

LinPak

New IGBT open standard medium power phase-leg module

ABB presents a new open standard phase leg module, the LinPak. The innovative LinPak concept answers the market's request for a new package that offers exceptionally low stray inductance and, due to separated phase- and DC-connections, allows for simpler inverter designs. The low-inductive phase leg IGBT module LinPak is available at 1,700 and 3,300 volt.



Features

The very low-inductive internal module design and the massive DC-connection enables both, a very low-inductive busbar design and a high current carrying capability. Both are desperately needed for state of the art silicon chipsets and even more for future SiC solutions. The LinPak module design results in excellent internal and external current sharing, making it ideally suited for paralleling. It thus renders possible a large range of current ratings with just one article. Derating-free paralleling is possible up to at least four modules. Moreover, the LinPak features an integrated temperature sensor and has a dedicated mounting area for a gate drive adapter board. For harsh environments in traction or off-highway vehicle applications, the adapter board can be additionally fixed with four screws in the module corners. This new open standard external module design can be freely used from all module manufacturers, as long as the outline and terminal positions are kept identical. So far at least two major suppliers are committed to this new high-power IGBT package.

The 3,300 V / 2 x 450 A LinPak offers a fast and low switching loss SPT⁺ chipset that ideally fits to the LinPak module. The LinPak is the first 3,300 V module with an integrated temperature sensor and offers unrivaled reliability thanks to well-matched materials such as AlN insulation and AlSiC baseplate, as well as advanced wire bonding techniques and particle free ultrasonic welded main connections.

The 3,300 V LinPak is an enabler for more reliable, efficient and compact inverter designs in traction applications such as regional trains and metros but as well locomotives and high-speed trains. It also serves markets such as OHV (off-highway- vehicle) and industrial converters for drives and wind-power.

Developments

Based on the shown concept, ABB develops highly reliable traction rated modules, starting with 1,700 V / 2 x 1,000 A followed by a 3,300 V / 2 x 450 A module. Also Cu-based industrial versions at 1,700 V and later 1,200 V are targeted. High-voltage traction versions with the same footprint, but rearranged electrical connections in order to cope with the higher clearance and creepage requirements will be presented soon.

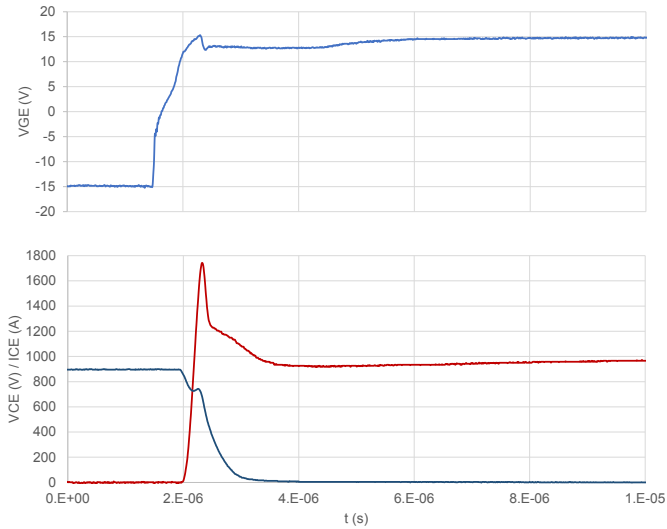
LinPaks	Voltage (V)	Current (A)
AlSiC / (Cu*)	1,700	2 x 1,000
AlSiC	3,300	2 x 450

*copper and 1,200 V versions will follow.

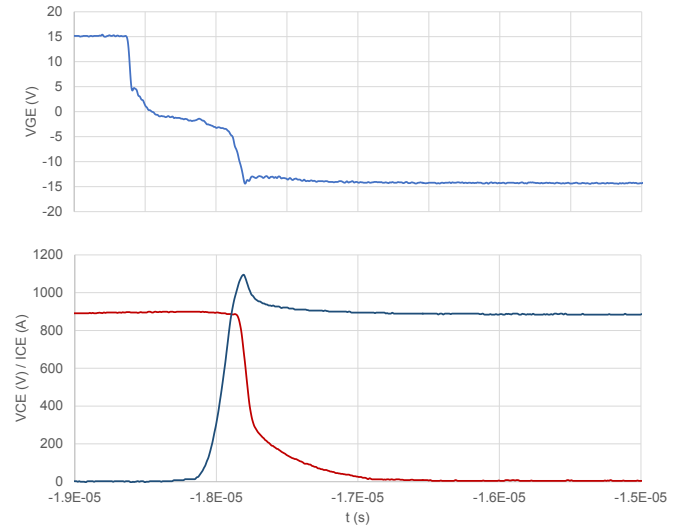
Exemplary nominal switching waveforms

The exemplary switching waveforms at nominal current show the benefit of the low overall stray inductance. Despite the fast switching and the very low switching losses of the 1,700 V SPT++ IGBT chipset, the overvoltage remains at a

very low level and the current as well as voltage waveforms are free of oscillations. In the present setup, we achieved a total stray inductance including capacitors, busbar and module of less than 25 nH per 1,000 A phase leg.

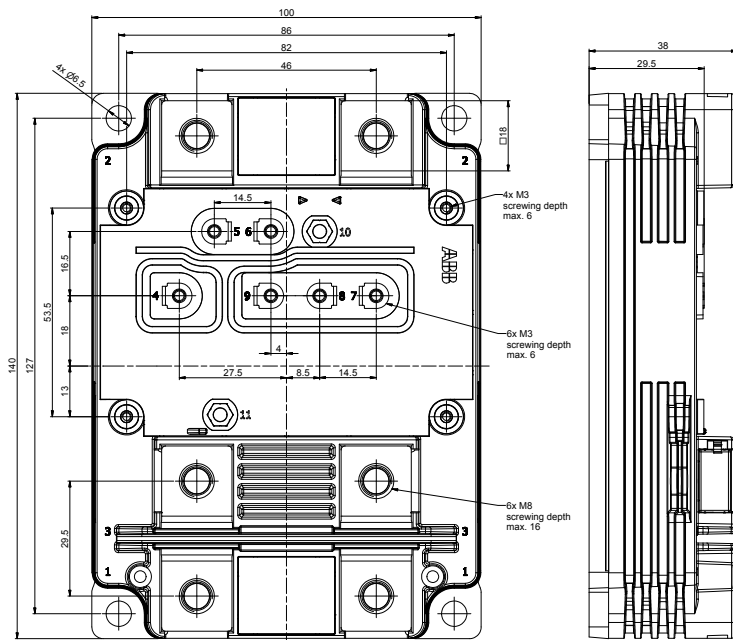


1,700 V LinPak turn-on switching curves



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Outline-drawing



Contact us

ABB Switzerland Ltd.
Semiconductors
 Fabrikstrasse 3
 5600 Lenzburg, Switzerland
 Tel: +41 58 586 14 19
 E-mail: abbsem@ch.abb.com
www.abb.com/semiconductors