

GaN-Based DC-DC Converters For Off-Highway And Commercial Vehicles

[BrightLoop Converters'](#) Value DC-DC product line of dc-dc converters leverages GaN transistors from Efficient Power Conversion (EPC) to offer high performance at affordable pricing for a range for off-highway and commercial vehicles, according to the vendor. The Value product line is composed of two converters (M and L) respectively delivering 6 kW and 300 A and 12 kW and 600 A (see the figure and the table).

While being competitively priced, they have a significantly smaller footprint and weight (<5 kg) than the equivalent power converters currently available on the market, according to BrightLoop. The VALUE range also features rugged and durable design, and compliance with market standards such as ECE R 10, ECE R 100 and LV 124.

Moreover, BrightLoop's VALUE M and L DC-DC converters can be used in 12-V, 24-V and 48-V architectures and with 400-V, 800-V or more exotic battery ranges: the same platform addresses all these needs. As with other BrightLoop converters, this product line is available in single- or dual-output versions with an option for setting the output voltage by CAN between 10 V and 54 V.

This feature allows removing some components—thus saving space—from the vehicle such as the battery equalizer, present when there are several batteries in the system. In addition, VALUE converters offer a reversibility function which allows, for example, to precharge the HV bus without the need for bulky resistors.

These features are made possible by the use of EPC's EPC2029 eGaN FET transistors. EPC's EPC2029 is an 80-V, 48-A eGaN FET featuring a 1-mm ball pitch. The wider pitch allows for placement of additional and larger vias under the device to enable high current carrying capability despite the small 2.6-mm x 4.6-mm footprint.

According to BrightLoop Converters, the company has gained experience from many years of development for motorsport applications and learned to make the most out of GaN technology to deliver highly reliable, extremely light and compact converters. In 2020, the company released a Performance DC-DC product line that is said to provide the best power density on the market (~3 kW/kg) and great versatility to extreme vehicle applications and motorsports.

After demonstrating that GaN technology can significantly improve performance, the French company now wants to prove that using this technology does not necessarily lead to higher costs. With the launch of the new Value product line later this year, the strategy is to make performance accessible to these markets, which are now also looking for lightweight, space-saving and high-performance converters in the most cost-effective way. However, at this time, the company is not releasing any pricing details on the Value DC-DC product line.

For more information, see the Value DC-DC product line, [page](#). Or for information on the 6-kW, 300-A converter, see the Value DCDC M [page](#) and for more on the 12-kW, 600-A converter, see the Value DCDC L [page](#).

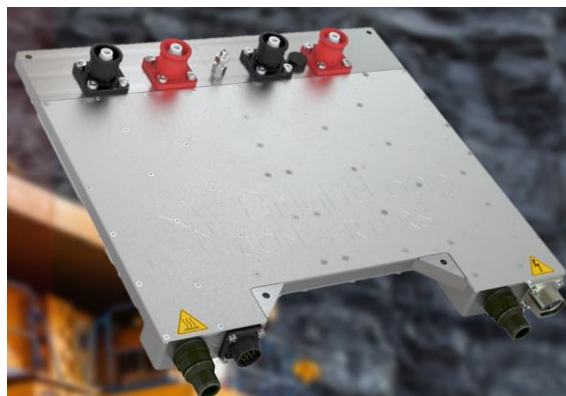


Figure. The Value product line is composed of the M and L dc-dc converters, which deliver 6-kW, 300-A output and 12-kW, 600-A output, respectively.

Table. Key electrical specifications of the Value dc-dc converters.

Specification	DC DC M	DC DC L
Output power (kW)	6	12
Input voltage range (V)	250 to 400 or 450 to 900	
Output voltage range (V)	10 to 54	
CAN functions	Bootloader and remote communication	
Cooling	Liquid or air	
Environment	Harsh environment	
Weight	<4 kg	