CATALOGUE 2019/2020

# Welcome to the World of Power Electronics

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OVERVIEW

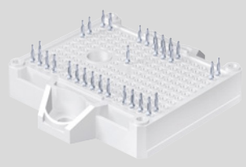
# Product Range

## 2 POWER MODULES

CHAPTER



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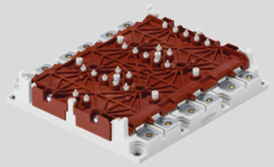
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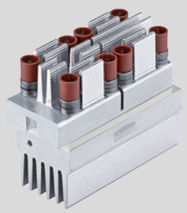
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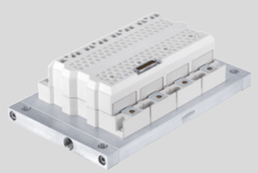


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**Intelligent Power Modules**



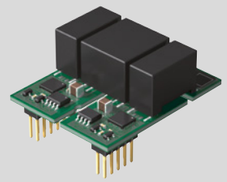
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**Product Classes**


| | |
|---|---|
| IGBT Modules | 38 |
| Full Silicon Carbide Modules, Hybrid Silicon Carbide Modules | 78, 88 |
| MOSFET Modules | 98 |
| Thyristor / Diode Modules | 104 |
| Bridge Rectifier Modules | 120 |


## 3 IGBT DRIVERS

CHAPTER

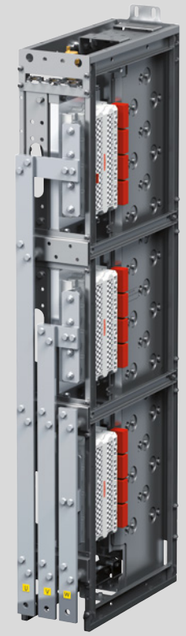


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## 4 STACKS

CHAPTER

**Water-cooled IGBT**



SEMISTACK RE Page 164

**Air-cooled IGBT**



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**Diode/Thyristor**



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**Customized**



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## 5 SYSTEMS

CHAPTER



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## 6 DISCRETES

CHAPTER



Diodes
Thyristors
Chips Page 196

FROM CHIP TO SYSTEM

# What Sets Us Apart



SEMIKRON offers high-level vertical integration in power electronics – from chip to system. We push the boundaries of module technologies in series products with sinter technology and a wide range of packaging technologies. Besides our unrivalled portfolio of industry standard modules, we also develop custom-built solutions for extended requirements.

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# Helping Your Business Use Our Products

## Application expertise is our strength

Being able to access service, technical support and experts that our customers can always rely on is instrumental to our customers' success.

Today, increased product diversity in power semiconductors calls for customer support far beyond the information contained in data sheets. Only comparison under application-specific conditions – such as voltage, switching frequency or cooling conditions – can demonstrate the differences in performance of available devices. That's why we continue to invest in our professional application engineering support, including lab space and reference designs.

In recent years, we have built a network comprising 25 sites across the globe to provide fast, comprehensive application support. Our application engineering teams work both locally and globally with our customers throughout the entire project life cycle. We strive to understand and help our customers overcome both big and small challenges throughout their projects. For example, we conduct topology studies to fully understand the advantages in the end user application and carry out benchmark investigations when needed. It is this application-centred approach that sets us apart from others.

**How can SEMIKRON's application team help you with inverter design?**

- Heatsink selection and TIM application
- DC link design and capacitor selection
- Isolation coordination
- Lifetime calculations
- Measurement support
- Application samples and reference designs

**www.semikron.com/service-support/application-support**



# Stay Cool – Heat Dissipation is Our Job

## Thermal Interface Materials

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 fifteen 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, a phase change material and high performance thermal paste with improved thermal performance are also available.

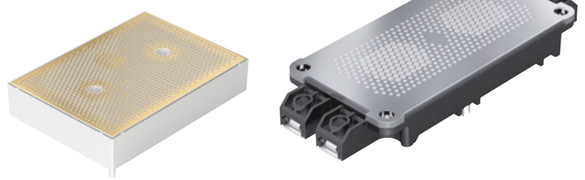
A thermal grease or a phase change material is recommended for the given customer needs for handling and module performance as well as for module type (with baseplate, baseplate-less). Phase change materials with a solid consistency at room temperatures can fully exploit the advantages that a non-smearing TIM layer offers on modules without any other drawbacks. Modules with no baseplate, 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

| |
|---|
| Phase Change Material: TPC-Z-PC-P8; TPC-4000PE; PSX-PE = P8 |
| Phase Change Material: TPC-V-PC-P-HT; TPC-7000 = HT |
| High Performance Thermal Paste = HPTP |
| Standard Thermal Paste: Wacker P12 = P12 |



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www.semikron.com/thermal-interface-materials



# Four Key Factors for Your Success

## Power Electronic Stacks

SEMIKRON's power electronic stacks enable our customers to prosper in dynamic markets and meet any global challenge. With more than 200,000 stacks in the field, SEMIKRON is the global market leader for power electronic stacks.

Our services are as multifaceted as our customers, highlighted by these four distinctive attributes: **time to market, cost savings, global production and engineering experience**. Our passion for power electronics and our commitment to high-performance design are the factors that make us your ultimate partner for value creation in the dynamic power electronics market.

The experience we have gained in over 40 years of high-performance stack design has reinforced the four essential ingredients needed for your success. In emerging markets, where new product innovation is essential, companies need to be nimble and have a fast time to market. In global markets, multiple production locations play a vital role in ensuring rapid deployment to more than one country, while also meeting local demand and building customer relationships. Quality and cost control are crucial factors in the long-term success of any project. Finally, success in highly competitive markets is underpinned by superior technical capability. All four of these prerequisites are addressed by SEMIKRON's power electronic stacks.




**Contact us: power-stack@semikron.com**
**www.semikron.com/video/power-electronic-stacks**

# IGBT Generation 7: The New Benchmark for Motor Drives



## IGBT Generation 7: The new benchmark for Motor Drives

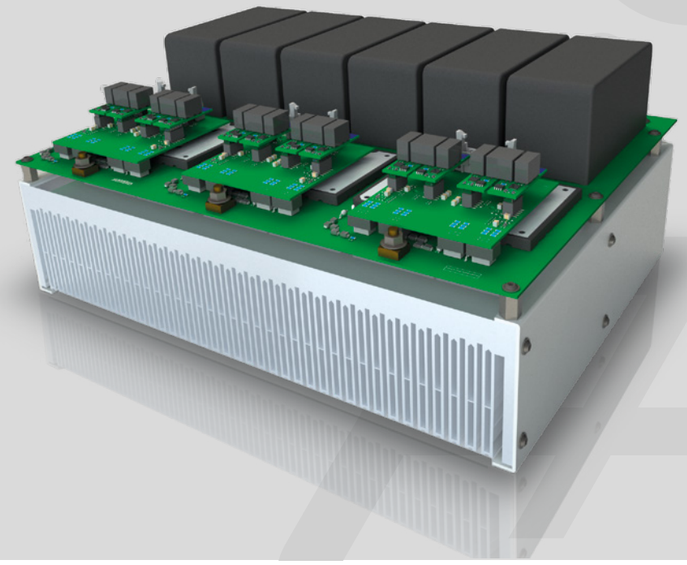
The generation 7 IGBTs represent the latest IGBT chip technology. This new generation is specifically designed to match the requirements of motor drive applications. The IGBTs come with a significantly lower forward voltage drop and deliver optimised switching performance. Thanks to roughly 25% smaller chips, higher nominal currents can fit into existing power module packages.
In application, the IGBT 7 provides reduced power losses or increased maximum output power and power density. This translates into lower system costs. As to motor drives, the generation 7 IGBT will initially be introduced into conventional drive topologies: CIB (Converter-Inverter-Brake), sixpack and half-bridge configurations. For low and medium power drives, MiniSKiiP and SEMITOP E1/E2 are the first available choice. For higher power classes IGBT 7 is available in SEMiX 3 press-fit and SEMiX 6 press-fit. More power modules are to follow.

## Product specifications/features

- Optimized IGBTs for motor drive applications
- Reduced saturation voltage and chip size
- Higher nominal currents
- Up to 45% more module output power
- Lower overall system costs

IGBT 7

# Up to 180kW for Solar String Inverters



## MiniSKiiP Dual Split MLI

SEMIKRON offers a broad portfolio of 3-level modules, the latest addition being the MiniSKiiP Dual Split MLI. The new module increases the nominal current to 400A in 1200V and 950V devices and comes with the option of SiC Schottky diodes in the neutral path for maximum efficiency. This new module allows for baseplate-less, PCB-mounted inverter designs with benchmarking power density of up to 180kW for 1500VDC photovoltaic systems. The benefits of the MiniSKiiP Dual's SPRiNG contact layout are low-inductance DC-link designs, easy driver integration and parallel AC power connections.

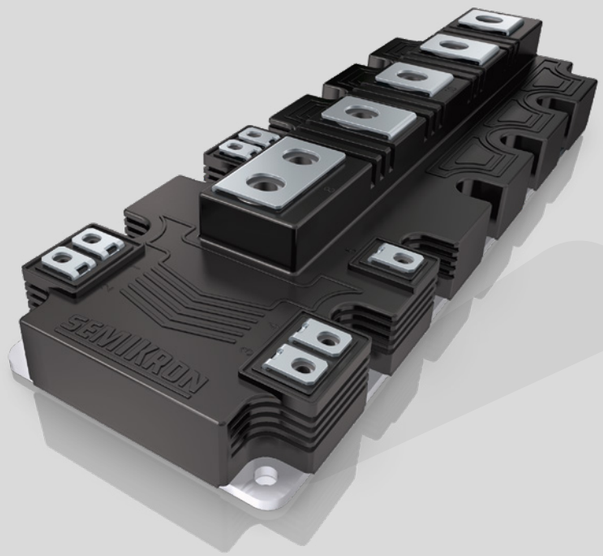
## Product specifications/features

- Up to 180kW baseplate-less design for direct PCB mounting
- 950V IGBT 7 chips and SiC Schottky diodes in neutral path for maximum efficiency
- Low-inductance DC-link connection
- Spring contacts for easy PCB routing
- Well established, highly reliable MiniSKiiP package
- Optimised production costs thanks to quick and easy assembly

IGBT 7

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# 3-Level Topologies for Wind Turbines




## SEMITRANS 10

In any new wind turbine developments, the primary objective is to reduce the cost of energy as well as to increase the output power. But this can't happen without new technologies. One solution is to increase the voltage up to the 1000VAC (1500VDC) Low-Voltage Directive limit. SEMIKRON's SEMITRANS 10 MLI is a 3-level NPC module that meets the needs of wind energy converters perfectly. Using 3-level topologies helps cut converter losses by 50 percent, lowering filter costs by some 30 percent. Besides lower converter losses, cable losses or diameters can also be reduced by around 30 percent.

### Product specifications/features

| Reduced System Costs | Higher Efficiency |
|---|---|
| Neutral power module cost compared to 2-Level | Lower semiconductor losses |
| Lower filter costs | Lower filter losses |
| Lower cabling costs | Lower cable losses |
| Reduced cooling needs | |
| Smaller EMI filter | |

# High Power and Outstanding Reliability for EV Charger



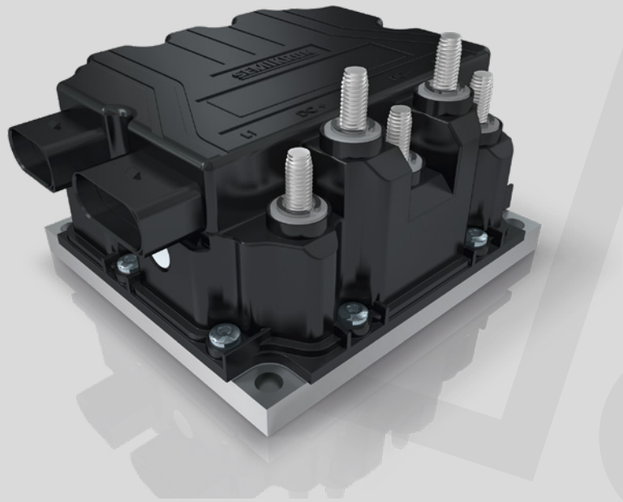

## PowerCell

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 the charging infrastructure. The critical points in the product decision are costs, power and reliability. SEMIKRON offers a comprehensive portfolio of products that meet the needs of fast charge equipment from as little as 22kW right up to 450kW. Our new 50kW PowerCell enables companies to market DC fast chargers using an existing power electronics platform. Availability, efficiency and reliability guarantees fast time to market and low upfront investment costs. In combination with a secure supply chain and a modular design, the PowerCell plays a vital role in the successful deployment of your DC fast chargers.

### Product specifications/features

| | |
|---|---|
| 50kW rated power | 3L PFC topology with 6 rather than 12 driver channels |
| AC Input: 400V ± 10 % | Efficient 650V IGBT technology thanks to split DC link |
| 500VDC or 1000VDC output voltage | HF transformer for safe galvanic isolation |
| $f_{sw}$: 40kHz | 40kHz switching frequency for optimum performance |
| PF > 0.98 | Integrated pre-charge topology |
| Efficiency > 94% | Standard technology for high availability |
| Scalable up to 350kW | |

# Most Compact MOSFET Inverter Platform for Battery Vehicles



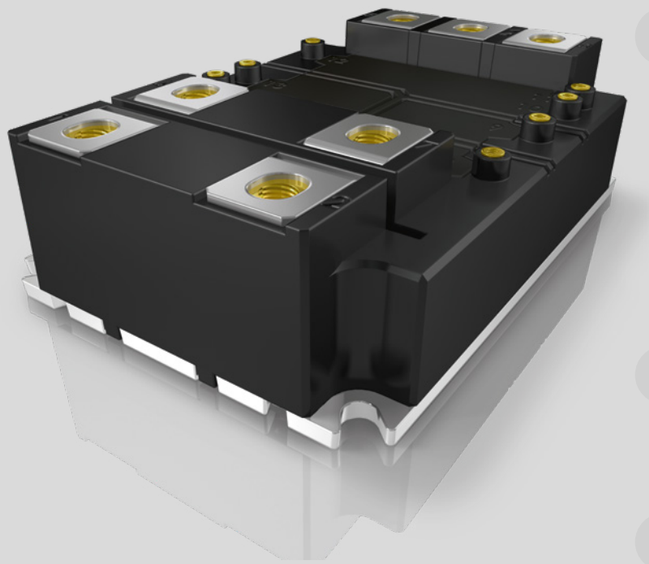
## SKAI 3 LV

SKAI 3 LV is the 3rd generation of industrial MOSFET inverters for material handling and battery powered vehicles with more than 1.5 million MOSFET inverters in the field.
The 3rd generation is a platform concept for standard inverter designs or customized designs tailored to the customer's needs. The inverter connects easily to the customer control board, facilitating quick and easy design while leaving control to the customer.

### Product specifications/features

- Easy-to-use gate driver interface
- Voltage, current and temperature sensors
- Gate driver with protection
- Low-inductance, low-loss power section
- DC-link capacitors
- Air and plate cooling
- Platform for customised designs
- Customer control board to be integrated in IP66 enclosure
- Design-in kit available

# The High-Power Standard in Traction, Renewables and Drives



## SEMITRANS 20

The SEMITRANS 20 overcomes the limits of conventional module concepts and provides a new design approach for inverters used in applications such as traction, industrial drives and grid infrastructure. Optimised for the traction and medium-voltage market, the SEMITRANS 20 is designed as a half-bridge configuration featuring a built-in temperature sensor and opposite DC and AC power terminals. Compared to conventional modules, the stray inductance is as much as 75% lower, providing greater operational safety and facilitating paralleling. The service life of the new SEMITRANS 20 traction module is up to 3 times longer than that of conventional traction modules. This is achieved through the use of state-of-the-art technologies such as sintered chips and AlCu Bond wires. The standardised package meets the increasing demands for lower costs, greater efficiency and durability for power electronics in industry, transportation and infrastructure.

### Product specifications/features

- Available in 1.7kV and 3.3kV
- Standard Package
- Innovative technologies with sintered chip interconnects and AlCu wire bonds
- Next level lifetime and power density
- Lower mounting and material cost in inverter assemblies
- Ideal for paralleling and scaling
- Support Package for testing and qualification

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# Power Modules


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| Hybrid Silicon Carbide Modules | 88 |
| MOSFET Modules | 98 |
| Thyristor / Diode Modules | 104 |
| Bridge Rectifier Modules | 120 |

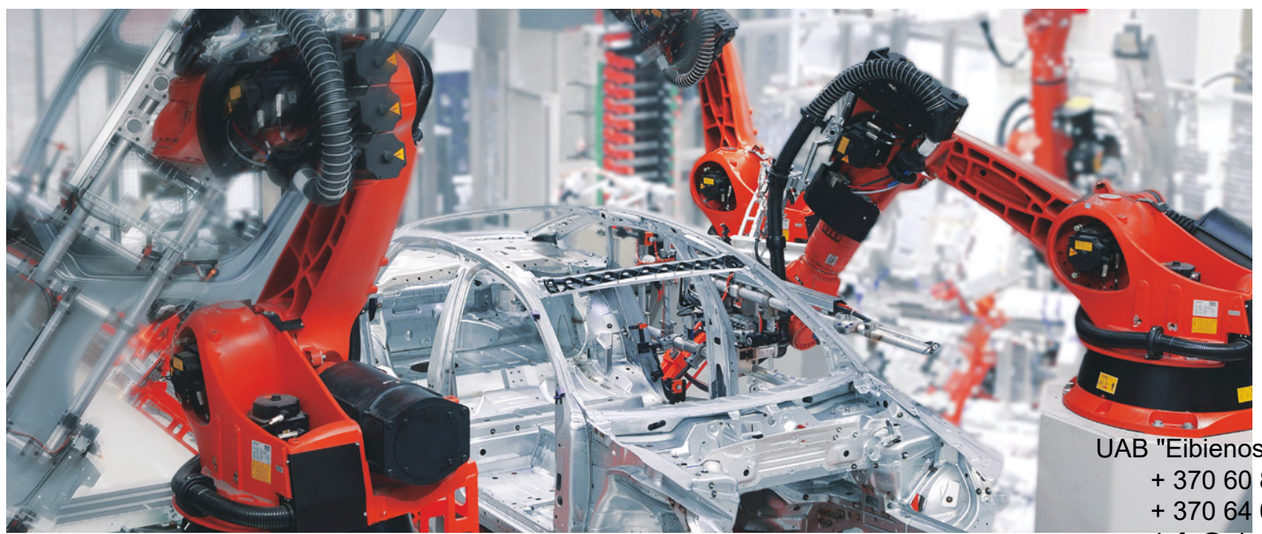



2



AC | DC

IGBT 7



# Fast, Cost-Efficient and Reliable Single-Screw Mounting

# MiniSKiiP®

## Short facts

Low-cost assembly, high production run rate, high yield

Small and compact inverter design

Excellent reliability and long product life time

## Key features

Solder-free SPRiNG technology for fast and easy assembly

Without copper baseplate for cost efficient designs

Easy and flexible PCB routing without pin holes

Current range 4A to 400A for inverter range up to 90kW with one product platform

Comprehensive setup of topologies:
CIB, Sixpack, Twelvepack, H-Bridge, Half-Bridge, 3-level, bridge rectifiers with brake chopper

## Applications

With two decades of field experience and more than 45 million modules in the field, this module platform has proven successful in all standard applications. Key applications include all kinds of inverters, such as standard drives, stand-alone drives, servo drives, system drives, solar inverters, UPS systems and welding machines. Thanks to the excellent reliability of spring contacts, applications such as agricultural vehicles or pitch drives in wind turbines benefit from MiniSKiiP technology as well.

## Benefits

An important mechanical feature of MiniSKiiP modules is the outstandingly easy assembly and service friendly spring contact for load and gate terminals. Compared to conventional solder or press-fit modules, where expensive equipment is required, no dedicated tools are needed for MiniSKiiP assembly. Instead, a single or two screw connection is used. The printed circuit board (PCB), the power module and the heat sink are assembled in one mounting step. This connection technology features a number of additional advantages: the PCB can be more flexible in design, as the printed circuit board does not need to include holes for solder pins or press-fit connections. The springs provide a flexible connection between the PCB and the power circuitry which is far superior to a soldered joint, particularly under thermal or mechanical stress conditions which can affect lifetime. Thanks to the high mechanical pressure provided by the springs, an air-tight, reliable electrical connection is achieved.

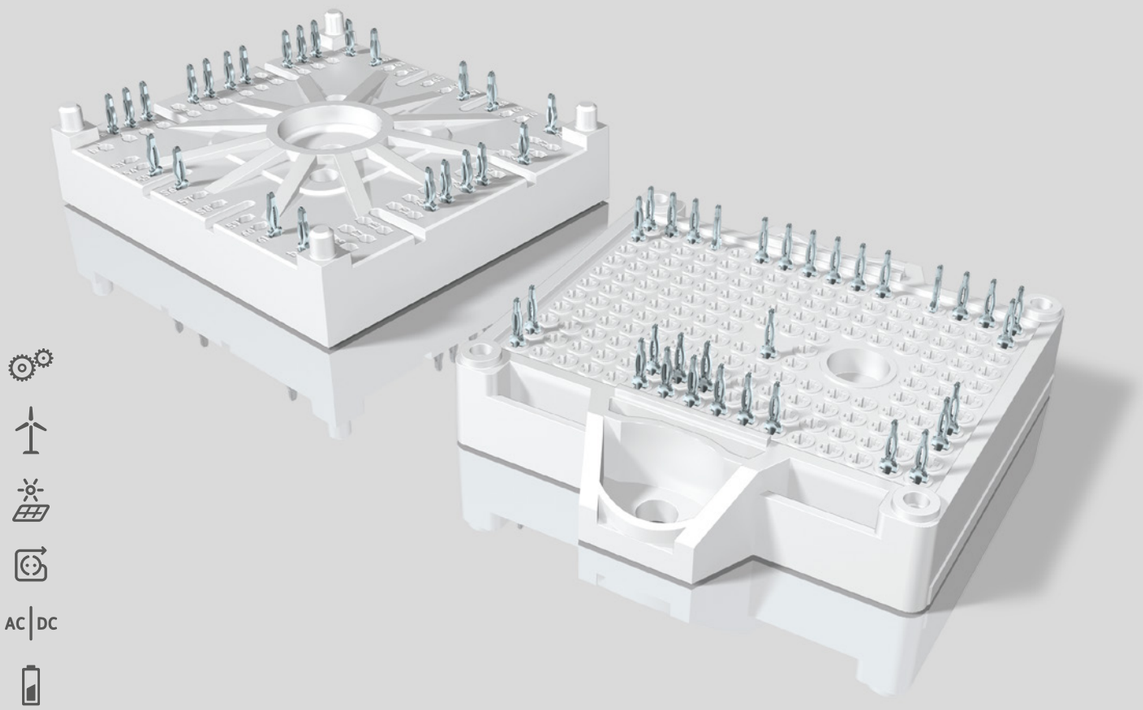
## Product range

MiniSKiiP modules are designed for 600V/650V, 1200V and 1700V with 4A - 400A nominal chip currents, and feature Trench IGBT technology in combination with the SEMIKRON CAL diodes. 1200V Trench IGBT 4/IGBT 7 and CAL 4 diodes are designed for maximum junction temperatures of 175°C.
In addition to CIB, sixpack, twelvepack, H-bridge, half-bridge, 3-level and uncontrolled/half-controlled rectifiers as well as brake chopper, customer-specific modules are also available. What's more, the latest chip technology such as full and hybrid silicon carbide power modules meet the highest of power density and efficiency demands. For fast evaluation, lab test boards can be ordered for each module type.

**Further information**: www.semikron.com/miniskiip

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# SEMITOP® 1-4
# SEMITOP® E1/E2





## Flexible and High Performance Product for a Comprehensive Portfolio

# SEMITOP®

### Portfolio

| | |
|---|---|
| SEMITOP 1, 2, 3, 4 | up to 55kW |
| SEMITOP E1/E2 | up to 70kW |

### Short facts

- 12mm module height
- Reliable solder or press-fit connection
- Low stray inductance case

### Key features

- No baseplate
- Complex configurations possible
- Different chip technologies and manufacturers available
- Optmised system costs

### Applications

The SEMITOP family features a cost effective design. This product generation is designed for the low and medium-power range of up to 70kW following the latest introduction of the SEMITOP E family. The scope this gives for compact and low inductance designs, coupled with the latest chip technologies and different topologies, makes the two platforms suitable for different markets such as UPS, solar, motor drives, power supplies and the new, emerging EV battery charger market.

### Benefits

The SEMITOP platform centers around 12-mm-high modules, covering the low and medium-power range, with one or two mounting screws and no baseplate, featuring PCB interface via solder or press-fit pins. The low commutation inductance design and the choice of the latest Si and SiC chip technologies make this product suitable for UPS and solar applications, motor drives, power supplies, welding and the new EV battery charger market. A large variety of configurations is possible within the SEMITOP family, including 3-level (NPC/TNPC) and CIB (converter-inverter-brake) topologies.

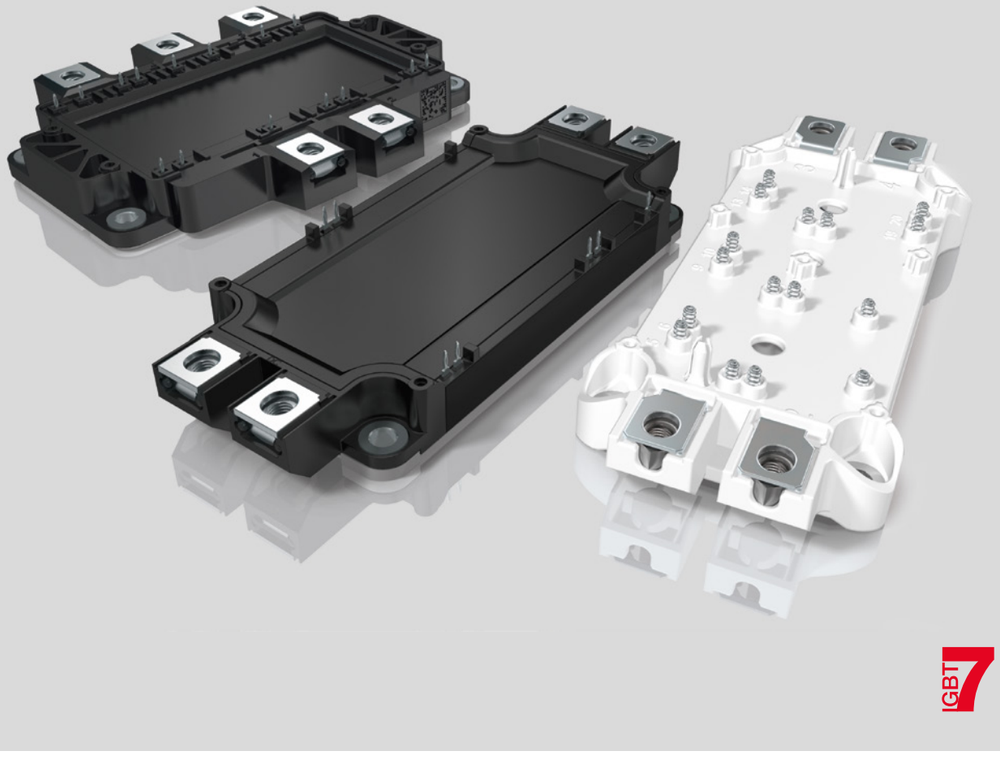
### Product range

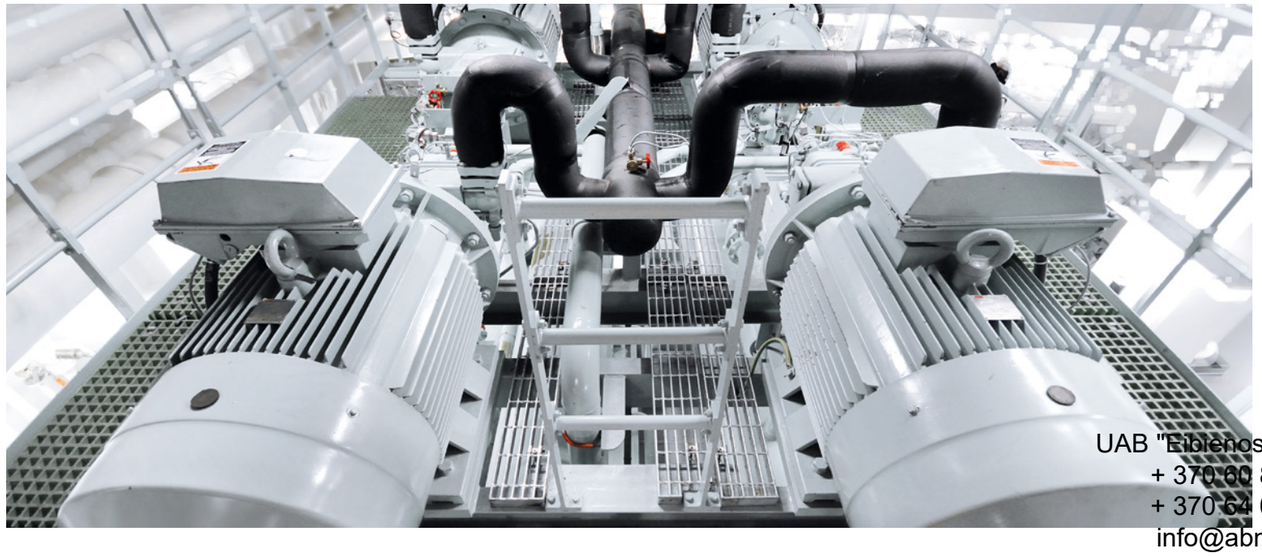
SEMITOP can include fast Si diodes, fast IGBTs in 650V/1200V class and MOSFETs even for high voltage. Even the latest SiC chip technologies for diodes and MOSFETs can be integrated in the platform, making a lot of different configurations with different chip combinations possible:

- Neutral point clamp 3-level configuration (NPC)
- T-type NPC 3-level configuration (TNPC)
- 3-phase inverter (Sixpack)
- CIB configurations (converter-inverter-brake)
- 3-phase bridge rectifier
- Full SiC and hybrid configurations
- Customised configurations possible

**Further information**: www.semikron.com/semitop

# SEMiX® Spring
# SEMiX® 3 Press-Fit
# SEMiX® 5
# SEMiX® 6 Press-Fit



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## IGBT and Rectifier Module Family for Solder-Free Mounting

# SEMiX®

### Portfolio

| | |
|---|---|
| SEMiX Spring | 75A up to 600A |
| SEMiX 3 Press-Fit | 225A up to 600A |
| SEMiX 5 | up to 350kVA |
| SEMiX 6 Press-Fit | up to 200A |

### Short facts

- Low stray inductance case
- Reliable spring or press-fit connection
- Flat and compact inverter design

### Key features

- Half-Bridge, Chopper, Sixpack and 3-level topologies
- Isolated copper baseplate using DBC technology
- Also available with integrated shunt resistor (SEMiX 3 press-fit)
- Multiple IGBT sources

### Applications

SEMiX is a flexible and application-oriented module. On the basis of a scalable platform concept, modern chip technology is integrated into IGBT and rectifier modules which are used in a wide variety of applications, such as AC motor drives, switching power supplies and current source inverters. Other typical applications include uninterruptible power supplies, photovoltaik systems, wind energy and automotive applications.

### Benefits

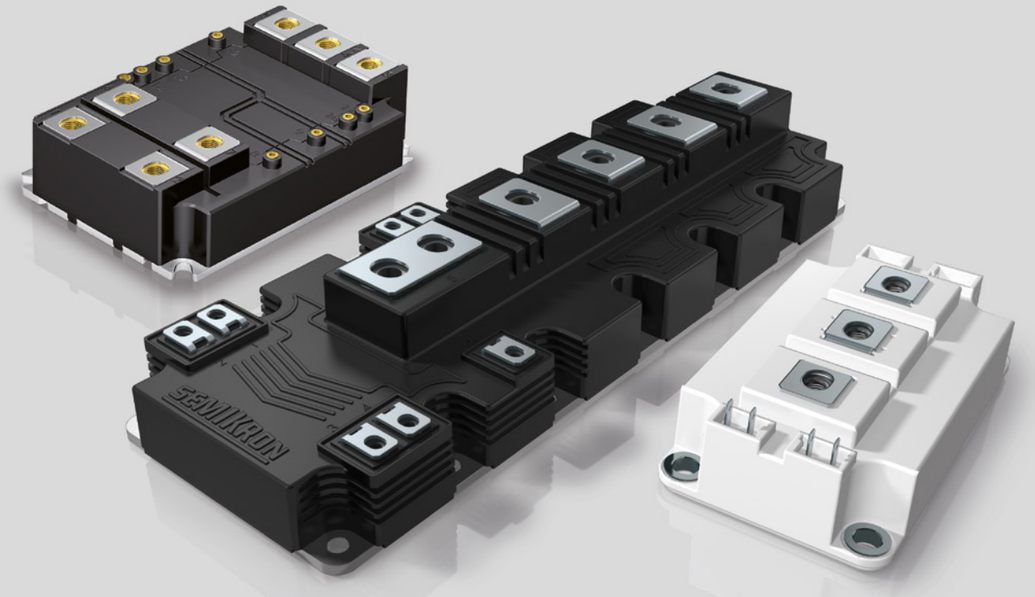
The family concept behind SEMiX includes uniform IGBT and rectifier housings. All have the same height (17mm) and can be connected by one principle DC-link design. This saves development time and makes a simple and low-inductance DC-link profile possible. Spring or press-fit contacts allow for a gate driver to be mounted directly on top of the module, eliminating the risk of noise on wires or loose connectors. Thanks to the flat package and separate AC and DC terminals, highly compact, state-of-the-art inverter designs are possible. The auxiliary contacts avoid solder joints and offer highly reliable pressure contacts. This leads to increased product reliability and lifetime.
The solder-free contacts make for quick and easy assembly. Production at the customer site can be optimised by using a uniform direction of assembly (everything top down). This simplifies logistics and reduces manufacturing costs.
The half-bridge topologies come with a selection of choices for connection technologies such as press-fit and spring contact as well as for the integration level: current measurement shunts can be included in the power module, plug & play driver solutions and pre-printed phase change material can be supplied to shorten the time-to-market and development times.

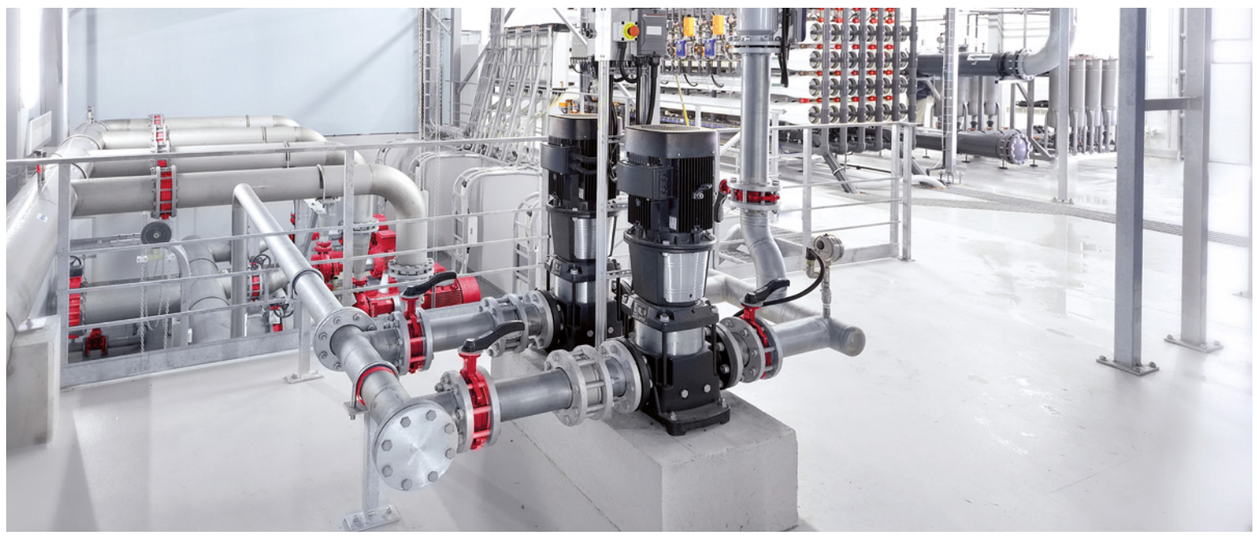
### Product range

For the IGBT modules, different housing sizes are available in 600V, 1200V and 1700V. Half-bridge, sixpack and chopper topologies are available with a current range from 75A to 600A. Besides IGBT3 and IGBT4 chips, the 1200V range also includes a series with V-IGBT devices. Controlled, half-controlled and uncontrolled rectifier modules with identical footprint and 17mm height are also available. For the latest housing versions, we also offer optional integrated shunt resistors and 3-level topologies (NPC, TNPC or Buck-Boost-Converters).

**Further information**: www.semikron.com/semix

# SEMITRANS® 2-9
# SEMITRANS® 10
# SEMITRANS® 20



## Low Inductance Package Design
## Down to 10nH

# SEMITRANS®

### Portfolio

| | |
|---|---|
| SEMITRANS 2-9 | 45kW up to 500kW |
| SEMITRANS 10 | 500kW up to 2MW |
| SEMITRANS 20 | 3,3 kV, 450A / 1,7kV, 1200A |

### Short facts

- Safe operation with high DC-link voltages
- Maximum power output
- Multiple IGBT sources

### Key features

- Half-Bridge, Chopper, Single Switch, 3-level, common emitter
- Isolated copper baseplate using DBC technology
- With integrated gate resitor
- High isolation voltage

### Applications

SEMITRANS power modules are designed for a broad range of applications such as motor drives, regenerative inverters, power supplies or traction applications. The long service life is perfectly suited to ambitious applications such as AC drives, switched reluctance and DC motors.

### Benefits

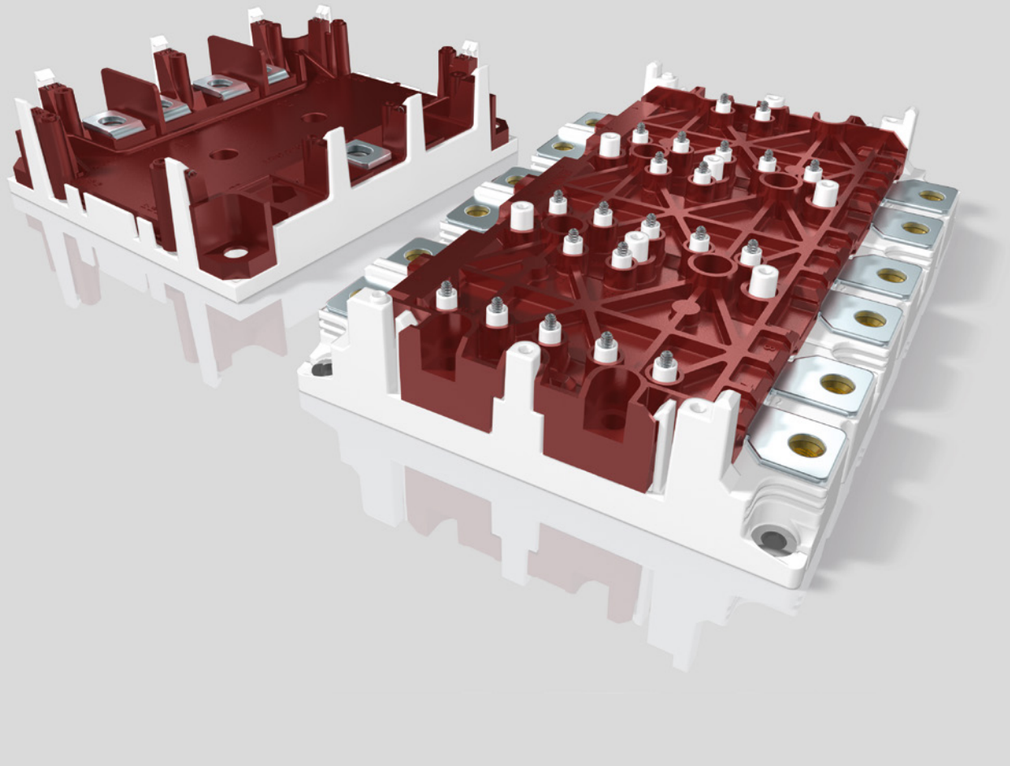
SEMITRANS 2-9 feature well-proven designs that come from over 25 years of market experience, but are still suitable for the latest chips generations , including silicon carbide, thanks to its low-inductance design. SEMITRANS 10 takes the power range into the realm of megawatt applications, utilizing the latest SEMIKRON packaging technologies including Direct Pressed Die technology for maximum reliability and minimum thermal resistance. SEMITRANS 20 serves low and medium-voltage applications with a low-inductance and easy-to-parallel power module design. With its advanced technologies such as sintered chips and AlCu bond wires, it boasts up to 5 time more lifetime than standard modules.

### Product range

The SEMITRANS family offers a broad range of topologies and power ranges. All the standard voltage classes from 600V to 3300V are available. The current rating ranges from 25A to 1800A. The SEMITRANS package is available as half-bridge, chopper, single switch, 3-level and common emitter.

**Further information**: www.semikron.com/semitrans

# SKiM® 4/5
# SKiM® 63/93





## 100% Solder-Free for Maximum Durability

SKiM®

### Portfolio

| | |
|---|---|
| SKiM 4/5 | 200A up to 600A |
| SKiM 63/93 | 300A up to 900A |

### Short facts

- No solder delamination thanks to sintered chips – SKiM 63/93
- 1500 temperature cycles without failure – SKiM 63/93
- Up to 23% more performance with AlCu-bonded diodes and high performance thermal grease

### Key features

- IGBT power module in Sixpack configuration with 3 separate half-bridges - SKiM 63/93
- Available in 600V, 1200V and 1700V and from 200A to 900A
- NPC and TNPC configuration - SKiM4/5
- In 1200V, 600A also available in buck/boost configuration - SKiM 63/93
- Solder-free design for maximum durability - SKiM 63/93
- Design without baseplate
- Solder-free module and driver PCB mounting
- Also available as solder version for less demanding cost-sensitive applications
- Low inductance design thanks to symmetrical layout
- Hybrid SiC version for maximum efficiency - SKiM 63/93

### Applications

The SKiM 63/93 is designed for applications that require excellent inverter reliability. This applies first and foremost to automotive applications such as electric powertrains in electric utility vehicles, heavy-duty construction machinery and tractors. It can also provide leading-edge performance in supersports and race cars. The SKiM 4/5 features proven 3-level topologies and can be found in ambitious applications such as solar and UPS.

### Benefits

The SKiM module can improve the reliability of inverters several times over, even under substantial active and passive temperature swings. In addition to sintered chips, pressure contacts and spring technology, the SKiM63/93 featuring AlCu-bonded diodes and high performance thermal grease delivers as much as 23.3% better performance with the same chip set and same lifetime or twice the power cycling capability of standard sinter modules. The SKiM 93 is also available with hybrid SiC technology to extend efficiency and switching frequency.

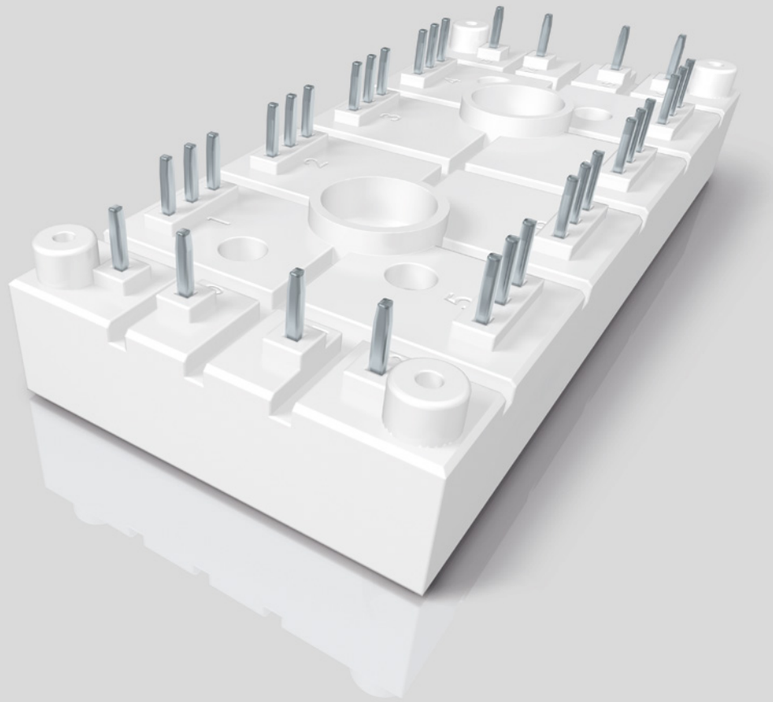
### Product range

The SKiM 4/5 modules are available as sixpack, 3-level (NPC and TNPC) configurations with nominal currents from 200A to 600A. The SKiM 63/93 offers 3-phase inverter topologies at 600V, 1200V and 1700V. The power ranges from 20kW to 180kW with nominal currents of 300A to 900A. Modules in buck and boost configurations for 1200V/600A round off the portfolio. Driver solutions are available as is an optimised water cooler for fast and customer-friendly evaluation. In addition, paralleling boards for a simple and powerful half-bridge configuration are also available.

**Further information**: www.semikron.com/skim

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SEMIPONT®





# Compact Package in Various Configurations

# SEMIPONT®

## Short facts

Compact packages with screw, fast-on or lead terminals

High insulation voltages

Diode, thyristor rectifier, rectifier/brake Chopper and AC controller

## Key features

Diode, thyristor rectifier, rectifier/brake Chopper and AC controller

From 400V up to 1.8kV blocking voltages

From 28A up to 207A

Compact packages with screw, fast-on or lead terminals

## Applications

Typical application areas for the broad field of SEMIPONT power bridge rectifiers include AC and DC drives, servo drives, (controlled) field rectifiers for DC motors, (controllable) rectifiers for power supplies, input rectifiers for variable frequency drives, soft motor starters, temperature control, (controlled) battery charger rectifiers, DC motor controllers and DC power supplies.

## Benefits

With blocking voltages up to 1.8kV the SEMIPONT family offers high ruggedness for harsh industrial applications. The different housings with soldered PCB connection allow for compact inverter designs.

## Product range

The SEMIPONT bridge rectifier family is available in various configurations with diode and thyristor rectifiers, rectifier/brake chopper or AC controller. The compact screw-mounted packages ensure quick and easy PCB assembly. High blocking voltages of up to 1800V, high ruggedness for harsh industrial applications and high insulation voltages are also realized in this package.

**Further information**: www.semikron.com/semipont

SEMIPACK®



AC | DC



# Bipolar Modules from the Market Leader

# SEMIPACK®

## Short facts

Well established thyristor diode package

Over 40 years of market experience

Wide power and topology range

## Key features

Industrial standard thyristor/diode modules

Over 40 years of market experience

Wide power and topology range

800V up to 2200V

15A up to 1360A

Uncontrolled, half-controlled and full-controlled rectifiers

Single thyristors and diodes

## Applications

The target applications for the thyristor, thyristor/diode or diode modules include input rectifiers (single-phase, three-phase, uncontrolled, half-controlled or full-controlled) for inverters or UPS systems, soft start applications and control systems.

## Benefits

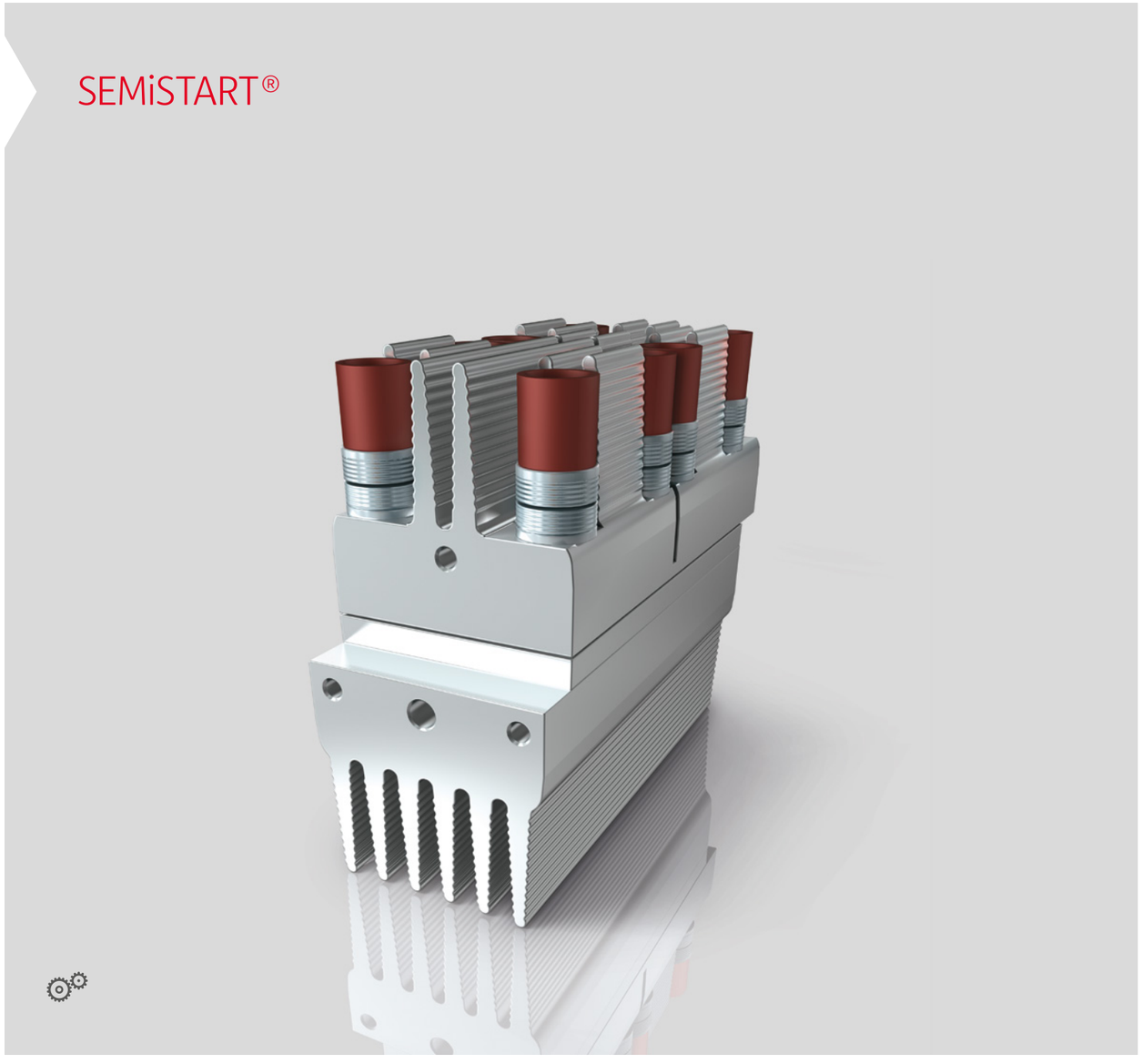
SEMIPACK delivers a well-established industrial standard with regard to footprint and module outline. Thanks to the comprehensive product range, the ideal solution can be found for any application. With SemiSel, the free online calculation and simulation tool for losses and temperature, the power electronic system developer can make the right power module choice.

## Product range

The SEMIPACK product line is a comprehensive product range with seven module lines covering voltage classes from 800V to 2200V, insulation voltages of 3.6kV, 4.8kV@1s and rated currents from 15A to 1360A. The SEMIPACK product line includes uncontrolled, half-controlled and full-controlled rectifier modules. Also available are custom topologies, single thyristor or diode modules and SEMIPACK modules featuring fast switching diodes for dedicated applications. The SEMIPACK FAST product line covers a current range from 40A to 600A with voltage classes from 600V to 1700V. The portfolio of the SEMIPACK product line is extended continuously to meet market requirements.

**Further information**: www.semikron.com/semipack

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# Compact Soft-Starter Module

# SEMiSTART®

## Short facts

- Double-sided cooling for high load cycle capability
- Robust pressure contact technology
- Low thermal resistance

## Key features

- Up to 3080A
- Qualified plug & play subsystem
- Excellent thermal performance
- From 560A to 3080A overload current

## Applications

SEMiSTART, the anti-parallel thyristor module, is designed for soft-start applications.

## Benefits

SEMiSTART – a power module with integrated heatsink – for ultra-compact designs in soft-start applications. Double-sided cooling along with pressure contact technology allows for a high current capability with overload currents of up to 3080A for 20s overload duration. SEMiSTART is a robust plug & play subsystem that helps cut development time and system costs.

## Product range

SEMiSTART power modules are available in three housing sizes for overload currents ranging from 560A to 3080A. All overload current classes are available for voltages of 1400V and 1800V.

**Further information** www.semikron.com/semistart

# IGBT Modules
# For Maximum Performance

SEMIKRON offers IGBT (Insulated-Gate Bipolar Transistor) modules in SEMITRANS, SEMiX, SKiM, MiniSKiiP and SEMITOP packages in different topologies, current and voltage ratings. Starting from 4A to 1400A in voltage classes from 600V to 1700V, the IGBT modules are used in a variety of applications and feature key technologies such as sintering, spring or press-fit contacts for quick and easy assembly.

Different topologies are available - CIB (converter inverter brake), half-bridge, H-bridge, sixpack, 3-level and many more, covering almost every application field. Featuring the latest IGBT chips in combination with SEMIKRON's CAL diode technology.

The latest IGBT generation 7 is now also available in SEMIKRON power modules. It provides higher power densities and delivers the new benchmark, especially in motor drive and solar applications.

**IGBT Generation 7**

Optimized IGBTs for motor drive applications

Reduced saturation voltage and chip size

Higher nominal currents

Up to 45% more module output power

Lower overall system costs

IGBT 7


| | |
|---|---|
| IGBT Generation 7 – MiniSKiiP, SEMITOP, SEMiX | 40 |
| MiniSKiiP | 42 |
| SEMITOP | 48 |
| SEMiX | 58 |
| SEMITRANS | 65 |
| SKiM 4/5 | 73 |
| SKiM 63/93 | 75 |


For detailed information please refer to data sheets.

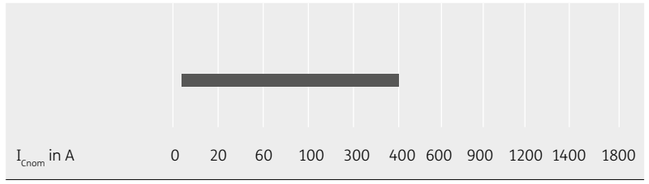
**Further information:** www.semikron.com/igbt-modules

## MiniSKiiP®

**Sixpack**
**3-level**
**H-Bridge**
**CIB**
**Half-Bridge**
**Twelvepack**

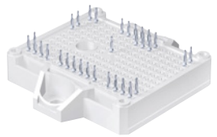


**600V up to 1700V**

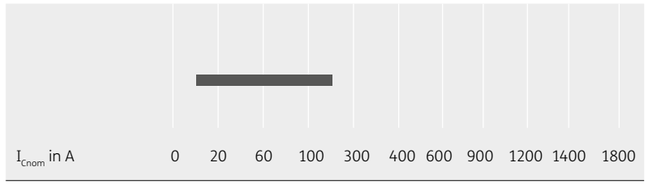



## SEMITOP®

**Half-Bridge**
**Sixpack**
**3-level**
**Chopper**
**H-Bridge**
**CIB**



**600V up to 1200V**

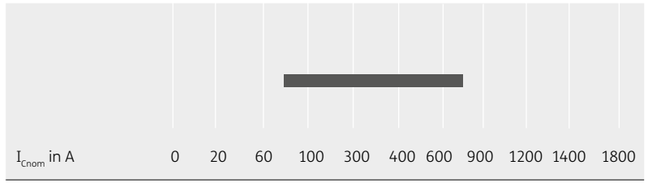



## SEMiX®

**Half-Bridge**
**Sixpack**
**3-level**
**Chopper**
**Buck-Boost converter**

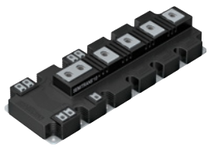


**600V up to 1700V**

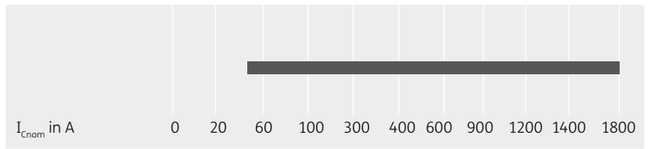



## SEMITRANS®

**Half-Bridge**
**Sixpack**
**Chopper**
**Single Switch**
**3-level**

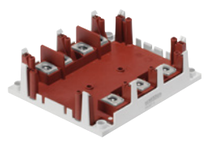


**600V up to 3300V**

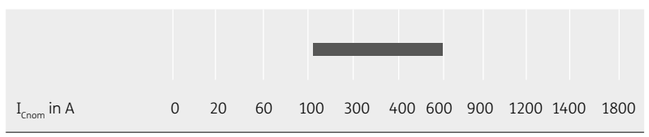



## SKiM®4/5

**Sixpack**
**3-level**

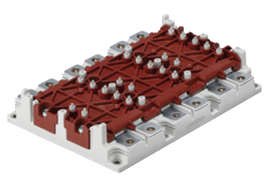


**600V up to 1700V**

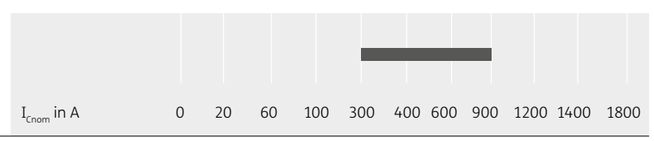



## SKiM®63/93

**Sixpack**
**Chopper**

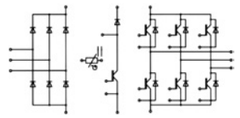
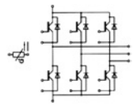
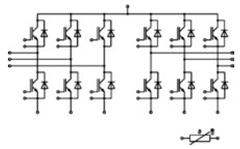
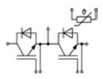


**600V up to 1700V**



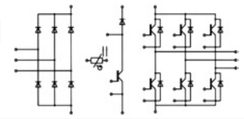
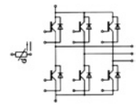
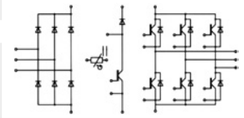
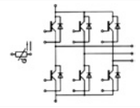
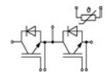

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# IGBT 7 Modules / MiniSKiiP

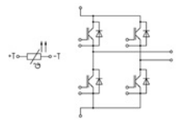
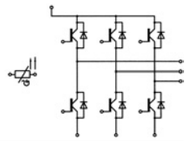
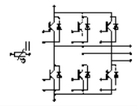
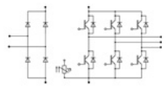
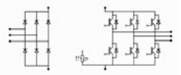
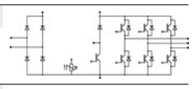
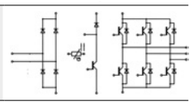
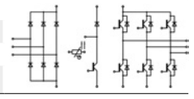
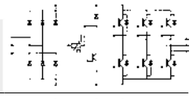
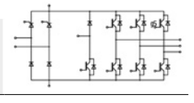
| Type | IGBT 7 | | | |
|---|---|---|---|---|
| | $I_{nom}$ A | Topology | Package | Topology |
| **1200V - IGBT (T7)** | | | | |
| **SKiiP11NAB12T7V1** | 10 | CIB | MiniSKiiP 1 |  |
| **SKiiP12NAB12T7V1** | 15 | CIB | MiniSKiiP 1 | |
| **SKiiP23NAB12T7V1** | 25 | CIB | MiniSKiiP 2 | |
| **SKiiP24NAB12T7V1** | 35 | CIB | MiniSKiiP 2 | |
| **SKiiP25NAB12T7V2** | 50 | CIB | MiniSKiiP 2 | |
| **SKiiP34NAB12T7V1** | 35 | CIB | MiniSKiiP 3 | |
| **SKiiP35NAB12T7V1** | 50 | CIB | MiniSKiiP 3 | |
| **SKiiP37NAB12T7V1** | 75 | CIB | MiniSKiiP 3 | |
| **SKiiP38NAB12T7V2** | 100 | CIB | MiniSKiiP 3 | |
| **SKiiP11AC12T7V1** | 10 | Sixpack | MiniSKiiP 1 |  |
| **SKiiP12AC12T7V1** | 15 | Sixpack | MiniSKiiP 1 | |
| **SKiiP13AC2T7V1** | 25 | Sixpack | MiniSKiiP 1 | |
| **SKiiP14AC12T7V1** | 35 | Sixpack | MiniSKiiP 1 | |
| **SKiiP23AC12T7V1** | 25 | Sixpack | MiniSKiiP 2 | |
| **SKiiP24AC12T7V1** | 35 | Sixpack | MiniSKiiP 2 | |
| **SKiiP25AC12T7V1** | 50 | Sixpack | MiniSKiiP 2 | |
| **SKiiP26AC12T7V1** | 70 | Sixpack | MiniSKiiP 2 | |
| **SKiiP27AC12T7V1** | 75 | Sixpack | MiniSKiiP 2 | |
| **SKiiP28AC12T7V1** | 100 | Sixpack | MiniSKiiP 2 | |
| **SKiiP37AC12T7V1** | 75 | Sixpack | MiniSKiiP 3 | |
| **SKiiP38AC12T7V1** | 100 | Sixpack | MiniSKiiP 3 | |
| **SKiiP39AC12T7V1** | 150 | Sixpack | MiniSKiiP 3 | |
| **SKiiP39AC12T7V10** | 200 | Sixpack | MiniSKiiP 3 | |
| **SKiiP12ACC12T7V1** | 15 | Twelvepack | MiniSKiiP 1 |  |
| **SKiiP23ACC12T7V1** | 25 | Twelvepack | MiniSKiiP 2 | |
| **SKiiP24ACC12T7V1** | 35 | Twelvepack | MiniSKiiP 2 | |
| **SKiiP35ACC12T7V1** | 50 | Twelvepack | MiniSKiiP 3 | |
| **SKiiP24GB12T7V1** | 150 | Half-Bridge | MiniSKiiP 2 Dual |  |
| **SKiiP26GB12T7V1** | 200 | Half-Bridge | MiniSKiiP 2 Dual | |
| **SKiiP27GB12T7V1** | 300 | Half-Bridge | MiniSKiiP 2 Dual | |
| **SKiiP38GB12T7V1** | 300 | Half-Bridge | MiniSKiiP 3 Dual | |



# IGBT 7 Modules / SEMITOP / SEMiX

| Type | IGBT 7 | | | |
|---|---|---|---|---|
| | $I_{nom}$ A | Topology | Package | Topology |
| **1200V - IGBT (T7)** | | | | |
| **SK10DGDL12T7ETE1** | 10 | CIB | SEMITOP E1 |  |
| **SK15DGDL12T7ETE1** | 15 | CIB | SEMITOP E1 | |
| **SK35DGDL12T7ETE2** | 35 | CIB | SEMITOP E2 | |
| **SK25GD12T7ETE1** | 25 | Sixpack | SEMITOP E1 |  |
| **SK35GD12T7ETE1** | 35 | Sixpack | SEMITOP E1 | |
| **SK50GD12T7ETE2** | 50 | Sixpack | SEMITOP E2 | |
| **SK75GD12T7ETE2** | 75 | Sixpack | SEMITOP E2 | |
| **SK100GD12T7ETE2** | 100 | Sixpack | SEMITOP E2 | |
| **1200V - IGBT (M7)** | | | | |
| **SEMiX076DGDL12M7p** | 75 | CIB | SEMiX 6p |  |
| **SEMiX106DGDL12M7p** | 100 | CIB | SEMiX 6p | |
| **SEMiX156DGDL12M7p** | 150 | CIB | SEMiX 6p | |
| **SEMiX106GD12M7p** | 100 | Sixpack | SEMiX 6p |  |
| **SEMiX156GD12M7p** | 150 | Sixpack | SEMiX 6p | |
| **SEMiX206GD12M7p** | 200 | Sixpack | SEMiX 6p | |
| **SEMiX223GB12M7p** | 220 | Half-Bridge | SEMiX 3p |  |
| **SEMiX303GB12M7p** | 300 | Half-Bridge | SEMiX 3p | |
| **SEMiX453GB12M7p** | 450 | Half-Bridge | SEMiX 3p | |
| **SEMiX603GB12M7p** | 500 | Half-Bridge | SEMiX 3p | |
| **SEMiX703GB12M7p** | 700 | Half-Bridge | SEMiX 3p | |

# IGBT Modules / MiniSKiiP

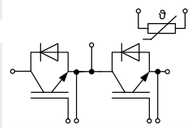
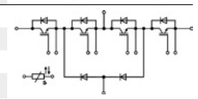
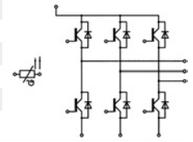
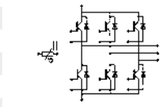
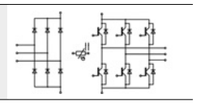
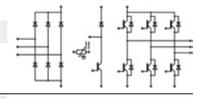
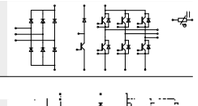
| Type | IGBT | | | | | Diode | | | Rectifier | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_s$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **600V - IGBT3 (Trench)** | | | | | | | | | | | | |
| **SKiiP 16GH066V1** | 65 | 50 | 1.45 | 1.7 | 1.7 | 56 | 1.50 | 1.3 | - | II 1 | P12, HPTP | |
| **SKiiP 27GH066V1** | 88 | 75 | 1.45 | 2.7 | 3 | 77 | 1.50 | 1.8 | - | II 2 | P12, HPTP | |
| **SKiiP 28GH066V1** | 112 | 100 | 1.45 | 3.4 | 3.5 | 112 | 1.30 | 3.3 | - | II 2 | P12, HPTP |  |
| **SKiiP 02AC066V1** | 20 | 10 | 1.45 | 0.45 | 0.3 | 20 | 1.30 | 0.3 | - | II 0 | P12, HPTP | |
| **SKiiP 04AC066V1** | 33 | 20 | 1.45 | 0.8 | 0.7 | 31 | 1.60 | 0.55 | - | II 0 | P12, HPTP | |
| **SKiiP 15AC066V1** | 40 | 30 | 1.45 | 1 | 1.1 | 39 | 1.50 | 1.1 | - | II 1 | P12, HPTP |  |
| **SKiiP 27AC066V1** | 88 | 75 | 1.45 | 2.7 | 3 | 77 | 1.50 | 1.8 | - | II 2 | P12, HPTP | |
| **SKiiP 28AC066V1** | 112 | 100 | 1.45 | 3.4 | 3.5 | 112 | 1.30 | 3.3 | - | II 2 | P12, HPTP | |
| **SKiiP 39AC066V4** | 146 | 150 | 1.45 | 7.9 | 5.6 | 164 | 1.30 | 3.5 | - | II 3 | P12, HPTP |  |
| **SKiiP 01NEC066V3** | 12 | 6 | 1.45 | 0.3 | 0.2 | 12 | 1.30 | 0.2 | 220 | II 0 | P12, HPTP | |
| **SKiiP 02NEC066V3** | 20 | 10 | 1.45 | 0.5 | 0.3 | 20 | 1.30 | 0.5 | 220 | II 0 | P12, HPTP | |
| **SKiiP 03NEC066V3** | 27 | 15 | 1.45 | 0.6 | 0.5 | 28 | 1.40 | 0.5 | 220 | II 0 | P12, HPTP |  |
| **SKiiP 01NAC066V3** | 12 | 6 | 1.45 | 0.3 | 0.2 | 12 | 1.30 | 0.2 | 220 | II 0 | P12, HPTP | |
| **SKiiP 02NAC066V3** | 20 | 10 | 1.45 | 0.5 | 0.3 | 20 | 1.30 | 0.5 | 220 | II 0 | P12, HPTP |  |
| **SKiiP 02NEB066V3** | 20 | 10 | 1.45 | 0.5 | 0.3 | 20 | 1.30 | 0.5 | 220 | II 0 | P12, HPTP | |
| **SKiiP 03NEB066V3** | 27 | 15 | 1.45 | 0.6 | 0.5 | 28 | 1.40 | 0.5 | 220 | II 0 | P12, HPTP |  |
| **SKiiP 25NEB066V1** | 43 | 30 | 1.45 | 0.9 | 1.2 | 39 | 1.50 | 1.1 | 370 | II 2 | P12, HPTP |  |
| **SKiiP 11NAB066V1** | 12 | 6 | 1.45 | 0.3 | 0.2 | 12 | 1.30 | 0.2 | 220 | II 1 | P12, HPTP | |
| **SKiiP 12NAB066V1** | 20 | 10 | 1.45 | 0.5 | 0.3 | 20 | 1.30 | 0.5 | 220 | II 1 | P12, HPTP | |
| **SKiiP 13NAB066V1** | 27 | 15 | 1.45 | 0.6 | 0.5 | 28 | 1.40 | 0.5 | 220 | II 1 | P12, HPTP | |
| **SKiiP 14NAB066V1** | 33 | 20 | 1.45 | 0.75 | 0.7 | 31 | 1.60 | 0.55 | 220 | II 1 | P12, HPTP |  |
| **SKiiP 25NAB066V1** | 43 | 30 | 1.45 | 0.9 | 1.2 | 39 | 1.50 | 1.1 | 370 | II 2 | P12, HPTP | |
| **SKiiP 26NAB066V1** | 65 | 50 | 1.45 | 1.6 | 1.6 | 56 | 1.50 | 1.3 | 370 | II 2 | P12, HPTP |  |
| **SKiiP 37NAB066V1** | 88 | 75 | 1.45 | 2.7 | 3 | 77 | 1.50 | 1.8 | 700 | II 3 | P12, HPTP | |
| **SKiiP 38NAB066V1** | 112 | 100 | 1.45 | 3.4 | 3.5 | 112 | 1.30 | 3.3 | 700 | II 3 | P12, HPTP |  |
| **SKiiP 11HEB066V1** | 27 | 15 | 1.50 | 0.6 | 0.5 | 28 | 1.40 | 0.5 | 370 | II 1 | P12, HPTP | |
| **SKiiP 12HEB066V1** | 33 | 15 | 1.50 | 0.8 | 0.7 | 29 | 1.40 | 0.6 | 370 | II 1 | P12, HPTP |  |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs

UAB "Eibienos automatika"
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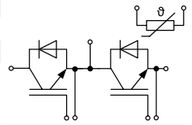
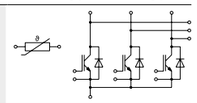
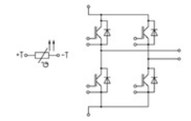
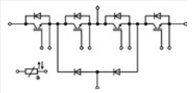
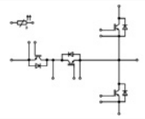
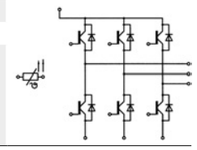
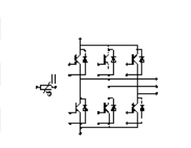
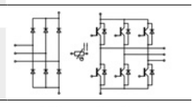
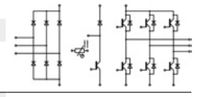


# IGBT Modules / MiniSKiiP

| Type | IGBT | | | | | Diode | | | Rectifier | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_s$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **650V - IGBT3 (Trench)** | | | | | | | | | | | | |
| **SKiiP 24GB07E3V1** [2] | 185 | 150 | 1.45 | 2.2 | 5.1 | 161 | 1.54 | 3.7 | - | II 2 | P12, HPTP | |
| **SKiiP 26GB07E3V1** [2] | 229 | 200 | 1.45 | 4.4 | 7.4 | 235 | 1.40 | 4.5 | - | II 2 | P12, HPTP | |
| **SKiiP 38GB07E3V1** [2] | 287 | 300 | 1.45 | 5.5 | 10.6 | 310 | 1.40 | 5.1 | - | II 3 | P12, HPTP |  |
| **SKiiP 26MLI07E3V1** [2] | 98 | 75 | 1.45 | 2.8 | 2.8 | 75 | 1.54 | 1.4 | - | II 2 | P12, HPTP | |
| **SKiiP 27MLI07E3V1** [2] | 110 | 100 | 1.45 | 4.2 | 4.2 | 107 | 1.40 | 3.5 | - | II 2 | P12, HPTP | |
| **SKiiP 28MLI07E3V1** [2] | 135 | 150 | 1.45 | 5.5 | 5.6 | 126 | 1.40 | 5.5 | - | II 2 | P12, HPTP | |
| **SKiiP 39MLI07E3V1** [2] | 159 | 200 | 1.45 | 3.6 | 8.9 | 163 | 1.39 | 8.3 | - | II 3 | P12, HPTP |  |
| **1200V - IGBT3 (Trench)** | | | | | | | | | | | | |
| **SKiiP 03AC126V1** [3] | 16 | 8 | 1.70 | 0.9 | 0.9 | 8 | 1.90 | 0.7 | - | II 0 | P12, HPTP | |
| **SKiiP 11AC126V1** [3] | 16 | 8 | 1.70 | 0.9 | 1 | 14 | 1.90 | 0.9 | - | II 1 | P12, HPTP | |
| **SKiiP 11AC126V10** [3] | 16 | 6 | 1.65 | 18 | 1 | 48 | 1.10 | 16.4 | - | II 1 | P12, HPTP | |
| **SKiiP 12AC126V1** [3] | 28 | 15 | 1.70 | 1.7 | 1.9 | 26 | 1.60 | 1.2 | - | II 1 | P12, HPTP | |
| **SKiiP 13AC126V1** [3] | 41 | 25 | 1.70 | 4.1 | 3.1 | 30 | 1.80 | 2.2 | - | II 1 | P12, HPTP | |
| **SKiiP 13AC126V20** [3] | 41 | 25 | 1.65 | 2.9 | 3 | 27 | 2.00 | 1.2 | - | II 1 | P12, HPTP |  |
| **SKiiP 23AC126V1** [3] | 41 | 25 | 1.70 | 3.7 | 3.1 | 30 | 1.80 | 2.6 | - | II 2 | P12, HPTP | |
| **SKiiP 24AC126V1** [3] | 52 | 35 | 1.70 | 4.2 | 4.4 | 38 | 1.80 | 3.5 | - | II 2 | P12, HPTP | |
| **SKiiP 25AC126V1** [3] | 73 | 50 | 1.70 | 5.8 | 6.5 | 62 | 1.60 | 5.1 | - | II 2 | P12, HPTP | |
| **SKiiP 26AC126V1** [3] | 88 | 70 | 1.70 | 9 | 7.7 | 91 | 1.50 | 7.5 | - | II 2 | P12, HPTP | |
| **SKiiP 37AC126V2** [3] | 97 | 75 | 1.70 | 9.6 | 8.7 | 90 | 1.60 | 9.6 | - | II 3 | P12, HPTP | |
| **SKiiP 38AC126V2** [3] | 118 | 105 | 1.70 | 13.1 | 13 | 118 | 1.60 | 11.2 | - | II 3 | P12, HPTP | |
| **SKiiP 39AC126V2** [3] | 157 | 140 | 1.70 | 19.9 | 17.2 | 167 | 1.50 | 16.2 | - | II 3 | P12, HPTP | |
| **SKiiP 39AC126V20** [3] | 157 | 140 | 1.65 | 13 | 17 | - | 2.00 | 8.1 | - | II 3 | P12, HPTP |  |
| **SKiiP 03NAC126V1** [3] | 16 | 8 | 1.70 | 0.9 | 0.9 | 14 | 1.60 | 0.7 | 220 | II 0 | P12, HPTP |  |
| **SKiiP 11NAB126V1** [3] | 16 | 8 | 1.70 | 0.8 | 1 | 14 | 1.90 | 0.9 | 220 | II 1 | P12, HPTP | |
| **SKiiP 12NAB126V1** [3] | 28 | 15 | 1.70 | 2 | 1.9 | 26 | 1.60 | 1.3 | 220 | II 1 | P12, HPTP | |
| **SKiiP 12NAB126V20** [3] | 28 | 15 | 1.65 | 1.5 | 1.8 | 28 | 2.45 | 0.9 | 220 | II 1 | P12, HPTP |  |
| **SKiiP 22NAB126V10** [3] | 28 | 15 | 1.65 | 2 | 1.9 | 28 | 1.60 | 1.1 | 700 | II 2 | P12, HPTP |  |
| **SKiiP 23NAB126V1** [3] | 41 | 25 | 1.70 | 3.5 | 3 | 30 | 1.80 | 2.5 | 370 | II 2 | P12, HPTP | |
| **SKiiP 23NAB126V10** [3] | 41 | 25 | 1.70 | 3.5 | 3 | 30 | 1.80 | 2.5 | 635 | II 2 | P12, HPTP | |
| **SKiiP 23NAB126V20** [3] | - | 25 | 1.65 | 2.7 | 2.9 | 41 | 2.00 | 1.2 | 370 | II 2 | P12, HPTP | |
| **SKiiP 24NAB126V1** [3] | 52 | 35 | 1.70 | 4.6 | 4 | 38 | 1.80 | 3.3 | 370 | II 2 | P12, HPTP | |
| **SKiiP 24NAB126V10** [3] | 52 | 35 | 1.70 | 4.6 | 4 | 38 | 1.80 | 3.3 | 635 | II 2 | P12, HPTP |  |
| **SKiiP 35NAB126V1** [3] | 73 | 50 | 1.70 | 6.5 | 6.1 | 62 | 1.60 | 4.7 | 700 | II 3 | P12, HPTP | |
| **SKiiP 35NAB126V10** [3] | 72 | 50 | 1.70 | 6.5 | 6.1 | 60 | 1.67 | 4.7 | 850 | II 3 | P12, HPTP | |
| **SKiiP 36NAB126V1** [3] | 88 | 70 | 1.70 | 9 | 7.7 | 91 | 1.50 | 7.5 | 700 | II 3 | P12, HPTP | |
| **SKiiP 36NAB126V10** [3] | 91 | 80 | 1.70 | 9 | 7.7 | 87 | 1.64 | 7.5 | 850 | II 3 | P12, HPTP |  |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs

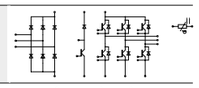
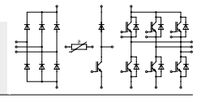
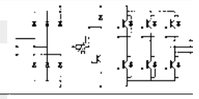
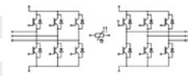
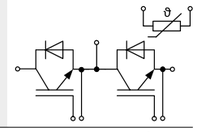
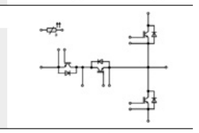
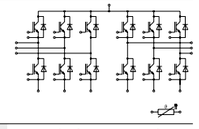
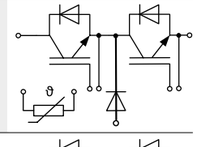
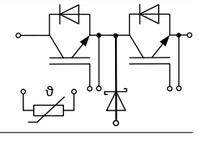
# IGBT Modules / MiniSKiiP

| Type | IGBT | | | | | Diode | | | Rectifier | Module | | Topology |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_s$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$@ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | | | |
| **SKiiP 24GB12T4V1** [2] | 170 | 150 | 1.85 | 10.8 | 15.6 | 157 | 2.17 | 10.3 | - | II 2 | P12, HPTP |  |
| **SKiiP 26GB12T4V1** [2] | 224 | 200 | 1.80 | 13.6 | 22.1 | 194 | 2.20 | 13.4 | - | II 2 | P12, HPTP | |
| **SKiiP 38GB12E4V1** [2] | 329 | 300 | 1.85 | 19.1 | 34.6 | 267 | 2.20 | 21.5 | - | II 3 | P12, HPTP | |
| **SKiiP 39GB12E4V1** [2] | 388 | 400 | 1.80 | 20.8 | 49.7 | 363 | 2.20 | 30.2 | - | II 3 | P12, HPTP | |
| **SKiiP 39GA12T4V1** [2] | 167 | 150 | 1.85 | 22.5 | 14 | 136 | 2.14 | 11.4 | - | II 3 | P12, HPTP |  |
| **SKiiP 26GH12T4V11** | 90 | 70 | 1.85 | 9.5 | 7.1 | 83 | 2.17 | 5.6 | - | II 2 | P12, HPTP |  |
| **SKiiP 39MLI12T4V1** [1] | 167 | 150 | 1.85 | 11.1 | 16.9 | 134 | 2.14 | 10.9 | - | II 3 | P12, HPTP |  |
| **SKiiP 39TMLI12T4V2** [2] | 235 | 200 | 1.80 | 7.5 | 12.8 | 194 | 2.20 | 9.7 | - | II 3 | P12, HPTP |  |
| **SKiiP 11AC12T4V1** | 12 | 8 | 1.85 | 0.87 | 0.75 | 15 | 2.33 | 0.53 | - | II 1 | P12, HPTP |  |
| **SKiiP 12AC12T4V1** | 18 | 15 | 1.85 | 1.65 | 1.5 | 23 | 2.38 | 0.79 | - | II 1 | P12, HPTP | |
| **SKiiP 13AC12T4V1** | 41 | 25 | 1.85 | 3.7 | 2.4 | 32 | 2.41 | 1.64 | - | II 1 | P12, HPTP | |
| **SKiiP 23AC12T4V1** | 41 | 25 | 1.85 | 3.7 | 2.4 | 32 | 2.41 | 1.64 | - | II 2 | P12, HPTP |  |
| **SKiiP 24AC12T4V1** | 52 | 35 | 1.85 | 3.7 | 3 | 44 | 2.30 | 2.3 | - | II 2 | P12, HPTP | |
| **SKiiP 25AC12T4V1** | 69 | 50 | 1.85 | 6 | 4.5 | 60 | 2.22 | 3.2 | - | II 2 | P12, HPTP | |
| **SKiiP 26AC12T4V1** | 90 | 70 | 1.85 | 9.5 | 7.1 | 83 | 2.17 | 5.6 | - | II 2 | P12, HPTP | |
| **SKiiP 37AC12T4V1** | 90 | 75 | 1.85 | 11.5 | 6.8 | 83 | 2.17 | 5.5 | - | II 3 | P12, HPTP | |
| **SKiiP 38AC12T4V1** | 115 | 100 | 1.80 | 13.7 | 9.7 | 100 | 2.20 | 6.5 | - | II 3 | P12, HPTP | |
| **SKiiP 39AC12T4V1** | 167 | 150 | 1.85 | 22.5 | 14 | 136 | 2.14 | 11.4 | - | II 3 | P12, HPTP | |
| **SKiiP 39AC12T4V21** [2] | 192 | 150 | 1.85 | 22.5 | 14 | 149 | 2.14 | 11.4 | - | II 3 | P12, HPTP | |
| **SKiiP 02NAC12T4V1** | 6 | 4 | 1.85 | 0.66 | 0.37 | 7.5 | 1.82 | 0.34 | 220 | II 0 | P12, HPTP |  |
| **SKiiP 03NAC12T4V1** | 7.5 | 8 | 1.85 | 0.9 | 0.7 | 9 | 2.33 | 0.5 | 220 | II 0 | P12, HPTP | |
| **SKiiP 10NAB12T4V1** | 6 | 4 | 1.85 | 0.66 | 0.37 | 7.5 | 1.82 | 0.34 | 220 | II 1 | P12, HPTP |  |
| **SKiiP 11NAB12T4V1** | 18 | 8 | 1.85 | 0.87 | 0.74 | 15 | 2.33 | 0.57 | 220 | II 1 | P12, HPTP | |
| **SKiiP 12NAB12T4V1** | 28 | 15 | 1.85 | 1.4 | 1.3 | 23 | 2.38 | 1.1 | 220 | II 1 | P12, HPTP | |
| **SKiiP 23NAB12T4V1** | 37 | 25 | 1.85 | 2.65 | 2.3 | 32 | 2.41 | 1.6 | 370 | II 2 | P12, HPTP |  |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs

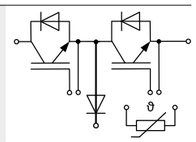
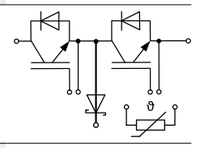
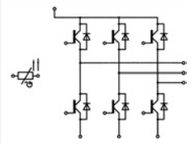
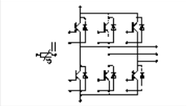
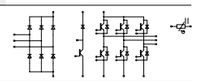
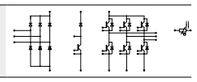
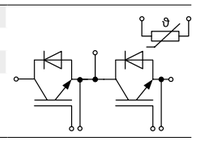


IGBT Modules / MiniSKiiP

| Type | IGBT | | | | | Diode | | | Rectifier | Module | | Topology |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_s$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$@ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | | | |
| **SKiiP 22NAB12T4V2** [1] | 28 | 15 | 1.85 | t.b.d. | t.b.d. | 22 | 2.38 | t.b.d. | 220 | II 2 | P12, HPTP |  |
| **SKiiP 23NAB12T4V2** [2] | 37 | 25 | 1.85 | 3.1 | 2.56 | 32 | 2.41 | 1.4 | 370 | II 2 | P12, HPTP |  |
| **SKiiP 24NAB12T4V4** [2] | 48 | 35 | 1.85 | 4.3 | 3.25 | 40 | 2.30 | 2.4 | 370 | II 2 | P12, HPTP | |
| **SKiiP 23NAB12T4V10** | 37 | 25 | 1.85 | 2.65 | 2.3 | 30 | 2.41 | 1.6 | 700 | II 2 | P12, HPTP |  |
| **SKiiP 24NAB12T4V1** | 48 | 35 | 1.85 | 4.3 | 3.25 | 44 | 2.30 | 2.4 | 370 | II 2 | P12, HPTP | |
| **SKiiP 24NAB12T4V10** | 48 | 35 | 1.85 | 4.3 | 3.25 | 44 | 2.30 | 2.4 | 700 | II 2 | P12, HPTP | |
| **SKiiP 34NAB12T4V1** | 52 | 35 | 1.85 | 4.3 | 3.3 | 44 | 2.30 | 2.4 | 370 | II 3 | P12, HPTP |  |
| **SKiiP 35NAB12T4V1** | 69 | 50 | 1.85 | 6 | 4.7 | 60 | 2.22 | 3.4 | 700 | II 3 | P12, HPTP | |
| **SKiiP 37NAB12T4V1** | 90 | 75 | 1.85 | 9.7 | 6.8 | 83 | 2.17 | 4.9 | 700 | II 3 | P12, HPTP | |
| **SKiiP 37NAB12T4V10** | 90 | 75 | 1.85 | 9.7 | 6.8 | 83 | 2.17 | 4.9 | 850 | II 3 | P12, HPTP | |
| **SKiiP 38NAB12T4V1** | 115 | 100 | 1.80 | 11.2 | 10 | 99 | 2.20 | 6.5 | 1000 | II 3 | P12, HPTP | |
| **SKiiP 12ACC12T4V10** [2] | 28 | 15 | 1.85 | 2.1 | 1.6 | 23 | 2.38 | 0.8 | 60 | II 1 | P12, HPTP |  |
| **SKiiP 23ACC12T4V10** [2] | 41 | 25 | 1.85 | 3.5 | 2.7 | 32 | 2.41 | 1.15 | 65 | II 2 | P12, HPTP | |
| **SKiiP 24ACC12T4V10** [2] | 52 | 35 | 1.85 | 3.9 | 3.5 | 44 | 2.30 | 2.3 | 100 | II 2 | P12, HPTP | |
| **SKiiP 24ACC12T4V1** [2] | 38 | 25 | 1.85 | 3.2 | 3 | 31 | 2.41 | 1.4 | - | II 2 | P12, HPTP | |
| **1200V - IGBT4 (Fast Trench)** | | | | | | | | | | | | |
| **SKiiP 26GB12F4V1** [2] | 197 | 200 | 2.05 | 16.8 | 16.3 | 194 | 2.20 | 11.7 | - | II 2 | P12, HPTP |  |
| **SKiiP 28TMLI12F4V1** [2] | 93 | 80 | 2.05 | 3.4 | 2.2 | 76 | 2.17 | 1.7 | - | II 2 | P12, HPTP |  |
| **SKiiP 29TMLI12F4V1** [2] | 144 | 150 | 2.05 | 5.2 | 6.1 | 148 | 2.17 | 6.5 | - | II 2 | P12, HPTP | |
| **SKiiP 35ACC12F4V1** [2] | 54 | 50 | 2.05 | 4.8 | 3.4 | 58 | 2.22 | 3 | 270 | II 3 | P12, HPTP |  |
| **SKiiP39MLIT12F4V1** [1] | 409 | 400 | 2.05 | t.b.d. | t.b.d. | 193 | 2.20 | t.b.d. | - | II 3 | P12, HPTP |  |
| **SKiiP39MLIT12F4V22**[1] | 409 | 400 | 2.05 | t.b.d. | t.b.d. | 193 | 2.20 | t.b.d. | - | II 3 | P12, HPTP |  |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs

# IGBT Modules / MiniSKiiP

| Type | IGBT | | | | | Diode | | | Rectifier | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_S$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **1200V - IGBT4 (Fast Trench)** | | | | | | | | | | | | |
| **SKiiP39MLIB12F4V1** [1] | 409 | 400 | 2.05 | t.b.d. | t.b.d. | 193 | 2.20 | t.b.d. | - | II 3 | P12, HPTP |  |
| **SKiiP39MLIB12F4V22** [1] | 409 | 400 | 2.05 | t.b.d. | t.b.d. | 193 | 2.20 | t.b.d. | - | II 3 | P12, HPTP |  |
| **SKiiP 37AC12F4V1** [1] | 81 | 75 | 2.05 | t.b.d. | t.b.d. | 83 | 2.17 | t.b.d. | - | II 3 | P12, HPTP |  |
| **1700V - IGBT3 (Trench)** | | | | | | | | | | | | |
| **SKiiP 38AC176V2** [2] | 118 | 100 | 2.00 | 23.8 | 32.2 | 115 | 1.76 | 26.2 | - | II 3 | P12, HPTP |  |
| **SKiiP 24NAB176V1** [2] | 38 | 29 | 2.00 | 5.1 | 6.3 | 48 | 2.00 | 4.9 | 370 | II 2 | P12, HPTP |  |
| **SKiiP 34NAB176V3** [2] | 67 | 58 | 2.00 | 11.2 | 12.8 | 66 | 2.06 | 6.6 | 635 | II 3 | P12, HPTP |  |
| **1700V - IGBT4 (Trench)** | | | | | | | | | | | | |
| **SKiiP 22GB17E4V1** [2] | 117 | 100 | 1.90 | 22.2 | 30.7 | 91 | 2.00 | 20.9 | - | II 2 | P12, HPTP |  |
| **SKiiP 24GB17E4V1** [2] | 177 | 150 | 1.90 | 26 | 46 | 149 | 2.00 | 32.4 | - | II 2 | P12, HPTP | |
| **SKiiP 36GB17E4V1** [2] | 224 | 200 | 1.90 | 37 | 66 | 193 | 2.00 | 47 | - | II 3 | P12, HPTP | |
| **SKiiP 38GB17E4V1** [2] | 341 | 300 | 1.90 | 47 | 102 | 267 | 2.00 | 69 | - | II 3 | P12, HPTP | |

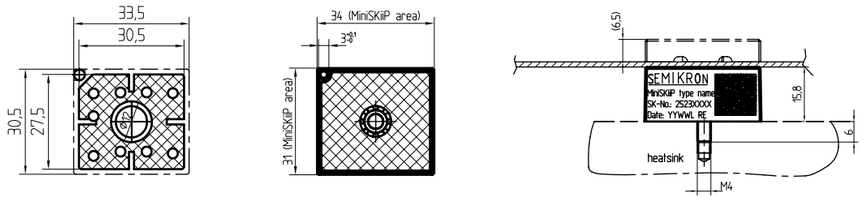
**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs



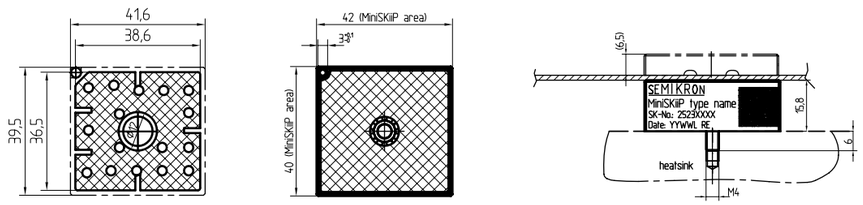
IGBT Modules / MiniSKiiP

## Packages

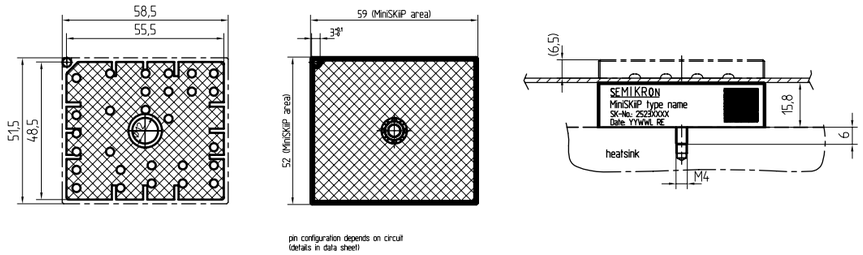
### MiniSKiiP II 0



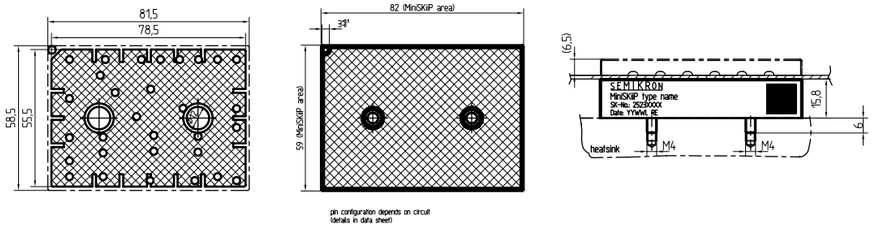

### MiniSKiiP II 1




### MiniSKiiP II 2




### MiniSKiiP II 3




Dimensions in mm

UAB "Eibienos automatika"
+ 370 60 823 097
+ 370 64 021 081
info@abn-a.com

# IGBT Modules / SEMITOP

| Type | IGBT | | | | | Diode | | | Rectifier | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$@ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **600V - IGBT3 (Trench)** | | | | | | | | | | | | |
| **SK 75 GB 066 T** | 77 | 75 | 1.45 | 3.1 | 2.8 | 62 | 1.35 | 0.85 | - | 3 | P12, HPTP | |
| **SK 100 GB 066 T** | 96 | 100 | 1.45 | 7 | 6 | 108 | 1.35 | 1.7 | - | 3 | P12, HPTP | |
| **SK 150 GB 066 T** | 124 | 150 | 1.45 | 6.25 | 5.7 | 135 | 1.35 | 1.7 | - | 3 | P12, HPTP | |
| **SK 30 GBB 066 T** | 40 | 30 | 1.45 | 0.97 | 1.77 | 36 | 1.45 | 0.26 | - | 3 | P12, HPTP | |
| **SK 50 GBB 066 T** | 60 | 50 | 1.45 | 2.2 | 1.73 | 56 | 1.50 | 0.72 | - | 3 | P12, HPTP | |
| **SK 75 GBB 066 T** | 77 | 75 | 1.45 | 3.1 | 2.8 | 77 | 1.35 | 0.85 | - | 3 | P12, HPTP | |
| **SK 20 MLI 066** | 30 | 20 | 1.45 | 0.4 | 1.07 | 30 | 1.60 | 0.2 | - | 3 | P12, HPTP | |
| **SK 30 MLI 066** | 40 | 30 | 1.45 | 0.97 | 1.77 | 37 | 1.50 | 0.26 | - | 3 | P12, HPTP | |
| **SK 30 MLI 066p** [1] | 37 | 30 | 1.45 | 0.97 | 1.77 | 34 | 1.50 | 0.26 | - | 3p | P12, HPTP | |
| **SK 50 MLI 066** | 60 | 50 | 1.45 | 1.46 | 2.02 | 56 | 1.50 | 1.07 | - | 3 | P12, HPTP | |
| **SK 75 MLI 066 T** | 83 | 75 | 1.45 | 1.7 | 2.8 | 92 | 1.50 | 1.1 | - | 4 | P12, HPTP | |
| **SK 100 MLI 066 T** | 105 | 100 | 1.45 | 2.5 | 4.2 | 110 | 1.35 | 1.9 | - | 4 | P12, HPTP | |
| **SK 150 MLI 066 T** | 151 | 150 | 1.45 | 2.7 | 5.9 | 115 | 1.50 | 2.6 | - | 4 | P12, HPTP | |
| **SK 20 GD 066 ET** | 30 | 20 | 1.45 | 0.34 | 0.63 | 31 | 1.45 | 0.2 | - | 3 | P12, HPTP | |
| **SK 30 GD 066 ET** | 40 | 30 | 1.45 | 0.97 | 1.77 | 36 | 1.45 | 0.26 | - | 3 | P12, HPTP | |
| **SK 50 GD 066 ET** | 60 | 50 | 1.45 | 2.2 | 1.73 | 56 | 1.50 | 0.72 | - | 3 | P12, HPTP | |
| **SK 50 GD 066 ETp** [1] | 59 | 50 | 1.45 | 2.2 | 1.73 | 51 | 1.47 | 0.72 | - | 3p | P12, HPTP | |
| **SK 30 GD 066 ETp** [1] | 40 | 30 | 1.45 | 0.97 | 1.77 | 36 | 1.45 | 0.26 | - | 3p | P12, HPTP | |
| **SK 75 GD 066 T** | 83 | 75 | 1.45 | 3.1 | 2.8 | 92 | 1.35 | 0.85 | - | 4 | P12, HPTP | |
| **SK 100 GD 066 T** | 105 | 100 | 1.45 | 7 | 6 | 99 | 1.30 | 1.7 | - | 4 | P12, HPTP | |
| **SK 150 GD 066 T** | 151 | 150 | 1.45 | 6.25 | 5.7 | 198 | 1.30 | 1.7 | - | 4 | P12, HPTP | |
| **SK 200 GD 066 T** [4] | 174 | 200 | 1.45 | 13.9 | 12 | 99 | 1.30 | 3.4 | - | 4 | P12, HPTP | |
| **SK 20 DGDL 066 ET** | 30 | 20 | 1.45 | 0.3 | 0.6 | 27 | 1.40 | 0.2 | 220 | 3 | P12, HPTP | |
| **SK 30 DGDL 066 ET** | 40 | 30 | 1.45 | 0.55 | 1.15 | 36 | 1.50 | 0.53 | 370 | 3 | P12, HPTP | |
| **SK 50 DGDL 066 T** | 69 | 50 | 1.45 | 2.2 | 1.74 | 54 | 1.35 | 0.73 | 370 | 4 | P12, HPTP | |
| **SK 75 DGDL 066 T** [3] | 81 | 75 | 1.45 | 3.1 | 2.8 | 64 | 1.35 | 0.9 | 700 | 4 | P12, HPTP | |
| **SK 100 DGDL 066 T** [4] | 106 | 100 | 1.45 | 4.4 | 3.5 | 99 | 1.10 | 1.45 | 700 | 4 | P12, HPTP | |
| **SK 50 DGDL 066 ETE2** [1] | 53 | 50 | 1.45 | 0.85 | 1.6 | 51 | 1.00 | 0.9 | 520 | E2 | HPTP, HT | |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 4) Discontinued

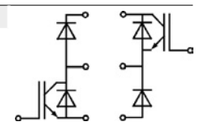
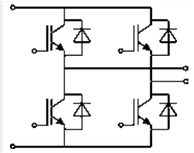
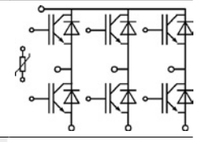
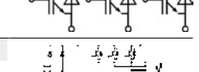
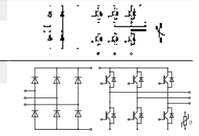
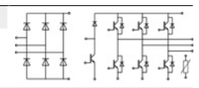
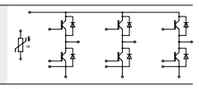
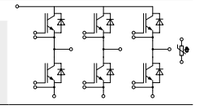
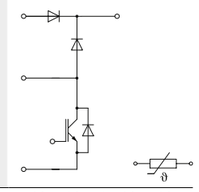
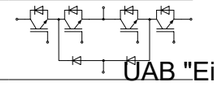


IGBT Modules / SEMITOP

| Type | IGBT | | | | | Diode | | | Rectifier | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$@ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **600V - NPT IGBT (Standard)** | | | | | | | | | | | | |
| **SK 45 GAL 063** [3] | 45 | 50 | 2.10 | 1.4 | 1.2 | 57 | 1.45 | 0.25 | - | 2 | P12 | |
| **SK 45 GAR 063** [3] | 45 | 50 | 2.10 | 1.4 | 1.2 | 57 | 1.45 | 0.25 | - | 2 | P12 | |
| **SK 45 GB 063** [4] | 45 | 50 | 2.10 | 1.4 | 1.2 | 57 | 1.45 | 0.25 | - | 2 | P12 | |
| **SK 80 GB 063** [4] | 81 | 100 | 2.10 | 4 | 3 | 79 | 1.40 | 1.2 | - | 3 | P12, HPTP | |
| **SK 80 GM 063** [3] | 81 | 100 | 2.00 | 3 | 2.3 | 105 | 1.30 | 0.2 | - | 2 | P12 | |
| **SK 15 GH 063** [3] | 20 | 15 | 2.00 | 0.71 | 0.4 | 20 | 1.45 | 0.45 | - | 2 | P12 | |
| **SK 25 GH 063** [3] | 30 | 30 | 2.10 | 1.1 | 0.8 | 36 | 1.45 | 0.25 | - | 2 | P12 | |
| **SK 45 GH 063** [3] | 45 | 50 | 2.10 | 1.4 | 1.2 | 57 | 1.30 | 0.9 | - | 3 | P12, HPTP | |
| **SK 13 GD 063** [3] | 18 | 10 | 2.10 | 0.6 | 0.4 | 22 | 1.45 | 0.1 | - | 3 | P12, HPTP | |
| **SK 25 GD 063** [3] | 30 | 30 | 2.10 | 1.3 | 0.9 | 36 | 1.45 | 0.25 | - | 3 | P12, HPTP | |
| **SK 45 GD 063** [3] | 45 | 50 | 2.10 | 1.4 | 1.2 | 36 | 1.45 | 0.25 | - | 3 | P12, HPTP | |
| **SK 25 GAD 063 T** [4] | 30 | 30 | 2.10 | 1.3 | 0.9 | 36 | 1.45 | 0.25 | - | 3 | P12, HPTP | |
| **600V - NPT IGBT (Ultrafast)** | | | | | | | | | | | | |
| **SK 50 GB 065** [4] | 54 | 60 | 2.00 | 1.1 | 0.7 | 64 | 1.45 | 0.55 | - | 2 | P12 | |
| **SK 50 GAL 065** [3] | 54 | 60 | 2.00 | 1.1 | 0.7 | 57 | 1.30 | 0.2 | - | 2 | P12 | |
| **SK 50 GAR 065** [3] | 54 | 60 | 2.00 | 1.1 | 0.7 | 57 | 1.30 | 0.2 | - | 2 | P12 | |
| **SK 50 GARL 065 F** [4] | 54 | 60 | 1.70 | 1.03 | 0.8 | 82 | 1.70 | 0.45 | - | 2 | P12 | |
| **SK 50 GARL 065 USA** [4] | 54 | 60 | 1.70 | 1.07 | 0.76 | 64 | 1.40 | 0.55 | - | 2 | P12 | |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 4) Discontinued

# IGBT Modules / SEMITOP

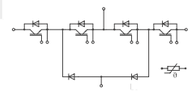
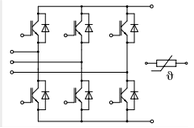
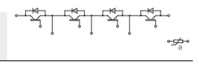
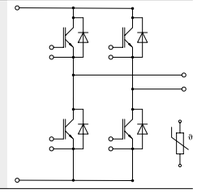
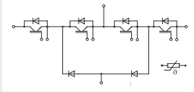
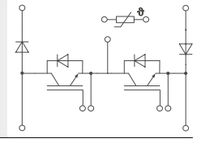
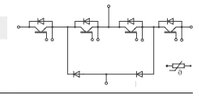
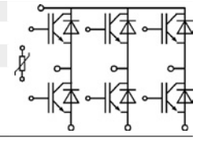
| Type | IGBT | | | | | Diode | | | Rectifier | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **600V - NPT IGBT (Ultrafast)** | | | | | | | | | | | | |
| **SK 55 GARL 065 E** [3] | 54 | 60 | 1.70 | 1.1 | 0.76 | 36 | 1.45 | 0.9 | - | 3 | P12, HPTP |  |
| **SK 75 GARL 065 E** [3] | 80 | 90 | 1.70 | 2.71 | 2.75 | 57 | 1.30 | 0.2 | - | 3 | P12, HPTP | |
| **SK 50 GH 065 F** [3] | 54 | 60 | 2.00 | 1.07 | 1.76 | 82 | 1.10 | 0.42 | - | 3 | P12, HPTP |  |
| **SK 35 GD 065 ET** [3] | 45 | 50 | 2.00 | 1.3 | 0.6 | 36 | 1.90 | 0.9 | - | 3 | P12, HPTP |  |
| **SK 10 BGD 065 ET** [4] | 17 | 6 | 2.00 | 0.18 | 0.13 | 22 | 1.30 | 0.18 | 220 | 3 | P12, HPTP |  |
| **SK 9 BGD 065 ET** [3] | 12 | 6 | 2.00 | 0.22 | 0.12 | 20 | 1.35 | 0.31 | 220 | 3 | P12, HPTP | |
| **SK 9 DGD 065 ET** [3] | 12 | 6 | 2.00 | 0.22 | 0.12 | 20 | 1.35 | 0.31 | 220 | 3 | P12, HPTP |  |
| **SK 20 DGD 065 ET** [3] | 26 | 20 | 2.00 | 0.66 | 0.4 | 25 | 1.60 | t.b.d. | 370 | 3 | P12, HPTP | |
| **SK 10 DGDL 065 ET** [4] | 17 | 6 | 2.00 | 0.18 | 0.13 | 22 | 1.30 | 0.18 | 220 | 3 | P12, HPTP |  |
| **SK 20 DGDL 065 ET** [3] | 24 | 20 | 2.00 | 0.69 | 0.39 | 25 | 1.60 | t.b.d. | 220 | 3 | P12, HPTP | |
| **650V - IGBT3 (Trench)** | | | | | | | | | | | | |
| **SK 75 GD 07E3 ETE2** [1] | 66 | 75 | 1.45 | 1.1 | 2.55 | 70 | 1.43 | 1.85 | - | E2 | HPTP, HT |  |
| **SK50GD07E3ETE1** [2] | 60 | 50 | 1.45 | 1.4 | 1.3 | 67 | 1.37 | 0.8 | - | E1 | - |  |
| **SK30GD07E3ETE1V1** [1] | 38 | 30 | 1.45 | 0.8 | 1.45 | 37 | 1.55 | 0.65 | - | E1 | - | |
| **650V - IGBT3 (Fast Trench)** | | | | | | | | | | | | |
| **SK 151 GALE 07F3 TUF** [2] | - | 150 | 1.85 | 8.8 | 4 | 116 | 1.59 | 0.26 | 635 | 3 | P12, HPTP |  |
| **SK 50 MLI 07F3 D1p** [1] | 51 | 50 | 1.85 | 1 | 1.18 | 56 | 1.37 | 0.95 | - | 3p | P12, HPTP |  |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 4) Discontinued

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+ 370 64 021 081
info@abn-a.com

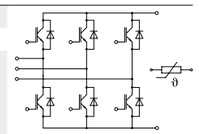
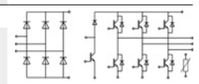
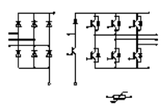
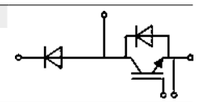
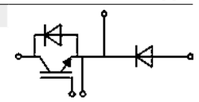
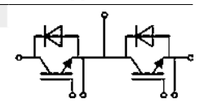
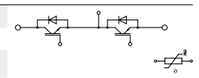
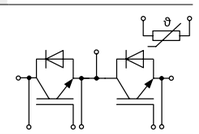
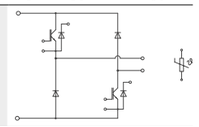
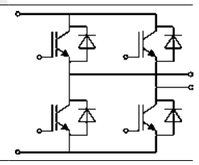


# IGBT Modules / SEMITOP

| Type | IGBT | | | | | Diode | | | Rectifier | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **650V - IGBT3 (Fast Trench)** | | | | | | | | | | | | |
| **SK100MLI07F3TD1p** [2] | 109 | 100 | 1.85 | 4.6 | 1 | 137 | 1.37 | 1.76 | - | 4p | P12, HPTP |  |
| **SK 150 MLI 07F3 TD1p** [2] | 151 | 150 | 1.85 | 9.07 | 1.3 | 137 | 1.37 | 1.76 | - | 4p | P12, HPTP | |
| **SK 100 GD 07F3 TD1** [2] | 104 | 100 | 1.85 | 3.92 | 2.1 | 95 | 1.35 | 0.92 | - | 4 | P12, HPTP |  |
| **SK150DBB07F3TD1p** [2] | 74 | 150 | 1.85 | 1.52 | 0.65 | 108 | 1.35 | 0.9 | - | 4p | P12, HPTP |  |
| **SK100DBB07F3TD1p** [2] | 54 | 100 | 1.85 | 1 | 0.5 | 115 | 1.35 | 0.7 | - | 4p | P12, HPTP | |
| **650V - IGBT H5 (High speed Trench5 technology)** | | | | | | | | | | | | |
| **SK225GH07H5TD1E2** [1] | 162 | 225 | 1.65 | 2.3 | 0.9 | 66 | 1.35 | 0.7 | - | E2 | HPTP, HT |  |
| **650V - IGBT L5 (Low saturation voltage Trench5 technology)** | | | | | | | | | | | | |
| **SK150MLI07L5TD1E2** [1] | 96 | 150 | 1.65 | 5.3 | 1.97 | 107 | 1.35 | 1.13 | - | E2 | HPTP, HT |  |
| **650V-IGBT S5 (High Speed Soft Switching)** | | | | | | | | | | | | |
| **SK75GARL07S5TD1E1** [1] | 68 | 75 | 1.42 | 2.3 | 1 | 66 | 1.35 | 0.7 | - | E1 | - |  |
| **SK75MLI07S5TD1E1** [1] | 64 | 75 | 1.42 | 0.5 | 1.2 | 49 | 1.35 | 1.5 | - | E1 | - | |
| **SK100MLI07S5TD1E2** [1] | 142 | 100 | 1.06 | 0.7 | 1.6 | 106 | 1.55 | 1.6 | - | E2 | HPTP, HT |  |
| **SK150MLI07S5TD1E2** [1] | 128 | 150 | 1.42 | 0.9 | 2.4 | 106 | 1.55 | 3 | - | E2 | HPTP, HT | |
| **1200V - IGBT3 (Trench)** | | | | | | | | | | | | |
| **SK 10 GD 126 ET** [3] | 15 | 8 | 1.70 | 1 | 1 | 25 | 1.90 | 1.4 | - | 3 | P12, HPTP |  |
| **SK 15 GD 126 ET** [3] | 22 | 15 | 1.70 | 2 | 1.8 | 25 | 1.60 | 1.4 | - | 3 | P12, HPTP | |
| **SK 25 GD 126 ET** | 32 | 25 | 1.70 | 3.3 | 3.1 | 28 | 1.80 | 2.1 | - | 3 | P12, HPTP | |
| **SK 35 GD 126 ET** | 40 | 35 | 1.70 | 4.6 | 4.3 | 34 | 1.80 | 2.9 | - | 3 | P12, HPTP | |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 4) Discontinued

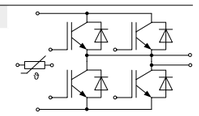
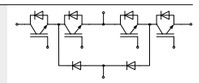
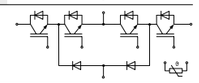
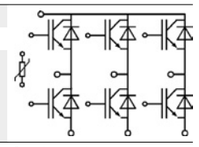
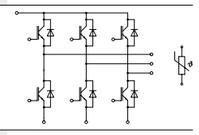
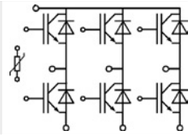
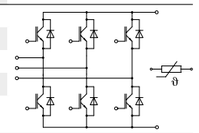
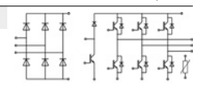
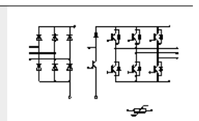
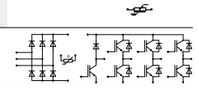
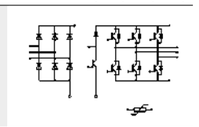
# IGBT Modules / SEMITOP

| Type | IGBT | | | | | Diode | | | Rectifier | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **1200V - IGBT3 (Trench)** | | | | | | | | | | | | |
| **SK 50 GD 126 T** [4] | 68 | 50 | 1.70 | 4.6 | 6.3 | 62 | 1.35 | 3.6 | - | 4 | P12, HPTP | |
| **SK 75 GD 126 T** [4] | 88 | 75 | 1.70 | 11.3 | 10 | 91 | 1.46 | 6 | - | 4 | P12, HPTP | |
| **SK 100 GD 126 T** [4] | 114 | 100 | 1.70 | 9.8 | 11.7 | 118 | 1.50 | 7.3 | - | 4 | P12, HPTP |  |
| **SK 10 DGDL 126 ET** [3] | 15 | 8 | 1.70 | 1 | 1 | 25 | 1.90 | 1.4 | 220 | 3 | P12, HPTP | |
| **SK 15 DGDL 126 ET** | 22 | 15 | 1.70 | 2 | 1.8 | 25 | 1.60 | 1.1 | 220 | 3 | P12, HPTP |  |
| **SK 25 DGDL 126 T** [4] | 41 | 25 | 1.70 | 2.8 | 3.1 | 30 | 1.50 | 2 | 370 | 4 | P12, HPTP | |
| **SK 35 DGDL 126 T** [4] | 52 | 35 | 1.70 | 3.7 | 4.8 | 38 | 1.50 | 3 | 370 | 4 | P12, HPTP | |
| **SK 50 DGDL 126 T** [3] | 68 | 50 | 1.70 | 4.6 | 6.3 | 62 | 1.35 | 3.6 | 700 | 4 | P12, HPTP |  |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | | | |
| **SK 35 GAL 12T4** | 44 | 35 | 1.85 | 3.27 | 3.3 | 38 | 2.30 | 1.46 | - | 2 | P12 | |
| **SK 75 GAL 12T4** | 80 | 75 | 1.85 | 13 | 7 | 70 | 2.10 | 3 | - | 2 | P12 |  |
| **SK 35 GAR 12T4** [1] | 44 | 35 | 1.85 | 3.27 | 3.3 | 38 | 2.30 | 1.46 | - | 2 | P12 | |
| **SK 75 GAR 12T4** | 80 | 75 | 1.85 | 13 | 7 | 70 | 2.10 | 3 | - | 2 | P12 |  |
| **SK 25 GB 12T4** [2] | 37 | 25 | 1.85 | 2.27 | 2.7 | 30 | 2.40 | 1.28 | - | 2 | P12 | |
| **SK 35 GB 12T4** | 44 | 35 | 1.85 | 3.27 | 3.3 | 38 | 2.30 | 1.46 | - | 2 | P12 |  |
| **SK 50 GB 12T4 T** [2] | 71 | 50 | 1.85 | 8.3 | 5 | 50 | 2.20 | 2.15 | - | 3 | P12, HPTP | |
| **SK 75 GB 12T4 T** | 80 | 75 | 1.85 | 13.6 | 8.2 | 70 | 2.10 | 3.39 | - | 3 | P12, HPTP | |
| **SK 100 GB 12T4 T** [2] | 100 | 100 | 1.85 | 16.6 | 10 | 85 | 2.25 | 5.2 | - | 3 | P12, HPTP |  |
| **SK 200 GB 12T4 Tp** [1] | 210 | 200 | 1.80 | 13.6 | 22.1 | 190 | 2.20 | 13.4 | - | 4p | P12, HPTP |  |
| **SK 150 GAH 12T4 Tp** [1] | 167 | 150 | 1.85 | 10.8 | 15.6 | 33 | 2.33 | 0.82 | - | 4p | P12, HPTP |  |
| **SK 25 GH 12T4** [2] | 35 | 25 | 1.85 | 2.27 | 2.7 | 28 | 2.41 | 1.28 | - | 3 | P12, HPTP |  |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 4) Discontinued

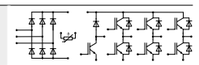
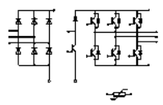
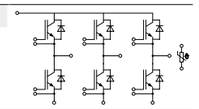
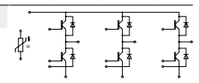
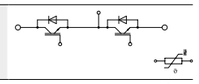
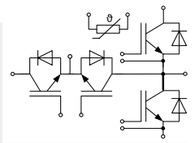
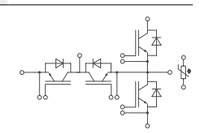
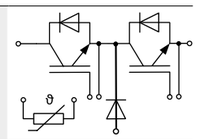
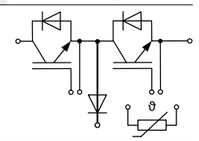
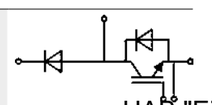


# IGBT Modules / SEMITOP

| Type | IGBT | | | | | Diode | | | Rectifier | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | | | |
| **SK 50 GH 12T4 T** [2] | 75 | 50 | 1.80 | 8.3 | 5 | 56 | 2.20 | 2.15 | - | 4 | P12, HPTP | |
| **SK 100 GH 12T4 T** | 126 | 100 | 1.80 | 16.6 | 10 | 102 | 2.20 | 5.2 | - | 4 | P12, HPTP |  |
| **SK 35 MLI 12T4 p** [1] | 43 | 35 | 1.85 | 1.6 | 3.27 | 38 | 2.30 | 1.73 | - | 3p | P12, HPTP |  |
| **SK 70 MLI 12T4 Tp** [1] | 90 | 70 | 1.85 | 13.5 | 8.5 | 78 | 2.30 | 2.73 | - | 4p | P12, HPTP |  |
| **SK 10 GD 12T4 ET** [2] | 17 | 8 | 1.85 | 0.41 | 0.76 | 15 | 2.38 | 0.41 | - | 3 | P12, HPTP | |
| **SK 15 GD 12T4 ET** | 27 | 15 | 1.85 | 0.83 | 1.52 | 21 | 2.38 | 0.82 | - | 3 | P12, HPTP | |
| **SK 25 GD 12T4 ET** | 37 | 25 | 1.85 | 2.27 | 2.7 | 30 | 2.40 | 1.28 | - | 3 | P12, HPTP |  |
| **SK 25 GD 12T4 ETp** [1] | 35 | 25 | 1.85 | 2.27 | 2.7 | 28 | 2.41 | 1.28 | - | 3p | P12, HPTP |  |
| **SK 35 GD 12T4 ET** [2] | 44 | 35 | 1.85 | 3.27 | 3.3 | 40 | 2.30 | 1.46 | - | 3 | P12, HPTP |  |
| **SK 50 GD 12T4 T** | 75 | 50 | 1.85 | 8.3 | 5 | 60 | 2.20 | 2.15 | - | 4 | P12, HPTP | |
| **SK 50 GD 12T4 Tp** [2] | 72 | 50 | 1.85 | 8.3 | 5 | 60 | 2.22 | 2.15 | - | 4p | P12, HPTP | |
| **SK 75 GD 12T4 T** | 102 | 75 | 1.85 | 13.6 | 8.2 | 83 | 2.20 | 3.38 | - | 4 | P12, HPTP | |
| **SK 75 GD 12T4 Tp** [1] | 97 | 75 | 1.85 | 13.6 | 8.2 | 83 | 2.17 | 3.38 | - | 4p | P12, HPTP | |
| **SK 100 GD 12T4 T** | 126 | 100 | 1.85 | 16.6 | 10 | 102 | 2.25 | 5.2 | - | 4 | P12, HPTP |  |
| **SK 10 DGDL 12T4 ET** | 17 | 8 | 1.85 | 0.41 | 0.75 | 15 | 2.38 | 0.41 | 220 | 3 | P12, HPTP | |
| **SK 15 DGDL 12T4 ET** | 27 | 15 | 1.85 | 0.82 | 1.52 | 21 | 2.38 | 0.82 | 220 | 3 | P12, HPTP |  |
| **SK 25 DGDL 12T4 T** | 45 | 25 | 1.85 | 2.27 | 2.7 | 30 | 2.40 | t.b.d. | 370 | 4 | P12, HPTP |  |
| **SK 25 DGDL 12T4 ETE2** [1] | 33 | 25 | 1.85 | 2.6 | 2.35 | 53 | 1.00 | 2.05 | 520 | E2 | HPTP, HT |  |
| **SK 35 DGDL 12T4 T** | 58 | 35 | 1.85 | 3.27 | 3.3 | 46 | 2.30 | 1.46 | 370 | 4 | P12, HPTP |  |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 4) Discontinued

# IGBT Modules / SEMITOP

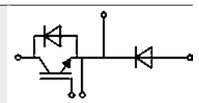
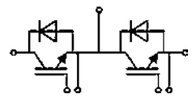
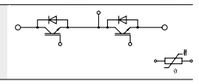
| Type | IGBT | | | | | Diode | | | Rectifier | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_S$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | | | |
| **SK 35 DGDL 12T4 ETE2** [1] | 43 | 35 | 1.85 | 3.15 | 3.2 | 53 | 1.00 | 2.6 | 520 | E2 | HPTP, HT |  |
| **SK 50 DGDL 12T4 T** | 75 | 50 | 1.85 | 8.3 | 5 | 60 | 2.22 | 2.15 | 700 | 4 | P12, HPTP |  |
| **SK25GD12T4ETE1** [1] | 33 | 25 | 1.85 | 2.6 | 2.35 | 29 | 2.41 | 2.05 | - | E1 | - |  |
| **SK35GD12T4ETE1** [1] | 43 | 35 | 1.85 | 3.15 | 3.2 | 38 | 2.30 | 2.6 | - | E1 | - | |
| **SK50GD12T4ETE2** [1] | 66 | 50 | 1.85 | 5.8 | 4.5 | 59 | 2.22 | 3.6 | - | E2 | HPTP, HT |  |
| **SK75GD12T4ETE2** [1] | 84 | 75 | 1.85 | 8 | 6.4 | 82 | 2.17 | 5.5 | - | E2 | HPTP, HT | |
| **1200V - IGBT4 (Fast Trench)** | | | | | | | | | | | | |
| **SK 120 GB 12F4 T** [1] | 174 | 120 | 2.05 | 8.8 | 7.47 | 29 | 2.38 | 2.04 | - | 3 | P12, HPTP |  |
| **SK80TMLI12F4Tp** [1] | 88 | 80 | 2.05 | 1.9 | 2.04 | 83 | 2.17 | 1.6 | - | 3p | P12, HPTP |  |
| **SK 150 TMLI 12F4 Tp** [2] | 180 | 150 | 2.05 | 3.13 | 5.29 | 100 | 2.20 | 4.8 | - | 4p | P12, HPTP | |
| **SK200TMLI12F4TE2** [2] | 166 | 200 | 2.05 | 4.44 | 5.4 | 65 | 2.17 | 3.2 | - | E2 | HPTP, HT |  |
| **SK 150 MLIT 12F4 TE2** [1] | 149 | 150 | 2.05 | 12.6 | 11 | 80 | 2.20 | 8.3 | - | E2 | HPTP, HT |  |
| **SK 150 MLIB 12F4 TE2** [1] | 149 | 150 | 2.05 | 12.6 | 11 | 80 | 2.20 | 8.3 | - | E2 | HPTP, HT |  |
| **1200V - NPT IGBT (Ultrafast)** | | | | | | | | | | | | |
| **SK 60 GAL 125** [3] | 51 | 50 | 3.20 | 8.36 | 3.32 | 43 | 2.00 | 2 | - | 2 | P12 |  |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 4) Discontinued

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# IGBT Modules / SEMITOP

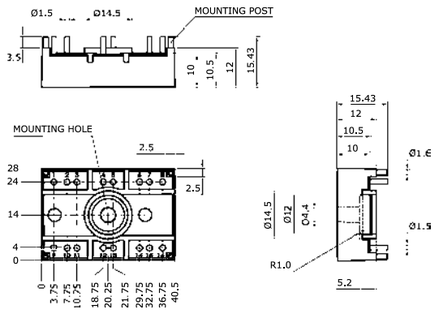
| Type | IGBT | | | | | Diode | | | Rectifier | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_S$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | $I_{FSM}$ @ $T_j$ = 25°C | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | A | | | |
| **1200V - NPT IGBT (Ultrafast)** | | | | | | | | | | | | |
| **SK 60 GAR 125** [4] | 51 | 50 | 3.20 | 8.36 | 3.32 | 43 | 2.00 | 2 | - | 2 | P12 |  |
| **SK 60 GB 125** | 51 | 50 | 3.20 | 8.36 | 3.32 | 57 | 2.00 | 2 | - | 3 | P12, HPTP |  |
| **SK 80 GB 125 T** | 85 | 75 | 3.20 | 9.9 | 5 | 90 | 2.00 | 1 | - | 3 | P12, HPTP |  |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 4) Discontinued

## Packages

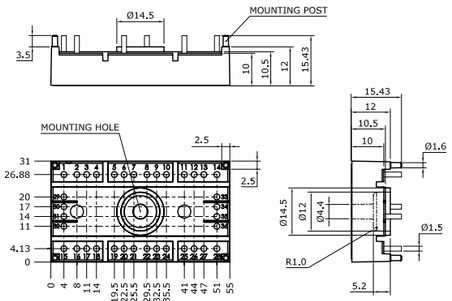
### SEMITOP 2

Dimensions: mm
Tolerance system: ISO 2768-m



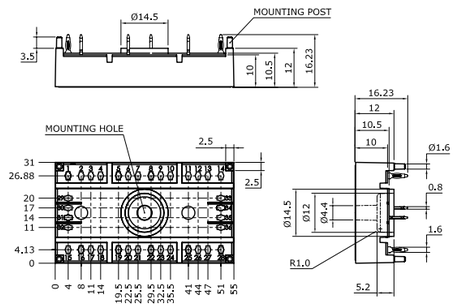

### SEMITOP 3

Dimensions: mm
Tolerance system: ISO 2768-m



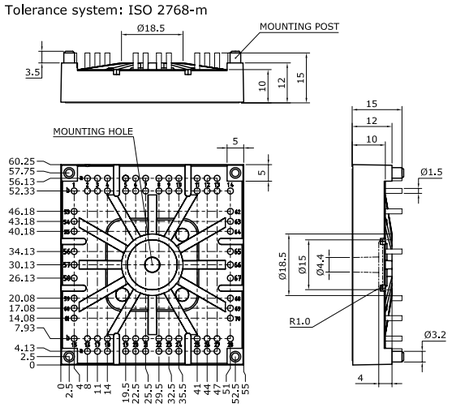

### SEMITOP 3 Press-Fit

Dimensions: mm
Tolerance system: ISO 2768-m



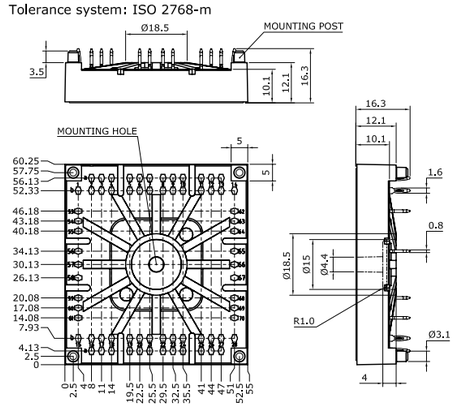

### SEMITOP 4

Dimensions: mm
Tolerance system: ISO 2768-m




### SEMITOP 4 Press-Fit

Dimensions: mm
Tolerance system: ISO 2768-m



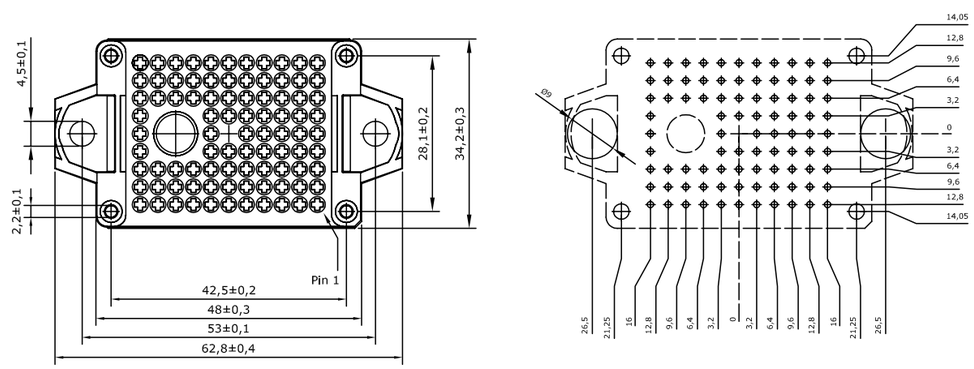

Dimensions in mm



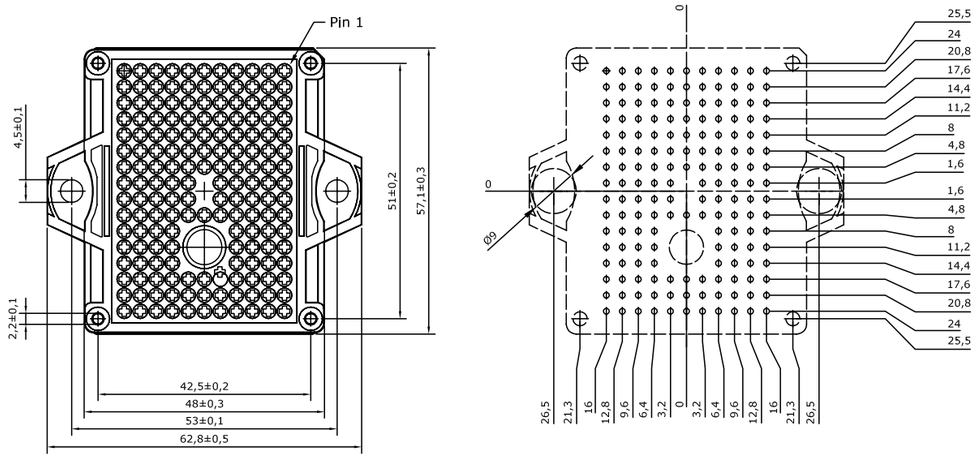


## Packages

### SEMITOP E1




### SEMITOP E2




Dimensions in mm

# IGBT Modules / SEMiX

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_J$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ @ $T_J$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **600V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SEMiX402GAL066HDs** | 502 | 400 | 1.45 | 22 | 24 | 543 | 1.40 | 10 | 2s | P8 | |
| **SEMiX603GAL066HDs** | 720 | 600 | 1.45 | 12 | 43 | 771 | 1.40 | 13 | 3s | P8, HT | |
| **SEMiX402GAR066HDs** | 502 | 400 | 1.45 | 22 | 24 | 543 | 1.40 | 10 | 2s | P8 | |
| **SEMiX603GAR066HDs** | 720 | 600 | 1.45 | 12 | 43 | 771 | 1.40 | 13 | 3s | P8, HT | |
| **SEMiX202GB066HDs** | 272 | 200 | 1.45 | 6 | 8 | 291 | 1.40 | 6.5 | 2s | P8 | |
| **SEMiX302GB066HDs** | 379 | 300 | 1.45 | 12 | 15 | 419 | 1.40 | 7.5 | 2s | P8 | |
| **SEMiX402GB066HDs** | 502 | 400 | 1.45 | 22 | 24 | 543 | 1.40 | 10 | 2s | P8 | |
| **SEMiX603GB066HDs** | 720 | 600 | 1.45 | 12 | 43 | 771 | 1.40 | 13 | 3s | P8, HT | |
| **SEMiX101GD066HDs** | 139 | 100 | 1.45 | 3 | 4 | 151 | 1.40 | 4.5 | 13 | P8 | |
| **SEMiX151GD066HDs** | 200 | 150 | 1.45 | 3.8 | 6.1 | 219 | 1.40 | 5.8 | 13 | P8 | |
| **SEMiX201GD066HDs** | 258 | 200 | 1.45 | 5 | 8 | 284 | 1.40 | 7.5 | 13 | P8 | |
| **650V - IGBT4 (Trench)** | | | | | | | | | | | |
| **SEMiX405GARL07E3** [1] | 457 | 400 | 1.45 | 28 | 28 | 86 | 1.37 | - | 5p | P8, HT | |
| **SEMiX453GB07E3p** [2] | 558 | 450 | 1.45 | 8 | 20 | 591 | 1.40 | 9 | 3p | P8, HT | |
| **SEMiX155MLI07E4** [2] | 187 | 150 | 1.55 | 1.5 | 8.6 | 145 | 1.40 | 2.3 | 5p | P8, HT | |
| **SEMiX205MLI07E4** [2] | 262 | 200 | 1.55 | 2 | 10 | 294 | 1.40 | 4.5 | 5p | P8, HT | |
| **SEMiX305MLI07E4** [2] | 388 | 300 | 1.55 | 2.5 | 16 | 294 | 1.40 | 7.7 | 5p | P8, HT | |
| **SEMiX405MLI07E4** [2] | 474 | 400 | 1.55 | 5.3 | 20 | 377 | 1.40 | 11 | 5p | P8, HT | |
| **SEMiX305GD07E4** [1] | 372 | 300 | 1.55 | 5.5 | 16 | 335 | 1.40 | 5.2 | 5p | P8, HT | |
| **1200V - V-IGBT** | | | | | | | | | | | |
| **SEMiX151GAL12Vs** | 231 | 150 | 1.75 | 19 | 17 | 189 | 2.14 | 12 | 1s | HT | |
| **SEMiX151GB12Vs** | 231 | 150 | 1.75 | 19 | 17 | 189 | 2.14 | 12 | 1s | HT | |
| **SEMiX202GB12Vs** | 310 | 200 | 1.75 | 25 | 24 | 229 | 2.20 | 15 | 2s | P8 | |
| **SEMiX223GB12Vs** | 323 | 225 | 1.85 | 20 | 27 | 263 | 2.17 | 16 | 3s | P8, HT | |
| **SEMiX302GB12Vs** | 448 | 300 | 1.75 | 37 | 36 | 356 | 2.14 | 22 | 2s | P8 | |
| **SEMiX303GB12Vs** | 448 | 300 | 1.75 | 27 | 36 | 327 | 2.20 | 21 | 3s | P8, HT | |
| **SEMiX404GB12Vs** | 596 | 400 | 1.75 | 39 | 52 | 440 | 2.20 | 34 | 4s | HT | |
| **SEMiX453GB12Vs** | 673 | 450 | 1.75 | 40 | 54 | 516 | 2.14 | 33 | 3s | P8, HT | |
| **SEMiX603GB12Vs** | 800 | 600 | 1.85 | 50 | 83 | 516 | 2.42 | 40 | 3s | P8, HT | |
| **SEMiX604GB12Vs** | 880 | 600 | 1.75 | 59 | 79 | 707 | 2.14 | 50 | 4s | HT | |

**Footnotes:** 1) Sample status / 2) In production new



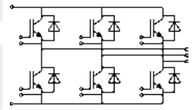
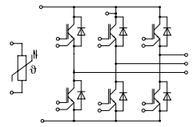
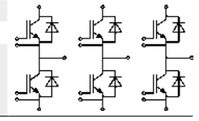
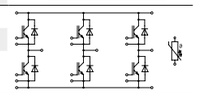
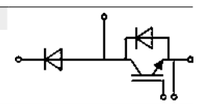
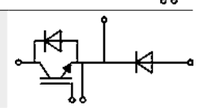
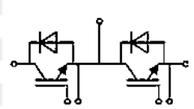
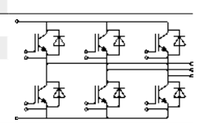
IGBT Modules / SEMiX

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_J$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ @ $T_J$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **1200V - V-IGBT** | | | | | | | | | | | |
| **SEMiX101GD12Vs** | 159 | 100 | 1.75 | 13 | 11 | 121 | 2.20 | 7.7 | 13 | P8 | |
| **SEMiX151GD12Vs** | 231 | 150 | 1.75 | 19 | 17 | 189 | 2.14 | 12 | 13 | P8 | |
| **SEMiX223GD12Vc** | 323 | 225 | 1.85 | 20 | 27 | 263 | 2.17 | 16 | 33c | P8 | |
| **SEMiX303GD12Vc** | 448 | 300 | 1.75 | 27 | 36 | 327 | 2.20 | 21 | 33c | P8 | |
| **SEMiX453GD12Vc** | 673 | 450 | 1.75 | 40 | 54 | 516 | 2.14 | 33 | 33c | P8 | |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | | |
| **SEMiX151GAL12E4s** | 232 | 150 | 1.80 | 17 | 18 | 189 | 2.14 | 8.9 | 1s | HT | |
| **SEMiX302GAL12E4s** | 463 | 300 | 1.80 | 30 | 44 | 356 | 2.14 | 19 | 2s | P8 | |
| **SEMiX453GAL12E4s** | 683 | 450 | 1.80 | 45 | 67 | 544 | 2.14 | 28 | 3s | P8, HT | |
| **SEMiX603GAL12E4p** [2] | 1110 | 600 | 1.80 | 59 | 76 | 856 | 2.08 | 33 | 3p | P8, HT | |
| **SEMiX604GAL12E4s** | 916 | 600 | 1.80 | 35 | 110 | 707 | 2.14 | 44 | 4s | HT | |
| **SEMiX151GAR12E4s** | 232 | 150 | 1.80 | 17 | 18 | 189 | 2.14 | 8.9 | 1s | HT | |
| **SEMiX302GAR12E4s** | 463 | 300 | 1.80 | 30 | 44 | 356 | 2.14 | 19 | 2s | P8 | |
| **SEMiX453GAR12E4s** | 683 | 450 | 1.80 | 45 | 67 | 544 | 2.14 | 28 | 3s | P8, HT | |
| **SEMiX603GAR12E4p** [2] | 1110 | 600 | 1.80 | 64 | 76 | 856 | 2.08 | 32 | 3p | P8, HT | |
| **SEMiX604GAR12E4s** | 916 | 600 | 1.80 | 35 | 110 | 707 | 2.14 | 44 | 4s | HT | |
| **SEMiX151GB12E4s** | 232 | 150 | 1.80 | 17 | 18 | 189 | 2.14 | 8.9 | 1s | HT | |
| **SEMiX202GB12E4s** | 312 | 200 | 1.80 | 22 | 28 | 229 | 2.20 | 12 | 2s | P8 | |
| **SEMiX223GB12E4p** | 326 | 225 | 1.85 | 14 | 26 | 287 | 2.17 | 17 | 3p | P8, HT | |
| **SEMiX302GB12E4s** | 463 | 300 | 1.80 | 30 | 44 | 356 | 2.14 | 19 | 2s | P8 | |
| **SEMiX303GB12E4p** | 469 | 300 | 1.80 | 23 | 38 | 378 | 2.20 | 23 | 3p | P8, HT | |
| **SEMiX303GB12E4s** | 466 | 300 | 1.80 | 30 | 41 | 338 | 2.20 | 18 | 3s | P8, HT | |
| **SEMiX404GB12E4s** | 618 | 400 | 1.80 | 27 | 60 | 440 | 2.20 | 26 | 4s | HT | |
| **SEMiX453GB12E4p** | 678 | 450 | 1.80 | 25 | 57 | 578 | 2.14 | 37 | 3p | P8, HT | |
| **SEMiX453GB12E4s** | 683 | 450 | 1.80 | 45 | 67 | 544 | 2.14 | 28 | 3s | P8, HT | |
| **SEMiX603GB12E4p** | 1110 | 600 | 1.80 | 69 | 80 | 856 | 2.08 | 40 | 3p | P8, HT | |
| **SEMiX604GB12E4s** | 916 | 600 | 1.80 | 35 | 110 | 707 | 2.14 | 44 | 4s | HT | |
| **SEMiX303GB12E4I50p** [1] | 469 | 300 | 1.80 | 23 | 38 | 378 | 2.20 | 23 | 3Ip | P8, HT | |
| **SEMiX453GB12E4Ip** | 678 | 450 | 1.80 | 33 | 57 | 578 | 2.14 | 39 | 3Ip | P8, HT | |
| **SEMiX603GB12E4Ip** | 1110 | 600 | 1.80 | 63 | 80 | 856 | 2.08 | 40 | 3Ip | P8, HT | |
| **SEMiX453GM12E4p** [1] | 678 | 450 | 1.80 | 11 | 66 | 544 | 2.14 | 32 | 3Ip | P8, HT | |
| **SEMiX205MLI12E4** [1] | 313 | 200 | 1.80 | 13 | 25 | 229 | 2.20 | 5.8 | 5p | P8, HT | |
| **SEMiX305MLI12E4** [2] | 451 | 300 | 1.80 | 17 | 39 | 344 | 2.14 | 22 | 5p | P8, HT | |
| **SEMiX205TMLI12E4B** [2] | 318 | 200 | 1.80 | 5 | 4 | 229 | 2.20 | 5.9 | 5p | P8, HT | |
| **SEMiX305TMLI12E4B** [2] | 479 | 300 | 1.80 | 4.5 | 21 | 363 | 2.20 | 8.8 | 5p | P8, HT | |
| **SEMiX405TMLI12E4B** [2] | 636 | 400 | 1.80 | 6 | 28 | 461 | 2.20 | 12 | 5p | P8, HT | |

**Footnotes:** 1) Sample status / 2) In production new

UAB "Eibienos automatika"
+ 370 60 823 097
+ 370 64 021 081
info@abn-a.com

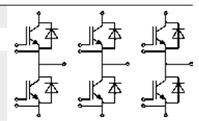
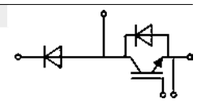
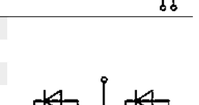
# IGBT Modules / SEMiX

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_J$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ @ $T_J$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | | |
| **SEMiX71GD12E4s** | 115 | 75 | 1.85 | 7.5 | 9 | 97 | 2.17 | 5.3 | 13 | P8 |  |
| **SEMiX101GD12E4s** | 160 | 100 | 1.80 | 11 | 13 | 121 | 2.20 | 6.5 | 13 | P8 | |
| **SEMiX151GD12E4s** | 232 | 150 | 1.80 | 14 | 19 | 189 | 2.14 | 8.9 | 13 | P8 | |
| **SEMiX205GD12E4** [2] | 313 | 200 | 1.80 | 14 | 23 | 224 | 2.20 | 16 | 5p | P8, HT |  |
| **SEMiX223GD12E4c** | 333 | 225 | 1.85 | 22 | 31 | 270 | 2.17 | 17 | 33c | P8 |  |
| **SEMiX303GD12E4c** | 466 | 300 | 1.80 | 29 | 42 | 338 | 2.20 | 23 | 33c | P8 | |
| **SEMiX453GD12E4c** | 683 | 450 | 1.80 | 52 | 68 | 544 | 2.14 | 28 | 33c | P8 | |
| **1200V - IGBT4 (Fast Trench)** | | | | | | | | | | | |
| **SEMiX155GD12T4** [1] | 219 | 150 | 1.80 | 13 | 21 | 175 | 2.14 | 14 | 5p | P8, HT |  |
| **SEMiX106GD12T4p** [1] | 161 | 100 | 1.80 | 7.5 | 9.5 | 118 | 2.20 | 8 | 6p | HT |  |
| **SEMiX156GD12T4p** [1] | 236 | 150 | 1.80 | 10 | 16 | 182 | 2.14 | 13.5 | 6p | HT | |
| **SEMiX206GD12T4p** [1] | 302 | 200 | 1.80 | 19 | 20 | 209 | 2.21 | 14.5 | 6p | HT | |
| **1200V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SEMiX452GAL126HDs** | 455 | 300 | 1.70 | 35 | 45 | 394 | 1.60 | 33 | 2s | P8 |  |
| **SEMiX703GAL126HDs** | 642 | 450 | 1.70 | 32 | 68 | 561 | 1.60 | 60 | 3s | P8, HT | |
| **SEMiX703GAR126HDs** | 642 | 450 | 1.70 | 32 | 68 | 561 | 1.60 | 60 | 3s | P8, HT |  |
| **SEMiX252GB126HDs** | 242 | 150 | 1.70 | 20 | 21 | 228 | 1.60 | 18 | 2s | P8 |  |
| **SEMiX302GB126HDs** | 311 | 200 | 1.70 | 30 | 26 | 292 | 1.60 | 23 | 2s | P8 | |
| **SEMiX353GB126HDs** | 364 | 225 | 1.70 | 27 | 33 | 329 | 1.60 | 29 | 3s | P8, HT | |
| **SEMiX452GB126HDs** | 455 | 300 | 1.70 | 35 | 45 | 394 | 1.60 | 33 | 2s | P8 | |
| **SEMiX503GB126HDs** | 466 | 300 | 1.70 | 28 | 44 | 431 | 1.60 | 33 | 3s | P8, HT | |
| **SEMiX604GB126HDs** | 590 | 400 | 1.70 | 36 | 60 | 533 | 1.60 | 46 | 4s | HT | |
| **SEMiX703GB126HDs** | 642 | 450 | 1.70 | 32 | 68 | 561 | 1.60 | 60 | 3s | P8, HT | |
| **SEMiX904GB126HDs** | 821 | 600 | 1.70 | 60 | 88 | 752 | 1.60 | 75 | 4s | HT | |
| **SEMiX101GD126HDs** | 129 | 75 | 1.70 | 10 | 11 | 117 | 1.60 | 9 | 13 | P8 |  |
| **SEMiX151GD126HDs** | 168 | 100 | 1.70 | 12 | 14 | 152 | 1.60 | 12 | 13 | P8 | |
| **SEMiX251GD126HDs** | 242 | 150 | 1.70 | 19 | 22 | 207 | 1.60 | 15 | 13 | P8 | |

**Footnotes:** 1) Sample status / 2) In production new



# IGBT Modules / SEMiX

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_J$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ @ $T_J$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **1200V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SEMiX353GD126HDc** | 364 | 225 | 1.70 | 27 | 33 | 329 | 1.60 | 29 | 33c | P8 |  |
| **SEMiX503GD126HDc** | 466 | 300 | 1.70 | 28 | 44 | 412 | 1.60 | 33 | 33c | P8 | |
| **SEMiX703GD126HDc** | 642 | 450 | 1.70 | 32 | 68 | 561 | 1.59 | 60 | 33c | P8 | |
| **1700V - IGBT4 (Trench)** | | | | | | | | | | | |
| **SEMiX302GAL17E4s** | 516 | 300 | 1.90 | 140 | 122 | 324 | 1.98 | 70 | 2s | P8 |  |
| **SEMiX453GAL17E4s** | 762 | 450 | 1.90 | 250 | 190 | 482 | 1.98 | 100 | 3s | P8, HT | |
| **SEMiX151GB17E4s** | 260 | 150 | 1.90 | 52 | 60 | 169 | 1.98 | 41 | 1s | HT | |
| **SEMiX202GB17E4s** | 321 | 200 | 1.90 | 75 | 82 | 213 | 2.00 | 55 | 2s | P8 | |
| **SEMiX302GB17E4s** | 516 | 300 | 1.90 | 140 | 122 | 324 | 1.98 | 70 | 2s | P8 | |
| **SEMiX303GB17E4s** | 477 | 300 | 1.90 | 140 | 125 | 311 | 2.00 | 85 | 3s | P8, HT | |
| **SEMiX404GB17E4s** | 633 | 400 | 1.90 | 190 | 165 | 412 | 2.00 | 97 | 4s | HT | |
| **SEMiX453GB17E4p** | 731 | 450 | 1.90 | 131 | 146 | 557 | 1.98 | 72 | 3p | P8, HT | |
| **SEMiX453GB17E4s** | 762 | 450 | 1.90 | 250 | 190 | 482 | 1.98 | 100 | 3s | P8, HT | |
| **SEMiX603GB17E4p** [2] | 981 | 600 | 1.95 | 125 | 200 | 794 | 1.88 | 120 | 3p | P8, HT | |
| **SEMiX604GB17E4s** | 1015 | 600 | 1.90 | 255 | 255 | 629 | 1.98 | 150 | 4s | HT | |
| **SEMiX453GB17E4Ip** | 731 | 450 | 1.90 | 153 | 150 | 557 | 1.98 | 73 | 3Ip | P8, HT |  |
| **SEMiX305TMLI17E4C** [1] | 486 | 300 | 1.90 | 38 | 60 | 338 | 2.00 | 38 | 5p | P8, HT |  |
| **SEMiX453GD17E4c** | 762 | 450 | 1.90 | 186 | 183 | 482 | 1.98 | 122 | 33c | P8 |  |
| **1700V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SEMiX653GAL176HDs** | 619 | 450 | 2.00 | 300 | 180 | 545 | 1.70 | 73 | 3s | P8, HT |  |
| **SEMiX653GAR176HDs** | 619 | 450 | 2.00 | 300 | 180 | 545 | 1.70 | 73 | 3s | P8, HT |  |
| **SEMiX252GB176HDs** | 246 | 150 | 2.00 | 90 | 55 | 288 | 1.55 | 32 | 2s | P8 |  |
| **SEMiX302GB176HDs** | 308 | 200 | 2.00 | 130 | 77 | 389 | 1.50 | 43 | 2s | P8 | |
| **SEMiX353GB176HDs** | 353 | 225 | 2.00 | 155 | 85 | 428 | 1.55 | 45 | 3s | P8, HT | |
| **SEMiX452GB176HDs** | 437 | 300 | 2.00 | 180 | 110 | 389 | 1.70 | 46 | 2s | P8 | |
| **SEMiX453GB176HDs** | 444 | 300 | 2.00 | 215 | 125 | 545 | 1.50 | 65 | 3s | P8, HT | |
| **SEMiX604GB176HDs** | 567 | 400 | 2.00 | 215 | 165 | 740 | 1.50 | 95 | 4s | HT | |

**Footnotes:** 1) Sample status / 2) In production new

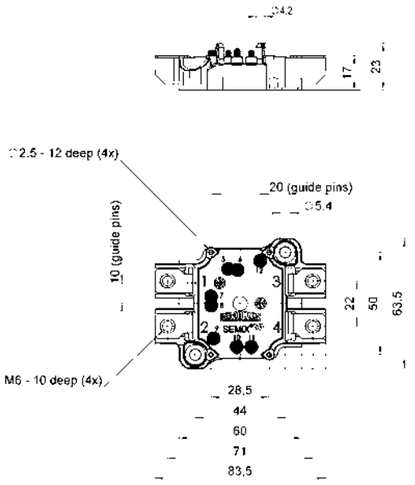
# IGBT Modules / SEMiX

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | |
| | A | A | V | mJ | mJ | A | V | mJ | | | Topology |
| **1700V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SEMiX653GB176HDs** | 619 | 450 | 2.00 | 300 | 180 | 545 | 1.70 | 73 | 3s | P8, HT | |
| **SEMiX854GB176HDs** | 779 | 600 | 2.00 | 300 | 250 | 740 | 1.70 | 170 | 4s | HT | |
| **SEMiX353GD176HDc** | 353 | 225 | 2.00 | 155 | 85 | 428 | 1.55 | 45 | 33c | P8 | |
| **SEMiX453GD176HDc** | 444 | 300 | 2.00 | 215 | 125 | 545 | 1.50 | 65 | 33c | P8 | |
| **SEMiX653GD176HDc** | 619 | 450 | 2.00 | 300 | 180 | 545 | 1.70 | 73 | 33c | P8 | |

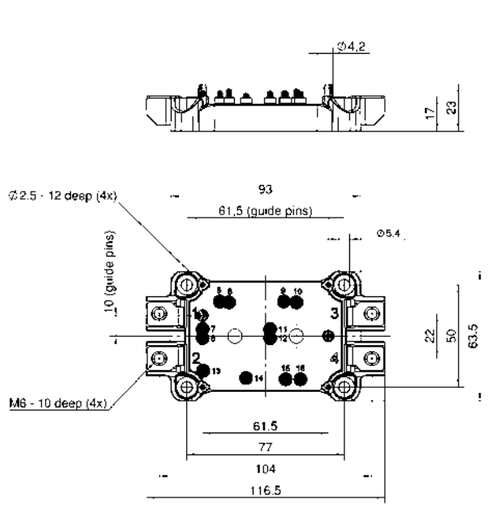
**Footnotes:** 1) Sample status / 2) In production new

## Packages

**SEMiX 1s**




**SEMiX 2s**

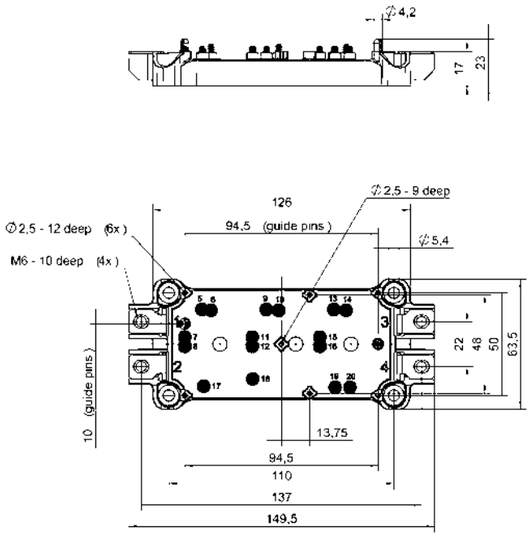



Dimensions in mm

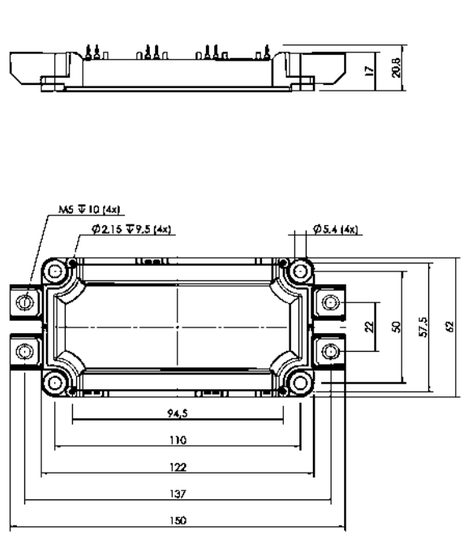
# IGBT Modules / SEMiX

## Packages

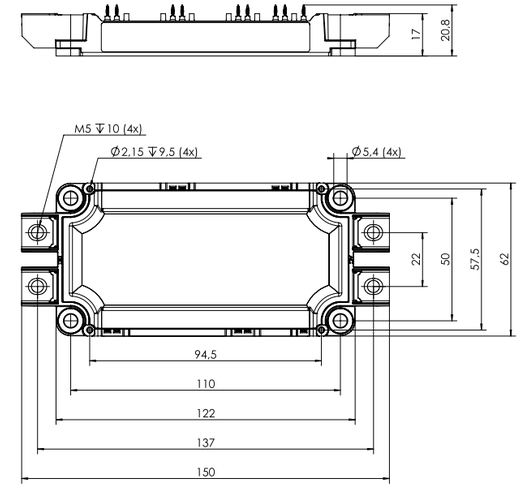
**SEMiX 3s**



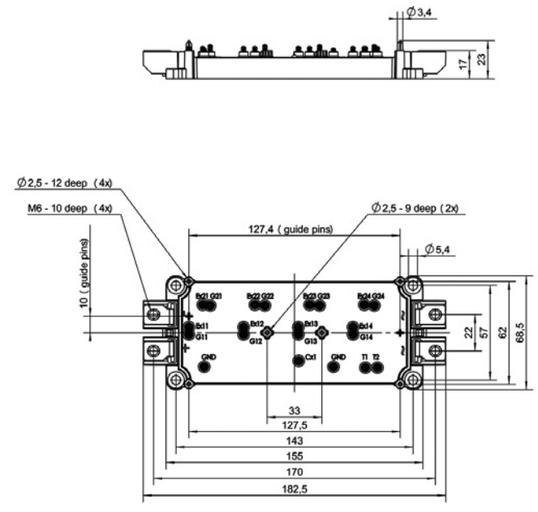

**SEMiX 3p**




**SEMiX 3Ip**




**SEMiX 4s**



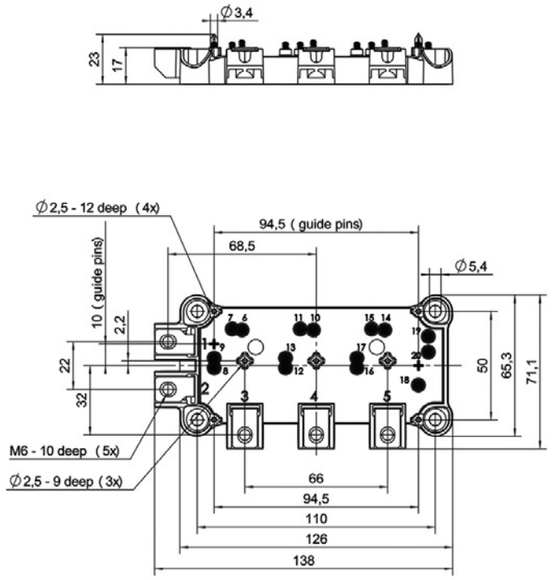

Dimensions in mm

UAB "Eibienos automatika"
+ 370 60 823 097
+ 370 64 021 081
info@abn-a.com

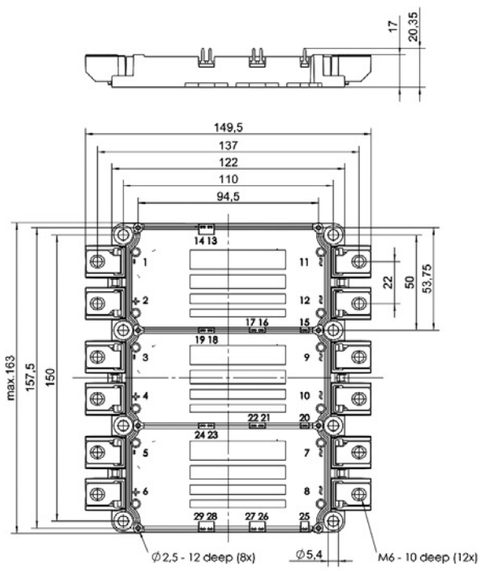
# IGBT Modules / SEMiX

## Packages

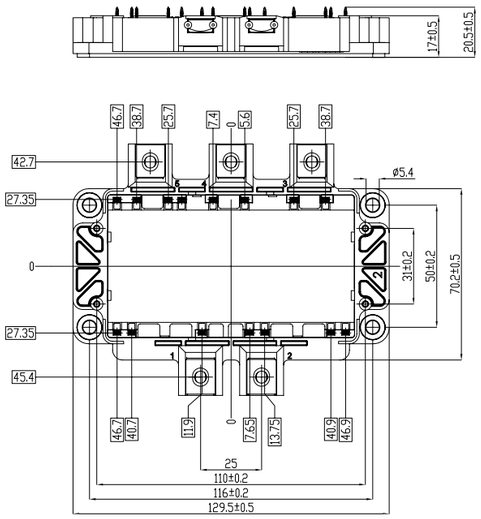
### SEMiX 13



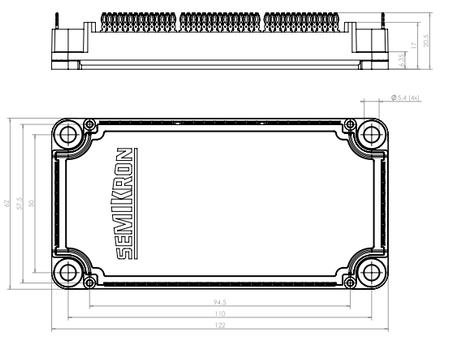

### SEMiX 33c




### SEMiX 5p

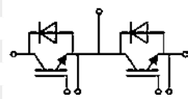
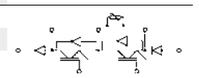
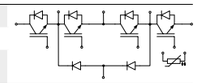
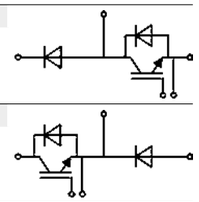
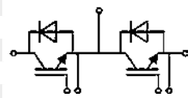
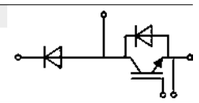
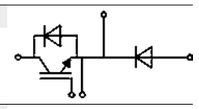
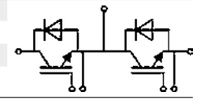
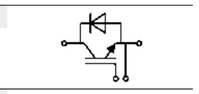
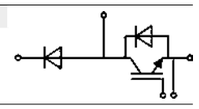



### SEMiX 6p



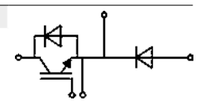
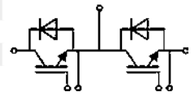
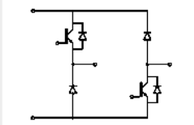
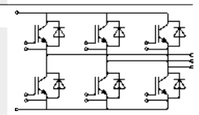
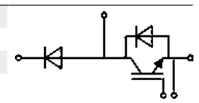
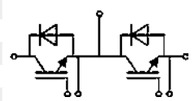
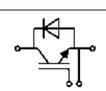
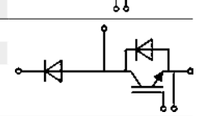
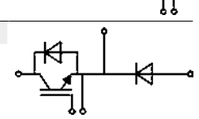

Dimensions in mm

# IGBT Modules / SEMITRANS

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$= 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **600V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SKM145GB066D** | 195 | 150 | 1.46 | 8.5 | 5.5 | 150 | 1.40 | 3.5 | 2 | HT |  |
| **SKM195GB066D** | 265 | 200 | 1.46 | 14 | 8 | 200 | 1.40 | 5.6 | 2 | HT | |
| **SKM300GB066D** | 390 | 300 | 1.45 | 7.5 | 11.5 | 350 | 1.38 | 10.5 | 3 | P8 | |
| **SKM400GB066D** | 500 | 400 | 1.45 | 8 | 16 | 450 | 1.40 | 14 | 3 | P8 | |
| **SKM600GB066D** | 760 | 600 | 1.45 | 7.5 | 29.5 | 700 | 1.40 | 25 | 3 | P8 | |
| **SKM200GARL066T** [2] | 280 | 200 | 1.45 | 2.24 | 7.89 | 270 | 1.45 | 4 | 5 | - |  |
| **SKM300GARL066T** [2] | 393 | 300 | 1.45 | 3.5 | 10.1 | 421 | 1.54 | 4 | 5 | - | |
| **SKM400GARL066T** [1] | 504 | 400 | 1.45 | 4.48 | 15.78 | 421 | 1.54 | 8 | 5 | - | |
| **SKM150MLI066TAT** [1] | 200 | 150 | 1.45 | 1.7 | 5.1 | 200 | 1.35 | 2 | 5 | - |  |
| **SKM200MLI066TAT** [2] | 280 | 200 | 1.45 | 2.53 | 6.82 | 270 | 1.4 | 4 | 5 | - | |
| **SKM300MLI066TAT** [2] | 400 | 300 | 1.45 | 3.5 | 10.1 | 324 | 1.35 | 4 | 5 | - | |
| **600V - NPT IGBT (Standard)** | | | | | | | | | | | |
| **SKM75GAL063D**[3] | 100 | 75 | 2.1 | 3 | 2.5 | 75 | 1.55 | 0.53 | 2 | HT |  |
| **SKM300GAL063D**[3] | 400 | 300 | 2.1 | 14 | 13 | 250 | 1.65 | 4 | 3 | P8 | |
| **SKM75GAR063D**[3] | 100 | 75 | 2.1 | 3 | 2.5 | 75 | 1.55 | 0.53 | 2 | HT | |
| **SKM300GAR063D**[3] | 400 | 300 | 2.1 | 14 | 13 | 250 | 1.65 | 4 | 3 | P8 | |
| **SKM50GB063D**[3] | 70 | 50 | 2.10 | 2.5 | 1.8 | 75 | 1.35 | 0.48 | 2 | HT |  |
| **SKM75GB063D**[3] | 100 | 75 | 2.1 | 3 | 2.5 | 75 | 1.55 | 0.53 | 2 | HT | |
| **SKM100GB063D**[3] | 130 | 100 | 2.1 | 4 | 3 | 100 | 1.55 | 1.5 | 2 | HT | |
| **SKM200GB063D**[3] | 260 | 200 | 2.1 | 11 | 7.5 | 200 | 1.55 | 2.1 | 3 | P8 | |
| **SKM300GB063D**[3] | 400 | 300 | 2.1 | 14 | 13 | 250 | 1.65 | 4 | 3 | P8 | |
| **650V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SKM195GAL07E3** [2] | 266 | 200 | 1.46 | 6.3 | 8.3 | 217 | 1.39 | 4.5 | 2 | HT |  |
| **SKM300GAL07E3** [2] | 382 | 300 | 1.45 | 3 | 14 | 335 | 1.40 | 6.4 | 3 | P8 | |
| **SKM195GAR07E3** [2] | 266 | 200 | 1.46 | 6.3 | 8.3 | 217 | 1.39 | 4.5 | 2 | HT |  |
| **SKM300GAR07E3** [2] | 382 | 300 | 1.45 | 3 | 14 | 335 | 1.40 | 6.4 | 3 | P8 | |
| **SKM195GB07E3** [2] | 266 | 200 | 1.46 | 6.3 | 8.3 | 217 | 1.39 | 4.5 | 2 | HT |  |
| **SKM300GB07E3** [2] | 382 | 300 | 1.45 | 3 | 14 | 335 | 1.40 | 6.4 | 3 | P8 | |
| **SKM400GB07E3** [2] | 506 | 400 | 1.45 | 4 | 17 | 449 | 1.39 | 12 | 3 | P8 | |
| **SKM600GB07E3** [2] | 758 | 600 | 1.45 | 4.7 | 37 | 770 | 1.40 | 9.3 | 3 | P8 | |
| **1200V - NPT IGBT (Ultrafast)** | | | | | | | | | | | |
| **SKM600GA125D** | 580 | 400 | 3.3 | 30 | 22 | 500 | 2.00 | 24 | 4 | P8 |  |
| **SKM800GA125D** | 760 | 600 | 3.20 | 88 | 48 | 720 | 2.3 | 28 | 4 | P8 | |
| **SKM200GAL125D** | 200 | 150 | 3.3 | 14 | 8 | 200 | 2.06 | 8 | 3 | P8 |  |
| **SKM400GAL125D** | 400 | 300 | 3.3 | 17 | 18 | 390 | 2.06 | 16 | 3 | P8 | |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 11) Values at $T_j$=150°C

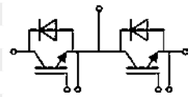
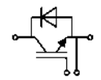
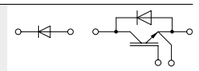
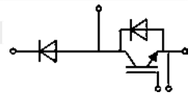
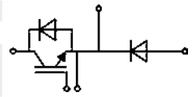
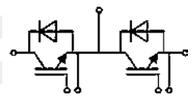
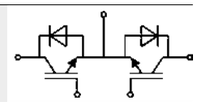
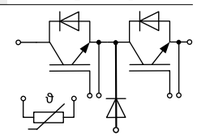
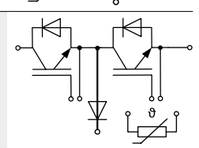
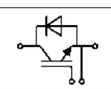
# IGBT Modules / SEMITRANS

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **1200V - NPT IGBT (Ultrafast)** | | | | | | | | | | | |
| **SKM200GAR125D** | 200 | 150 | 3.3 | 14 | 8 | 200 | 2.06 | 8 | 3 | P8 |  |
| **SKM400GAR125D** | 400 | 300 | 3.3 | 17 | 18 | 390 | 2.06 | 16 | 3 | P8 | |
| **SKM100GB125DN** | 100 | 75 | 3.3 | 9 | 3.5 | 95 | 2.06 | 4 | 2N | - |  |
| **SKM200GB125D** | 200 | 150 | 3.3 | 14 | 8 | 200 | 2.06 | 8 | 3 | P8 | |
| **SKM300GB125D** | 300 | 200 | 3.3 | 16 | 11 | 260 | 2.00 | 13 | 3 | P8 | |
| **SKM400GB125D** | 400 | 300 | 3.3 | 17 | 18 | 390 | 2.06 | 16 | 3 | P8 | |
| **SKM25GAH125D** [3] | 39 | 25 | 3.20 | 3.9 | 1.6 | 47 | 2.13 | 1.1 | 6 | - |  |
| **SKM25GD125D** [3] | 39 | 25 | 3.20 | 3.9 | 1.6 | 47 | 2.13 | 1.1 | 6 | - |  |
| **SKM50GD125D** [3] | 73 | 50 | 3.20 | 8 | 3.2 | 77 | 2.00 | 2.1 | 6 | - | |
| **1200V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SKM600GA126D** | 660 | 400 | 1.70 | 39 | 64 | 490 | 1.60 | 41 | 4 | P8 |  |
| **SKM800GA126D** | 910 | 600 | 1.70 | 65 | 95 | 703 | 1.60 | 59 | 4 | P8 | |
| **SKM195GAL126D** | 220 | 150 | 1.71 | 16 | 24.5 | 143 | 2.00 | 5.8 | 2 | HT |  |
| **SKM200GAL126D** | 260 | 150 | 1.71 | 18 | 24 | 200 | 1.60 | 18 | 3 | P8 | |
| **SKM400GAL126D** | 470 | 300 | 1.69 | 29 | 48 | 352 | 1.60 | 27 | 3 | P8 | |
| **SKM600GAL126D** | 660 | 400 | 1.70 | 39 | 64 | 490 | 1.60 | 41 | 3 | P8 | |
| **SKM195GB126D** | 220 | 150 | 1.71 | 16 | 24.5 | 143 | 2.00 | 5.8 | 2 | HT |  |
| **SKM200GB126D** | 260 | 150 | 1.71 | 18 | 24 | 200 | 1.60 | 18 | 3 | P8 | |
| **SKM300GB126D** | 310 | 200 | 1.70 | 21 | 33 | 250 | 1.60 | 18 | 3 | P8 | |
| **SKM400GB126D** | 470 | 300 | 1.69 | 29 | 48 | 352 | 1.60 | 27 | 3 | P8 | |
| **SKM600GB126D** | 660 | 400 | 1.70 | 39 | 64 | 490 | 1.60 | 41 | 3 | P8 | |
| **1200V - V-IGBT** | | | | | | | | | | | |
| **SKM300GA12V** | 420 | 300 | 1.84 | 23 | 33 | 353 | 2.17 | 21 | 4 | P8 |  |
| **SKM400GA12V** | 612 | 400 | 1.74 | 39 | 42 | 440 | 2.20 | 26 | 4 | P8 | |
| **SKM600GA12V** | 908 | 600 | 1.75 | 76 | 76 | 707 | 2.14 | 43 | 4 | P8 | |
| **SKM150GAL12V** | 231 | 150 | 1.75 | 13.5 | 14.2 | 189 | 2.14 | 8.5 | 2 | HT |  |
| **SKM200GAL12VL2** [2] | 299 | 200 | 1.86 | 24 | 22 | 189 | 2.14 | 8.5 | 2 | HT | |
| **SKM400GAL12V** | 612 | 400 | 1.74 | 39 | 42 | 440 | 2.20 | 26 | 3 | P8 | |
| **SKM150GAR12V** [2] | 231 | 150 | 1.75 | 13.5 | 14.2 | 189 | 2.14 | 8.5 | 2 | HT |  |
| **SKM400GAR12V** | 612 | 400 | 1.74 | 39 | 42 | 440 | 2.20 | 26 | 3 | P8 | |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 11) Values at $T_j$=150°C



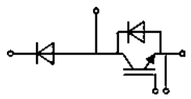
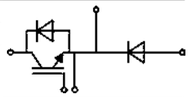
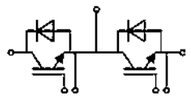
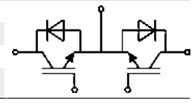
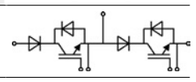
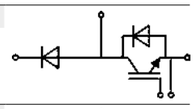
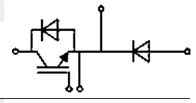
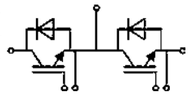
IGBT Modules / SEMITRANS

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **1200V - V-IGBT** | | | | | | | | | | | |
| **SKM50GB12V** | 77 | 50 | 1.84 | 4.9 | 4.5 | 65 | 2.22 | 2.8 | 2 | HT |  |
| **SKM75GB12V** | 114 | 75 | 1.84 | 6.7 | 7.1 | 97 | 2.17 | 4.2 | 2 | HT | |
| **SKM100GB12V** | 159 | 100 | 1.75 | 10.7 | 8.7 | 121 | 2.20 | 5.7 | 2 | HT | |
| **SKM150GB12V** | 231 | 150 | 1.75 | 13.5 | 14.2 | 189 | 2.14 | 8.5 | 2 | HT | |
| **SKM150GB12VG** | 222 | 150 | 1.86 | 10 | 16.5 | 187 | 2.17 | 11 | 3 | P8 | |
| **SKM200GB12V** | 311 | 200 | 1.76 | 14 | 22 | 229 | 2.20 | 13 | 3 | P8 | |
| **SKM300GB12V** | 420 | 300 | 1.84 | 23 | 33 | 353 | 2.17 | 21 | 3 | P8 | |
| **SKM400GB12V** | 612 | 400 | 1.74 | 39 | 42 | 440 | 2.20 | 26 | 3 | P8 | |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | | |
| **SKM300GA12E4** | 422 | 300 | 1.85 | 23.4 | 35 | 353 | 2.17 | 22.2 | 4 | P8 |  |
| **SKM400GA12E4** | 616 | 400 | 1.80 | 28 | 59 | 461 | 2.20 | 37 | 4 | P8 | |
| **SKM600GA12E4** | 913 | 600 | 1.80 | 30 | 77 | 707 | 2.14 | 39 | 4 | P8 | |
| **SKM900GA12E4** | 1305 | 900 | 1.83 | 130 | 121 | 871 | 2.31 | 53 | 4 | P8 | |
| **SKM600GAE12E4** [2] | 860 | 600 | 1.80 | 81 | 83 | 54 | 14.62 | 35.5 | 5 | - |  |
| **SKM200GAL12E4** | 313 | 200 | 1.80 | 21 | 27 | 229 | 2.20 | 13 | 3 | P8 |  |
| **SKM300GAL12E4** | 422 | 300 | 1.85 | 27 | 39 | 353 | 2.17 | 23 | 3 | P8 | |
| **SKM400GAL12E4** | 616 | 400 | 1.80 | 33 | 56 | 461 | 2.20 | 30.5 | 3 | P8 | |
| **SKM200GAR12E4** | 313 | 200 | 1.80 | 21 | 27 | 229 | 2.20 | 13 | 3 | P8 |  |
| **SKM300GAR12E4** | 422 | 300 | 1.85 | 27 | 39 | 353 | 2.17 | 23 | 3 | P8 | |
| **SKM400GAR12E4** | 616 | 400 | 1.80 | 33 | 56 | 461 | 2.20 | 30.5 | 3 | P8 | |
| **SKM200GB12E4** | 313 | 200 | 1.80 | 21 | 27 | 229 | 2.20 | 13 | 3 | P8 |  |
| **SKM300GB12E4** | 422 | 300 | 1.85 | 27 | 39 | 353 | 2.17 | 23 | 3 | P8 | |
| **SKM400GB12E4** | 616 | 400 | 1.80 | 33 | 56 | 461 | 2.20 | 30.5 | 3 | P8 | |
| **SKM450GB12E4** | 700 | 450 | 1.84 | 32 | 60 | 461 | 2.31 | 28 | 3 | P8 | |
| **SKM600GB12E4** [2] | 860 | 600 | 1.80 | 30 | 77 | 623 | 2.28 | 39 | 3 | P8 | |
| **SKM450GM12E4** [1] | 700 | 450 | 1.84 | 32 | 60 | 461 | 2.31 | 28 | 3 | P8 |  |
| **SKM1200MLI12TE4** [2] | 2082 | 1200 | 1.80 | 108 | 189 | 1065 | 2.46 | 76 | 10 | HT |  |
| **SKM1200MLI12BE4** [2] | 2082 | 1200 | 1.80 | 108 | 189 | 1065 | 2.46 | 76 | 10 | HT |  |
| **1200V - IGBT4 Fast (Trench)** | | | | | | | | | | | |
| **SKM300GA12T4** | 422 | 300 | 1.85 | 23.4 | 26 | 353 | 2.17 | 22.2 | 4 | P8 |  |
| **SKM400GA12T4** | 616 | 400 | 1.80 | 28 | 44 | 461 | 2.20 | 37 | 4 | P8 | |
| **SKM600GA12T4** | 913 | 600 | 1.80 | 74 | 63 | 707 | 2.14 | 38 | 4 | P8 | |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 11) Values at $T_j$=150°C

UAB "Eibienos automatika"
+ 370 60 823 097
+ 370 64 021 081
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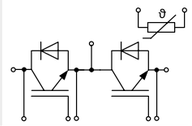
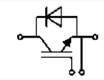
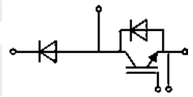
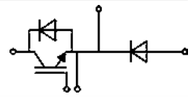
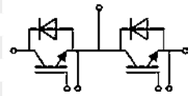
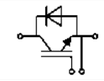
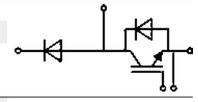
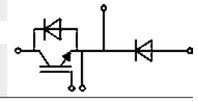
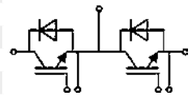
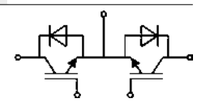
# IGBT Modules / SEMITRANS

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **1200V - IGBT4 Fast (Trench)** | | | | | | | | | | | |
| **SKM50GAL12T4** | 81 | 50 | 1.85 | 5.5 | 4.5 | 65 | 2.22 | 3.6 | 2 | HT |  |
| **SKM100GAL12T4** | 160 | 100 | 1.80 | 15 | 10.2 | 121 | 2.20 | 5.9 | 2 | HT | |
| **SKM150GAL12T4** | 232 | 150 | 1.81 | 19.2 | 15.8 | 189 | 2.14 | 13 | 2 | HT | |
| **SKM200GAL12T4** | 313 | 200 | 1.80 | 21 | 20 | 229 | 2.20 | 13 | 3 | P8 | |
| **SKM300GAL12T4** | 422 | 300 | 1.85 | 27 | 29 | 353 | 2.17 | 23 | 3 | P8 | |
| **SKM400GAL12T4** | 616 | 400 | 1.80 | 33 | 42 | 461 | 2.20 | 30.5 | 3 | P8 | |
| **SKM600GAL12T4** [2] | 860 | 600 | 1.80 | 33 | 70 | 623 | 2.28 | 40 | 3 | P8 | |
| **SKM150GAR12T4** | 232 | 150 | 1.81 | 19.2 | 15.8 | 189 | 2.14 | 13 | 2 | HT |  |
| **SKM400GAR12T4** | 616 | 400 | 1.80 | 33 | 42 | 461 | 2.20 | 30.5 | 3 | P8 | |
| **SKM600GAR12T4** [2] | 860 | 600 | 1.80 | 33 | 70 | 623 | 2.28 | 40 | 3 | P8 | |
| **SKM50GB12T4** | 81 | 50 | 1.85 | 5.5 | 4.5 | 65 | 2.22 | 3.8 | 2 | HT |  |
| **SKM75GB12T4** | 115 | 75 | 1.85 | 11 | 6.9 | 97 | 2.17 | 4.7 | 2 | HT | |
| **SKM100GB12T4** | 160 | 100 | 1.80 | 15 | 10.2 | 121 | 2.20 | 5.9 | 2 | HT | |
| **SKM100GB12T4G** | 154 | 100 | 1.90 | 16.1 | 8.6 | 118 | 2.22 | 6 | 3 | P8 | |
| **SKM150GB12T4** | 232 | 150 | 1.81 | 19.2 | 15.8 | 189 | 2.14 | 13 | 2 | HT | |
| **SKM150GB12T4G** | 223 | 150 | 1.85 | 18.7 | 14.1 | 183 | 2.17 | 9 | 3 | P8 | |
| **SKM200GB12T4** | 313 | 200 | 1.80 | 21 | 20 | 229 | 2.20 | 13 | 3 | P8 | |
| **SKM300GB12T4** | 422 | 300 | 1.85 | 27 | 29 | 353 | 2.17 | 23 | 3 | P8 | |
| **SKM400GB12T4** | 616 | 400 | 1.80 | 33 | 42 | 461 | 2.20 | 30.5 | 3 | P8 | |
| **SKM450GB12T4** [2] | 699 | 450 | 1.84 | 32 | 49 | 461 | 2.31 | 28 | 3 | P8 | |
| **SKM600GB12T4** [2] | 860 | 600 | 1.80 | 33 | 70 | 623 | 2.28 | 40 | 3 | P8 | |
| **SKM150GM12T4G** | 229 | 150 | 1.85 | 19.2 | 15.8 | 187 | 2.17 | 13 | 3 | P8 |  |
| **SKM200GM12T4** | 313 | 200 | 1.80 | 21 | 20 | 229 | 2.20 | 13 | 3 | P8 | |
| **SKM300GM12T4** | 422 | 300 | 1.85 | 27 | 29 | 353 | 2.17 | 23 | 3 | P8 | |
| **SKM400GM12T4** | 616 | 400 | 1.80 | 33 | 42 | 461 | 2.20 | 30.5 | 3 | P8 | |
| **SKM300GBD12T4** | 422 | 300 | 1.85 | 27 | 29 | 56 | 2.41 | 30.5 | 3 | P8 |  |
| **1200V - IGBT4 High Speed (Trench) (new product series, target data)** | | | | | | | | | | | |
| **SKM100GAL12F4** [2] | 142 | 100 | 2.05 | 6.2 | 7.9 | 111 | 2.55 | 6.4 | 2 | HT |  |
| **SKM400GAL12F4** [1] | 548 | 400 | 2.06 | 26 | 28 | 402 | 2.55 | 20 | 3 | P8 | |
| **SKM100GAR12F4** [2] | 142 | 100 | 2.05 | 6.2 | 7.9 | 111 | 2.55 | 6.4 | 2 | HT |  |
| **SKM400GAR12F4** [1] | 548 | 400 | 2.06 | 26 | 28 | 402 | 2.55 | 20 | 3 | P8 | |
| **SKM75GB12F4** [2] | 103 | 75 | 2.08 | 7 | 5 | 93 | 2.43 | 3 | 2 | HT |  |
| **SKM100GB12F4** [2] | 142 | 100 | 2.05 | 6.2 | 7.9 | 111 | 2.55 | 6.4 | 2 | HT | |
| **SKM150GB12F4** [1] | 201 | 150 | 2.05 | 14 | 10 | 174 | 2.43 | 5.8 | 2 | HT | |
| **SKM150GB12F4G** [1] | 201 | 150 | 2.05 | 8 | 12 | 174 | 2.43 | 8.4 | 3 | P8 | |
| **SKM200GB12F4** [1] | 279 | 200 | 2.06 | 15 | 14 | 211 | 2.55 | 8.5 | 3 | P8 | |
| **SKM300GB12F4** [1] | 380 | 300 | 2.06 | 27 | 23 | 334 | 2.43 | 12 | 3 | P8 | |
| **SKM400GB12F4** [1] | 548 | 400 | 2.06 | 26 | 28 | 402 | 2.55 | 20 | 3 | P8 | |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 11) Values at $T_j$=150°C



# IGBT Modules / SEMITRANS

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **1200V - IGBT4 High Power (Trench)** | | | | | | | | | | | |
| **SKM1400GB12P4** [2] | 2165 | 1400 | 1.75 | 150 | 277 | 1768 | 2.06 | 85 | 10 | HT |  |
| **1700V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SKM600GA176D** | 660 | 400 | 2.00 | 255 | 155 | 600 | 1.6 | 102 | 4 | P8 |  |
| **SKM800GA176D** | 830 | 600 | 2.00 | 335 | 245 | 630 | 1.6 | 155 | 4 | P8 | |
| **SKM145GAL176D** | 160 | 100 | 2.00 | 60 | 38 | 140 | 1.6 | 27.5 | 2 | HT |  |
| **SKM200GAL176D** | 260 | 150 | 2.01 | 93 | 58 | 210 | 1.70 | 31 | 3 | P8 | |
| **SKM400GAL176D** | 432 | 300 | 1.99 | 170 | 118 | 440 | 1.70 | 78 | 3 | P8 | |
| **SKM400GAR176D** | 432 | 300 | 1.99 | 170 | 118 | 440 | 1.70 | 78 | 3 | P8 |  |
| **SKM75GB176D** | 80 | 50 | 2.00 | 25 | 18 | 80 | 1.70 | 14.5 | 2 | HT |  |
| **SKM100GB176D** | 125 | 75 | 1.98 | 44 | 28.5 | 100 | 1.6 | 21.4 | 2 | HT | |
| **SKM145GB176D** | 160 | 100 | 2.00 | 60 | 38 | 140 | 1.6 | 27.5 | 2 | HT | |
| **SKM200GB176D** | 260 | 150 | 2.01 | 93 | 58 | 210 | 1.70 | 31 | 3 | P8 | |
| **SKM400GB176D** | 432 | 300 | 1.99 | 170 | 118 | 440 | 1.70 | 78 | 3 | P8 | |
| **1700V - IGBT4 (Trench)** | | | | | | | | | | | |
| **SKM600GA17E4** | 1021 | 600 | 1.90 | 258 | 246 | 629 | 1.98 | 132 | 4 | P8 |  |
| **SKM100GAL17E4** | 164 | 100 | 1.90 | 43 | 39 | 113 | 2.00 | 26 | 2 | HT |  |
| **SKM200GAL17E4** | 321 | 200 | 1.90 | 69 | 79 | 213 | 2.00 | 45 | 3 | P8 | |
| **SKM400GAL17E4** | 614 | 400 | 1.92 | 156.5 | 180 | 443 | 2.00 | 130 | 3 | P8 | |
| **SKM100GAR17E4** | 164 | 100 | 1.90 | 43 | 39 | 113 | 2.00 | 26 | 2 | HT |  |
| **SKM200GAR17E4** | 321 | 200 | 1.90 | 69 | 79 | 213 | 2.00 | 45 | 3 | P8 | |
| **SKM400GAR17E4** | 614 | 400 | 1.92 | 156.5 | 180 | 443 | 2.00 | 130 | 3 | P8 | |
| **SKM75GB17E4** | 125 | 75 | 1.93 | 30 | 29 | 88 | 2.00 | 21 | 2 | HT |  |
| **SKM100GB17E4** | 164 | 100 | 1.90 | 43 | 39 | 113 | 2.00 | 26 | 2 | HT | |
| **SKM150GB17E4** | 261 | 150 | 1.90 | 67 | 59 | 169 | 1.98 | 32 | 2 | HT | |
| **SKM150GB17E4G** | 242 | 150 | 1.90 | 39 | 59 | 163 | 2.00 | 33 | 3 | P8 | |
| **SKM200GB17E4** | 321 | 200 | 1.90 | 69 | 79 | 213 | 2.00 | 45 | 3 | P8 | |
| **SKM300GB17E4** | 476 | 300 | 1.91 | 88 | 121 | 314 | 2.00 | 77 | 3 | P8 | |
| **SKM400GB17E4** | 614 | 400 | 1.92 | 156.5 | 180 | 443 | 2.00 | 130 | 3 | P8 | |
| **SKM500GB17E4** [1] | 737 | 500 | 1.90 | 195 | 220 | 546 | 1.96 | 140 | 3 | P8 | |
| **SKM400GM17E4** | 614 | 400 | 1.92 | 156.5 | 180 | 443 | 2.00 | 130 | 3 | P8 |  |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 11) Values at $T_j$=150°C

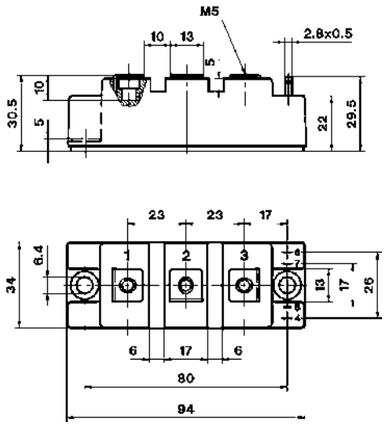
# IGBT Modules / SEMITRANS

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_c$ @ $T_c$= 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_c$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | |
| | A | A | V | mJ | mJ | A | V | mJ | | | Topology |
| **1700V - IGBT4 (Trench) chip - dedicated for humid environment (target data)** | | | | | | | | | | | |
| SKM75GB17E4H16 2) | 132 | 75 | 1.93 | 37 | 29 | 88 | 2.00 | 18 | 2 | HT | |
| SKM150GB17E4GH16 2) | 255 | 150 | 1.96 | 69 | 59 | 163 | 2.00 | 36 | 3 | P8 | |
| SKM300GB17E4H16 2) | 500 | 300 | 1.97 | 106 | 122 | 314 | 2.00 | 71 | 3 | P8 | |
| **1700V - Renesas Gen 8** | | | | | | | | | | | |
| SKM1000GB17R8 2) | 1574 | 1000 | 1.66 | 465 | 332 | 1449 | 1.78 | 159 | 10 | HT | |
| SKM1400GB17R8 2) | 2337 | 1400 | 1.63 | 866 | 495 | 1874 | 1.84 | 253 | 10 | HT | |
| **3300V - N-Channel F-IGBT (new product series, target data)** | | | | | | | | | | | |
| SKM450GB33F 2) 11) | 760 | 450 | 2.07 | 601 | 601 | 674 | 2.05 | 542 | 20 | - | |

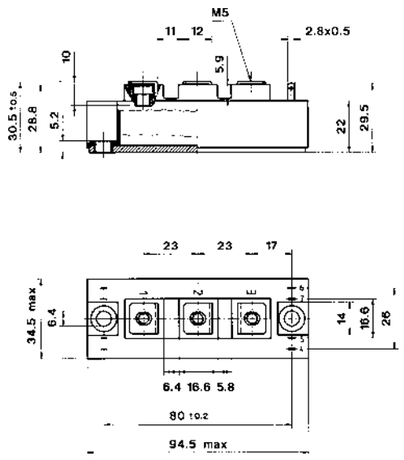
**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs / 11) Values at $T_j$=150°C

## Packages

### SEMITRANS 2




### SEMITRANS 2N



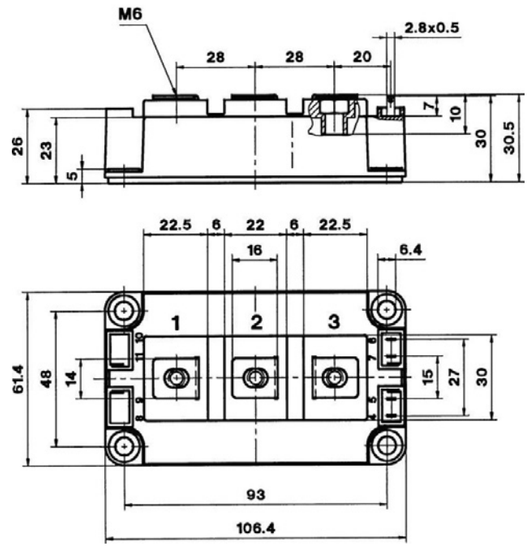

Dimensions in mm



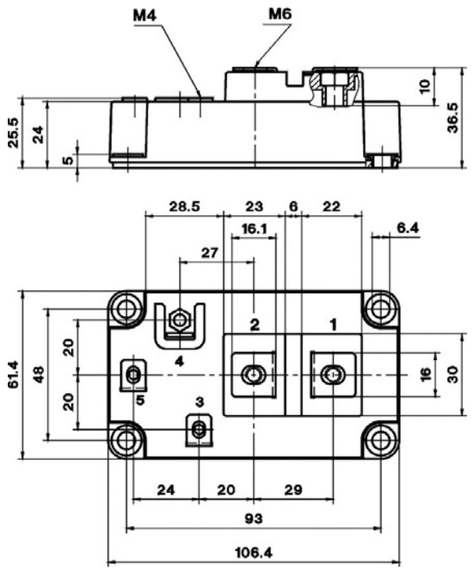
# IGBT Modules / SEMITRANS

## Packages

### SEMITRANS 3

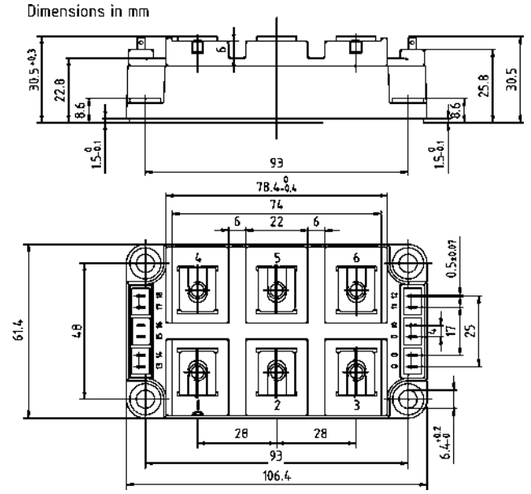



### SEMITRANS 4

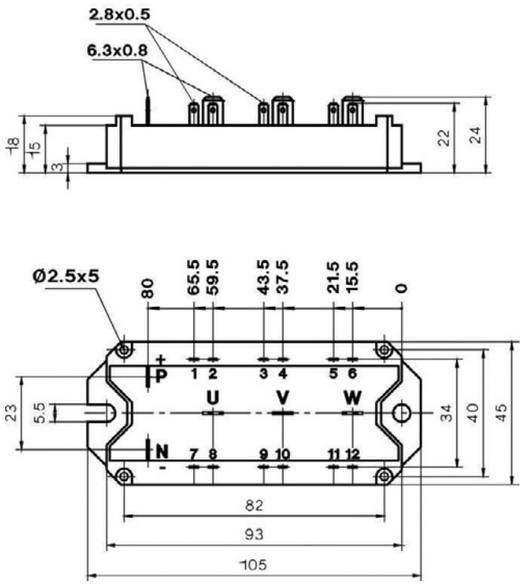



### SEMITRANS 5

Dimensions in mm




### SEMITRANS 6



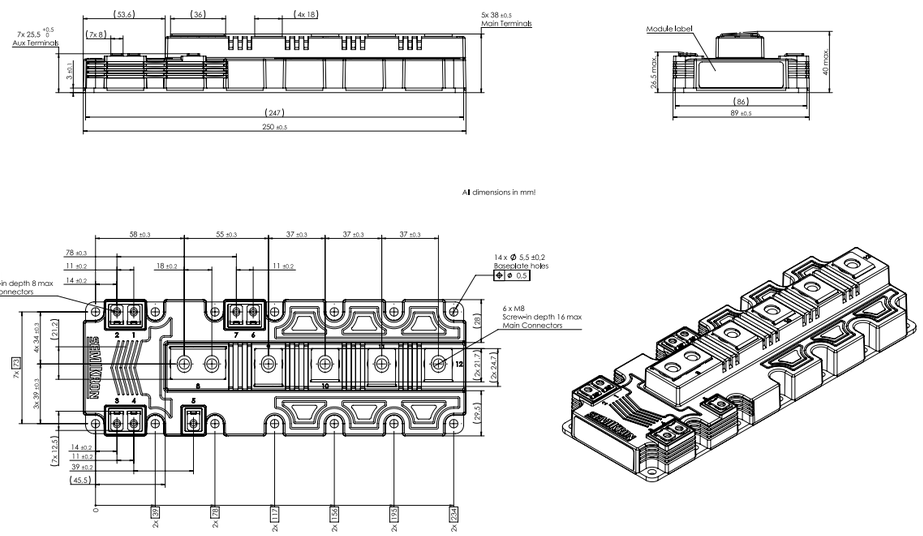

Dimensions in mm

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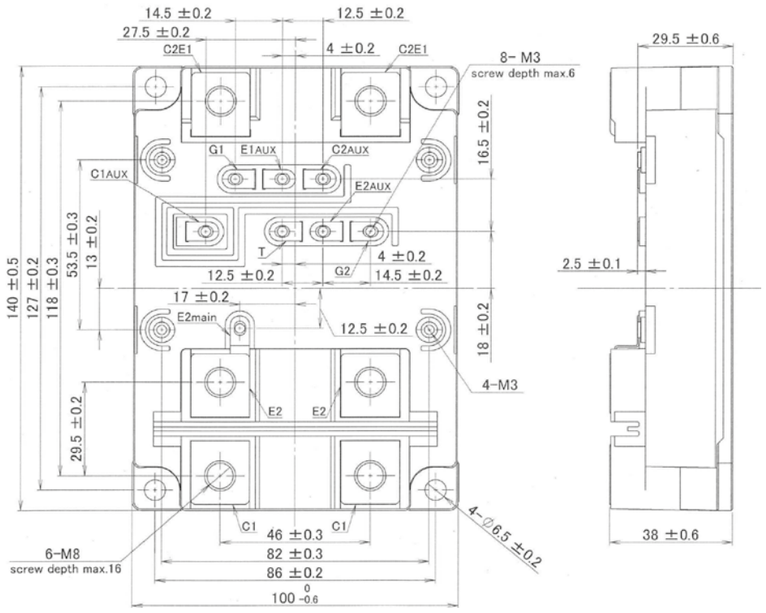
# IGBT Modules / SEMITRANS

## Packages

### SEMITRANS 10



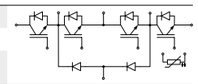
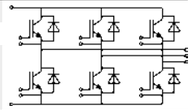
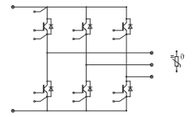
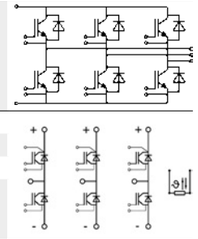
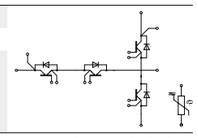
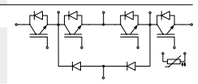
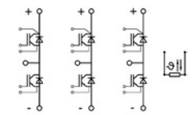
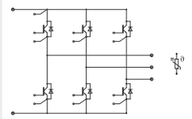

### SEMITRANS 20




Dimensions in mm

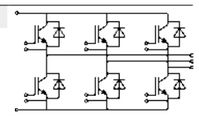
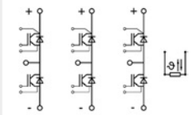


# IGBT Modules / SKiM 4/5

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_s$= 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **600V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SKiM301MLI07E4** | 252 | 300 | 1.55 | 2.8 | 17 | 177 | 1.40 | - | 4 | P12 + HPTP |  |
| **SKiM401MLI07E4** | 314 | 400 | 1.55 | 3.3 | 21 | 289 | 1.40 | 1.8 | 4 | P12 + HPTP | |
| **SKiM601MLI07E4** | 433 | 600 | 1.55 | 6.1 | 44 | 318 | 1.39 | 2.4 | 4 | P12 + HPTP | |
| **1200V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SKiM200GD126D** [3] | - | 200 | 1.65 | 15 | 25 | 152 | 2.39 | - | 4 | P12 + HPTP |  |
| **SKiM300GD126D** | 265 | 300 | 1.70 | 28 | 47 | 260 | 1.92 | - | 4 | P12 + HPTP | |
| **SKiM300GD126DL** | 265 | 300 | 1.65 | 28 | 47 | 260 | 1.92 | - | 4 | P12 + HPTP | |
| **SKiM400GD126DM** | 330 | 300 | 1.70 | 25 | 36 | 300 | 1.92 | 22 | 4 | P12 + HPTP |  |
| **SKiM400GD126DLM** | 330 | 300 | 1.65 | 29 | 46 | 300 | 1.92 | - | 4 | P12 + HPTP |  |
| **SKiM450GD126D** | 390 | 450 | 1.70 | 42 | 70 | 345 | 1.92 | - | 5 | HPTP | |
| **SKiM450GD126DL** [3] | 390 | 450 | 1.65 | 42 | 70 | 345 | 1.92 | - | 5 | HPTP | |
| **SKiM600GD126DLM** | 480 | 450 | 1.65 | 42 | 70 | 450 | 1.92 | - | 5 | HPTP | |
| **SKiM601GD126DM** | 480 | 450 | 1.70 | 42 | 70 | 450 | 1.92 | - | 5 | HPTP | |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | | |
| **SKiM301TMLI12E4B** | 311 | 300 | 1.80 | 6.6 | 19 | 249 | 2.20 | 1.8 | 4 | P12 + HPTP |  |
| **SKiM401TMLI12E4B** | 388 | 400 | 1.80 | 8.8 | 26 | 311 | 2.20 | 2.4 | 4 | P12 + HPTP | |
| **SKiM601TMLI12E4B** | 529 | 600 | 1.80 | 11 | 45 | 495 | 2.14 | 4.4 | 4 | P12 + HPTP | |
| **SKiM201MLI12E4** | 206 | 200 | 1.80 | 15 | 23 | 187 | 2.20 | 15 | 4 | P12 + HPTP |  |
| **SKiM301MLI12E4** | 311 | 300 | 1.80 | 22 | 34 | 282 | 2.20 | 22 | 4 | P12 + HPTP | |
| **SKiM455GD12T4D1** [3] | 400 | 450 | 1.80 | 34 | 40 | 295 | 2.33 | 28 | 5 | HPTP |  |
| **SKiM304GD12T4D** [3] | 312 | 300 | 1.80 | - | - | 221 | 2.33 | - | 4 | P12 + HPTP |  |

**Footnotes:** 3) Not for new designs

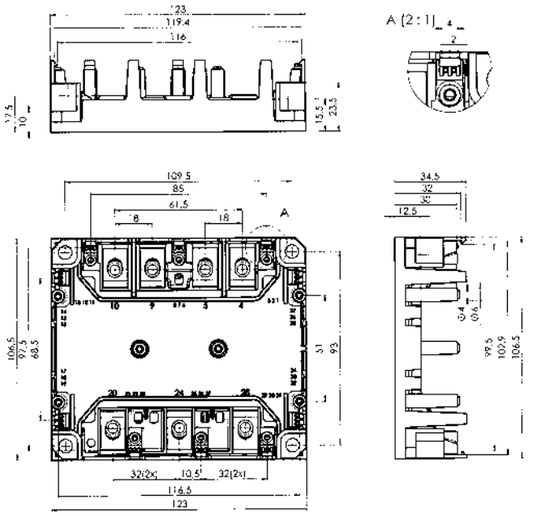
# IGBT Modules / SKiM 4/5

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$= 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_S$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **1700V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SKiM120GD176D** | 110 | 125 | 2.00 | 72 | 46 | 105 | 1.6 | 22 | 4 | P12 + HPTP |  |
| **SKiM220GD176DH4** | 220 | 250 | 2.00 | 145 | 100 | 220 | 1.7 | 65 | 4 | P12 + HPTP | |
| **SKiM270GD176D** | 260 | 300 | 2.00 | 170 | 120 | 215 | 1.7 | - | 5 | HPTP |  |

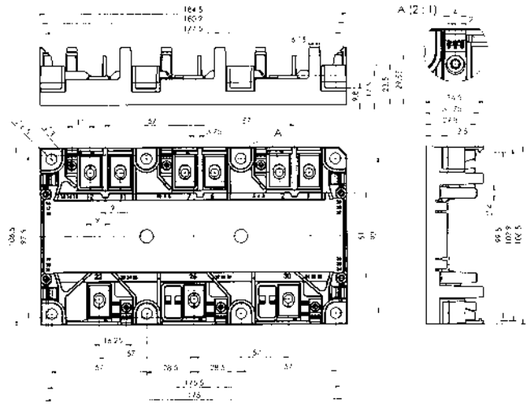
**Footnotes:** 3) Not for new designs

## Packages

**SKiM 4**

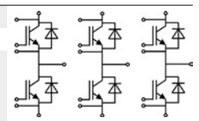
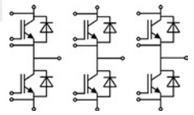
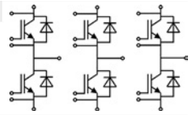
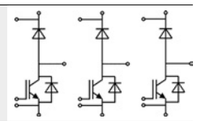
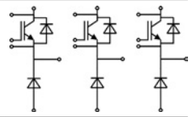
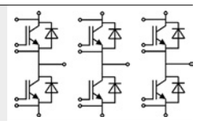



**SKiM 5**




Dimensions in mm

# IGBT Modules / SKiM 63/93

| Type | IGBT | | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$= 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_S$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | mJ | | | |
| **600V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SKiM406GD066HD**[10)] | 468 | 400 | 1.45 | 8 | 25 | 360 | 1.53 | 12 | 63 | P12, HPTP |  |
| **SKiM606GD066HD**[10)] | 640 | 600 | 1.45 | 16 | 53 | 462 | 1.52 | 21 | 63 | P12, HPTP | |
| **SKiM909GD066HD**[10)] | 897 | 900 | 1.45 | 36 | 88 | 690 | 1.52 | 29 | 93 | P12, HPTP | |
| **650V - IGBT3 (Trench)** | | | | | | | | | | | |
| **SKiM606GD07V1**[10)] | - | 600 | 1.45 | 14 | 39 | - | 1.57 | 15 | 63 | P12, HPTP |  |
| **SKiM909GD07V1**[10)] | - | 900 | 1.45 | 30 | 57 | 573 | 1.57 | 19 | 93 | P12, HPTP | |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | | |
| **SKiM459GD12E4 V2**[10)] | 554 | 450 | 1.85 | 22 | 57 | 438 | 2.14 | 40 | 93 | P12, HPTP |  |
| **SKiM306GD12E4 V2**[10)] | 410 | 300 | 1.85 | 19 | 39 | 305 | 2.14 | 21 | 63 | P12, HPTP | |
| **SKiM609GAL12E4**[10)] | 748 | 600 | 1.85 | 136 | 83 | 1397 | 1.7 | 39 | 93 | P12, HPTP |  |
| **SKiM609GAR12E4**[10)] | 748 | 600 | 1.85 | 136 | 83 | 1397 | 1.7 | 39 | 93 | P12, HPTP |  |
| **1700V - IGBT4 (Trench)** | | | | | | | | | | | |
| **SKiM429GD17E44F**[10)] | 608 | 420 | 1.90 | 178 | 189 | 394 | 1.93 | 119 | 93 | P12, HPTP |  |

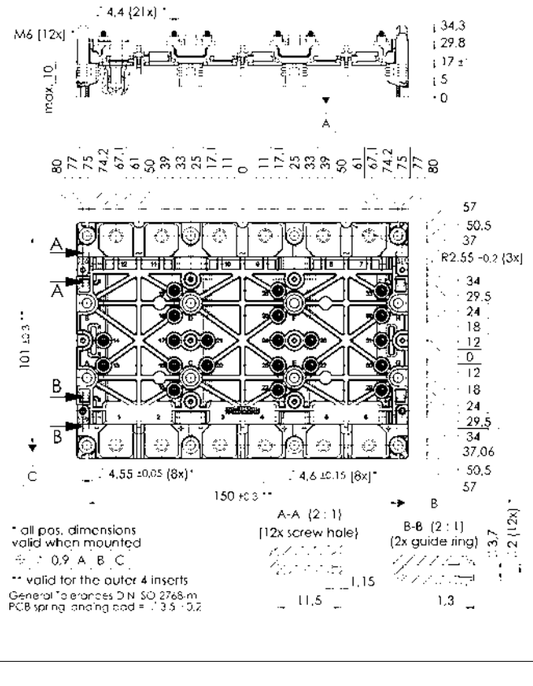
**Footnotes:** 10) Also available with new HpTp, see Accessories/Thermal Interface Materials

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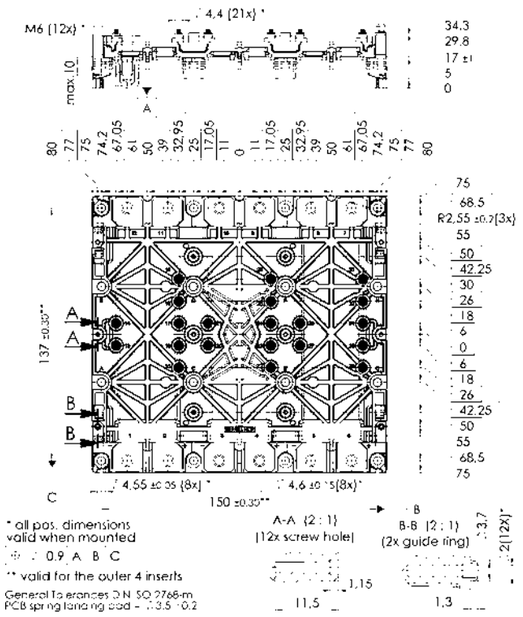
# IGBT Modules / SKiM 63/93

## Packages

### SKiM 63




### SKiM 93




Dimensions in mm

# Full Silicon Carbide Modules
# Highest Power Output and Efficiency

SEMIKRON offers full silicon carbide power modules in MiniSKiiP, SEMITOP and SEMITRANS housings. Using SiC MOSFETs from leading suppliers, excellent output power and power densities are reached in combination with high switching frequencies, minimal losses and maximum efficiency.

The increase in switching frequency means passive filter components can be drastically reduced. Power losses are reduced at the same time, resulting in smaller heat sinks and reducing cooling needs in general. Both benefits result in a major decrease in overall system costs.

The full silicon carbide power modules are available from 20A to 540A in 1200V, with and without anti-parallel free-wheeling Schottky diode. The standard topology sixpacks in classic configuration but split output is also an option that allows for flexible adaption to your application.

Other half-bridges and boost converters including a bypass diode are also available. Beside its SiC MOSFET module portfolio, SEMIKRON offers also single SiC Schottky diodes in SEMIPACK 2 housing.

**Full SiC**


| | |
|---|---|
| MiniSKiiP | 80 |
| SEMITOP | 82 |
| SEMITRANS | 86 |
| SEMIPACK | 87 |


For detailed information please refer to data sheets.

**Further information**
http://www.semikron.com/full-sic

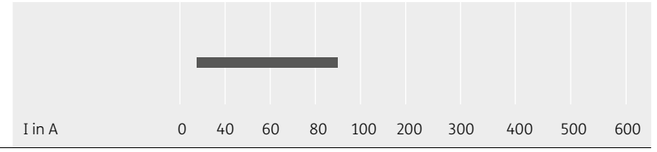
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## Full SiC

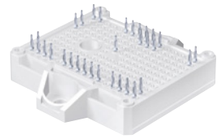
### MiniSKiiP®
**Sixpack**



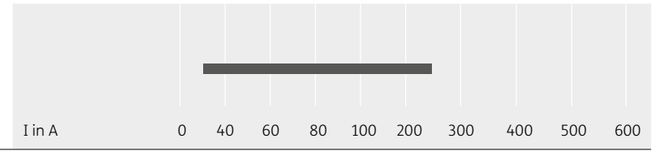
**1200V**




### SEMITOP®
**Sixpack**
**Chopper**
**H-Bridge**
**Half-Bridge**
**Rectifier**



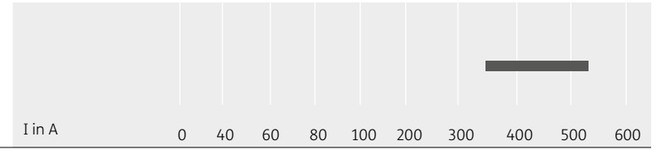
**1200V**




### SEMITRANS®
**Half-Bridge**



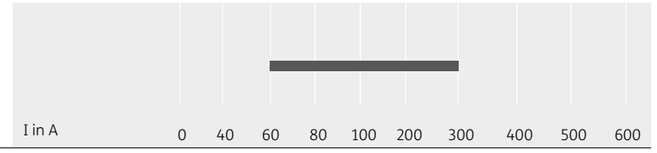
**1200V**

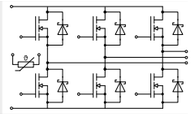
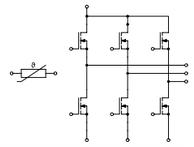
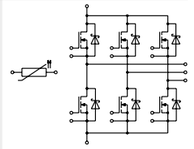



### SEMIPACK® 2
**Rectifier**



**1200V**

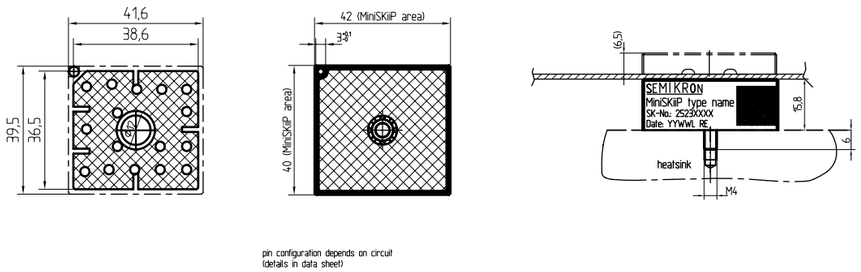


| Type | $V_{DS}$ | $I_D$ @ $T_C$ = 25°C | $R_{DS(on)}$ @ $T_J$ = 25°C typ. | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|
| | V | A | mΩ | | | |
| **1200V - SiC MOSFET** | | | | | | |
| **SKiiP 13ACM12V17** [1)] | 1200 | 25 | 80 | II 1 | P12, HPTP |  |
| **SKiiP 13ACM12V18** [1)] | 1200 | 25 | 80 | II 1 | P12, HPTP |  |
| **SKiiP 26ACM12V17** [1)] | 1200 | 72 | 23 | II 2 | P12, HPTP |  |

**Footnotes:** 1) Sample status

## Packages

**MiniSKiiP II 1**



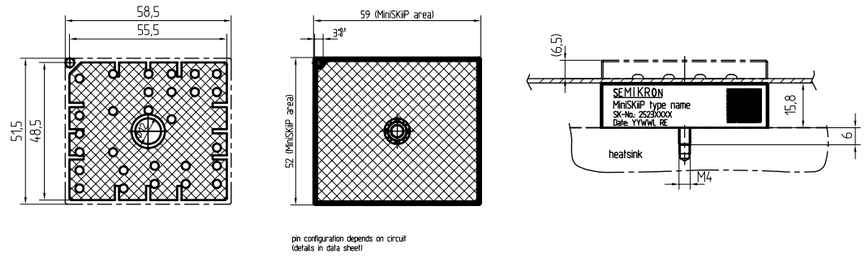

Dimensions in mm





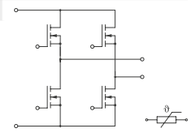
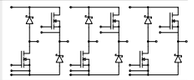
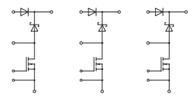
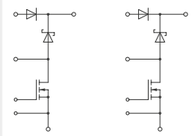
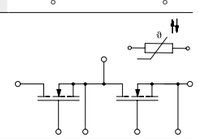
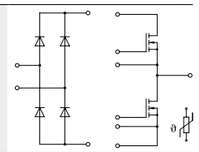
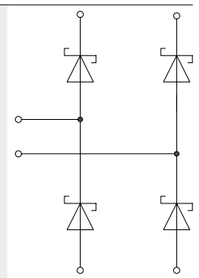
## Packages

**MiniSKiiP II 2**




Dimensions in mm

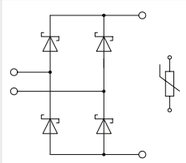
# SiC Modules / Full SiC / SEMITOP

| Type | $V_{DS}$ V | $I_D$ @ $T_C$ = 25°C A | $R_{DS(on)}$ @ $T_j$ = 25°C typ. mΩ | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|
| **1200V - SiC MOSFET** | | | | | | |
| **SK45MH120TSCp** [1] | 1200 | 40 | 45 | 2p | P12 |  |
| **SK25MH120SCTp** [1] | 1200 | 26 | 80 | 2p | P12 | |
| **SK45MAHT12SCp** [2] | 1200 | 39 | 45 | 3p | P12, HPTP |  |
| **SK45MLET12SCp** [1] | 1200 | 39 | 45 | 3p | P12, HPTP |  |
| **SK35MLLE120SCp** [1] | 1200 | 36 | 40 | 2p | P12 |  |
| **SK250MB120SCTE2** [1] | 1200 | 251 | 3.7 | E2 | HPTP, HT |  |
| **SK50BMB120SCTE2** [1] | 1200 | 52 | 80 | E2 | HPTP, HT |  |
| **SEMITOP rectifier module** | | | | | | |
| **SK20KDD12SCp** [1] | 1200 | 18 | - | 2p | P12 |  |

**Footnotes:** 1) Sample status / 2) In production new



# SiC Modules / Full SiC / SEMITOP

| Type | $V_{DS}$ V | $I_D$ @ $T_C$ = 25°C A | $R_{DS(on)}$ @ $T_j$ = 25°C typ. mΩ | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|
| **SEMITOP rectifier module** | | | | | | |
| **SK70B12SCTE1** [1] | 1200 | 54 | - | E1 | - |  |

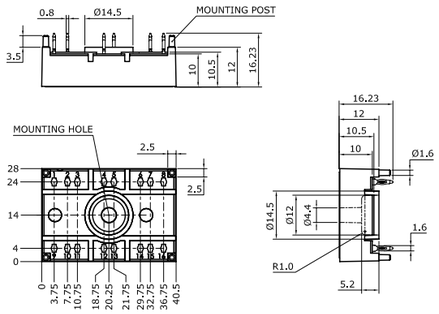
**Footnotes:** 1) Sample status / 2) In production new

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## Packages

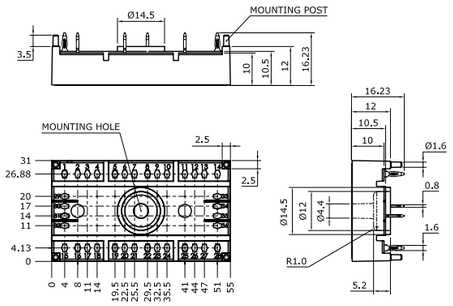
### SEMITOP 2 Press-Fit

Dimensions: mm
Tolerance system: ISO 2768-m

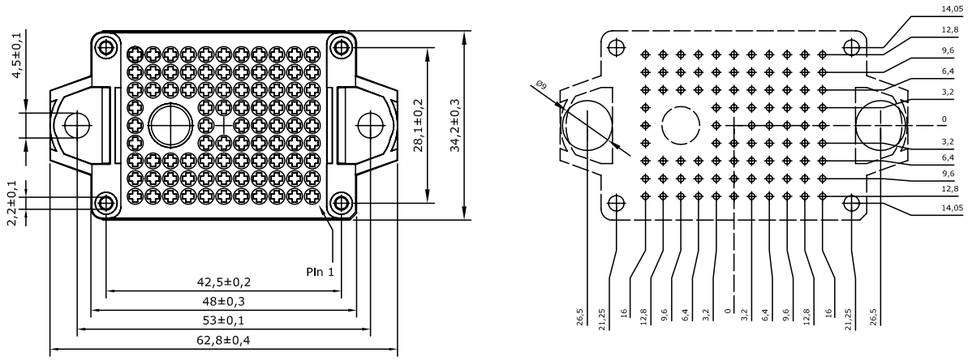



### SEMITOP 3 Press-Fit

Dimensions: mm
Tolerance system: ISO 2768-m




### SEMITOP E1




Dimensions in mm

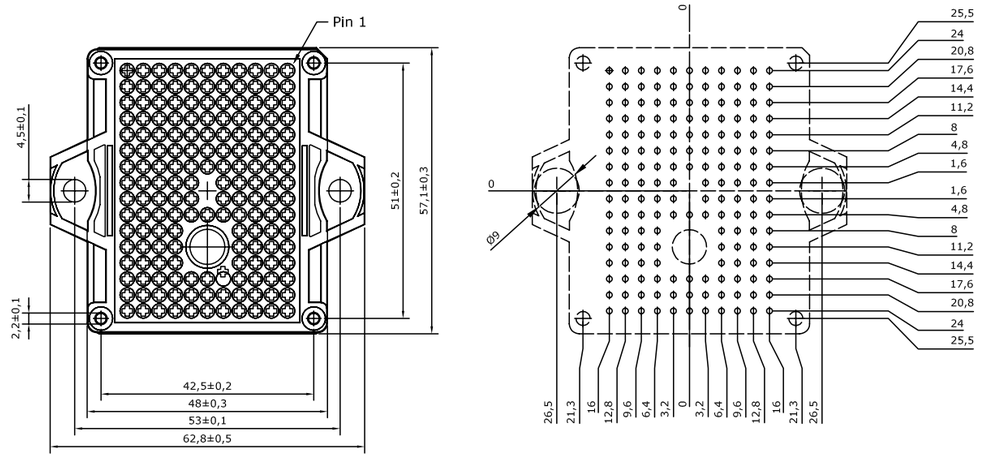






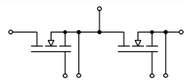
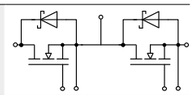
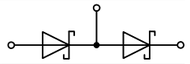
## Packages

### SEMITOP E2




Dimensions in mm

# SiC Modules / Full SiC / SEMITRANS

| Type | $V_{DS}$ V | $I_D$ @ $T_C$ = 25°C A | $R_{DS(on)}$ @ $T_j$ = 25°C typ. mΩ | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|
| **1200V - SiC MOSFET** | | | | | | |
| **SKM350MB120SCH15** [1] | 1200 | 523 | 5.6 | 3 | P8 |  |
| **SKM500MB120SC** [1] | 1200 | 541 | 3.8 | 3 | P8 | |
| **SKM350MB120SCH17** [1] | 1200 | 523 | 5.6 | 3 | P8 |  |
| **1200V - SiC Rectifier** | | | | | | |
| **SKM125KD12SC** [1] | 1200 | 236 | - | 3 | P8 |  |

**Footnotes:** 1) Sample status

## Packages

**SEMITRANS 3**




Dimensions in mm

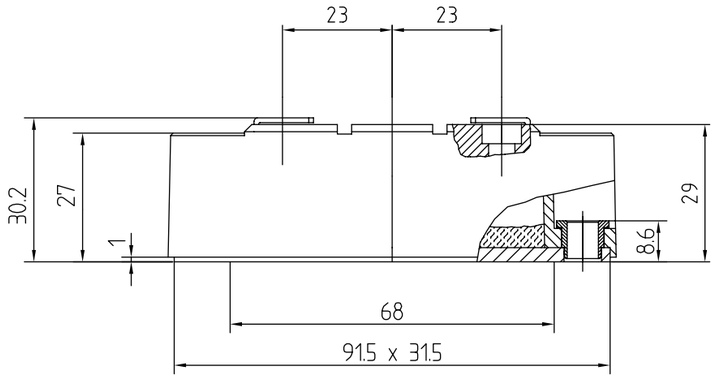
# SiC Modules / Full SiC / SEMIPACK

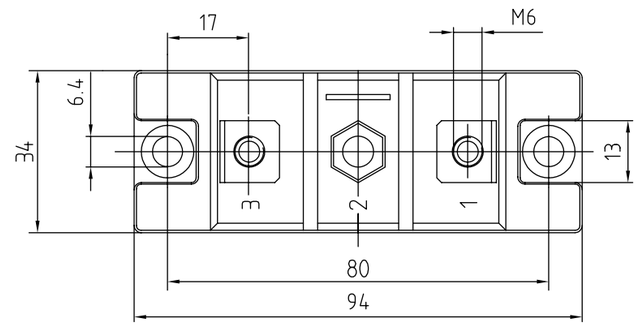
| Type | $V_{RRM}$ $V_{DRM}$ V | $I_{FAV}$ @ $T_C$ A | $T_C$ °C | $V_{F0}$ @ $T_j$ = 150°C max. V | $r_F$ @ $T_j$ = 150°C max. mΩ | $T_j$ °C | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|
| **SKKE60S12** [1] | 1200 | 64 | 85 | 0.90 | 15 | -40 ... +175 | 2 | - |  |
| **SKKE300S12** [1] | 1200 | 400 | 85 | 0.90 | 3.0 | -40 ... +175 | 2 | - | |

**Footnotes:** 1) Sample status

## Packages

**SEMIPACK 2**




Dimensions in mm

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# Hybrid Silicon Carbide Modules For Maximum Energy Efficiency

SEMIKRON offers hybrid silicon carbide power modules in MiniSKiiP, SEMITOP, SEMITRANS, SEMiX 3 Press-Fit and SKiM63/93. The latest IGBT technology is combined with SiC Schottky diodes from leading suppliers to increase the switching frequency and reduce power losses at the same time.

The hybrid silicon carbide power modules are available from 50A to 600A in 1200V in sixpack, half-bridge and chopper topologies.

SiC Schottky free-wheeling diodes have virtually no switching losses and reduce the turn-on losses of the IGBT drastically. With these effects, higher switching frequencies can be achieved in the same module package, which efficiently lowers the filter needs on the output side, for example, of solar inverters, UPS systems or high frequency power supplies. Higher output powers than with standard silicon power modules can also be achieved.


| **Hybrid SiC** | |
|---|---|
| MiniSKiiP | 90 |
| SEMITOP | 92 |
| SEMiX Press-Fit | 95 |
| SEMITRANS | 96 |
| SKiM 63/93 | 97 |


For detailed information please refer to data sheets.

**Further information**
http://www.semikron.com/hybrid-sic

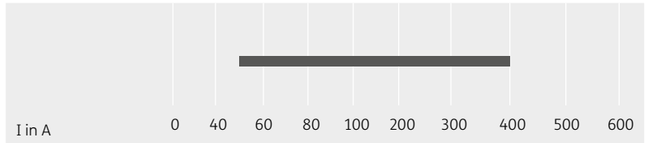
## Hybrid SiC

### MiniSkiiP®

**Half-Bridge**
**Sixpack**
**3-level**



**1200V**

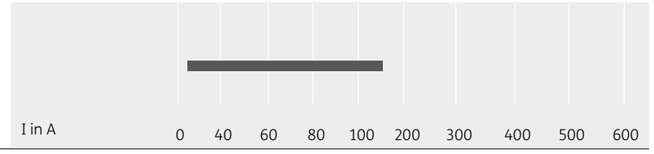



### SEMITOP®

**Chopper**
**3-level**



**1200V**

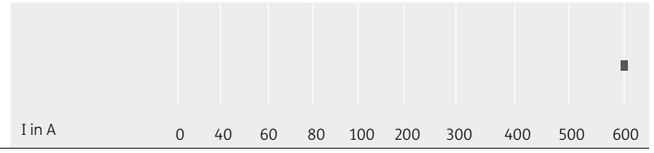



### SEMiX Press-Fit®

**Half-Bridge**



**1200V**

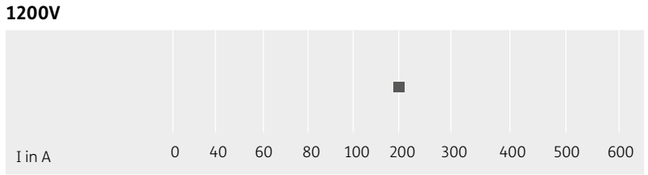



### SEMITRANS®

**Half-Bridge**



**1200V**

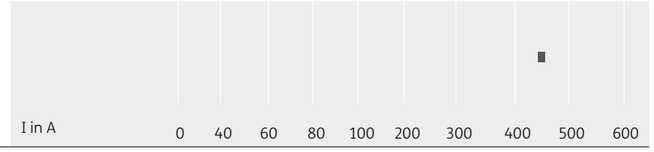



### SKiM®63/93

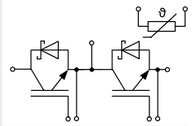
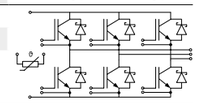
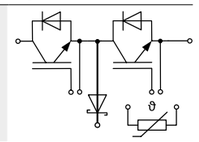
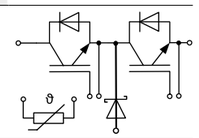
**Sixpack**



**1200V**



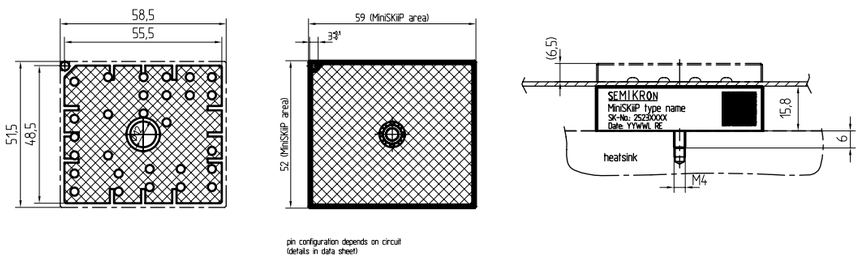
# SiC Modules / Hybrid SiC / MiniSKiiP

| Type | IGBT | | | | | Diode | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_s$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$@ $T_s$ = 25°C | $V_F$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | | | |
| **1200V - IGBT4 (Fast Trench)** | | | | | | | | | | |
| **SKiiP 38GB12F4V19** [1] | 303 | 300 | 2.05 | 10 | 22 | 133 | 1.40 | II 3 | P12, HPTP |  |
| **SKiiP25AC12F4V19**[1] | 61 | 50 | 2.05 | 0.6 | 3.1 | 45 | 1.40 | II 2 | P12, HPTP |  |
| **SKiiP38AC12F4V19**[1] | 102 | 100 | 2.05 | 6.4 | 6.3 | 64 | 1.36 | II 3 | P12, HPTP | |
| **SKiiP39AC12F4V19**[1] | 144 | 150 | 2.05 | 9.6 | 9.4 | 118 | 1.40 | II 3 | P12, HPTP | |
| **SKiiP39MLIB12F4V22**[1] | 409 | 400 | 2.05 | t.b.d. | t.b.d. | 193 | 2.20 | II 3 | P12, HPTP |  |
| **SKiiP39MLIT12F4V22**[1] | 409 | 400 | 2.05 | t.b.d. | t.b.d. | 193 | 2.20 | II 3 | P12, HPTP |  |

**Footnotes:** 1) Sample status

## Packages

**MiniSKiiP II 2**



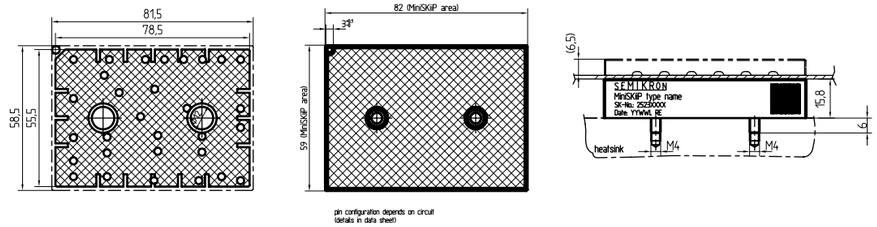

Dimensions in mm



# SiC Modules / Hybrid SiC / MiniSKiiP

## Packages

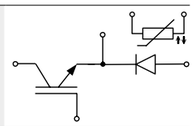
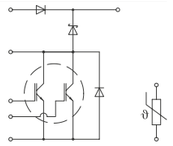
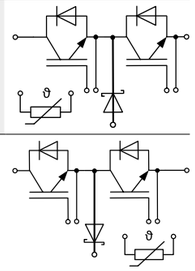
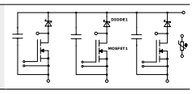
**MiniSKiiP II 3**




Dimensions in mm

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# SiC Modules / Hybrid SiC / SEMITOP

| Type | IGBT | | | | | Diode | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_S$ = 25°C | $V_F$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | | | |
| **1200V - IGBT4 Fast (Trench)** | | | | | | | | | | |
| **SK 25 GAR 12F4 TSC** [1] | 33 | 25 | 2.05 | 2.27 | 2.7 | 21 | 1.40 | 2 | P12 |  |
| **SK 50 GLLE 12F4 TSC** [1] | 56 | 50 | 2.05 | 4.5 | 5.4 | 67 | 1.00 | 2 | P12 |  |
| **SK150MLIT12F4TSCE2** [1] | 149 | 150 | 2.05 | 8.9 | 11 | 80 | 2.20 | E2 | HPTP, HT |  |
| **600V - CoolMOS** | | | | | | | | | | |
| **SK35MLT60SCKE1** [1] | - | 45 | - | t.b.d. | t.b.d. | - | 1.35 | E1 | - |  |

**Footnotes:** 1) Sample status

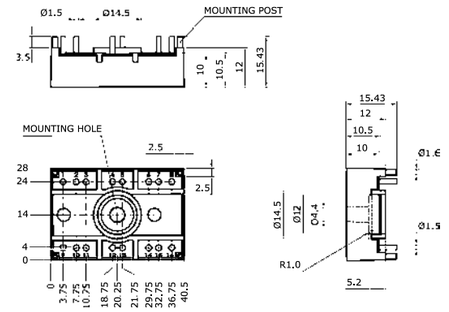


SiC Modules / Hybrid SiC / SEMITOP

## Packages

**SEMITOP 2**

Dimensions: mm
Tolerance system: ISO 2768-m

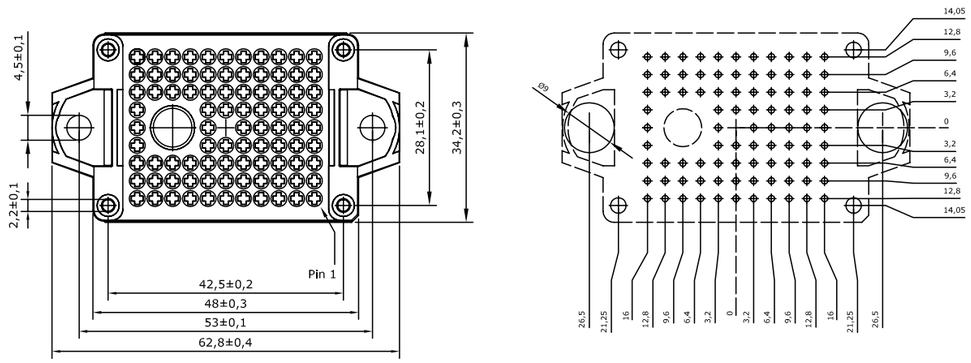



Dimensions in mm

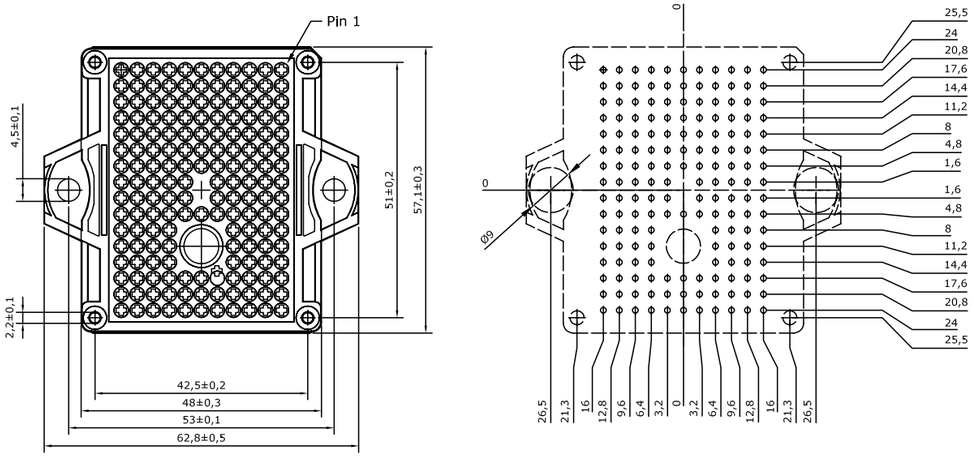
# SiC Modules / Hybrid SiC / SEMITOP

## Packages

### SEMITOP E1

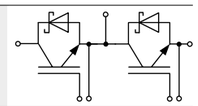



### SEMITOP E2




Dimensions in mm

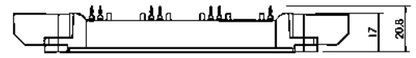
# SiC Modules / Hybrid SiC / SEMiX

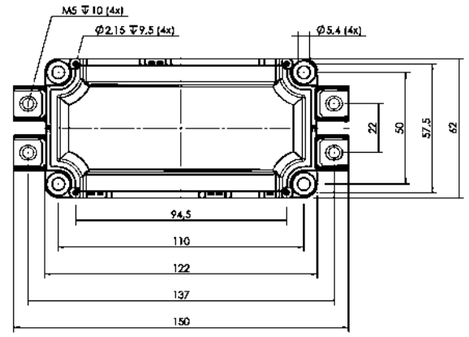
| Type | IGBT | | | | | Diode | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | | | |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | |
| **SEMiX603GB12E4SiCp**[1)] | 1110 | 600 | 1.80 | 17 | 72 | 404 | 1.40 | 3p | P8, HT |  |

**Footnotes:** 1) Sample status

## Packages

### SEMiX 3p

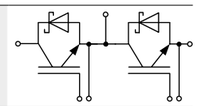
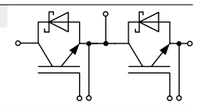



Dimensions in mm

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+ 370 64 021 081
info@abn-a.com

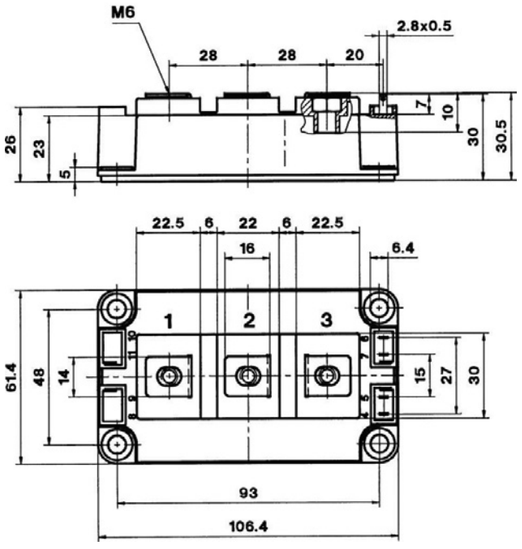
# SiC Modules / Hybrid SiC / SEMITRANS

| Type | IGBT | | | | | Diode | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_C$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_C$ = 25°C | $V_F$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | | | |
| **1200V - IGBT4 (Trench)** | | | | | | | | | | |
| **SKM200GB12T4SiC2** [1)] | 313 | 200 | 1.80 | 7 | 20 | 246 | 1.40 | 3 | P8 |  |
| **1200V - IGBT4 (Fast Trench)** | | | | | | | | | | |
| **SKM200GB12F4SiC2** [1)] | 279 | 200 | 2.06 | 7 | 17 | 246 | 1.40 | 3 | P8 |  |
| **SKM200GB12F4SiC3** [1)] | 279 | 200 | 2.06 | 7 | 17 | 123 | 1.40 | 3 | P8 | |

**Footnotes:** 1) Sample status

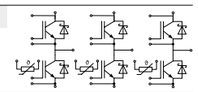
## Packages

**SEMITRANS 3**




Dimensions in mm

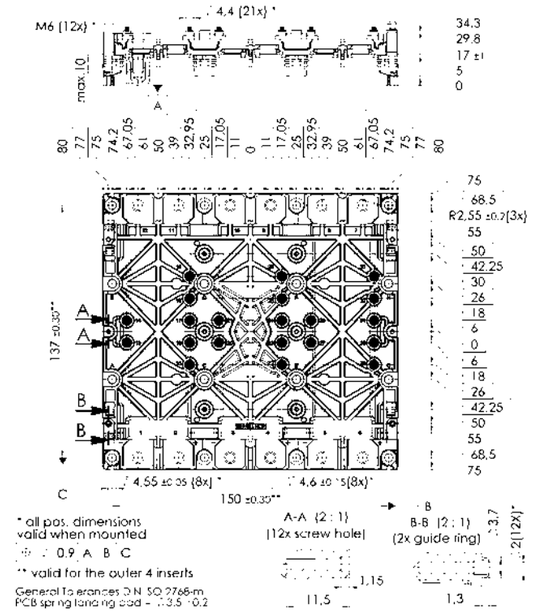
# SiC Modules / Hybrid SiC / SKiM 63/93

| Type | IGBT | | | | | Diode | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_S$ = 25°C | $I_{Cnom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ | $E_{off}$ | $I_F$ @ $T_S$ = 25°C | $V_F$ | Package | Thermal Interface Material | Topology |
| | A | A | V | mJ | mJ | A | V | | | |
| **1200V - IGBT4 (Fast Trench)** | | | | | | | | | | |
| **SKiM459GD12F4V3** [1)] | 476 | 450 | 2.05 | 2 | 11 | 214 | 1.33 | 93 | P12, HPTP |  |
| **SKiM459GD12F4V4** [1)] | 476 | 450 | 2.05 | 5 | 20 | 357 | 1.33 | 93 | P12, HPTP | |

**Footnotes:** 1) Sample status

## Packages

**SKiM 93**




Dimensions in mm

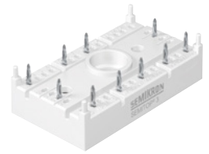
# MOSFET Modules
# Best in Class Switching Performance

SEMIKRON produces MOSFET (Metal Oxide Semiconductor Field Effect Transistor) modules in single switch, half-bridge, H-bridge and sixpack configuration in SEMITOP and SEMITRANS packages.

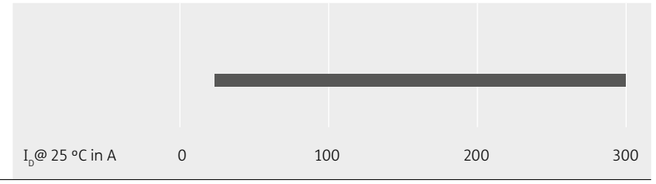
The available MOSFET modules in the voltage range from 55V up to 600V and current ratings of 40A up to 290A are designed for high-speed switching applications, in particular, and boast low switching losses.

## SEMITOP®

**Sixpack**
**H-Bridge**
**Half-Bridge**



**60V up to 100V**

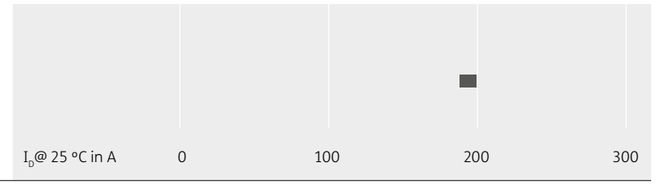



## SEMITRANS®

**Single Switch**



**100V up to 200V**





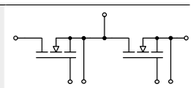
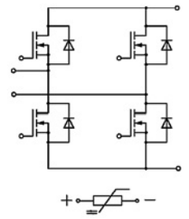
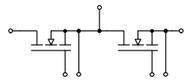
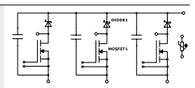
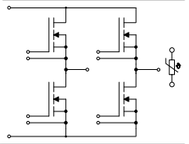
| | |
|---|---|
| SEMITOP | 100 |
| SEMITRANS | 102 |


For detailed information please refer to data sheets.

**Further information**: http://www.semikron.com/mosfet-modules

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# MOSFET Modules / SEMITOP

| Type | $V_{DS}$ | $I_D$ @ $T_C$ = 25°C | $R_{DS(on)}$ @ $T_j$ = 25°C typ. | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|
| | V | A | mΩ | | | |
| **80V** | | | | | | |
| **SK300MB080** [1)] | 80 | 317 | 0.90 | 3 | P12, HPTP |  |
| **100V** | | | | | | |
| **SK 85 MH 10 T** [3)] | 100 | 80 | - | 2 | P12 |  |
| **SK280MB10** [1)] | 100 | 278 | 1.15 | 3 | P12, HPTP |  |
| **600V** | | | | | | |
| **SK35MLT60SCKE1** [1)] | 600 | 45 | 37 | E1 | - |  |
| **SK50MH65TE1** [1)] | 650 | 55 | 9.8 | E1 | - |  |

**Footnotes:** 1) Sample status / 3) Not for new designs

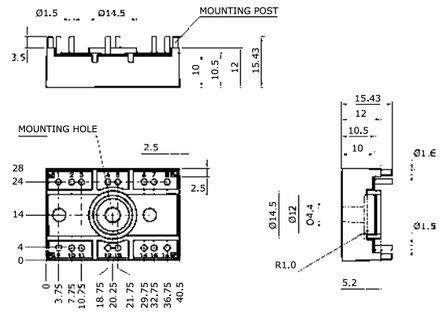


MOSFET Modules / SEMITOP

## Packages

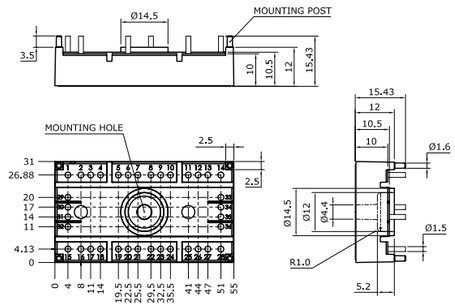
### SEMITOP 2

Dimensions: mm
Tolerance system: ISO 2768-m




### SEMITOP 3

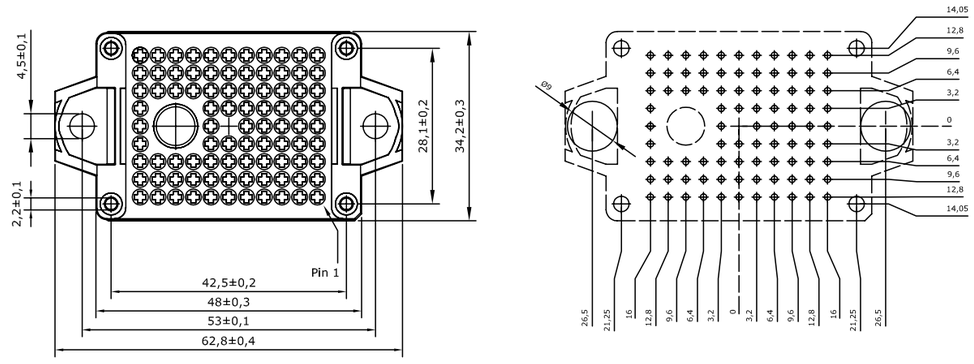
Dimensions: mm
Tolerance system: ISO 2768-m




Dimensions in mm

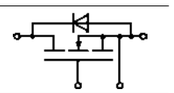
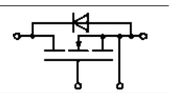
## Packages

### SEMITOP E1



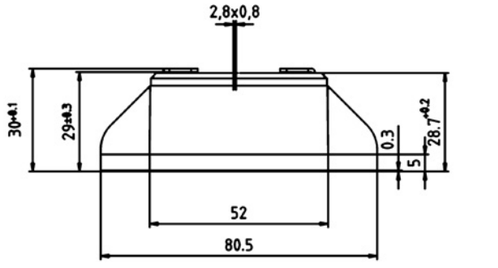

Dimensions in mm

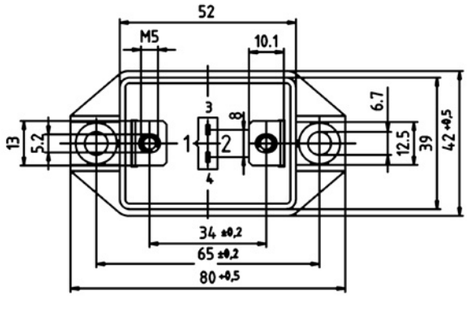
# MOSFET Modules / SEMITRANS

| Type | $V_{DS}$ V | $I_D$ @ $T_C$ = 25°C A | $R_{DS(on)}$ @ $T_j$ = 25°C typ. mΩ | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|
| **100V** | | | | | | |
| **SKM 111 AR** | 100 | 200 | 7 | M1 | - |  |
| **SKM 111 RZR** | 100 | 200 | 7 | M1 | - | |
| **200V** | | | | | | |
| **SKM 180 A020** | 200 | 180 | 9 | M1 | - |  |

**Packages**

**SEMITRANS M1**




Dimensions in mm

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# Thyristor / Diode Modules With Proven Packages

The SEMIKRON thyristor/diode modules are available in different packages such as SEMIPACK, SEMiSTART, SEMIPONT, SEMiX and SEMITOP. Different contact technologies – soldered contact, bonded contact or pressure contact modules – are available.

The thyristor/diode modules come in a variety of dual and single topologies for virtually any phase control or rectifier application.

The product class offers a product range with voltages of up to 2200V. Thanks to the comprehensive product range, the optimum solution can be found for each application.


| | |
|---|---|
| SEMITOP | 106 |
| SEMiX | 108 |
| SEMIPONT | 110 |
| SEMIPACK | 111 |
| SEMIPACK Fast | 115 |
| SEMiSTART | 117 |


For detailed information please refer to data sheets.

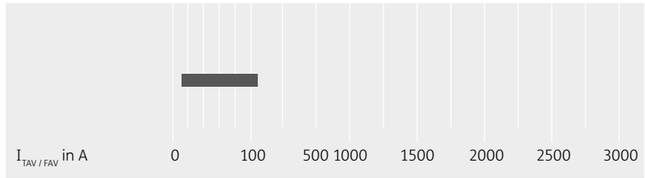
**Further information:** www.semikron.com/thyristor-diode-modules

## SEMITOP®

**Rectifier**
**Thyristor**



**800V up to 1600V**

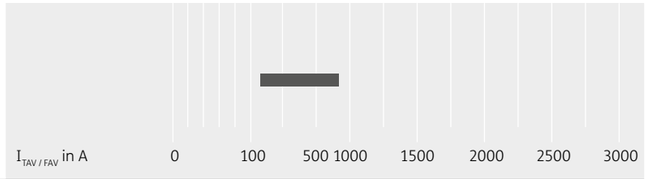



## SEMiX®

**Rectifier**
**Thyristor**



**1600V up to 2200V**

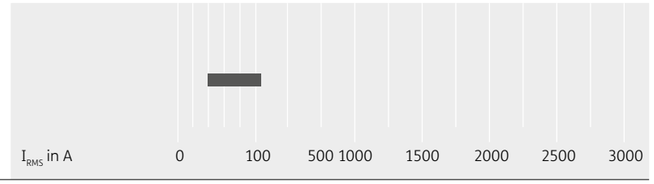



## SEMIPONT®

**Rectifier**
**Thyristor**



**800V up to 2200V**

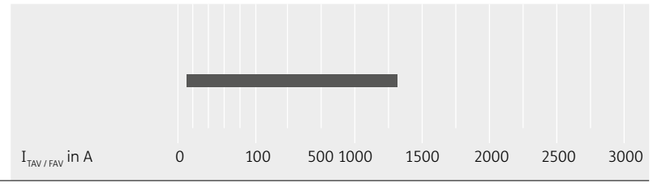



## SEMIPACK®

**Rectifier**
**Thyristor**

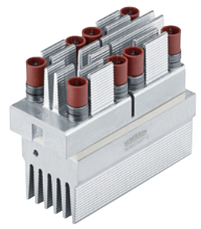


**400V up to 2200V**

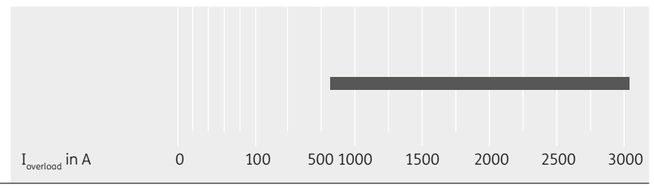



## SEMiSTART®

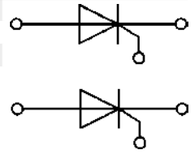
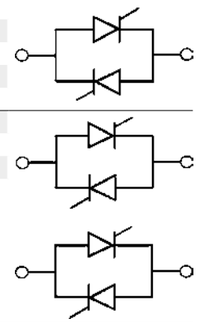
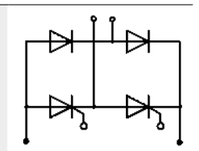
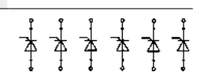
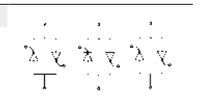
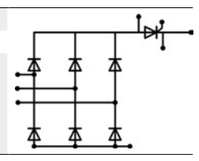
**Thyristor**



**1400V up to 1800V**



# Thyristor / Diode Modules / SEMITOP

| Type | $V_{RRM}$ $V_{DRM}$ | $I_{TAV}$ $I_{FAV}$ @ $T_S$ | $T_S$ | $I_{TSM}$ $I_{FSM}$ @ $T_{jmax}$ | $V_{T(TO)}$ @ $T_{jmax}$ | $r_T$ @ $T_{jmax}$ | $T_j$ | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | mΩ | °C | | | |
| **SK 35 TAA** [2] | 800-1600 | 35 | 80 | 380 | 0.85 | 9.10 | -40 ... +130 | 2 | P12 |  |
| **SK 55 TAA** | 800-1600 | 55 | 80 | 900 | 0.85 | 5.70 | -40 ... +130 | 2 | P12 | |
| **SK 75 TAA** [2] | 800-1600 | 75 | 80 | 1500 | 0.90 | 4.50 | -40 ... +130 | 2 | P12 | |
| **SK 100 TAA** [2] | 800-1600 | 100 | 80 | 2000 | 0.90 | 3.50 | -40 ... +130 | 2 | P12 | |
| **SK 75 TAE 12** | 1200 | 75 | 80 | 1250 | 0.85 | 4.40 | -40 ... +130 | 2 | P12 | |
| **SK 25 KQ** | 800-1600 | 29 | 85 | 280 | 1.10 | 20.00 | -40 ... +125 | 1 | - |  |
| **SK 45 KQ** | 800-1600 | 47 | 85 | 380 | 1.00 | 10.00 | -40 ... +125 | 1 | - | |
| **SK 70 KQ** | 800-1600 | 72 | 85 | 900 | 1 | 6.00 | -40 ... +125 | 1 | - | |
| **SK 100 KQ** | 800-1600 | 101 | 85 | 1350 | 0.90 | 4.50 | -40 ... +125 | 2 | P12 | |
| **SK 120 KQ** | 800-1600 | 134 | 85 | 1800 | 0.90 | 3.50 | -40 ... +125 | 2 | P12 | |
| **SK 25 WT** | 800-1600 | 29 | 85 | 280 | 1.10 | 20.00 | -40 ... +125 | 2 | P12 | |
| **SK 45 WT** | 800-1600 | 47 | 85 | 380 | 1.00 | 10.00 | -40 ... +125 | 2 | P12 | |
| **SK 70 WT** | 800-1600 | 72 | 85 | 900 | 1.00 | 6.00 | -40 ... +125 | 3 | P12, HPTP | |
| **SK 100 WT** | 800-1600 | 101 | 85 | 1350 | 0.90 | 4.50 | -40 ... +125 | 3 | P12, HPTP | |
| **SK 35 BZ** [2] | 800-1600 | 35 | 80 | 270 | 0.85 | 14.00 | -40 ... +125 | 2 | P12 |  |
| **SK 45 STA** | 800-1600 | 47 | 75 | 380 | 1.00 | 10.00 | -40 ... +125 | 3 | P12, HPTP |  |
| **SK 25 UT** | 800-1600 | 29 | 85 | 280 | 1.10 | 20.00 | -40 ... +125 | 3 | P12, HPTP |  |
| **SK 45 UT** | 800-1600 | 47 | 85 | 380 | 1.00 | 10.00 | -40 ... +125 | 3 | P12, HPTP | |
| **SK 30 DTA** | 800-1600 | 25 | 80 | 900 | 1.00 | 6.00 | -40 ... +150 | 3 | P12, HPTP |  |
| **SK 60 DTA** | 800-1600 | 61 | 80 | 1350 | 0.90 | 0.60 | -40 ... +125 | 3 | P12, HPTP | |
| **SK 80 DTA** | 800-1600 | 65 | 80 | 1800 | 0.90 | 3.50 | -40 ... +150 | 3 | P12, HPTP | |

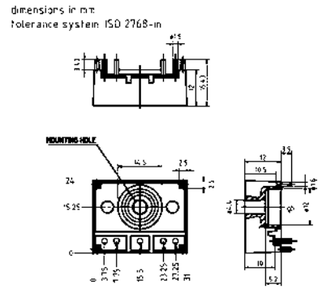
**Footnotes:** 2) In production new



Thyristor / Diode Modules / SEMITOP

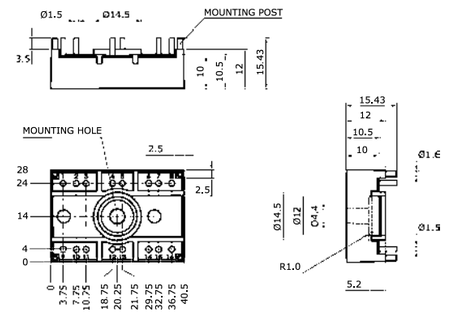
## Packages

### SEMITOP 1



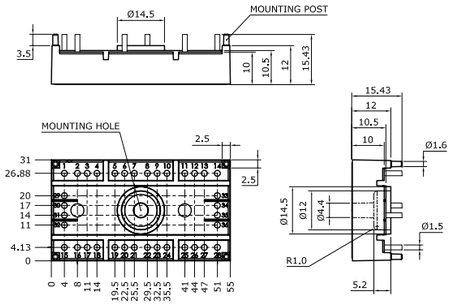

### SEMITOP 2

Dimensions: mm
Tolerance system: ISO 2768-m




### SEMITOP 3

Dimensions: mm
Tolerance system: ISO 2768-m



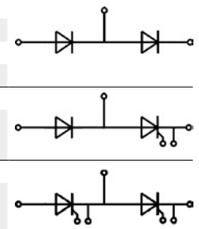

Dimensions in mm

UAB "Eibienos automatika"
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+ 370 64 021 081
info@abn-a.com

# Thyristor / Diode Modules / SEMiX

**Type**

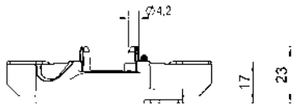
| | $V_{RRM}$ $V_{DRM}$ | $I_{TAV}$ $I_{FAV}$ @ $T_C$ | $T_C$ | $I_{TSM}$ $I_{FSM}$ @ $T_{jmax}$ | $V_{T(TO)}$ @ $T_{jmax}$ | $r_T$ @ $T_{jmax}$ | $T_j$ | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | mΩ | °C | | | |
| **SEMiX191KD16s** | 1600 | 190 | 85 | 5000 | 0.85 | 0.95 | -40 ... +130 | 1s | HT | |
| **SEMiX302KD16s** | 1600 | 300 | 85 | 7500 | 0.85 | 1.1 | -40 ... +130 | 2s | P8 | |
| **SEMiX443KD16p**[1)] | 1600 | 585 | 85 | 8200 | 0.916 | 2.0 | -40 ... +175 | 3Ip | P8, HT | |
| **SEMiX603KD16p**[2)] | 1600 | 732 | 85 | 9000 | 0.916 | 1.9 | -40 ... +175 | 3Ip | P8, HT | |
| **SEMiX443KD22p**[2)] | 2200 | 580 | 85 | 8200 | 0.834 | 2.0 | -40 ... +150 | 3Ip | P8, HT | |
| **SEMiX171KH16s** | 1600 | 170 | 85 | 4800 | 0.85 | 1.5 | -40 ... +130 | 1s | HT | |
| **SEMiX302KH16s** | 1600 | 300 | 85 | 8000 | 0.85 | 1.1 | -40 ... +130 | 2s | P8 | |
| **SEMiX141KT16s** | 1600 | 140 | 85 | 3000 | 0.85 | 2.1 | -40 ... +130 | 1s | HT | |
| **SEMiX302KT16s** | 1600 | 300 | 85 | 8000 | 0.85 | 1.7 | -40 ... +130 | 2s | P8 | |

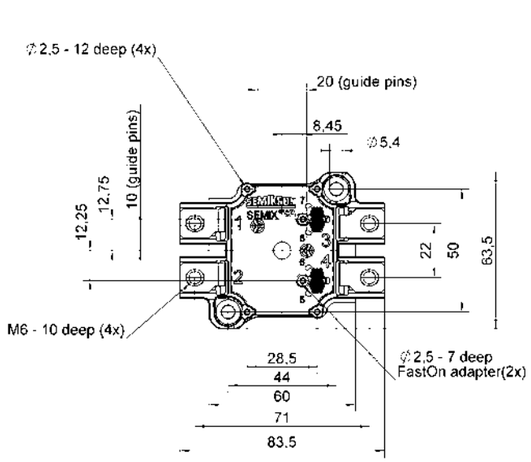


**Footnotes:** 1) Sample status / 2) In production new

## Packages

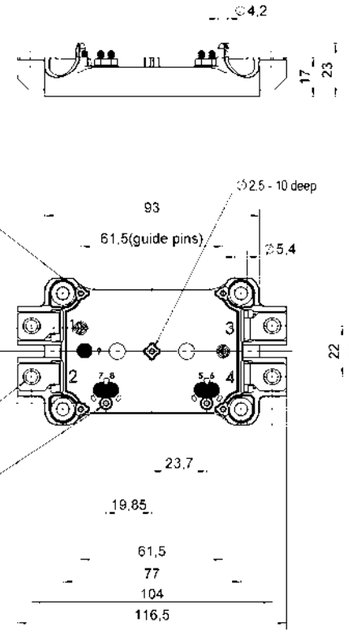
**SEMiX 1s**




Dimensions in mm

**SEMiX 2s**

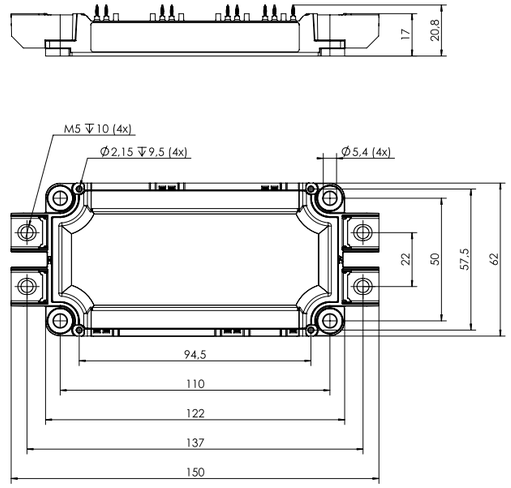





# Thyristor / Diode Modules / SEMiX

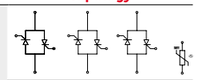
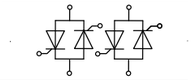
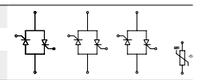
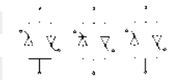
## Packages

**SEMiX 3Ip**




Dimensions in mm

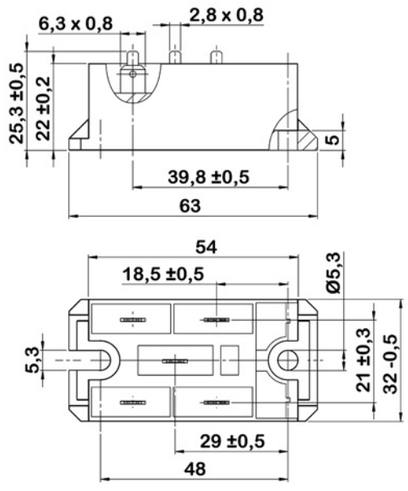
# Thyristor / Diode Modules / SEMIPONT

| Type | $V_{RRM}$ $V_{DRM}$ V | $I_{TAV}$ $I_{FAV}$ @ $T_S$ A | $T_S$ °C | $I_{TSM}$ $I_{FSM}$ @ $T_{jmax}$ A | $V_{T(TO)}$ @ $T_{jmax}$ V | $r_T$ @ $T_{jmax}$ mΩ | $T_j$ °C | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| **SKUT 85/12 T V2** [2] | 1200 | 94 | 85 | 1050 | 1.10 | 6.0 | -40 ... +125 | 5 | - |  |
| **SKWT 40** [1] | 800-2200 | 40 | 85 | 580 | 0.9 | 6.0 | -40 ... +125 | 1 | - |  |
| **SKUT 85/16 T V2** [2] | 1600 | 94 | 85 | 1050 | 1.10 | 6.0 | -40 ... +125 | 5 | - |  |
| **SKUT 115/12T V2** [2] | 1200 | 127 | 85 | 1250 | 0.90 | 5 | -40 ... +125 | 5 | - | |
| **SKUT 115/16T V2** [2] | 1600 | 127 | 85 | 1250 | 0.90 | 5 | -40 ... +125 | 5 | - | |
| **SKUT 85/12 V2** [2] | 1200 | 85 | 85 | 1050 | 1.1 | 6.0 | -40 ... +125 | 5 | - |  |
| **SKUT 85/16 V2** [2] | 1600 | 85 | 85 | 1050 | 1.1 | 6.0 | -40 ... +125 | 5 | - | |
| **SKUT 115/12 V2** [2] | 1200 | 105 | 85 | 1250 | 0.9 | 5.0 | -40 ... +125 | 5 | - | |
| **SKUT 115/16 V2** [2] | 1600 | 105 | 85 | 1250 | 0.9 | 5.0 | -40 ... +125 | 5 | - | |

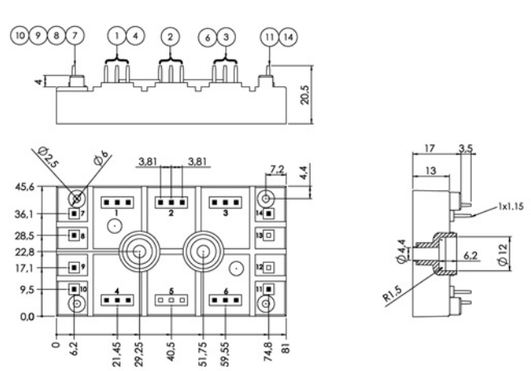
**Footnotes:** 1) Sample status / 2) In production new

## Packages

**SEMIPONT 1**

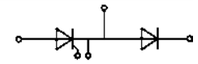
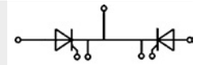
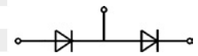
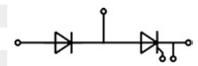



**SEMIPONT 5**




Dimensions in mm

# Thyristor / Diode Modules / SEMIPACK

| Type | $V_{RRM}$ $V_{DRM}$ V | $I_{TAV}$ $I_{FAV}$ @ $T_C$ A | $T_C$ °C | $I_{TSM}$ $I_{FSM}$ @ $T_{jmax}$ A | $V_{T(TO)}$ @ $T_{jmax}$ V | $r_T$ @ $T_{jmax}$ mΩ | $T_j$ °C | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| **SKET 330** | 800-2200 | 295 | 85 | 8000 | 1.20 | 0.55 | -40 ... +130 | 4 | - |  |
| **SKET 400** | 800-1800 | 392 | 85 | 12000 | 0.92 | 0.3 | -40 ... +130 | 4 | - | |
| **SKET 741/22 E** | 2200 | 819 | 85 | 26500 | 0.82 | 0.17 | -40 ... +125 | 6 | - | |
| **SKET 801/18 E** | 1800 | 819 | 85 | 30000 | 0.82 | 0.17 | -40 ... +125 | 6 | - | |
| **SKKE 15** | 600-1600 | 14 | 85 | 280 | 0.85 | 15 | -40 ... +125 | 0 | - | |
| **SKKE 81** | 800-1600 | 82 | 85 | 1750 | 0.85 | 1.8 | -40 ... +125 | 1 | - | |
| **SKKE 162** | 800-2200 | 195 | 85 | 5000 | 0.85 | 1.2 | -40 ... +135 | 2 | HT |  |
| **SKKE 212/16 H2** | 1600 | 213 | 85 | 5500 | 0.75 | 1.05 | -40 ... +135 | 2 | HT | |
| **SKKE 380** | 1200-1600 | 380 | 100 | 10000 | 0.80 | 0.35 | -40 ... +150 | 3 | - | |
| **SKKE 600** | 1200-2200 | 600 | 100 | 18000 | 0.75 | 0.25 | -40 ... +150 | 4 | - | |
| **SKKE 1201/22** | 2200 | 1360 | 85 | 35000 | 0.75 | 0.073 | -40 ... +125 | 6 | - | |
| **SKKL 92** | 800-1800 | 95 | 85 | 1750 | 0.90 | 2 | -40 ... +125 | 1 | - |  |
| **SKMT 92** | 800-1800 | 95 | 85 | 1750 | 0.90 | 2 | -40 ... +125 | 1 | - |  |
| **SKKD 15** | 600-1600 | 14 | 85 | 280 | 0.85 | 15 | -40 ... +125 | 0 | - | |
| **SKKD 26** | 1200-1600 | 31 | 85 | 480 | 0.85 | 6 | -40 ... +125 | 1 | - | |
| **SKKD 46** | 800-1800 | 47 | 85 | 600 | 0.85 | 5 | -40 ... +125 | 1 | - | |
| **SKKD 81** | 800-1800 | 82 | 85 | 1750 | 0.85 | 1.8 | -40 ... +125 | 1 | - | |
| **SKKD 81 H4** | 2000-2200 | 82 | 85 | 1750 | 0.85 | 1.8 | -40 ... +125 | 1 | - | |
| **SKKD 100** | 400-1800 | 100 | 85 | 2000 | 0.85 | 1.3 | -40 ... +125 | 1 | - | |
| **SKKD 101/16** | 1600 | 134 | 85 | 2000 | 0.87 | 2.45 | -40 ... +130 | 1 | - | |
| **SKKD 152/16 H1** | 1600 | 171 | 85 | 4500 | 0.82 | 1.35 | -40 ... +135 | 2 | HT |  |
| **SKKD 162** | 800-2200 | 195 | 85 | 5000 | 0.85 | 1.2 | -40 ... +135 | 2 | HT | |
| **SKKD 212** | 1200-1800 | 212 | 85 | 5500 | 0.75 | 1.05 | -40 ... +135 | 2 | HT | |
| **SKKD 260** | 800-2200 | 260 | 85 | 10000 | 0.9 | 0.37 | -40 ... +130 | 3 | - | |
| **SKKD 353** | 1200-1800 | 350 | 85 | 9500 | 0.84 | 0.75 | -40 ... +130 | 3 | - | |
| **SKKD 380** | 800-2200 | 380 | 100 | 10000 | 0.80 | 0.35 | -40 ... +150 | 3 | - | |
| **SKKD 701** | 1200-2200 | 701 | 100 | 22500 | 0.70 | 0.28 | -40 ... +160 | 5 | - | |
| **SKKH 15** | 600-1600 | 13.5 | 85 | 280 | 1.10 | 20 | -40 ... +125 | 0 | - | |
| **SKKH 27** | 800-1800 | 25 | 85 | 480 | 0.90 | 12 | -40 ... +125 | 1 | - | |
| **SKKH 42** | 800-1800 | 40 | 85 | 850 | 1.00 | 4.5 | -40 ... +125 | 1 | - | |
| **SKKH 57** | 800-1800 | 50 | 85 | 1250 | 0.90 | 3.5 | -40 ... +125 | 1 | - | |
| **SKKH 57 H4** | 2000-2200 | 50 | 85 | 1250 | 0.90 | 3.5 | -40 ... +125 | 1 | - | |
| **SKKH 58/16 E** | 1600 | 55 | 85 | 1200 | 1.00 | 4.8 | -40 ... +130 | 1 | - | |
| **SKKH 72** | 800-1800 | 70 | 85 | 1450 | 0.90 | 3.5 | -40 ... +125 | 1 | - | |
| **SKKH 72 H4** | 2000-2200 | 70 | 85 | 1450 | 0.90 | 3.5 | -40 ... +125 | 1 | - | |
| **SKKH 92** | 800-1800 | 95 | 85 | 1750 | 0.90 | 2 | -40 ... +125 | 1 | - |  |
| **SKKH 106** | 800-1800 | 106 | 85 | 1900 | 0.90 | 2 | -40 ... +130 | 1 | - | |
| **SKKH 107/16 E** | 1600 | 119 | 85 | 1900 | 0.90 | 3.35 | -40 ... +130 | 1 | - | |
| **SKKH 122** | 800-1800 | 129 | 85 | 3200 | 0.85 | 2 | -40 ... +125 | 2 | HT | |
| **SKKH 132** | 800-1800 | 137 | 85 | 4000 | 1.00 | 1.6 | -40 ... +125 | 2 | HT | |
| **SKKH 132 H4** | 2000-2200 | 128 | 85 | 3800 | 1.10 | 2 | -40 ... +125 | 2 | HT | |
| **SKKH 162** | 800-1800 | 156 | 85 | 5000 | 0.85 | 1.5 | -40 ... +125 | 2 | HT | |
| **SKKH 162 H4** | 2000-2200 | 143 | 85 | 4800 | 0.95 | 2 | -40 ... +125 | 2 | HT | |
| **SKKH 172/16 E** | 1600 | 175 | 85 | 5000 | 0.83 | 1.3 | -40 ... +125 | 2 | HT | |

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# Thyristor / Diode Modules / SEMIPACK

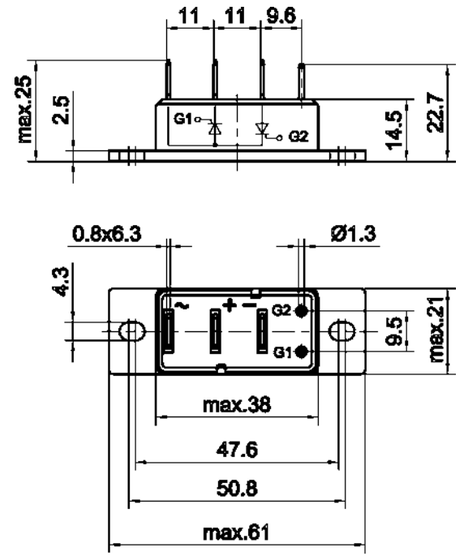
| Type | $V_{RRM}$ $V_{DRM}$ | $I_{TAV}$ $I_{FAV}$ @ $T_C$ | $T_C$ | $I_{TSM}$ $I_{FSM}$ @ $T_{jmax}$ | $V_{T(TO)}$ @ $T_{jmax}$ | $r_T$ @ $T_{jmax}$ | $T_j$ | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | mΩ | °C | | | |
| **SKKH 250** | 1200-1800 | 250 | 85 | 8000 | 0.93 | 0.45 | -40 ... +130 | 3 | - | |
| **SKKH 273** | 1200-1800 | 273 | 85 | 8000 | 0.90 | 0.92 | -40 ... +130 | 3 | - | |
| **SKKH 280 H4** | 2000-2200 | 252 | 85 | 7500 | 0.90 | 0.75 | -40 ... +125 | 3 | - | |
| **SKKH 323** | 1200-1800 | 320 | 85 | 8200 | 0.81 | 0.85 | -40 ... +130 | 3 | - | |
| **SKKH 330** | 800-1800 | 305 | 85 | 8000 | 0.80 | 0.6 | -40 ... +130 | 3 | - | |
| **SKKH 460** | 1600-2200 | 460 | 85 | 15500 | 0.88 | 0.45 | -40 ... +130 | 5 | - | |
| **SKKH 570** | 1600-1800 | 570 | 85 | 15500 | 0.78 | 0.32 | -40 ... +135 | 5 | - | |
| **SKKT 15** | 600-1600 | 13.5 | 85 | 280 | 1.10 | 20 | -40 ... +125 | 0 | - | |
| **SKKT 20** | 800-1600 | 18 | 85 | 280 | 1.00 | 16 | -40 ... +125 | 1 | - | |
| **SKKT 20B** | 800-1600 | 18 | 85 | 280 | 1.00 | 16 | -40 ... +125 | 1 | - | |
| **SKKT 27** | 800-1600 | 25 | 85 | 480 | 0.90 | 12 | -40 ... +125 | 1 | - | |
| **SKKT 27B** | 800-1600 | 25 | 85 | 480 | 0.90 | 12 | -40 ... +125 | 1 | - | |
| **SKKT 42** | 800-1800 | 40 | 85 | 850 | 1.00 | 4.5 | -40 ... +125 | 1 | - | |
| **SKKT 42B** | 800-1800 | 40 | 85 | 850 | 1.00 | 4.5 | -40 ... +125 | 1 | - | |
| **SKKT 57** | 800-1800 | 50 | 85 | 1250 | 0.90 | 3.5 | -40 ... +125 | 1 | - | |
| **SKKT 57B** | 800-1800 | 50 | 85 | 1250 | 0.90 | 3.5 | -40 ... +125 | 1 | - | |
| **SKKT 57 H4** | 2000-2200 | 50 | 85 | 1250 | 0.90 | 3.5 | -40 ... +125 | 1 | - | |
| **SKKT 58/16 E** | 1600 | 55 | 85 | 1200 | 1.00 | 4.8 | -40 ... +130 | 1 | - | |
| **SKKT 58B16 E** | 1600 | 55 | 85 | 1200 | 1.00 | 4.8 | -40 ... +130 | 1 | - | |
| **SKKT 72** | 800-1800 | 70 | 85 | 1450 | 0.90 | 3.5 | -40 ... +125 | 1 | - | |
| **SKKT 72B** | 800-1800 | 70 | 85 | 1450 | 0.90 | 3.5 | -40 ... +125 | 1 | - | |
| **SKKT 72 H4** | 2000-2200 | 70 | 85 | 1450 | 0.90 | 3.5 | -40 ... +125 | 1 | - | |
| **SKKT 92** | 800-1800 | 95 | 85 | 1750 | 0.90 | 2 | -40 ... +125 | 1 | - | |
| **SKKT 92B** | 800-1800 | 95 | 85 | 1750 | 0.90 | 2 | -40 ... +125 | 1 | - | |
| **SKKT 106** | 800-1800 | 106 | 85 | 1900 | 0.90 | 2 | -40 ... +130 | 1 | - | |
| **SKKT 106B** | 800-1800 | 106 | 85 | 1900 | 0.90 | 2 | -40 ... +130 | 1 | - | |
| **SKKT 107/16 E** | 1600 | 119 | 85 | 1900 | 0.90 | 3.35 | -40 ... +130 | 1 | - | |
| **SKKT 107B16 E** | 1600 | 119 | 85 | 1900 | 0.90 | 3.35 | -40 ... +130 | 1 | - | |
| **SKKT 122** | 800-1800 | 129 | 85 | 3200 | 0.85 | 2 | -40 ... +125 | 2 | HT | |
| **SKKT 132** | 800-1800 | 137 | 85 | 4000 | 1.00 | 1.6 | -40 ... +125 | 2 | HT | |
| **SKKT 132 H4** | 2000-2200 | 128 | 85 | 3800 | 1.10 | 2 | -40 ... +125 | 2 | HT | |
| **SKKT 162** | 800-1800 | 156 | 85 | 5000 | 0.85 | 1.5 | -40 ... +125 | 2 | HT | |
| **SKKT 162 H4** | 2000-2200 | 143 | 85 | 4800 | 0.95 | 2 | -40 ... +125 | 2 | HT | |
| **SKKT 172** | 1400-1800 | 175 | 85 | 5000 | 0.83 | 1.3 | -40 ... +125 | 2 | HT | |
| **SKKT 215/16 E** | 1600 | 215 | 85 | 5700 | 0.85 | 1.2 | -40 ... +125 | 2 | HT | |
| **SKKT 215/18 E** | 1800 | 215 | 85 | 5700 | 0.85 | 1.2 | -40 ... +125 | 2 | HT | |
| **SKKT 250** | 800-1800 | 250 | 85 | 8000 | 0.93 | 0.45 | -40 ... +130 | 3 | - | |
| **SKKT 273** | 1200-1800 | 273 | 85 | 8000 | 0.90 | 0.92 | -40 ... +130 | 3 | - | |
| **SKKT 280 H4** | 2000-2200 | 252 | 85 | 7500 | 0.90 | 0.75 | -40 ... +125 | 3 | - | |
| **SKKT 323** | 1200-1800 | 320 | 85 | 8200 | 0.81 | 0.85 | -40 ... +130 | 3 | - | |
| **SKKT 330** | 800-1800 | 305 | 85 | 8000 | 0.80 | 0.6 | -40 ... +130 | 3 | - | |
| **SKKT 460/16 E** | 1600 | 460 | 85 | 15500 | 0.88 | 0.45 | -40 ... +130 | 5 | - | |
| **SKKT 460/22 E H4** | 2200 | 460 | 85 | 15500 | 0.88 | 0.45 | -40 ... +130 | 5 | - | |
| **SKKT 570** | 1200-1800 | 570 | 85 | 15500 | 0.78 | 0.32 | -40 ... +135 | 5 | - | |



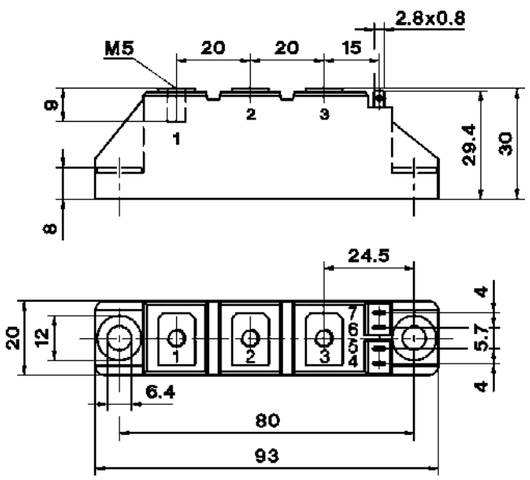
Thyristor / Diode Modules / SEMIPACK

## Packages

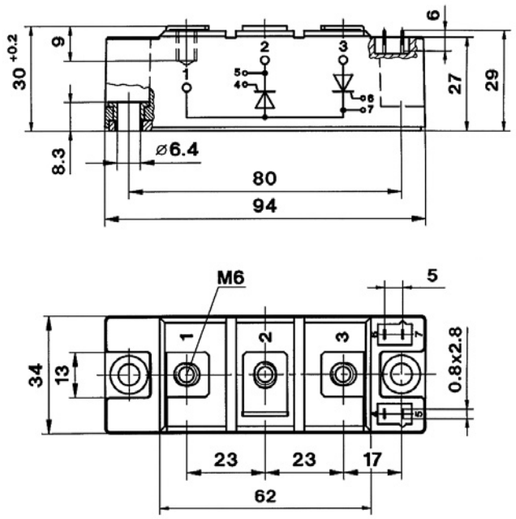
**SEMIPACK 0**



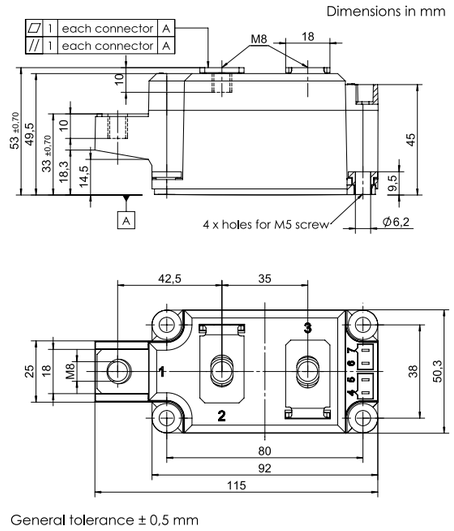

**SEMIPACK 1**




**SEMIPACK 2**




**SEMIPACK 3**



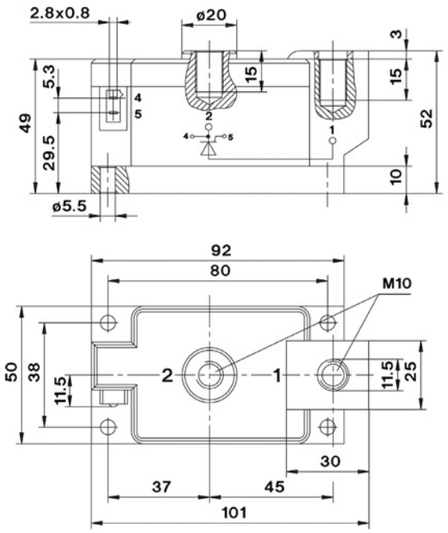

General tolerance ± 0,5 mm

Dimensions in mm

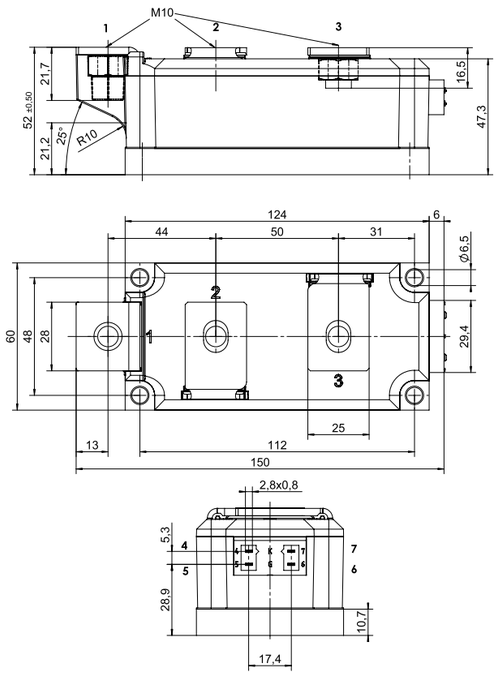
# Thyristor / Diode Modules / SEMIPACK

## Packages

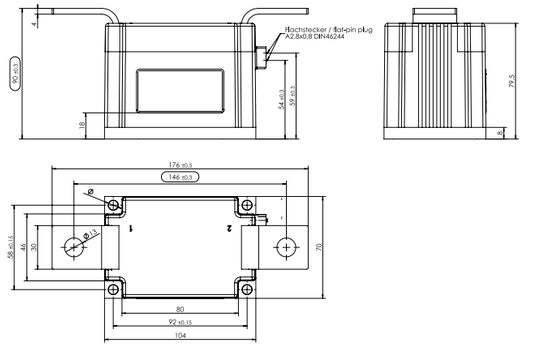
### SEMIPACK 4




### SEMIPACK 5




### SEMIPACK 6




Dimensions in mm

# Thyristor / Diode Modules / SEMIPACK FAST

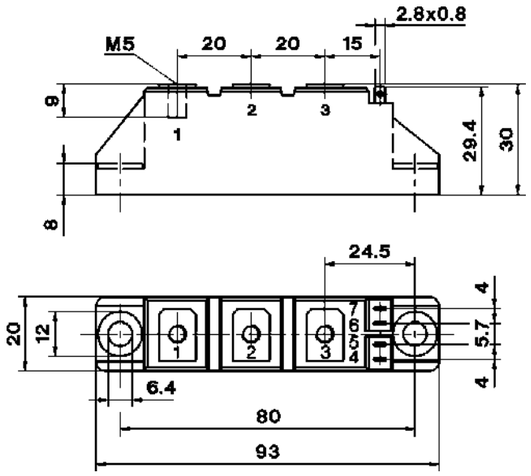
**Type**

| | $V_{RRM}$ $V_{DRM}$ | $I_{TAV}$ $I_{FAV}$ @ $T_C$ | $T_C$ | $I_{FSM}$ @ $T_{jmax}$ | $V_{T(TO)}$ @ $T_{jmax}$ | $r_T$ @ $T_{jmax}$ | $T_j$ | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | mΩ | °C | | | |
| **SKKE 120F17** | 1700 | 120 | 82 | 1800 | 1.5 | 4.5 | -40 ... +150 | 2 | - | |
| **SKKE 290F06** | 600 | 290 | 109 | 6000 | 0.9 | 1.2 | -40 ... +150 | 2 | - | |
| **SKKE 301F12** | 1200 | 300 | 43 | 3600 | 1.2 | 2.75 | -40 ... +150 | 2 | - | |
| **SKKE 310F12** | 1200 | 310 | 84 | 5500 | 1.2 | 1.9 | -40 ... +150 | 2 | - | |
| **SKKE 330F17**[5)] | 1700 | 330 | 70 | 5200 | 1.5 | 1.9 | -40 ... +150 | 4 | - | |
| **SKKE 600F12**[5)] | 1200 | 600 | 85 | 5800 | 1.2 | 1.9 | -40 ... +150 | 4 | - | |
| **SKKD 40F** | 600-1000 | 40 | 80 | 940 | 1.2 | 4 | -40 ... +125 | 1 | - | |
| **SKKD 42F** | 1200-1400 | 42 | 85 | 1100 | 1 | 5 | -40 ... +130 | 1 | - | |
| **SKKD 60F** | 1700 | 60 | 83 | 900 | 1.5 | 9 | -40 ... +150 | 2 | - | |
| **SKKD 75F12** | 1200 | 75 | 55 | 900 | 1.2 | 11 | -40 ... +150 | 2 | - | |
| **SKKD 105F16** | 1600 | 105 | 83 | 2100 | 1.2 | 2.5 | -40 ... +130 | 1 | - | |
| **SKKD 150F12** | 1200 | 150 | 54 | 1800 | 1.2 | 5.5 | -40 ... +150 | 2 | - | |
| **SKKD 170F** | 1200 | 170 | 85 | 2300 | 1.2 | 3.5 | -40 ... +150 | 2 | - | |
| **SKKD 205F06** | 600 | 205 | 87 | 3000 | 0.9 | 2 | -40 ... +150 | 2 | - | |
| **SKMD 150F12** | 1200 | 150 | 54 | 1800 | 1.2 | 5.5 | -40 ... +150 | 2 | - | |
| **SKND 150F12** | 1200 | 150 | 54 | 1800 | 1.2 | 5.5 | -40 ... +150 | 2 | - | |
| **SKND 205F06** | 600 | 205 | 87 | 3000 | 0.9 | 2 | -40 ... +150 | 2 | - | |

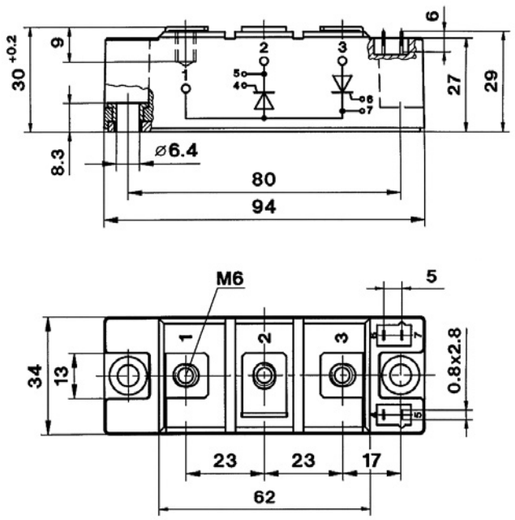
**Footnotes:** 5) SEMIPACK Fast in SEMITRANS 4 case

## Packages

### SEMIPACK 1




### SEMIPACK 2



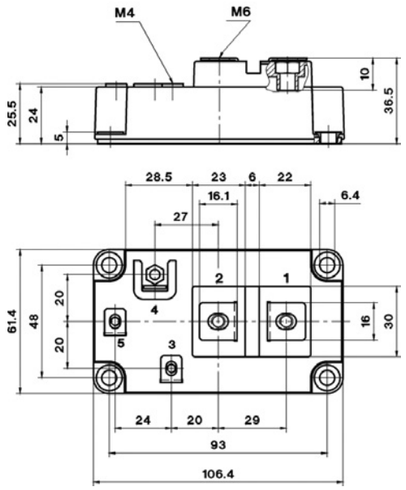

Dimensions in mm

UAB "Eibienos automatika"
+ 370 60 823 097
+ 370 64 021 081
info@abn-a.com

# Thyristor / Diode Modules / SEMIPACK FAST

## Packages

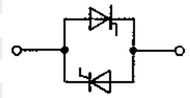
**SEMIPACK Fast in SEMITRANS 4**




Dimensions in mm

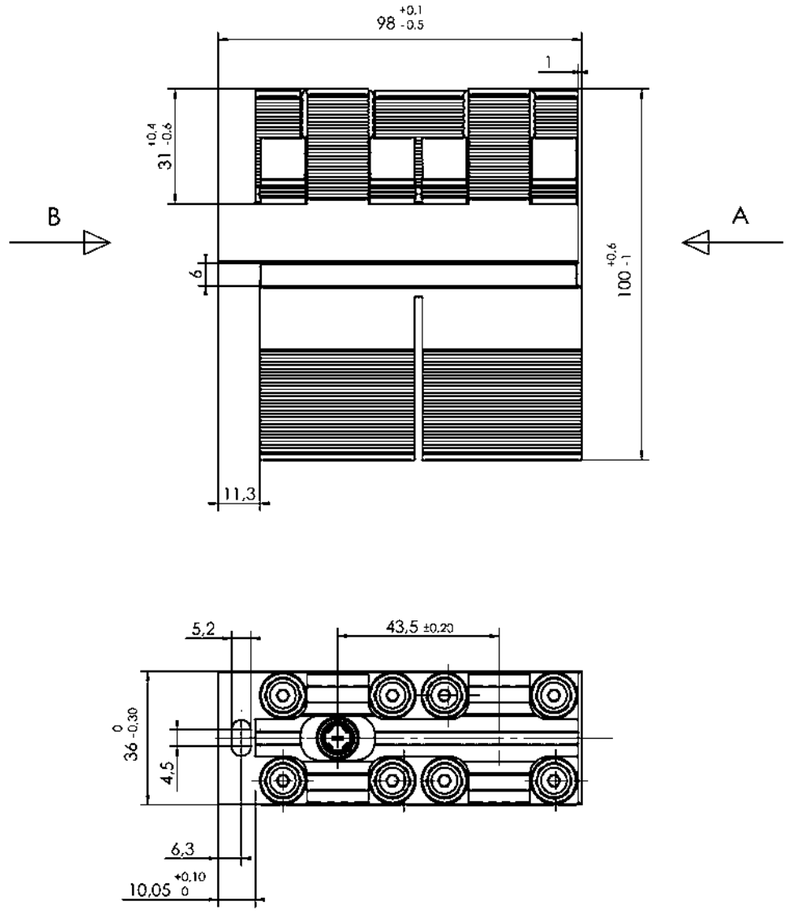
# Thyristor Modules / SEMiSTART

## Type

| Type | $V_{RRM}$ $V_{DRM}$ | $I_{overload}$ W1C (for 20s) | $T_C$ | $I_{TSM}$ @ $T_j$ = 125°C | $V_{T(TO)}$ @ $T_{jmax}$ =125°C | $r_T$ @ $T_{jmax}$ =125°C | $T_{jmax}$ (for 20s) | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | mΩ | °C | | | |
| **SKKQ 560** | 1400-1800 | 560 | 150 | 5200 | 0.9 | 0.9 | 150 | 1 | - |  |
| **SKKQ 800** | 1400-1800 | 800 | 150 | 5200 | 0.9 | 0.8 | 150 | 2 | - | |
| **SKKQ 1200** | 1400-1800 | 1225 | 150 | 8000 | 0.9 | 0.5 | 150 | 2 | - | |
| **SKKQ 1500** | 1400-1800 | 1500 | 150 | 15000 | 0.85 | 0.3 | 150 | 2 | - | |
| **SKKQ 3000** | 1400-1800 | 3080 | 150 | 25500 | 0.95 | 0.18 | 150 | 3 | - | |

## Packages

**SEMiSTART 1**

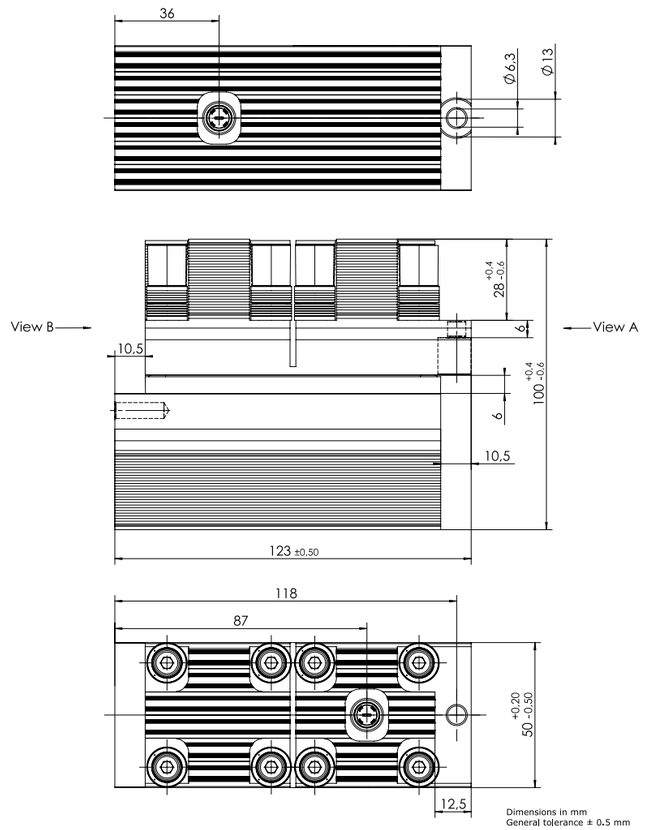



Dimensions in mm

# Thyristor Modules / SEMiSTART

## Packages

**SEMiSTART 2**



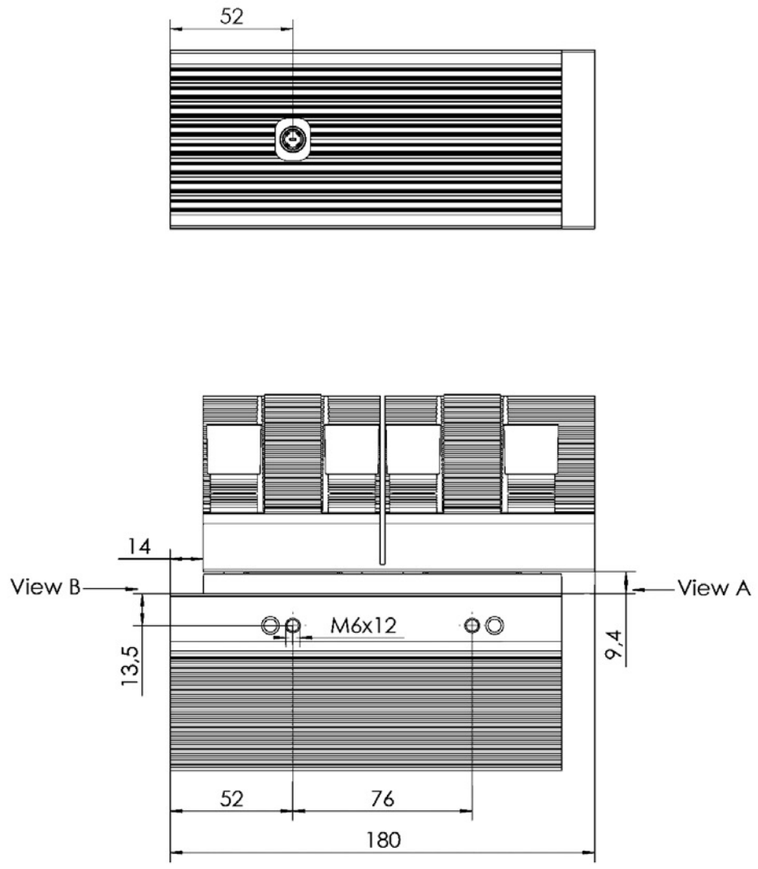

Dimensions in mm

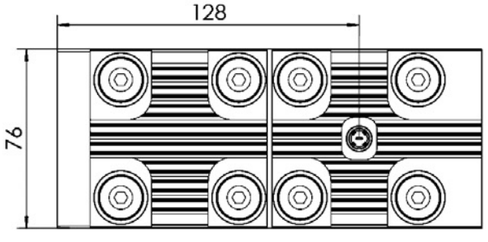


Thyristor Modules / SEMiSTART

## Packages

**SEMiSTART 3**




Dimensions in mm

UAB "Eibienos automatika"
+ 370 60 823 097
+ 370 64 021 081
info@abn-a.com

# Bridge Rectifier Modules
# For Reliable Inverter Designs

Bridge rectifiers include every branch of a rectifier topology in a single, compact case. Bridge rectifiers exist from a few amps to several hundred amps in different package types.

SEMIKRON offers bridge rectifier modules in single phase or 3-phase topology with or without brake chopper. The bridge rectifier modules are available in different packages such as SEMiX, SEMITOP, SEMIPONT, Power Bridge and MiniSKiiP.


| | |
|---|---|
| MiniSKiiP | 122 |
| SEMITOP | 124 |
| SEMIPONT | 128 |
| SEMiX | 132 |
| Power Bridge | 134 |

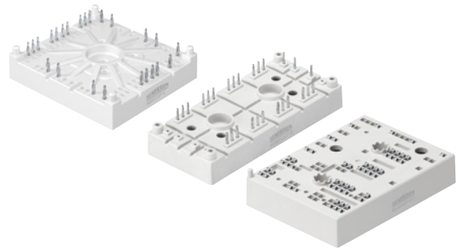

For detailed information please refer to data sheets.

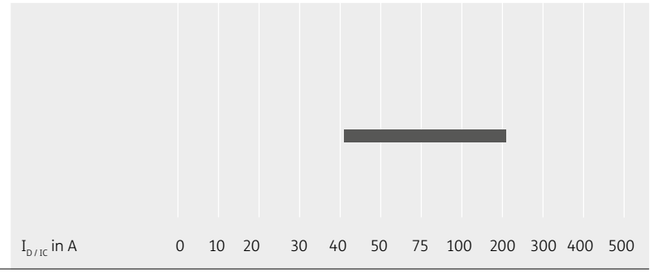
**Further information:** www.semikron.com/bridge-rectifier-modules

## SEMITOP®/SEMIPONT®/MiniSKiiP®

**Rectifier with Brake Chopper**

**600V up to 1800V**

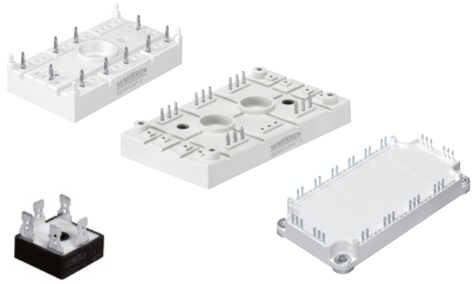


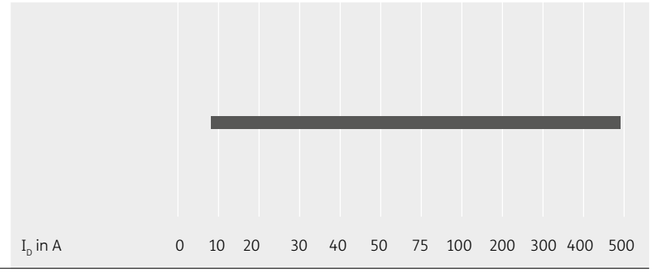



## SEMITOP®/SEMIPONT®/SEMiX®/ Power Bridge

**Three Phase Rectifier**

**200V up to 2200V**

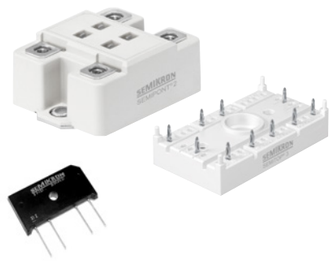


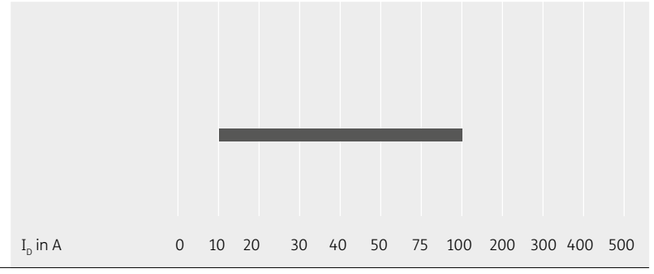



## SEMIPONT®/SEMITOP®/ Power Bridge

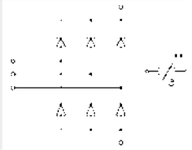
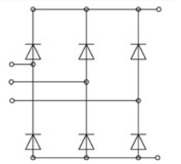
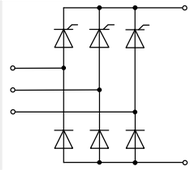
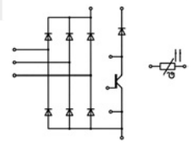
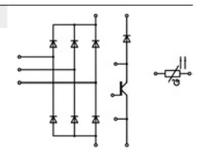
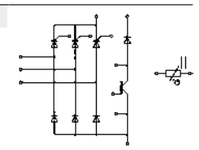
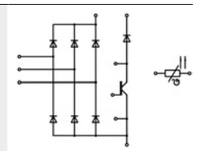
**Single Phase Rectifier**

**100V up to 2200V**





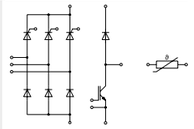
# Bridge Rectifier Modules / MiniSKiiP

| Type | $V_{RRM}$ $V_{DRM}$ V | $I_F$@$T_S$ A | $T_S$ °C | $I_{FSM}$/$I_{TSM}$@$T_S$=25°C A | $V_{T(TO)}$ V | $r_T$@$T_{jmax}$ mΩ | $T_j$ °C | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| **3-phase Rectifier** | | | | | | | | | | |
| **SKiiP 28AN16V2** [2] | 1200 | 86 | 70 | 890 | 0.83 | 6 | -40 ... +150 | II 2 | P12, HPTP |  |
| **SKiiP 39AN16V1** [1] | 1600 | 179 | 70 | 3200 | 0.83 | 2.5 | -40 ... +150 | II 3 | P12, HPTP |  |
| **SKiiP 39AH16V1** [1] | 1600 | 112 | 70 | 2900 | 0.85 | 2.4 | -40 ... +130 | II 3 | P12, HPTP |  |
| **3-phase Rectifier + Chopper** | | | | | | | | | | |
| **SKiiP 28ANB16V1** | 1600 | 83 | 70 | 1000 | 0.8 | 7 | -40 ... +150 | II 2 | P12, HPTP |  |
| **SKiiP 28ANB16V2** | 1600 | 83 | 70 | 1000 | 0.8 | 7 | -40 ... +150 | II 2 | P12, HPTP | |
| **SKiiP 28ANB16V10** | 1600 | 83 | 70 | 1000 | 0.8 | 7 | -40 ... +150 | II 2 | P12, HPTP |  |
| **SKiiP 28ANB18V3** [2] | 1800 | 98 | 70 | 1000 | 0.965 | 3.4 | -40 ... +150 | II 2 | P12, HPTP | |
| **SKiiP 28AHB16V1** | 1600 | 82 | 70 | 1000 | 0.85 | 7 | -40 ... +125 | II 2 | P12, HPTP |  |
| **SKiiP 39AHB16V1** | 1600 | 121 | 70 | 1250 | 0.85 | 4 | -40 ... +125 | II 3 | P12, HPTP | |
| **SKiiP 39ANB16V1** | 1600 | 124 | 70 | 1600 | 0.8 | 4 | -40 ... +150 | II 3 | P12, HPTP |  |

**Footnotes:** 1) Sample status / 2) In production new



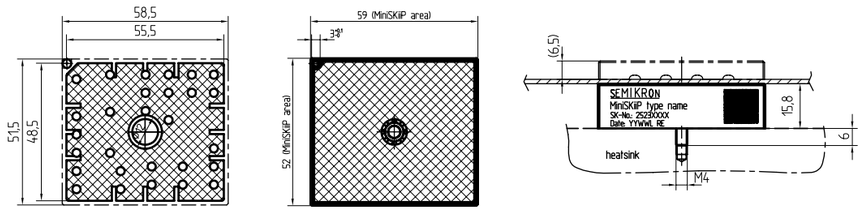
# Bridge Rectifier Modules / MiniSKiiP

| Type | $V_{RRM}$ $V_{DRM}$ V | $I_F$@$T_S$ A | $T_S$ °C | $I_{FSM}$/$I_{TSM}$@$T_S$=25°C A | $V_{T(TO)}$ V | $r_T$@$T_{jmax}$ mΩ | $T_j$ °C | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| **3-phase Rectifier + Chopper** | | | | | | | | | | |
| **SKiiP 39AHB16V3** [1] | 1600 | 126 | 70 | 1250 | 0.85 | 2.8 | -40 ... +130 | II 3 | P12, HPTP |  |

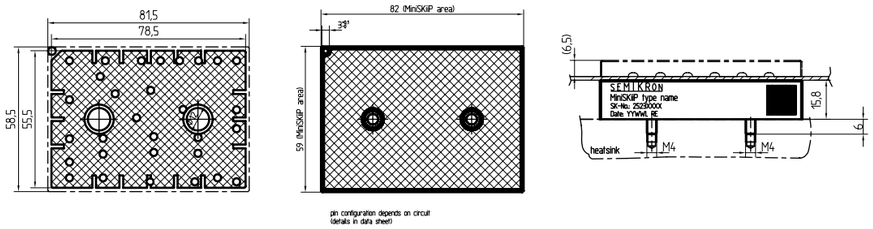
**Footnotes:** 1) Sample status / 2) In production new

## Packages

**MiniSKiiP II 2**



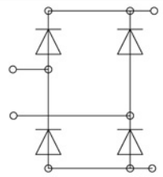
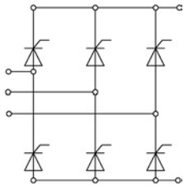
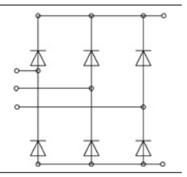
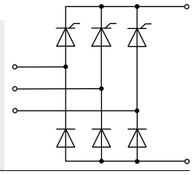
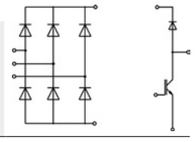
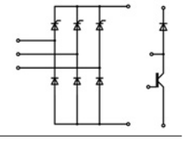
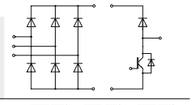
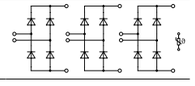

**MiniSKiiP II 3**




Dimensions in mm

UAB "Eibienos automatika"
+ 370 60 823 097
+ 370 64 021 081
info@abn-a.com

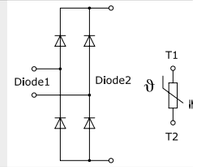
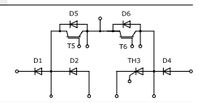
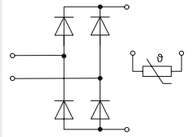
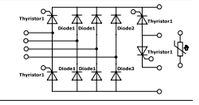
# Bridge Rectifier Modules / SEMITOP

| Type | $V_{RRM}$ $V_{DRM}$ V | $I_D$ @ $T_S$ A | $T_S$ °C | $I_{TSM}$ $I_{FSM}$@$T_{jmax}$ A | $V_{T(TO)}$@$T_{jmax}$ V | $r_T$@$T_{jmax}$ mΩ | $T_j$ °C | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| **1 and 3 phase** | | | | | | | | | | |
| **SK 50 B 06 UF** | 600 | 46 | 80 | 400 | 0.80 | 11.00 | -40 ... +150 | 2 | P12 |  |
| **SK 50 B** | 800-1600 | 51 | 80 | 270 | 0.8 | 13.00 | -40 ... +150 | 2 | P12 | |
| **SK 55 B 06 F** | 600 | 54 | 80 | 440 | 0.9 | 16.00 | -40 ... +150 | 2 | P12 | |
| **SK 55 B 12 F** | 1200 | 57 | 80 | 550 | 1.20 | 22.00 | -40 ... +150 | 2 | P12 | |
| **SK 70 B** | 800-1600 | 68 | 80 | 560 | 0.8 | 11.00 | -40 ... +150 | 2 | P12 | |
| **SK 100 B** | 800-1600 | 100 | 80 | 890 | 0.83 | 3.90 | -40 ... +150 | 2 | P12 | |
| **SK 40 DT** | 800-1600 | 42 | 80 | 280 | 1.1 | 20.00 | -40 ... +125 | 3 | P12, HPTP |  |
| **SK 70 DT** | 800-1600 | 68 | 80 | 380 | 1 | 10.00 | -40 ... +125 | 3 | P12, HPTP | |
| **SK 55 D** | 800-1600 | 55 | 80 | 200 | 0.8 | 13.00 | -40 ... +150 | 2 | P12 |  |
| **SK 70 D** | 800-1600 | 70 | 80 | 270 | 0.8 | 13.00 | -40 ... +150 | 2 | P12 | |
| **SK 80 D 12F** [4] | 1200 | 80 | 80 | 550 | 1.2 | 22.00 | -40 ... +150 | 3 | P12, HPTP | |
| **SK 95 D** | 800-1600 | 95 | 80 | 560 | 0.8 | 11.00 | -40 ... +150 | 2 | P12 | |
| **SK 95 D 16p** [2] | 1600 | 95 | 80 | 560 | 0.8 | 11.00 | -40 ... +150 | 2p | P12 | |
| **SK 40 DH** | 800-1600 | 42 | 80 | 270 | 1.1 | 20.00 | -40 ... +150 | 3 | P12, HPTP |  |
| **SK 70 DH** | 800-1600 | 68 | 80 | 270 | 1 | 10.00 | -40 ... +125 | 3 | P12, HPTP | |
| **SK 55 DGL 126** | 1200 | 55 | 80 | 370 | 0.80 | 13.00 | -40 ... +150 | 3 | P12, HPTP |  |
| **SK 95 DGL 126** | 1600 | 96 | 80 | 700 | 0.8 | 11.00 | -40 ... +150 | 3 | P12, HPTP | |
| **SK 170 DHL 126** [1] | 1200 | 170 | 70 | 1000 | 0.8 | 7.00 | -40 ... +150 | 4 | P12, HPTP |  |
| **SK 200 DHL 066** [1] | 600 | 210 | 70 | 1250 | 0.8 | 4.00 | -40 ... +150 | 4 | P12, HPTP | |
| **SK 40 BHL 066T** [2] | 1600 | 42 | 42 | 280 | 0.85 | 20.00 | -40 ... +130 | 3 | P12, HPTP |  |
| **SK150DGL12T4** [1] | 1200 | 49 | - | - | 0.83 | - | -40 ... +150 | 3 | P12, HPTP | |
| **SK40BBB07TD1E2** [1] | 650 | 42 | 42 | - | 1.1 | 20.00 | -40 ... +125 | E2 | HPTP, HT |  |

**Footnotes:** 1) Sample status / 2) In production new / 4) Discontinued



# Bridge Rectifier Modules / SEMITOP

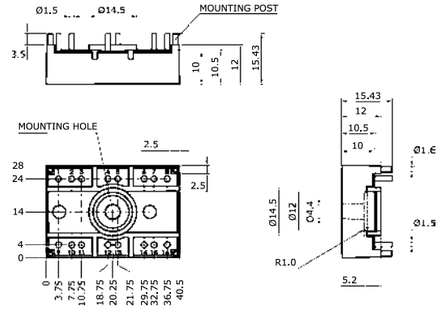
| Type | $V_{RRM}$ $V_{DRM}$ V | $I_D$ @ $T_S$ A | $T_S$ °C | $I_{TSM}$ $I_{FSM}$@$T_{jmax}$ A | $V_{T(TO)}$@$T_{jmax}$ V | $r_T$@$T_{jmax}$ mΩ | $T_j$ °C | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| **1 and 3 phase** | | | | | | | | | | |
| **SK60B12TUFE1** [1] | 650 | 51 | - | - | - | - | -40 ... +175 | E1 | - |   |
| **SK225BV07S5D1E2** [1] | 800 | 135 | - | 1250 | 0.83 | 3.09 | -40 ... +130 | E2 | HPTP, HT |   |
| **SK70B07TD1E1** [1] | 650 | 68 | 68 | 560 | 0.8 | 11.00 | -40 ... +150 | E1 | - |  |
| **SK90DZNT16TE2** | 1600 | 56 | - | 1000 | 0.83 | 4.38 | -40 ... +130 | E2 | HPTP, HT |   |

**Footnotes:** 1) Sample status / 2) In production new / 4) Discontinued

## Packages

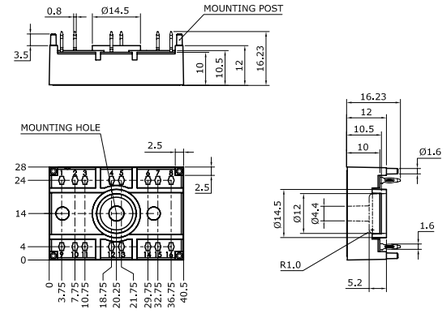
### SEMITOP 2

Dimensions: mm
Tolerance system: ISO 2768-m




### SEMITOP 2 Press-Fit

Dimensions: mm
Tolerance system: ISO 2768-m



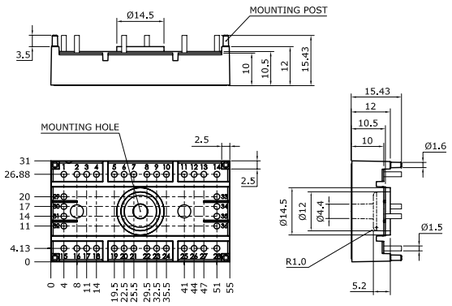

Dimensions in mm

# Bridge Rectifier Modules / SEMITOP

## Packages

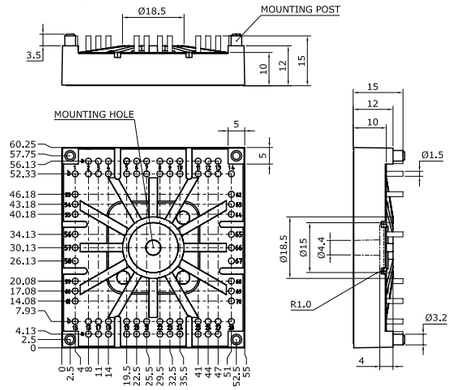
### SEMITOP 3

Dimensions: mm
Tolerance system: ISO 2768-m




### SEMITOP 4

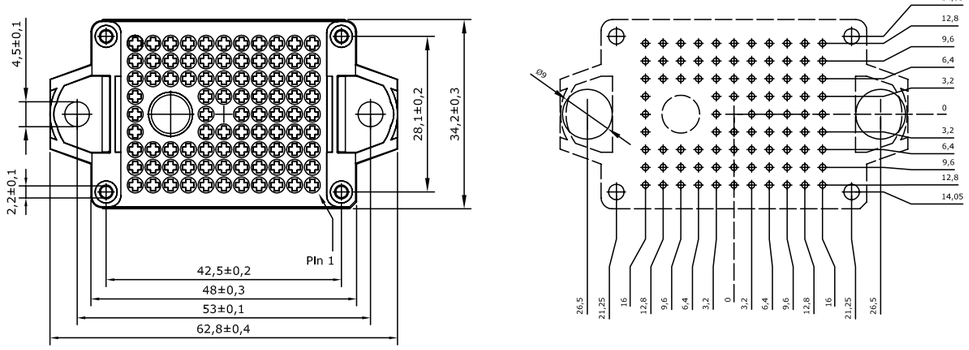
Dimensions: mm
Tolerance system: ISO 2768-m




Dimensions in mm

## Packages

### SEMITOP E1



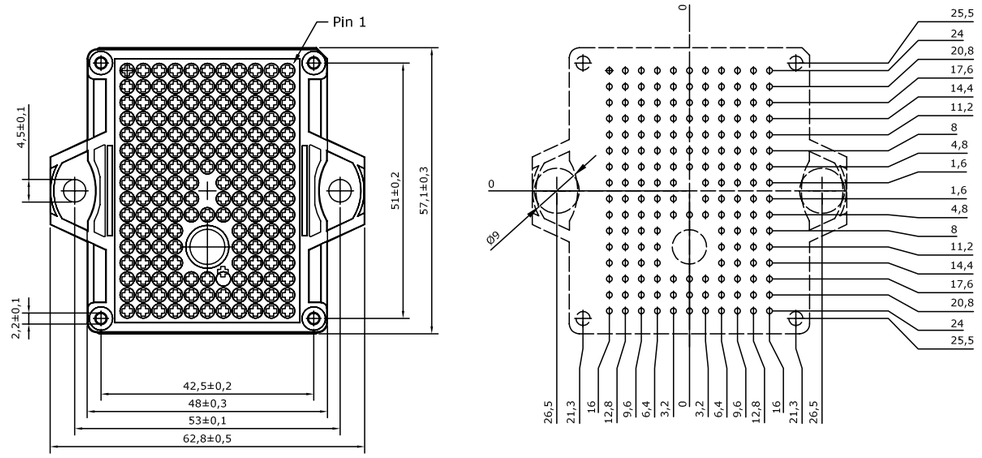

Dimensions in mm



# Bridge Rectifier Modules / SEMITOP

## Packages

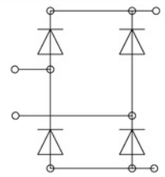
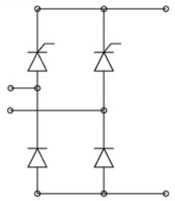
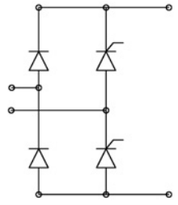
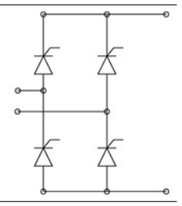
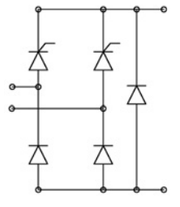
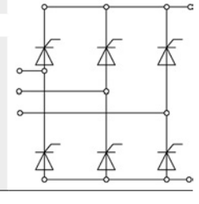
### SEMITOP E2




Dimensions in mm

UAB "Eibienos automatika"
+ 370 60 823 097
+ 370 64 021 081
info@abn-a.com

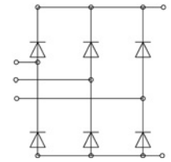
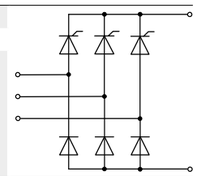
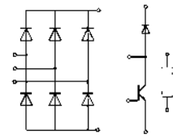
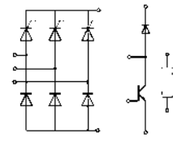
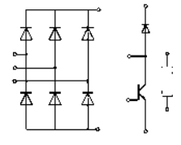
# Bridge Rectifier Modules / SEMIPONT

| Type | $V_{RRM}$ $V_{DRM}$ V | $I_D$ @ $T_C$ A | $T_C$ °C | $I_{TSM}$ $I_{FSM}$@$T_{jmax}$ A | $V_{T(TO)}$@$T_{jmax}$ V | $r_T$@$T_{jmax}$ mΩ | $T_j$ °C | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| **1 and 3 phase** | | | | | | | | | | |
| **SKB 28** | 200-1600 | 28 | 87 | 320 | 0.85 | 12.0 | -40 ... +125 | 1 | - |  |
| **SKB 52** | 400-1800 | 50 | 99 | 425 | 0.85 | 8.0 | -40 ... +150 | 3 | - | |
| **SKB 60** | 400-1600 | 60 | 88 | 850 | 0.85 | 5.0 | -40 ... +125 | 2 | - | |
| **SKB 72** | 400-1800 | 70 | 101 | 640 | 0.85 | 5.0 | -40 ... +150 | 3 | - | |
| **SKBH 28** | 600-1400 | 28 | 89 | 280 | 1 | 16.0 | -40 ... +125 | 1 | - |  |
| **SKBZ 28** | 400-1400 | 28 | 89 | 280 | 1 | 16.0 | -40 ... +125 | 1 | - |  |
| **SKBT 28** | 600-1400 | 28 | 89 | 280 | 1 | 16.0 | -40 ... +125 | 1 | - |  |
| **SKBT 40** | 800-1400 | 40 | 92 | 400 | 1 | 16.0 | -40 ... +125 | 2 | - | |
| **SKCH 28** | 400-1400 | 28 | 89 | 280 | 1 | 16.0 | -40 ... +125 | 1 | - |  |
| **SKCH 40** | 400-1600 | 40 | 92 | 400 | 1 | 16.0 | -40 ... +125 | 2 | - | |
| **SKDT 60** | 400-1400 | 60 | 86 | 400 | 1 | 16.0 | -40 ... +125 | 2 | - |  |
| **SKDT 115** [3] | 1200-1600 | 110 | 80 | 950 | 1.1 | 6.0 | -40 ... +125 | 5 | - | |
| **SKDT 145** | 1200-1600 | 145 | 80 | 1250 | 0.9 | 5.0 | -40 ... +125 | 5 | - | |

**Footnotes:** 2) In production new / 3) Not for new designs



Bridge Rectifier Modules / SEMIPONT

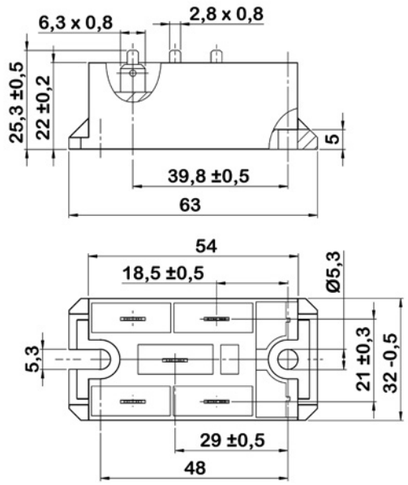
| Type | $V_{RRM}$ $V_{DRM}$ V | $I_D$ @ $T_C$ A | $T_C$ °C | $I_{TSM}$ $I_{FSM}$@$T_{jmax}$ A | $V_{T(TO)}$@$T_{jmax}$ V | $r_T$@$T_{jmax}$ mΩ | $T_j$ °C | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| **1 and 3 phase** | | | | | | | | | | |
| **SKD 31** | 200-1600 | 31 | 100 | 320 | 0.85 | 12.0 | -40 ... +125 | 1 | - |  |
| **SKD 60** | 400-1600 | 60 | 102 | 850 | 0.85 | 5.0 | -40 ... +125 | 2 | - | |
| **SKD 62** | 400-1800 | 60 | 110 | 425 | 0.85 | 8.0 | -40 ... +150 | 3 | - | |
| **SKD 82** | 400-1800 | 80 | 110 | 640 | 0.85 | 5.0 | -40 ... +150 | 3 | - | |
| **SKD 100** | 400-1600 | 100 | 93 | 1000 | 0.85 | 5.0 | -40 ... +125 | 2 | - | |
| **SKD 110** | 800-1800 | 110 | 100 | 1000 | 0.85 | 4.0 | -40 ... +150 | 4 | - | |
| **SKD 115** | 1200-1800 | 110 | 85 | 1150 | 0.8 | 7.0 | -40 ... +150 | 5 | - | |
| **SKD 145** | 1200-1800 | 145 | 85 | 1700 | 0.8 | 4.0 | -40 ... +150 | 5 | - | |
| **SKD 160** | 800-1800 | 205 | 85 | 1500 | 0.85 | 3.0 | -40 ... +150 | 4 | - | |
| **SKD 210** | 900-1800 | 207 | 99 | 1600 | 0.85 | 3.0 | -40 ... +150 | 4 | - | |
| **SKDH 100** | 800-1400 | 100 | 84 | 850 | 1 | 4.5 | -40 ... +125 | 2 | - |  |
| **SKDH 115** | 1200-1600 | 110 | 80 | 950 | 1.1 | 6.0 | -40 ... +125 | 5 | - | |
| **SKDH 145** | 1200-1600 | 145 | 80 | 1250 | 0.9 | 5.0 | -40 ... +125 | 5 | - | |
| **3 phase with brake chopper** | | | | | | | | | | |
| **SKD 116/..-L105** [2] | 1200-1600 | 110 | 85 | 1050 | 0.8 | 7.0 | -40 ... +125 | 6 | - |  |
| **SKD 116/..-L140** [2] | 1200-1600 | 110 | 85 | 1050 | 0.8 | 7.0 | -40 ... +125 | 6 | - | |
| **SKD 146/..-L105** [2] | 1200-1600 | 140 | 85 | 1250 | 0.8 | 4.0 | -40 ... +125 | 6 | - | |
| **SKD 146/..-L140T4** [2] | 1200-1600 | 140 | 85 | 1250 | 0.8 | 4.0 | -40 ... +125 | 6 | - | |
| **SKDH 116/..L105** [2] | 1200-1600 | 110 | 85 | 1000 | 0.8 | 7.0 | -40 ... +125 | 6 | - |  |
| **SKDH 116/..L140** [2] | 1200-1600 | 110 | 85 | 1000 | 0.8 | 7.0 | -40 ... +125 | 6 | - | |
| **SKDH 146/..-L105** [2] | 1200-1600 | 140 | 85 | 1250 | 0.8 | 4.0 | -40 ... +125 | 6 | - | |
| **SKDH 146/..-L140** [2] | 1200-1600 | 140 | 85 | 1250 | 0.8 | 4.0 | -40 ... +125 | 6 | - | |
| **SKD 146/16-L140** | 1600 | 140 | - | 1250 | 0.83 | - | -40 ... +150 | 6 | - |  |
| **SKD 146/12-L140** [2] | 1200 | 140 | - | 1250 | 0.83 | - | -40 ... +150 | 6 | - | |

**Footnotes:** 2) In production new / 3) Not for new designs

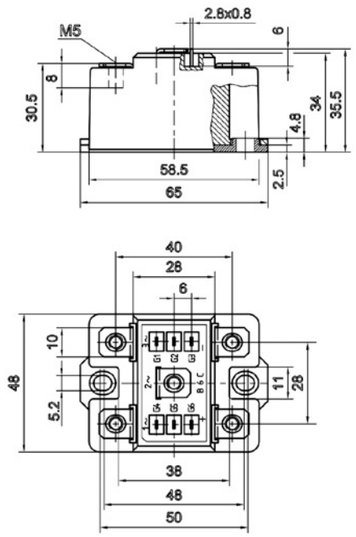
# Bridge Rectifier Modules / SEMIPONT

**Packages**

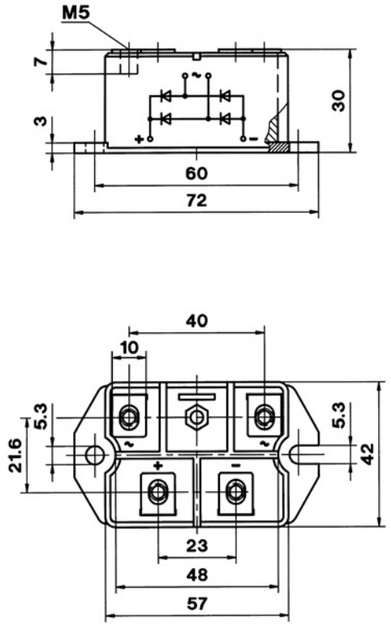
**SEMIPONT 1**



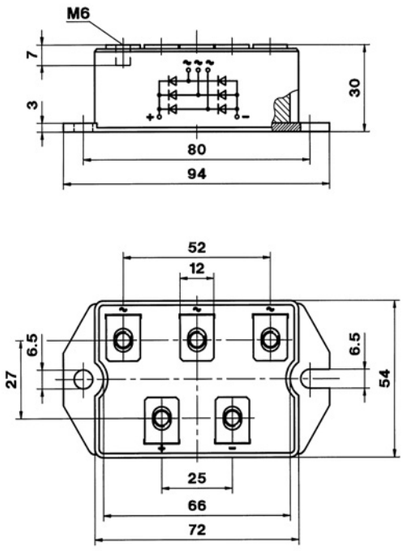

**SEMIPONT 2**




**SEMIPONT 3**



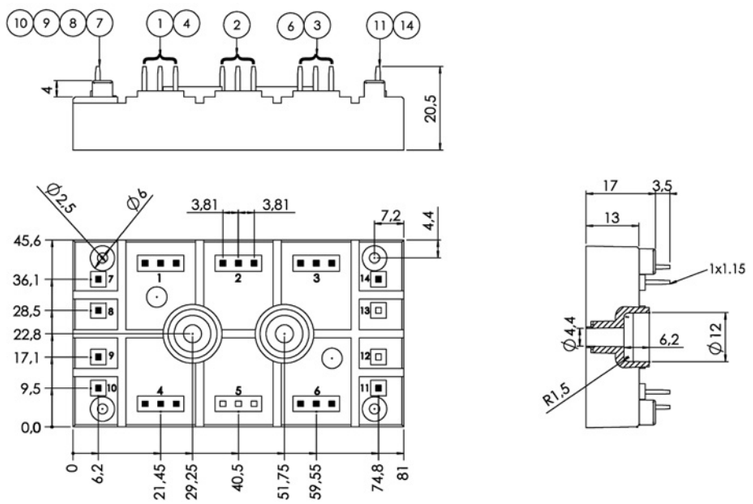

**SEMIPONT 4**



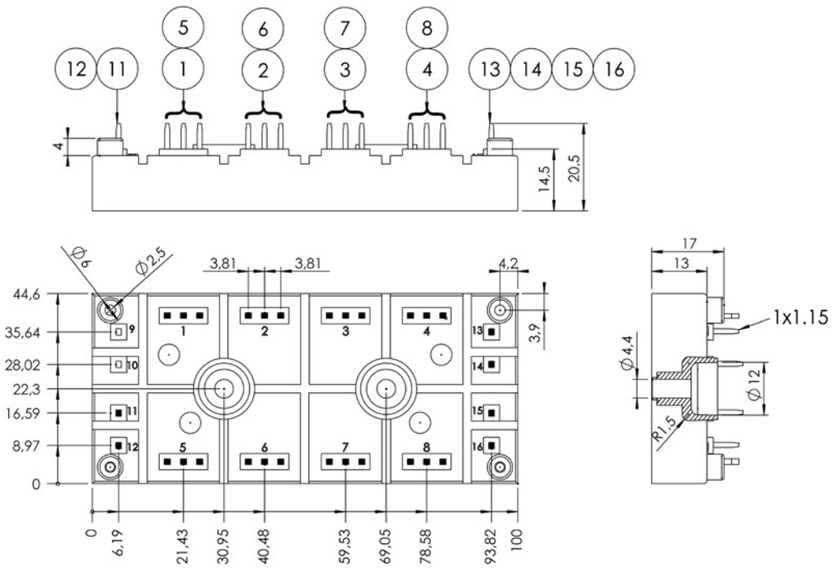

Dimensions in mm

**Packages**

**SEMIPONT 5**



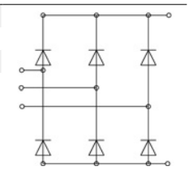
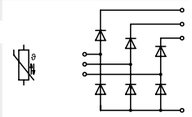
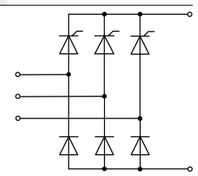
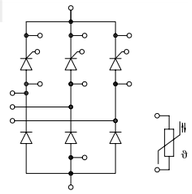

**SEMIPONT 6**




Dimensions in mm

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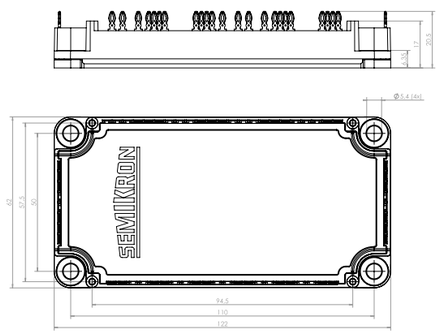
# Bridge Rectifier Modules / SEMiX

| Type | $V_{RRM}$ $V_{DRM}$ V | $I_D$ @ $T_C$ A | $T_C$ °C | $I_{TSM}$ $I_{FSM}$@$T_{jmax}$ A | $V_{T(TO)}$@$T_{jmax}$ V | $r_T$@$T_{jmax}$ mΩ | $T_j$ °C | Package | Thermal Interface Material | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| **3 phase** | | | | | | | | | | |
| **SEMiX251D12Fs** [3] | 1200 | 256 | 85 | 1330 | 1.20 | 7 | -40 ... +150 | 13 | P8 |  |
| **SEMiX291D16s** | 1600 | 232 | 85 | 1380 | 0.83 | 4.6 | -40 ... +150 | 13 | P8 | |
| **SEMiX341D16s** | 1600 | 348 | 85 | 2000 | 0.9 | 2.7 | -40 ... +130 | 13 | P8 | |
| **SEMiX501D17Fs** | 1700 | 494 | 85 | 2140 | 1.10 | 2.7 | -40 ... +150 | 13 | P8 | |
| **SEMiX586D16p** [1] | 1600 | 700 | 85 | 4200 | 0.916 | 1.4 | -40 ... +175 | 6p | HT |  |
| **SEMiX636D16p** [1] | 1600 | 700 | 85 | 5500 | 0.916 | 1.3 | -40 ... +175 | 6p | HT | |
| **SEMiX526D22p** [1] | 2200 | 650 | 85 | 5300 | 0.834 | 1.4 | -40 ... +150 | 6p | HT | |
| **SEMiX241DH16s** | 1600 | 298 | 100 | 1800 | 0.85 | 3.4 | -40 ... +130 | 13 | P8 |  |
| **SEMiX245DH16** [2] | 1600 | 336 | 96 | 1800 | 0.91 | 3.0 | -40 ... +130 | 5p | P8, HT |  |
| **SEMiX365DH16** [2] | 1600 | 484 | 96 | 2750 | 0.85 | 2.5 | -40 ... +130 | 5p | P8, HT | |

**Footnotes:** 1) Sample status / 2) In production new / 3) Not for new designs

## Packages

**SEMiX 6p**



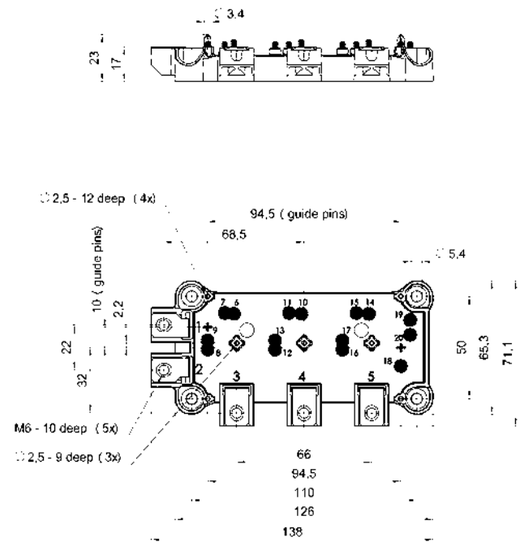

Dimensions in mm



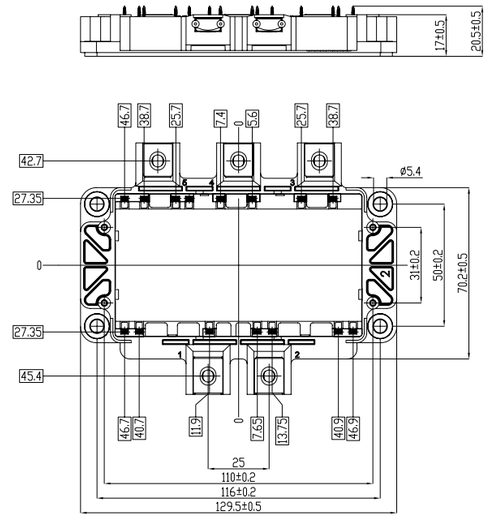
Bridge Rectifier Modules / SEMiX

## Packages

**SEMiX 13**




**SEMiX 5p**



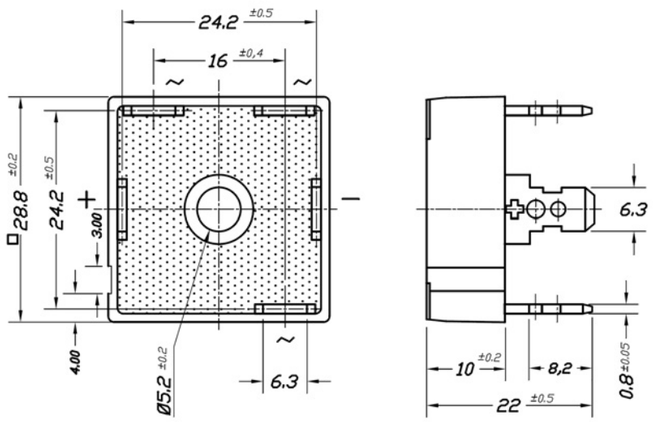

Dimensions in mm

# Bridge Rectifier Modules / Power Bridge

| Type | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $V_{RRM}$ $V_{DRM}$ | $I_D$ @ $T_C$ | $T_C$ | $I_{FSM}$@$T_{jmax}$ | $V_{T(TO)}$@$T_{jmax}$ | $r_T$@$T_{jmax}$ | $T_j$ | Package | Thermal Interface Material | Topology |
| | V | A | °C | A | V | mΩ | °C | | | |
| **1 phase** | | | | | | | | | | |
| **SKB 25** | 100-1600 | 17 | 75 | 320 | 0.85 | 12.00 | -40 ... +150 | G 10b | - | |
| **SKB 26** | 200-2000 | 18 | 75 | 320 | 0.85 | 12.00 | -40 ... +150 | G 50a | - | |
| **SKB 30** | 200-1600 | 30 | 94 | 320 | 0.85 | 12.00 | -40 ... +150 | G 12, G 13 | - | |
| **SKB 35** | 400-1600 | 35 | 29 | 330 | 0.85 | 7.00 | -40 ... +150 | G 10b | - | |
| **3 phase** | | | | | | | | | | |
| **SKD 25** | 200-1600 | 20 | 73 | 320 | 0.85 | 12.00 | -40 ... +150 | G 11b | - | |
| **SKD 26** | 400-1600 | 20 | 73 | 320 | 0.85 | 12.00 | -40 ... +150 | G 50b | - | |
| **SKD 30** | 200-1600 | 30 | 98 | 320 | 0.85 | 12.00 | -40 ... +150 | G 12, G 13 | - | |
| **SKD 33** | 400-1800 | 33 | 110 | 240 | 0.8 | 18.00 | -40 ... +150 | G55 | - | |
| **SKD 35** | 400-1600 | 36 | 70 | 320 | 0.85 | 7.00 | -40 ... +150 | G 11b | - | |
| **SKD 35 AV** | 1200-1600 | 39 | 70 | 345 | 0.9 | 6.00 | -40 ... +150 | G 11b | - | |
| **SKD 51** | 400-1800 | 50 | 127 | 700 | 0.8 | 8.50 | -40 ... +150 | G51 | - | |
| **SKD 53** | 400-1800 | 53 | 100 | 270 | 0.8 | 13.00 | -40 ... +150 | G55 | - | |
| **SKD 83** | 400-1800 | 83 | 95 | 560 | 0.8 | 7.50 | -40 ... +150 | G55 | - | |
| **DBI 6 P** | 400-2200 | 9 | 113 | 165 | 0.8 | 24.00 | -40 ... +150 | DBI P | - | |
| **DBI 25 P** | 400-2200 | 27 | 32 | 310 | 0.85 | 9.00 | -40 ... +150 | DBI P | - | |

## Packages

**G 10b, G 11b**

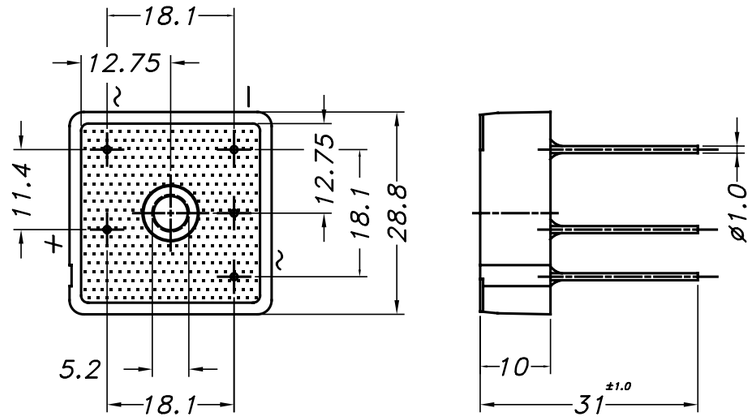



Dimensions in mm

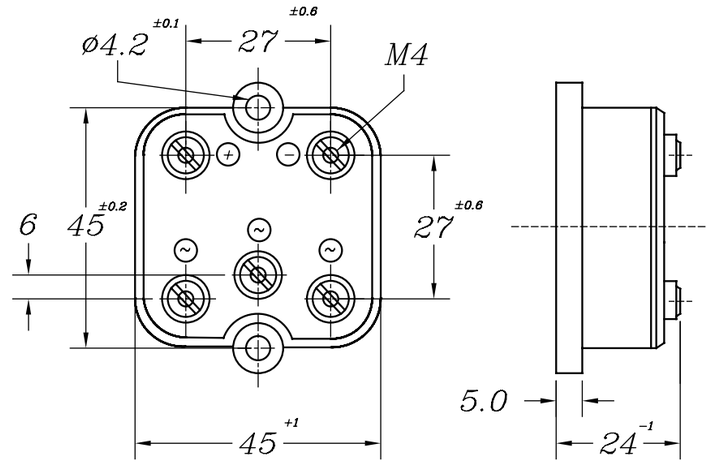
# Bridge Rectifier Modules / Power Bridge

## Packages

**G 50a, G 50b**




**G 12, G 13**



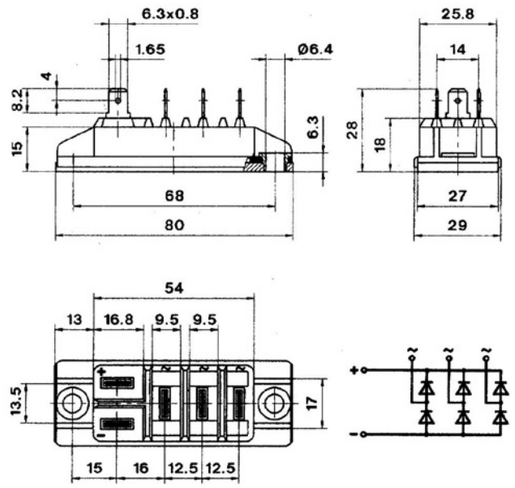

Dimensions in mm

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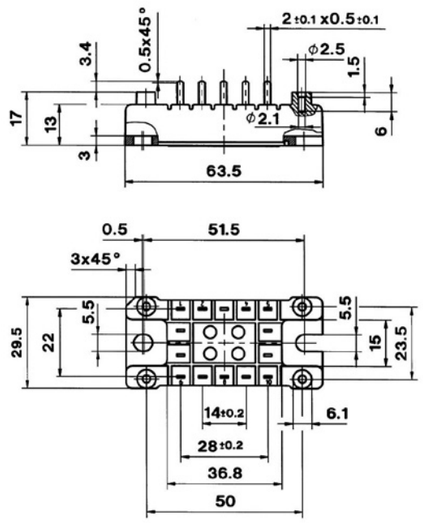
# Bridge Rectifier Modules / Power Bridge

## Packages

**G 51**




**G 55**



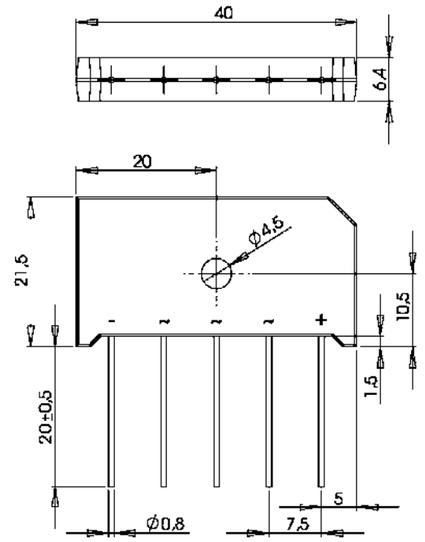

Dimensions in mm



# Bridge Rectifier Modules / Power Bridge

## Packages

**DBI P**




Dimensions in mm



# Intelligent Power Modules

## IPMs

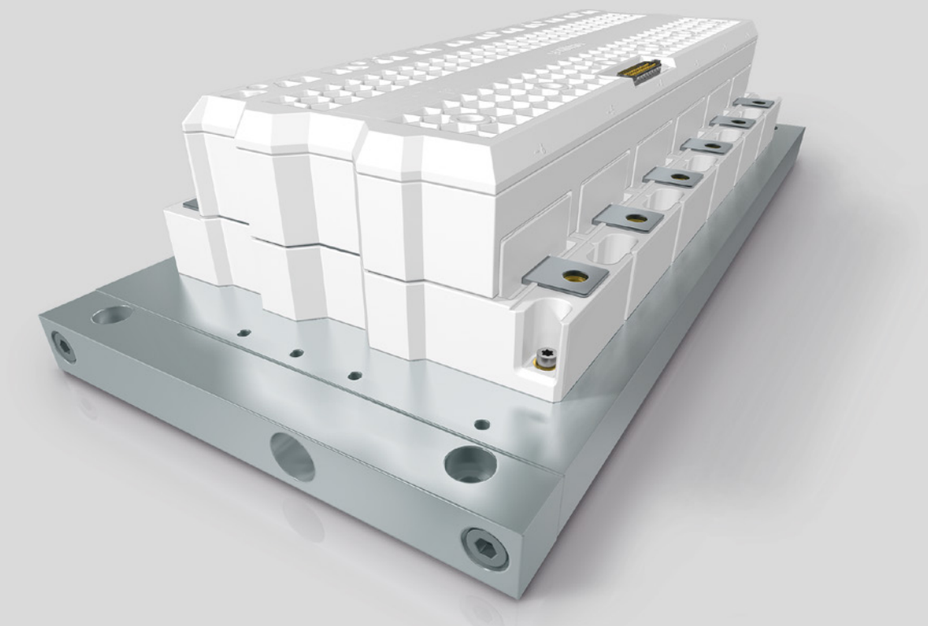
PAGE

SKiiP 140

2

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SKiiP® 3/4





# Intelligent Power Module (IPM) for Maximum Reliability

SKiiP®

## Portfolio

| | |
|---|---|
| SKiiP 3, 4 | 500A up to 3600A |

## Short facts

3-in-1: Driver, semiconductors and cooling

2-3 times higher power cycling capability thanks to sinter technology (SKiiP 4)

Fully assembled and 100% tested

## Key features

Integrated driver, semiconductor and cooling

Integrated temperature measurement

Integrated current sensors

Integrated DC-Link monitoring

100% solder-free (SKiiP 4)

## Applications

SKiiP fully meets the specific requirements for wind turbines in the 0.5 to 6MW power range. Besides wind power applications, SKiiP modules can also be found in elevators, solar power and railway applications – in fact, in any area where powerful, safe and reliable IGBT IPMs are a must.

## Benefits

SKiiP is the most powerful IPM on the market. The power semiconductors used in SKiiP 4 modules can be operated up to a junction temperature of 175°C. To make sure these components can be reliably used at these temperatures, the power circuitry is 100% solder-free. Sinter technology is used to create a sintered silver layer instead of the solder layer which could limit the service life of power modules. Reliability during active and passive thermal cycling is greatly improved.
The integrated gate driver in the SKiiP 4 sets new standards in terms of reliability and functionality. The digital driver guarantees safe isolation between the primary and secondary side for both switching signals and parameter measurement. This means the user no longer has to introduce complex and costly topology components to provide safe isolation.

## Product range

SKiiP IPMs are available in half-bridge and sixpack topologies in power ratings of up to 2MW without paralleling. Cooling solutions range from water to air-cooled systems and customised cooling in SKiiP 3/4. A wide range of accessories is now also available for both SKiiP 3 and SKiiP 4. These include fiber optic boards, paralleling boards for SKiiP systems and adapter boards to connect SKiiP 4 to SKiiP 3 controller.

**Further information**: www.semikron.com/skiip

# IPM
# SEMIKRON For Highly Integrated IPMs

The SKiiP IPMs set a benchmark for high performance and robust converter designes. Especially the SKiiP 4 with its sintered chips is an enabler for maximum load cycle capability and lifetime for use in renewable energy converters such as wind turbines and solar inverters as well as for traction applications.


| | |
|---|---|
| SKiiP 3/4 | 144 |
| SKiiP Accessories | 153 |

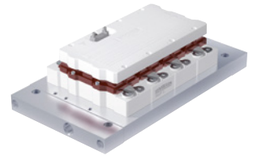

For detailed information please refer to data sheets.

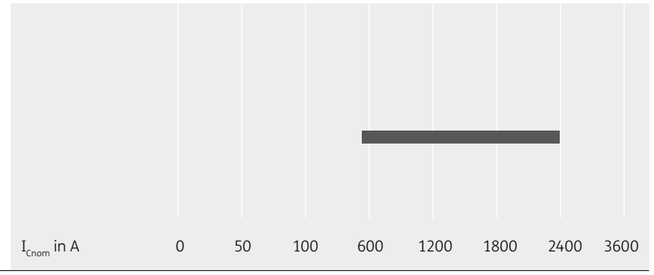
**Further information**: www.semikron.com/ipm

## SKiiP®3

**Sixpack**
**Half-Bridge**

**1200V up to 1700V**



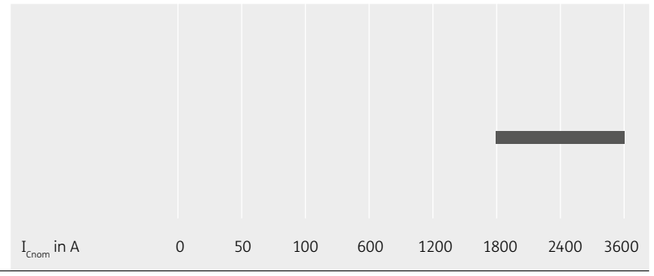



## SKiiP®4

**Half-Bridge**

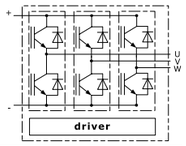
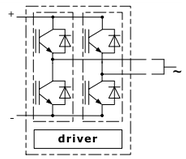
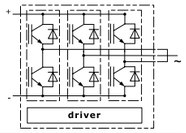
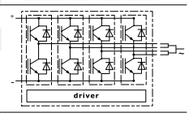
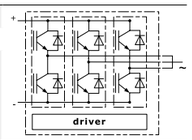
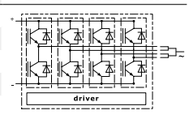
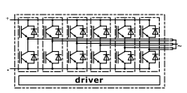
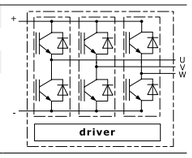
**1200V up to 1700V**





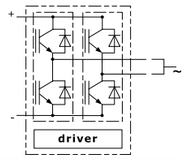
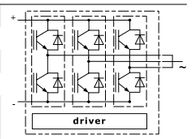
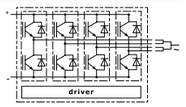
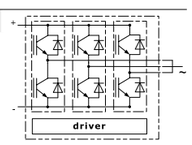
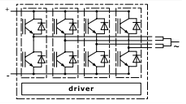
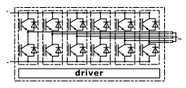

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# IPM / SKiiP

| Type | IGBT | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_s$ = 25°C | $I_{nom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ + $E_{off}$ | $I_F$ @ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Options F=F-Option U=U-Option S=SKiFace Adapter | Package | Topology |
| | A | A | V | mJ | A | V | mJ | | | |
| **1200V - IGBT 3 (Trench) - SKiiP3** | | | | | | | | | | |
| **SKiiP 603 GD123-3DUL V3** | 627 | 600 | 1.7 | 195 | 508 | 1.50 | 28 | - | S33 |  |
| **SKiiP 603 GD123-3DUW V3** | 627 | 600 | 1.7 | 195 | 508 | 1.50 | 28 | - | S33 | |
| **SKiiP 613 GD123-3DUL V3** | 577 | 600 | 1.7 | 195 | 466 | 1.50 | 28 | - | S33 | |
| **SKiiP 613 GD123-3DUW V3** | 577 | 600 | 1.7 | 195 | 466 | 1.50 | 28 | - | S33 | |
| **SKiiP 1213 GB123-2DL V3** | 1145 | 1200 | 1.7 | 390 | 925 | 1.50 | 56 | F | S23 |  |
| **SKiiP 1213 GB123-2DW V3** | 1145 | 1200 | 1.7 | 390 | 925 | 1.50 | 56 | F | S23 | |
| **SKiiP 1813 GB123-3DL V3** | 1695 | 1800 | 1.7 | 585 | 1411 | 1.50 | 84 | F,U | S33 |  |
| **SKiiP 1813 GB123-3DW V3** | 1695 | 1800 | 1.7 | 585 | 1411 | 1.50 | 84 | F,U | S33 | |
| **SKiiP 1813 GB123-3DUL V3** | 1695 | 1800 | 1.7 | 585 | 1411 | 1.50 | 84 | F,U | S33 | |
| **SKiiP 2413 GB123-4DUL V3** | 2280 | 2400 | 1.7 | 780 | 1807 | 1.50 | 112 | F,U | S43 |  |
| **SKiiP 2413 GB123-4DL V3** | 2280 | 2400 | 1.7 | 780 | 1807 | 1.50 | 112 | F,U | S43 | |
| **SKiiP 2413 GB123-4DW V3** | 2280 | 2400 | 1.7 | 780 | 1807 | 1.50 | 112 | F,U | S43 | |
| **1200V - IGBT 4 (Trench) - SKiiP4** | | | | | | | | | | |
| **SKiiP 1814 GB12E4-3DUL** | 2345 | 1800 | 2.01 | 1260 | 1776 | 2.33 | 150 | F,S | S34 |  |
| **SKiiP 1814 GB12E4-3DUW** | 2345 | 1800 | 2.01 | 1260 | 1776 | 2.33 | 150 | F,S | S34 | |
| **SKiiP 1814 GB12E4-3DUSL** | 2345 | 1800 | 2.01 | 1260 | 1776 | 2.33 | 150 | F,S | S34 | |
| **SKiiP 2414 GB12E4-4DUL** | 3109 | 2400 | 2.01 | 1680 | 2369 | 2.33 | 200 | F,S | S44 |  |
| **SKiiP 2414 GB12E4-4DUW** | 3109 | 2400 | 2.01 | 1680 | 2369 | 2.33 | 200 | F,S | S44 | |
| **SKiiP 2414 GB12E4-4DUSL** | 3109 | 2400 | 2.01 | 1680 | 2369 | 2.33 | 200 | F,S | S44 | |
| **SKiiP 2414 GB12E4-4DUL** | 3109 | 2400 | 2.01 | 1680 | 2369 | 2.33 | 200 | F,S | S44 | |
| **SKiiP 2414 GB12E4-4DULR** | 3109 | 2400 | 2.01 | 1680 | 2369 | 2.33 | 200 | F,S | S44 | |
| **SKiiP 3614 GB12E4-6DUL** | 4664 | 3600 | 2.01 | 2520 | 3558 | 2.33 | 300 | F,S | S64 |  |
| **SKiiP 3614 GB12E4-6DUW** | 4664 | 3600 | 2.01 | 2520 | 3558 | 2.33 | 300 | F,S | S64 | |
| **SKiiP 3614 GB12E4-6DULR** | 4664 | 3600 | 2.01 | 2520 | 3558 | 2.33 | 300 | F,S | S64 | |
| **SKiiP 3614 GB12E4-6DUSL** | 4664 | 3600 | 2.01 | 2520 | 3558 | 2.33 | 300 | F,S | S64 | |
| **SKiiP 3614 GB12E4-6DUL** | 4664 | 3600 | 2.01 | 2520 | 3558 | 2.33 | 300 | F,S | S64 | |
| **1700V - IGBT 3 (Trench) - SKiiP3** | | | | | | | | | | |
| **SKiiP 513 GD172-3DUL V3** | 540 | 500 | 1.9 | 288 | 438 | 2.00 | 43 | - | S33 |  |
| **SKiiP 513 GD172-3DUW V3** | 540 | 500 | 1.9 | 288 | 438 | 2.00 | 43 | - | S33 | |
| **SKiiP 603 GD172-3DUL V3** | 587 | 570 | 1.9 | 288 | 476 | 2.00 | 43 | - | S33 | |
| **SKiiP 603 GD172-3DUW V3** | 570 | 570 | 1.9 | 288 | 476 | 2.00 | 43 | - | S33 | |

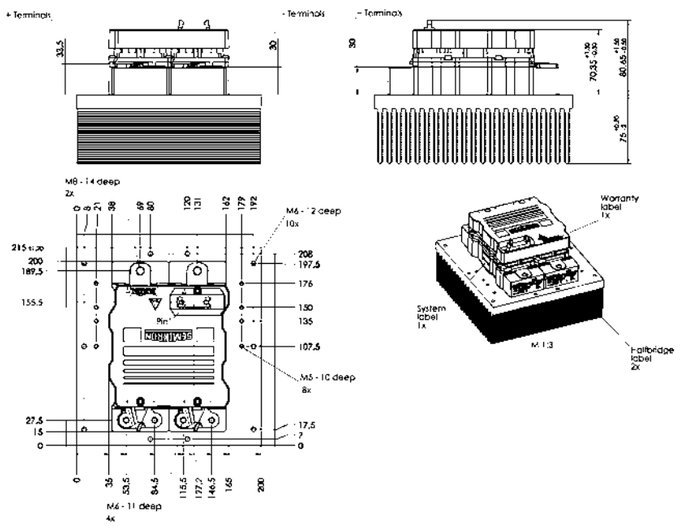


IPM / SKiiP

| Type | IGBT | | | | Diode | | | Module | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $I_C$ @ $T_s$ = 25°C | $I_{nom}$ | $V_{CE(sat)}$ @ $T_j$ = 25°C typ. | $E_{on}$ + $E_{off}$ | $I_F$ @ $T_s$ = 25°C | $V_F$ @ $T_j$ = 25°C typ. | $E_{rr}$ | Options F=F-Option U=U-Option S=SKiFace Adapter | Package | Topology |
| | A | A | V | mJ | A | V | mJ | | | |
| **1700V - IGBT 3 (Trench) - SKiiP3** | | | | | | | | | | |
| **SKiiP 1013 GB172-2DL V3** | 1072 | 1000 | 1.9 | 575 | 879 | 2.00 | 86 | F | S23 |  |
| **SKiiP 1013 GB172-2DW V3** | 1072 | 1000 | 1.9 | 575 | 879 | 2.00 | 86 | F | S23 | |
| **SKiiP 1203 GB172-2DL V3** | 1159 | 1200 | 1.9 | 575 | 961 | 2.00 | 86 | F | S23 | |
| **SKiiP 1203 GB172-2DW V3** | 1159 | 1200 | 1.9 | 575 | 961 | 2.00 | 86 | F | S23 | |
| **SKiiP 1513 GB172-3DL V3** | 1589 | 1500 | 1.9 | 863 | 1336 | 2.00 | 128 | F,U | S33 |  |
| **SKiiP 1513 GB172-3DW V3** | 1589 | 1500 | 1.9 | 863 | 1336 | 2.00 | 128 | F,U | S33 | |
| **SKiiP 1513 GB172-3DFL V3** | 1589 | 1500 | 1.9 | 863 | 1336 | 2.00 | 128 | F,U | S33 | |
| **SKiiP 1803 GB172-3DL V3** | 1744 | 1800 | 1.9 | 863 | 1454 | 2.00 | 128 | F,U | S33 | |
| **SKiiP 1803 GB172-3DW V3** | 1744 | 1800 | 1.9 | 863 | 1454 | 2.00 | 128 | F,U | S33 | |
| **SKiiP 2013 GB172-4DL V3** | 2102 | 2000 | 1.9 | 1150 | 1758 | 2.00 | 171 | F,U | S43 |  |
| **SKiiP 2013 GB172-4DW V3** | 2102 | 2000 | 1.9 | 1150 | 1758 | 2.00 | 171 | F,U | S43 | |
| **SKiiP 2013 GB172-4DFL V3** | 2102 | 2000 | 1.9 | 1150 | 1758 | 2.00 | 171 | F,U | S43 | |
| **SKiiP 2403 GB172-4DL V3** | 2282 | 2400 | 1.9 | 1150 | 1921 | 2.00 | 171 | F,U | S43 | |
| **SKiiP 2403 GB172-4DW V3** | 2282 | 2400 | 1.9 | 1150 | 1921 | 2.00 | 171 | F,U | S43 | |
| **1700V - IGBT 4 (Trench) - SKiiP4** | | | | | | | | | | |
| **SKiiP 1814 GB17E4-3DUL V2** | 2547 | 1800 | 2.12 | 2130 | 1771 | 2.02 | 498 | F,S | S34 |  |
| **SKiiP 1814 GB17E4-3DUW V2** | 2547 | 1800 | 2.12 | 2130 | 1771 | 2.02 | 498 | F,S | S34 | |
| **SKiiP 2414 GB17E4-4DUL V2** | 3385 | 2400 | 2.12 | 2840 | 2362 | 2.02 | 664 | F,S | S44 |  |
| **SKiiP 2414 GB17E4-4DUW V2** | 3385 | 2400 | 2.12 | 2840 | 2362 | 2.02 | 664 | F,S | S44 | |
| **SKiiP 2414 GB17E4-4DPVL** | 3385 | 2400 | 2.12 | 2840 | 2362 | 2.02 | 664 | F,S | S44 | |
| **SKiiP 2414 GB17E4-4DPVW** | 3385 | 2400 | 2.12 | 2840 | 2362 | 2.02 | 664 | F,S | S44 | |
| **SKiiP 3614 GB17E4-6DUL V2** | 5078 | 3600 | 2.12 | 6840 | 3547 | 2.02 | 996 | F,S | S64 |  |
| **SKiiP 3614 GB17E4-6DUW V2** | 5078 | 3600 | 2.12 | 6840 | 3547 | 2.02 | 996 | F,S | S64 | |
| **SKiiP 3614 GB17E4-6DULR V2** | 5078 | 3600 | 2.12 | 6840 | 3547 | 2.02 | 996 | F,S | S64 | |
| **SKiiP 3614 GB17E4-6DPVLR** | 5078 | 3600 | 2.12 | 6840 | 3547 | 2.02 | 996 | F,S | S64 | |
| **SKiiP 3614 GB17E4-6DPVL** | 5078 | 3600 | 2.12 | 6840 | 3547 | 2.02 | 996 | F,S | S64 | |

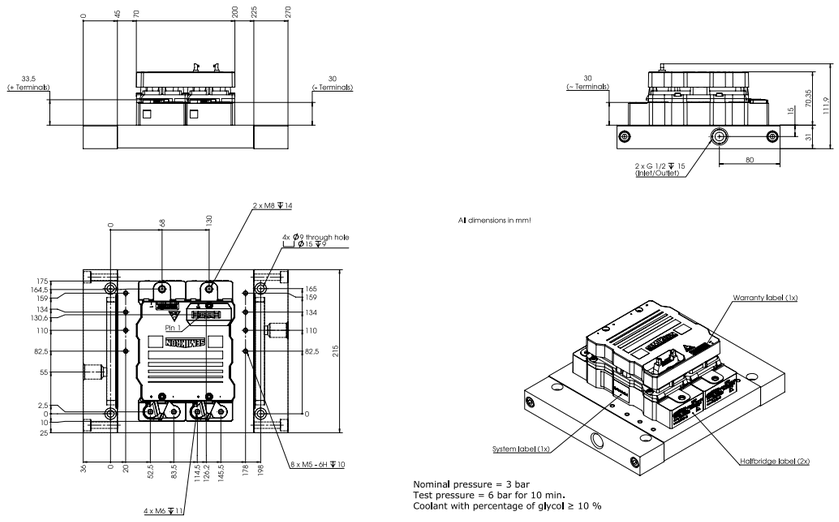
SKiiP 3

**Package S 23 mounted on P3016 heat sink**




| | |
|---|---|
| Weight without heat sink: | 1,7 kg |
| P3016: | 4,4 kg |

**Package S 23 mounted on liquid cooled heat sink NWK 40**




| | |
|---|---|
| NWK 40: | 2,8 kg |

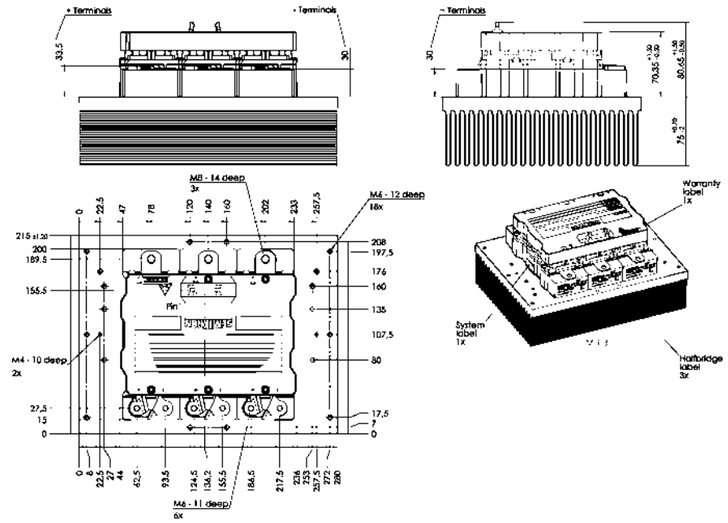
Dimensions in mm





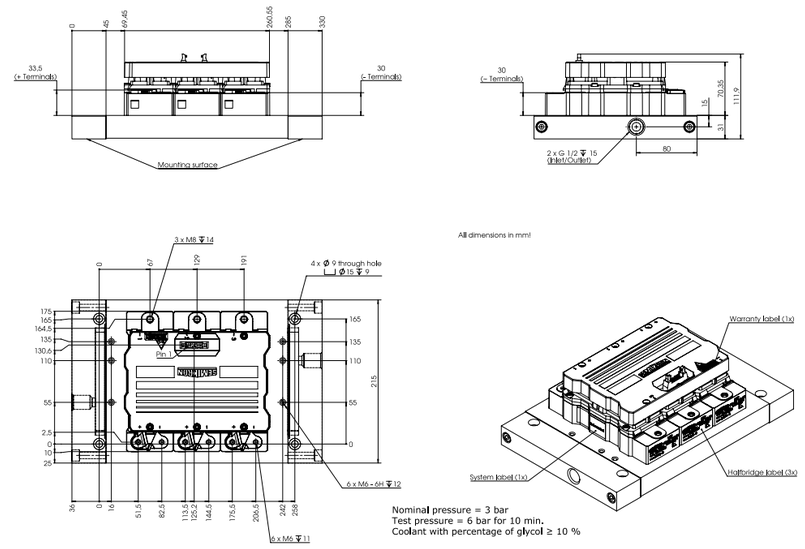
SKiiP 3

**Package S 33 mounted on P3016 heat sink**




| | |
|---|---|
| Weight without heat sink: | 2,4 kg |
| P3016: | 6,2 kg |

**Package S 33 mounted on liquid cooled heat sink NWK 40**



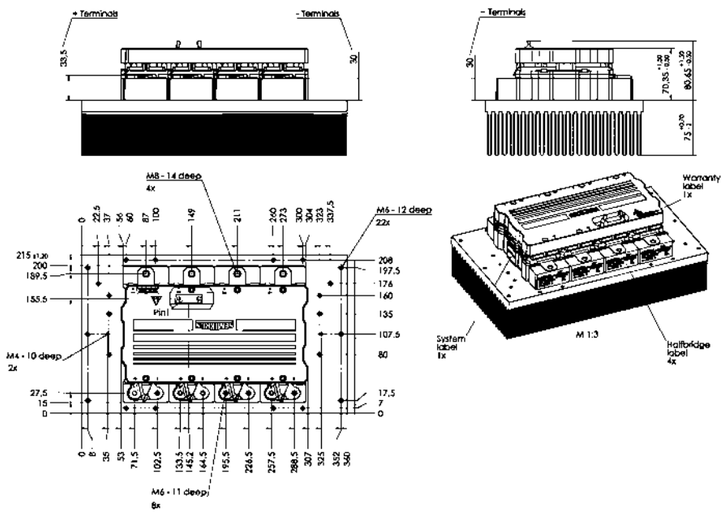

| | |
|---|---|
| NWK 40: | 5,2 kg |

Dimensions in mm

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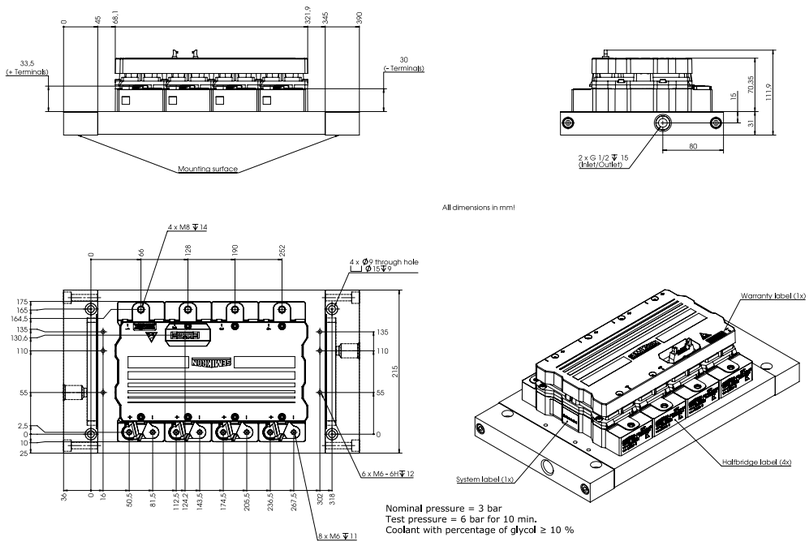
## SKiiP 3

**Package S 43 mounted on P3016 heat sink**




| | |
|---|---|
| Weight without heat sink: | 3,1 kg |
| P3016: | 8,0 kg |

**Package S 43 mounted on liquid cooled heat sink NWK 40**




| | |
|---|---|
| NWK 40: | 6,2 kg |

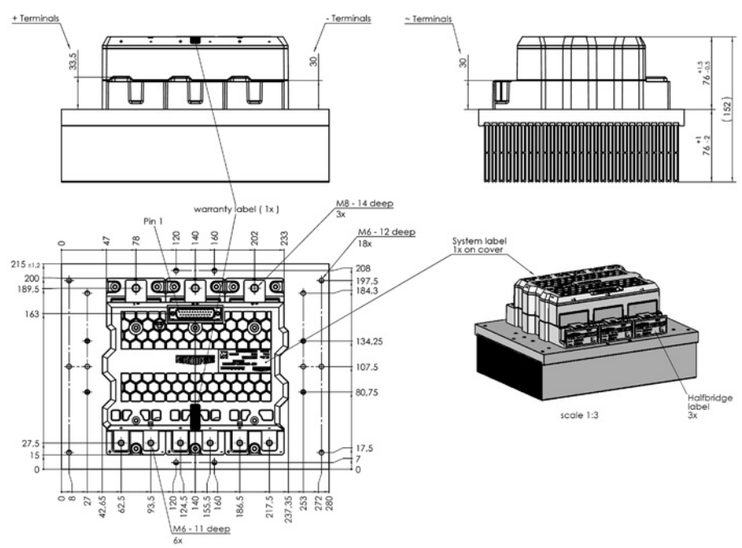
Dimensions in mm





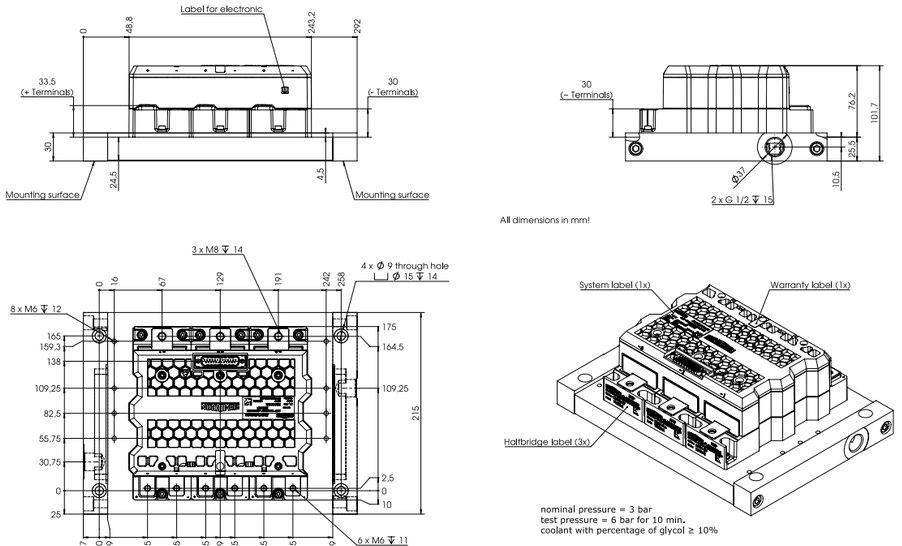
## SKiiP 4

**Package S 34 mounted on P4016 heat sink**




| | |
|---|---|
| Weight without heat sink: | 2,48 kg |
| P4016: | 5,9 kg |

**Package S 34 mounted on liquid cooled heat sink NHC**

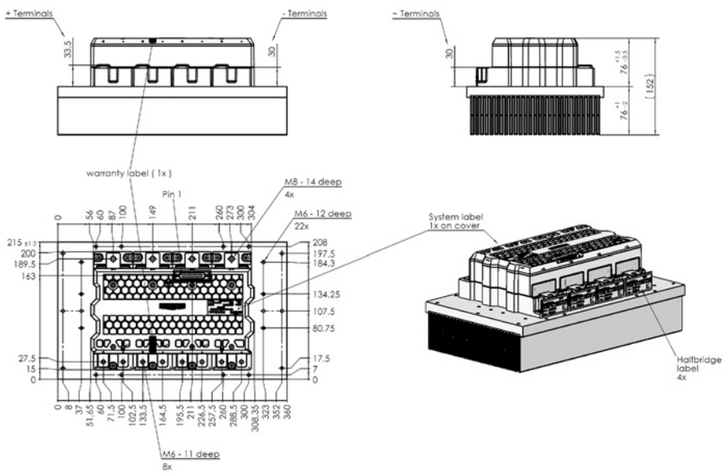



| | |
|---|---|
| NHC: | 3,49 kg |

Dimensions in mm

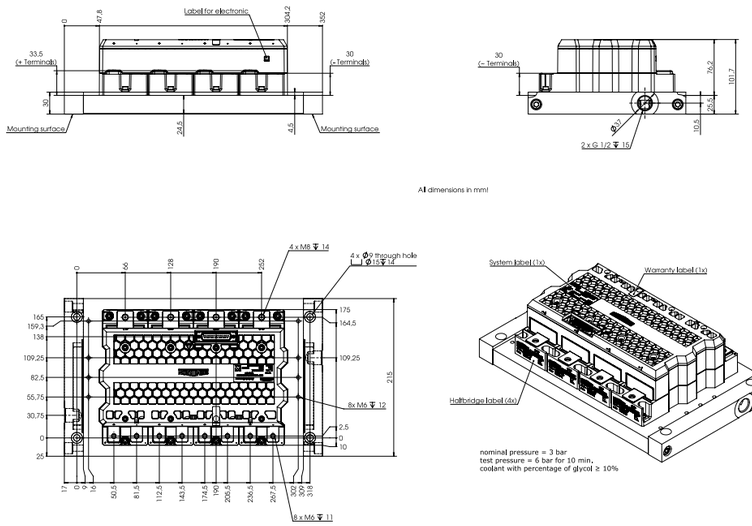
## SKiiP 4

**Package S 44 mounted on P4016 heat sink**




| | |
|---|---|
| Weight without heat sink: | 3,22 kg |
| P4016: | 7,55 kg |

**Package S 44 mounted on liquid cooled heat sink NHC**




| | |
|---|---|
| NHC: | 4,25 kg |

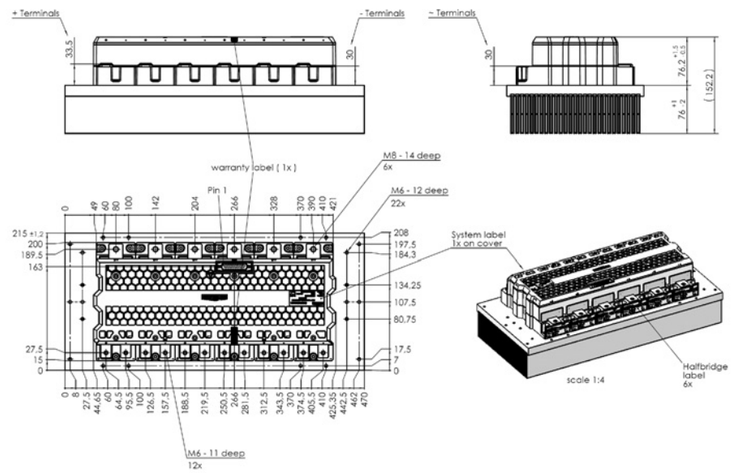
Dimensions in mm





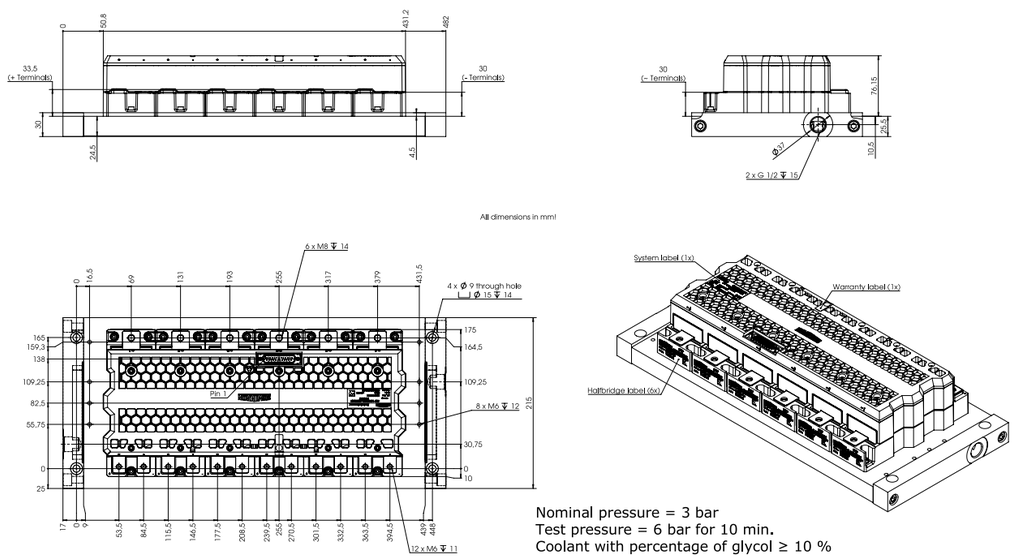
## SKiiP 4

**Package S 64 mounted on P4016 heat sink**




| | |
|---|---|
| Weight without heat sink: | 4,84 kg |
| P4016: | 9,9 kg |

**Package S 64 mounted on liquid cooled heat sink NHC**




| | |
|---|---|
| NHC: | 5,77 kg |

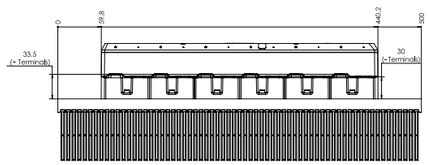
Dimensions in mm

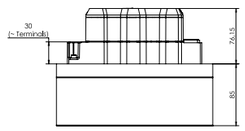
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# IPM / SKiiP

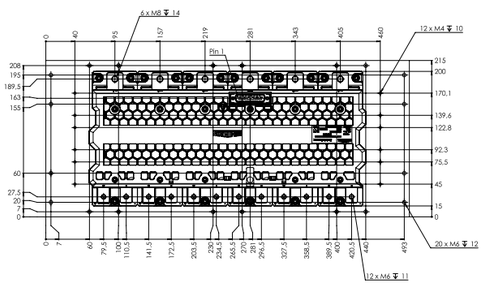
## SKiiP 4

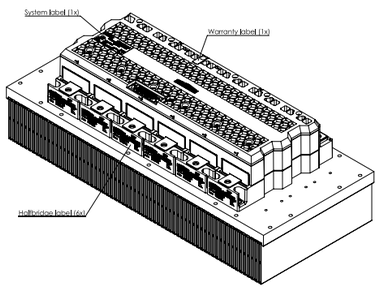
**Package S 64 mounted on P4016 heat sink with 90° rotated fins**



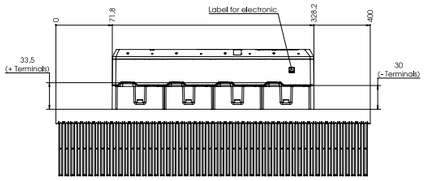

All dimensions in mm!

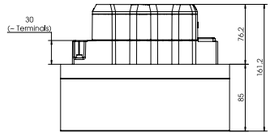


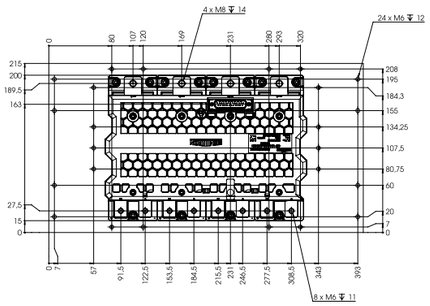

| | |
|---|---|
| Weight without heat sink: | 4,84 kg |
| P4016: | 9,9 kg |

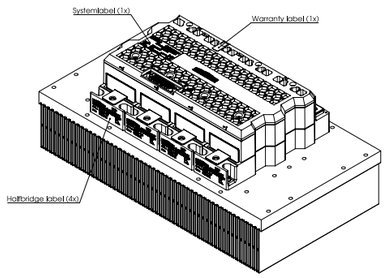
**Package S 44 mounted on P4016 heat sink with 90° rotated fins**




All dimensions in mm!



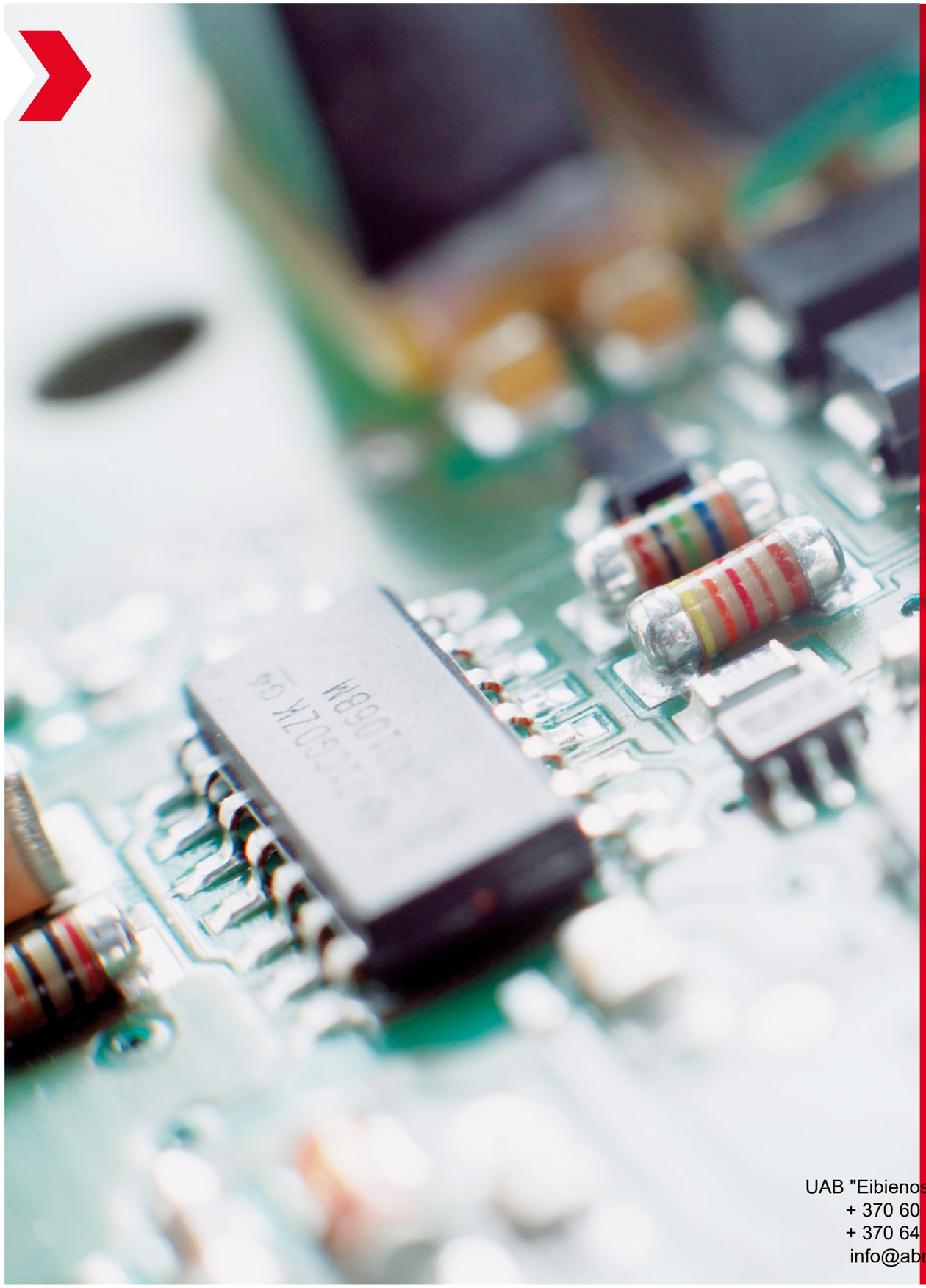




| | |
|---|---|
| Weight without heat sink: | 3,22 kg |
| P4016: | 8,5 kg |

Dimensions in mm

# IPM / SKiiP Accessories

| Type | |
|---|---|
| **F-Option SKiiP3** | |
| **SKiiP3 F-Option** | Fiber optic control board for SKiiP3 |
| **F-Option SKiiP4** | |
| **SKiiP4 F-Option** | Fiber optic control board for SKiiP4 |
| **SKiiP4 F-Option with D-Sub connector** | Fiber optic control board for SKiiP4 |
| **SKiiP3 Parallel Board** | |
| **SKiiP3 Parallel Board 4-fold** | Board for paralleling of 4 SKiiP3, F-Option usage possible |
| **SKiiP3 Parallel Board 3-fold** | Board for paralleling of 3 SKiiP3, F-Option usage possible |
| **SKiiP3 Parallel Board 2-fold** | Board for paralleling of 2 SKiiP3, F-Option usage possible |
| **SKiiP4 Parallel Board** | |
| **SKiiP4 Parallel Board 4-fold without F-Option** | Board for paralleling of 4 SKiiP4, F-Option usage not possible |
| **SKiiP4 Parallel Board 4-fold F-Option** | Board for paralleling of 4 SKiiP4, F-Option usage possible |
| **SKiiP4 Parallel Board 3-fold without F-Option** | Board for paralleling of 3 SKiiP4, F-Option usage not possible |
| **SKiiP4 Parallel Board 3-fold F-Option** | Board for paralleling of 3 SKiiP4, F-Option usage possible |
| **SKiiP4 Parallel Board 2-fold without F-Option** | Board for paralleling of 2 SKiiP4, F-Option usage not possible |
| **SKiiP4 Parallel Board 2-fold F-Option** | Board for paralleling of 2 SKiiP4, F-Option usage possible |
| **SKiFace Adapter Board** | |
| **SKiiP4 SKiFace Adapter UZK** | Adapter board to connect SKiiP4 to SKiiP3 controller with DC-Link voltage measurement function |
| **SKiiP4 SKiFace Adapter Temp** | Adapter board to connect SKiiP4 to SKiiP3 controller with temperatur measurement function |



# IGBT Drivers

PAGE

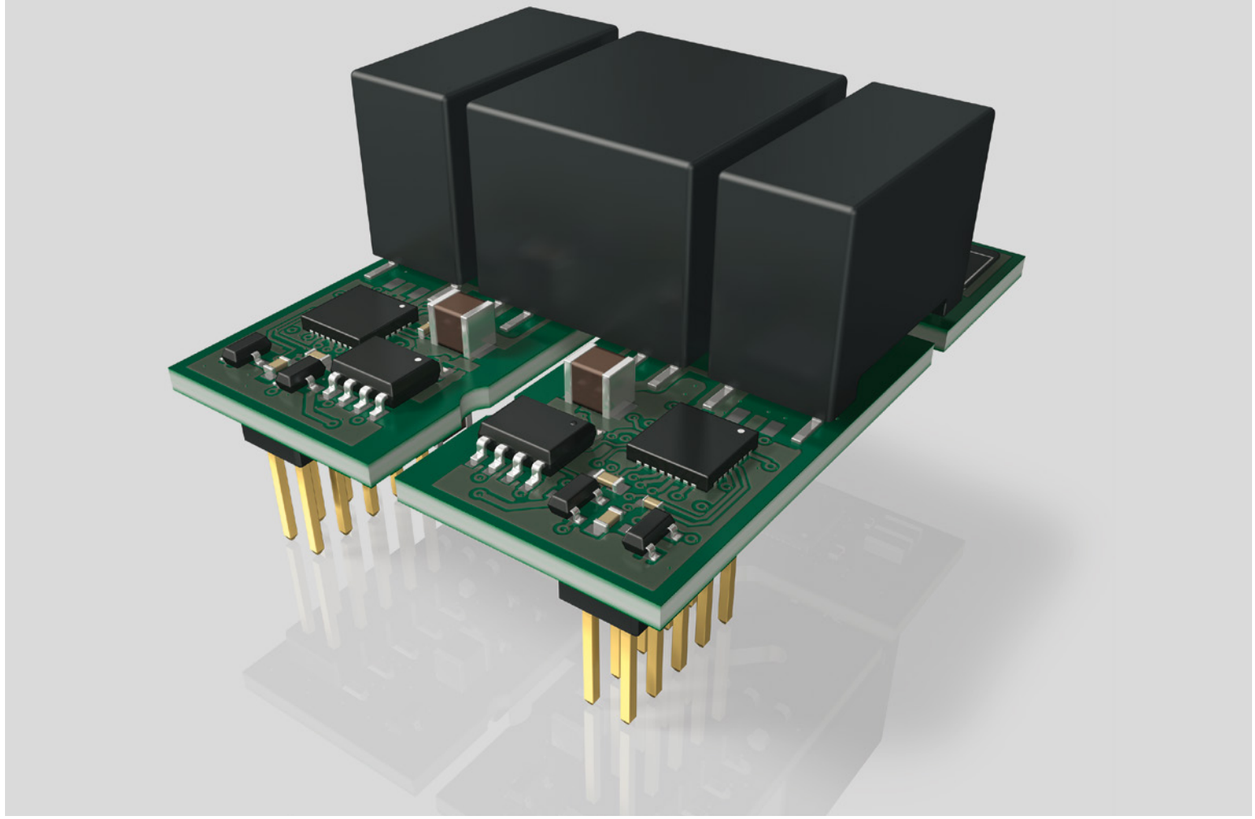
SKYPER 156



3

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# Driver Cores
# Plug & Play Drivers
# Adapter Boards





## Drives 3 Times Longer

# SKYPER®

### Short facts

- MTBF rate of 5 x $10^6$ hours (29500) with new SEMIKRON ASIC chipset
- Safe gate control with separate signal transmission
- 7kV burst durability thanks to interlayer connection and metal pad ASICs

### Key features

- Two driver channels for IGBT single and half-bridges
- For 600V, 1200V and 1700V IGBT modules
- Driving up to 2500A
- Short pulse suppression and EMC cage
- SoftOff and separate error channels
- Adjustable filter and failure management
- Customized adapter boards on request

### Applications

SKYPER 12 PV R is the latest driver core which delivers 20A output peak current and allows for operation at 1500VDC in an unrivalled compact design. Its features and the robustness make it perfect for use in solar applications. The SKYPER 12 PF is a plug & play driver solution based on the same platform, allowing solutions without adapter board for 17mm modules and direct press-fit mounting. SKYPER 42 LJ offers the benefits of digital signal consistency while maintaining full performance. Ambitious applications such as medical technology or large drives of up to 500kW are powered reliably and safely. SKYPER 32 is the perfect solution for industrial drives and process control applications. SKYPER 42 meets the requirements of induction heating / welding applications that call for high currents, durable solar inverters and motor drives between 500kW and 1.5MW. The new plug & play driver SKYPER Prime and Prime O is the best match for high power with SEMITRANS 10 modules for up to 1700V and 1800A.

### Benefits

The high integration level of SEMIKRON's new ASIC chipset provides safe IGBT gate control throughout the entire lifecycle. Short circuits are managed quickly by separate error channels. SoftOff and over voltage feedback help prevent dangerous overvoltages. The mixed signal ASICs guarantee minimum tolerances across the full temperature range. NPC or paralleled IGBT topologies are managed by adjustable error handling. With an optimised interface and the adjustable filter setting, the SKYPER IGBT driver family survives external interference over 100% of IEC standards.

### Product range

The SKYPER drivers are available as IGBT driver cores and plug & play drivers. The SKYPER platform can drive 600V, 1200V and 1700V IGBT modules. SKYPER 32 uses a standard and a PRO version 1W per channel. The PRO version has additional protection features such as external failure inputs and SoftOff. The SKYPER 42 has 4W per channel and can drive up to 2500A IGBTs. The SKYPER 42LJ has 3W per channel, closing the gap between SKYPER 32 and 42. The driver core SKYPER 12 R and the two qualified plug & play drivers, SKYPER 12 press-fit and SKYPER Prime, offer maximum performance when using SEMiX press-fit or SEMITRANS 10 modules.

**Further information**: www.semikron.com/skyper

# IGBT Driver
# SEMIKRON IGBT Driver Family

SEMIKRON offers two different IGBT driver families for any application. Driver cores from the SKHI and SKYPER family can be optimised using adapter boards for each module type. Drivers such as the SKYPER Prime offer a fully qualified plug & play solution, saving time and costs in application. The SKYPER family with 1W to 4W output power per channel covers the entire range of inverters from 30kW to 2MW. The high integration level of SEMIKRON's new ASIC chipset ensures safe IGBT gate control throughout the entire lifecycle. Short topologies are managed very fast by separate error channels.

SoftOff and over voltage feedback prevent dangerous over voltages. The mixed signal ASICs guarantee minimum tolerances over the full temperature range. NPC or paralleled IGBT topologies are managed thanks to adjustable error management. With an optimised interface and adjustable filter settings, the SKYPER family operates safely in noisy environments. The SEMIKRON adapter boards enable a wide range of inverter platforms to be built using various types of IGBT modules.

The latest highlights are the SKYPER 12 driver core and the plug & play driver SKYPER Prime that features electrical and optical interfaces. SKYPER 12 PV R is the latest driver core which delivers 20A output peak current and allows for operation at 1500VDC in an unrivalled compact design. Its featuresand the robustness makes it perfectfor use in solar applications. The SKYPER Prime offers integrated insulated DC link and temperature measurement and can help customers reduce system costs significantly.

SKYPER & SKHI 160

For detailed information please refer to data sheets.

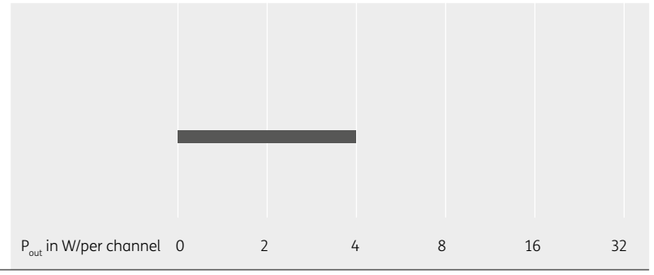
**Further information:** www.semikron.com/igbt-driver

## SKYPER® & SKHI

**Driver Cores**

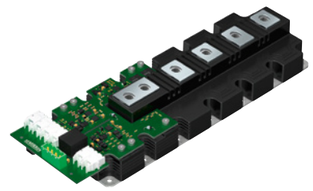


**Up to 1700V**

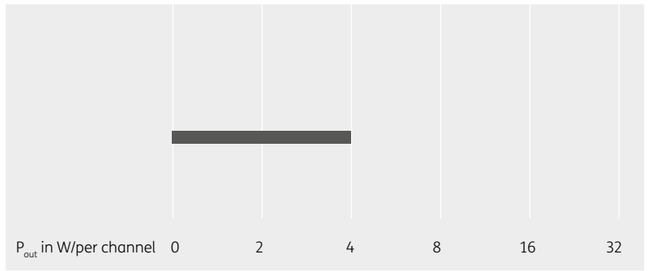



## SKYPER®

**Plug & Play Driver**

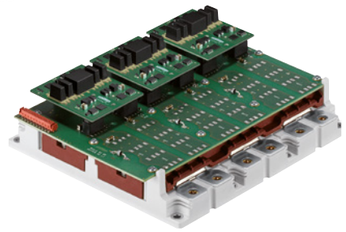


**600V up to 1700V**

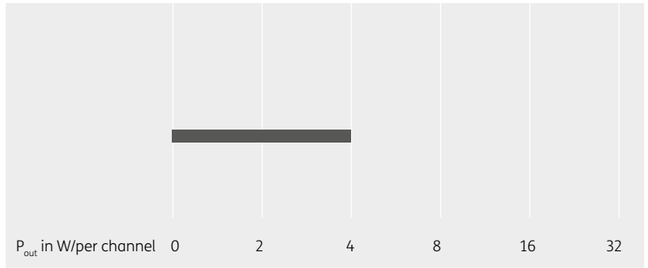



## SKYPER® & SKHI

**Adapter Boards**



**Up to 1700V**




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# IGBT Driver

| Type | Channels | $V_{CE}$ V | $V_{G(on)}$ V | $V_{G(off)}$ V | $I_{outPEAK}$ A | $Q_{out/pulse}$ µC | $f_{max}$ kHz | VisoIO kV | dv/dt kV/µs |
|---|---|---|---|---|---|---|---|---|---|
| **Driver** | | | | | | | | | |
| **SKHI 10/12 R** | 1 | 1200 | 15 | -8 | 8 | 9.6 | 100 | 2500 | 75 |
| **SKHI 10/17 R** | 1 | 1700 | 15 | -8 | 8 | 9.6 | 100 | 4000 | 75 |
| **SKHI 23/12 R** | 2 | 1200 | 15 | -8 | 8 | 4.8 | 100 | 2500 | 75 |
| **SKHI 23/17 R** | 2 | 1700 | 15 | -8 | 8 | 4.8 | 100 | 4000 | 75 |
| **SKHIT 01 R** [7] | 3 | 528 | - | - | - | - | 10 | 2500 | - |
| **SKYPER 12 press-fit 300A** | 2 | 1200 | 15 | -11.3 | 15 | 8 | 20 | 4000 | 50 |
| **SKYPER 12 press-fit 450A** | 2 | 1200 | 15 | -11.3 | 15 | 8 | 13 | 4000 | 50 |
| **SKYPER 12 press-fit 600A** | 2 | 1200 | 15 | -11.3 | 15 | 8 | 10 | 4000 | 50 |
| **SKYPER 12 press-fit C 300A** | 2 | 1200 | 15 | -11.3 | 15 | 8 | 20 | 4000 | 50 |
| **SKYPER 12 press-fit C 450A** | 2 | 1200 | 15 | -11.3 | 15 | 8 | 13 | 4000 | 50 |
| **SKYPER 12 press-fit C 600A** | 2 | 1200 | 15 | -11.3 | 15 | 8 | 10 | 4000 | 50 |
| **SKYPER 12 press-fit 450A 1700V** | 2 | 1700 | 15 | -11.3 | 15 | 8 | 9 | 4000 | 50 |
| **SKYPER 12 press-fit 600A 1700V** | 2 | 1700 | 15 | -11.3 | 15 | 8 | 7 | 4000 | 50 |
| **SKYPER 12 press-fit C 450A 1700V** | 2 | 1700 | 15 | -11.3 | 15 | 8 | 9 | 4000 | 50 |
| **SKYPER 12 press-fit C 600A 1700V** | 2 | 1700 | 15 | -11.3 | 15 | 8 | 7 | 4000 | 50 |
| **SKYPER PRIME 1000A / 1700V PP** [2] | 2 | 1700 | 15 | -8 | 15 | 10 | 10 | 5000 | 50 |
| **SKYPER PRIME 1000A / 1700V ST10** [2] | 2 | 1700 | 15 | -8 | 15 | 7 | 10 | 5000 | 50 |
| **SKYPER PRIME 1400A / 1700V PP** [2] | 2 | 1700 | 15 | -8 | 15 | 13.5 | 7 | 5000 | 50 |
| **SKYPER PRIME 1400A / 1700V ST10** [2] | 2 | 1700 | 15 | -8 | 15 | 10 | 10 | 5000 | 50 |
| **SKYPER PRIME 1400A / 1200V PP** [2] | 2 | 1200 | 15 | -8 | 15 | 10 | 10 | 5000 | 50 |
| **SKYPER PRIME 1400A / 1200V ST10** [2] | 2 | 1200 | 15 | -8 | 15 | 7.5 | 10 | 5000 | 50 |
| **SKYPER PRIME O 1400A / 1200V PP** [2] | 2 | 1200 | 15 | -8 | 15 | 10 | 10 | 5000 | 50 |
| **SKYPER PRIME O 1400A / 1200V ST10** [2] | 2 | 1200 | 15 | -8 | 15 | 7.5 | 10 | 5000 | 50 |
| **SKYPER PRIME O 1400A / 1700V PP** [2] | 2 | 1700 | 15 | -8 | 15 | 13.5 | 7.4 | 5000 | 50 |
| **SKYPER PRIME O 1400A / 1700V ST10** [2] | 2 | 1700 | 15 | -8 | 15 | 10 | 10 | 5000 | 50 |
| **Driver Core** | | | | | | | | | |
| **SKHI 21A R** [8] | 2 | 1200 | 15 | 0 | 8 | 4 | 50 | 2500 | 50 |
| **SKHI 22 A/B H4 R** | 2 | 1700 | 15 | -7 | 8 | 4 | 50 | 4000 | 50 |
| **SKHI 24 R** | 2 | 1700 | 15 | -8 | 15 | 5 | 50 | 4000 | 50 |
| **SKHI 61 R** [4] | 6 | 900 | 15 | -7 | 2 | 1 | 50 | 2500 | 15 |
| **SKHI 71 R** [4] | 7 | 900 | 15 | -7 | 2 | 1 | 50 | 2500 | 15 |
| **SKYPER 12 R** [2] | 2 | 1700 | 15 | -9 | 20 | 20 | 100 | 5000 | 50 |
| **SKYPER 12 PV R** [2] | 2 | 1700 | 15.4 | -9.5 | 20 | 20 | 100 | 5000 | 50 |
| **SKYPER 32 R** | 2 | 1700 | 15 | -7 | 15 | 2.5 | 50 | 4000 | 50 |
| **SKYPER 32 PRO R** | 2 | 1700 | 15 | -7 | 15 | 6.3 | 50 | 4000 | 50 |
| **SKYPER 42 R** | 2 | 1700 | 15 | -8 | 30 | 50 | 100 | 4000 | 100 |
| **SKYPER 42 R/02 (coated)** [2] | 2 | 1700 | 15 | -8 | 30 | 50 | 100 | 4000 | 100 |
| **SKYPER 42 LJ R** | 2 | 1700 | 14.8 | -8 | 24 | 20 | 100 | 4000 | 100 |
| **SKYPER 42 LJ R (coated)** [2] | 2 | 1700 | 14.8 | -8 | 24 | 20 | 100 | 4000 | 100 |
| **Adapter Board** | | | | | | | | | |
| **Board 1 SKYPER 32 R** | 2 | 1700 | 15 | -7 | 15 | 2.5 | 50 | 4000 | 50 |
| **Board 1 SKYPER 32PRO R** | 2 | 1700 | 15 | -7 | 15 | 6.3 | 50 | 4000 | 50 |
| **Board 2 // 4S SKYPER 42 R** | 2 | 1200 | 15 | -8 | 30 | 50 | 100 | 4000 | 100 |
| **Board 2 generic SKYPER 42 R** | 2 | 1700 | 15 | -8 | 30 | 50 | 100 | 4000 | 100 |
| **Board 2//3S SKYPER 42 R** | 2 | 1700 | 15 | -8 | 30 | 50 | 100 | 4000 | 100 |
| **Board 2S SKYPER 32 PRO R Gold** | 2 | 1700 | 15 | -7 | 15 | 6.3 | 50 | 4000 | 50 |
| **Board 2S SKYPER 32 R Gold** | 2 | 1700 | 15 | -7 | 15 | 2.5 | 50 | 4000 | 50 |
| **Board 3S SKYPER 32 PRO R Gold** | 2 | 1700 | 15 | -7 | 15 | 6.3 | 50 | 4000 | 50 |
| **Board 3S SKYPER 32 R Gold** | 2 | 1700 | 15 | -7 | 15 | 2.5 | 50 | 4000 | 50 |
| **Board 4S SKYPER 32 PRO R Gold** | 2 | 1700 | 15 | -7 | 15 | 6.3 | 50 | 4000 | 50 |
| **Board 4S SKYPER 32 R Gold** | 2 | 1700 | 15 | -7 | 15 | 2.5 | 50 | 4000 | 50 |
| **Board 63 GB SKYPER 42 R** | 2 | 1700 | 15 | -8 | 30 | 50 | 100 | 4000 | 100 |
| **Board 93 GB SKYPER 42 R** [2] | 2 | 1700 | 15 | -8 | 30 | 50 | 100 | 4000 | 100 |

**Footnotes:** 2) In production new / 4) Discontinued / 7) Thyristor Driver / 8) MOSFET Driver



# Stacks


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4

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SEMISTACK® RE
SKiiPRACK®





# IGBT Platforms up to 6MVA
# Standards for Water-Cooled Inverter

## Water-Cooled IGBT
# STACKS

### Short facts

- Off-the-shelf product range
- 2 and 4-quadrant 3-phase converter
- IGBT inverter power density of up to 10.4kVA/L
- Long life expectancy

### Key features

- Maximum continuous output current from 600A to 1400$A_{RMS}$
- DC bus voltage of up to 1250$V_{DC}$
- Inverter output voltage of up to 690$V_{AC}$
- DC bus polypropylene capacitor bank lifetime rates at 100,000 hours at 40°C
- Analogue measurements for $T_{heatsink}$, $V_{bus}$, $I_{out}$
- CAN interface (configuration & monitoring)

### Applications

The SEMISTACK platforms comply with wind turbine requirements, making it possible to build 4-quadrant converters that are suitable for use with synchronous generators and double fed induction generators, with an optional brake chopper design. The platform flexibility allows for the requirements of solar central inverters to be met with a continuous DC bus voltage of up to 900$V_{DC}$. Alternatively, SEMISTACK platforms can be used in low-voltage applications requiring high power and a high degree of reliability, such as 3-phase inverters in a shipyard or in a battery energy storage unit installed close to renewable energy power plants.

### Benefits

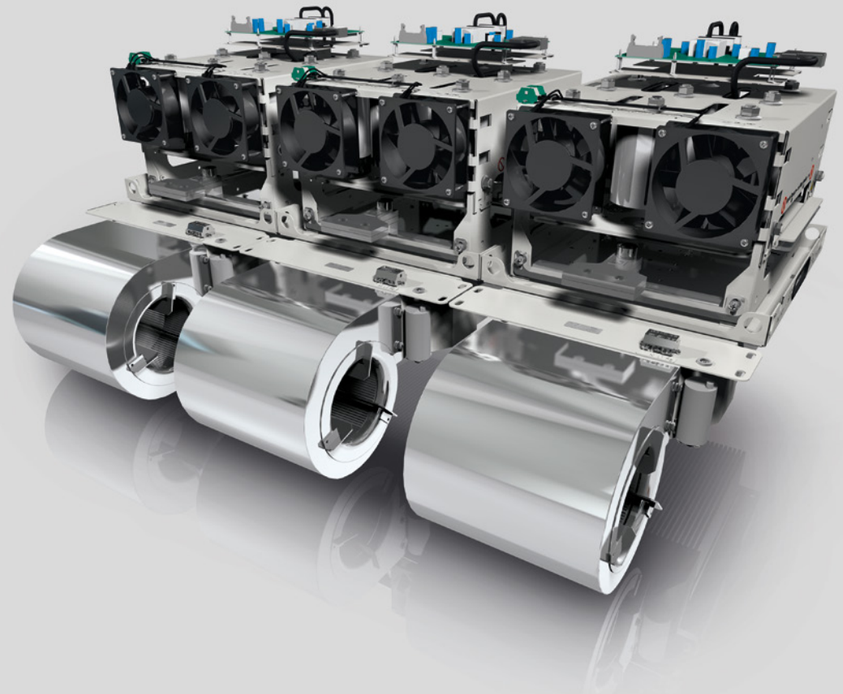
The SEMISTACK water-cooled platforms offer a pre-qualified power assembly ready for integration following rigorous SEMIKRON qualification tests and the latest environmental standards (IEC 60721-3). The platform design has been optimised to achieve the ideal balance between costs and performance for a water-cooled power inverter in the megawatt power range. They are designed for applications requiring a high degree of reliability and a long service life of up to 20 years. The design and footprint enables compact integration into standard industrial cabinets, making high power of up to 6MVA low-voltage possible. Specified for wind turbine applications, the SEMISTACK family boasts excellent IGBT cycling capability and a high capacitor bank lifetime, reducing maintenance requirements.

### Product range

The SEMISTACK water-cooled platform offers various inverter sizes to fit two power sub-assemblies into a 600 x 600 x 2000mm cabinet. The standard size has a current range between 1000A and 1400$A_{RMS}$. For applications with lower current ratings or with tighter cabinet size constraints, a smaller inverter size is available with a continuous output current rated for up to 900$A_{RMS}$. The SEMISTACKs embed the SKiiP IPM product family, which in turn integrates IGBT gate driver and monitors analogue outputs (temperature, output current and DC bus voltage). As an option, a CAN interface is also available to monitor the SKiiP. To increase power capacity up to 6MVA, SEMISTACKs can be put in parallel, connected together through the DC bus and controlled all-in-one using a SEMIKRON paralleling board. Optionally, SEMISTACK platforms are also available integrated into an industrial cabinet with suitable AC and/or DC power filters, electrical and hydraulic distribution systems.

**Further information**: www.semikron.com/water-cooled-igbt-stacks

# SEMIKUBE®
# SEMIKUBE® SlimLine
# SEMIKUBE® 1500V





## IGBT Converter Family up to 1MVA
## Standards for Air-Cooled Inverter

Air-Cooled IGBT

# STACKS

### Short facts

- Off-the shelf product range
- Air-cooled power assemblies
- Maximum output current from 150A to 1500A
- Customizable

### Key features

- Frame sizes ranging from 75kVA up to 1500kVA
- AC output voltage of up to 690$V_{AC}$
- Current measurement accuracy <1%
- Analogue measurements or CAN monitoring for $T_{heatsink}$, $V_{bus}$, $I_{out}$
- Forced-air cooled platform
- For 300mm cabinet
- UL1741 1500V ready

### Applications

The SEMIKUBE platform is optimised for general-purpose inverters and central solar inverters. Designed for the most commonly used PV central inverter ratings on the market, i.e. 500kW, 670kW up to as much as 1200kW, the SEMIKUBE 3-phase inverter operates at up to 1500$V_{DC}$ bus voltage. Designed in accordance with IEC 62109, the platform is set to obtain UL recognition. The SEMIKUBE family complies with most AC drives application requirements. The current measurement precision of 1% (at 25°C) allows for premium motor control as required in highly dynamic applications and motion control systems.

### Benefits

The SEMIKUBE platform is a family of pre-qualified power assemblies which are in line with the rigorous SEMIKRON qualification tests and certifications. The platform integrates advanced technologies which maximize performance and power density. SEMIKUBE, thanks to its modular design and patented DC connections, allows for designs in various converter power ranges.

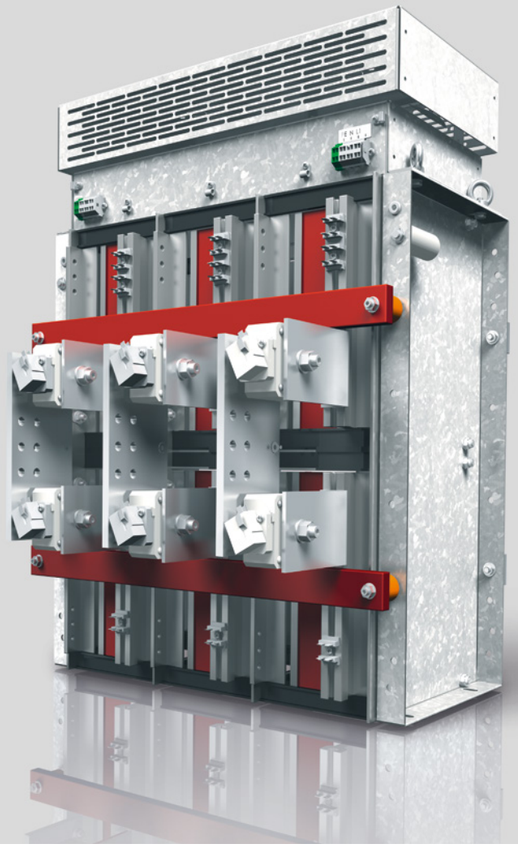
### Product range

The SEMIKUBE platform comes in four frame sizes for continuous rated currents ranging from 150A to 1500A and features SEMITRANS 1200V and 1700V IGBT Trench E4 modules. The SEMIKUBE design is optimised for 3-phase inverter topologies. A dedicated rectifier with 3-phase inverter and optional brake chopper can be added. The IGBTs are controlled by a SEMIKRON embedded driver for error management, and analogue outputs for current, DC voltage and heatsink temperature.
For the SEMIKUBE SlimLine a CAN interface is available for parameter configuration and diagnostics monitoring. Air cooling is provided by highly efficient long-life axial and radial fans, achieving maximum power within a compact package.
SEMIKUBE is a versatile product, allowing for converter designs around a common DC link, including four quadrant converters, multiphase converters and a 1500V inverter for central solar power systems. Thanks to its optimised layout, the platform integrates state-of-the-art hybrid SiC and full SiC modules, extending the SEMIKUBE Slimline portfolio.

**Further information**: www.semikron.com/air-cooled-igbt-stacks

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# SEMISTACK® CLASSIC B6U
# SEMISTACK® CLASSIC B6C
# SEMISTACK® CLASSIC W3C





## Rectifier Stacks
## Standards for LV Diode/Thyristor Rectifiers

Diode/Thyristor
# STACKS

### Short facts

- Off-the shelf product range
- Air-cooled power assemblies
- Ready for integration
- Customizable

### Key features

- Various topologies (B6U, B6C, B2C, B2U, W3C, W1C)
- Maximum continuous DC Current from 60A to 4015A
- Rectifier AC voltage of up to 500$V_{AC}$
- DC bus voltage of up to 670$V_{DC}$
- RC, fuses, cooling fans and thermal switches

### Applications

The SEMISTACK CLASSIC product range is designed for fast integration of industrial rectifiers. Each power bridge has been sized to embed semiconductors with a suitable RC commutation topology, proper AC fuses and cooling devices. The high rectifier power range has been improved using a new heatsink profile, resulting in modularity, various fan options, low maintenance and weight reductions.

### Benefits

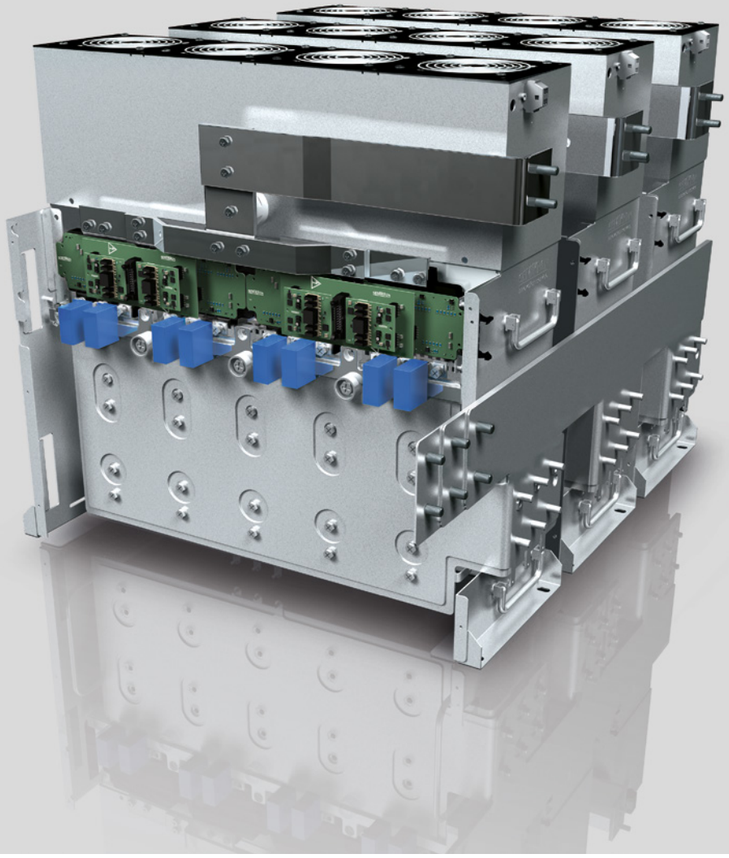
The SEMISTACK CLASSIC family offers a pre-qualified power assembly ready for integration in line with rigorous SEMIKRON qualification tests and current environmental standards. The platform design has been optimised to achieve the best balance between costs and performance for power inverters and rectifiers right up to the megawatt range.

### Product range

The SEMISTACK family consists of a broad portfolio of over 200 stacks with different topologies of uncontrolled, half-controlled and fully controlled rectifiers. These products are available with natural or forced cooling, with or without fuses. All SEMISTACK Classics include RC protection circuitry and are optimised for fast cabinet integration.

**Further information**: www.semikron.com/diode-thyristor-stacks

# SEMISTACK® Application





# Customized Power Electronic Stacks Create the Standard for Your Inverter

## Customized STACKS

### Short facts

- 45 years of experience in stack design, manufacture and service
- Global market leader in power electronic stacks
- 7 local engineering & production locations for direct and fast communication
- More than 200,000 stacks already in the field
- 1,500 different assemblies available
- Air and water-cooled power assemblies

### Outsource design and manufacturing to:

- Focus on your core competencies
- Reduce production fluctuations
- Benefit from economy of scale
- Cut design, assembly and production costs
- Reduce your risks

### Applications

SEMIKRON provides custom stacks to the world´s leading electric industries, ranging from simple press-fit diode plates for battery chargers or welding equipment, to thyristor and IGBT industrial drives, complex high-power four-quadrant inverters for wind energy generation, and IGBT converters for main traction drives in railway applications. SEMIKRON has experience in many different applications each with their specific constraints. This extensive knowledge ensures a robust and reliable design.

### Benefits

If our platforms and/or standard stacks do not suit the customer requirements, our stack center can always offer a 100% customized turn-key solution. Our unparalleled experience in the stack business coupled with direct access to our core semiconductor and driver technology enables us to provide highly efficient, cost effective designs to meet every customer need. We encourage exchange and transfers between the stack centers and transform local success into global competence. Thanks to this internal information exchange, you get an optimised, pre-qualified and field-tested stack in the shortest possible time.

### Product range

SEMIKRON designs, builds and tests customized stacks based on your needs. With our long-term experience and successful track record, we are the global market leader in stack design and production. With our vast portfolio of standard stacks we deliver short lead times while adapting the stacks to your requirements. SEMIKRON continuously develops new stack assemblies with the latest materials, topologies and technologies in order to guarantee our customers up-to-date products for a short time-to-market. Semikron offers full cycle cooperation from the product concept stage to mass delivery and beyond for repairs & aftermarket services. Costs and delivery times are kept to the minimum. Our R&D departments continuously focus on designing re-useable standard sub-assemblies in our SEMISTACKs. As an example, the SEMIKUBE platform is the result of 45 years of experience in the stacks business and with more than 75,000 SEMIKUBEs in the field, the most successful stack to date.

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# Stack Platforms – Fully Qualified Inverter Assemblies Tailored to Your Specific Needs

In addition to standard semiconductor components, SEMIKRON has developed a full range of power converter assemblies. Stack center application engineers are available to offer specific power solutions by adapting existing platforms or designing customized converters.


| | |
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| SEMIKUBE SlimLine | 178 |
| SEMISTACK CLASSICS | 179 |


For detailed information please refer to data sheets.

**Further information:** www.semikron.com/stacks

## Water-cooled IGBT

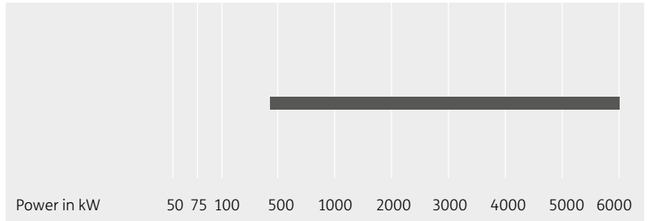
### SEMISTACK® RE

**Synchronous wind generators**

**Double-fed wind generators**

**Solar inverters**





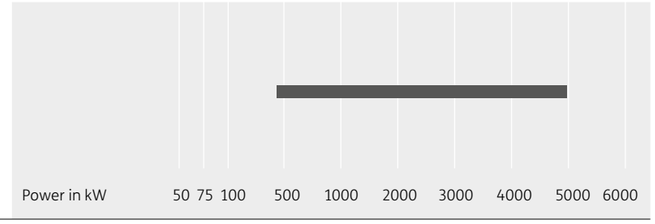

### SKiiPRACK®

**Synchronous wind generators**

**Double-fed wind generators**

**High power AC drives**





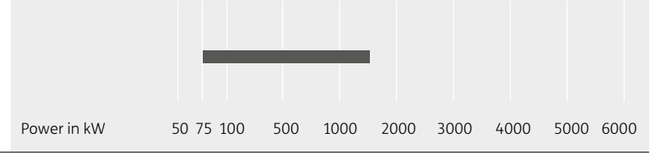

## Air-cooled IGBT

### SEMIKUBE®

**Solar inverters**

**Pump and compressor drives**



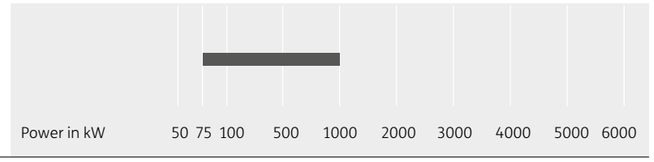



### SEMIKUBE® SlimLine

**Solar inverters**

**AC drives and servos**



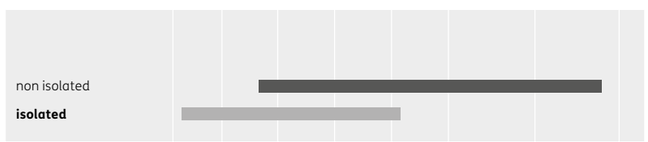



## Diode/Thyristor

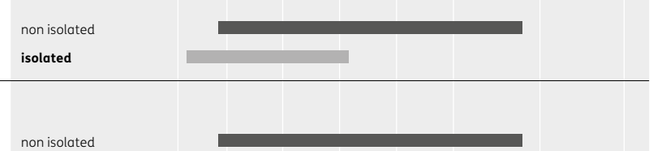
### SEMISTACK® CLASSICS



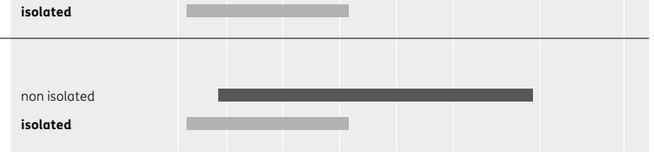
**B6U**
3-phase uncontrolled rectifier




**B6HK**
3-phase half controlled rectifier



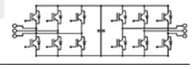
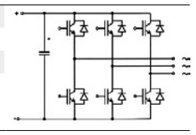

**B6C**
3-phase fully controlled rectifier




**W3C**
3-phase reverse parallel thyristor converter



# Stacks / SEMISTACK RE

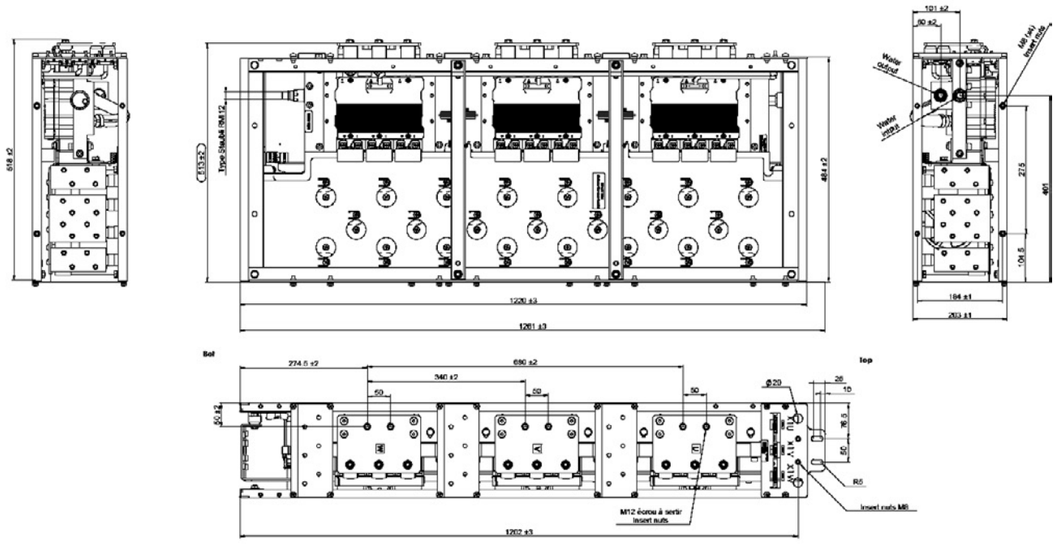
| Type | $V_{AC}$ | $V_{DC}$ | Current | Component Family | Cooling | Heatsink profile | Isolated | Topology |
|---|---|---|---|---|---|---|---|---|
| | V | V | A | | | | | |
| **4-Quadrant converter** | | | | | | | | |
| **SKS B2 120 GDD 69/11 - A11 MA PB** | 690 | 1100 | 1200 | SKiiP 3 | Water/Glycol | - | yes |  |
| **SKS B2 140 GDD 69/12 U - A11 MA PB** | 690 | 1250 | 1400 | SKiiP 4 | Water/Glycol | - | yes | |
| **3-phase inverter** | | | | | | | | |
| **SKS B1 090 GD 69/11 - MA PB** | 690 | 1100 | 900 | SKiiP 3 | Water/Glycol | - | yes |  |
| **SKS B2 100 GD 69/11 - MA PB** | 690 | 1100 | 1000 | SKiiP 3 | Water/Glycol | - | yes | |
| **SKS B2 120 GD 69/11 - MA PB** | 690 | 1100 | 1200 | SKiiP 3 | Water/Glycol | - | yes | |
| **SKS B2 140 GD 69/12 U - MA PB** | 690 | 1250 | 1400 | SKiiP 4 | Water/Glycol | - | yes | |



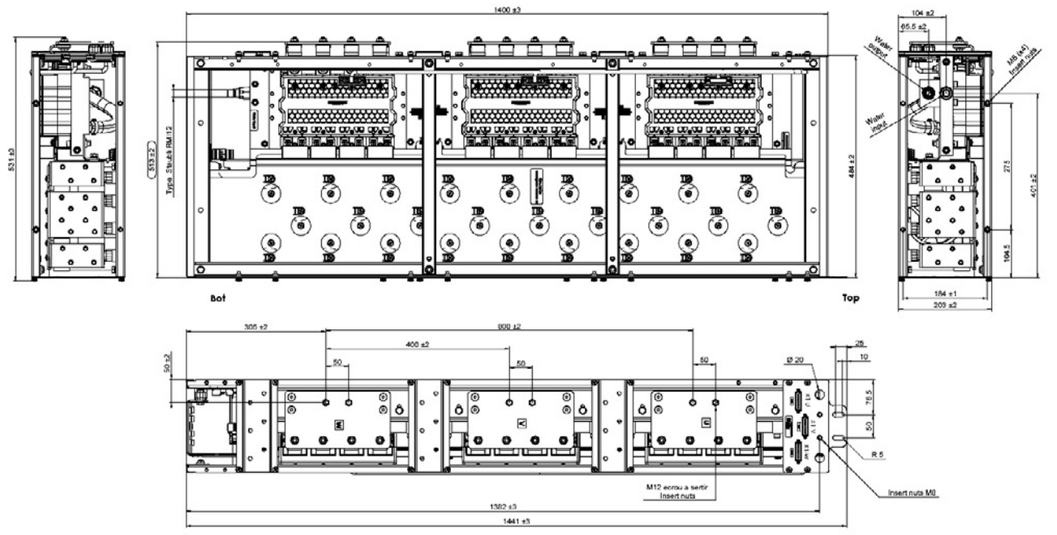
Stacks / SEMISTACK RE

## Packages

**SKS B1 090 GD 69/11 - MA PB**



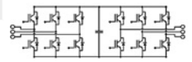

**SKS B2 100 GD 69/11 - MA PB, SKS B2 120 GD 69/11 - MA PB, and SKS B2 140 GD 69/12 - MA PB**




Dimensions in mm

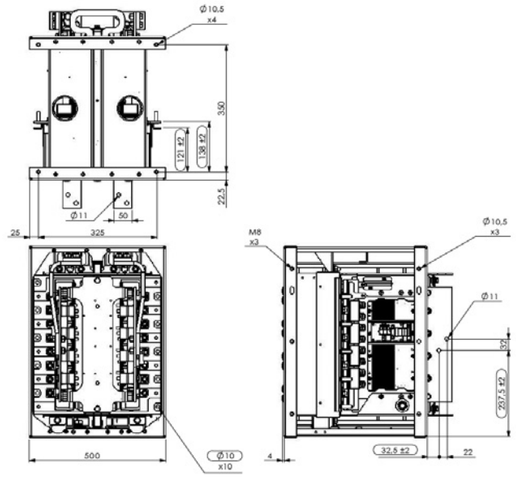
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info@abn-a.com

# Stacks / SKiiPRACK

| Type | $V_{AC}$ V | $V_{DC}$ V | Current A | Component Family | Cooling | Heatsink profile | Isolated | Topology |
|---|---|---|---|---|---|---|---|---|
| **4-Quadrant converter** | | | | | | | | |
| **SKS C 120 GDD 69/11 - A3A WA B1B** | 690 | 1100 | 1200 | SKiiP 3 | Water/Glycol | - | yes |  |
| **SKS C 240 GDD 69/11 - A6A MA B1C** | 690 | 1100 | 2400 | SKiiP 3 | Water/Glycol | - | yes | |

## Packages

**SKiiPRACK basic stack element, the CELL**



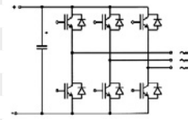
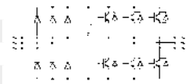

**3-Cell vertical integration**



Dimensions in mm



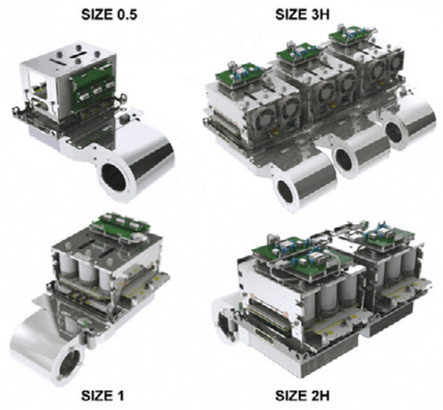
# Stacks / SEMIKUBE

| Type | $V_{AC}$ V | $V_{DC}$ V | Current A | Component Family | Cooling | Heatsink profile | Isolated | Topology |
|---|---|---|---|---|---|---|---|---|
| **3-phase inverter** | | | | | | | | |
| **IGD-1-424-P1N4-DL-FA** | 460 | 900 | 200 | SEMITRANS | Forced-air cooled | PX 308 | yes |  |
| **IGD-2-424-P1N6-DH-FA** | 460 | 900 | 350 | SEMITRANS | Forced-air cooled | PX 308 | yes | |
| **IGD-4-424-P1F7-BL-FA** | 460 | 900 | 750 | SEMITRANS | Forced-air cooled | PX 308 | yes | |
| **IGD-8-326-E1F12-BH-FA** | 460 | 750 | 1230 | SEMITRANS | Forced-air cooled | PX 308 | yes | |
| **IGD-8-426-E1F12-BH-FA** | 460 | 750 | 1470 | SEMITRANS | Forced-air cooled | PX 308 | yes | |
| **IGD-8-424-P1F9-BH-FA** | 460 | 900 | 1470 | SEMITRANS | Forced-air cooled | PX 308 | yes | |
| **IGD-8-474-P2F9-BI-FA** [2)] | 690 | 1250 | 1300 | SEMITRANS | Forced-air cooled | PX 308 | yes | |
| **3-phase rectifier and inverter** | | | | | | | | |
| **IGDD6-1-326-D1616-E1N6-DL-FA** | 460 | 750 | 150 | SEMITRANS/SEMIPACK | Forced-air cooled | PX 308 | yes |  |
| **IGDD6-1-426-D1616-E1N6-DL-FA** | 460 | 750 | 180 | SEMITRANS/SEMIPACK | Forced-air cooled | PX 308 | yes | |
| **IGDD6-2-326-D1616-E1F12-DH-FA** | 460 | 750 | 280 | SEMITRANS/SEMIPACK | Forced-air cooled | PX 308 | yes | |
| **IGDD6-2-426-D1616-E1F12-DH-FA** | 460 | 750 | 330 | SEMITRANS/SEMIPACK | Forced-air cooled | PX 308 | yes | |
| **IGDD6-4-326-D3816-E1F12-BL-FA** | 460 | 750 | 570 | SEMITRANS/SEMIPACK | Forced-air cooled | PX 308 | yes | |
| **IGDD6-4-426-D3816-E1F12-BL-FA** | 460 | 750 | 680 | SEMITRANS/SEMIPACK | Forced-air cooled | PX 308 | yes | |

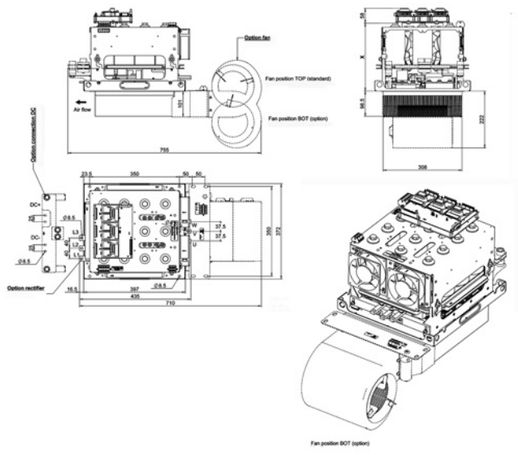
**Footnotes:** 2) In production new

## Packages

**Frames**



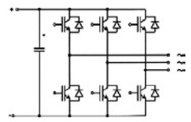

**Size 1**




Dimensions in mm

# Stacks / SEMIKUBE SlimLine

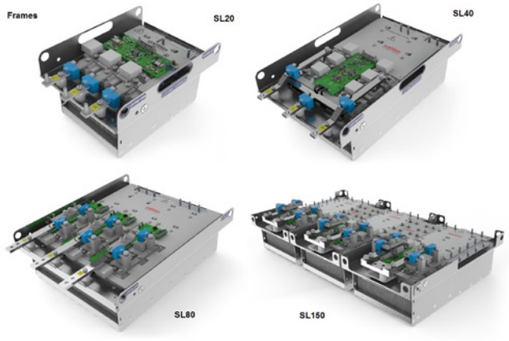
| Type | $V_{AC}$ | $V_{DC}$ | Current | Component Family | Cooling | Frame | Isolated | Topology |
|---|---|---|---|---|---|---|---|---|
| | V | V | A | | | | | |
| **3-phase inverter** | | | | | | | | |
| **SKS SL 20 GD 50/10 - E4 P1 G** [2] | 500 | 1000 | 230 | SEMITRANS | Forced-air cooled | SL20 | - | |
| **SKS SL 40 GD 50/10 - E4 P1 G** [2] | 500 | 1000 | 440 | SEMITRANS | Forced-air cooled | SL40 | - | |
| **SKS SL 80 GD 50/10 - E4 P1 G** [2] | 500 | 1000 | 750 | SEMITRANS | Forced-air cooled | SL80 | - | |
| **SKS SL 150 GD 50/10 - E4 P1 G** [2] | 500 | 1000 | 1500 | SEMITRANS | Forced-air cooled | SL150 | - | |
| **SKS SL 20 GD 50/10 - E4 P1 AF** [2] | 500 | 1000 | 230 | SEMITRANS | Forced-air cooled | SL20 | - | |
| **SKS SL 40 GD 50/10 - E4 P1 AF** [2] | 500 | 1000 | 440 | SEMITRANS | Forced-air cooled | SL40 | - | |
| **SKS SL 80 GD 50/10 - E4 P1 AF** [2] | 500 | 1000 | 750 | SEMITRANS | Forced-air cooled | SL80 | - | |
| **SKS SL 150 GD 50/10 - E4 P1 AF** [2] | 500 | 1000 | 1500 | SEMITRANS | Forced-air cooled | SL150 | - | |



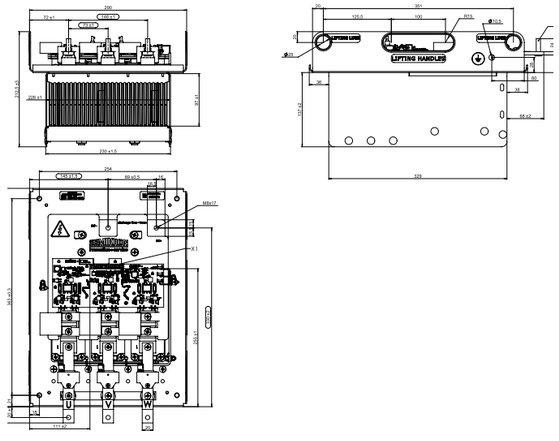
**Footnotes:** 2) In production new

## Packages

**Semikube SlimLine**




**SL 20**



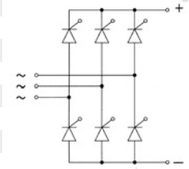
Dimensions in mm

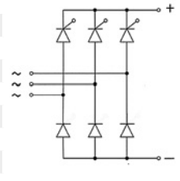
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+ 370 64 021 081
info@abn-a.com



# Stacks / SEMISTACK CLASSICS

| Type | $V_{AC}$ | $V_{DC}$ | DC Current | Component Family | Cooling | Heatsink profile | Isolated | Topology |
|---|---|---|---|---|---|---|---|---|
| | V | V | A | | | | | |
| **3-phase fully-controlled thyristor bridge rectifier** | | | | | | | | |
| **SKS 88N B6C 60 V16** | 500 | 670 | 88 | SEMIPACK 1 | Natural cooled | P3/180 | yes | |
| **SKS 88N B6C 60 V16 SU** | 500 | 670 | 88 | SEMIPACK 1 | Natural cooled | P3/180 | yes | |
| **SKS 180F B6C 120 V16** | 500 | 670 | 180 | SEMIPACK 1 | Forced-air cooled | P3/180 | yes | |
| **SKS 180F B6C 120 V16 SU** | 500 | 670 | 180 | SEMIPACK 1 | Forced-air cooled | P3/180 | yes | |
| **SKS 215N B6C 145 V16** | 500 | 670 | 215 | Stud devices | Natural cooled | P1/150 | no | |
| **SKS 215N B6C 145 V16 SU** | 500 | 670 | 215 | Stud devices | Natural cooled | P1/150 | no | |
| **SKS 250F B6C 170 V16** | 500 | 670 | 250 | SEMIPACK 2 | Forced-air cooled | P3/265 | yes | |
| **SKS 250F B6C 170 V16 SU** | 500 | 670 | 250 | SEMIPACK 2 | Forced-air cooled | P3/265 | yes | |
| **SKS 355N B6C 240 V16** | 500 | 670 | 355 | Stud devices | Natural cooled | P1/200 | no | |
| **SKS 355N B6C 240 V16 SU** | 500 | 670 | 355 | Stud devices | Natural cooled | P1/200 | no | |
| **SKS 365F B6C 245 V16** | 500 | 670 | 365 | SEMIPACK 2 | Forced-air cooled | P16/200 | yes | |
| **SKS 365F B6C 245 V16 SU** | 500 | 670 | 365 | SEMIPACK 2 | Forced-air cooled | P16/200 | yes | |
| **SKS 570F B6C 380 V16** | 500 | 670 | 570 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 570F B6C 380 V16 SU** | 500 | 670 | 570 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 640F B6C 430 V16** | 500 | 670 | 640 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 640F B6C 430 V16 SU** | 500 | 670 | 640 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 700N B6C 470 V16** | 500 | 670 | 700 | Capsules | Natural cooled | P11/415 | no | |
| **SKS 700N B6C 470 V16 SU** | 500 | 670 | 700 | Capsules | Natural cooled | P11/415 | no | |
| **SKS 845N B6C 570 V16** | 500 | 670 | 845 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 845N B6C 570 V16 SU** | 500 | 670 | 845 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 970F B6C 650 V16** | 500 | 670 | 970 | SEMIPACK 5 | Forced-air cooled | P16/300 | yes | |
| **SKS 970F B6C 650 V16 SU** | 500 | 670 | 970 | SEMIPACK 5 | Forced-air cooled | P16/300 | yes | |
| **SKS 1000N B6C 670 V16** | 500 | 670 | 1000 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 1000N B6C 670 V16 SU** | 500 | 670 | 1000 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 1200F B6C 800 V16** | 500 | 670 | 1200 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1200F B6C 800 V16 SU** | 500 | 670 | 1200 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1500F B6C 1010 V16** | 500 | 670 | 1500 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1500F B6C 1010 V16 SU** | 500 | 670 | 1500 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1890F B6C 1270 V16** | 500 | 670 | 1890 | Capsules | Forced-air cooled | P18/180 | no | |
| **SKS 1890F B6C 1270 V16 ZU** | 500 | 670 | 1890 | Capsules | Forced-air cooled | P18/180 | no | |
| **SKS 2580F B6C 1730 V16** | 500 | 670 | 2580 | Capsules | Forced-air cooled | N4/250 | no | |
| **SKS 2580F B6C 1730 V16 ZU** | 500 | 670 | 2580 | Capsules | Forced-air cooled | N4/250 | no | |
| **SKSE 2580F B6C 1730 V16** [2] | 500 | 670 | 2580 | Capsules | Forced-air cooled | Z5/120 | no | |
| **SKSE 2580F B6C 1730 V16 ZU** [2] | 500 | 670 | 2580 | Capsules | Forced-air cooled | Z5/120 | no | |
| **SKSE 1890F B6C 1270 V16 ZU** [2] | 500 | 670 | 1890 | Capsules | Forced-air cooled | Z5/90 | no | |
| **SKSE 1890F B6C 1270 V16** [2] | 500 | 670 | 1890 | Capsules | Forced-air cooled | Z5/90 | no | |
| **SKSE 1500F B6C 1010 V16 SU** [2] | 500 | 670 | 1500 | Capsules | Forced-air cooled | Z5/60 | no | |
| **SKSE 1500F B6C 1010 V16** [2] | 500 | 670 | 1500 | Capsules | Forced-air cooled | Z5/60 | no | |
| **SKSE 1200F B6C 800 V16 SU** [2] | 500 | 670 | 1200 | Capsules | Forced-air cooled | Z5/60 | no | |
| **SKSE 1200F B6C 800 V16** [2] | 500 | 670 | 1200 | Capsules | Forced-air cooled | Z5/60 | no | |
| **3-phase half-controlled bridge rectifier** | | | | | | | | |
| **SKS 88N B6HK 60 V16** | 500 | 670 | 88 | SEMIPACK 1 | Natural cooled | P3/180 | yes | |
| **SKS 88N B6HK 60 V16 SU** | 500 | 670 | 88 | SEMIPACK 1 | Natural cooled | P3/180 | yes | |
| **SKS 180F B6HK 120 V16** | 500 | 670 | 180 | SEMIPACK 1 | Forced-air cooled | P3/180 | yes | |
| **SKS 180F B6HK 120 V16 SU** | 500 | 670 | 180 | SEMIPACK 1 | Forced-air cooled | P3/180 | yes | |
| **SKS 215N B6HK 145 V16** | 500 | 670 | 215 | Stud devices | Natural cooled | P1/150 | no | |
| **SKS 215N B6HK 145 V16 SU** | 500 | 670 | 215 | Stud devices | Natural cooled | P1/150 | no | |
| **SKS 250F B6HK 170 V16** | 500 | 670 | 250 | SEMIPACK 2 | Forced-air cooled | P3/265 | yes | |
| **SKS 250F B6HK 170 V16 SU** | 500 | 670 | 250 | SEMIPACK 2 | Forced-air cooled | P3/265 | yes | |
| **SKS 355N B6HK 240 V16** | 500 | 670 | 355 | Stud devices | Natural cooled | P1/200 | no | |
| **SKS 355N B6HK 240 V16 SU** | 500 | 670 | 355 | Stud devices | Natural cooled | P1/200 | no | |
| **SKS 365F B6HK 245 V16** | 500 | 670 | 365 | SEMIPACK 2 | Forced-air cooled | P16/200 | yes | |
| **SKS 365F B6HK 245 V16 SU** | 500 | 670 | 365 | SEMIPACK 2 | Forced-air cooled | P16/200 | yes | |
| **SKS 570F B6HK 380 V16** | 500 | 670 | 570 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 570F B6HK 380 V16 SU** | 500 | 670 | 570 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |

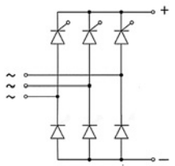


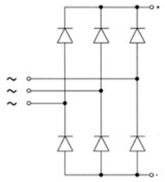


**Footnotes:** 2) In production new

# Stacks / SEMISTACK CLASSICS

| Type | $V_{AC}$ V | $V_{DC}$ V | DC Current A | Component Family | Cooling | Heatsink profile | Isolated | Topology |
|---|---|---|---|---|---|---|---|---|
| **3-phase half-controlled bridge rectifier** | | | | | | | | |
| **SKS 640F B6HK 430 V16** | 500 | 670 | 640 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 640F B6HK 430 V16 SU** | 500 | 670 | 640 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 700N B6HK 470 V16** | 500 | 670 | 700 | Capsules | Natural cooled | P11/415 | no | |
| **SKS 700N B6HK 470 V16 SU** | 500 | 670 | 700 | Capsules | Natural cooled | P11/415 | no | |
| **SKS 845N B6HK 570 V16** | 500 | 670 | 845 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 845N B6HK 570 V16 SU** | 500 | 670 | 845 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 970F B6HK 650 V16** | 500 | 670 | 970 | SEMIPACK 5 | Forced-air cooled | P16/300 | yes | |
| **SKS 970F B6HK 650 V16 SU** | 500 | 670 | 970 | SEMIPACK 5 | Forced-air cooled | P16/300 | yes | |
| **SKS 1000N B6HK 670 V16** | 500 | 670 | 1000 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 1000N B6HK 670 V16 SU** | 500 | 670 | 1000 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 1200F B6HK 800 V16** | 500 | 670 | 1200 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1200F B6HK 800 V16 SU** | 500 | 670 | 1200 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1500F B6HK 1010 V16** | 500 | 670 | 1500 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1500F B6HK 1010 V16 SU** | 500 | 670 | 1500 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1890F B6HK 1270 V16** | 500 | 670 | 1890 | Capsules | Forced-air cooled | P18/180 | no | |
| **SKS 1890F B6HK 1270 V16 ZU** | 500 | 670 | 1890 | Capsules | Forced-air cooled | P18/180 | no | |
| **SKS 2580F B6HK 1730 V16** | 500 | 670 | 2580 | Capsules | Forced-air cooled | N4/250 | no | |
| **SKS 2580F B6HK 1730 V16 ZU** | 500 | 670 | 2580 | Capsules | Forced-air cooled | N4/250 | no | |
| **3-phase uncontrolled bridge rectifier** | | | | | | | | |
| **SKS 91N B6U 60 V16** | 500 | 670 | 91 | SEMIPACK 1 | Natural cooled | P3/180 | yes | |
| **SKS 185F B6U 125 V16** | 500 | 670 | 185 | SEMIPACK 1 | Forced-air cooled | P3/180 | yes | |
| **SKS 185F B6U 125 V16 SU** | 500 | 670 | 185 | SEMIPACK 1 | Forced-air cooled | P3/180 | yes | |
| **SKS 290F B6U 195 V16** | 500 | 670 | 290 | SEMIPACK 2 | Forced-air cooled | P3/265 | yes | |
| **SKS 290F B6U 195 V16 SU** | 500 | 670 | 290 | SEMIPACK 2 | Forced-air cooled | P3/265 | yes | |
| **SKS 425N B6U 285 V16** | 500 | 670 | 425 | Stud devices | Natural cooled | P1/150 | no | |
| **SKS 425N B6U 285 V16 SU** | 500 | 670 | 425 | Stud devices | Natural cooled | P1/150 | no | |
| **SKS 430F B6U 290 V16** | 500 | 670 | 430 | SEMIPACK 2 | Forced-air cooled | P16/200 | yes | |
| **SKS 430F B6U 290 V16 SU** | 500 | 670 | 430 | SEMIPACK 2 | Forced-air cooled | P16/200 | yes | |
| **SKS 535N B6U 360 V16** | 500 | 670 | 535 | Stud devices | Natural cooled | P1/200 | no | |
| **SKS 535N B6U 360 V16 SU** | 500 | 670 | 535 | Stud devices | Natural cooled | P1/200 | no | |
| **SKS 660F B6U 440 V16** | 500 | 670 | 660 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 660F B6U 440 V16 SU** | 500 | 670 | 660 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 850F B6U 570 V16** | 500 | 670 | 850 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 850F B6U 570 V16 SU** | 500 | 670 | 850 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 1185N B6U 795 V16** | 500 | 670 | 1185 | Capsules | Natural cooled | P11/415 | no | |
| **SKS 1185N B6U 795 V16 SU** | 500 | 670 | 1185 | Capsules | Natural cooled | P11/415 | no | |
| **SKS 1220F B6U 820 V16** | 500 | 670 | 1220 | SEMIPACK 5 | Forced-air cooled | P16/300 | yes | |
| **SKS 1220F B6U 820 V16 SU** | 500 | 670 | 1220 | SEMIPACK 5 | Forced-air cooled | P16/300 | yes | |
| **SKS 1630N B6U 1090 V16** | 500 | 670 | 1630 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 1630N B6U 1090 V16 ZU** | 500 | 670 | 1630 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 1910N B6U 1280 V16** | 500 | 670 | 1910 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 1910N B6U 1280 V16 ZU** | 500 | 670 | 1910 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 1950F B6U 1305 V16** | 500 | 670 | 1950 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1950F B6U 1305 V16 ZU** | 500 | 670 | 1950 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 2300F B6U 1540 V16** | 500 | 670 | 2300 | Capsules | Forced-air cooled | P18/180 | no | |
| **SKS 2300F B6U 1540 V16 ZU** | 500 | 670 | 2300 | Capsules | Forced-air cooled | P18/180 | no | |
| **SKS 4015F B6U 2690 V16** | 500 | 670 | 4015 | Capsules | Forced-air cooled | N4/250 | no | |
| **SKSE 2300F B6U 1540 V16 ZU** [2)] | 500 | 670 | 2300 | Capsules | Forced-air cooled | Z5/120 | no | |
| **SKSE 2300F B6U 1540 V16** [2)] | 500 | 670 | 2300 | Capsules | Forced-air cooled | Z5/120 | no | |
| **SKSE 1950F B6U 1305 V16 ZU** [2)] | 500 | 670 | 1950 | Capsules | Forced-air cooled | Z5/90 | no | |
| **SKSE 1950F B6U 1305 V16** [2)] | 500 | 670 | 1950 | Capsules | Forced-air cooled | Z5/90 | no | |



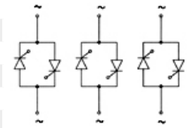


**Footnotes:** 2) In production new



# Stacks / SEMISTACK CLASSICS

| Type | $V_{AC}$ V | $V_{DC}$ V | DC Current A | Component Family | Cooling | Heatsink profile | Isolated | Topology |
|---|---|---|---|---|---|---|---|---|
| **3-phase reverse parallel thyristor converter** | | | | | | | | |
| **SKS 67N W3C 60 V16** | 500 | - | 67 | SEMIPACK 1 | Natural cooled | P3/180 | yes | |
| **SKS 67N W3C 60 V16 SU** | 500 | - | 67 | SEMIPACK 1 | Natural cooled | P3/180 | yes | |
| **SKS 140F W3C 120 V16** | 500 | - | 140 | SEMIPACK 1 | Forced-air cooled | P3/180 | yes | |
| **SKS 140F W3C 120 V16 SU** | 500 | - | 140 | SEMIPACK 1 | Forced-air cooled | P3/180 | yes | |
| **SKS 170N W3C 150 V16** | 500 | - | 170 | Stud devices | Natural cooled | P1/150 | no | |
| **SKS 170N W3C 150 V16 SU** | 500 | - | 170 | Stud devices | Natural cooled | P1/150 | no | |
| **SKS 195F W3C 170 V16** | 500 | - | 195 | SEMIPACK 2 | Forced-air cooled | P3/265 | yes | |
| **SKS 195F W3C 170 V16 SU** | 500 | - | 195 | SEMIPACK 2 | Forced-air cooled | P3/265 | yes | |
| **SKS 275N W3C 240 V16** | 500 | - | 275 | Stud devices | Natural cooled | P1/200 | no | |
| **SKS 275N W3C 240 V16 SU** | 500 | - | 275 | Stud devices | Natural cooled | P1/200 | no | |
| **SKS 290F W3C 250 V16** | 500 | - | 290 | SEMIPACK 2 | Forced-air cooled | P16/200 | yes | |
| **SKS 290F W3C 250 V16 SU** | 500 | - | 290 | SEMIPACK 2 | Forced-air cooled | P16/200 | yes | |
| **SKS 450F W3C 390 V16** | 500 | - | 450 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 450F W3C 390 V16 SU** | 500 | - | 450 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 520F W3C 450 V16** | 500 | - | 520 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 520F W3C 450 V16 SU** | 500 | - | 520 | SEMIPACK 3 | Forced-air cooled | P16/200 | yes | |
| **SKS 545N W3C 470 V16** | 500 | - | 545 | Capsules | Natural cooled | P11/415 | no | |
| **SKS 545N W3C 470 V16 SU** | 500 | - | 545 | Capsules | Natural cooled | P11/415 | no | |
| **SKS 650N W3C 560 V16** | 500 | - | 650 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 650N W3C 560 V16 SU** | 500 | - | 650 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 760F W3C 660 V16** | 500 | - | 760 | SEMIPACK 5 | Forced-air cooled | P16/300 | yes | |
| **SKS 760F W3C 660 V16 SU** | 500 | - | 760 | SEMIPACK 5 | Forced-air cooled | P16/300 | yes | |
| **SKS 780N W3C 675 V16** | 500 | - | 780 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 780N W3C 675 V16 SU** | 500 | - | 780 | Capsules | Natural cooled | U3/515 | no | |
| **SKS 950F W3C 825 V16** | 500 | - | 950 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 950F W3C 825 V16 SU** | 500 | - | 950 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1180F W3C 1020 V16** | 500 | - | 1180 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1180F W3C 1020 V16 SU** | 500 | - | 1180 | Capsules | Forced-air cooled | P17/130 | no | |
| **SKS 1540F W3C 1335 V16** | 500 | - | 1540 | Capsules | Forced-air cooled | P18/180 | no | |
| **SKS 1540F W3C 1335 V16 SU** | 500 | - | 1540 | Capsules | Forced-air cooled | P18/180 | no | |
| **SKS 2150F W3C 1860 V16** | 500 | - | 2150 | Capsules | Forced-air cooled | N4/250 | no | |
| **SKS 2150F W3C 1860 V16 ZU** | 500 | - | 2150 | Capsules | Forced-air cooled | N4/250 | no | |

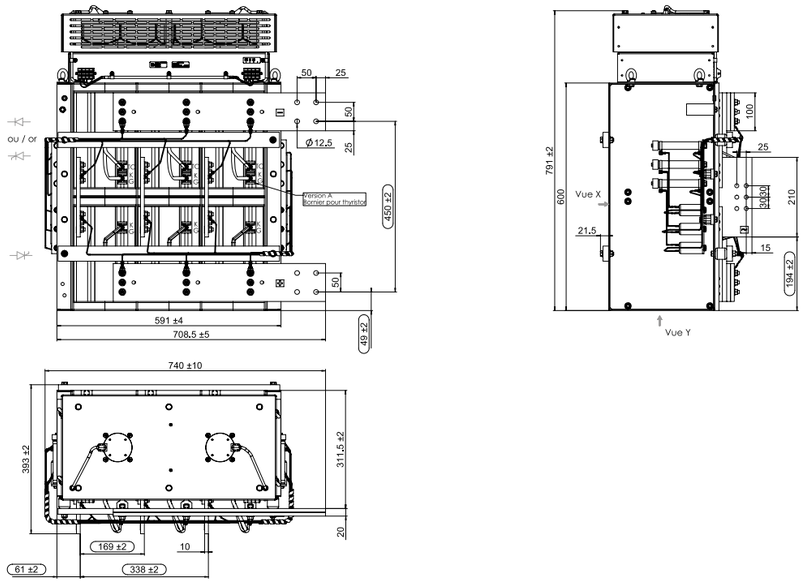


**Footnotes:** 2) In production new

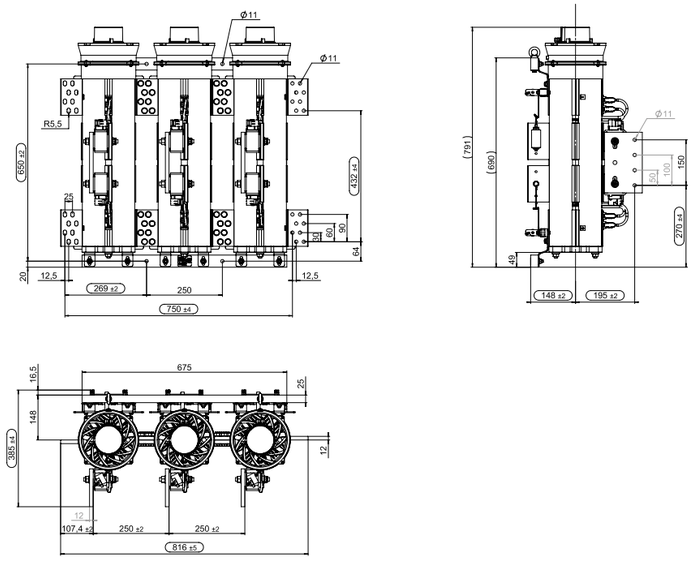
# Stacks / SEMISTACK CLASSICS

## Packages

### SKS

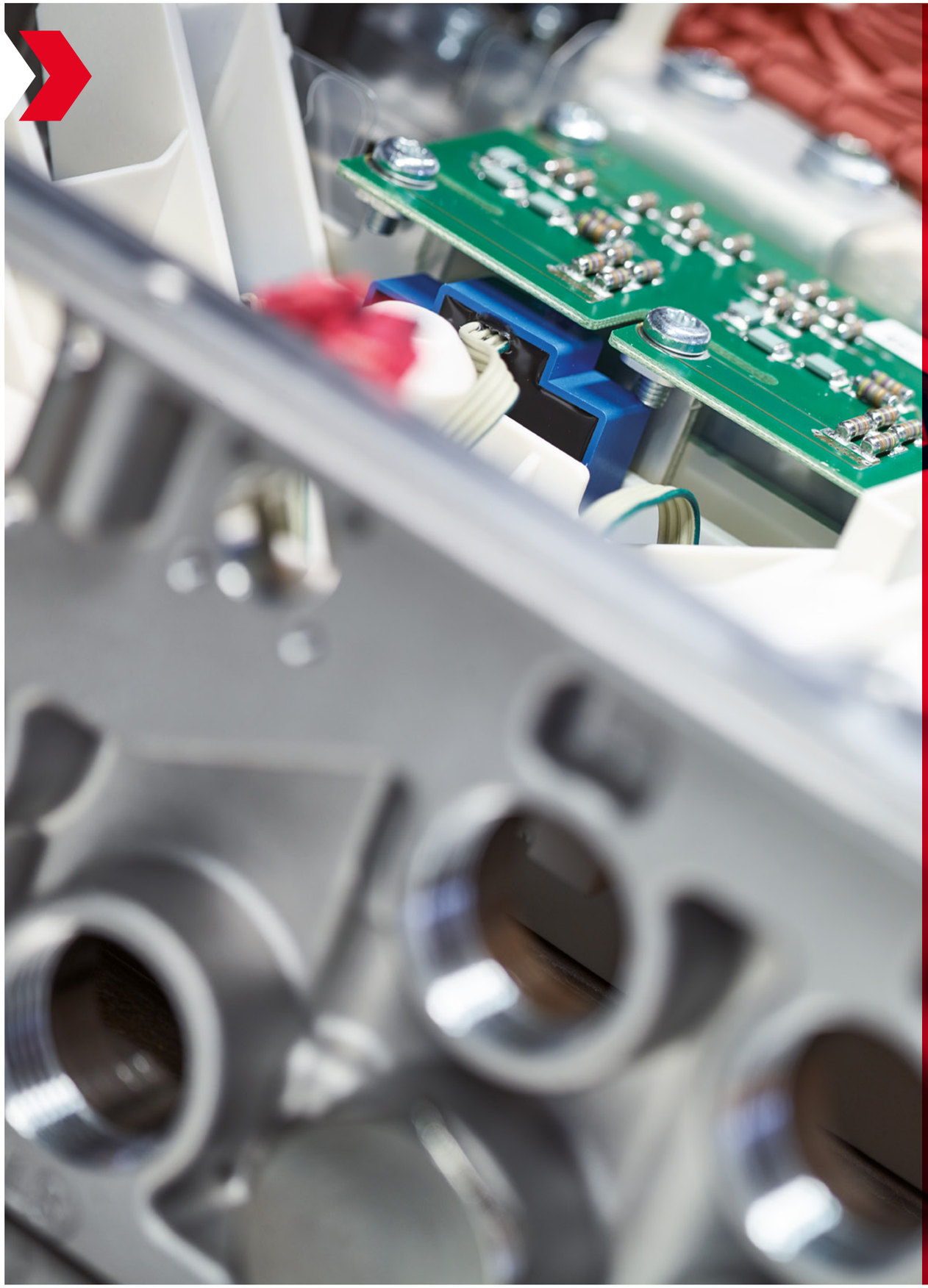



### SKSE




Dimensions in mm

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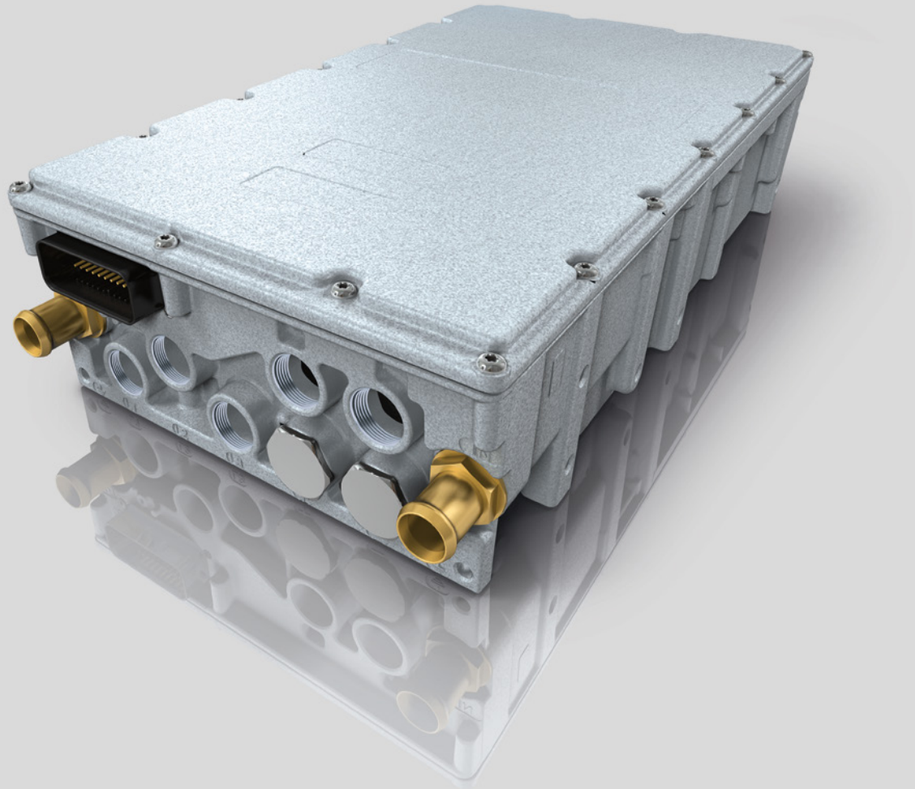
# Systems


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| SKAI®2 HV | 188 |
| SKAI®3 LV | 188 |




5

# SKAI®2 HV
# SKAI®3 LV





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## Most Compact Power Electronic System “Off-the-shelf” for Electro-Mobility

SKAI®

### Short facts

- Suitable for battery voltages 24V up to 800V
- Sintered power semiconductors
- EMI compliant
- “Off-the-shelf” versions with gate driver interface, vector control software, automotive power connections

### Key features

- Compact integration into IP67 enclosure
- Voltage, current and temperature sensors
- Gate driver with protection
- IGBT/ MOSFET power semiconductors
- Fully programmable digital signal processor
- EMI filters
- Versatile cooling system (liquid cooled, forced air cooled, base plate)
- DC link capacitors
- Motor control software

### Applications

The SKAI “off-the-shelf” power electronic building block family has been introduced to cover a broad range of vehicle electrification applications. Examples are electric drivetrains with standardized motor/generator flanges to fit or retrofit the drives easily into existing vehicle designs. These types of drivetrains have been developed for many vehicle types, i.e. buses, light trucks, agriculture and construction machinery as well as marine applications or cars.

### Benefits

The SKAI power electronic platform comprises highly integrated motor controllers which provide the ideal powertrain solution for mobile electric and hybrid applications.

Power densities of up to 20 kVA / liter bring about notable size reductions compared with other existing standard motor controller products. The systems are designed to operate with supply voltages of 24V to 800V and with output power ratings of up to 250 kVA. The IGBT-based SKAI 2 HV motor controller operates on sintered, 100% solder-free 600V or 1200V power semiconductors and it features polypropylene film DC-link capacitors. The MOS-based SKAI 3 LV motor controller uses established SkiiP technology with a very low-inductance connection to the DC-link capacitors, driver electronics, current, voltage and temperature sensors. It is integrated into a waterproof IP66 enclosure. The compact motor controllers can withstand high vibration amplitudes of up to 10g rms. SKAIware motor control software adds to the system function and finishes off this tried-and-tested package for the SKAI 2 HV nicely. SEMIKRON provides engineering services to support customers with the integration of SKAI 2 HV motor controller systems. Other available services include, for instance, lifetime estimation, field application support, individual parameterization of motor control software, and others.

### Product range

Versatile SKAI 2 HV “off-the-shelf” versions are available. The SKAI 3 LV is available for supply voltages between 24V and 180V. Cooling methods are liquid, forced air cooling or baseplate. Various optional services also exists, such as end-of-line flashing of customer specific software, lifetime estimation based on application profile analysis, field application support, individual parameterization of motor control software and other services (on request).

**Further information**: www.semikron.com/skai

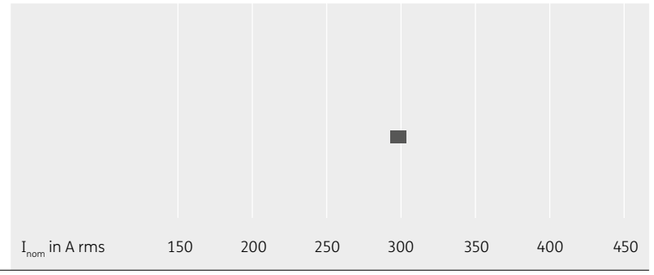
# Systems – Ultra Compact
# Power Electronics System for Utility Vehicles

SEMIKRON's motor controllers are already fully equipped with current sensors, IGBT drivers, DC link capacitors and a fast processor (DSP). The systems are designed to operate with supply voltages of 24V to 800V and with output power ratings of up to 300kVA.

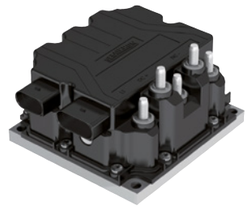
## SKAI®2 HV
## IGBT Motor Controller



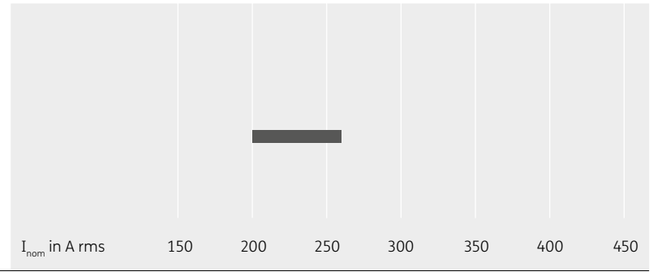
**115V up to 800V**




## SKAI®3 LV
## MOSFET Sixpack Stack



**24V up to 115V**



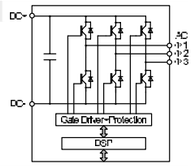
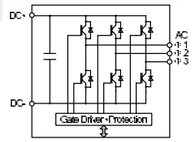
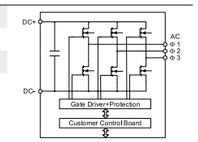

SKAI 190

For detailed information please refer to data sheets.

**Further information:** www.semikron.com/systems

# Systems / SKAI

**Type**

| | $V_{battery\ (max)}$ V | $I_{nom}$ $A_{rms}$ | Topology | Cooling | DSP | Package | Topology |
|---|---|---|---|---|---|---|---|
| **IGBT - Motor Controller** | | | | | | | |
| **SKAI 90 A2 GD06-WCI** | 450 | 300 | 3-Phase | Liquid | Yes | 7 |  |
| **SKAI 45 A2 GD12-WCI** | 800 | 300 | 3-Phase | Liquid | Yes | 7 | |
| **SKAI 90 A2 GD06-WDI** [3] | 450 | 300 | 3-Phase | Liquid | No | 7 |  |
| **SKAI 45 A2 GD12-WDI** | 800 | 300 | 3-Phase | Liquid | No | 7 | |
| **MOSFET - Motor Controller** | | | | | | | |
| **SKAI 41 A3 MD10-P** [1] | 72 | 240 | 3-Phase | Baseplate | No | A P |  |
| **SKAI 41 E3 MD10-PE** [1] | 72 | 240 | 3-Phase | Baseplate | No | E P | |
| **SKAI 48 A3 MD15-P** [1] | 120 | 230 | 3-Phase | Baseplate | No | A P | |
| **SKAI 48 E3 MD15-PE** [1] | 120 | 230 | 3-Phase | Baseplate | No | E P | |

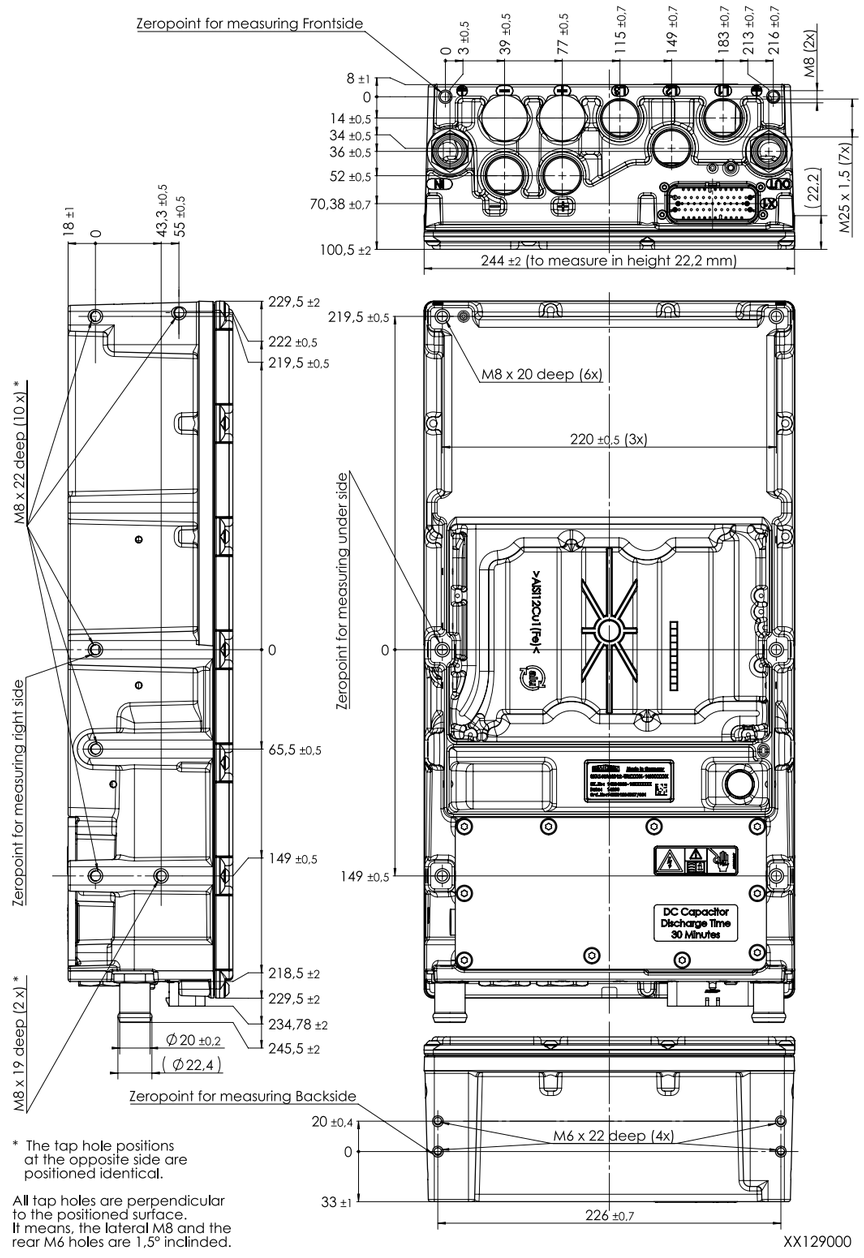


**Footnotes:** 1) Sample status / 3) Not for new designs

# Systems / SKAI

**Packages**

**7**



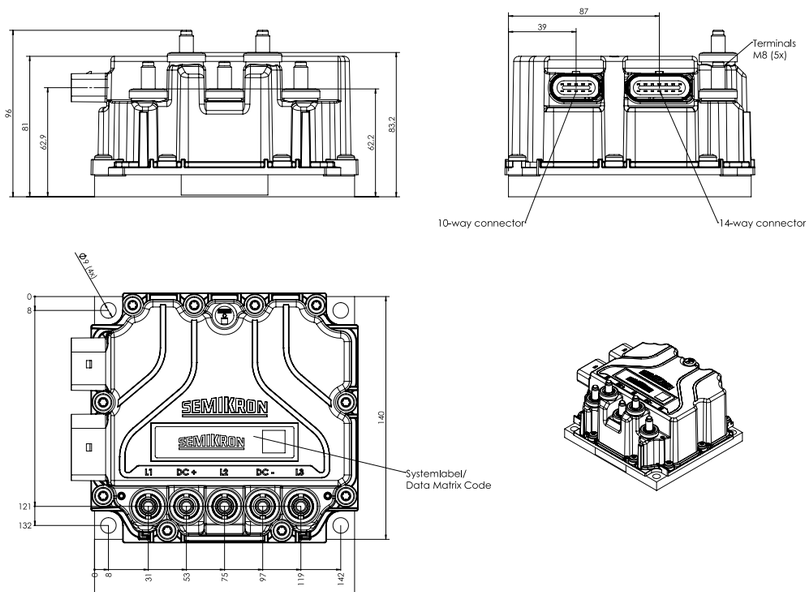

Dimensions in mm

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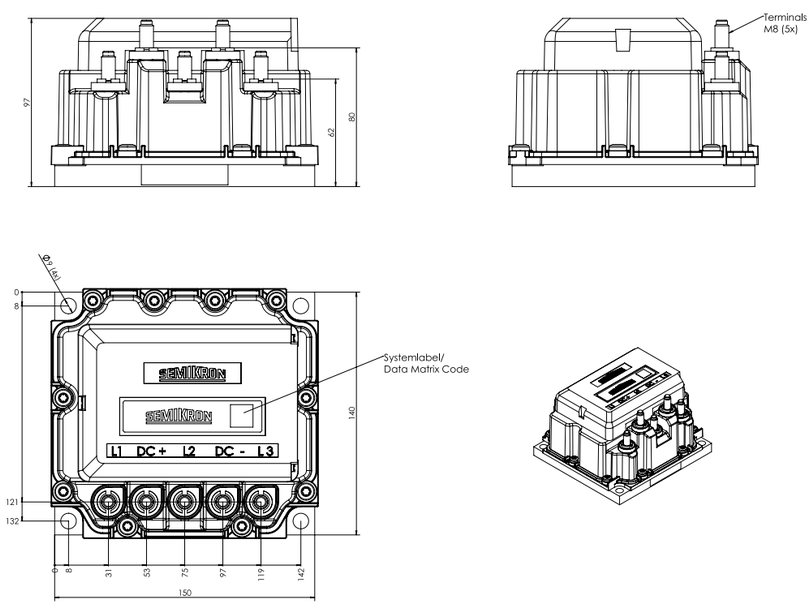
# Systems / SKAI

## Packages

**A P**




**E P**




Dimensions in mm



# Discretes

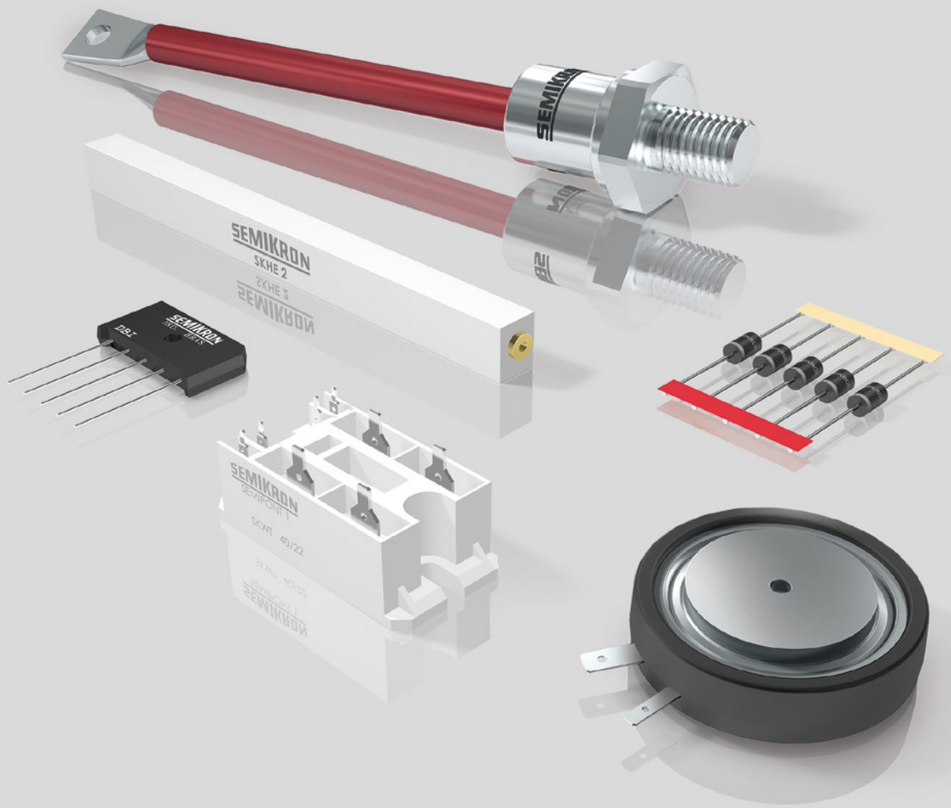

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| Discretes | 198 |
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# Discrete Diodes
# Discrete Thyristors
# Rectifier Bridges






## Discrete Devices – Robust and Easy to Use

# Discretes

### Short facts

- Discrete diodes and thyristors for low to high-power applications
- Rectifier bridges for low to medium-power applications
- Available in voltage classes from 200V to 8000V
- Current ratings from 1A to 7500A
- Wide range of case designs

### Key features

- Recommended for natural convection, forced air and water cooling
- Compact case with high current capability
- Stud and disc types: forward drop selections available for easy paralleling
- Axial diodes for PCB mounting
- Standard, avalanche and fast types

### Discrete benefits

Discrete components are used in a wide variety of applications. Particular benefits are achieved whenever high current, uncommon topologies, natural cooling or resistance to harsh conditions are required.
The SEMIKRON portfolio includes axial leaded diodes of up to 6A, diodes and thyristors in screw fit (stud) and capsule housings from 7500A and 8000V for diodes to 1200A and 1800V for thyristors.

- Easy assembly
- Hermetic sealing
- Rugged construction

### Rectifier bridge benefits

SEMIKRON rectifier bridges are the best solution in many applications where performance, space and fast production are paramount. Single or 3-phase topologies using diodes, thyristors and IGBTs in isolated compact cases are possible. Whether your preference is connection by solder, solderless spring or press-fit contacts, mechanical screw connections, fast-on or busbars, SEMIKRON has the right product for your needs.

### Discrete applications

Key applications include welding machines, battery chargers, electroplating, soft starters, DC motor control, AC controllers (e.g. for temperature control), alternators and others. With sealed cases, discrete devices make sense for both natural convection and forced cooling, allowing for use in wider fields of application. With over 50 years of field experience and millions of units produced every year, the SEMIKRON portfolio provides options that are competitive, flexible and highly reliable

### Avalanche diodes

- No overvoltage suppressors needed
- Insensitive to short term reverse overloads
- High blocking voltages possible without static or dynamic voltage sharing topology

### Rectifier bridge applications

Key applications include battery chargers, motor drive input rectifiers, power supplies, DC motor control, rectifiers with PFC, AC controllers, static switches (SKWT types) for natural convection or forced cooling.

**Further information**: www.semikron.com/discrete-diodes-thyristors
www.semikron.com/rectifier-bridges

# Discretes

SEMIKRON offers discrete diodes in three major packaging styles; axial epoxy diodes for PCB mounting, stud screw-fit diodes that are suitable for applications such as welding, rotating rectifiers in brushless generators thanks to their robustness and easy assembly, as well as capsule (disc) diodes for high-power applications.

The line includes standard rectifiers with current ratings up to 7500A, fast rectifiers up to 140A, and avalanche rectifiers that allow for high voltage rectification of up to 8000V with single diodes and much more when connected in series. Typical applications: all-purpose rectifiers, battery chargers, welding equipment, rotating rectifiers for brushless generators, electroplating, free-wheeling diodes, high-voltage rectifiers, electrostatic filters, blocking diodes and others.

SEMIKRON's discrete thyristors are available as stud screw-fit types that are suitable for applications which require robustness and easy assembly, plus capsule (disc) types for high-power applications. The line also has phase control types for current ratings of up to 1200A, with blocking and reverse voltages of up to 1800V, covering the major market applications. Typical applications are soft-starters, resistance heating, static switches, battery chargers, welding equipment, static excitation and others.


**Discrete diodes**

| | |
|---|---|
| HV Screw-Axial | 200 |
| Leaded | 201 |
| Stud Screw-Fit | 202 |
| Capsules | 205 |

**Discrete thyristors**

| | |
|---|---|
| Stud Screw-Fit | 207 |
| Capsules | 208 |

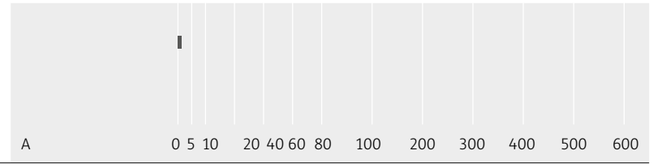

For detailed information please refer to data sheets.

**Further information**
www.semikron.com/discrete-diodes
www.semikron.com/discrete-thyristors

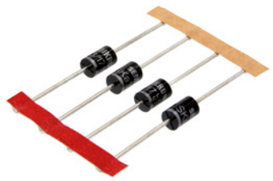
## Discrete Diodes

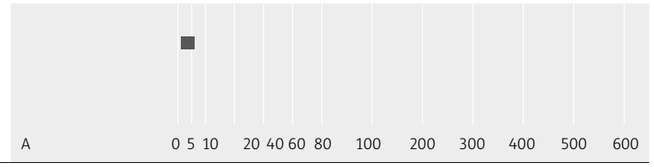
**HV Screw-Axial** — **4800V up to 8000V**





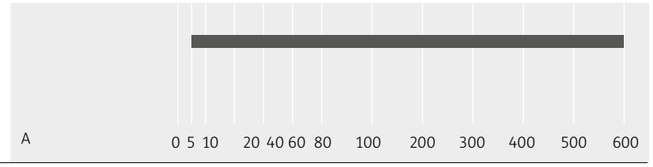

**Leaded** — **100V up to 2000V**





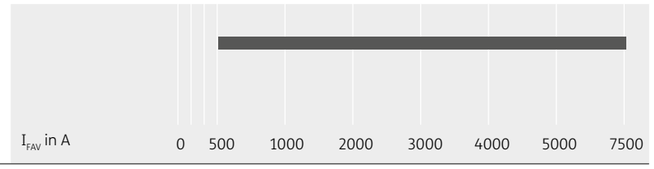

**Stud Screw-Fit** — **400V up to 5000V**






**Capsules** — **200V up to 2200V**

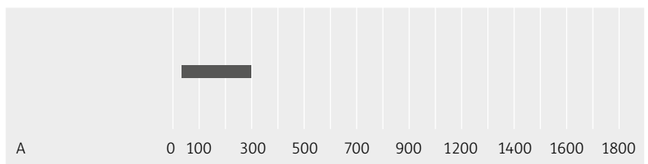





## Discrete Thyristors

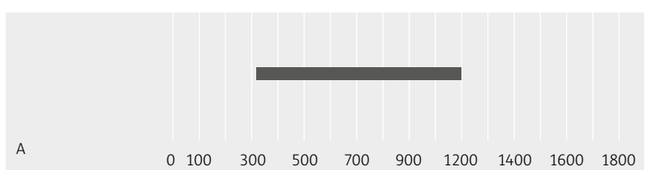
**Stud Screw-Fit** — **400V up to 1800V**






**Capsules** — **400V up to 1800V**





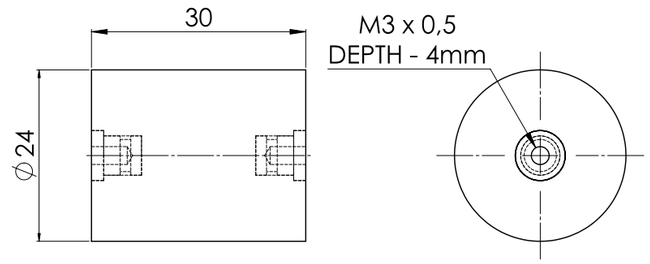

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# Discretes / Diodes / HV Screw Axial

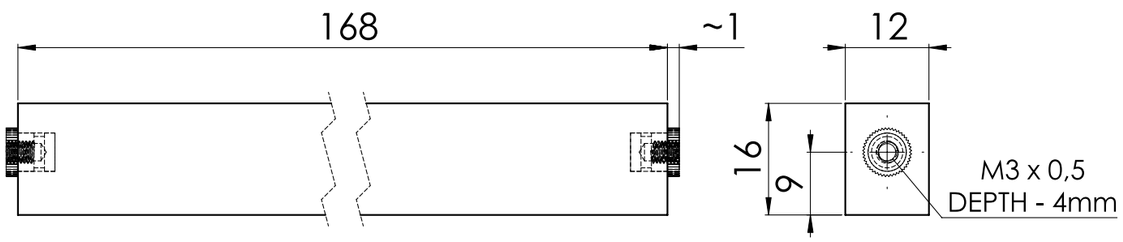
| Type | Voltage (V) | $I_{FAV}$ @ $T_{oil}$ | $T_{oil}$ | $I_{FSM}$@$T_j$=25°C | $V_F$ | $R_{th(j-s)}$ per chip | $T_j$ | Package | Topology |
|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | K/W | °C | | |
| **SKHE 2000/900-1,2** | 4800 | 1.5 | 75 | 135 | 3.60 | 21 | -40 ... +150 | SKHE 1 | |
| **SKHE 3500/1550-2,0** | 8000 | 2.5 | 75 | 270 | 6.70 | 8 | -40 ... +150 | SKHE 2 | |

## Packages

**SKHE 1**




**SKHE 2**




Dimensions in mm



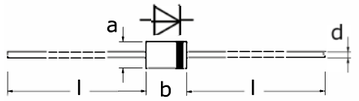
# Discretes / Diodes / Leaded

| Type | Voltage (V) | Current (A) | $T_C$ | $I_{FSM}$@$T_j$=25°C | $V_F$ | $R_{th(j-c)}$ per chip | $T_j$ | Package | Topology |
|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | K/W | °C | | |
| **Standard recovery** | | | | | | | | | |
| **SK 1** | 1000-1600 | 1.45 | 85 | 60 | 1.50 | 85 | -40 ... +150 | E33 | |
| **SKN 2,5** | 400-1600 | 2.5 | 173 | 180 | 1.20 | 55 | -40 ... +180 | E5 | |
| **SK 3** | 400-1600 | 3 | 92 | 180 | 1.20 | 60 | -40 ... +150 | E34 | |
| **SKN 5** | 200-1600 | 5 | 169 | 190 | 1.25 | 25 | -40 ... +180 | E6 | |
| **SK 6**[2)] | 400-1600 | 6 | 46 | 375 | 1.10 | 55 | -40 ... +150 | SK6 | |
| **Avalanche** | | | | | | | | | |
| **SKa1** | 1300-1700 | 1.45 | 85 | 60 | 1.50 | 85 | -40 ... +150 | E33 | |
| **SKNa2** | 1300-1700 | 2 | 175 | 180 | 1.20 | 2.5 | -40 ... +150 | E5 | |
| **SKa3** | 1300-2000 | 3 | 92 | 180 | 1.20 | 60 | -40 ... +150 | E34 | |
| **SKNa4** | 1300-1700 | 4 | 171 | 190 | 1.20 | 25 | -40 ... +150 | E6 | |
| **SKa 6**[2)] | 1300-2000 | 6 | 46 | 375 | 1.10 | 55 | -40 ... +150 | SK6 | |

**Footnotes:** 2) In production new

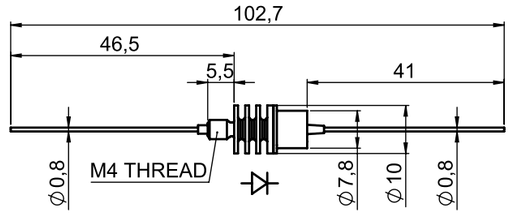
## Packages

**E33 / E34 / SK6**

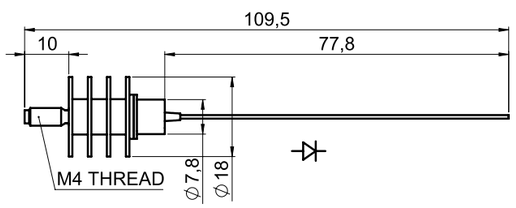



| Cases | a | b | l | d |
|---|---|---|---|---|
| E 33 | 4,5 | 7 | 28 | 0,75 |
| E 34 | 6 | 9 | 27 | 1,18 |
| SK6 | 7,5 | 9 | 27 | 1,28 |

**E5**




**E6**




Dimensions in mm

# Discretes / Diodes / Stud Screw Fit

| Type | Voltage (V) | Current (A) | $T_C$ | $I_{FSM}$@$T_j$=25°C | $V_F$ | $R_{th(j-c)}$ per chip | $T_j$ | Package | Topology |
|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | K/W | °C | | |
| **Standard recovery** | | | | | | | | | |
| **SKN 20** | 400-1600 | 20 | 125 | 375 | 1.55 | 2 | -40 ... +180 | E9 | |
| **SKN 26** | 400-1600 | 25 | 100 | 375 | 1.55 | 2 | -40 ... +180 | E8 | |
| **SKN 45** | 400-1600 | 45 | 125 | 700 | 1.60 | 0.85 | -40 ... +180 | E12 | |
| **SKN 46** | 800-1600 | 45 | 125 | 700 | 1.60 | 0.85 | -40 ... +180 | E11 | |
| **SKN 70** | 400-1600 | 70 | 125 | 1150 | 1.50 | 0.55 | -40 ... +180 | E12 | |
| **SKN 71** | 400-1600 | 70 | 125 | 1150 | 1.50 | 0.55 | -40 ... +180 | E11 | |
| **SKN 86** [2] | 800-1600 | 86 | 129 | 1500 | 1.20 | 0.4 | -40 ... +180 | E10 | |
| **SKN 94** | 200-1200 | 96 | 141 | 2000 | 1.20 | 0.35 | -40 ... +180 | E12 | |
| **SKN 96** | 200-1200 | 96 | 141 | 2000 | 1.20 | 0.35 | -40 ... +180 | E10 | |
| **SKN 100** | 400-1800 | 100 | 120 | 1750 | 1.55 | 0.45 | -40 ... +180 | E13 | |
| **SKN 130** | 400-1800 | 130 | 125 | 2500 | 1.50 | 0.35 | -40 ... +180 | E14 | |
| **SKN 152** | 200-1200 | 152 | 139 | 4500 | 1.40 | 0.22 | -40 ... +180 | DO-8 | |
| **SKN 240** | 400-1800 | 240 | 125 | 6000 | 1.40 | 0.2 | -40 ... +180 | E15 | |
| **SKN 262** | 2000-2800 | 262 | 115 | 6000 | 1.40 | 0.2 | -40 ... +180 | E45 | |
| **SKN 300** | 400-1600 | 300 | 124 | 6500 | 1.40 | 0.15 | -40 ... +180 | E15 | |
| **SKN 320** | 400-1600 | 320 | 125 | 9000 | 1.35 | 0.16 | -40 ... +180 | E16 | |
| **SKN 390** | 400-1600 | 390 | 117 | 9000 | 1.35 | 0.13 | -40 ... +180 | E15 | |
| **SKN 400** | 1800-3600 | 400 | 100 | 9000 | 1.45 | 0.11 | -40 ... +160 | E17 | |
| **SKN 600** [2] | 400-1600 | 600 | 105 | 14000 | 1.33 | 0.1 | -40 ... +180 | E16 | |
| **SKR 20** | 400-1600 | 20 | 125 | 375 | 1.55 | 2 | -40 ... +180 | E9 | |
| **SKR 26** | 400-1600 | 25 | 100 | 375 | 1.55 | 2 | -40 ... +180 | E8 | |
| **SKR 45** | 400-1600 | 45 | 125 | 700 | 1.60 | 0.85 | -40 ... +180 | E12 | |
| **SKR 46** | 800-1600 | 45 | 125 | 700 | 1.60 | 0.85 | -40 ... +180 | E11 | |
| **SKR 70** | 400-1600 | 70 | 125 | 1150 | 1.50 | 0.55 | -40 ... +180 | E12 | |
| **SKR 71** | 400-1600 | 70 | 125 | 1150 | 1.50 | 0.55 | -40 ... +180 | E11 | |
| **SKR 86** [2] | 800-1600 | 86 | 129 | 1500 | 1.20 | 0.4 | -40 ... +180 | E10 | |
| **SKR 94** | 200-1200 | 96 | 141 | 2000 | 1.20 | 0.35 | -40 ... +180 | E12 | |
| **SKR 96** | 200-1200 | 96 | 141 | 2000 | 1.20 | 0.35 | -40 ... +180 | E10 | |
| **SKR 100** | 400-1800 | 100 | 120 | 1750 | 1.55 | 0.45 | -40 ... +180 | E13 | |
| **SKR 130** | 400-1800 | 130 | 125 | 2500 | 1.50 | 0.35 | -40 ... +180 | E14 | |
| **SKR 152** | 200-1200 | 152 | 139 | 4500 | 1.40 | 0.22 | -40 ... +180 | DO-8 | |
| **SKR 240** | 400-1800 | 240 | 125 | 6000 | 1.40 | 0.2 | -40 ... +180 | E15 | |
| **SKR 262** | 2000-2800 | 262 | 115 | 6000 | 1.40 | 0.2 | -40 ... +180 | E45 | |
| **SKR 300** | 400-1600 | 300 | 124 | 6500 | 1.40 | 0.15 | -40 ... +180 | E15 | |
| **SKR 320** | 400-1600 | 320 | 125 | 9000 | 1.35 | 0.16 | -40 ... +180 | E16 | |
| **SKR 390** | 400-1600 | 390 | 117 | 9000 | 1.35 | 0.13 | -40 ... +180 | E15 | |
| **SKR 400** | 1800-3600 | 400 | 100 | 9000 | 1.45 | 0.11 | -40 ... +160 | E17 | |
| **SKR 600** [2] | 400-1600 | 600 | 105 | 14000 | 1.33 | 0.1 | -40 ... +180 | E16 | |
| **Fast recovery** | | | | | | | | | |
| **SKN 2F17** | 400-1000 | 17 | 113 | 450 | 2.15 | 1.2 | -40 ... +150 | E7 | |
| **SKN 3F20** | 800-1200 | 20 | 104 | 375 | 2.15 | 1.2 | -40 ... +150 | E7 | |
| **SKN 2F50** | 400-1000 | 50 | 105 | 1100 | 1.80 | 0.5 | -40 ... +150 | E10 | |
| **SKN 60F** | 1200-1700 | 60 | 100 | 1400 | 1.75 | 0.5 | -40 ... +150 | E10 | |
| **SKN 135F** | 800-1200 | 135 | 100 | 2500 | 1.95 | 0.2 | -40 ... +150 | E14 | |
| **SKN 136F** | 800-1200 | 135 | 100 | 2500 | 1.95 | 0.2 | -40 ... +150 | E31 | |
| **SKN 140F** | 1200-1700 | 140 | 100 | 2500 | 1.80 | 0.2 | -40 ... +150 | E14 | |
| **SKN 141F** | 1200-1700 | 140 | 100 | 2500 | 1.80 | 0.2 | -40 ... +150 | E31 | |
| **SKR 2F17** | 400-1000 | 17 | 113 | 450 | 2.15 | 1.2 | -40 ... +150 | E7 | |
| **SKR 3F20** | 800-1200 | 20 | 104 | 375 | 2.15 | 1.2 | -40 ... +150 | E7 | |
| **SKR 2F50** | 400-1000 | 50 | 95 | 1100 | 1.80 | 0.5 | -40 ... +150 | E10 | |
| **SKR 60F** | 1200-1700 | 60 | 100 | 1400 | 1.75 | 0.5 | -40 ... +150 | E10 | |
| **SKR 135F** | 800-1200 | 135 | 100 | 2500 | 1.95 | 0.2 | -40 ... +150 | E14 | |
| **SKR 136F** | 800-1200 | 135 | 100 | 2500 | 1.95 | 0.2 | -40 ... +150 | E31 | |
| **SKR 140F** | 1200-1700 | 140 | 100 | 2500 | 1.80 | 0.2 | -40 ... +150 | E14 | |

**Footnotes:** 1) Sample status / 2) In production new

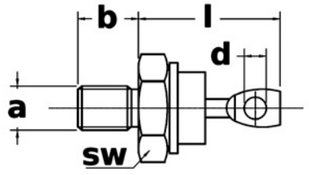
Discretes / Diodes / Stud Screw Fit

| Type | Voltage (V) | Current (A) | $T_C$ | $I_{FSM}$@$T_j$=25°C | $V_F$ | $R_{th(j-c)}$ per chip | $T_j$ | Package | Topology |
|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | K/W | °C | | |
| **Fast recovery** | | | | | | | | | |
| **SKR 141F** | 1200-1700 | 140 | 100 | 2500 | 1.80 | 0.2 | -40 ... +150 | E31 | |
| **Avalanche** | | | | | | | | | |
| **SKNa 20** | 1300-1700 | 20 | 93 | 375 | 1.55 | 2 | -40 ... +150 | E9 | |
| **SKNa 22** | 3600-5000 | 25 | 104 | 450 | 1.95 | 1 | -40 ... +160 | E42 | |
| **SKNa 26** | 1300-1700 | 26 | 69 | 375 | 1.55 | 2 | -40 ... +150 | E8 | |
| **SKNa 46** | 1400-2000 | 46 | 124 | 700 | 1.60 | 0.85 | -40 ... +180 | E11 | |
| **SKNa 47** | 3600-5000 | 45 | 106 | 700 | 1.80 | 0.6 | -40 ... +160 | E43 | |
| **SKNa 86** [1] | 1400-2000 | 86 | 129 | 1500 | 1.20 | 0.4 | -40 ... +180 | E10 | |
| **SKNa 102** | 3600-5000 | 125 | 80 | 1900 | 1.90 | 0.3 | -40 ... +160 | E44 | |
| **SKNa 202** | 3600-5000 | 200 | 80 | 3800 | 1.95 | 0.2 | -40 ... +160 | E45 | |
| **SKNa 402** | 3600-5000 | 400 | 88 | 7800 | 1.85 | 0.1 | -40 ... +160 | E46 | |
| **SKRa 26** | 1300-2000 | 26 | 69 | 375 | 1.55 | 2 | -40 ... +150 | E8 | |
| **SKRa 46** | 1400-2000 | 46 | 124 | 700 | 1.60 | 0.85 | -40 ... +180 | E11 | |
| **SKRa 86** [1] | 1400-2000 | 86 | 129 | 1500 | 1.20 | 0.4 | -40 ... +180 | E10 | |

**Footnotes:** 1) Sample status / 2) In production new

## Packages

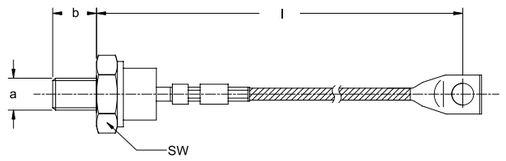
**E7 / E8 / E10 / E11 / E31**




| Cases | a | b | d | l | sw |
|---|---|---|---|---|---|
| E 7 | M 5 | 11 | 2,7 | 22 | 11 |
| E 8 | M 6 | 11 | 2,7 | 21,5 | 11 |
| E 10 | M 6 | 11 | 4 | 25 | 17 |
| E 11 | M 8 | 11 | 4 | 25,5 | 17 |
| E 31 | M 12 | 18 | 8,4 | 55 | 24 |

Dimensions in mm

**E9 / E12 ... E17 / DO-8**



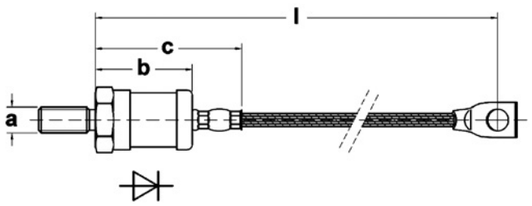

| Cases | a | b | l | SW |
|---|---|---|---|---|
| E9 | M6 | 11 | 130 | 11 |
| E12 | M8 | 11 | 135 | 17 |
| E13 | M12 | 18 | 165 | 24 |
| E14 | M12 | 18 | 165 | 24 |
| E15 | M16 x 1.5 | 20 | 190 | 32 |
| E16, E17 | M24 x 1.5 | 20 | 230 | 41 |
| DO-8 | 3/8 - 24 UNF 2A | 16 | 112 | 27 |

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# Discretes / Diodes / Stud Screw Fit

## Packages

**E 42 / E 43 / E 44 / E 45 / E 46**




| Cases | a | b | c | l |
|---|---|---|---|---|
| E 42 | M 6 | 28.5 | 45 | 150 |
| E 43 | M 8 | 32 | 54 | 160 |
| E 44 | M 12 | 38 | 57 | 185 |
| E 45 | M 16 x 1,5 | 48 | 70 | 205 |
| E 46 | M 24 x 1,5 | 54 | 82 | 250 |

Dimensions in mm



# Discretes / Diodes / Capsules

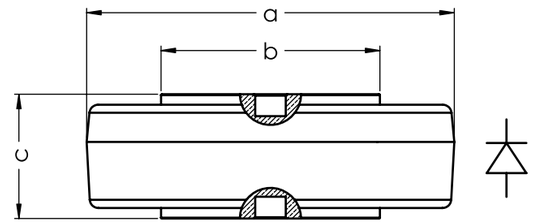
## Type

| | Voltage (V) | Current (A) | $T_c$ | $I_{FSM}$@$T_j$=25°C | $V_F$ | $R_{th(j-c)}$ per chip | $T_j$ | Package | Topology |
|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | K/W | °C | | |
| **SKN 503 SG** [1] | 400-2200 | 503 | 120 | 7000 | 1.50 | 0.075 | -40 ... +180 | E25 | |
| **SKN 1503 SG** [1] | 400-2200 | 1503 | 91 | 19000 | 1.50 | 0.033 | -40 ... +175 | E26 | |
| **SKN 6000** | 200-600 | 6000 | 85 | 60000 | 1.30 | 0.012 | -40 ... +180 | E35 | |
| **SKN 7500/06** [1] | 600 | 7500 | 85 | 60000 | 1.12 | 0.009 | -40 ... +180 | E28 | |

**Footnotes:** 1) Sample status

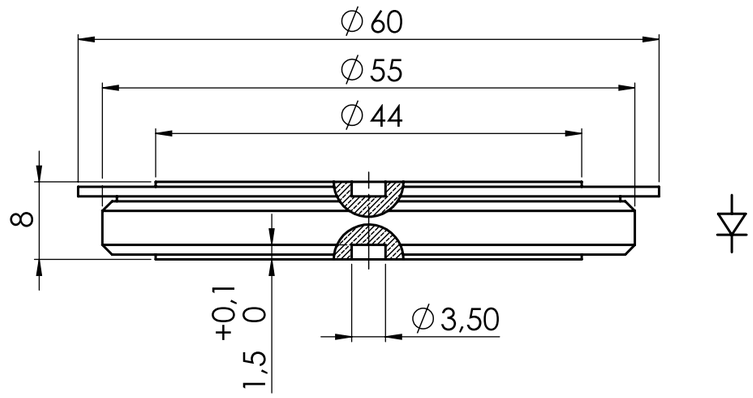
## Packages

**E25, E26, E27**




| Cases | a | b | c |
|---|---|---|---|
| E25 | 42 | 25 | 14,5 |
| E26 | 58 | 36 | 26,5 |
| E27 | 50 | 32 | 14,5 |

**E35**

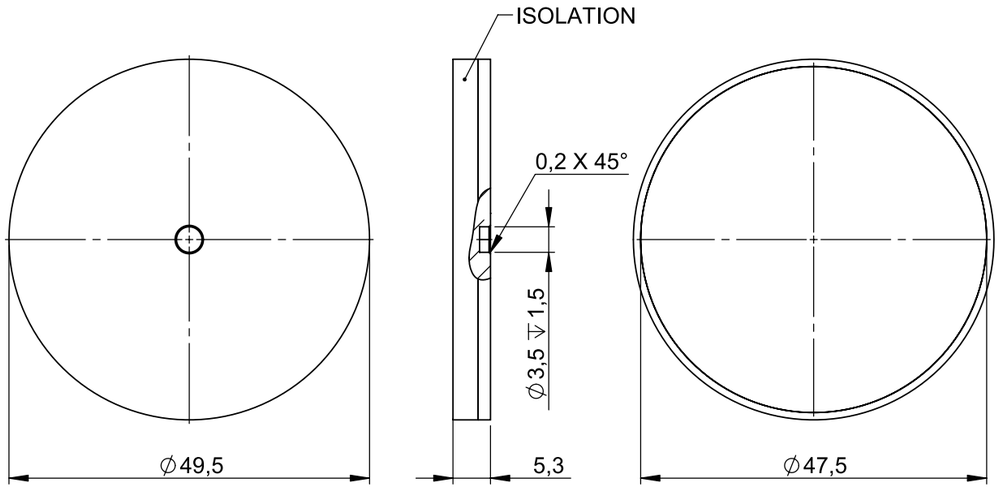



Dimensions in mm

# Discretes / Diodes / Capsules

## Packages

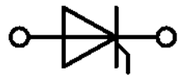
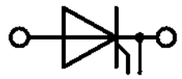
**E28**




Dimensions in mm

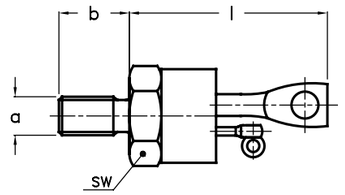
# Discretes / Thyristors / Stud Screw Fit

**Type**

| | Voltage (V) | Current (A) | $T_C$ | $I_{TSM}$@$T_j$=25°C | $V_T$ @ $I_T$, $T_j$=25°C | $I_T$@$V_T$ | $R_{th(j-c)}$ per chip | $T_j$ | Package | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | A | K/W | °C | | |
| **SKT 10** | 600-1200 | 10 | 111 | 250 | 1.6 | 30 | 1.3 | -40 ... +130 | B1 |  |
| **SKT 16** | 400-1800 | 16 | 104 | 370 | 2.4 | 75 | 0.9 | -40 ... +130 | B2 | |
| **SKT 24** | 400-1800 | 24 | 95 | 450 | 1.9 | 75 | 0.9 | -40 ... +130 | B2 | |
| **SKT 40** | 400-1800 | 40 | 80 | 700 | 1.95 | 120 | 0.66 | -40 ... +130 | B3 | |
| **SKT 50** | 600-1800 | 50 | 78 | 1050 | 1.8 | 120 | 0.6 | -40 ... +130 | B3 | |
| **SKT 55** | 400-1800 | 55 | 92 | 1300 | 1.8 | 200 | 0.47 | -40 ... +130 | B5 |  |
| **SKT 80** | 600-1800 | 80 | 85 | 1700 | 2.25 | 300 | 0.28 | -40 ... +130 | B5 | |
| **SKT 100** | 400-1800 | 100 | 85 | 2000 | 1.75 | 300 | 0.28 | -40 ... +130 | B5 | |
| **SKT 130** | 400-1600 | 130 | 85 | 3500 | 2.25 | 500 | 0.18 | -40 ... +130 | B6 | |
| **SKT 160** | 400-1600 | 160 | 84 | 4300 | 1.75 | 500 | 0.18 | -40 ... +130 | B6 | |
| **SKT 250** | 400-1600 | 250 | 85 | 7000 | 1.65 | 800 | 0.123 | -40 ... +130 | B7 | |
| **SKT 300** | 400-1600 | 300 | 93 | 11000 | 1.45 | 800 | 0.096 | -40 ... +130 | B7 | |

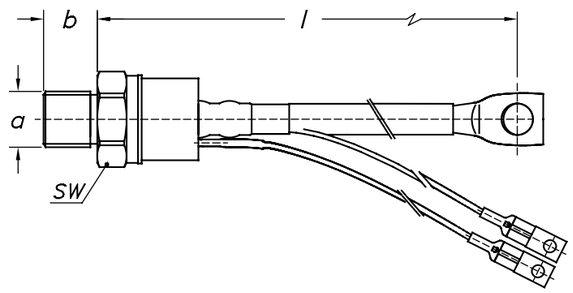
## Packages

**B1 ... B3**




| Cases | a | b | l | SW |
|---|---|---|---|---|
| B1 | M5 | 11 | 20,3 | 11 |
| B2 | M6 | 11 | 30 | 14 |
| B3 | M8 | 11 | 33,5 | 17 |

**B5 ... B7**




| *Cases* | *a* | *b* | *l* | *SW* |
|---|---|---|---|---|
| *B5* | *M12* | *18* | *160* | *24* |
| *B6* | *M16 x 1,5* | *20* | *190* | *32* |
| *B7* | *M24 x 1,5* | *20* | *230* | *41* |

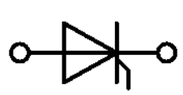
Dimensions in mm

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# Discretes / Thyristors / Capsules

**Type**

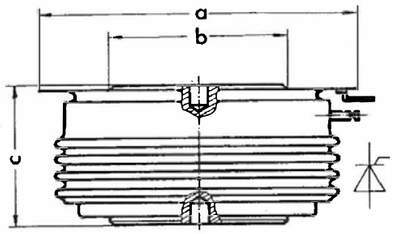
| | Voltage (V) | Current (A) | $T_C$ | $I_{TSM}$@$T_j$=25°C | $V_T$ @ $I_p$, $T_j$=25°C | $I_T$@$V_T$ | $R_{th(j-c)}$ per chip | $T_j$ | Package | Topology |
|---|---|---|---|---|---|---|---|---|---|---|
| | V | A | °C | A | V | A | K/W | °C | | |
| **SKT 340** | 1200-1800 | 340 | 82 | 5700 | 1.9 | 1000 | 0.072 | -40 ... +125 | B8 | |
| **SKT 551** | 1200-1800 | 550 | 85 | 9000 | 1.65 | 1500 | 0.047 | -40 ... +125 | B11 | |
| **SKT 553 SG** [2] | 400-1800 | 554 | 85 | 9000 | 1.65 | 1500 | 0.045 | -40 ... +125 | B11b | |
| **SKT 760** | 1200-1800 | 760 | 80 | 15000 | 1.65 | 2400 | 0.04 | -40 ... +125 | B10 | |
| **SKT 813** [2] | 400-1800 | 855 | 85 | 15000 | 1.65 | 2400 | 0.03 | -40 ... +125 | B21 | |
| **SKT 883** [1] | 400-1800 | 890 | 85 | 19000 | 1.46 | 2400 | 0.032 | -40 ... +125 | B23 | |
| **SKT 1200** | 1200-1800 | 1200 | 85 | 30000 | 1.65 | 3600 | 0.021 | -40 ... +125 | B14 | |



**Footnotes:** 1) Sample status / 2) In production new

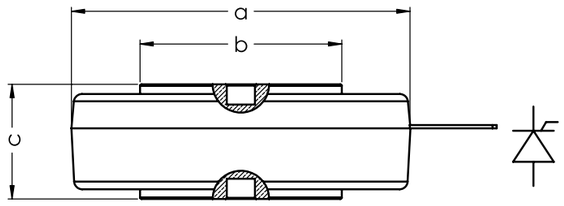
## Packages

**B8 ... B14**




| Cases | a | b | c |
|---|---|---|---|
| B 8 | 41 | 19 | 14 |
| B 10 | 57,3 | 34 | 26 |
| B 11 | 41 | 25 | 14 |
| B 14 | 73 | 47 | 26 |

**B11b, B21, B23**




| Cases | a | b | c |
|---|---|---|---|
| B11b | 42 | 25 | 14,5 |
| B21 | 50 | 32 | 14,5 |
| B23 | 58 | 36 | 26,5 |

Dimensions in mm

# Discretes / Chips

CAL (Controlled Axial Lifetime) freewheeling diodes are available in 600V / 650V, 1200V, and 1700V voltage classes with current ratings of up to 200A. Depending on the frequency of the target application, custom-designed switching properties are also available.

Rectifier diodes and thyristors are designed for the 1600V voltage class, covering a wide range of current ratings up to 770A, equivalent to a die size of more than 500mm2. Variable configurations of the thyristor gate (corner vs. center gate) allow for optimised bond layout in the respective target design on the customer side. All the chips cover SEMIKRON's extensive module and system range, which means a proven history of outstanding performance and reliability. They are compatible with various connection and assembly technologies. Customers can benefit from the wealth and depth of application knowledge that the SEMIKRON engineering team has.


| | |
|---|---|
| Freewheeling Diode CAL | 212 |
| Rectifier Diode | 215 |
| Thyristor | 215 |


For detailed information please refer to data sheets.

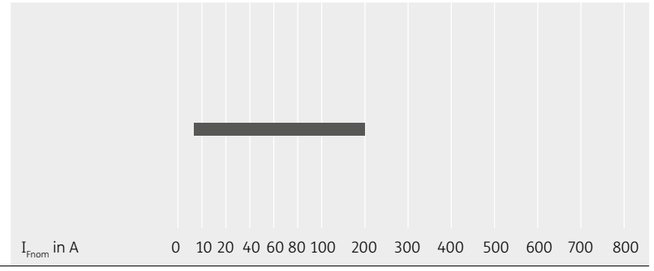
**Further information:** www.semikron.com/chips

## Chips SEMICELL

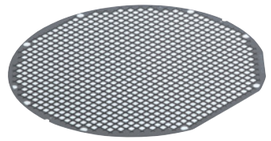
**Freewheling Diode CAL**



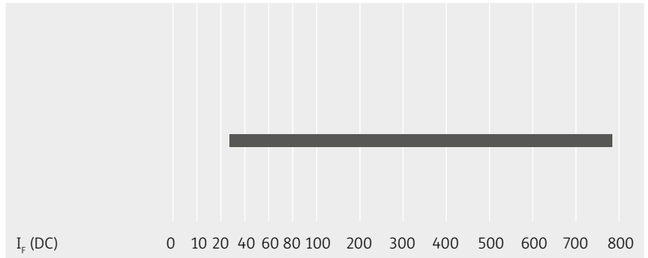
**600V up to 1700V**



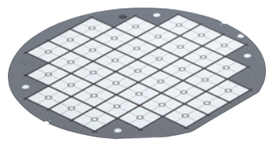

**Rectifier Diode**



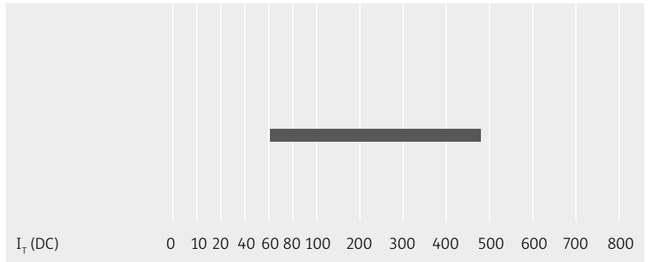
**1600V**




**Thyristor**



**1600V**




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+ 370 64 021 081
info@abn-a.com

# Discretes / Chips / SEMICELL

| Type | $V_{RRM}$ | $I_F$ @$T_j$=150°C | $I_{FSM}$ @$T_j$=150°C | $V_F$ @$T_j$=25°C | $I_F$ @ $V_F$ $T_j$=25°C | $Q_{rr}$ @$T_j$=125°C |
|---|---|---|---|---|---|---|
| | V | A | A | V | A | µC |
| **600V - Freewheeling Diodes CAL I3 Fast** | | | | | | |
| **SKCD 06 C 060 I3** | 600 | 15 | 80 | 1.35 | 8 | 1 |
| **SKCD 09 C 060 I3** | 600 | 20 | 100 | 1.35 | 13 | 1.46 |
| **SKCD 18 C 060 I3** | 600 | 30 | 200 | 1.35 | 25 | 1.98 |
| **SKCD 31 C 060 I3** | 600 | 50 | 440 | 1.35 | 50 | 3.3 |
| **SKCD 47 C 060 I3** | 600 | 80 | 720 | 1.35 | 85 | 6.2 |
| **SKCD 61 C 060 I3** | 600 | 100 | 1000 | 1.35 | 110 | 8.7 |
| **SKCD 81 C 060 I3** | 600 | 150 | 1260 | 1.35 | 155 | 11.5 |
| **SKCD 121 C 060 I3** | 600 | 210 | 2100 | 1.35 | 245 | 18 |

| Type | $V_{RRM}$ | $I_F$ @$T_j$=175°C | $I_{FSM}$ @$T_j$=150°C | $V_F$ @$T_j$=25°C | $I_F$ @ $V_F$ $T_j$=25°C | $Q_{rr}$ @$T_j$=150°C |
|---|---|---|---|---|---|---|
| | V | A | A | V | A | µC |
| **600V - Freewheeling Diodes CAL High Density** | | | | | | |
| **SKCD 04 C 060 I HD** | 600 | 10 | 65 | 1.23 | 4.7 | 1.3 |
| **SKCD 06 C 060 I HD** | 600 | 20 | 95 | 1.23 | 8 | 1.42 |
| **SKCD 09 C 060 I HD** | 600 | 30 | 160 | 1.23 | 13 | 2.4 |
| **SKCD 16 C 060 I HD** | 600 | 50 | 320 | 1.23 | 25 | 3.87 |
| **SKCD 24 C 060 I HD** | 600 | 75 | 395 | 1.23 | 41 | 6 |
| **SKCD 42 C 060 I HD** | 600 | 100 | 810 | 1.23 | 75 | 11.1 |
| **SKCD 61 C 060 I HD** | 600 | 150 | 1080 | 1.23 | 112 | 15.75 |
| **SKCD 81 C 060 I HD** | 600 | 200 | 1310 | 1.23 | 152 | 19.69 |

| Type | $V_{RRM}$ | $I_F$ @$T_j$=175°C | $I_{FSM}$ @$T_j$=150°C | $V_F$ @$T_j$=25°C | $I_F$ @ $V_F$ $T_j$=25°C | $E_{rr}$ @$T_j$=150°C |
|---|---|---|---|---|---|---|
| | V | A | A | V | A | mJ |
| **650V - Freewheeling Diodes CAL I4 Fast** | | | | | | |
| **SKCD 24 C 065 I4F** | 650 | 50 | 460 | 1.30 | 39 | 1.1 |
| **SKCD 42 C 065 I4F** | 650 | 100 | 680 | 1.30 | 73 | 2.2 |
| **SKCD 61 C 065 I4F** | 650 | 150 | 1100 | 1.30 | 109 | 3.8 |
| **SKCD 81 C 065 I4F** | 650 | 200 | 1290 | 1.30 | 148 | 5.8 |



# Discretes / Chips / SEMICELL

| Type | $V_{RRM}$ | $I_F$ @$T_j$=150°C | $I_{FSM}$ @$T_j$=150°C | $V_F$ @$T_j$=25°C | $I_F$ @ $V_F$ $T_j$=25°C | $Q_{rr}$ @$T_j$=125°C |
|---|---|---|---|---|---|---|
| | V | A | A | V | A | µC |
| **1200V - Freewheeling Diodes CAL I3 Fast** | | | | | | |
| **SKCD 11 C 120 I3** | 1200 | 15 | 130 | 2.00 | 10 | 1.6 |
| **SKCD 18 C 120 I3** | 1200 | 25 | 200 | 2.00 | 15 | 3 |
| **SKCD 23 C 120 I3R** | 1200 | 30 | 270 | 2.00 | 25 | 3.8 |
| **SKCD 31 C 120 I3** | 1200 | 40 | 370 | 2.00 | 35 | 5.3 |
| **SKCD 47 C 120 I3** | 1200 | 55 | 600 | 2.00 | 55 | 7.5 |
| **SKCD 61 C 120 I3** | 1200 | 75 | 800 | 2.00 | 70 | 11 |
| **SKCD 81 C 120 I3** | 1200 | 100 | 1100 | 2.00 | 100 | 16.5 |
| **SKCD 121 C 120 I3** | 1200 | 150 | 1600 | 2.00 | 155 | 24 |
| **1200V - Freewheeling Diodes CAL High Density** | | | | | | |
| **SKCD 06 C 120 I HD** | 1200 | 6 | 60 | 1.50 | 5 | 1.24 |
| **SKCD 11 C 120 I HD** | 1200 | 15 | 140 | 1.50 | 12 | 2.9 |
| **SKCD 14 C 120 I HD** | 1200 | 20 | 170 | 1.50 | 15 | 4 |
| **SKCD 18 C 120 I HD** | 1200 | 25 | 200 | 1.50 | 20 | 5 |
| **SKCD 31 C 120 I HD** | 1200 | 55 | 480 | 1.50 | 45 | 11 |
| **SKCD 47 C 120 I HD** | 1200 | 85 | 700 | 1.50 | 70 | 17.4 |
| **SKCD 61 C 120 I HD** | 1200 | 115 | 900 | 1.50 | 90 | 24.5 |
| **SKCD 81 C 120 I HD** | 1200 | 160 | 1150 | 1.50 | 130 | 34.4 |

| Type | $V_{RRM}$ | $I_F$ @$T_j$=175°C | $I_{FSM}$ @$T_j$=150°C | $V_F$ @$T_j$=25°C | $I_F$ @ $V_F$ $T_j$=25°C | $E_{rr}$ @$T_j$=150°C |
|---|---|---|---|---|---|---|
| | V | A | A | V | A | mJ |
| **1200V - Freewheeling Diodes CAL I4 Fast** | | | | | | |
| **SKCD 08 C 120 I4F** | 1200 | 8 | 36 | 2.33 | 8 | 0.4 |
| **SKCD 11 C 120 I4F** | 1200 | 15 | 65 | 2.38 | 15 | 0.6 |
| **SKCD 16 C 120 I4F** | 1200 | 25 | 100 | 2.41 | 25 | 1 |
| **SKCD 22 C 120 I4F** | 1200 | 35 | 170 | 2.30 | 35 | 1.6 |
| **SKCD 31 C 120 I4F** | 1200 | 50 | 270 | 2.22 | 50 | 2.6 |
| **SKCD 31 C 120 I4F R** | 1200 | 50 | 270 | 2.22 | 50 | 4.38 |
| **SKCD 46 C 120 I4F** | 1200 | 75 | 430 | 2.17 | 75 | 4.2 |
| **SKCD 46 C 120 I4F R** | 1200 | 75 | 430 | 2.17 | 75 | 4.2 |
| **SKCD 53 C 120 I4F** | 1200 | 100 | 550 | 2.20 | 100 | 5.4 |
| **SKCD 81 C 120 I4F** | 1200 | 150 | 900 | 2.14 | 150 | 8.7 |

# Discretes / Chips / SEMICELL

| Type | $V_{RRM}$ V | $I_F$ @$T_j$=150°C A | $I_{FSM}$ @$T_j$=150°C A | $V_F$ @$T_j$=25°C V | $I_F$ @ $V_F$ $T_j$=25°C A | $Q_{rr}$ @$T_j$=125°C µC |
|---|---|---|---|---|---|---|
| **1700V - Freewheeling Diodes CAL Fast** | | | | | | |
| **SKCD 47 C 170 I** | 1700 | 55 | 550 | 2.05 | 55 | 15 |
| **SKCD 61 C 170 I** | 1700 | 75 | 720 | 2.05 | 75 | 24 |
| **1700V - Freewheeling Diodes CAL High Density** | | | | | | |
| **SKCD 47 C 170 I HD** | 1700 | 75 | 650 | 1.73 | 75 | 25 |
| **SKCD 61 C 170 I HD** | 1700 | 100 | 710 | 1.73 | 100 | 35 |
| **SKCD 81 C 170 I HD** | 1700 | 150 | 1070 | 1.73 | 150 | 53.5 |

| Type | $V_{RRM}$ V | $I_F$ @$T_j$=175°C A | $I_{FSM}$ @$T_j$=150°C A | $V_F$ @$T_j$=25°C V | $I_F$ @ $V_F$ $T_j$=25°C A | $E_{rr}$ @$T_j$=150°C mJ |
|---|---|---|---|---|---|---|
| **1700V - Freewheeling Diodes CAL I4 Fast** | | | | | | |
| **SKCD 28 C 170 I4F** | 1700 | 40 | 280 | 1.71 | 23 | 12 |
| **SKCD 46 C 170 I4F** | 1700 | 75 | 450 | 1.71 | 43 | 17 |
| **SKCD 56 C 170 I4F** | 1700 | 100 | 580 | 1.71 | 57 | 22.2 |
| **SKCD 81 C 170 I4F** | 1700 | 150 | 860 | 1.71 | 89 | 31.5 |



# Discretes / Chips / SEMICELL

| Type | $V_{RRM}$ V | $T_{j\,max}$ °C | $I_{F(DC)}$ @$T_{j\,max}$ A | $I_{F(AV)}$ @$T_{j\,max}$ A | $I_{FSM}$ @$T_j$=150°C A | $V_F$ @$T_j$=25°C V | $I_F$ @ $V_F$ $T_j$=25°C A |
|---|---|---|---|---|---|---|---|
| **1600V - Rectifier - Standard** | | | | | | | |
| **SKR 3,5 Qu bond[6)]** | 1600 | 150 | 25 | 18 | 200 | 1.00 | 8 |
| **SKR 4,2 Qu bond[6)]** | 1600 | 150 | 35 | 28 | 270 | 1.00 | 13 |
| **SKR 4,8 Qu bond[6)]** | 1600 | 150 | 45 | 35 | 350 | 1.00 | 18 |
| **SKR 5,6 Qu bond[6)]** | 1600 | 150 | 50 | 40 | 490 | 1.00 | 25 |
| **SKR 6,2 Qu bond[6)]** | 1600 | 150 | 65 | 50 | 600 | 1.00 | 33 |
| **SKR 7,0 Qu bond[6)]** | 1600 | 150 | 75 | 60 | 890 | 1.00 | 45 |
| **SKR 8,9 Qu bond[6)]** | 1600 | 150 | 140 | 110 | 1380 | 1.00 | 77 |
| **SKR 10,3 Qu bond[6)]** | 1600 | 150 | 170 | 135 | 1650 | 1.00 | 106 |
| **SKR 12,4 Qu bond[6)]** | 1600 | 150 | 235 | 190 | 2300 | 1.00 | 160 |
| **SKR 15,2 Qu bond[6)]** | 1600 | 150 | 330 | 270 | 3800 | 1.00 | 245 |
| **SKR 16,3 x 18,2 Qu bond[6)]** | 1600 | 150 | 365 | 305 | 5100 | 1.00 | 320 |
| **SKN 18,2 Qu bond[6)]** | 1600 | 150 | 380 | 318 | 5500 | 1.00 | 360 |
| **SKN 22,4 Qu bond[6)]** | 1600 | 150 | 770 | 634 | 9450 | 1.00 | 550 |
| **1600V - Rectifier - PEP** | | | | | | | |
| **SKR012XP16B1F** | 1600 | 175 | 35 | 26 | 200 | 0.97 | 8 |
| **SKR018XP16B1F** | 1600 | 175 | 50 | 38 | 270 | 0.97 | 13 |
| **SKR023XP16B1F** | 1600 | 175 | 63 | 48 | 350 | 0.97 | 18 |
| **SKR031XP16B1F** | 1600 | 175 | 85 | 64 | 490 | 0.97 | 26 |
| **SKR106XP16B1F** | 1600 | 175 | 290 | 220 | 1650 | 0.97 | 103 |
| **SKR231XP16B1T** | 1600 | 175 | 665 | 510 | 4200 | 0.97 | 238 |
| **SKR297XP16B1T** | 1600 | 175 | 840 | 640 | 5100 | 0.97 | 310 |

**Footnotes:** 6) solderable top metallization on request

| Type | $V_{RRM}$ $V_{DRM}$ V | $I_{T(DC)}$ @ $T_j$=130°C A | $I_{TSM}$ @$T_j$=130°C A | $V_{GT}$ @$T_j$=25°C V | $I_{GT}$ @$T_j$=25°C A | $t_q$ @$T_j$=130°C µs |
|---|---|---|---|---|---|---|
| **1600V - Thyristor Central Gate** | | | | | | |
| **SKT 8,9 Qu ZG bond[6)]** | 1600 | 105 | 1000 | 1.65 | 100 | 150 |
| **SKT 10,3 Qu ZG bond[6)]** | 1600 | 125 | 1250 | 1.65 | 100 | 150 |
| **SKT 12,4 Qu ZG bond[6)]** | 1600 | 165 | 1800 | 1.65 | 100 | 150 |
| **SKT 13,5 Qu ZG bond[6)]** | 1600 | 185 | 2300 | 1.65 | 100 | 135 |
| **SKT 15,2 Qu ZG bond[6)]** | 1600 | 215 | 3200 | 1.65 | 100 | 150 |
| **SKT 18,2 Qu ZG bond[6)]** | 1600 | 250 | 5000 | 1.65 | 100 | 150 |
| **SKT 24,3 Qu ZG bond SG [6)]** | 1600 | 480 | 8200 | 1.65 | 150 | 150 |
| **1600V - Thyristor Corner Gate** | | | | | | |
| **SKT 5,6 Qu RG bond[6)]** | 1600 | 60 | 280 | 1.65 | 100 | 150 |
| **SKT 7,0 Qu RG bond[6)]** | 1600 | 75 | 450 | 1.65 | 100 | 150 |
| **SKT 8,9 Qu RG bond[6)]** | 1600 | 105 | 1000 | 1.65 | 100 | 150 |
| **SKT 10,3 Qu RG bond[6)]** | 1600 | 125 | 1250 | 1.65 | 100 | 150 |
| **SKT 12,4 Qu RG bond[6)]** | 1600 | 165 | 1800 | 1.65 | 100 | 150 |

**Footnotes:** 6) solderable top metallization on request

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# Accessories
# Heatsinks / Fans

SEMIKRON offers a wide range of heat sinks including forced and natural air cooling. The heatsinks are available for capsules, insulated base modules or IPMs.

SEMIKRON offers a broad range of axial, centrifugal and radial fans for different inverter designs.

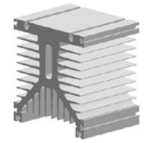

| | |
|---|---|
| Heatsinks | 218 |
| Fans | 220 |


For detailed information please refer to data sheets.

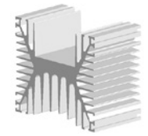
**Further information**
www.semikron.com/heatsinks
www.semikron.com/fans

## Heatsinks

**Forced air-cooled**



**Natural cooled**

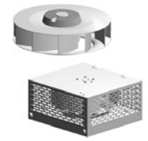


## Fans

**Axial**



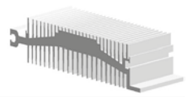
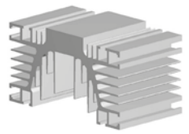
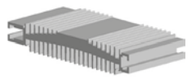
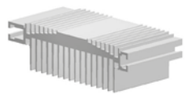
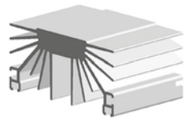
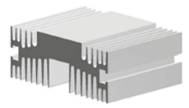
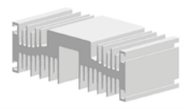
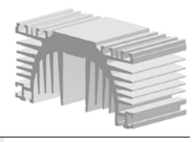
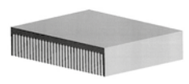
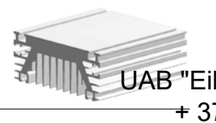
**Centrifugal**



**Radial**



# Accessories / Heatsinks

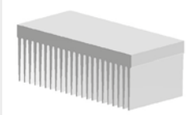
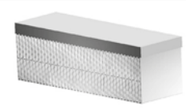
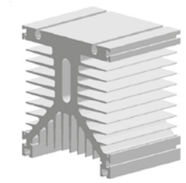
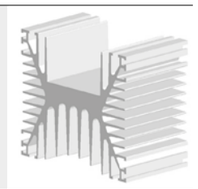
| Type | Suitable for | $R_{th\,sa}$ natural cooling K/W | $R_{th\,sa}$ forced air cooling K/W | Weight kg | Weight kg/m | Produkt Picture |
|---|---|---|---|---|---|---|
| **Forced-air cooled** | | | | | | |
| **N 4** | Capsules | - | 0.04 | 6.3 | 25.1 |  |
| **P 11** | Capsules | 0.2 | 0.05 | 3.8 | 15 |  |
| **P 17** | Capsules | 0.45 | 0.12 | 1.5 | 10.6 |  |
| **P 18** | Capsules | 0.37 | 0.08 | 1.6 | 12.2 |  |
| **P 8**[9)] | Capsules | 0.35 | 0.07 | 1.7 | 9.6 |  |
| **P 8,5**[9)] | Capsules | 0.3 | 0.08 | 1.5 | 9.5 |  |
| **P 9**[9)] | Capsules | 0.21 | 0.06 | 4.1 | 17.8 |  |
| **U 3** | Capsules | 0.14 | 0.06 | 7.1 | 23.7 |  |
| **P 21**[9)] | Isolated base modules | - | 0.02 | 4.1 | 40.8 |  |
| **R 4A** | Isolated base modules | 1.4 | 0.38 | 0.6 | - |  |

**Footnotes:** 9) Non standard item, available on request only, typical minimum batch quantities of 60 pieces will apply

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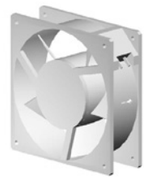
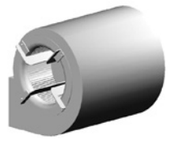
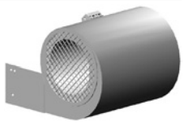


# Accessories / Heatsinks

| Type | Suitable for | $R_{th\,sa}$ natural cooling K/W | $R_{th\,sa}$ forced air cooling K/W | Weight kg | Weight kg/m | Produkt Picture |
|---|---|---|---|---|---|---|
| **Forced-air cooled** | | | | | | |
| **P 16** | SKiiP or modules | - | 0.06 | 1.3 | 23.5 |  |
| **Px 308**[9)] | SKiiP or modules | - | 0.013 | 2 | 12.2 |  |
| **P 1** | Studs or modules | 0.7 | 0.4 | 0.8 | 11.3 |  |
| **P 3** | Isolated base modules | 0.45 | 0.14 | 0.7 | 17.6 |  |
| **Natural cooled** | | | | | | |
| **P 4**[9)] | Stud device | 0.27 | - | 4.1 | 20.6 |  |

**Footnotes:** 9) Non standard item, available on request only, typical minimum batch quantities of 60 pieces will apply

# Accessories / Fans

| Type | $V_{in}$ | f | $V_{air}$/t | $P_{max}$ | $T_{Amax}$ | Weight | Noise | Produkt Picture |
|---|---|---|---|---|---|---|---|---|
| | V | Hz | m³/h | W | °C | kg | dB | |
| **Axial Fans** | | | | | | | | |
| **SKF 3-230-01** | 230 | 50 / 60 | 150 / 174 | 15 / 14 | 70 | 0.55 | 37 / 41 |  |
| **SKF RE-024-02** | 24 | - | 500 | 90 | 75 | 0.43 | 76 | |
| **SKF SR-024-01** | 24 | - | 56 | 3.6 | 70 | 0.085 | 43 | |
| **SKF 9-230-01** | 230 | 50 / 60 | 375 / 440 | 24 / 26 | 70 | 1 | 54 / 60 | |
| **Centrifugal Fans** | | | | | | | | |
| **SKF 17A-230-11** | 230 | 50 / 60 | 850 / 930 | 110 / 120 | 70 | 2 | 74 |  |
| **SKF 17B-230-12** | 230 | 50 / 60 | 1175 / 1300 | 230 | 70 | 6.1 | 73 / 76 | |
| **SKF N4-230-03** [2)] | 230 | - | 1500 / 1700 | 250 / 390 | 80 / 80 | 3.1 | 76 / 78 |  |
| **Radial Fans** | | | | | | | | |
| **SKF 16A-230-01** | 230 | 50 / 60 | 630 / 590 | 130 / 140 | 60 / 50 | 3.3 | 59 |  |
| **SKF 16P-230-01** | 230 | 50 / 60 | 1125 | 165 | 60 | 3.9 | - | |
| **SKF 16B-230-01** | 230 | 50 / 60 | 640 / 580 | 167 / 191 | 70 / 50 | 3.75 | 58 / 57 |  |
| **SKF 16A-230-11** | 230 | 50 / 60 | 630 / 590 | 130 / 140 | 60 / 50 | 3.3 | 59 |  |

**Footnotes:** 2) In production new

INFORMATION

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7



# Technical Seminars at SEMIKRON

SEMIKRON develops innovative power electronics products for space saving, energy efficient electronic systems. Our power modules are the heart of modern, energy efficient motor drives and industrial automation systems. But that's not all – our products are also paving the way for reduced global energy consumption in the areas of power supplies, the production of renewable energy and electric commercial vehicles. Our success is based on close cooperation and technical dialogue between our application engineers, product managers and our customers.

This close partnership is also reflected in our practical range of technical seminars and roadmap workshops which cover all the relevant topics in our product scope and application areas.
You are cordially invited to any of our seminars and workshops.

**Examples of topics at our technical seminars**

- SiC chips and their application-specific advantages
- Three level topology - topology, protection concepts, application areas
- Reliability and service life of power modules
- Loss calculation, thermal resistance, module dimensioning
- IGBT driver topologies
- Parallel connection of power modules
- Simulation tool SEMISEL
- Typical problems in inverter design
- Motor drives – topologies, challenges, trends
- Solar inverters – topologies, challenges, trends
- UPS inverters – topologies, challenges, trends
- Wind inverters – topologies, challenges, trends
- Fault analysis of power semiconductors

**Further information:** www.semikron.com/technical-seminars

# Technologies

**Single Sided Sintering** Technology
Single Sided Sintering (SSS) technology utilises a highly reliable silver sinter layer to connect the chip to the ceramic substrate (DBC), replacing the standard solder layer.

---

Double Sided Sintering Technology

**Double Sided Sintering** Technology
In Double Sided Sintering technology (DSS) two sinter layers are used: the chip is sintered to the DBC and a flex layer is sintered on top of the chip. The flex layer replaces the wire bonds, resulting in maximum reliability and current capability.

---

Direct Pressed Die Technology ™

**Direct Pressed Die** Technology ™
Direct Pressed Die (DPD) technology includes a Double Sided Sintered (DSS) chip on a ceramic substrate that is pressed onto the heatsink by a defined force directly on top of the chip.
This optimises reliability and thermal resistance, combined with flexibility with regard to cooling and integration in standard power modules.

---

SKiN® Technology inside

**SKiN**® Technology
SKiN technology is based on Double Sided Sintering. It also integrates the heatsink using a third sinter layer. SKiN technology is free of bond wires, thermal grease and solder, combining maximum reliability with minimum thermal resistance.

---

**SPRiNG** Technology
SPRiNG technology utilises springs to establish the contacts to the PCB. It is the best choice for ultra fast assembly and when field reliability in harsh environments is critical.

---

**SKiiP**® Technology
Semikron's SKiiP technology utilises spring loaded mechanical and electrical contacts and features a compact and durable module construction.

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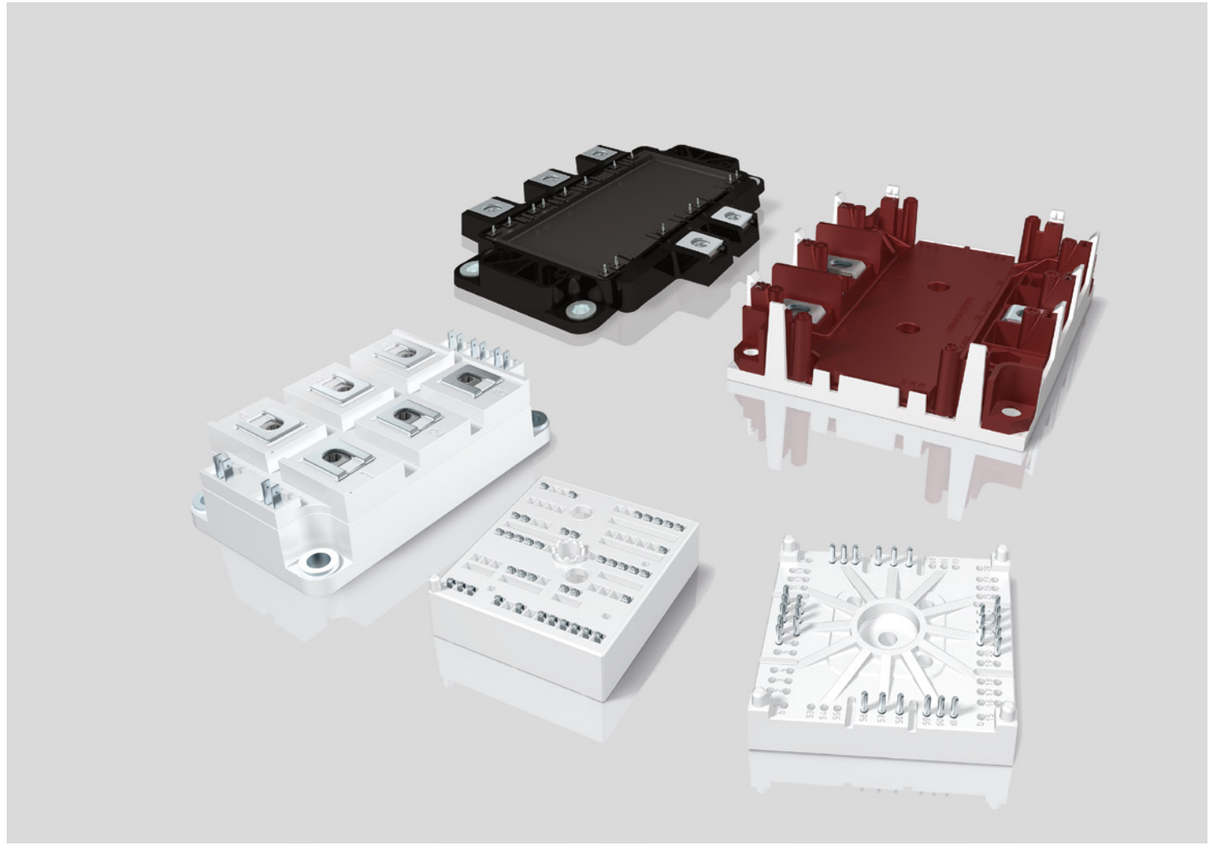
**Press-Fit** Technology
Alternative concept to solder for module to PCB assembly press-fit pins ensure a reliable connection in a solder-free production process.

---

**SOLDER** Technology
The tried and tested interface for power modules. Solder pins are a robust interface that are used in a wide range of applications worldwide. Solder processes are widely used and easy to implement.

---

**SCREW** Technology
The standard interface to the power terminals for medium and high-power modules.
Easy to use and robust power interface to AC and DC terminals.



# Product Sample Request

**Product sample service at a click**
The development of prototypes is more precise and faster if power electronics modules are integrated during the design-in phase.

As of now, you can request samples for electronic design online from SEMIKRON. This is available during this project phase and gives you quick and easy access to our samples with no obligation. Depending on the design, application and the size of the project, we also offer this service free of charge.

**Three steps to getting your SEMIKRON sample**
- **Initial contact** Fill in the sample order request form
- **Consultation** Response from SEMIKRON within 24 hours
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# SemiSel Simulation
# Free Support for Your Converter Design

**Applications**
SemiSel is the SEMIKRON online calculation and simulation tool for losses, temperatures and optimal choice of power electronic components (www.semikron.com). The days when a module was purchased solely on the basis of its nominal current are over. Today, increased product diversity in the field of power semiconductors calls for comparisons beyond the information contained in data sheets. Only a comparison under application-oriented conditions, such as voltage level, switching frequency or cooling conditions, can demonstrate differences in the performance of the devices available. Miniaturisation combined with higher power densities makes it essential to have information on device losses and temperatures to be able to specify requirements for a cooling system at an early stage of product development.

**Benefits**
In proper topology design the risk arising from variations in both component and electrical topology parameters ought to be considered. These facts are only a few of the many points that need to be considered when developing a power electronics system. And this is where efficient support is provided by SemiSel to enabling developers to make the right decision. SemiSel is still the most comprehensive free tool of its kind that can be used to investigate different power electronic topologies under different operating conditions.

This tool has been available online since 2001, and it has been continually improved and expanded since its introduction. It provides a good compromise between user-friendliness, applications and speed. The calculation functions range from product proposal for nominal operating conditions to drivers and heat sink specifications and product selections for specific overload conditions and complex calculations, such as complete load cycles that take into account temperature cycling problems.

**Further information::** www.semikron.com/semisel




Available in German, English, Chinese and Japanese

# Application Manual Power Semiconductors

IGBTs and MOSFETs integrated in power modules are the key components of power electronic topologies today and are continuously finding their way into new fields of application. This goes hand in hand with the ever increasing call for line rectifier diodes and thyristors as a cost effective way of connecting the topologies to the power grid. The aim of the application manual is to provide users with support in selecting and using such devices.

The manual contains basic background knowledge on semiconductors in order to enable a better understanding of application possibilities and limits. More in-depth explanations are given on packaging and assembly technologies, because of the major influence they have on module properties and limitations in field applications. The manual also includes statements on reliability data, life cycle analyses and key test processes.

The Application Manual also explains the structure of datasheets and provides notes to help users better understand datasheet parameters. The Application Manual contains detailed application-related information on electrical configuration under important operating conditions, driver and protection elements for semiconductors, thermal dimensioning and cooling, tips on parallel and series connection, assembly tips for optimised power layouts with regard to parasitic elements and the requirements arising from specific ambient conditions.

This book is written for users and provides help with component selection and design-in work. It couples a wealth of experience with detailed practical knowledge, the result being a vast pool of information which up till now has been spread across various individual articles or in the minds of experts only. The second revised edition was published in 2015.

**Further information:** www.semikron.com/application-manual

# Abbreviations

| Acronym | English |
|---|---|
| $E_{off}$ | Energy dissipation during turn-off |
| $E_{on}$ | Energy dissipation during turn-on |
| $E_{rr}$ | Energy dissipation during reverse recovery (diode) |
| $f$ | Operating frequency |
| $f_{max}$ | Maximum frequency |
| $I_C$ | Continuous collector current |
| $I_{Cnom}$ | Nominal collector current |
| $I_D$ | Direct output current (of a rectifier connection) |
| $I_D$ | Continuous drain current (MOSFET) |
| $I_F$ | Forward current (actual value) |
| $I_{FAV}$ | Mean forward current |
| $I_{FSM}$ | Surge forward current |
| $I_{GT}$ | Minimum guaranteed gate trigger current |
| $I_{outPEAK}$ | Output peak current (driver) |
| $I_{overload}$ | Overload current for a specified time |
| $i_T$ | On-State current (instantaneous value) |
| $I_{TAV}$ | Mean on-state current |
| $I_{TSM}$ | Surge on-state curren |
| $Q_{out/pulse}$ | Output charge per pulse (Driver) |
| $Q_{rr}$ | Reverse recovery charge |
| $R_{DS(on)}$ | Drain-source on-resistance (MOSFET) |
| $r_T$ | On-state slope resistance, forward slope resistance (Thyristor) |

| Acronym | English |
|---|---|
| $R_{th(c-s)}$ | Thermal resistance case to heat sink |
| $R_{th(j-a)}$ | Thermal resistance junction to ambient |
| $R_{th(j-c)}$ | Thermal resistance junction to case |
| $R_{th(j-s)}$ | Thermal resistance junction to sink |
| $R_{th(s-a)}$ | Thermal resistance heat sink to ambient |
| $T_c$ | Case temperature |
| $T_j$ | Junction temperature |
| $t_q$ | Circuit commutated turn-off time (thyristor) |
| $T_s$ | Heatsink temperature |
| $V_{air}/t$ | Air flow |
| $V_{CE}$ | Collector-emitter voltage |
| $V_{CEsat}$ | Collector-emitter saturation voltage |
| $V_{DRM}$ | Repetitive peak off-state voltage |
| $V_{DS}$ | Drain-source voltage |
| $V_F$ | Forward voltage |
| $V_{G(off)}$ | Turn-off gate voltage level (driver) |
| $V_{G(on)}$ | Turn-on gate voltage level (driver) |
| $V_{GT}$ | Gate trigger voltage |
| $V_{in}$ | Input voltage |
| $V_{isol(IO)}$ | Isolation test voltage (r.m.s. /1 min.) input-output (driver) |
| $V_{RRM}$ | Repetitive peak reverse voltage |
| $V_T$ | On-state voltage (Thyristor) |
| $W$ | Weight |

# Applications

**Motor Drives**
Converters for all types of electric motors utilized in industry. SEMIKRON power semiconductors help to maximize efficiency in any 2 or 4-quadrant drive or servo.

**Wind Energy**
With power semiconductors in the converters or in the drives controlling blade pitch. Almost one in three wind turbines in the world is fitted with SEMIKRON power modules.

**Solar Energy**
With focus on cost and efficiency in photo voltaic systems, SEMIKRON has products that cover the entire spectrum from micro inverters and medium-power multi string to megawatt central inverters.

**Power Quality**
PFC, AVC and UPS systems ensure a clean reliable mains supply is kept available to critical applications. SEMIKRON power modules are at the heart of critical power systems.

**Process and Medical Power Supplies**
In electrotechnology and medical diagnostics, power semiconductors at the mains input facilitate and improve processes and save energy.

**Urban Transport Equipment**
Electrical transportation applications demand high reliability of the drive systems with their cyclic operating profile and the continuous auxiliary supplies over years of operation.

**Car Charger Stations**
EV charging based on DC-transmission to the electric vehicle needs especially powerful semiconductor modules. Reliable and efficient SEMIKRON power modules drive the distance-range of e-mobility.

**Energy Storage**
For integration of renewable energy sources into the grid, high-performance energy storage systems are essential to ensure permanent grid stability. SEMIKRON offers a variety of power modules that are ideally suited for this application.

# Applications
# Electric & Electrified Vehicles

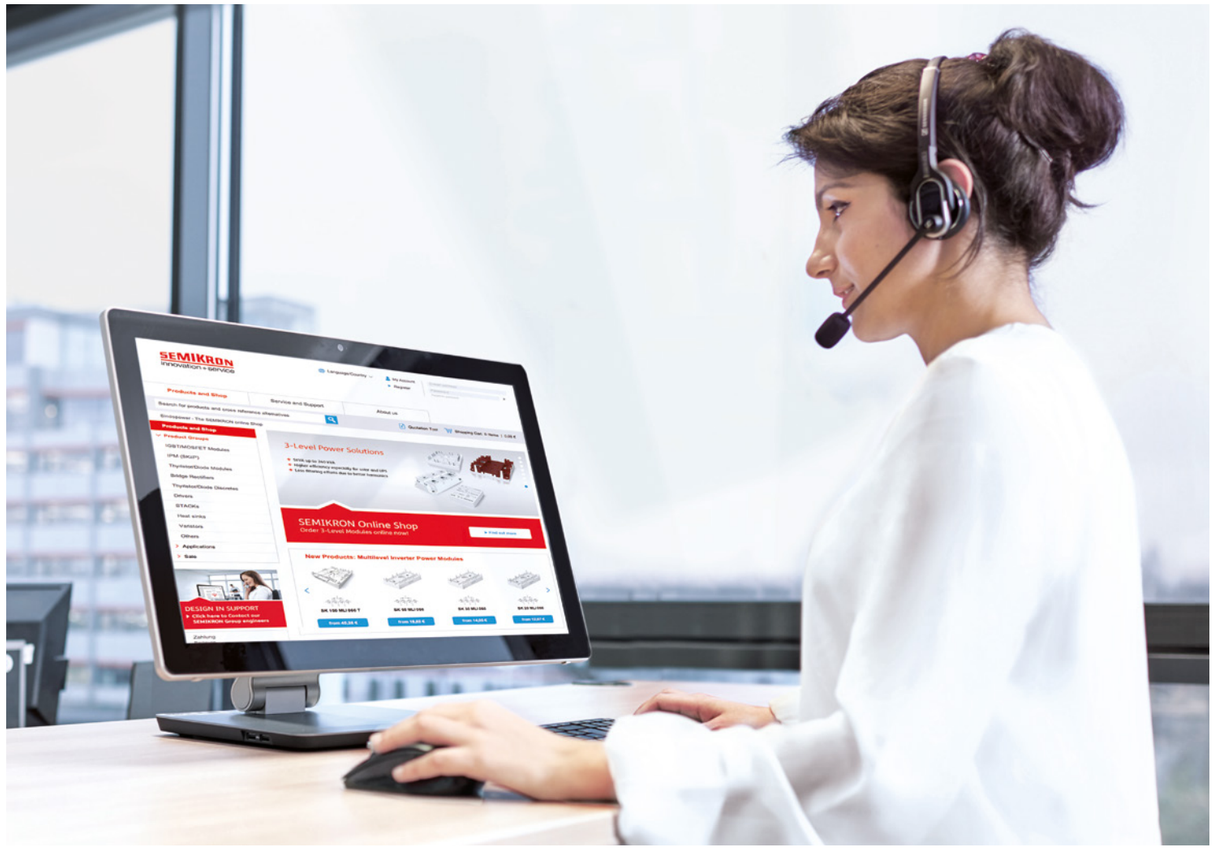
**Light Duty Vehicles**
Power electronics form the heart of any electric vehicle. SEMIKRON's solder-free semiconductor modules and systems are particularly well suited to the robust needs of today's vehicles.

**Battery Vehicles**
Battery driven vehicles, mostly for material handling such as fork lifters, require maximum availability. SEMIKRON's SKAI LV systems are the ideal solution for this application.

**Heavy Duty Vehicles**
For heavy duty vehicle applications such as hybrid and all-electric trucks and buses, SEMIKRON offers a broad portfolio, from highly reliable modules and IPMs to highly integrated SKAI HV systems.



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Note: All information is based on our present knowledge and is to be used for information purposes only. The specifications of our components may not be considered as an assurance of component characteristics.

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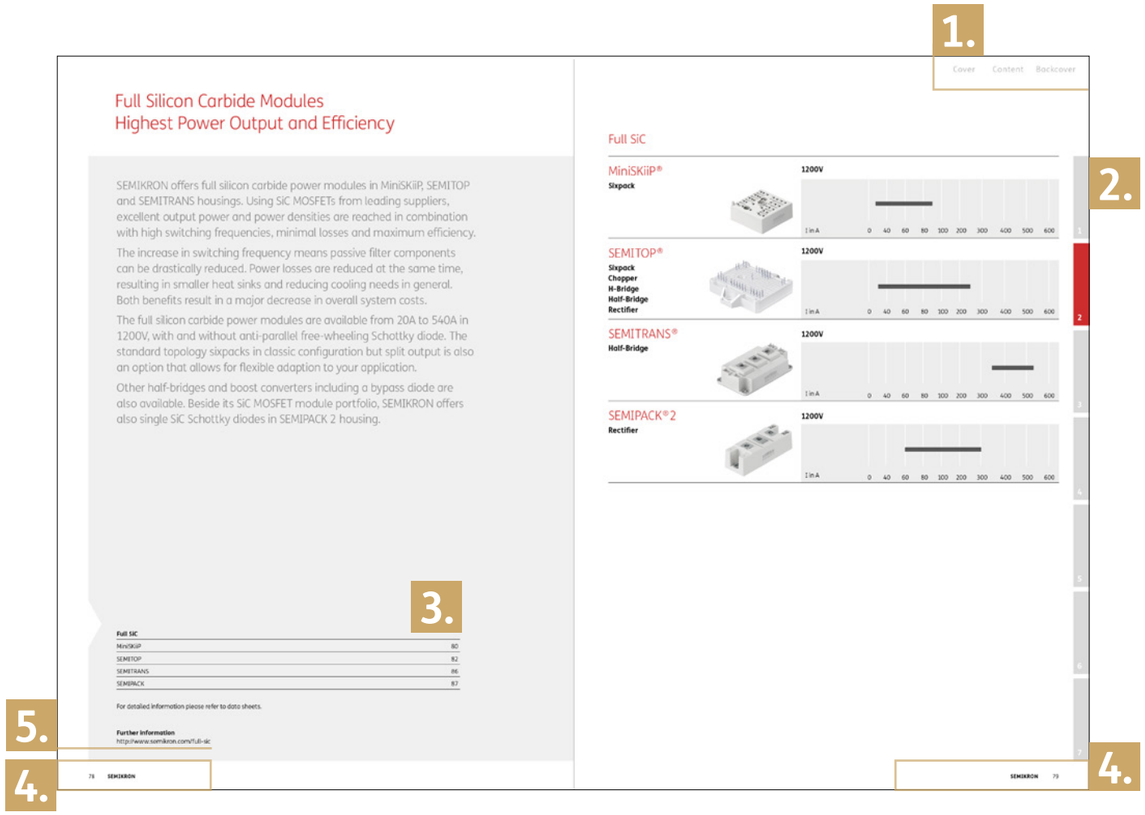
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6. Online-shop icon










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