SEMIKRON
innovation + service

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Traction

Power Electronics for Traction Applications

PERFORMANCE

Whenever we talk about traction applications, we see extremely high demand for reliability, lifetime and safety. SEMIKRON is offering this requirements to our customers since we developed the first isolated power module on the market in 1974. Since 25 years our highly reliable SKiiP IPMs are driving light rails, trams and subways all over the world.

With our new SEMITRANS 20 power module familiy, SEMIKRON brings latest sinter and bonding technology to the new high power standard package. SEMIKRON stands also for innovative solutions for auxiliary power supplies: our silicon and silicon carbide powered devices, especially the SEMITRANS and SEMITOP module families, allow reliable, efficient and compact systems.

AUXILIARY POWER SUPPLY

5kW - 500kW

- Compact designs and high power density
- High reliability in harsh environments
- High power quality
- High efficiency

Products

- SEMITOP E1/E2
- SEMITRANS
- SEMITRANS 10
- SEMITRANS 20
- SEMiX 3 Press-Fit
- SEMIPACK
- SKYPER Driver Series

MAIN TRACTION DRIVE

500kW - 10MW

- Highest reliability and lifetime
- High power cycling capability
- Long lifetime and availability

Products

- SEMITRANS 10
- SEMITRANS 20
- SEMIPACK
- SKiiP 3 IPM
- SKiiP 4 IPM
- Discretes
- SKYPER Driver Series
- SKHI Driver Series

Highlight

The New High Power Standard in Traction Drives

The SEMITRANS 20 product family increases product lifetime- and power output. SEMITRANS 20 modules deliver significant advantages for the traction market:

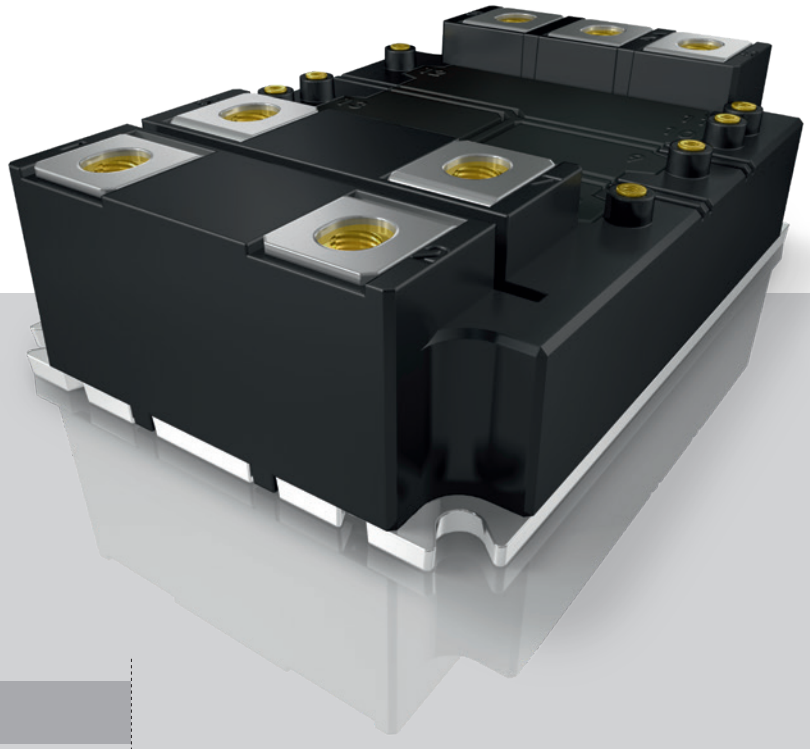
- A simplified inverter design leads to reduced costs for mounting materials as well as in the inverter assembly process
- More space for driver boards and less EMC disturbance from high current bus bars to the driver
- Three AC terminal connectors for low operating temperatures even at high loads
- Less derating at parallel operation thanks to the low inductance bus bar layout and the extremely low module inductance
- Ideal for cost-effective inverter design scaling

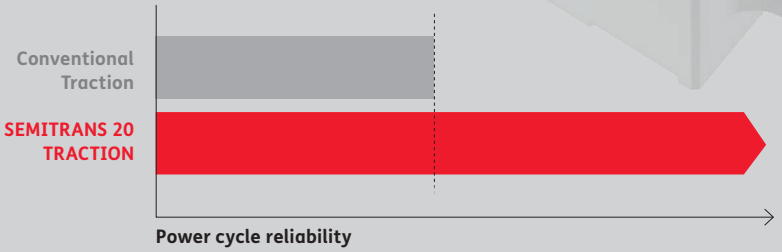
On top of this, the SEMITRANS 20 TRACTION module provides SEMIKRON innovative technologies such as sintered chips and AlCu wire bonds. This takes realiability and power density to new levels, resulting in:

- Superior product lifetime
- Lower cost per kW and
- Higher power density

Key features

Standard package for traction and industrial applications
Innovative technologies with sintered chips and AlCu wire bonds
Next level lifetime and power density
Lower mounting and material cost in inverter assemblies
Ideal for paralleling and scaling

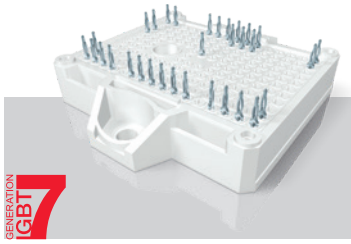




SEMITRANS® 20
1.7kV half-bridge module

Product Portfolio

Power Modules



SEMITOP® E1/E2

Exceeding the standard for superior performance

- PCB based and press-fit connected baseplate-less industry standard power module in two housing sizes
- 650V and 1200V:
  10A to 100A
  IGBT 4 and Generation 7 IGBTs
- CIB, half-bridge and sixpack topologies
- Optimised mounting concept provides lowest thermal resistance in class
- Hybrid and full SiC modules up to 1200V/250A

SEMIPACK®

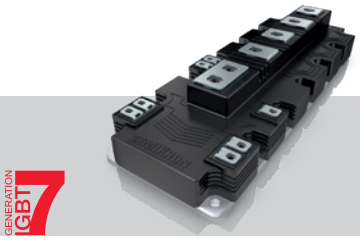
Bipolar modules from the market leader

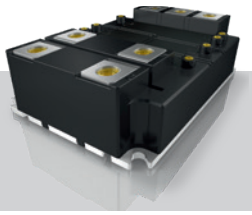
- Industrial standard thyristor/diode modules
- Market experience for over 40 years
- Broad power and topology range
- 800V up to 2200V
  15A up to 1360A
- Uncontrolled, half-controlled and controlled rectifiers
- SiC Schottky Diode modules up to 300A

SEMITRANS®

The proven power electronics package

- Robust industry standard package for multiple sourcing in 6 housing sizes
- 600V/650V/1200V/1700V IGBT: 25A to 900A
  1200V SiC: 125A to 500A
- Half-bridge, single switch and brake chopper topology
- Multiple IGBT sources
- Increased power range in 62mm thanks to portfolio extension in 1200V and 1700V half-bridges:
  1200V/600A
  1700V/500A





SEMiX®3 Press-Fit

For solder-free mounting with press-fit contacts

- Industry standard press-fit design with 17mm high housing
- 650V/1200V/1700V IGBT: 225A to 700A
  1200V Hybrid SiC: 600A
- Direct driver assembly
- Solder-free contacts for highest durability
- Increased power density thanks to Generation 7 IGBT M7
- Available with integrated shunt resistor

SEMITRANS® 10

Robust high power module

- Established high power module package
- 1200V IGBT: 1400A
  1700V IGBT: 1000A and 1400A
- Half-bridge and split NPC topologies
- Latest Generation 7 IGBTs for for 3-level NPC modules

SEMITRANS® 20

The new standard in high power

- The latest industry standard power module for high power applications
- 1700V IGBT: 1000A and 1200A
- Half-bridge topology
- Low stray inductance, high power density package
- Increased reliability thanks to the latest packaging technology

Intelligent Power Modules – IPMs

For Maximum Reliability

The SKiiP IPM product line sets a benchmark for high performance and robust inverter designs. Both SKiiP 3 and SKiiP 4 feature high power densities combined with flexible cooling options such as air- or water-cooling, also with customized heat sinks. Reliable driver technology, integrated current sensors and comprehensive protection functions complete the IPM design.

SKiiP 3 has propagated widely through the industrial drive segment. With its sixpack or half-bridge topologies, it covers a current range from 500A up to 2400A.

Key features

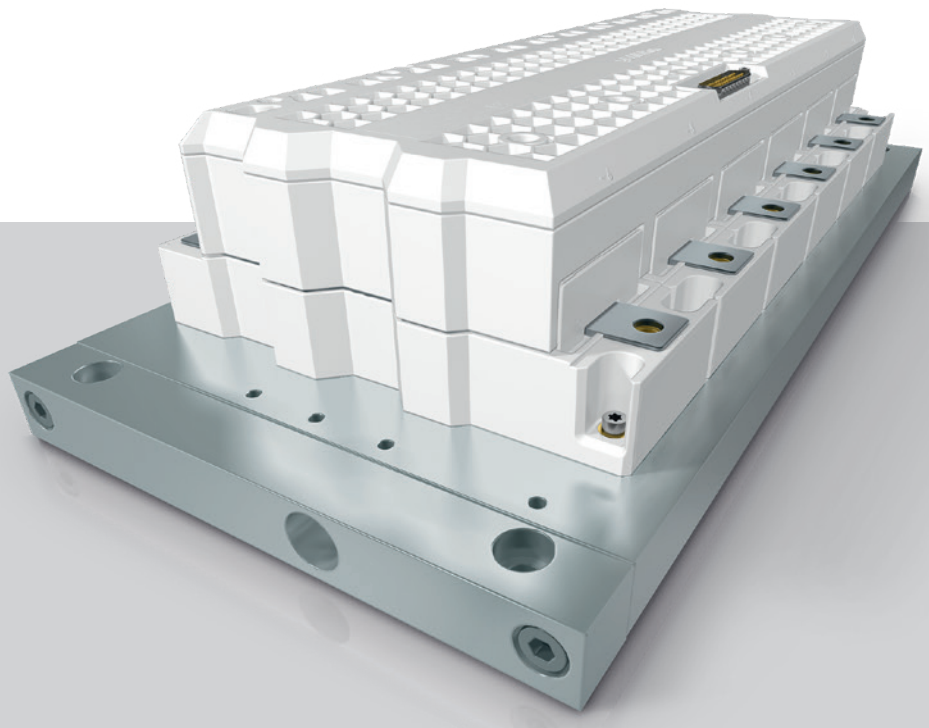
1200V and 1700V
Half-bridge and sixpack
500A to 3600A
Flexible cooling options: air, water or customized cooling options, high performance cooling
Paralleled operation for even higher output power possible

The SKiiP 4, available in half-bridge topology, has been optimized for highest power cycling requirements and covers the higher power range up to 3600A.

To ensure highest reliability and service life, the power circuitry is 100% solder-free. Sinter technology as die attach replaces the solder layer, which usually causes the limitation in lifetime. Hence, sintering improves power and thermal cycling capability.

The integrated gate driver in the SKiiP 4 has set new standards in terms of reliability and enhanced functionality through its CAN interface. The digital driver guarantees safe isolation between the primary and secondary side for both switching signals and parameter measurement. The CAN interface allows setting the SKiiP 4 configuration parameter and reading application parameter.

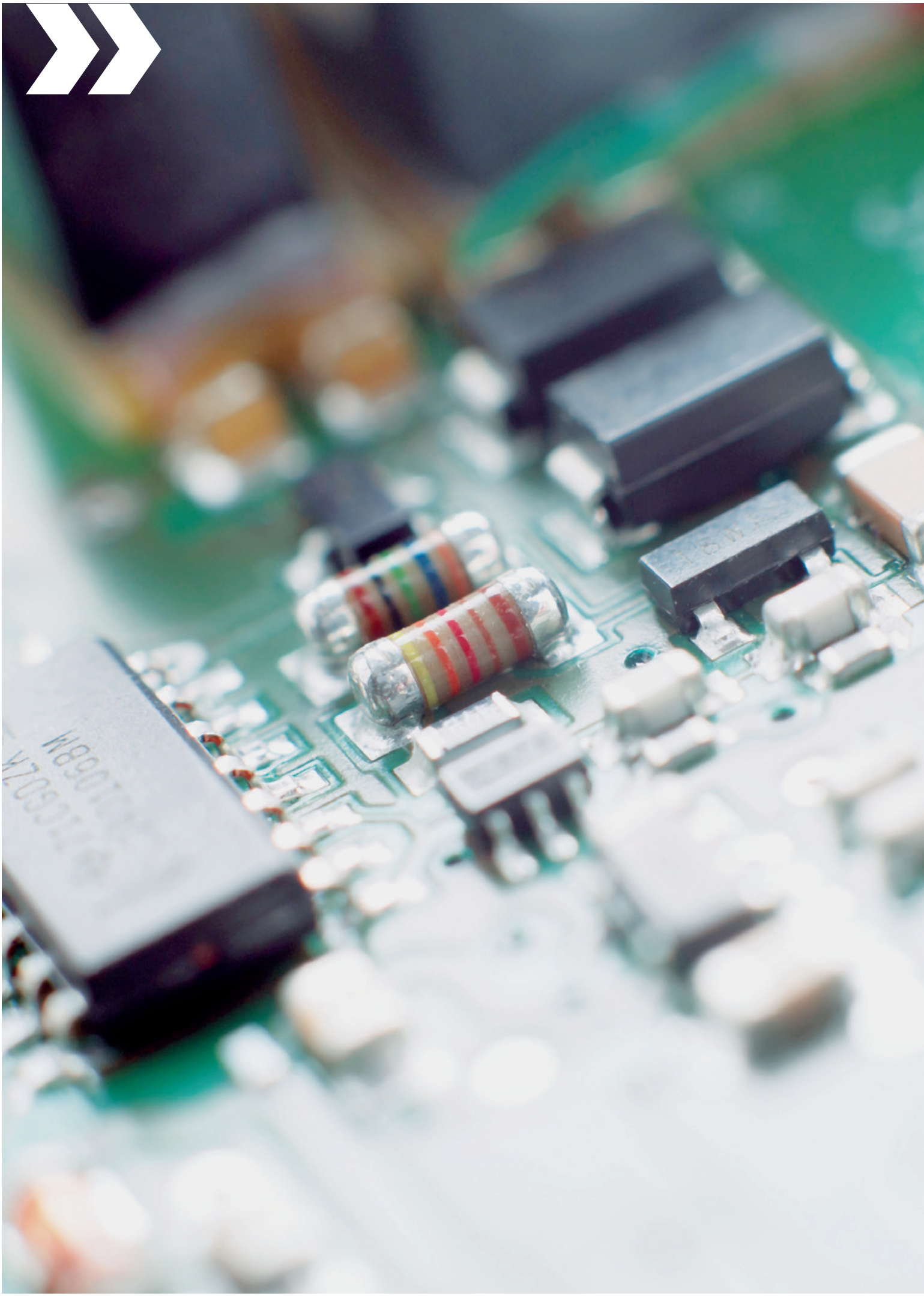
High performance cooling technology will be gradually introduced providing approximately 20% more output capability compared with standard water cooling.



SKiiP®4

500kW up to 2.5MW

The most powerful IPM in the market



Product Portfolio IGBT Driver

Above the Standard

SEMIKRON's unique product portfolio enables access to all established industries with a one-stop solution that combines state-of-the-art power modules and driver electronics.

SEMIKRON's IGBT drivers are available as two- channel driver cores suitable for any standard semiconductor power module or as Plug-and-Play solutions, which perfectly fit the SEMiX 3 Press-Fit, SEMITRANS 10 and compatible modules.

Cost-Efficient

Achieve outstanding system compactness and create space- and cost-effective inverter designs with SEMIKRON's drivers, utilizing highly integrated ASIC technology. Isolated DC-link voltage and temperature sensor signals at the driver's interface along with over-voltage and over-temperature lockout also help to reduce system costs significantly.

Time-Efficient

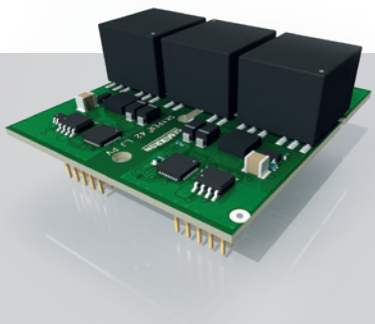
More than 25 years of experience in developing innovative IGBT driver electronics enables SEMIKRON to have a short-term solution for almost every challenge related to driver electronics. SEMIKRON's Plug-and-Play drivers connect directly to most common standard IGBT modules. The IGBT driver cores fit with SEMIKRON's adapter boards or application sample PCBs. For the latter, SEMIKRON shares the entire manufacturing data to decrease development time, speeding up the time-to-market.

Reliable

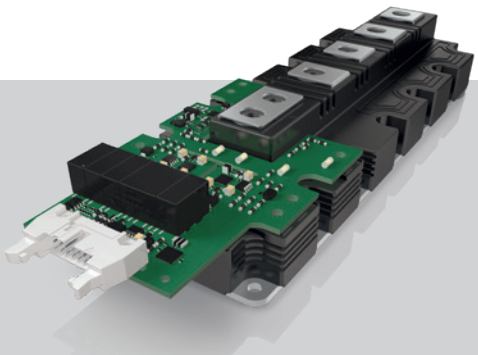
SEMIKRON's SKYPER and SKHI IGBT drivers are well known, highly robust and reliable IGBT driver solutions under demanding environmental conditions.
Over many years of field operation experience the proprietary IGBT driver technology has been relentlessly developed further. This technology sets new standards for the essential features of safe gate control, reliable gate protection and reinforced insulation.

Key factors

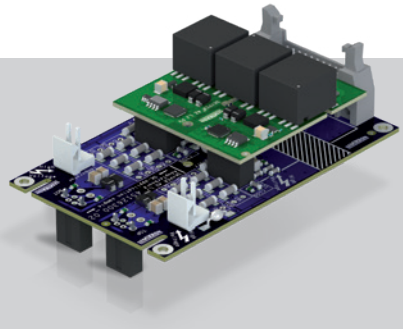
Reinforced insulation for signal and power transmission
Two-channel driver
Up to 1700V transients
Up to 1500V continuous DC bus voltage
8Apk to 35Apk per channel
1W to 4.2W peak per channel
Suitable for multi-level topologies and Generation 7 IGBT



SKYPER® & SKHI
Driver Cores
Up to 1700V



SKYPER®
Plug-and-Play Driver
Up to 1700V



SKYPER® & SKHI
Adapter Boards and
Application Samples
Up to 1700V

Thermal Interface Materials

Stay Cool – Heat Dissipation is Our Job

SEMIKRON was the first power module manufacturer on the market to offer power modules with pre-applied thermal interface material. With more than two decades of field experience and more than 15 million pre-printed modules in the field, benchmarks are being set. The modules with pre-applied TIM are printed in a clean environment on an automated and SPC controlled silk screen and stencil printing line.

For each requirement SEMIKRON offers the right choice of material. In addition to the standard silicone thermal grease, phase change materials and high performance thermal paste with improved thermal performance are also available.

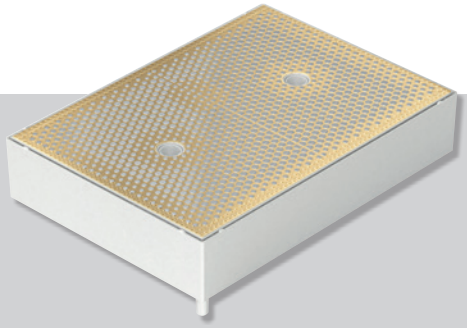
SEMIKRON offers either thermal grease or phase change materials depending on customer requirements (e.g. performance increase, reduced handling effort) and module type (with or without baseplate). Phase change materials have a solid consistency at room temperature, fully exploiting the advantages a non-smearing TIM layer offers, with no drawbacks. Baseplate-less modules, on the other hand, usually require a lower-viscosity material to help improve robustness during assembly. Here, thermal grease is the preferred solution.

Key features

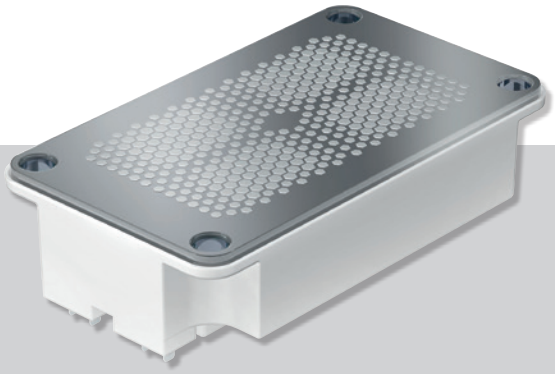
- Increased productivity thanks to reduced handling costs and improved logistics
- Low thermal resistance with optimised TIM layer thickness
- Improved lifetime and reliability
- Improved assembly robustness
- Modules can be shipped directly to the assembly line without any additional treatment processes
- Lower overall costs

Portfolio

- **P8:** Phase Change Material for highest performance
- **HT:** Phase Change Material for highest sink temperature
- **HPTP:** High Performance Thermal Paste
- **P12:** Standard Thermal Paste



Baseplate-less Power Modules



Baseplate Power Modules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from 14,55 €
from 12,87 €

Service

Your 24/7 Online Service

SemiSel Simulation

Have you ever asked yourself “Have I selected the right power semiconductors?” Then you should check out SemiSel – SEMIKRON’s simulation tool for losses and temperatures, the perfect tool to help you select the right power semiconductors for the specific needs of your application. The first of its kind almost 20years ago, SemiSel has been continually improved and now boasts lots of new features and functions.

Product range

Available for all Semikron products:

- Rectifier diode and thyristor modules
- IGBT and fast diode modules
- SiC Schotty diodes and SiC MOSFET modules
- From 3A to 6000A rated current
- From 55V to 3300V devices

Key features

26 different power electronic circuits can be simulated
Simulations with different degrees of complexity, from simple nominal conditions to complex mission profiles
Cooling conditions for air and liquid cooled systems proposed to match the housing and devices selected
Efficiency and temperatures at a glance

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