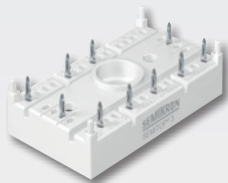


Leading Chip and Packaging Technology for Highest Energy Efficiency



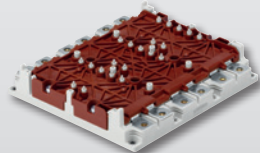
MiniSKiiP



SEMITOP



SEMITRANS



SKiM 93

Silicon Carbide Power Modules

10kW up to 250kW



Motor Drives



Solar Energy



Power Quality



Power Supplies



Urban Transport Equipment

Silicon Carbide Power Modules



Various connection technologies, wide output power range and highest efficiency are features combined today in SEMIKRON silicon carbide power modules. Both, hybrid and full SiC modules are currently available in four different packages, utilizing the unique features of each package.

Benefits

SEMIKRON hybrid silicon carbide power modules are the easy-to-implement solution for reduced power losses and increased switching frequency. They combine the latest IGBT technology with SiC Schottky diodes.

For efficiencies higher than 99%, a minimum of power losses and the maximum output power and power density, full silicon carbide modules have to be used with SiC MOSFET switches. Thanks to the MOSFET's body diode an external anti-parallel diode is not required in all cases, but can be beneficial to increase the efficiency even further. SEMIKRON supplies power modules with silicon carbide chips of the leading suppliers, tested to the well known SEMIKRON quality and reliability.

Applications

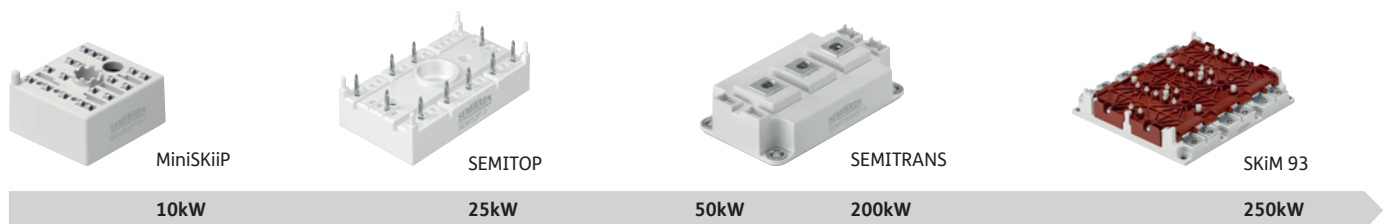
Silicon carbide power modules are the perfect technology to create system benefits, both technically and commercially. With the increase of the switching frequency, filter components like chokes in booster applications or the load side filters of power supplies, UPS or solar inverters can be drastically reduced. Additionally the power losses are reduced which leads to savings in cooling lower fan power, smaller heatsinks or the change of a formerly forced cooled application to a

convection cooled design. Finally the overall system efficiency can be maximised as well to fulfil the demands of modern power conversion systems.

Product range

Currently the products cover a power range from 10kW to 250kW in 4 different packages. MiniSKiiP and SEMITOP represent the low power module range up to 25kW, both without baseplate. The MiniSKiiP comes with its well proven SPRiNG technology as a full SiC 6-pack, with or without SiC Schottky free-wheeling diodes. The SEMITOP 3 can be supplied with press-fit or solder connections as a 6-pack with split output configuration, that can be flexibly utilised in a variety of applications and comes with an extremely high power density. Additionally, a triple boost is available in the same package. In the medium power range the 62mm module SEMITRANS 3 is available as a hybrid SiC half-bridge with 200A rated current and a full SiC half-bridge with 500A rated current.

The portfolio is completed with a 6-pack module in SKiM 93 with separated half-bridges, using SKiNTER and SPRiNG technologies and therefore being completely solder-free, which guarantees the longest lifetimes. It is available with fast-switching IGBT 4 in combination with SiC Schottky free-wheeling diodes.



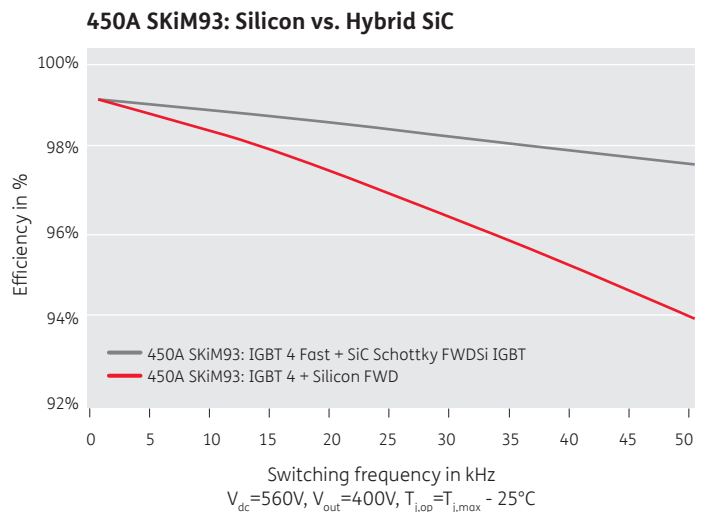
Key features

- Increased switching frequencies enable optimisation and cost down of filter components
- Reduced power losses lead to increased efficiency and lower system cost and size through smaller cooling devices
- Latest SiC chips of the leading suppliers
- Various packages and connection technologies with optimised chipsets for your application

Leading Chip and Packaging Technology for Highest Energy Efficiency

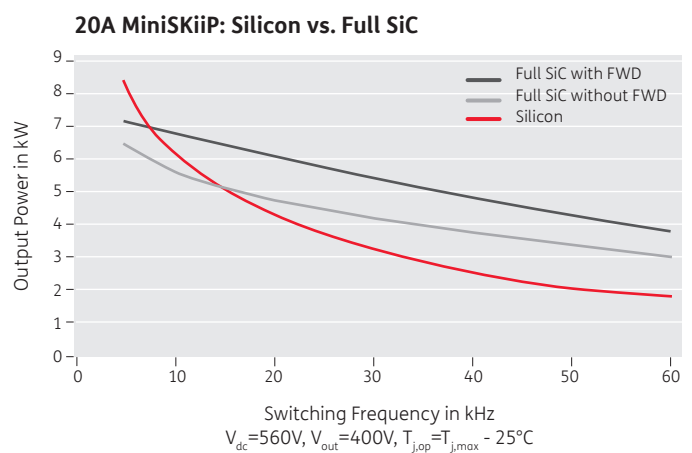
Hybrid SiC modules: high efficiency at high switching frequencies

- Hybrid SiC modules combine fast switching IGBT chips with silicon carbide Schottky free-wheeling diodes
- Major reduction of switching losses and efficiency increase
- Comparison of SKiM93, 1200V, 450A with medium power IGBT 4 and silicon free-wheeling diodes to IGBT 4 Fast and SiC Schottky free-wheeling diodes:
 - Efficiency increase from 96% to 98.3%
 - Output power increase by 50% to 110kW



Full SiC modules: +150% power output at high switching frequencies

- Full SiC modules use the latest generation of SiC MOSFETs, with or without SiC Schottky free-wheeling diodes
- Maximum reduction of switching losses and reduction of static losses in low load condition thanks to MOSFET characteristic
- Comparison of MiniSKiiP, 1200V, 20A with low power IGBT 4 and SiC MOSFETs with and without free-wheeling diode:
 - Efficiency increase to more than 99%
 - Output power increase by more than 100%.



Silicon Carbide chips of the leading suppliers combined with SEMIKRON packaging technology

- Chip mounting by solder or sinter interconnects for high temperature operation and highest reliability
- Soldered or solder-free (spring/press-fit) PCB assembly
- Broad power range in multiple packages
- Baseplate and baseplate-free modules
- Customer-specific solutions

Topologies

