EV Chargers
Power Electronics for DC Fast Chargers
As electric vehicles become widespread, so must the infrastructure to charge them. One of the main requirements for the widespread use of electric vehicles is having an accessible EV charging infrastructure. Governments and industries worldwide are preparing to invest in charging infrastructures.

Availability and costs are the key to success in the fast growing EV Charger market. As the specialist in power electronics, we use state-of-the-art topologies featuring standard components, guaranteeing both excellent efficiency and availability. SEMIKRON offers a comprehensive portfolio of products that meet the needs of fast charge equipment from as little as 22kW up to 450kW.
- Modular Power Blocks
- Passenger EV Chargers
- Bus Chargers

Compact designs and high power density
High reliability to reduce downtime
Forward-looking topologies
High efficiency

Products
- SEMITOP E1/E2
- MinISKiiP
- SEMIX 3 Press-Fit
- SEMIX 5
- SKIM 63/93
- SEMITRANS
- SEMIPACK
- SKYPER Driver Series
- SKHI Driver Series
- Power Electronic Stacks
- PowerCell
DC Fast Chargers require a power dense PFC, DC/DC, and output rectifier, all available in the SEMITOP E1/E2 packages. With a low inductance design, fast switching Si and SiC chips may be used to their full potential. Achieve supply chain safety with this industrial standard module with a wide array of topologies.

The thermal resistance is about 10% lower than the closest competitor using standard thermal paste. Using High Performance Thermal Paste (HPTP), a further 20% reduction is possible.

Key features

- Low stray inductance case
- Multiple sourcing right down to chip level
- Optimised footprint
- Flexible architecture
- 2-screw concept
- Press-Fit terminals
- 12mm module height
- No baseplate

Highlight

Industrial Standard Combined with Superior

SEMITOP® E1/E2
From 5kW to 100kW
The 50kW PowerCell is a full power converter including PWM controller and filters. With a modular design, the PowerCell may be paralleled to 350kW and beyond. The output voltage can seamlessly change between 500V\textsubscript{DC} and 1000V\textsubscript{DC} to meet any power requirement in the market.

### Key features

- 50kW rated power
- 500V\textsubscript{DC} or 1000V\textsubscript{DC} Isolated output
- Scalable for high power charging
- CANopen communication protocol
- Easy integration and maintenance – all connections at the front
- Parallel operation for high power charging
- Integrated transformer for safe galvanic isolation

**PowerCell**
50kW charging unit
**SEMITOP® E1/E2**

Extended standard for superior thermal and dynamic performance

- PCB based and press-fit connected baseplate-less industry standard power module in two housing sizes
- 650V, 950V and 1200V IGBTs
- 10A to 200A
- IGBT 4 and Generation 7 IGBTs
- Sixpack, half-bridge, H-bridge, PFC and rectifier topologies
- Optimised mounting concept provides lowest thermal resistance in class
- Increased power density thanks to Generation 7 IGBT T7
- Hybrid and full SiC modules up to 1200V/250A

---

**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
- Full second source thanks to alternative 1700V chip source

---

**SEMITRANS® 20**

The new standard in high power

- The latest industry standard power module for high power applications
- 1200V: 1400A
- 1700V: 1000A and 1200A
- Half-bridge topology
- Low stray inductance, high power density package
- Increased reliability thanks to the latest packaging technology
Product Portfolio
Power Modules

SEMIPACK®
Bipolar modules from the market leader
6 housing sizes SEMIPACK 1 to 6
800V to 2200V:
20A to 1360A
SEMIKRON diode and thyristors chips
Diode and Thyristors in un-, half- and full-controlled topologies
Different technologies for certain packages:
high reliability pressure contact or cost-effective wire bonded modules
Enhanced isolation voltage of 4.8kV/1s available on request
SiC Schottky Diode modules up to 300A

SEMiX® 3 Press-Fit
Exceeding the standard for superior performance
Industry standard press-fit design with 17mm high housing
650V / 1200V / 1700V IGBT: 225A to 700A
1200V Hybrid SiC: 600A
Half-Bridge and split NPC topologies
Direct driver assembly
Available with integrated shunt resistor

SEMiX® 5
Extended standard for superior thermal and dynamic performance
Industry standard baseplate module
650V / 1200V / 1700V IGBT: 100A to 400A
Sixpack, NPC, TNPC, PFC, and half-controlled Bridge Rectifier topologies
Optimised module layout for maximum heat transfer
Enhanced thermal and electrical diode performance

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

SKiM® 63/93
High reliability design using sinter technology
Power module in sixpack configuration with three separate half-bridges
650V/1200V/1700V IGBT:
300A to 900A
1200V Hybrid SiC: 450A
Sixpack and buck/boost topologies
Low inductance design thanks to symmetrical layout
Solder-free module and driver
PCB mounting

MiniSKiiP®
Solder-free spring technology for minimum assembly time
Full family of power modules up to 300kW
650V /1200V / 1700V IGBT: 4A to 400A
1200V Hybrid SiC: 50A to 150A
1200V Full SiC: 25A to 85A
Comprehensive set of topologies: CIB, sixpack, twelvepacks, H-bridge, half-bridge, 3-level, bridge rectifiers with brake chopper
Easy and flexible PCB routing without pin holes
**Power Electronic Stack Platforms**

Fully Qualified Inverter Assemblies
Tailored to Your Specific Needs

---

**Standard stacks**
SEMIKRON’s Power Electronic Stacks enable our customers to succeed in dynamic markets and meet any global challenge. We deliver Rectifier-, IGBT- and SiC-based stacks for AC voltages from 380V to 690V. Our standard stacks cover a output current range from 70A to 4000A.

**Water-cooled IGBT Stacks**
- SKiiPRACK
- SEMIKUBE MLI

**Air-cooled IGBT Stacks**
- SEMIKUBE
- SEMIKUBE SlimLine

**Diode/Thyrister Stacks**
- SEMISTACK CLASSIC B6U/B6C/W3C

---

**Customised stacks**
In addition to standard stacks, SEMIKRON has vast experience in developing customer-specific solutions. Engineers are available in our stack centres around the globe to offer specific solutions by adapting existing platforms or designing customized converters.

**Four key factors for your success**
- Shortest time to market
- Cost savings in R&D, production and qualification
- Global SEMIKRON stack production footprint
- Highly experienced engineering team

---

**SEMIKUBE® SlimLine**
Air-cooled IGBT Power Stack
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 Board and Application Samples
  - Up to 1700V
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**
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 20 years 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

Online Shop
Our specialty lies in the delivery of expert support to small and medium-sized enterprises by offering them the following services:

Technical & sales support
- Reply within 24 hours
- Multilingual sales and support
- Design-in-support directly from manufacturers’ specialists

Worldwide shipping
- Fast shipping to more than 100 countries
- Low-volume purchases also possible
- Shipping directly from manufacturer’s warehouse
- Over 600 conventional SCRs, IGBT modules, bridge rectifiers and IPMs in stock

Transparency & efficiency
- Transparent price breakdowns online
- Updated information
- Instant quotes using the online quotation tool

Cross reference search
- Find a fully compatible SEMIKRON device for any other brand: shop.semikron.com/en/Cross-Reference-Search/

Visit us at
www.semikron.com/semisel

Visit us at
shop.semikron.com