Leading Chip and Packaging Technology for Maximum Energy Efficiency

Silicon Carbide Power Modules
10kW up to 350kW

MiniSKiiP
SEMITOP
SEMITOP E1/E2
SEMIPACK
SEMITRANS
SKiM 93
SEMIX 3p
Silicon Carbide Power Modules

SEMIKRON Silicon Carbide power modules: Industry standard package outlines combined with sophisticated packaging technologies.

Benefits
SEMIKRON’s hybrid and full silicon carbide power modules combine the benefits of proven industry standard power modules with SEMIKRON packaging technologies. Thanks to various packaging optimizations, all the benefits that silicon carbide offers can be fully exploited.

A low module commutation inductance allows for full speed switching of SiC MOSFETs. The higher switching speeds can be converted into higher switching frequencies, resulting in smaller magnetic filter components. At the same time the switching losses can be reduced, increasing the system efficiency.

Sophisticated materials and packaging technologies minimize the thermal resistance of the chip to the heatsink, enabling higher power densities.

Applications
- Solar inverters: booster and inverter applications
- Energy storage systems: maximum efficiency and low audible noise
- UPS: high efficiency double conversion systems
- Motor drives: active front end and motor side (hybrid SiC)
- Power supplies: auxiliary supplies for traction application, induction heating, etc.

Product range
Our products cover a power range from 10kW to 350kW in 1200V and come in seven different packages. MiniSKiiP and SEMITOP represent the low power range of up to 25kW, both baseplate-less. The MiniSKiiP comes with tried and tested SPRiNG technology as a full SiC 6-pack, with or without SiC Schottky free-wheeling diodes. The first and second generation SEMITOP modules help achieve maximum flexibility in combination with the industry standard package SEMITOP E1/E2.

The medium and high-power range is covered by SEMITRANS 3, SKiM63/93 and SEMiX 3 Press-Fit, available in hybrid and full SiC topologies for up to 600A rated chip current. Fast rectifier modules with SiC Schottky diodes are also available in SEMIPACK and SEMITOP packages.

Key features
- Higher switching frequencies allow for optimised and lower-cost filter components
- Reduced power losses boost efficiency and lower the system costs and size thanks to more compact cooling devices
- Latest SiC chips from leading suppliers
- Standard industry packages, optimised to the requirements of SiC: low inductance, low thermal resistance
- Optimised chipsets for your application
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Hybrid SiC modules: 50% lower power losses and easy implementation

- Combination of IGBT switches with silicon carbide Schottky diodes
- Virtually no diode losses and significantly reduced IGBT turn-on losses
- High-speed IGBT and SiC Schottky diode result in 50% lower switching losses
- Easy implementation of cost optimised SiC solution: no major driver or system design change required, small SiC chip area limits cost

References: Solar inverters, energy storage systems, high power car charging stations, high efficiency and high-speed motor drives.

Full SiC modules: Unmatched efficiency and performance

- >99% efficiency at maximum switching frequency.
- Latest silicon carbide trench MOSFET technology
- Optimised chipsets to fit customer requirements
- With and without SiC Schottky free-wheeling diode

References: Solar inverters, traction auxiliary power supplies, sports and racing cars

SEMIKRON packaging technologies and leading chip suppliers

- Optimised chip packages with minimum inductance to facilitate fast switching
- Minimum thermal resistance thanks to the use of SEMIKRON packaging technologies
- Customer specific chipsets that are perfectly aligned with customer requirements

- Wide power range from 10 to 350kW in full and hybrid SiC modules
- Full range of industry standard packages
- SiC Schottky diodes and MOSFETs from leading chip suppliers

Examples of topologies
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