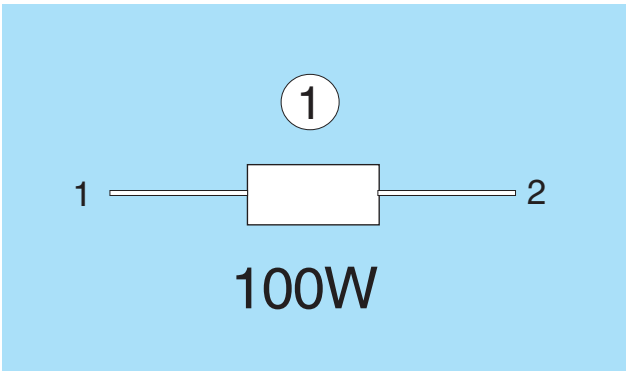
This is a new model designed for high pulse withstanding capabilities. Please let us have your exact pulse parameters to offer you the best option/ design details.

These elements are usually used in areas where stringent pulse withstanding requirements are common such as welding equipment, variable speed drives and motor controls and other switching devices.

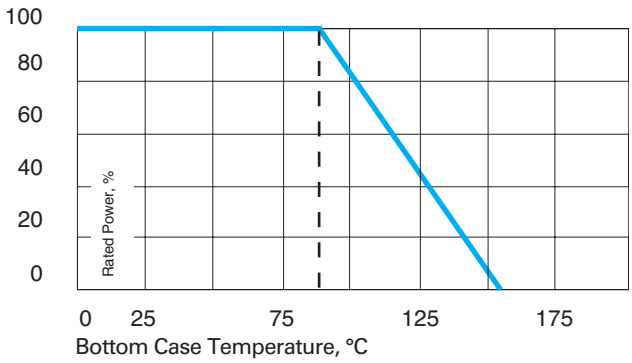


Specifications

- Resistance range: 0.05 Ω to 0.5 Ω
- Standard tolerance: ±10% standard (±5% upon request)
- Temperature coefficient: typical +500 ppm/°C (at +105°C ref. to +25°C)
- Max. work. voltage: up to 500 V (depending on pulse load scenario)
- Power rating: at 85°C BCT
- Standard wire length: L = 10 mm
  (other lengths are available upon special request)
- Electric strength: 3 kV DC (1.5 kV AC, higher values upon request)
- Mounting - max. torque: 1.2 Nm
- Working temperature range: –55 up to 155 °C
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!



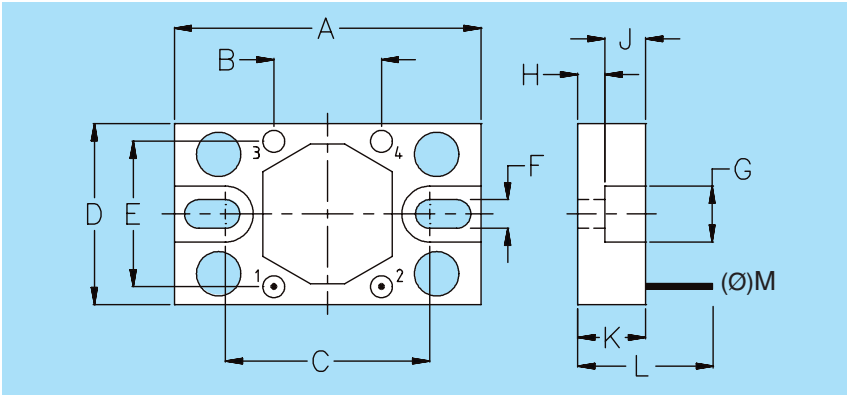
Derating:



Best results can be obtained by using a thermal transfer compound with a heat conductivity of better than 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.

Suggested Mounting Procedure:

1) Position component and press down by hand.
2) Fix both mounting screws (M4) with 0.1 to 0.2 Nm torque.
3) Apply final torque to mounting screws of 1.0 to 1.2 Nm max.



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	44.8	45.2	1.764	1.779
B	16.3	17.3	0.642	0.681
C	29.7	30.1	1.169	1.185
D	26.2	26.6	1.031	1.047
E	22.0	23.0	0.866	0.906
F	4.1	4.3	0.161	0.169
G	8.0	8.4	0.315	0.331
H	4.1	4.4	0.161	0.173
J	5.8	6.2	0.228	0.244
K	10.0	10.5	0.394	0.413
L	19.0	21.0	0.748	0.827
M	0.95	1.05	0.037	0.041

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

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Power Resistors

Series GXP 120, SOT 227

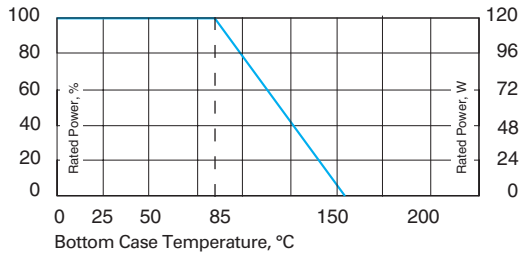
120 W Power Resistor in "ISOTOP" power device (1x120 W/2x50 W/3x30 W acc. configurations)

Thanks to our Non-Inductive Design, these elements are ideally suited for high-frequency and pulse-loading applications. Through direct mounting on a heat sink, significant cost advantages can be realized. Type GXP can be supplied in a two- or four-terminal version. Even triple resistors are available. Main applications are: variable speed drives; power supplies; control devices; telecommunications; robotics; motor controls and other switching devices. Special and custom-designed components upon request.



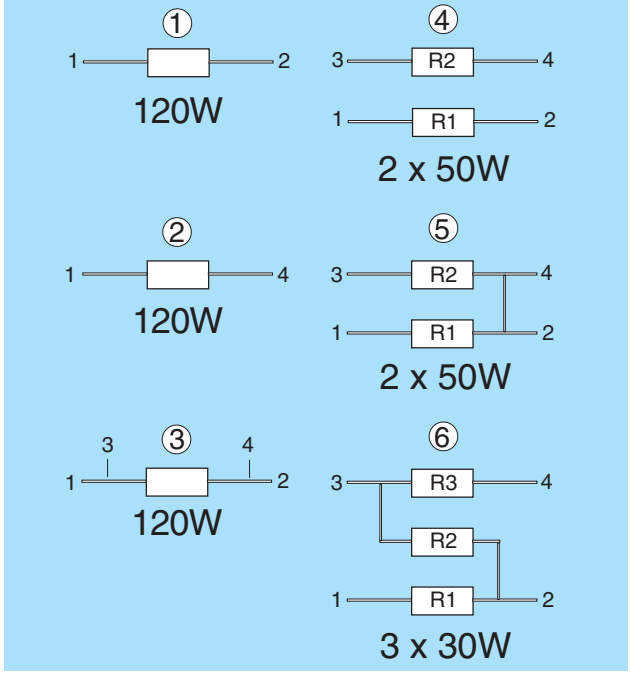
Specifications

- Resistance range: 0.1 Ω to 1 MΩ
- Tolerance: ±1%, 2%, 5%, 10%
- Temperature coefficient (>1ohm): ±250 ppm/°C (at +105°C ref. to +25°C), better TCR on request
- Max. work. voltage: 500 V (up to 1,000 V upon special request)
- Power rating at 85°C: 120 W (see derating)
- Short time overload: 1.5 x rated power at 85°C bottom case temp. for 10 sec, ΔR = 0.4% max. (for conf. 1, 2 and 3)
- Partial discharge: up to 2,000 Vrms/80 pC
- Voltage proof: dielectric strength up to 4,000 V DC against ground
- Insulation resistance: 10 GΩ Min. at 1 kV DC
- Isolation voltage between R1 and R2: 500 V, 1,000 V upon special request
- Protection class: acc. to IEC 950/CSA22.2 950/ M-89 and EN 60950.88: 2
- Heat resistance to cooling plate: Rth <0.45 K/W
- Capacitance/mass: 45 pF (typical)
- Working temperature range: –55°C to +155°C
- Mounting - max. torque for base plate (static): 1.5 Nm. M4 screws
- Mounting - max. torque for contacts (static): 1.3 Nm, M4 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!

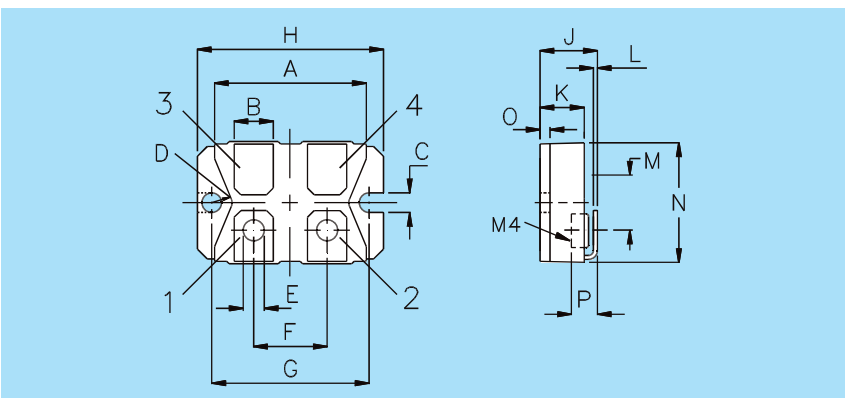


Best results can be obtained by using a thermal transfer compound with a heat conductivity of better than 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.
Derating (thermal resistance): 2.22 W/°K (0.45°K/W). (for conf. 1, 2 and 3)

Configurations (P/package)



Version 5: ohmic value between contact 2 and 4 = 3 mΩ



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	31.0	32.0	1.220	1.260
B	7.8	8.2	0.307	0.323
C	4.1	4.3	0.162	0.169
D	4.0	--	0.158	--
E	4.1	4.3	0.162	0.169
F	14.9	15.1	0.587	0.595
G	30.1	30.3	1.186	1.193
H	37.7	38.3	1.484	1.508
J	11.8	12.2	0.465	0.481
K	8.9	9.1	0.351	0.359
L	0.75	0.85	0.030	0.033
M	12.6	12.8	0.496	0.504
N	24.4	25.4	0.960	1.001
O	1.95	2.05	0.077	0.081
P	5.3	--	0.209	--

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

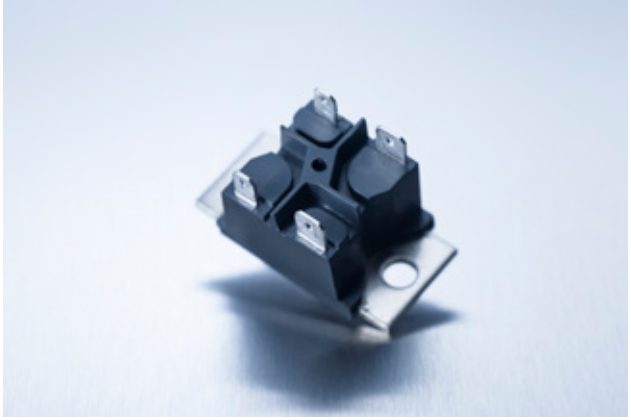
A Miba Group Company

Power Resistors

Series HPP 150

Non-Inductive 150 W Power Resistors according to VDE 0160 and UL 94-V0

EBG's HPP series is rated at 150 W mounted to a heat sink. There are four configurations of resistive patterns available in the package. The increased height of the package makes this resistor ideal in applications where creeping distance must meet VDE 0160 and UL 094-V0 standards.

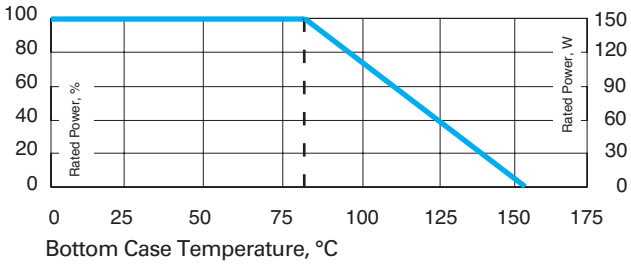


General Characteristics

- 150 W at 85°C
- Non-Inductive Design
- Four configurations of resistive patterns
- Up to three resistors in one package
- Easy mounting using already existing infrastructure

Specifications

- Resistance range: 1 Ω to 1 MΩ (other values upon request)
- Tolerance: ±1%, ±2%, ±5%, ±10%
- Temperature coefficient: ±250 ppm (at +105°C ref. to +25°C), better TCR on request
- Max. working voltage: 500 V (up to 1,000 V upon special request)
- Power rating at 85°C: 150 W (others upon request)
- Voltage proof: 5,000 V DC, 3,000 V AC
- Insulation resistance: 10 GΩ min. at 1 kV DC
- Isolation voltage between R1 and R2: 500 V (1000 V upon special request)
- Heat resistance to cooling plate: <0.47°K/W
- Capacitance/mass: 45 pF (typical)
- Working temperature range: –55°C to +155°C
- Mounting - max. torque for base plate (static): 1.5 Nm. M5 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!



Best results can be obtained by using a thermal transfer compound with a heat conductivity of better than 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.

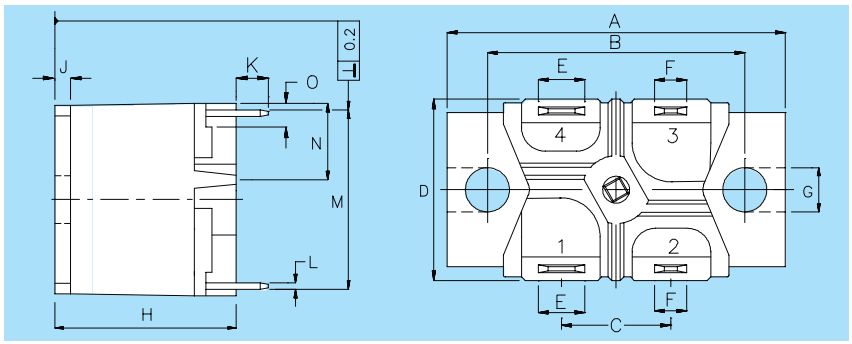
Derating (thermal resistance): 2.14 W/°K (0.47°K/W). (for conf. 3)

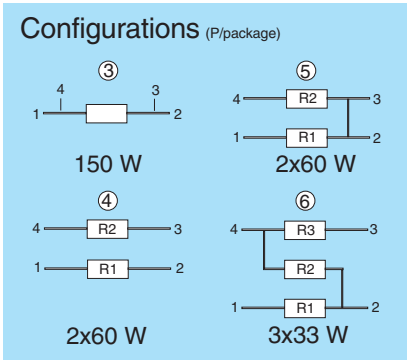
Air distance contact to contact:

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

Creeping distance:

③	Contacts 1 and 2 resp. 3 and 4	
	without fast-on-Plug:	20.0 mm
	with fast-on-Plug:	19.0 mm
④	Contacts 1 and 4 resp. 2 and 3	
	without fast-on-Plug:	27.4 mm
	with fast-on-Plug:	25.8 mm
⑤	Contacts 2 resp. 3 to base plate	
	without fast-on-Plug:	20.2 mm
	with fast-on-Plug:	19.8 mm
⑥	Contacts 1 resp. 4 to base plate	
	without fast-on-Plug:	19.5 mm
	with fast-on-Plug:	18.9 mm





Version 5: ohmic value between contact 2 and 3 = 3mΩ

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	44.7	46.5	1.760	1.831
B	34.7	35.3	1.366	1.390
C	14.8	15.2	0.583	0.598
D	- -	26.5	- -	1.043
E	6.2	6.4	0.244	0.252
F	4.7	4.9	0.185	0.193
G	5.9	6.1	0.232	0.240
H	20.9	21.3	0.823	0.839
J	1.9	2.1	0.075	0.083
K	3.4	4.0	0.134	0.157
L	0.77	0.83	0.0303	0.0326
M	23.0	23.4	0.905	0.921
N	9.4	9.8	0.370	0.386
O	1.9	2.1	0.075	0.083

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

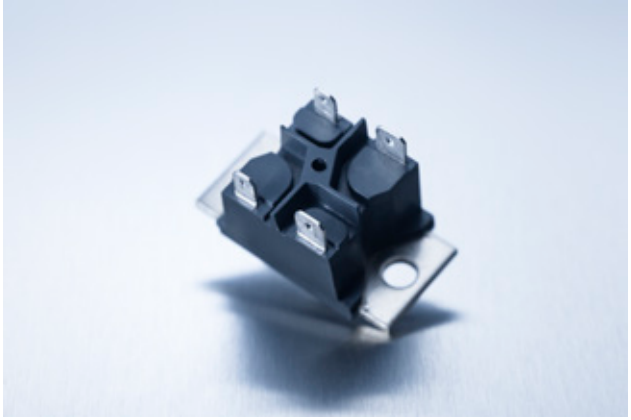
A Miba Group Company

Power Resistors

Series VHP

Non-Inductive 180 W Power Resistors according to VDE 0160 and UL 94-V0

EBG's VHP series is rated at 180 W mounted to a heat sink. There are four configurations of resistive patterns available in the package. The increased height of the package makes this resistor ideal in applications where creeping distance must meet VDE 0160 and UL 094-V0 standards.

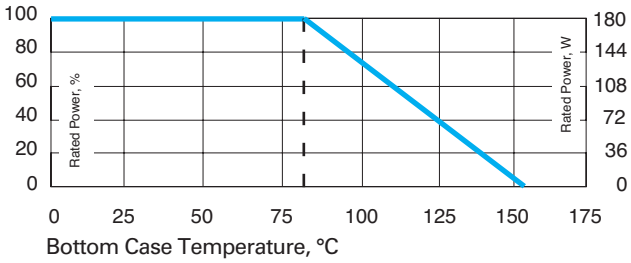


General Characteristics

- 180 W at 85°C
- Non-Inductive Design
- Four configurations of resistive patterns
- Up to three resistors in one package
- Easy mounting using already existing infrastructure

Specifications

- Resistance range: 1 Ω to1 MΩ (other values upon request)
- Tolerance: ±1%, ±2%, ±5%, ±10%
- Temperature coefficient: ±250 ppm (at +105°C ref. to +25°C), better TCR on request
- Max. working voltage: 500 V (up to 1,000 V upon special request)
- Power rating at 85°C: 180 W (others upon request)
- Voltage proof: 5,000 V DC, 3,000 V AC
- Insulation resistance: 10 GΩ min. at 1 kV DC
- Isolation voltage between R1 and R2: 500 V (1,000 V upon special request)
- Heat resistance to cooling plate: <0.47°K/W
- Capacitance/mass: 45 pF (typical)
- Working temperature range: –55°C to +155°C
- Mounting - max. torque for base plate (static):1.5 Nm, M5 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!



Best results can be obtained by using a thermal transfer compound with a heat conductivity of better than 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.

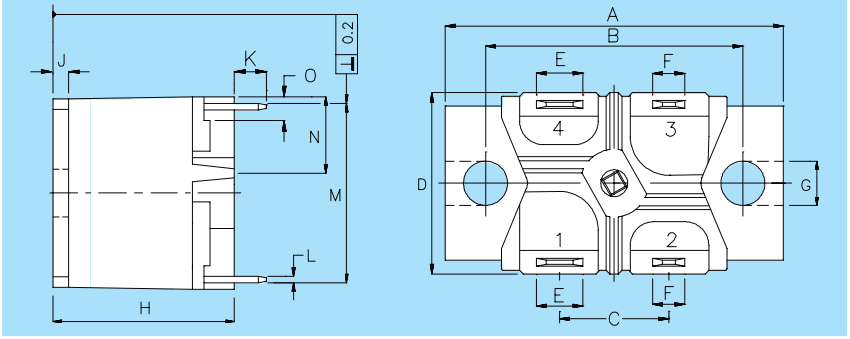
Derating (thermal resistance): 2.5 W/°K (0.40°K/W). (for conf. 3)

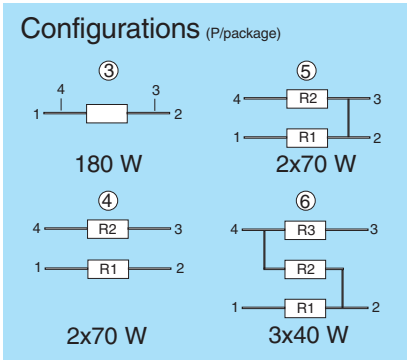
Air distance contact to contact:

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

Creeping distance:

③ Contacts 1 and 2 resp. 3 and 4	
without fast-on-Plug:	20.0 mm
with fast-on-Plug:	19.0 mm
④ Contacts 1 and 4 resp. 2 and 3	
without fast-on-Plug:	27.4 mm
with fast-on-Plug:	25.8 mm
⑤ Contacts 2 resp. 3 to base plate	
without fast-on-Plug:	20.2 mm
with fast-on-Plug:	19.8 mm
⑥ Contacts 1 resp. 4 to base plate	
without fast-on-Plug:	19.5 mm
with fast-on-Plug:	18.9 mm





Version 5: ohmic value between contact 2 and 3 = 3 mΩ

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	44.7	46.5	1.760	1.831
B	34.7	35.3	1.366	1.390
C	14.8	15.2	0.583	0.598
D	- -	26.5	- -	1.043
E	6.2	6.4	0.244	0.252
F	4.7	4.9	0.185	0.193
G	5.9	6.1	0.232	0.240
H	20.9	21.3	0.823	0.839
J	1.9	2.1	0.075	0.083
K	3.4	4.0	0.134	0.157
L	0.77	0.83	0.0303	0.0326
M	23.0	23.4	0.905	0.921
N	9.4	9.8	0.370	0.386
O	1.9	2.1	0.075	0.083

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

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Power Resistors

Series HPS 150

Non-Inductive 150 W Power Resistor according to VDE 0160 and UL 94-V0

EBG's HPS series is rated at 150 W mounted to a heat sink. The increased height of the package makes this resistor ideal in applications where creeping distance must meet VDE 0160 and UL 094-V0 standards.

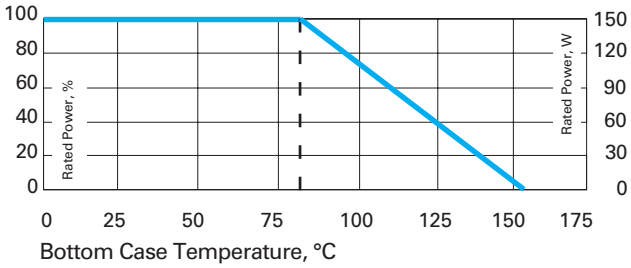


General Characteristics

- 150 W at 85°C
- Non-Inductive Design
- Easy mounting using already existing infrastructure

Specifications

- Resistance range: 1 Ω to 1 MΩ (other values upon request)
- Tolerance: ±1, ±2, ±5, ±10%
- Temperature coefficient: ±250 ppm/°C (at +105°C ref. to +25°C), better TCR on request
- Power rating at 85°C: 150 W (others upon request)
- Max. working voltage: 500 V (up to 1,000 V upon special request = "S"-version)
- Voltage proof: 5,000 V DC, 3,000 V AC
- Insulation resistance: 10 GΩ Min. at 1 kV DC
- Heat resistance to cooling plate: <0.47 °K/W
- Capacitance/mass: 45 pF (typical)
- Working temp. range: –55°C to +155°C
- Mounting - max. torque for base plate (static): 1.5 Nm M5 screws
- Mounting - max. torque for contacts (static): 1.3 Nm M4 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!



Derating (thermal resistance): 2.14 W/°K (0.47°K/W).
Best results can be obtained by using a thermal transfer compound with a heat conductivity of better than 1W/mK. The flatness of the cooling plate must be better than 0.05mm overall. The roughness of the surface should not exceed 6.4µm.

Air distance contact to contact:

Contact to contact:	> 9.2 mm
Contact to base plate: (with mounting screw M5 and washer)	> 13.2 mm

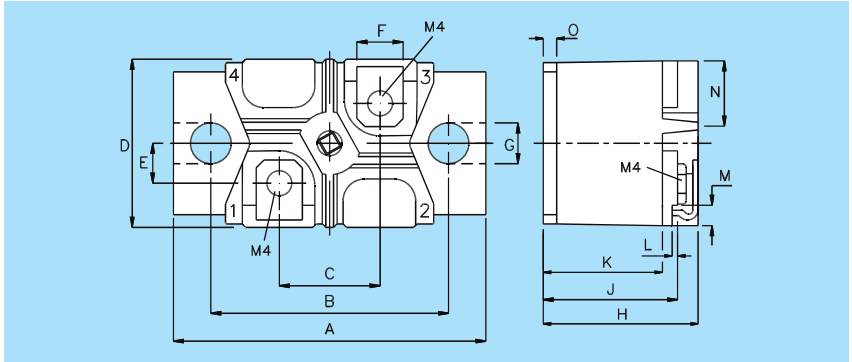
Creeping distance:

Contact to base plate:	17.0 mm
Contact to contact:	
- without PT-screw	> 22.8 mm
- with PT-screw	> 20.2 mm

Configuration:



R1



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	44.7	46.5	1.760	1.831
B	34.7	35.3	1.366	1.390
C	14.8	15.2	0.583	0.598
D	- -	26.5	- -	1.043
E	6.25	6.45	0.246	0.254
F	7.4	7.8	0.291	0.307
G	5.9	6.1	0.232	0.240
H	20.9	21.3	0.823	0.839
J	18.0	18.4	0.709	0.724
K	16.0	16.4	0.630	0.646
L	0.77	0.83	0.0303	0.0326
M	2.9	3.1	0.114	0.122
N	9.4	9.8	0.370	0.386
O	1.9	2.1	0.075	0.083

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

Power Resistors

Series HXP 200, SOT 227

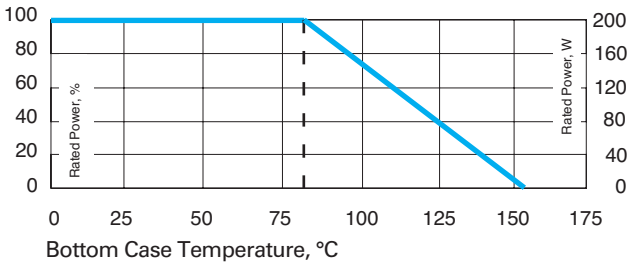
200 W Power Resistor in "ISOTOP" power device

Thanks to our Non-Inductive Design, these elements are ideally suited for high-frequency and pulse-loading applications. Through direct mounting on a heat sink, significant cost advantages can be realized. Type HXP can be supplied in a two- or four-terminal version. Even double resistors are available. Main applications are: variable speed drives; power supplies; control devices; telecommunications; robotics; motor controls and other switching devices.
Special and custom-designed components upon request.



Specifications

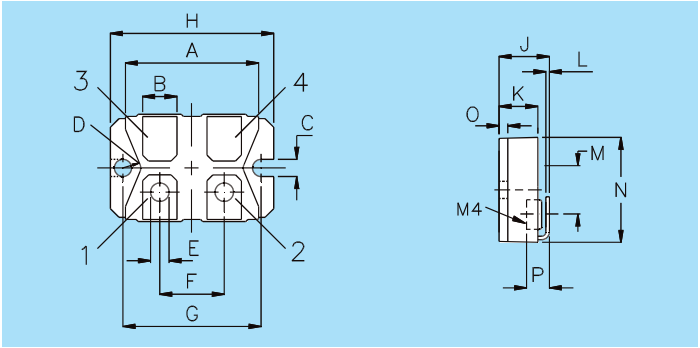
- Resistance range: 0.1 Ω to 1 MΩ
- Tolerance: ±1%, 2%, 5%,10%
- Temperature coefficient (>1ohm): ±250 ppm (at +105°C ref. to +25°C), better TCR on request
- Max. work. voltage: 500 V (up to 1,000 V upon special request)
- Power rating at 85°C: 200 W (see derating)
- Short time overload: 1.25 x rated power at 85°C bottom case temp. for 10 sec, ΔR = 0.4% max. (for conf. 1, 2 and 3)
- Partial discharge: up to 2,000 Vrms/80 pC
- Voltage proof: dielectric strength up to 4,000 V DC against ground
- Insulation resistance: 10 GΩ Min. at 1 kV DC
- Isolation voltage between R1 and R2: 500 V
  1,000 V upon special request
- Protection class: acc. to IEC 950/CSA22.2 950/ M-89 and EN 60950.88: 2
- Heat resistance to cooling plate: Rth <0.35 K/W
- Capacitance/mass: 45 pF (typical)
- Serial inductivity: HXP-1 typical 40 nH
- Working temp. range: –55°C to +155°C
- Mounting - max. torque for base plate (static): 1.5 Nm M4 screws
- Mounting - max. torque for contacts (static): 1.3 Nm M4 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!

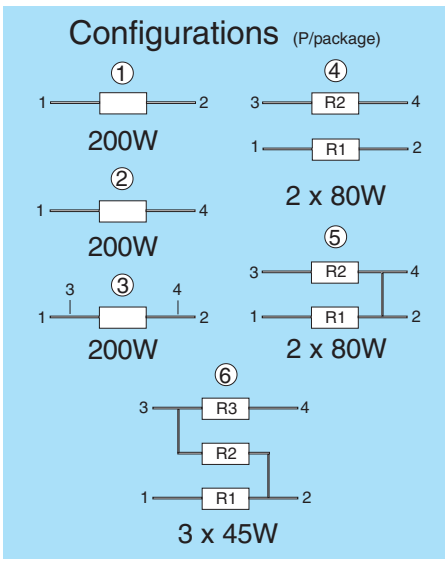


Derating (thermal resistance): 2.86W/°K (0.35°K/W). (for conf. 1, 2 and 3)

Best results can be obtained by using a thermal transfer compound with a heat conductivity of better than 1W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	31.0	32.0	1.220	1.260
B	7.8	8.2	0.307	0.323
C	4.1	4.3	0.162	0.169
D	4.0	- -	0.158	- -
E	4.1	4.3	0.162	0.169
F	14.9	15.1	0.587	0.595
G	30.1	30.3	1.186	1.193
H	37.7	38.3	1.484	1.508
J	11.8	12.2	0.465	0.481
K	8.9	9.1	0.351	0.359
L	0.75	0.85	0.030	0.033
M	12.6	12.8	0.496	0.504
N	24.4	25.4	0.960	1.001
O	1.95	2.05	0.077	0.081
P	5.3	- -	0.209	- -





Version 5: ohmic value between contact 2 and 4 = 3 mΩ

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

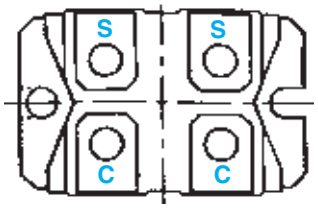
A Miba Group Company

Shunts

PCS – Precision Current Sense Resistors

The PCS series uses EBG's state-of-the-art technology to provide a highly reliable resistor with a Non-Inductive Design. This makes the PCS resistor ideal for many current-monitoring and control applications.

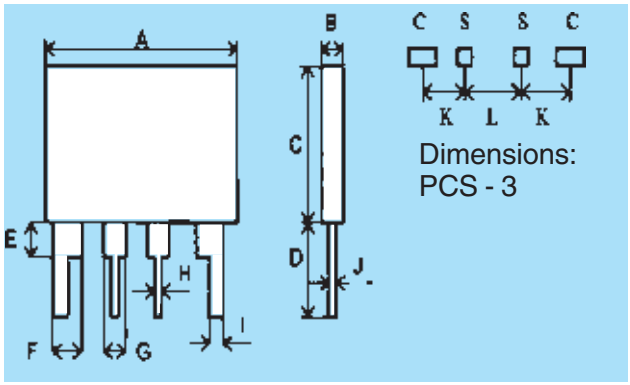
- Available in two different designs
- Values starting at 0.5 mΩ
- Non-Inductive Design
- Four-terminal Kelvin connection
- 100% QC measurement
- Housing material acc. to UL94-V0

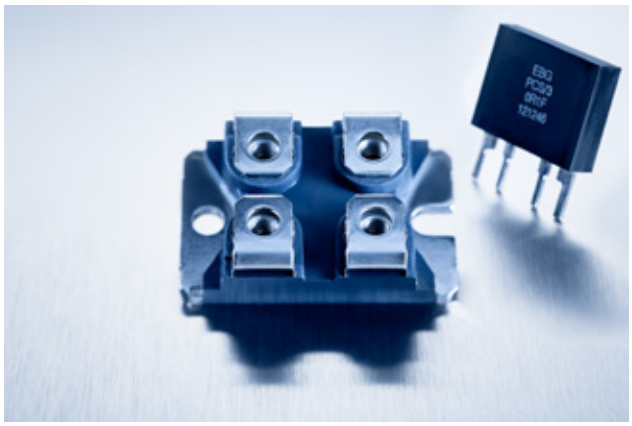


PCS - 100 / PCS - 60

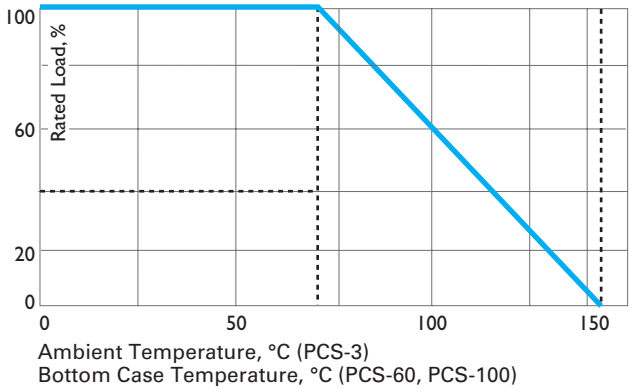
C = current connection (source)
S = voltage connection (sense)

For dimensions, please see our catalog datasheet HXP.





Power Rating Curve (for all types):



PCS - 3

- Standard resistance values: 1 mΩ – 60 mΩ (60 mΩ – 1 Ω upon request)
- Resistance tolerances: 1%, 2%, 5%
- Pulse current up to 200 A / 0.5 sec, depending on ohmic value
- Temperature coefficient: 60 ppm/°C typically, TC referenced to 25°C, ΔR taken at –15°C and +105°C; for values >60 mΩ Please ask for details!
- Power rating: 3 W at 70°C 40 A permanent (higher upon request)
- Dielectric strength: 1,800 V AC (housing) – other on request
- Load life: 1,000 hours at rated power at +70°C, DR 0.2% max.
- Thermal shock: Mil-Std-202, Method 107, Cond. A, DR 0.2% max.
- Moisture resistance: Mil-Std-202, Method 106, DR 0.2% max.
- Terminal material: Kelvin Terminals; tinned copper
- Encapsulation: polyester over resistance element
- Operating Temperature: –55°C to +150°C
- Storage Temperature: –40°C to +85°C

PCS - 100

- Standard resistance values: 0.5 mΩ–1 Ω (others upon request)
- Resistance tolerances: 1%, 2%, 5%
- Pulse current up to 500 A/0.5 sec, depending on ohmic value
- Temperature coefficient: TC referenced to 25°C, ΔR taken at 15°C and +105°C, <60 ppm/°C (TC <500 ppm/°C for resistance range from 27 mΩ to 49 mΩ)
- Power rating: 100 W (at 70°C case temperature) 50 A permanent (higher upon request)
- Dielectric strength: 1,000 V DC higher value upon request
- Heat resistance: Rth = <0.56°K/W
- Protection class acc. to IEC 950/CSA22.2 950/M – 89 and EN 60950.88:2
- Operating temperature: –55°C to +150°C
- Storage temperature: –40°C to +85°C
- Mounting - max. torque for contacts: 1.3 Nm 8 (static)
- Mounting - max. torque for base plate:1.5 Nm (static)

PCS - 60

This resistor equals PCS-100 except:

- Power rating: 60 W (at 70°C case temperature)
- Dielectric strength: up to 4,000 V DC or 2,800 V AC, higher values upon request
- Temperature coefficient: TC referenced to 25°C, ΔR taken at –15°C and +105°C, <60 ppm/°C (TC <500 ppm/°C for resistance range from 20 mΩ to 49 mΩ)
- Operating temperature: –55°C to +150°C
- Storage temperature: –40°C to +85°C

PCS - 3

Dim.	Millimeter	Inches
A	20.5 ± 1.20	(0.807 ± 0.008)
B	5.35 ± 0.10	(0.211 ± 0.004)
C	16.4 ± 0.20	(0.646 ± 0.008)
D	8.00 ± 0.20	(0.315 ± 0.008)
E	3.00 ± 0.20	(0.118 ± 0.008)
F	3.00	(0.118)
G	2.00	(0.079)
H	1.10	(0.043)
I	1.50	(0.059)
J	0.80	(0.031)
K	5.08	(0.2)
L	7.62	(0.3)

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

Ultra-High-Power Resistors

Series UXP 300

300 W Power Resistor, Non-Inductive Design

Mainly used as a snubber resistor to compensate the C-R peaks in traction power supplies.



General Characteristics

Electric support:

- High alumina ceramic metalized on top side with EBG METOXFILM placed on a solid Al heat distribution plate for perfect connection to the main heat sink.

Encapsulation:

- Special resin-filled epoxy casing with large creeping distance to mass, large air distance between the terminals and high insulation resistance (CTI 600).

Resistance Element:

- Special design for perfect current yield over the entire resistor area.

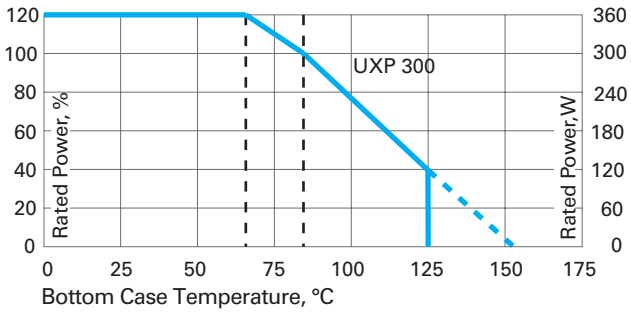
Contacts:

- Easy load connecting with M4 or M5 screws. (Inch thread terminals upon special request)
- Connector height (M+N) available from 25 to 42 mm.
- Various sleeves for increased creeping distance up to 85 mm or potted cable connections are available upon special request.
- The model UXP 300 introduced on this page can be changed according to customer specification.

Please note that almost all of our UXP customers have their own custom designed drawing. Therefore please do not hesitate to discuss your special need with the local representative of EBG.

Specifications

- Resistance values: 0.5 Ω to 1 MΩ
- Resistance tolerance: ±5% to ±10% (1% on special request)
- Temperature coefficient: ±150 ppm/°C (others upon request)
- Maximum working voltage: 5,000 VDC; higher voltage upon request, not exceeding max. power
- Short time overload: 1.5x rated power = 450 W at 70°C for 10 sec, ΔR = 0.4% max.
- Power rating: 300 W at 85°C bottom case temperature.
- Electric strength voltage: 6 kVrms, 50 Hz,1 min., up to 8,000 Vrms upon special request
- Single shot voltage: up to 12 kV norm wave (1.5/50 µsec)
- Partial discharge: 3 kVrms <10pC, up to 5 kV upon special request
- Insulation resistance: 10 GΩ Min. at 500 V
- Creeping distance: 42 mm min. (higher on request)
- Air distance: 14 mm min. (higher on request)
- Inductance: 80 nH (typical)
- Capacity/mass: 110 pF (typical)
- Capacity/parallel: 40 pF (typical)
- Operating temperature: –55°C to +150°C
- Mounting - max. torque for contacts: 2 Nm
- Mounting - max. torque: 1.8 Nm M4 screws
- Dimensions: please see datasheet UXP-600
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!



Derating (thermal resist.) UXP 300: 4.35 W/°K (0.23°K/W)
Power rating: 300 W at 85°C bottom case temp.*
Please ask for detailed mounting procedure!

*This value is only applicable when using a thermal conduction to the heat sink Rth-cs<0.025°K/W. This value can be obtained by using a thermal transfer compound with a heat conductivity of 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

Ultra-High-Power Resistors

Series UXP 600

600 W Resistor · US Patent-No. 5,355,281

For variable speed drives, power supplies, control devices, robotics, motor control and other power designs, the easy mounting fixture guarantees an auto-calibrated pressure to the cooling plate of about 120 to 160 N.



General Characteristics

Electric support:

- High alumina ceramic metalized with EBG ALTOX film on the bottom for better heat transfer and optimum discharge.

Encapsulation:

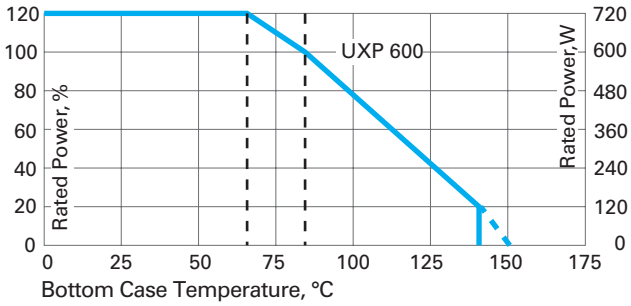
- Special resin-filled epoxy casing with large creeping distance to mass, large air distance between the terminals and high insulation resistance (CTI 600).

Resistance Element:

- Special design for low inductance and capacitance values. The element employs our special METOXFILM, which demonstrates stability while covering high wattage and pulse loading.

Contacts:

- Easy load connecting with M4 or M5 screws. (Inch thread terminals upon special request.)
- Connector height (M+N) available from 25 to 42 mm.
- Various sleeves for increased creeping distance up to 85 mm or potted cable connections are available upon special request



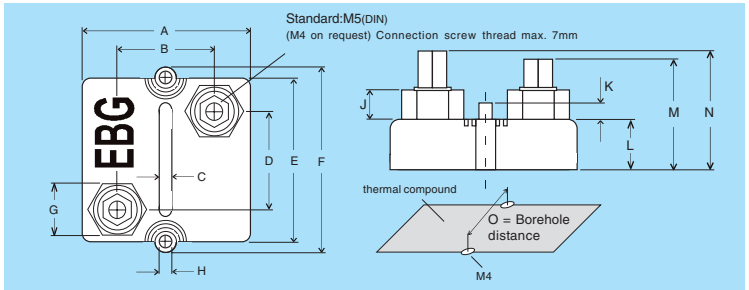
Derating (thermal resist.) UXP 600: 8.33 W/°K (0.12°K/W)
Power rating: 600 W at 85°C bottom case temp.*
Please ask for detailed mounting procedure!

* This value is only applicable when using a thermal conduction to the heat sink Rth-cs<0.025°K/W. This value can be obtained by using a thermal transfer compound with a heat conductivity of 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.

Specifications

- Resistance values: 0.5 Ω to 1 MΩ
- Resistance tolerance: ±5% to ±10% (1% on special request)
- Temperature coefficient: ±150 ppm/°C (others upon request)
- Maximum working voltage: 5,000 V DC, higher voltage upon request, not exceeding max. power
- Short time overload: 1,000 W at 70°C for 10 sec., ΔR = 0.4% max.
- Power rating: 600 W at 85°C bottom case temperature.
- Peak current: up to 1,500 A depending on pulse length and frequency Please ask for details!
- Electric strength voltage: 6 kVrms, 50 Hz, up to 12 kVrms or up to 20 kV DC onon special request.
- Single shot voltage: up to 12 kV norm wave (1.5/50 µsec)
- Partial discharge:4 KVrms, <10pC, up to 7 kV upon special request
- Insulation resistance: 10 GΩ min. at 500 V
- Creeping distance: 42 mm min. (higher on request)
- Air distance:14 mm min. (higher on request)
- Inductance: 80 nH (typical)
- Capacity/mass: 110 pF (typical)
- Capacity/parallel: 40 pF (typical)
- Operating temperature: –55°C to +150°C
- Mounting - max. torque for contacts: 2 Nm
- Mounting - max. torque: 1.8 Nm M4 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!

Test	Method	Typical results
Short time overload	1,000 W/10sec	0.4%
Humidity steady state	56 days/40°C/95%	0.25%
Temp. sycling	-55/+125/5cycles	0.20%
Shock	40g/4,000 times	0.25%
Vibrations	2-500Hz/10g	0.25%
Load life 3,000cyl	Pn 30 min. on / 30 min off	0.40%
Terminal strengths f. contacts	200N	0.05%



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	59.2	60.8	2.331	2.394
B	35.8	36.2	1.409	1.425
C	4.5	5.5	0.177	0.216
D	33.8	34.2	1.331	1.346
E	57.0	58.0	2.244	2.283
F	64.2	65.8	2.527	2.591
G	17.5	18.5	0.689	0.728
H	4.05	4.3	0.159	0.169
J	6.5	7.5	0.256	0.295
K	4.5	5.5	0.177	0.216
L	14.5	15.5	0.571	0.610
M	29.5	30.5	1.161	1.201
N	31.5	32.5	1.240	1.279
O	56.8	57.2	2.236	2.252

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

Ultra-High-Power Resistors

Series UXP 800

800 W Resistor · US Patent-No. 5,355,281

For variable speed drives, power supplies, control devices, robotics, motor control and other power designs, the easy mounting fixture guarantees an auto-calibrated pressure to the cooling plate of about 120 to 160 N.



General Characteristics

Electric support:

- High alumina ceramic metalized with EBG ALTOX film on bottom for better heat transfer and optimum discharge.

Encapsulation:

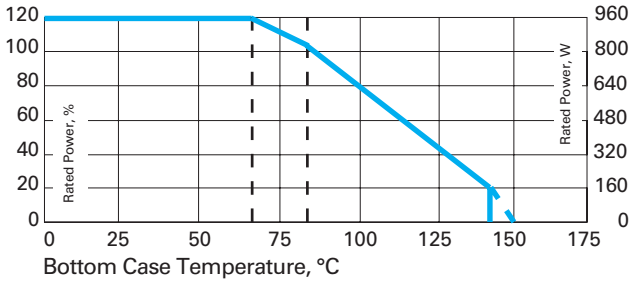
- Special resin-filled epoxy casing with large creeping distance to mass, large air distance between the terminals and high insulation resistance (CTI 600).

Resistance Element:

- Special design for low inductance and capacitance values. The element employs our special METOXFILM, which demonstrates stability while covering high wattage and pulse loading.

Contacts:

- Easy load connecting with M4 or M5 screws. (Inch thread terminals on special request.)
- Connector height (M+N) available from 25 to 42 mm.
- Various sleeves for increased creeping distance up to 85 mm or potted cable connections are available upon special request



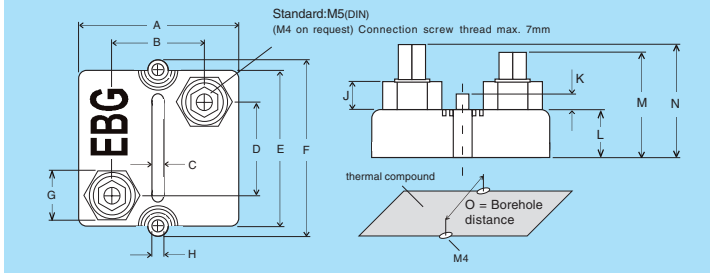
Derating (thermal resist.) UXP 800: 9.09 W/°K (0.11°K/W)
Power rating: 800 W at 85°C bottom case temp.*
Please ask for detailed mounting procedure!

* This value is only applicable when using a thermal conduction to the heat sink Rth-cs<0.025°K/W. This value can be obtained by using a thermal transfer compound with a heat conductivity of 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.

Specifications

- Resistance values: 0.5 Ω to 1 MΩ
- Resistance tolerance: ±5% to ±10%
- Temperature coefficient: ±150 ppm/°C (others upon request)
- Maximum working voltage: 5,000 V DC, higher voltage upon request, not exceeding max. power
- Short time overload: 1,200 W at 70°C for 10 sec., ΔR = 0.4% max.
- Power rating: 800 W at 85°C bottom case temperature.
- Peak current: up to 1,500 A depending on pulse length and frequency Please ask for details!
- Electric strength voltage: 6 kVrms, 50 Hz, up to 12 kVrms or up to 20kV DC on special request.
- Single shot voltage: up to 12 kV norm wave (1.5/50 µsec)
- Partial discharge: 4 KVrms, <10 pC, up to 7 kV upon special request
- Insulation resistance: 10 GΩ min. at 500 V
- Creeping distance: 42 mm min. (higher on request)
- Air distance: 14 mm min. (higher on request)
- Inductance: 80 nH (typical)
- Capacity/mass: 140 pF (typical)
- Capacity/parallel: 40 pF (typical)
- Operating temperature: –55°C to +150°C
- Mounting - max. torque for contacts: 2 Nm
- Mounting - max. torque: 1.8 Nm M4 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!

Test	Method	Typical results
Short time overload	1,000 W/10sec	0.4%
Humidity steady state	56 days/40°C/95%	0.25%
Temp. cycling	-55/+125/5cycles	0.20%
Shock	40g/4,000 times	0.25%
Vibrations	2-500Hz/10g	0.25%
Load life 3,000cyl	Pn 30 min. on / 30 min off	0.40%
Terminal strengths f. Contacts	200N	0.05%



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	59.2	60.8	2.331	2.394
B	35.8	36.2	1.409	1.425
C	4.5	5.5	0.177	0.216
D	33.8	34.2	1.331	1.346
E	57.0	58.0	2.244	2.283
F	64.2	65.8	2.527	2.591
G	17.5	18.5	0.689	0.728
H	4.05	4.3	0.159	0.169
J	6.5	7.5	0.256	0.295
K	4.5	5.5	0.177	0.216
L	14.5	15.5	0.571	0.610
M	29.5	30.5	1.161	1.201
N	31.5	32.5	1.240	1.279
O	56.8	57.2	2.236	2.252

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

Ultra-High-Power Resistors

Series UPT 400

400 W Resistor · US Patent-No. 5,355,281

For variable speed drives, power supplies, control devices, robotics, motor control and other power devices, the easy mounting fixture guarantees an auto-calibrated pressure to the cooling plate of about 120 to 160 N.



General Characteristics

Encapsulation:

- Special resin-filled epoxy casing with large creeping distance to mass, large air distance between the terminals and high insulation resistance.

Resistance Element:

- Special design for low inductance and capacitance values. The element employs our special METOXFILM, which demonstrates stability while covering high wattage and pulse loading.

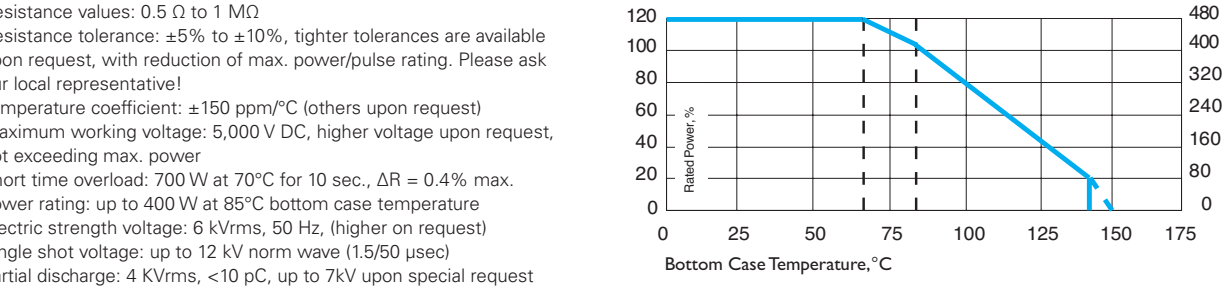
Contacts:

- Easy load connecting with M5 screws (others upon special request).

Specifications

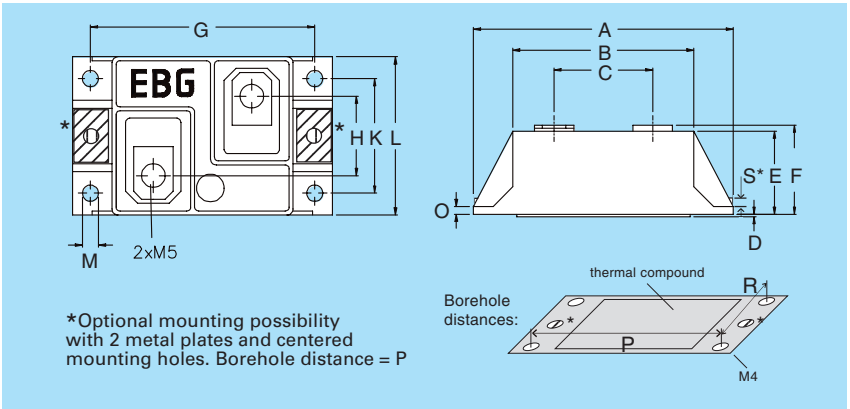
- Resistance values: 0.5 Ω to 1 MΩ
- Resistance tolerance: ±5% to ±10%, tighter tolerances are available upon request, with reduction of max. power/pulse rating. Please ask our local representative!
- Temperature coefficient: ±150 ppm/°C (others upon request)
- Maximum working voltage: 5,000 V DC, higher voltage upon request, not exceeding max. power
- Short time overload: 700 W at 70°C for 10 sec., ΔR = 0.4% max.
- Power rating: up to 400 W at 85°C bottom case temperature
- Electric strength voltage: 6 kVrms, 50 Hz, (higher on request)
- Single shot voltage: up to 12 kV norm wave (1.5/50 µsec)
- Partial discharge: 4 KVrms, <10 pC, up to 7kV upon special request
- Insulation resistance: 10 GΩ min. at 500 V
- Inductance: 80 nH (typical)
- Capacity/mass: 110 pF (typical)
- Capacity/parallel: 40 pF (typical)
- Operating temperature: –55°C to +150°C
- Mounting - max. torque for contacts: 2 Nm
- Mounting - Max. torque : 1.8 Nm M4 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!

For other configurations, please contact EBG.



Derating (thermal resist.) UPT 400: 5.55W/°K (0.18°K/W)
Power rating: 400W at 85°C bottom case temp.*
Please ask for detailed mounting procedure!

* This value is only applicable if using thermal conduction to heat sink Rth-cs<0.025°K/W.
This value can be obtained by using a thermal transfer compound with a heat conductivity of 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	65.2	66.8	2.567	2.630
B	45.2	46.8	1.780	1.843
C	24.5	25.5	0.965	1.004
D	0.1	0.2	0.004	0.008
E	20.5	21.5	0.807	0.846
F	22.0	23.0	0.866	0.906
G	56.2	57.8	2.213	2.276
H	19.5	20.5	0.768	0.807
K	28.5	29.5	1.122	1.161
L	39.2	40.8	1.543	1.606
M	4.1	4.3	0.161	0.169
O	1.85	2.15	0.073	0.085
P	56.8	57.2	2.236	2.252
R	28.8	29.2	1.134	1.150
S*	1.3	1.7	0.051	0.067

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

Ultra-High-Power Resistors

Series UPT 600

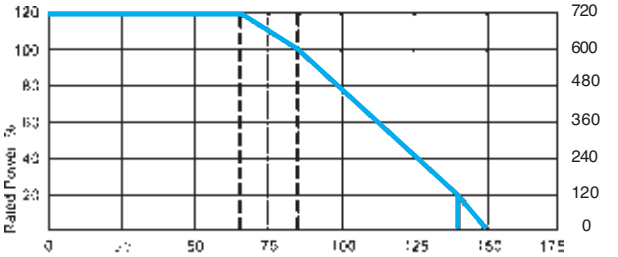
600 W Resistor · US Patent-No. 5,355,281

For variable speed drives, power supplies, control devices, robotics, motor control and other power devices, the easy mounting fixture guarantees an auto-calibrated pressure to the cooling plate of about 120 to 160 N.



Specifications

- Resistance values: 0.5 Ω to 1 MΩ
- Resistance tolerance: ±5% to ±10%, tighter tolerances are available upon request, with the reduction of the max. power/pulse rating. Please ask your local representative!
- Temperature coefficient: ±150 ppm/°C (others upon request)
- Maximum working voltage: 5,000 V DC, higher voltage upon request, not exceeding max. power
- Short time overload: 1,000 W at 70°C for 10sec., ΔR = 0.4% max. (for conf. 2 and 3)
- Power rating: up to 600 W at 85°C bottom case temperature, see configurations
- Electric strength voltage: 6 kVrms, 50 Hz, up to 12 kVrms or 23 kV DC upon special request.
- Dielectric strength between R1–R2: >5kV DC (for conf. 4)
- Single shot voltage: up to 12 kV norm wave (1.5/50 µsec)
- Partial discharge: 4 KVrms, <10 pC, up to 7 kV upon special request
- Insulation resistance: 10 GΩ min. at 500 V
- Inductance: 80 nH (typical)
- Capacity/mass: 110 pF (typical)
- Capacity/parallel: 40 pF (typical)
- Operating temperature: –55°C to +150°C
- Mounting - max. torque for contacts: 2 Nm
- Mounting - max. torque: 1.8 Nm, M4 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!



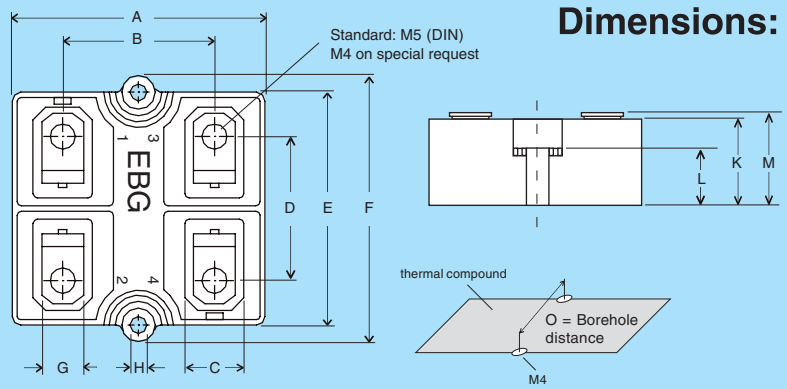
Bottom Case Temperature, °C,
Maximum Power Rating see UPT - Configurations

Derating (thermal resist.) UPT 600: 8.33W/°K (0.12°K/W) (for conf. 2 and 3)
Power rating: 600W at 85°C bottom case temp.*
Please ask for detailed mounting procedure!

* This value is only applicable if using thermal conduction to heat sink Rth-cs<0.025°K/W.
This value can be obtained by using a thermal transfer compound with a heat conductivity of 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.

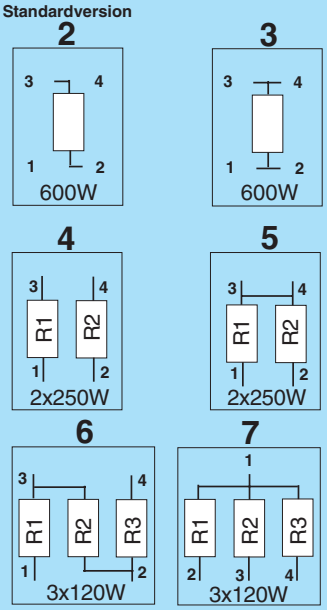
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	59.2	60.8	2.331	2.394
B	35.8	36.2	1.409	1.425
C	13.5	14.5	0.531	0.571
D	33.8	34.2	1.331	1.346
E	57.0	58.0	2.244	2.283
F	64.2	65.8	2.527	2.591
G	9.5	10.5	0.374	0.413
H	4.05	4.3	0.159	0.169
K	24.0	25.0	0.945	0.984
L	14.5	15.5	0.571	0.610
M	25.5	26.5	1.004	1.043
O	56.8	57.2	2.236	2.252

Dimensions:



Configurations: (P/package)

Standardversion



The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

Ultra High Power Resistors

Series UPT 800

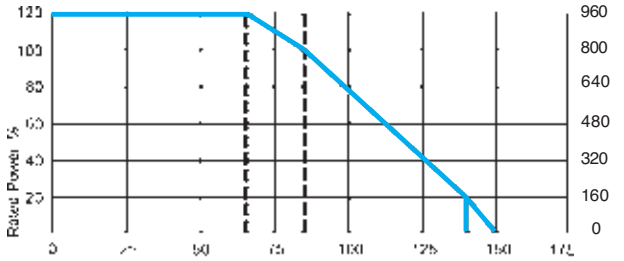
800 W Resistor · US Patent-No. 5,355,281

For variable speed drives, power supplies, control devices, robotics, motor control and other power designs, the easy mounting fixture guarantees an auto-calibrated pressure to the cooling plate of about 120 to 160 N.



Specifications

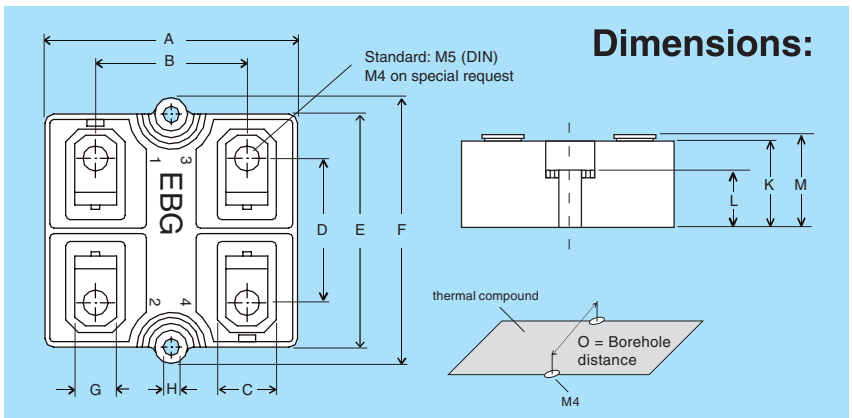
- Resistance values: 0.5 Ω to 1 MΩ
- Resistance tolerance: ±5% to ±10%, tighter tolerances are available upon request, with reduction of max. power/pulse rating. Please ask our local representative!
- Temperature coefficient: ±150 ppm/°C (others upon request)
- Maximum working voltage: 5,000 V DC, higher voltage upon request, not exceeding max. power
- Short time overload: 1,000 W at 70°C for 10sec., R = 0.4% max. (for conf. 2 and 3)
- Power rating: up to 800 W at 85°C bottom case temperature, see configurations
- Electric strength voltage: 6 kVrms, 50 Hz, up to 12 kVrms or 23 kV DC upon special request.
- Dielectric strength between R1–R2 : >5 kV DC (for conf. 4)
- Single shot voltage: up to 12 kV norm wave (1.5/50 µsec)
- Partial discharge: 4 KVrms, <10 pC, up to 7 kV upon special request
- Insulation resistance: 10 GΩ min. at 500 V
- Inductance: 80 nH (typical)
- Capacity/mass: 140 pF (typical)
- Capacity/parallel: 40 pF (typical)
- Operating temperature: –55°C to +150°C
- Mounting - max. torque for contacts: 2 Nm
- Mounting - max. torque: 1.8 Nm, M4 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!

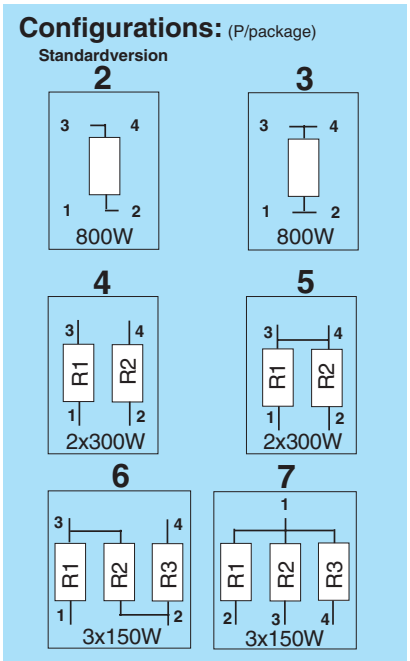


Derating (thermal resist.) UPT 800: 9.09W/°K (0.11°K/W) for conf. 2 and 3
Power rating: 800W at 85°C bottom case temp.*
Please ask for detailed mounting procedure!

* This value is only applicable if using thermal conduction to heat sink Rth-cs<0.025°K/W.
This value can be obtained by using a thermal transfer compound with a heat conductivity of 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	59.2	60.8	2.331	2.394
B	35.8	36.2	1.409	1.425
C	13.5	14.5	0.531	0.571
D	33.8	34.2	1.331	1.346
E	57.0	58.0	2.244	2.283
F	64.2	65.8	2.527	2.591
G	9.5	10.5	0.374	0.413
H	4.05	4.3	0.159	0.169
K	24.0	25.0	0.945	0.984
L	14.5	15.5	0.571	0.610
M	25.5	26.5	1.004	1.043
O	56.8	57.2	2.236	2.252





The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

A Miba Group Company

Ultra-High Pulse Load Resistors

Series UXM 400

400 W High Pulse Load Resistor

For variable speed drives, power supplies, control devices, robotics, motor control and other power designs, the easy mounting fixture guarantees an auto-calibrated pressure to the cooling plate of about 120 to 160 N.



General Characteristics

Electric support:

- High alumina ceramic metalized with EBG ALTOX film on bottom for better heat transfer and optimum discharge.

Encapsulation:

- Special resin-filled epoxy casing with large creeping distance to mass, large air distance between the terminals and high insulation resistance (CTI 600).

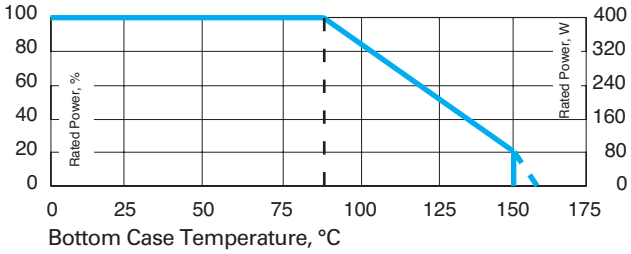
Contacts:

- Easy load connecting with M4 or M5 screws.
- Connector height (M+N) available from 25 to 42 mm.
- Various sleeves for increased creeping distance up to 85 mm or potted cable connections are available upon special request

Specifications

- Resistance values: 0.1 Ω to 10 Ω (others upon request)
- Resistance tolerance: ±5% to ±10% (others upon request)
- Temperature coefficient: +500 ppm/°C typical (others upon request)
- Maximum working voltage: Depending on max. pulse load capability. Please ask for details!
- Short time overload: 600 W at 70°C for 10 sec., ΔR = 0.4% max.
- Power rating: 400 W at 85°C bottom case temperature. (higher upon request)
- Electric strength voltage: Standard: 6 kV DC, (higher on request)
- Partial discharge: upon request
- Insulation resistance: 10 GΩ min. at 1000 V
- Creeping distance: 42 mm min. (higher on request)
- Air distance: 14 mm min. (higher on request)
- Inductance: 400 nH ÷ 1µH (typical)
- Capacity/mass: 110 pF (typical)
- Operating temperature: –55°C to +150°C
- Mounting - max. torque for contacts: 2 Nm
- Mounting- max. torque: 1.8 Nm M4 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!

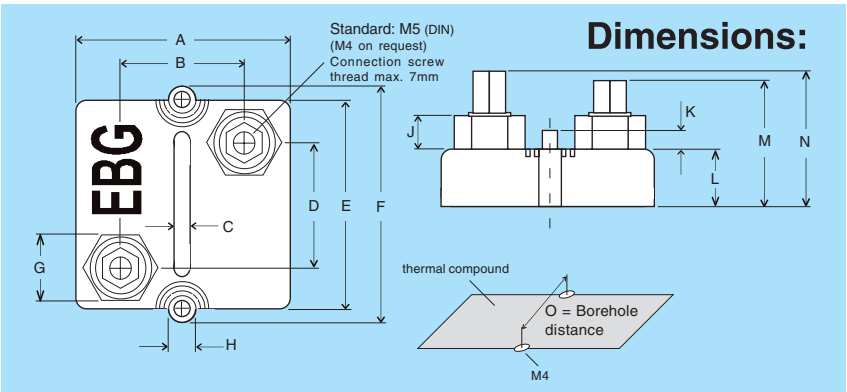
Derating:



Best results can be obtained by using a thermal transfer compound with a heat conductivity of better than 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.

Test	Method	Typical results
Short time overload	1,000 W/10sec	0.4%
Humidity steady state	56 days/40°C/95%	0.25%
Temp. cycling	-55/+125/5cycles	0.20%
Shock	40g/4,000 times	0.25%
Vibrations	2-500Hz/10g	0.25%
Load life 3,000cyl	Pn 30 min. on / 30 min off	0.40%
Terminal strengths f. contacts	200N	0.05%

Dimensions:



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	59.2	60.8	2.331	2.394
B	35.8	36.2	1.409	1.425
C	13.5	14.5	0.531	0.571
D	33.8	34.2	1.331	1.346
E	57.0	58.0	2.244	2.283
F	64.2	65.8	2.527	2.591
G	9.5	10.5	0.374	0.413
H	4.05	4.3	0.159	0.169
J	6.5	7.5	0.256	0.295
K	4.5	5.5	0.177	0.216
L	14.5	15.5	0.571	0.610
M	29.5	30.5	1.161	1.201
N	31.5	32.5	1.240	1.279
O	56.8	57.2	2.236	2.252

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EBG RESISTORS

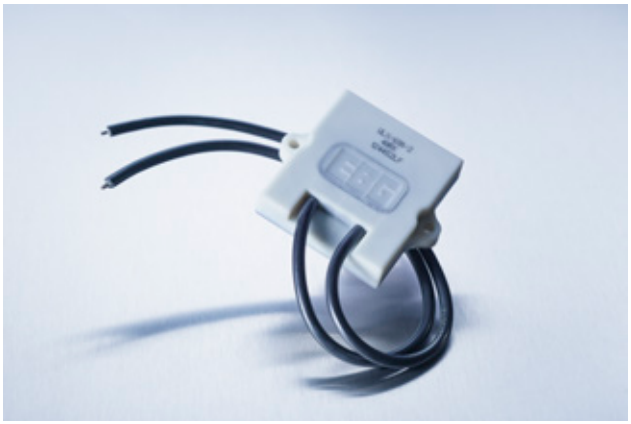
A Miba Group Company

Ultra-High-Power Resistors

Series ULX 600 (Very low component height)

600 W Resistor · US Patent-No. 5,355,281

For variable speed drives, power supplies, control devices, robotics, motor control and other power designs.



General Characteristics

Electric Support:

- High-purity ceramic metalized with EBG ALTOX film on bottom for better heat transfer and optimum discharge.

Encapsulation:

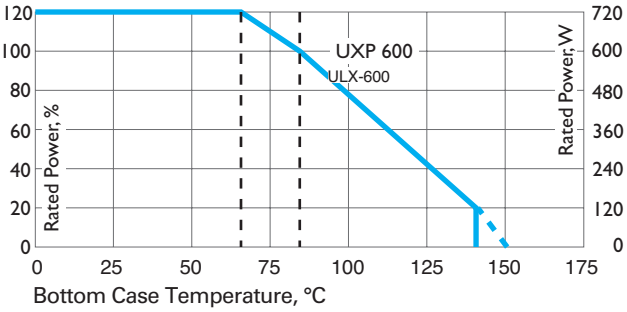
- Special resin-filled epoxy casing. High insulation resistance (CTI 600), high dielectric strength and partial discharge capability.

Resistance Element:

- Special design for low inductance and capacitance values. The element employs our special METOXFILM, which demonstrates stability while covering high wattage and pulse loading.

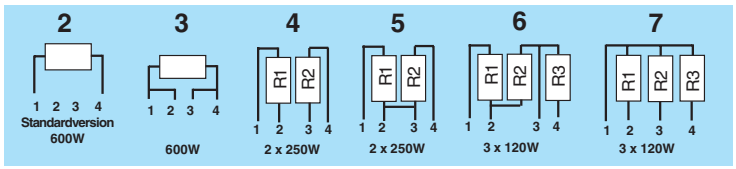
Specifications

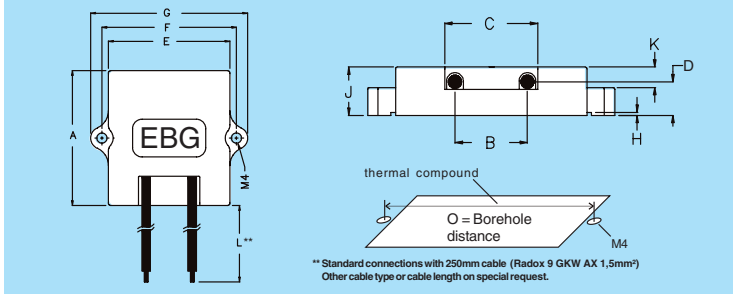
- Resistance values: 0.5 Ω to 1 MΩ (others upon request)
- Resistance tolerance: ±5% to ±10%
- Temperature coefficient: ±150 ppm/°C (others upon request)
- Maximum working voltage: 5,000 V DC, higher voltage upon request, not exceeding max. power
- Short time overload: 1,000 W at 70°C for 10sec., ΔR = 0.4% max. (for conf. 2 and 3)
- Power rating: 600 W at 85°C bottom case temperature (others upon request)
- Peak current: up to 1,500 A depending on pulse length and frequency Please ask for details!
- Electric strength voltage: 6 kVrms, 50 Hz,up to 12 kVrms upon special request.
- Dielectric strength between R1-R2: >5kV DC (for conf. 4)
- Single shot voltage: up to 12 kV norm wave (1.5/50 µsec)
- Partial discharge: 4 KVrms, <10 pC, up to 7 kV upon special request
- Insulation resistance: 10 GΩ min. at 500 V
- Inductance: 80 nH (typical)
- Capacity/mass: 110 pF
- Capacity/parallel: 40 pF
- Operating temperature: res. body: –55°C to +150°C
  std. cables: –40°C to +120°C (other cables upon request)
- Mounting- max. torque: 1.8 Nm, M4 screws
- Housing material acc. to UL94-V0
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!
- Pulse load rating: please see our website (www.ebg-at.com/...) for sample pulse load information. For details please contact your local EBG representative!



Derating (thermal resist.) ULX 600: 8.33W/°K (0.12°K/W)
Power rating: 600W at 85°C bottom case temp.*
Please ask for detailed mounting procedure!

* This value is only applicable if using thermal conduction to the heat sink Rth-cs<0.025°K/W.
This value can be obtained by using a thermal transfer compound with a heat conductivity of 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 µm.





Test	Method	Typical results
Short time overload	1,000 W/10sec (for 600 W Element)	0.4%
Humidity steady state	56 days/40°C/95%	0.25%
Temp. cycling	-55/+125/5cycles	0.20%
Shock	40g/4,000 times	0.25%
Vibrations	2-500Hz/10g	0.25%
Load life 3,000cyl	Pn 30 min. on / 30 min off	0.40%

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	57.0	58.0	2.244	2.283
B	19.5	20.5	0.767	0.807
C	25.5	26.5	1.004	1.043
D	8.0	9.5	0.315	0.374
E	51.0	52.0	2.007	2.047
F	56.5	57.5	2.224	2.264
G	66.2	66.7	2.606	2.626
H	0.5	0.8	0.019	0.032
J	12.5	13.5	0.492	0.532
K	5.3	5.8	0.208	0.228
L	250	255	9.843	10.039
O	56.8	57.2	2.236	2.252

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

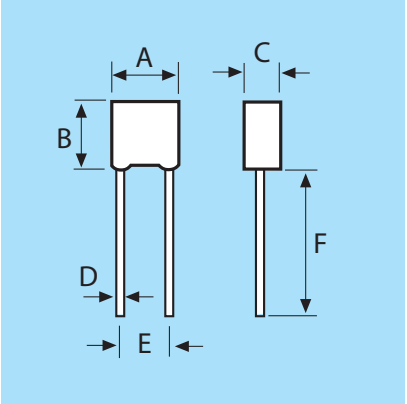
A Miba Group Company

Metal Film

Series UPR / UPSC

Radial Resistors, extremely precise

- Precision tolerances: ±0.1% is standard, and tolerances as close as ±0.01% are available
- Low temperature coefficient: better than 3 ppm/°C, 5 ppm°C, 10 ppm/°C or 15 ppm/°C
- Long-term stability: better than ±0.05% per 2,000 hours of operation.
- Wide resistance range: from 10 Ω to 255 KΩ



Specifications

- Resistance tolerance: ±1.0% (tolerances to ±0.01% upon special request)
- Std. operating temperature: –55°C to + 85°C
- TC Temperature range: –20°C to +85°C
- Overload: 6.25 times rated power for 5 seconds at voltage not to exceed 1.5 times maximum rated working voltage, ΔR less than 0.05%
- Load life: 2,000 hours at + 125°C, ΔR less than 0.05%
- Moisture resistance: Mil-Std-202, Method 106, ΔR less than 0.02%
- Thermal shock: Mil-Std-202, Method 107, Cond. B, ΔR less than 0.05%
- Insulation resistance: 10,000 MΩ
- Low temperature operation: ΔR less than 0.02%
- Dielectric withstanding voltage: ΔR less than 0.02%
- Vibration: ΔR less than 0.01%
- Shock: ΔR less than 0.02%
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!

Dim.	Dimensions in millimeters *Dimensions in inches*	
	UPSC	UPR
A	7.50±.20 *(.295±.008)*	10.50±.30 *(.413±.012)*
B	8.50±.20 *(.335±.008)*	9.00±.30 *(.354±.012)*
C	2.50±.20 *(.098±.008)*	4.00±.30 *(.157±.012)*
D	0.63±.05 *(.025±.002)*	0.63±.05 *(.025±.002)*
E	3.81±.38 *(0.150±.015)*	7.62±.38 *(0.300±.015)*
F	25±1 *(0.98±.04)*	25±1 *(0.98±.04)*

Types UPSC and UPR Low TC Precision Radial-Lead Resistors - Standard Characteristics

Model no.	Temperature coefficient ppm/°C	Wattage +70°C	Max. working voltage	Dielect strength U DC	Resistance		Dimensions
					Min.	Max.	
UPSC UPR	±3 to ±15 ±3 to ±15	0.60 0.60	300 250	500 400	100R 10R	1M 255K	see Matrix see Matrix

Tests	Conditions	MIL-R-55182/9	Typical drifts
Power conditioning (108)	100 hours/rated power at + 125°C 90'/30' cycle	-	±0.02% combined test
Thermal shock (107)	5 cycles -65°C / +150°C	±0.05% combined test	
Short time overload	6.25 times rated power / 5sec		
Low temperature storage and operation	1h stor. 45 min rated pow. at -65°C	±0.05%	-
	24h stor. 45 min rated pow. at -65°C	-	±0.01%
Terminal strength (211)	2lb pull test	±0.02%	±0.01%
Dielectric withstanding Voltage (301)	300 V Atmospheric 200 V / 100.000 ft.	±0.02%	±0.01%
Resist to soldering (210)	350°C / 3 sec.	±0.02%	±0.01%
Moisture resistance (106)	10 days	±0.05%	±0.01%
Shock	10 shocks 100g 6ms sawtooth	±0.01%	±0.01%
Vibration (204)	10 to 2000 Hz. 20 g 8 hours	±0.02%	±0.01%
Load life (108)	2000 hours at rated power at +25°C, +85°C or +125°C	±0.05%	±0.05%
	10,000 hours at rated power at +125°C	+ ±0.5%	±0.2%
Storage LIfe	10,000 h. no load at room conditions	-	±0.005%

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

A Miba Group Company

Metal Film

Series NE

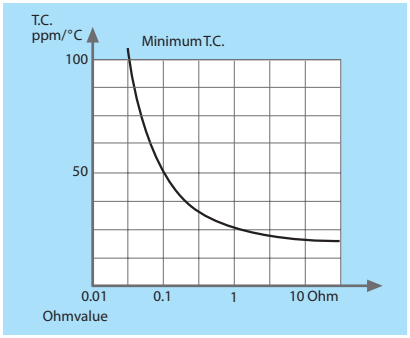
Precision Metal Film Resistors, molded style

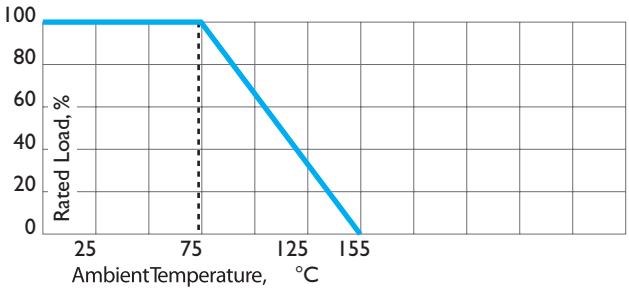
EBG's NE series features extremely low ranges heretofore unavailable in the industry. As a result of a special proprietary filming method, a nickel film is employed with controlled amounts of other metals, which results in fracturial resistance value availability, but with low temperature coefficient of resistance and high stability.

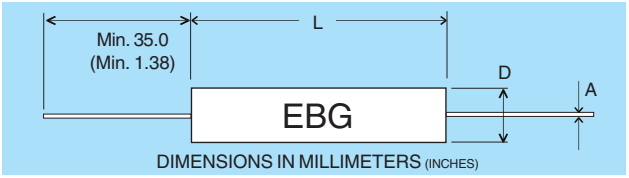
- Resistance values as low as 0.05 Ω

Specifications

- Resistance tolerance: from ±0.05% to ±5%
- Temperature coefficient: according to drawing
- Operating temperature: –55°C to + 155°C
- Insulation resistance: 104 MΩ at 500 V DC
- Noise: less than 0.05 µV/V







Model no.	Wattage	Resistance		Dimensions in millimeters (inches)		
		Min.	Max.	L	D	A
NE 1/10	0.25	0.025R	20R	6.80±.30 *(.268±.01)*	2.50±.40 *(.098±.02)*	.060±.05 *(.024±.002)*
NE 1/8	0.50	0.1R	20R	10.00±.30 *(.394±.01)*	3.70±.40 *(.146±.02)*	.60±.05 *(.024±.002)*
NE 1/4	1.00	0.1R	20R	14.80±.30 *(.583±.01)*	5.20±.40 *(.205±.02)*	.60±.05 *(.024±.002)*
NE 1/2	1.50	0.1R	20R	18.30±.30 *(.720±.01)*	6.50±.40 *(.256±.02)*	.81±.05 *(.032±.0.002)*

Series EE

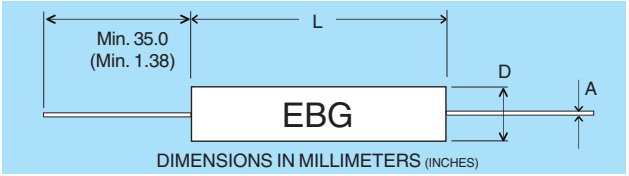
Precision Metal Film Resistors, molded style

EBG's EE styles conform dimensionally to the RN styles of MIL-R- 10509 and the RNR styles of MIL-R- 55182. All of EBG's Metal Film Resistor styles offer performances that exceed the requirements of both of these specifications. All EE styles can be used for automatic insertion and/or encapsulation.

Specifications

- Resistance tolerance: from ±0.02% to ±1%
- temperature coefficient: from ±5 ppm/°C to ±50 ppm/°C all TCR referenced to 25°C, ΔR taken at +25°C and +85°C, other temperature ranges upon request
- Elements are produced and tested in accordance with MIL-R-10509 and MIL-R-55182 as well as MIL-STD-202.
- Special Feature – Series UAR
- Standard storage conditions: 0 to 85°C at 80% RH max. for min. 12 months. For different conditions please contact your local EBG representative!

Upon request, EBG will conduct a "burn-in" of these elements for ultimate stability. Please refer to the UAR (Ultra Accurate Resistor) series and ask for a detailed datasheet!



Type MIL 10509	EE 1/20 RN 50	EE 1/10 RN 55	EE 1/8 RN 60	EE 1/4 RN 65	EE 1/2 RN 70
Power rating (W at 125°C)	.05	.10	.125	.25	.50
Max. working voltage (V)	200	250	300	300	350

Model no.	Wattage 70°C	Max. continuous oper. Volt.	Resistance	
			Min.	Max.
EE 1/20	.125	200	20R	600K
EE 1/10	.250	250	20R	3M
EE 1/8	.500	300	20R	5M
EE 1/4	.750	300	20R	10M
EE 1/2	1.000	350	20R	15M

Model no.	Dimensions in millimeters (inches)		
	L	D	A
EE 1/20	390±.30 *(.154±.01)*	1.80±.40 *(.071±.02)*	.45±.05 *(.018±.002)*
EE 1/10	6.80±.30 *(.268±.01)*	2.50±.40 *(.098±.02)*	.60±.05 (.024±.002)
EE 1/8	10.00±.30 *(.394±.01)*	3.70±.40 *(.146±.02)*	.60±.05 *(.024±.002)*
EE 1/4	14.80±.30 *(.583±.01)*	5.20±.40 *(.205±.02)*	.60±.05 *(.024±.002)*
EE 1/2	18.30±.30 *(.720±.01)*	6.50±.40 *(.256±.02)*	.81±.05 *(.032±.0.002)*

The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

Custom-designed

EBG is pleased to introduce our strength in custom-designed passive components. Listed below are just some of the components we have developed in close cooperation with our valued customers.

INX
3 x 70 up to 3 x 100 W Thick Film Resistor with four or six terminals. All resistor values available from 1 Ω to 1 MΩ. Insulation voltage >2500 V, Non-Inductive Design

SMG & ESP
High Pulse Load Resistors; different versions available: 1 Ω to 1 MΩ as standard, easy M4 mounting and connecting

UMT 400
High Pulse Load Resistor with two internal resistors, based on a specially selected metal alloy. The design for the resistive layers shows best results regarding power and pulse load energy relative to available active area size!

DISC 120
Press Pack Ultra-High-Power Resistor (up to 10 kW) for ohmic values <1 Ohm. Designed for high current peaks! With high creeping distance design!

MODULE
Ultra Compact Custom-Designed Resistor/Hybrid Module. This solution offers many options for different internally connected resistors/components. Easy connection through use of standardized multiple pin strips. Extremely high-insulating potting material used to cover the active area! Easy mounting and handling!

RXP
High-Power Resistor solution with integrated air-cooled heat sink! Up to three internal resistors with four terminal contacts available! High insulation rating!
Dimensions comply with standard electrolytic capacitors. Low air flow needed for high power rating performance!

GWN
1,800 W Non-Inductive Discharge Resistor for traction application.

SWS
High Current Pulse Load Resistor, <0.5Ω, e.g. 3,500A for 100 msec. for 0.1Ω value.



The above spec. sheet features our standard products. For further options, please contact our local EBG representative or contact us directly. For updated information, please visit our website!

EBG RESISTORS

A Miba Group Company

EBG Inquiry Form for High Power Resistors

1. **Resistor type:** (if already known) _____
2. **Ohmic value:** _____ R
3. **Tolerance:** _____ %
4. **TCR:** (if requested) _____ ppm/°C
5. **Working load:** (rated power) _____ W

   At what heat sink temperature: _____ °C
6. **Pulses:**
   a. Shape of pulse ☐ square type ☐ pulse graph enclosed ☐ e-function type
   b. Frequency (how often does pulse occur) _____ Hz
   c. Length of pulse / tau _____ s
   d. Peak voltage or current _____ V or A
   e. Value of capacitor _____
7. **Insulation tests:** (if you need different than our standard performed testing specified in our catalogue data sheets, please subscribe)
   a. Dielectric strength test at _____ kV ☐ AC ☐ DC

      How long to be tested _____ s
   b. Partial discharge test at _____ kV

      How long to be tested (<10pC) _____ s
8. **Application details:**
   a. **Single resistor needed** ☐ **Multiples can be used** ☐
   b. **Function of requested resistor:** **(please select)**

   ☐ Snubber resistor ☐ Balancing resistor ☐ Chopper (braking) resistor
   ☐ Crowbar resistor ☐ Pre-charge resistor ☐ Filter cap. discharge resistor
   ☐ Heater resistor ☐ DC coupling cap. discharge resistor ☐ Filter resistor
   ☐ Others: (please subscribe) _____

   c. **Requested resistor is intended to be used in the following application (please subscribe):**

   ☐ Motor Drive (☐ traction ☐ stationary) ☐ HVDC-Energy Transmission ☐ X-Ray
   ☐ Medical Instruments ☐ Laser ☐ Electrical Vehicle ☐ Aerospace ☐ Radar

   d. **Cooling requirement for requested resistor (please select):**

   ☐ Resistor gets mounted onto heat sink ☐ Direct cooling of resistor element
   ☐ No extra cooling available (e.g. ambient air, etc.)
9. **Requested quantity:** _____ pcs
10. **Form completed by:** _____ **Date:** _____

EBG RESISTORS

A Miba Group Company

EBG Inquiry Form for High-Voltage Resistors

1. **Resistor type:** (if already known) ____
2. **Ohmic value:** ____ R
3. **Tolerance:** ____ %
4. **TCR:** (if requested) ____ ppm/°C

   Over which temperature range: ____ °C up to ____ °C
5. **VCR:** (if requested) ____ - ppm/V
6. **Operating voltage:** ____ V
7. **Impuls voltage / Peaks** ____ V

   a. Shape of pulse ☐ square type ☐ pulse graph enclosed ☐ e-function type

   b. Frequency (how often does pulse occur) ____ Hz

   c. Length of pulse / tau ____ s
8. **Continuous load:** ____ W

   Over which temperature range: ____ °C up to ____ °C
9. **Where do you use the requested resistor / ambient condition (please select):**

   ☐ air ☐ oil ☐ potting ☐ other: ____
10. **Special type of coating requested:** ____

    (Conformal Silicone, High Temperature Silicone, Printed Silicone (U2), Epoxy, Printed Epoxy (U3), Polyimide, Glass)
11. **Currently used part numbers (also other than EBG):**

    ____ ____ ____ ____
12. **Application details:**

    a. **Single resistor needed or can multiple be used:** **(please describe)** ____

    b. **Function of requested resistor:** **(please select)**

    ☐ Snubber resistor ☐ Balancing resistor ☐ Measuring resistor

    ☐ Pre-charge resistor ☐ Filter cap. discharge resistor ☐ HV-Divider

    ☐ Heater resistor ☐ DC coupling cap. discharge resistor ☐ Filter resistor

    ☐ Others: (please subscribe) ____

    c. **Requested resistor is intended to be used in the following application (please subscribe):**

    ☐ Motor Drive (☐ traction ☐ stationary) ☐ HVDC-Energy Transmission ☐ X-Ray

    ☐ Medical Instruments ☐ Laser ☐ Electrical Vehicle ☐ Aerospace ☐ Mining

    ☐ Electrostatic Ionization ☐ Other (please subscribe): ____
13. **Requested quantity:** ____ pcs
14. **Form completed by:** ____ **Date:** ____

Contacts

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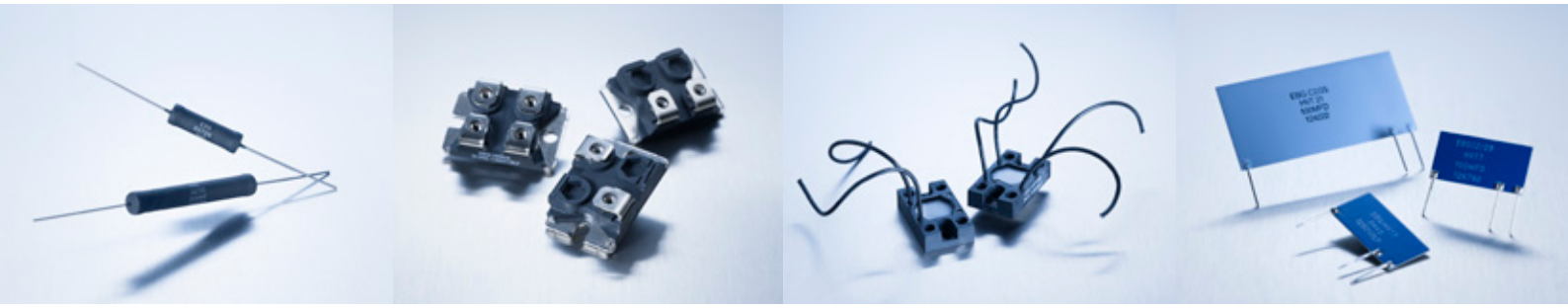
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Email: sales@ebg-us.com

Example of how to order

Model #	Ohmic value	Tolerance	TCR
HXP-2	1 ohm = 1 R 10 kohm = 10 k	F = ± 1 % J = ± 5 % K = ± 10 %	50 ppm 100 ppm 250 ppm
FBX 8/5	100 kohm = 100k	D = ± 0,5 %	80 ppm

This catalog and single datasheets are also available at EBG's website: www.ebg-at.com ("Products" – "Online Catalog") or www.ebg-usa.com

www.ebg-at.com



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