EBG
RESISTORS
A Miba Group Company

Innovation in Motion Miba

Power resistors & power safety devices for eMobility applications

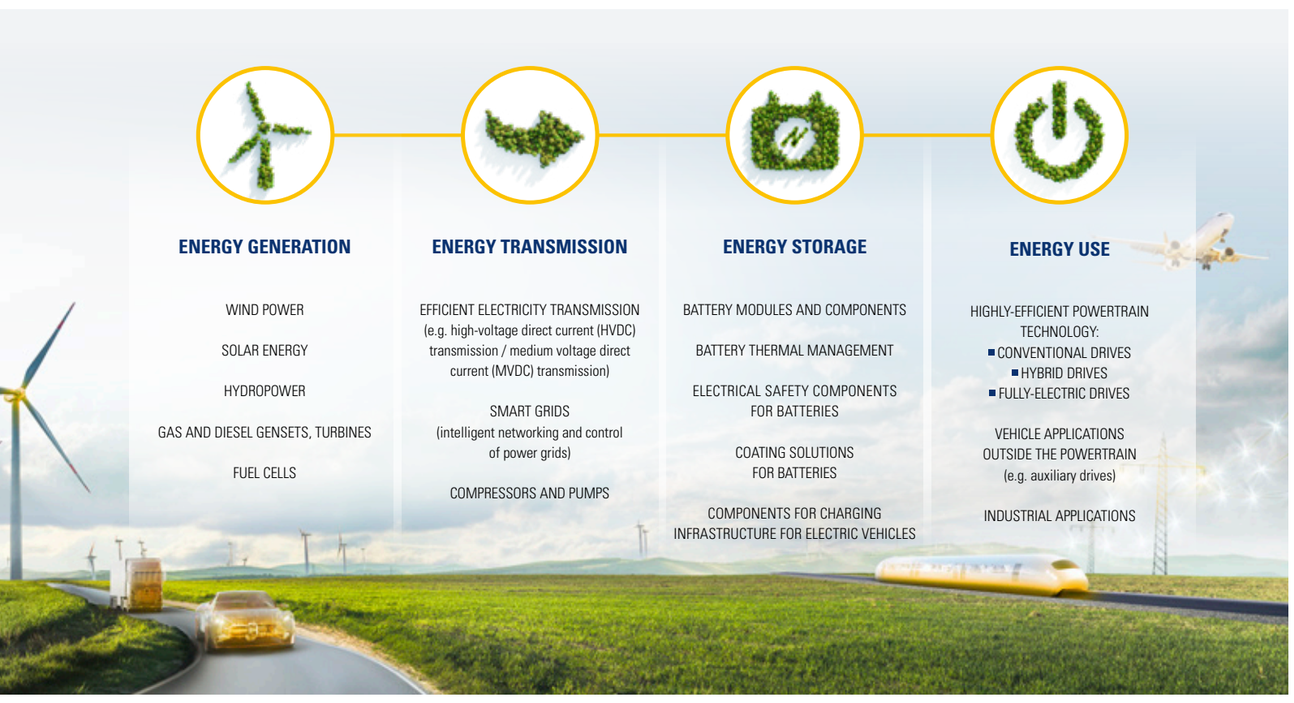
Product catalogue 2022

Innovation in Motion

No power without Miba technology

We strive for product and technology leadership in technologically demanding niches along the entire energy value chain. Our products make an important contribution to the efficient and sustainable generation, transmission, storage and use of energy. They are making our customer applications even more sustainable and environmentally friendly.

Miba technologies accompany the entire cycle of efficient generation, transmission, storage and use of energy.



The Miba Group develops and produces function-critical components with highest requirements to performance, quality and cost worldwide. Miba offers proven solutions for conventional powertrains and customer specific engineered solutions for eMobility applications. Miba sintered components, engine and industrial bearings, friction materials, power electronics components and coatings are used around the world in motor vehicles, trains, ships, aircrafts, power plants, refineries, compressors and industrial pumps.

EBG RESISTORS
A Miba Group Company

EBG Resistors

We develop the optimal resistor solution for your requirements

As a leading international manufacturer of high power, high voltage, and high energy resistors, EBG Resistors ensures that energy is converted and transmitted safely and efficiently. With strong innovative power, our development teams are always working towards smaller and more powerful resistors to keep up with the ever-changing demands.

True to the motto: Technologies for a Cleaner Planet

Our products are available in various power and voltage ranges, sizes, tight tolerances and ohmic values. With our technical expertise and years of experience EBG Resistors is able to react quickly and flexibly to suggest a solution to meet your changing needs. Since 2010 EBG Resistors has been part of the Miba Group.

Innovation is what drives us

We are your development partner for technology complex components

We at Miba and EBG have a passion for innovation. With our team of dedicated R&D peoples around the globe drive forward the latest technology in electric driving.

As a specialist in the field of power electronics, we have made it to our mission to save installation space while achieving higher performance. With our development teams, we are constantly working on individual innovations for our customers. In this way, we respond to the constant changes in the markets, which are driven by ever-increasing environmental and performance requirements.

Benefit from our experience

As part of a joined development process, we can respond to the wishes of our customers in detail and adapt applications flexibly based on customer-specific requirements

We are constantly working to make our products lighter, smaller and more powerful. We are happy to incorporate our development expertise and product knowledge into our customers' applications.

All components are extensively tested in our in-house laboratory. In this way, we ensure that our customers receive a high-quality product for their applications.

Continuous Improvement Process is the base for our high product quality. Every single production process is proven over the long history in manufacturing. Quality gates after every process step are mandatory to keep the high quality.

We offer automotive-compliant manufacturing, automated according to IATF 16949 certification, in both large and small series.

We produce and develop close to you: Miba has 30 production sites with 7500 employees worldwide.

Innovative components driving performance, safety and sustainability

Power Safety Devices

Miba POWERfuse® Emergency disconnect for HV vehicle batteries

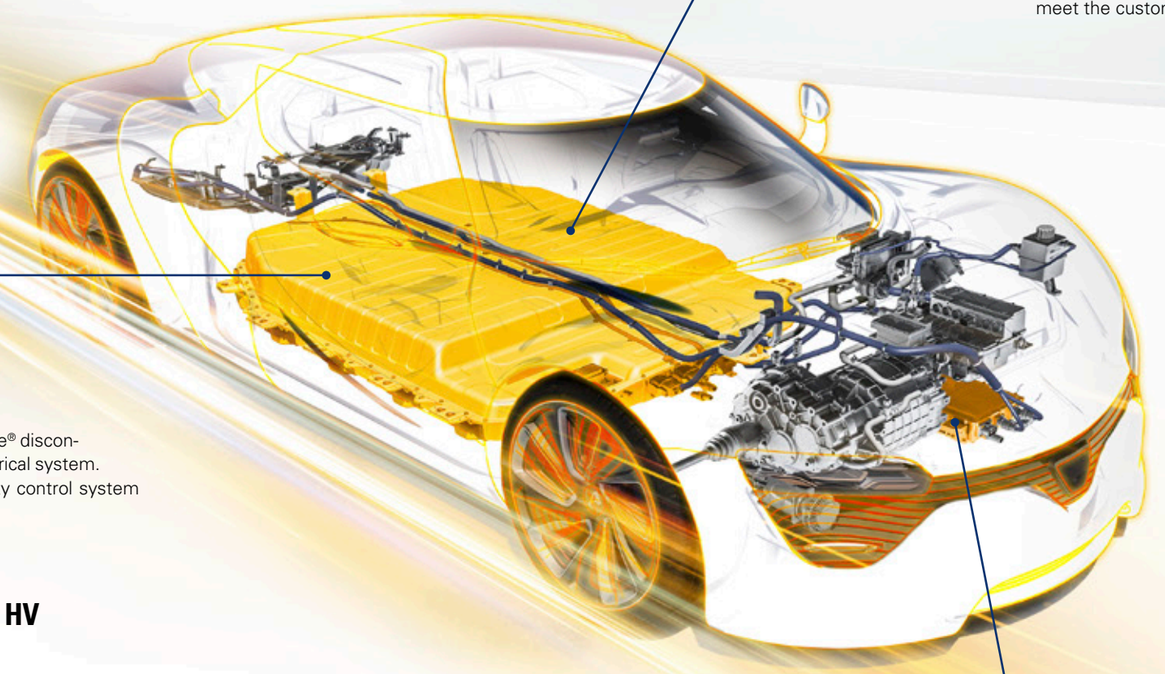
In the event of a technical malfunction or accident, the Miba POWERfuse® disconnects the battery quickly and safely from the vehicle's high-voltage electrical system. This disconnection is triggered both by a signal from the vehicle safety control system and by an integrated self-release mechanism.

Miba POWERcloser® Emergency stop switch for HV applications

The Miba Powercloser® is an electrical safety switch. It reliably closes circuits that could pose a hazard to the system or people. The switch is triggered by a pyrotechnic actuator. The switch-off is fully automatic.

Our power safety devices as POWERfuse® and POWERcloser® offer:

- 100% safe operation
- Fast reaction
- High switching power
- Made for serial manufacturing



PREcharge Resistors

The premium high-power resistors can be used to charge the DC-Link capacitor with very high pulse energy. And this can be done in a very short time, even ithout additional cooling. The design and electrical connection can also be customized to meet the customer's requirements.

Advantages:

- Excellent isolation performance
- Standard Fast-On connection
- High overload capability
- AEC-Q200 compliant
- Recyclable

DIScharge Resistors

Discharging resistors are used to discharge the DC link capacitors after an electric car has been switched off. Preferably they are used in inverters. The high-voltage-resistant and non-inductive design enables various circuit designs. Our discharge resistors are characterized by a compact and lightweight design, which also allows mounting on printed circuit boards.

We are able to integrate several types of resistors in one package. This also saves size and weight.

Advantages:

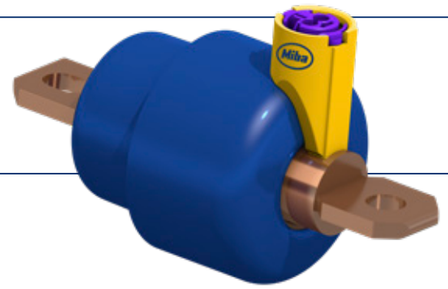
- High robustness
- Extensive possibilities for connection to heat sinks
- Vibration and pulse resistant
- AEC-Q200 compliant
- Customized electrical connection

Miba power safety devices

Power Safety Devices ensure fast and reliable electrical switching in case of a car accident to disconnect the battery from the car and fast discharge of all other energy sources such as capacitors or fuel cells. Miba Power Safety Devices are designed to switch large energies within milliseconds. The high energy density due to our special technology enables a light and compact design.

Miba POWERfuse®

The **Miba POWERfuse®** is a pyrotechnic battery isolator that is triggered by a pyrotechnic actuator. Due to its special design, the power fuse is suitable for automated assembly, requires little space and low weight.



Features

- Low resistance before separation
- Fast separation time
- High separation capacity ensuring safe operation
- Hermetically closed, compact, intrinsically safe component
- Customizable bus bar connection
- Highest energy density
- Lowest weight & smallest size

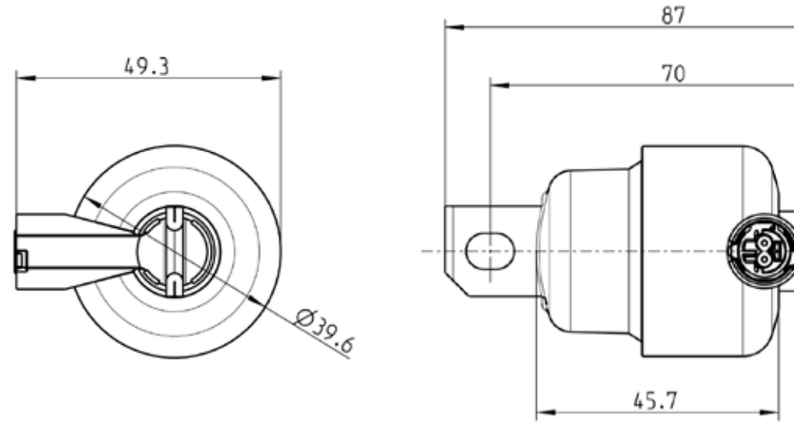
Technical specification

Feature	Value
Separation capacity – typical values	900VDC / 15kA / 25µH | 900VDC / 5kA / 110µH 800VDC / 30kA / 7µH | 500VDC / 20kA / 20 µH
Resistance before separation	< 32µΩ
Separation time	< 2ms @ 900V / 15kA / 25µH
Permanent current capability	400A
Weight	180g

Technical specification ignitor

Feature	Value
Qualified acc. to	AK-LV 16 & USCAR-28
Diagnostic current	≤ 100mA

Dimensions in mm [inches]



Miba POWERcloser® BEV

Miba POWERcloser® BEV
The Miba POWERcloser® BEV is designed for a fast discharge of all capacities in battery electric vehicle in case of a malfunction. Additionally resistance can be integrated to prevent any damage during fast discharge.

Features

- Easy integration with Fast-On
- High voltage capable
- Fast reconnect time
- Very leightweight & small
- Optional: resistance integration

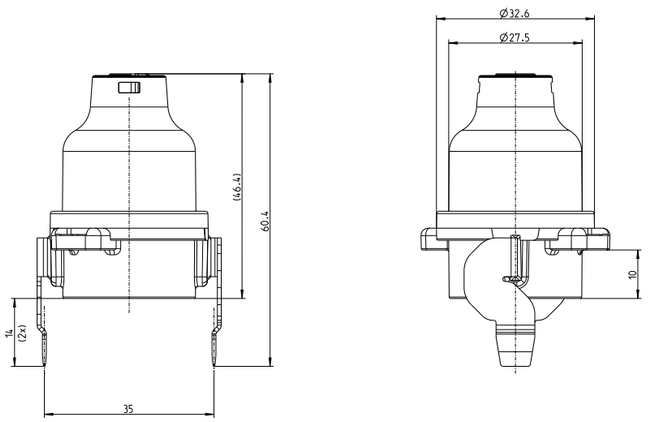
Technical specification

Feature	Value
Closing capability	900VDC / 4kA
Resistance after closing	< 5mΩ @1kVDC
Nominal closing time	< 500µs
Weight	35g

Technical specification ignitor

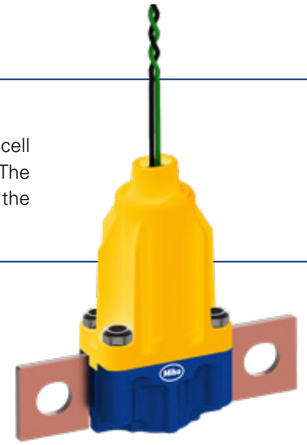
Feature	Value
Qualified acc. to	AK-LV 16 & USCAR-28
Diagnostic current	100mA

Dimensions in mm [inches]



Miba POWERcloser® Fuel Cell

Miba POWERcloser® Fuel Cell
The Miba POWERcloser® Fuel Cell is designed for emergency shortcut of the fuel cell in case of car accident to eliminate all electrical energy produced by the fuel cell. The Miba POWERCloser® Fuel Cell is hermetically sealed so it can even be operated in the hydrogen hazard environment and still operates safe and secure.



Features

- Hermetically sealed
- High voltage capable
- High current profile
- Small and easy integration
- Fast closing time

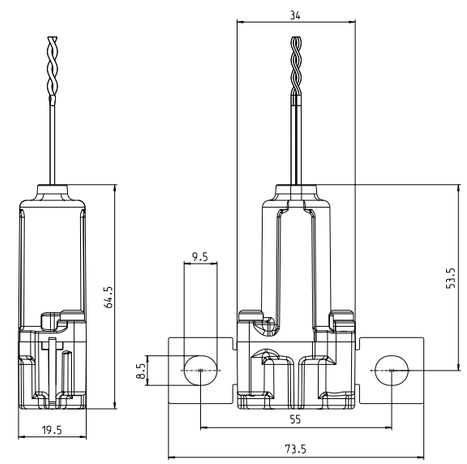
Technical specification

Feature	Value
Closing capability	900VDC / 3,5kA
Resistance after closing	< 3mΩ @ 1kVDC
Nominal closing time	< 500µs
Weight	87g

Technical specification ignitor

Feature	Value
Qualified acc. to	AK-LV 16 & USCAR-28
Diagnostic current	100mA

Dimensions in mm [inches]



EBG PREcharge resistors

PREcharge resistors are typically used in the battery junction box to limit the charging current of the DC-Link capacitor. The PREcharge resistor must withstand the high energy pulse up to 1000V. EBG PREcharge resistors can withstand this single pulse event without heat sink. Of course, all our resistors are AECQ-200 qualified. The product and electrical design can be manufactured according to customer specifications.

EBG ESP 62/20

ESP 62/20
The ESP 62/20 is a cylindrical PREcharge resistors made for high voltages. No extra cooling is required.

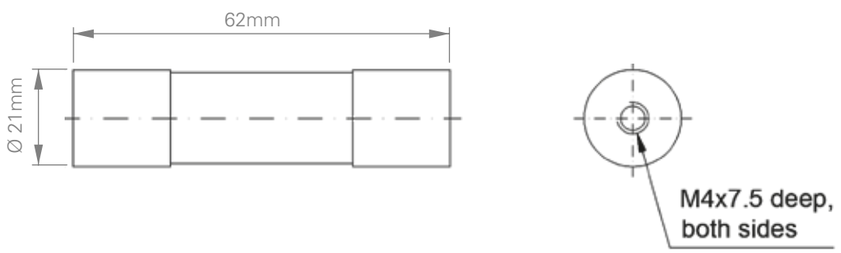
Features

- Very robust design
- High voltage resistant
- No external cooling required
- Easy integration
- Non-inductive

Technical specification

Feature	Value
Power rating	150W
Maximum operating voltage	900V
Pulse energy rating	3.300J at 1 sec.
Mounting	M4 scews, max. torque 3Nm (static)

Dimensions in mm [inches]



EBG RST3

The EBG REST3 resistor is covered with an aluminum housing and made for PREcharge applications. A short-term overload is possible. The Fast-On connection allows an easy and fast integration in the production process.

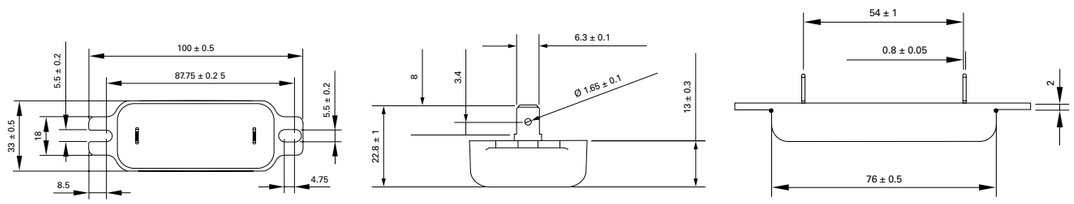
Features

- Easy Integration with Fast-On
- Very robust design
- Lightweight and small
- Short term overload possible

Technical specification

Feature	Value
Power rating	75W
Maximum operating voltage	800VDC
Dielectric strength	3000VDC for 60s
Weight	63g ± 5g

Dimensions in mm [inches]



EBG RST5N

The EBG RST5N is a robust resistor for extreme high PREcharge pulses. Suitable for high voltages up to 1000V.

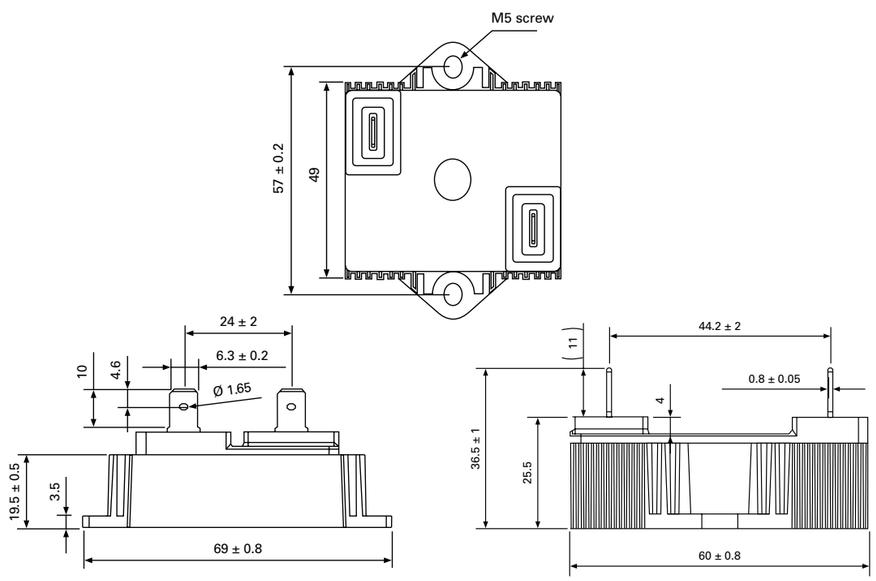
Features

- High voltage capable
- Extreme pulse capability
- External cooling possible
- Easy connection via Fast-On
- Robust design

Technical specification

Feature	Value
Power rating	100W at 85°C bottom case temperature
Short time overload	2800W at 70°C for 5s, ΔR = 0.5% max.; one time
Maximum operating voltage	≤ 1000VDC (precharge voltage)
Insulation resistance	500MΩ at 1000V
Weight	~148,5g

Dimensions in mm [inches]

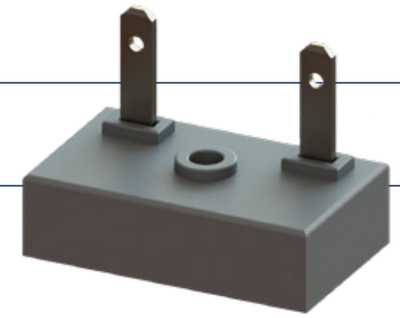


EBG DIScharge resistors

DIScharge resistors are typically used in the inverter to DIScharge the DC-Link capacitor after driving. The design of our DIScharge resistors varies in the shape, size and electrical connection. EBG with its special technology for DIScharge resistors is able to adopt the resistor design to customer requirements. The non-inductive design of our resistors offers new DIScharge concepts by using a constant power DIScharge. Such a concept allows smaller resistors, thus saving in weight and size. All DIScharge resistors are AEC-Q200 compliant. All DIScharge resistors with heat sink mount can be equipped with phase change material for a better thermal connection.

EVR - 50

The EVR-50 is a 50Watt constant power DIScharge resistor.



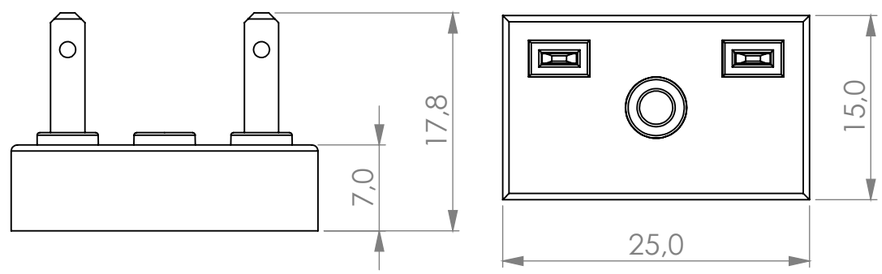
Features

- Very small design and lightweight
- Fast connection
- Intelligent mounting process doesn't require screws
- Non- inductive

Technical specification

Feature	Value
Power rating	50W
Operating voltage	900V
Dielectric strength	3000VDC
Weight	6g

Dimensions in mm [inches]



EVR - 150

The EBG EVR-150 is a DIScharge resistor developed for the automotive segment. It is a very robust product with a 150Watt constant power discharge and Fast-On connection. The unique design makes the product vibrations proof.

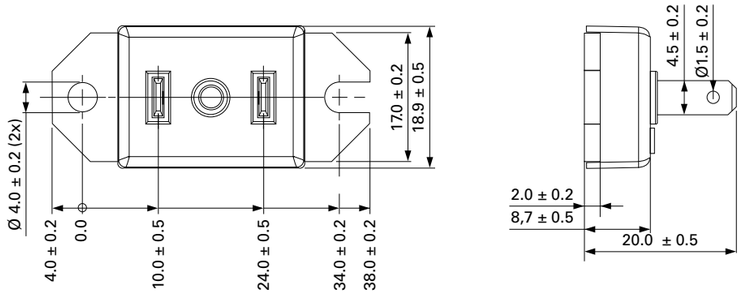
Features

- Easy integration with Fast-On
- Robust design
- Lightweight and small
- Short term overload possible

Technical specification

Feature	Value
Power rating	150W
Maximum operating voltage	900V
Dielectric strength	3000VDC for 60s
Weight	16,2g

Dimensions in mm [inches]



EVR - 300

EVR-300 power resistor is our universal resistor. This 300Watt resistor can handle different single as well as PWM pulses. Further it can be equipped with several options such as NTC for temperature control and or passive discharge resistor.

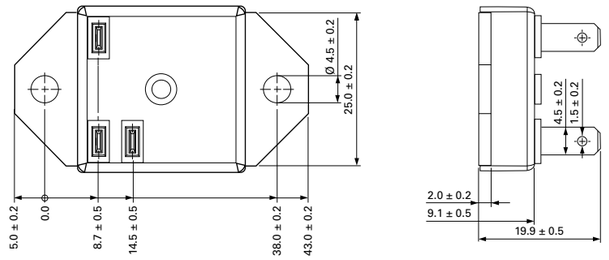
Features

- High voltage capable
- Fast-On connection
- Integration of temperature control
- Integration of passive DIScharge resistor
- Small & lightweight design

Technical specification

Feature	Value
Power rating of active discharge resistor	250W
Power rating of passive discharge resistor	10W
Maximum operating voltage	1.000V
Dielectric strength	3.000VDC for 60s
Weight	29g

Dimensions in mm [inches]



GXP-NTC

The GXP-NTC is the EBG's workhorse. The 120Watt DIS-charge resistor is equipped with a temperature sensor. Further the standard SOT-227 package with screw terminal requires a differnet electricla connection to the PCB design.

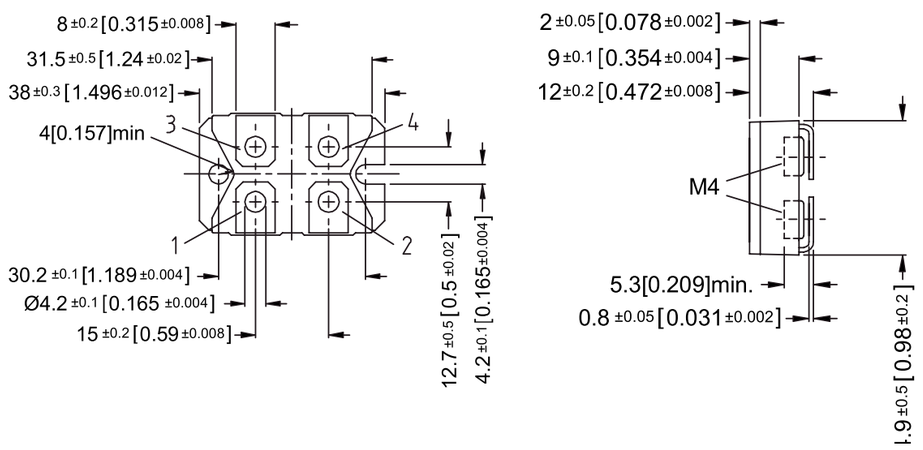
Features

- Temperature sensor included
- Screw terminals
- Standard SOT-227 housing
- Non-inductive design

Technical specification

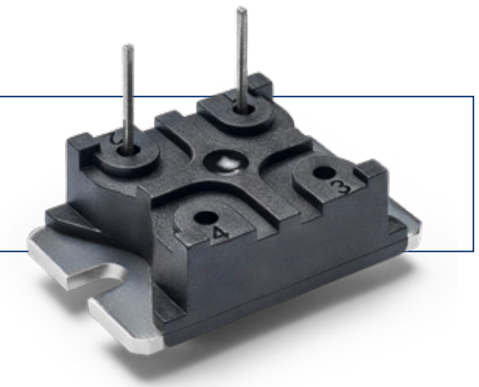
Feature	Value
Power rating	up to 120W at 85°C bottom case temperature (see configurations)
Short time overload	1.5x rated power at 85°C bottom case temperature for 10 sec., l'iR = 0.4% max. (for conf. 1, 2 and 3)
Maximum working voltage	500V (up to 1,000V on special request = "S"-version)
Voltage proof	Tests only on special request dielectric strength up to 4,000VDC against ground
Weight	~26g

Dimensions in mm [inches]



PXP-200

PXP-200 is our 200W power resistor and talent in the electrical connection. The resistor can be easily equipped with cables as well as solder pin. The standard SOT-227 housing enables a standard footprint.



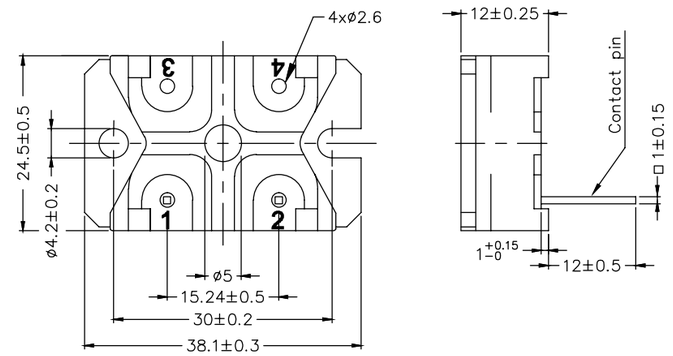
Features

- Different designs available
- Cable or solder pin connection possible
- Standard SOT-227 housing
- Non-inductive design

Technical specification

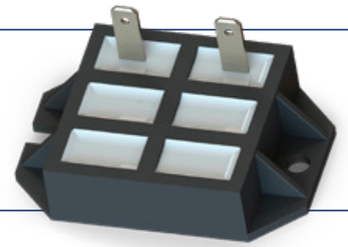
Feature	Value
Power rating	up to 200W at 85°C bottom case temperature (see configurations)
Short time overload	1.25x rated power at 85°C bottom case temperature for 10 sec., ΔR = 0.4% max. (for conf. 1, 2 and 3)
Maximum working voltage	500VDC (up to 1,000V on special request = "S"-version)
Voltage proof	dielectric strength up to 4,000VDC against ground
Weight	~20g

Dimensions in mm [inches]



EVR-250

The EVR-250 is the newest DIScharge solution from EBG with a revolutionary design. This 250Watt DIScharge resistor is available as a housing solution to fit on a heatsink or as SMD solution. As SMD solution the resistor can be mounted with an SMD robot automatically and saves time and money in manufacturing.



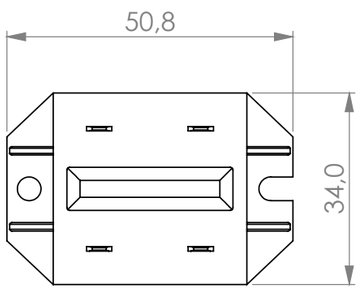
Features

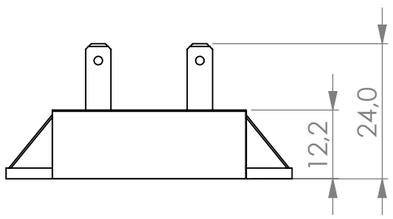
- Option SMD mounting solution in development
- Option with housing and Fast-On
- Small & lightweight design
- High pulse capability

Technical specification

Feature	Value
Rated power	250W
Maximum operating voltage	1.000V
Electric strength	4.000VDC
Shorttime overload	1,25x
Weight	22,8g

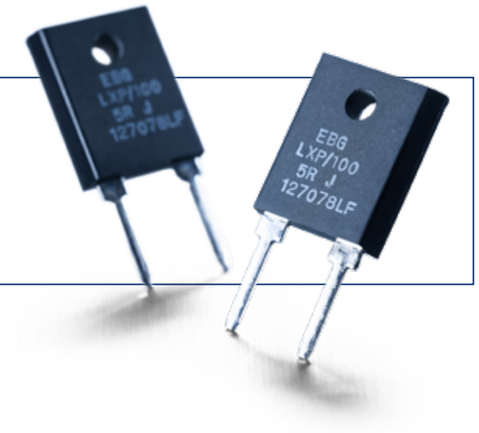
Dimensions in mm [inches]





LXP-100

The LXP-100 is the 100Watt solution in a TO-247 housing. The single screw mount resistors with for direct solder connection on PCB. The smallest and most lightweight industry solution. The non-inductive design works perfect for constant power DIScharge. This resistor will be used as load damping resistor as well



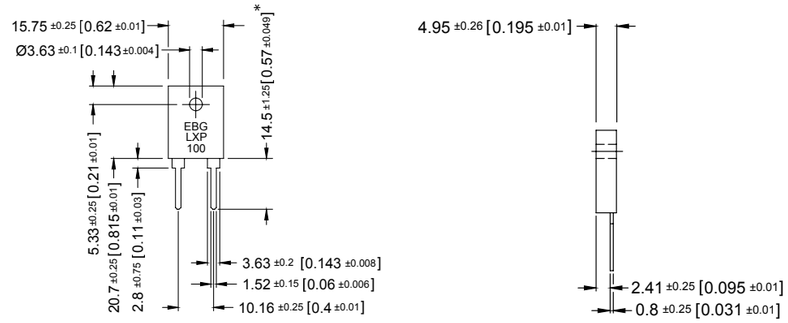
Features

- Single screw mount on heat sink
- Solder pins for direct PCB mount
- Standard TO-247 housing
- Non-inductive design

Technical specification

Feature	Value
Power rating	100W at 25°C bottom case temperature derated to 0W 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% + 0.0005Ω)
Maximum operating voltage	350V, max. 500V on special request
Insulation resistance	> 10GΩ at 1,000VDC
Dielectric strength voltage	1,800VAC
Weight	~4g

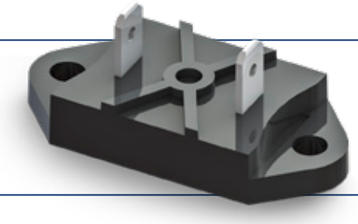
Dimensions in mm [inches]



* longer contacts availabe (ask for details)

ACP-100

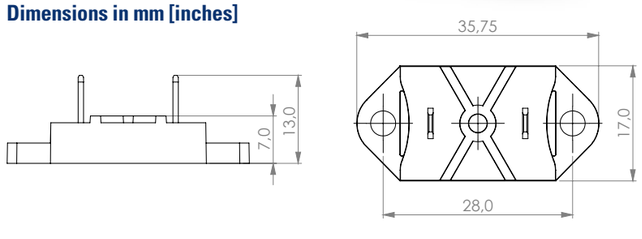
This 100W DIScharge resistor is a good solution for smaller pulses. The proven concept with Fast-On connection offers easy mounting in heat sinks and PCB. A small and lightweight resistor for smaller puls energy.



Features

- Small solution for heat sink mount
- Fast-On connection
- Proven concept

Dimensions in mm [inches]

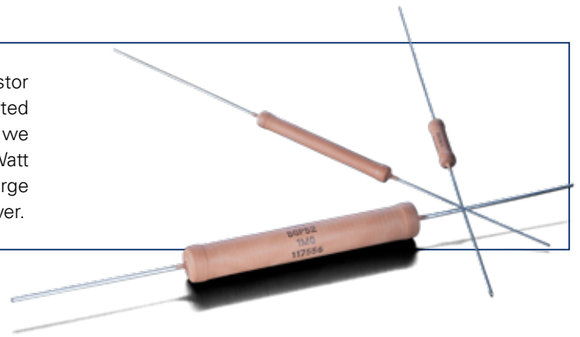


Technical specification

Feature	Value
Dielectric strength	3000VDC (for 60s)
Maximum operating voltage	600V
Power rating	100W
Weight	6g

SGP-Series

The SGP-series by EBG is our pulse DIScharge resistor without heat sink requirement. It can be easily mounted directly on the PCB. Depending on the pulse energy, we offer different sizes. Starting with 1 Watt up to 20 Watt continuous power. Small solution for minor DIScharge pulses. Ask for more details on the size and rated power.



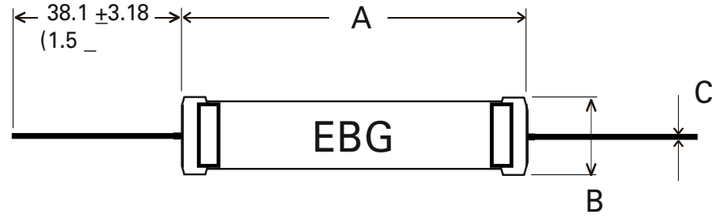
Features

- Different designs available
- Solder pin connection
- No heat sink for cooling required
- Non-inductive design

Technical specification

Feature	Value
Dielectric strength	1000VDC
Insulation resistance	> 10GΩ at ,1000VDC
Overload / overvoltage	5x rated power at 125°C with applied voltage not to exceed 1.5x Vmax for 5 seconds.

Dimensions in mm [inches]

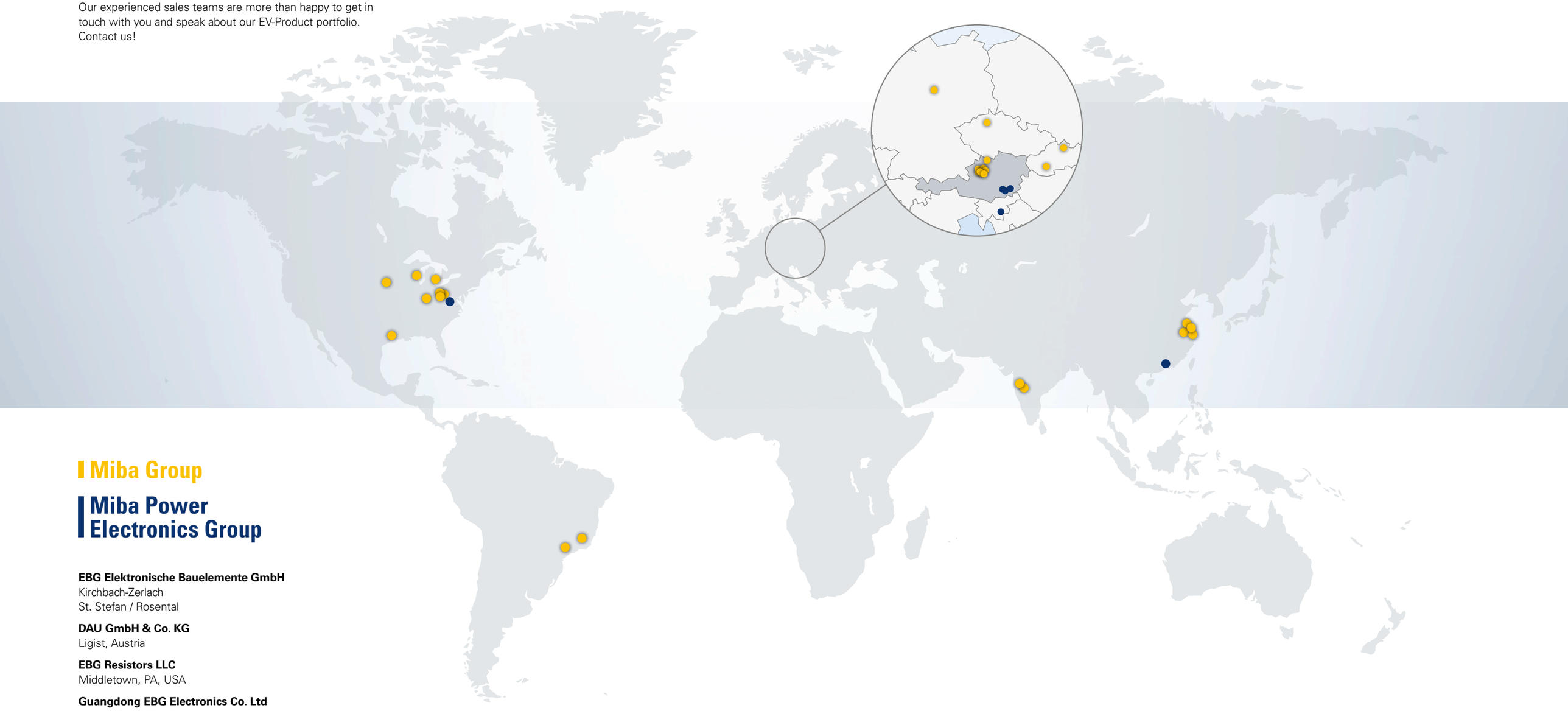


Model Specifications

Model no.	Wattage 75°C	Max. kV	Dimensions in Millimeters (inches)		
			A ±0.50 | ±0.02	**B** ±0.50 | ±0.02	**C** ±0.05 | ±0.002
OGP-13	1.0	1.5	13.30 (0.524)	4.20 (0.165)	0.60 (0.024)
OGP-20	1.5	2.0	19.70 (0.776)	4.20 (0.165)	0.60 (0.024)
OGP-26	1.9	4.0	26.20 (1.031)	4.20 (0.165)	0.60 (0.024)
OGP-30	2.5	5.0	32.30 (1.272)	4.20 (0.165)	0.60 (0.024)
OGP-39	3.0	6.0	39.40 (1.551)	4.20 (0.165)	0.60 (0.024)
OGP-52	3.3	10.0	49.50 (1.949)	4.20 (0.165)	0.60 (0.024)
SGP-20	2.5	3.0	20.20 (0.795)	8.20 (0.323)	1.00 (0.040)
SGP-26	3.7	4.0	26.90 (1.059)	8.20 (0.323)	1.00 (0.040)
SGP-32	4.5	5.0	33.00 (1.3)	8.20 (0.323)	1.00 (0.040)
SGP-39	5.2	8.0	39.50 (1.555)	8.20 (0.323)	1.00 (0.040)
SGP-52	7.5	10.0	52.10 (2.051)	8.20 (0.323)	1.00 (0.040)
SGP-78	11	15.0	77.70 (3.059)	8.20 (0.323)	1.00 (0.040)
SGP-103	12	20.0	102.90 (4.051)	8.20 (0.323)	1.00 (0.040)
SGP-124	15	25.0	123.70 (4.870)	8.20 (0.323)	1.00 (0.040)
SGP-148	30	45.0	148.00 (5.83)	16.00 (0.63)	-
SGP-154	20	30.0	153.70 (6.051)	8.20 (0.323)	1.00 (0.040)

We develop and produce close to you

Miba and EBG are strong partners of the automotive business. We work closely together with our automotive customers around the world. Our international network with 30 production sites und many sales offices in Europe, Americas or Asia offer direct support. Miba and EBG both are next to ISO9001 also IATF 16949 certified. Our products are AEC-Q200 compliant and meet the automotive standard. Industry standard documentation such as PPAP is available per request.
Our experienced sales teams are more than happy to get in touch with you and speak about our EV-Product portfolio.
Contact us!



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EBG Elektronische Bauelemente GmbH
Kirchbach-Zerlach
St. Stefan / Rosental

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Ligist, Austria

EBG Resistors LLC
Middletown, PA, USA

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Qinqxi, China

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Šentjernej, Slovenia

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www.miba.com **www.ebg-resistors.com**

Miba Energy Holding GmbH
Dr.-Mitterbauer-Strasse 3
4663 Laakirchen, Austria
T +43 7613 2541-0
E powerelectronics@miba.com

EBG Elektronische Bauelemente GmbH
Kirchbach 384
8082 Kirchbach-Zerlach, Austria
T +43 3116 2625-0
E sales@ebg-resistors.com