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2019 20

**Power  
Electronics**

CATALOGUE

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CATALOGUE 2019/2020

# Welcome to the World of Power Electronics

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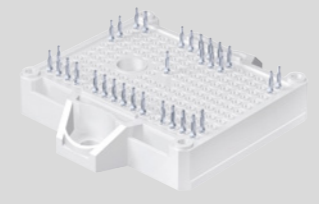


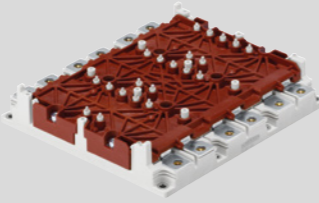



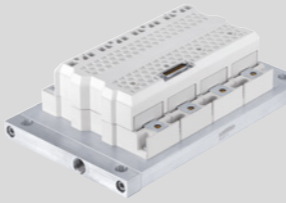
OVERVIEW

# Product

# Range

## 2 POWER MODULES

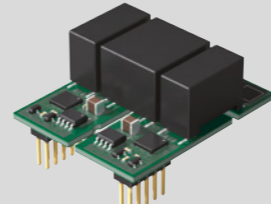
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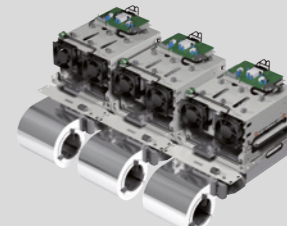

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FROM CHIP TO SYSTEM

# 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](http://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

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Increased productivity thanks to reduced handling costs and improved logistics

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Low thermal resistance with optimised TIM layer thickness

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Improved lifetime and reliability

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Improved assembly robustness

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Modules can be shipped directly to the assembly line without any additional treatment processes

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Lower overall costs

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### Portfolio

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Phase Change Material: TPC-Z-PC-P8; TPC-4000PE; PSX-PE = P8

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Phase Change Material: TPC-V-PC-P-HT; TPC-7000 = HT

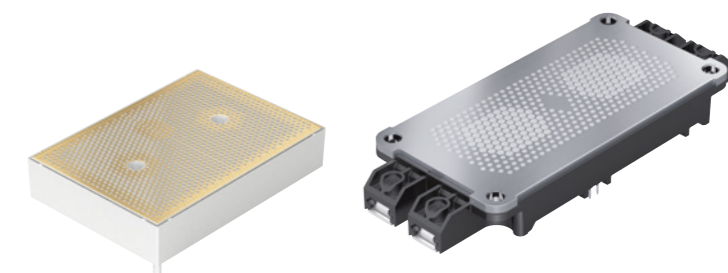
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High Performance Thermal Paste = HPTP

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Standard Thermal Paste: Wacker P12 = P12

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[www.semikron.com/thermal-interface-materials](http://www.semikron.com/thermal-interface-materials)



# Four Key Factors for Your Success

## » Power Electronic Stacks

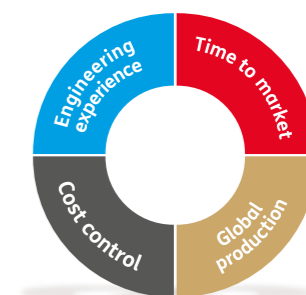
SEMIKRON's power electronic stacks enable our customers to prosper in dynamic markets and meet any global challenge. With more than 200,000 stacks in the field, SEMIKRON is the global market leader for power electronic stacks.

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](mailto:power-stack@semikron.com)  
[www.semikron.com/video/power-electronic-stacks](http://www.semikron.com/video/power-electronic-stacks)



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# 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

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Optimized IGBTs for motor drive applications

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Reduced saturation voltage and chip size

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Higher nominal currents

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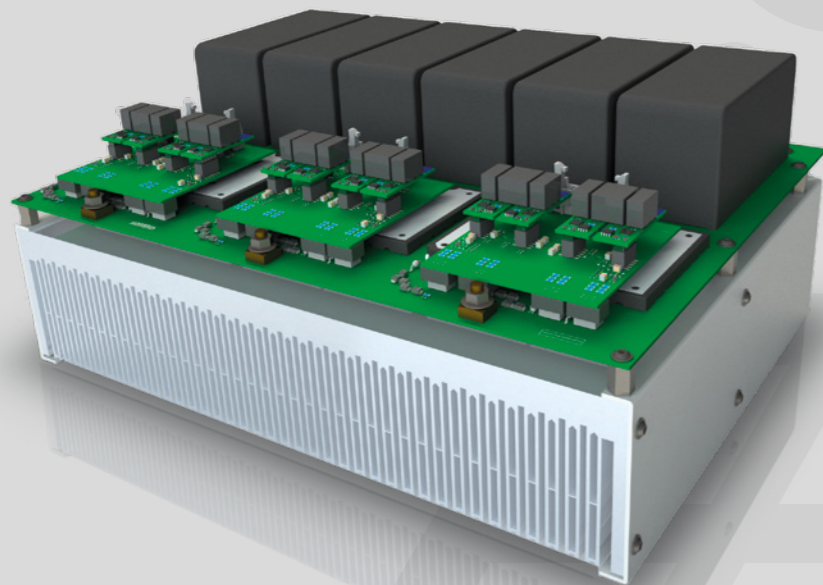
Up to 45% more module output power

---

Lower overall system costs



# 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

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Up to 180kW baseplate-less design for direct PCB mounting

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950V IGBT 7 chips and SiC Schottky diodes in neutral path for maximum efficiency

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Low-inductance DC-link connection

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Spring contacts for easy PCB routing

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Well established, highly reliable MiniSKiiP package

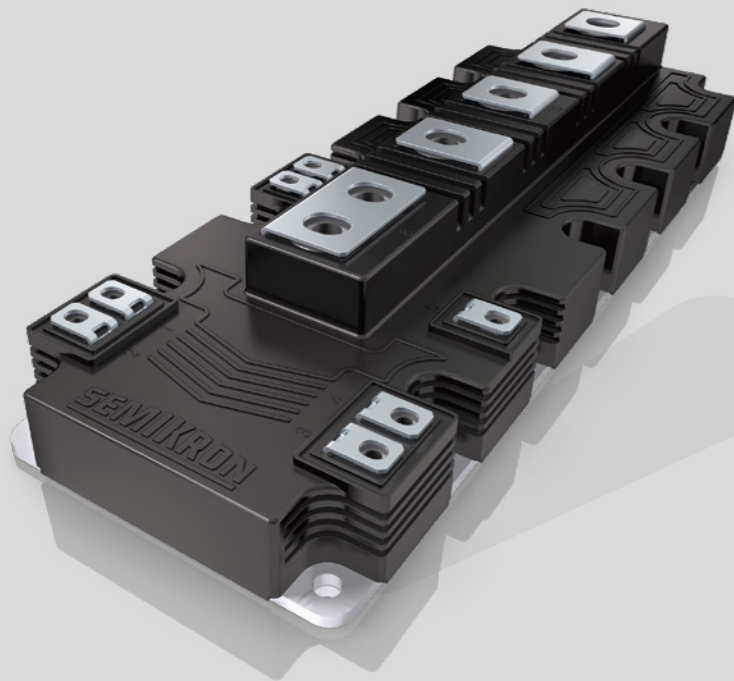
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Optimised production costs thanks to quick and easy assembly





## 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

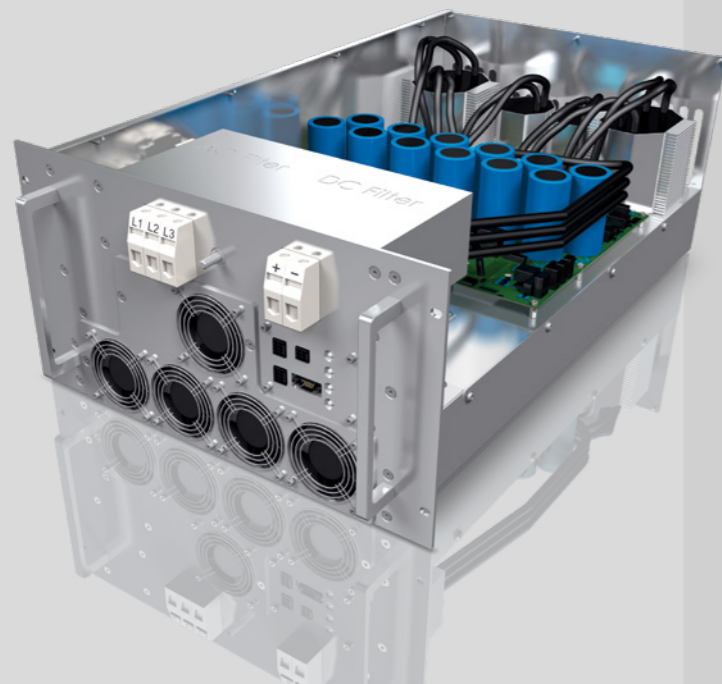
##### Reduced System Costs

Neutral power module cost compared to 2-Level  
Lower filter costs  
Lower cabling costs  
Reduced cooling needs  
Smaller EMI filter

##### Higher Efficiency

Lower semiconductor losses  
Lower filter losses  
Lower cable losses

## 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

AC Input: 400V  $\pm$  10 %

500VDC or 1000VDC output voltage

$f_{sw}$ : 40kHz

PF > 0.98

Efficiency > 94%

Scalable up to 350kW

3L PFC topology with 6 rather than 12 driver channels

Efficient 650V IGBT technology thanks to split DC link

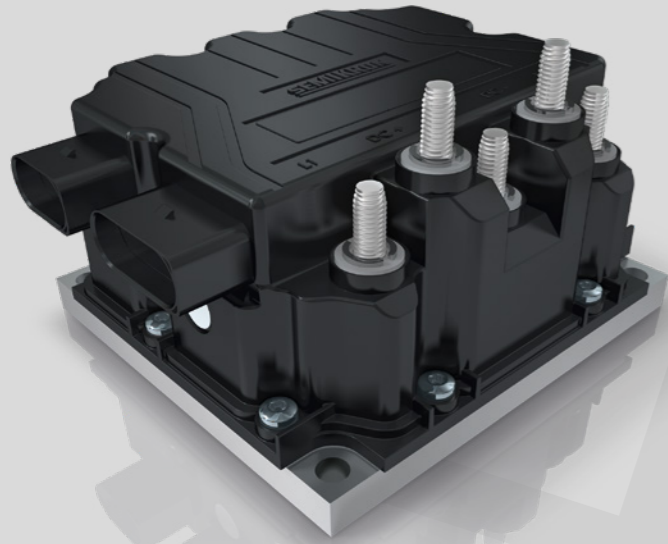
HF transformer for safe galvanic isolation

40kHz switching frequency for optimum performance

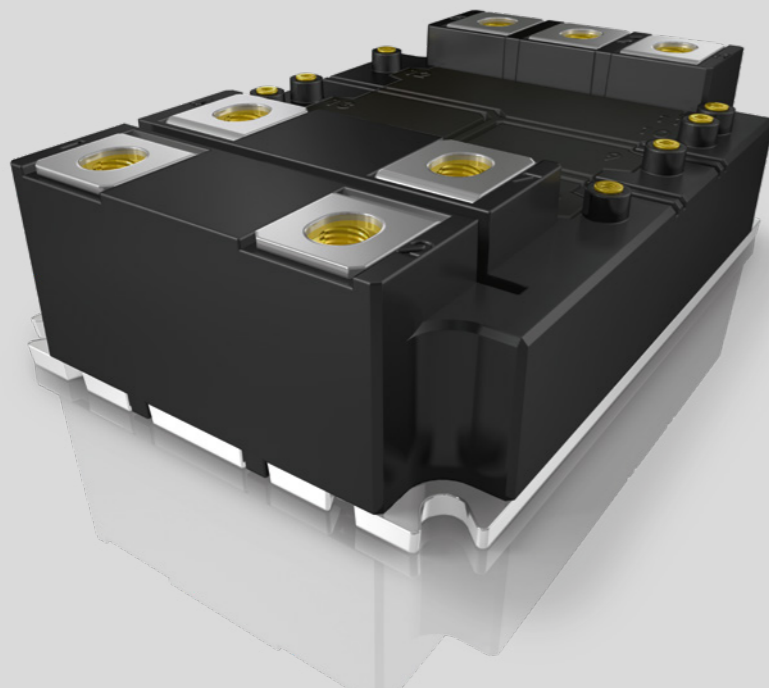
Integrated pre-charge topology

Standard technology for high availability

## Most Compact MOSFET Inverter Platform for Battery Vehicles



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



### 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

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Easy-to-use gate driver interface

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Voltage, current and temperature sensors

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Gate driver with protection

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Low-inductance, low-loss power section

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DC-link capacitors

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Air and plate cooling

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Platform for customised designs

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Customer control board to be integrated in IP66 enclosure

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Design-in kit available

### 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

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Available in 1.7kV and 3.3kV

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Standard Package

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Innovative technologies with sintered chip interconnects and AlCu wire bonds

---

Next level lifetime and power density

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Lower mounting and material cost in inverter assemblies

---

Ideal for paralleling and scaling

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Support Package for testing and qualification

# Power Modules

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MiniSKiiP®



AC | DC

IGBT 7

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

# MiniSKiiP®

### Short facts

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

---

Small and compact inverter design

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Excellent reliability and long product life time

### Key features

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Solder-free SPRING technology for fast and easy assembly

---

Without copper baseplate for cost efficient designs

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Easy and flexible PCB routing without pin holes

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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

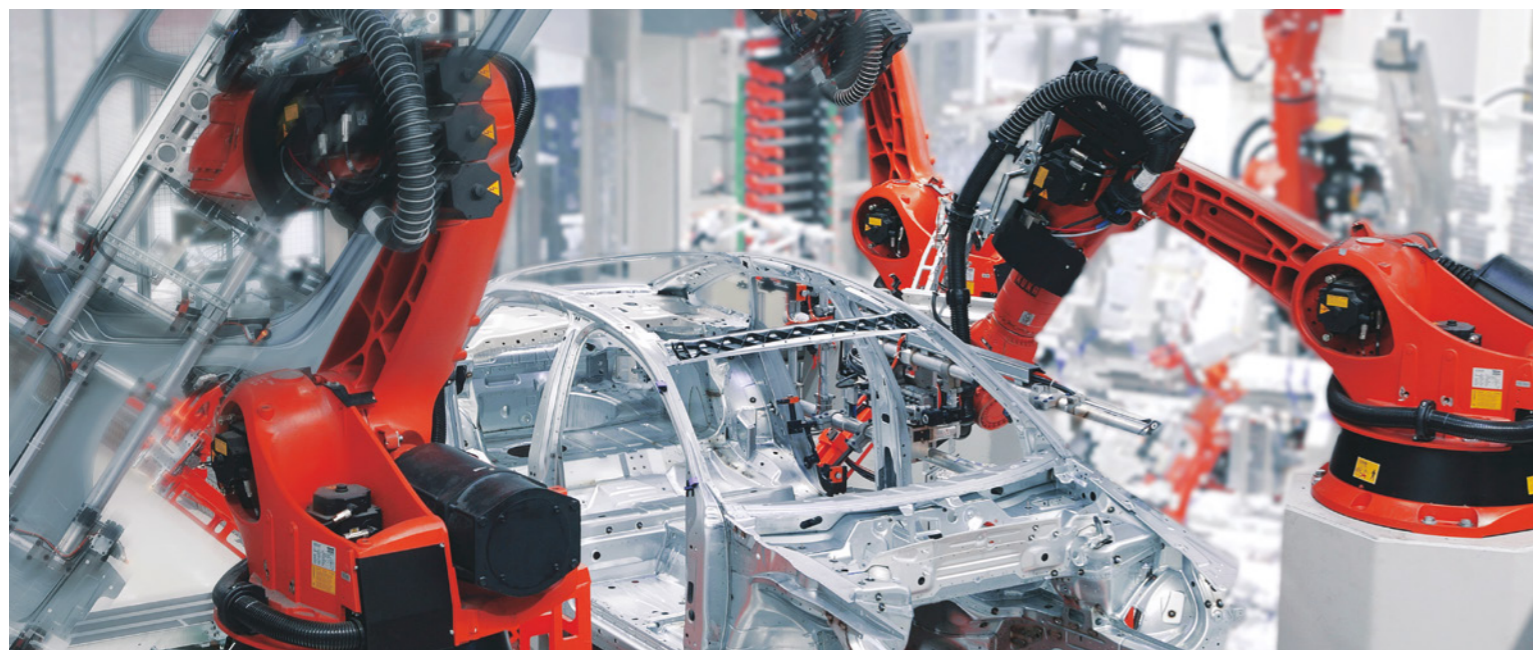
An important mechanical feature of MiniSKiiP modules is the outstandingly easy assembly and service friendly spring contact for load and gate terminals. Compared to conventional solder or press-fit modules, where expensive equipment is

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.

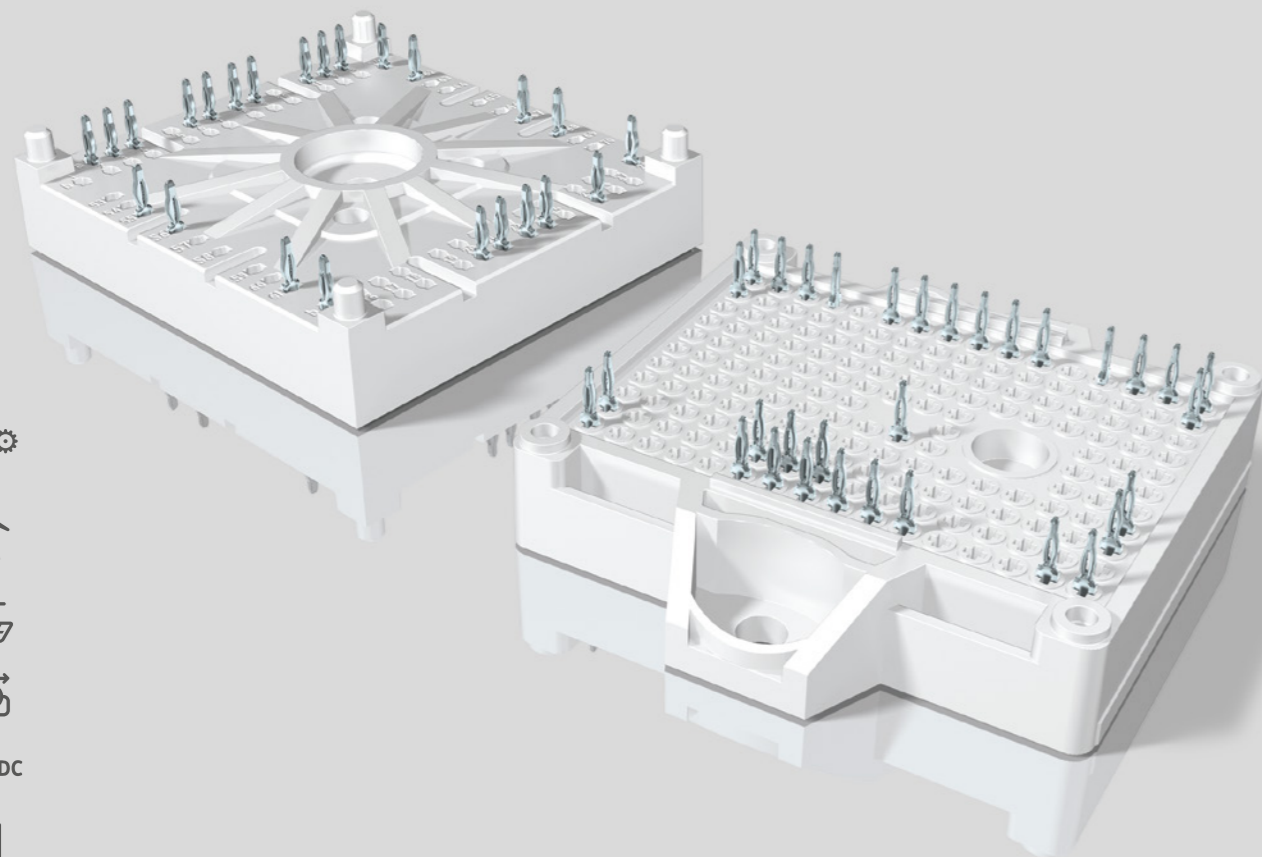
### Product range

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](http://www.semikron.com/miniskiiP)



## SEMITOP® 1-4 SEMITOP® E1/E2



AC | DC



## 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

Optimised 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

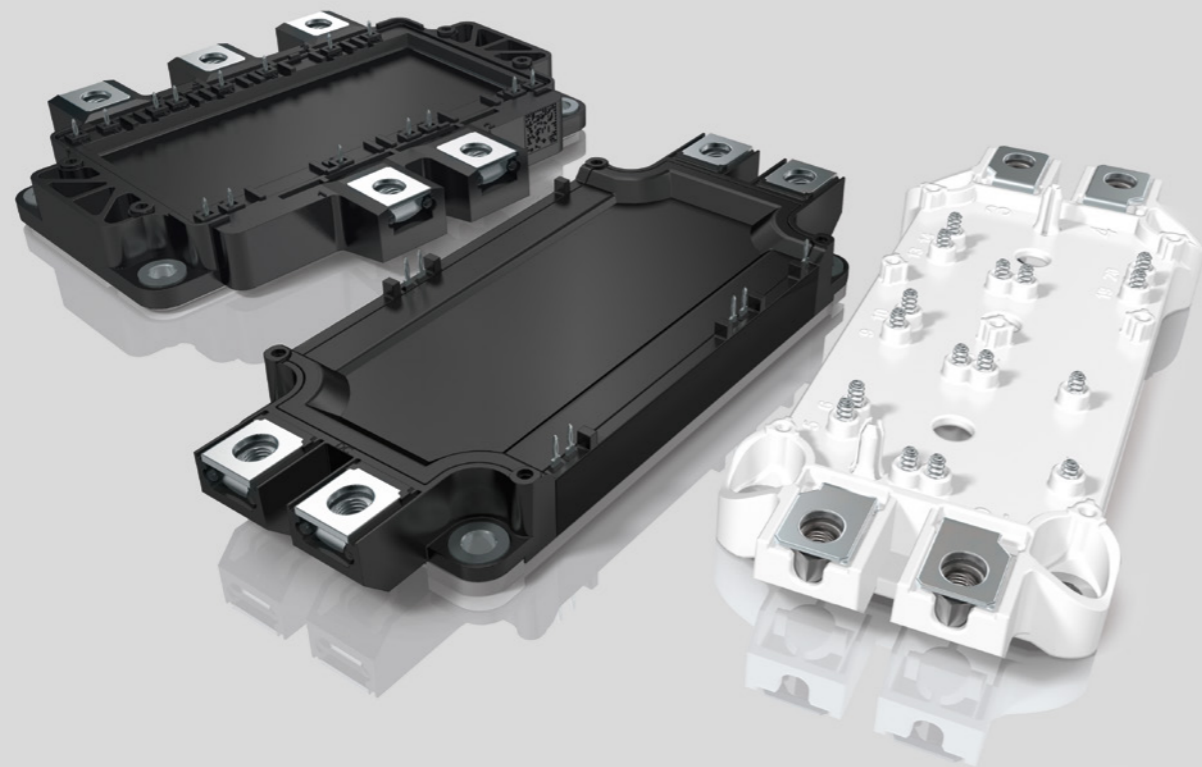
**Further information:** [www.semikron.com/semitop](http://www.semikron.com/semitop)



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



AC | DC



IGBT 7

## 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 develop-

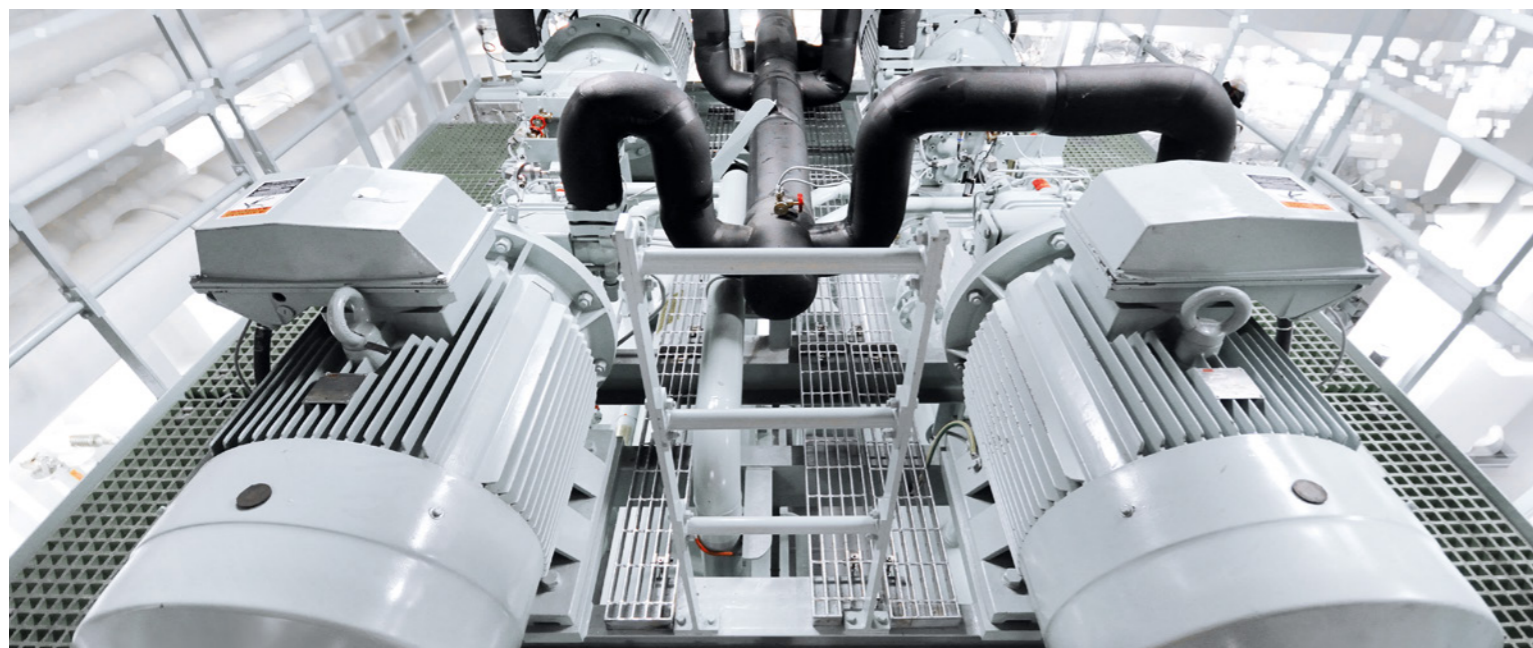
ment time and makes a simple and low-inductance DC-link profile possible. Spring or press-fit contacts allow for a gate driver to be mounted directly on top of the module, eliminating the risk of noise on wires or loose connectors. Thanks to the flat package and separate AC and DC terminals, highly compact, 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.

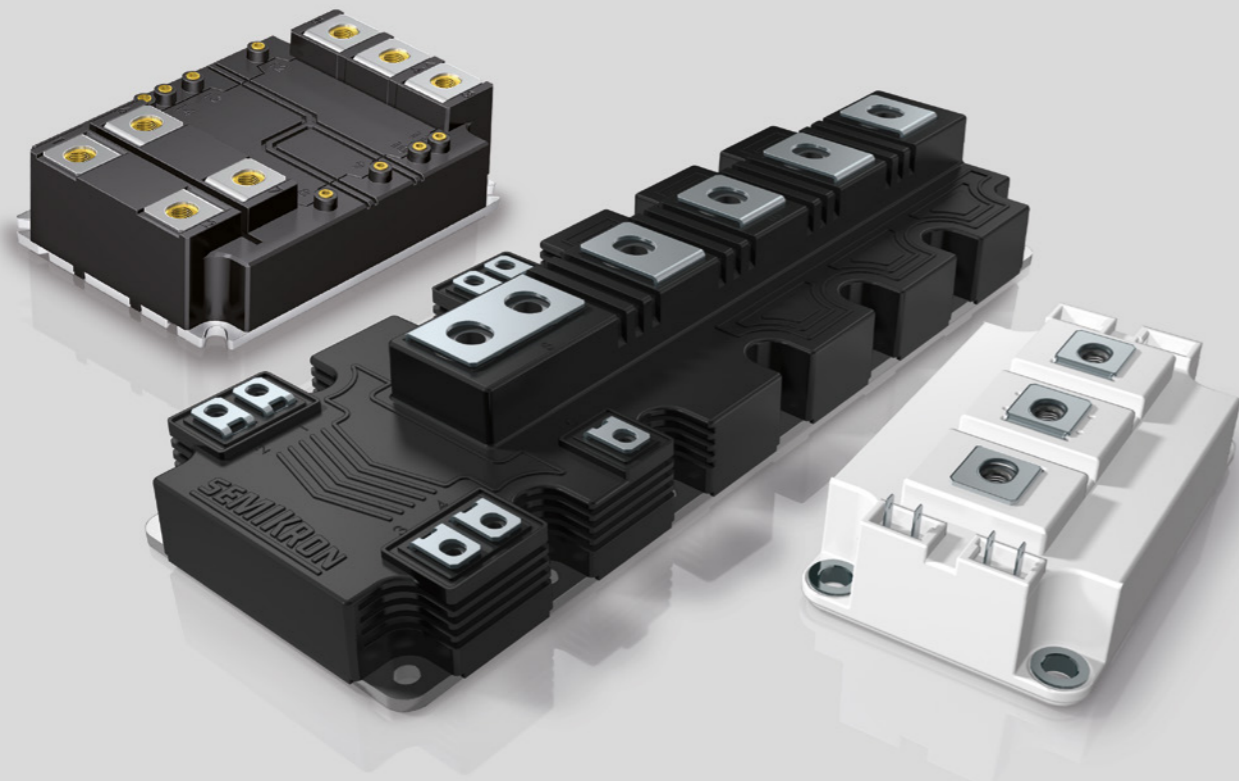
### Product range

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](http://www.semikron.com/semix)



SEMITRANS® 2-9  
SEMITRANS® 10  
SEMITRANS® 20



AC | DC

## 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 resistor

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 times more lifetime than standard modules.

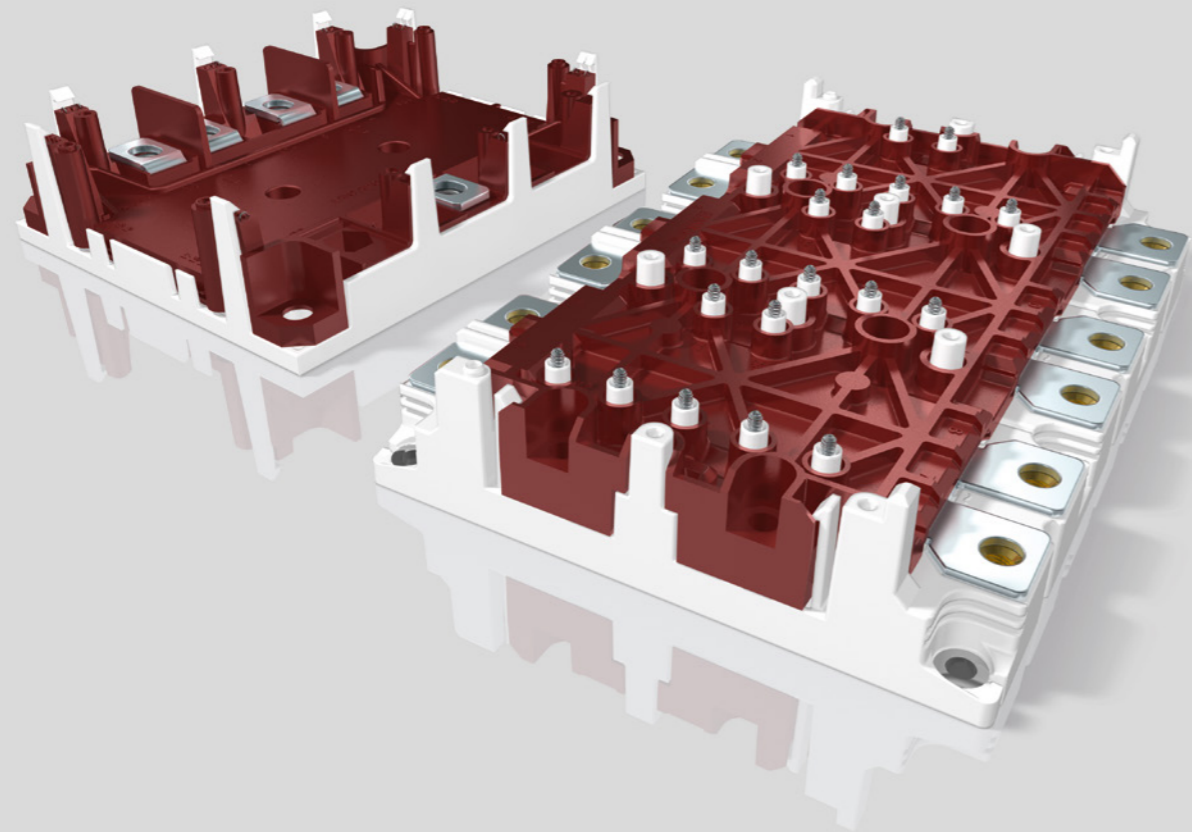
### Product range

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](http://www.semikron.com/semitrans)



SKiM® 4/5  
SKiM® 63/93



AC | DC

## 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

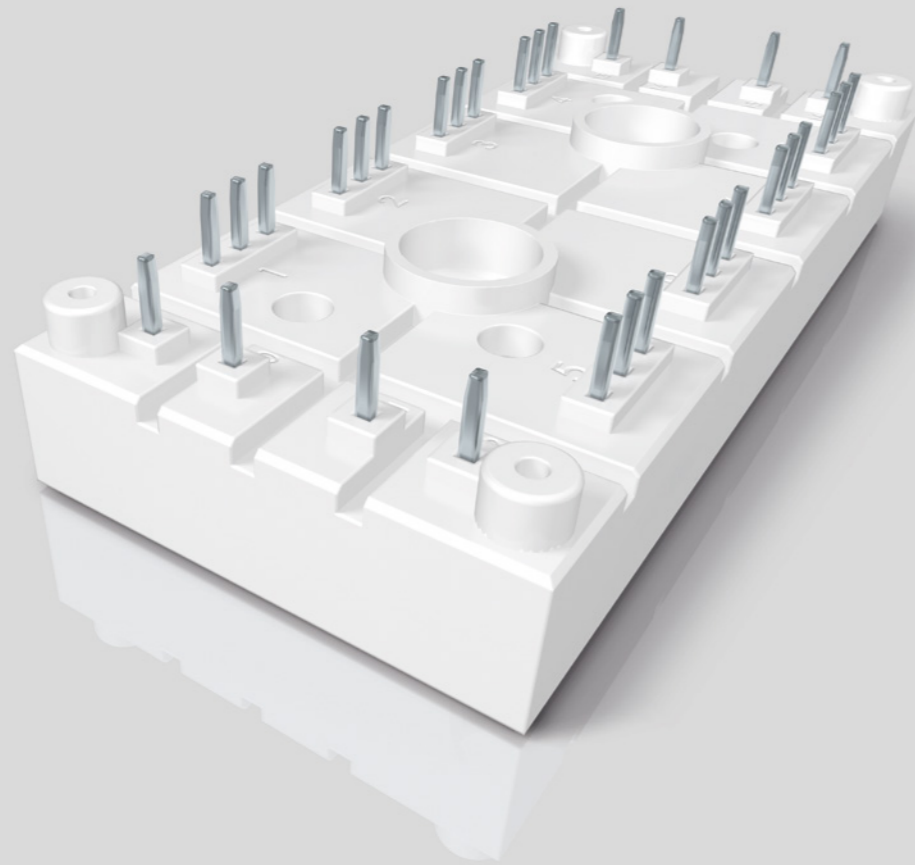
The SKiM 4/5 modules are available as sixpack, 3-level (NPC and TNPC) configurations with nominal currents from 200A to 600A. The SKiM 63/93 offers 3-phase inverter topologies at 600V, 1200V and 1700V. The power ranges from 20kW to 180kW with nominal currents of 300A to 900A. Modules in buck and boost 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](http://www.semikron.com/skim)





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 field controllers, 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](http://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

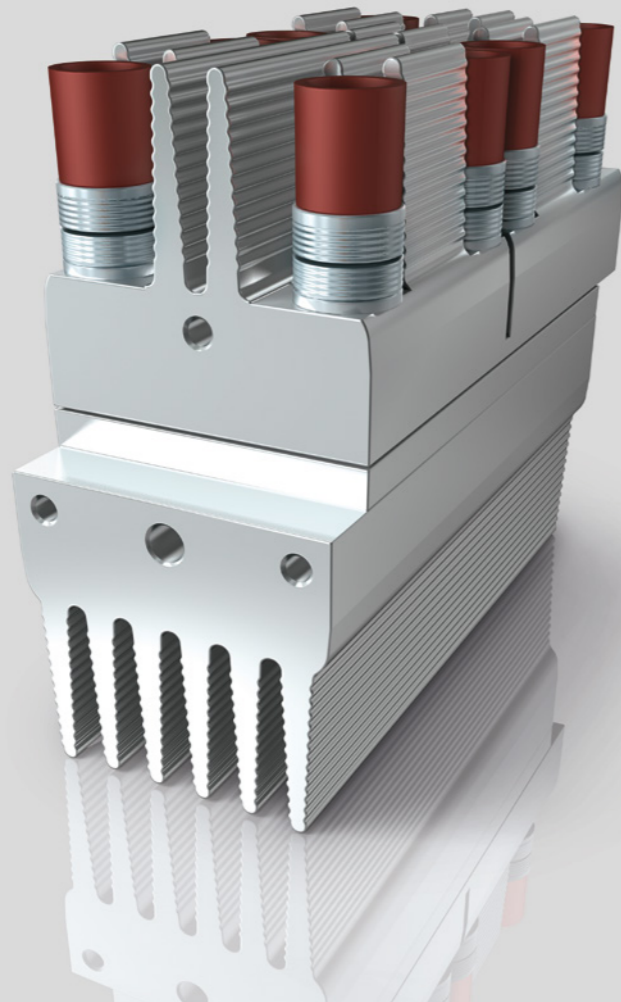
SEMIPACK delivers a well-established industrial standard with regard to footprint and module outline. Thanks to the comprehensive product range, the ideal solution can be found for any application. With SemiSel, the free online calculation and simulation tool for losses and temperature, the power electronic 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](http://www.semikron.com/semipack)

SEMISTART®



## 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](http://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 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.

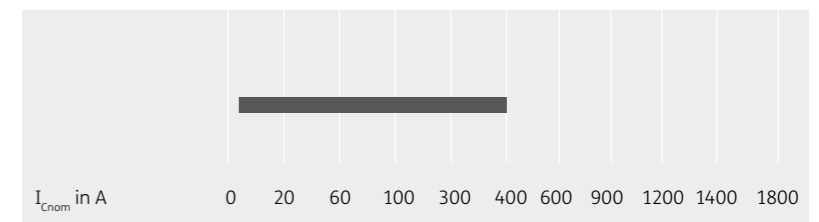
**Further information:** [www.semikron.com/igbt-modules](http://www.semikron.com/igbt-modules)

## MiniSKiiP®

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

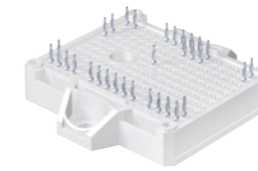


600V up to 1700V

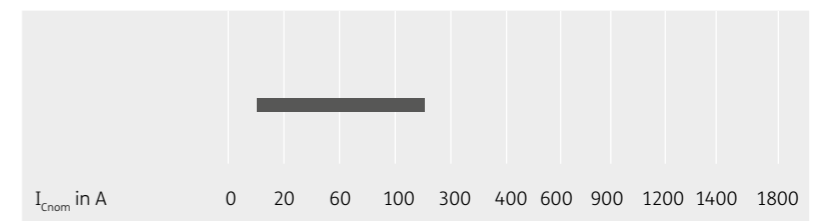


## SEMITOP®

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



600V up to 1200V

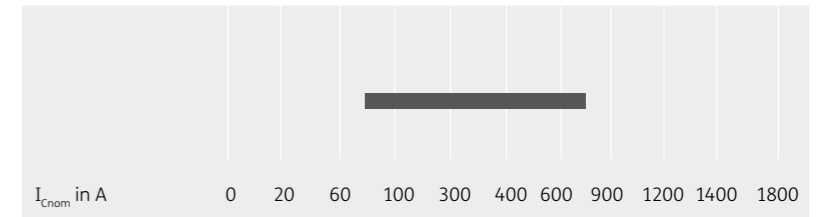


## SEMiX®

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

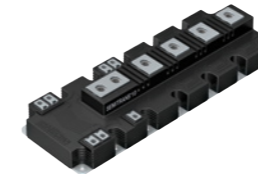


600V up to 1700V

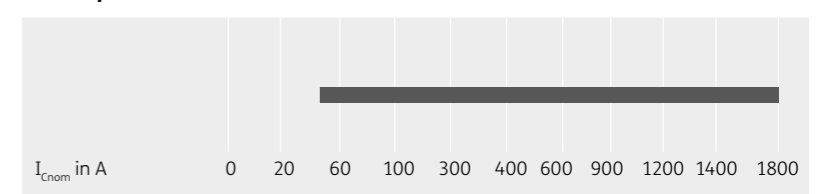


## SEMITRANS®

Half-Bridge  
Sixpack  
Chopper  
Single Switch  
3-level

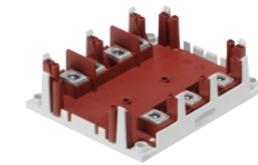


600V up to 3300V

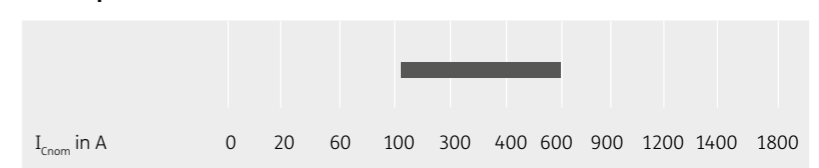


## SKiM® 4/5

Sixpack  
3-level

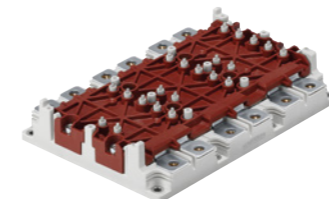


600V up to 1700V

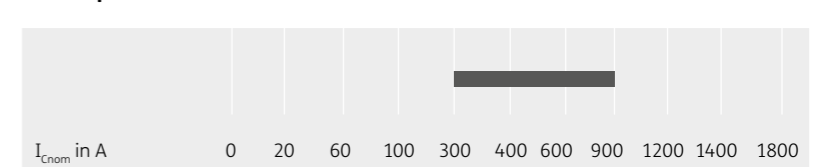


## SKiM® 63/93

Sixpack  
Chopper



600V up to 1700V



# IGBT 7 Modules / MiniSKiiP

Type	IGBT 7				
	$I_{Tnom}$ A	Topology	Package	Topology	
<b>1200V - IGBT (T7)</b>					
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			
	$I_{Tnom}$ A	Topology	Package	Topology
<b>1200V - IGBT (T7)</b>				
SK10DGD12T7ETE1	10	CIB	SEMISTOP E1	
SK15DGD12T7ETE1	15	CIB	SEMISTOP E1	
SK35DGD12T7ETE2	35	CIB	SEMISTOP E2	
SK25GD12T7ETE1	25	Sixpack	SEMISTOP E1	
SK35GD12T7ETE1	35	Sixpack	SEMISTOP E1	
SK50GD12T7ETE2	50	Sixpack	SEMISTOP E2	
SK75GD12T7ETE2	75	Sixpack	SEMISTOP E2	
SK100GD12T7ETE2	100	Sixpack	SEMISTOP E2	
<b>1200V - IGBT (M7)</b>				
SEMiX076DGD12M7p	75	CIB	SEMiX 6p	
SEMiX106DGD12M7p	100	CIB	SEMiX 6p	
SEMiX156DGD12M7p	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				
	$I_c @ T_s = 25^\circ\text{C}$	$I_{cnom}$	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$	$E_{on}$	$E_{off}$	$I_f @ T_s = 25^\circ\text{C}$	$V_f @ T_j = 25^\circ\text{C typ.}$	$E_{rr}$	$I_{FSM} @ T_j = 25^\circ\text{C}$	Package	Thermal Interface Material	Topology
	A	A	V	mJ	mJ	A	V	mJ	A			
<b>1200V - IGBT4 (Trench)</b>												
SKiiP 24GB12T4V1 <sup>2)</sup>	170	150	1.85	10.8	15.6	157	2.17	10.3	-	II 2	P12, HPTP	
SKiiP 26GB12T4V1 <sup>2)</sup>	224	200	1.80	13.6	22.1	194	2.20	13.4	-	II 2	P12, HPTP	
SKiiP 38GB12E4V1 <sup>2)</sup>	329	300	1.85	19.1	34.6	267	2.20	21.5	-	II 3	P12, HPTP	
SKiiP 39GB12E4V1 <sup>2)</sup>	388	400	1.80	20.8	49.7	363	2.20	30.2	-	II 3	P12, HPTP	
SKiiP 39GA12T4V1 <sup>2)</sup>	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 <sup>1)</sup>	167	150	1.85	11.1	16.9	134	2.14	10.9	-	II 3	P12, HPTP	
SKiiP 39TMLI12T4V2 <sup>2)</sup>	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 <sup>2)</sup>	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				
	$I_c @ T_s = 25^\circ\text{C}$	$I_{cnom}$	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$	$E_{on}$	$E_{off}$	$I_f @ T_s = 25^\circ\text{C}$	$V_f @ T_j = 25^\circ\text{C typ.}$	$E_{rr}$	$I_{FSM} @ T_j = 25^\circ\text{C}$	Package	Thermal Interface Material	Topology
	A	A	V	mJ	mJ	A	V	mJ	A			
<b>1200V - IGBT4 (Trench)</b>												
SKiiP 22NAB12T4V2 <sup>1)</sup>	28	15	1.85	t.b.d.	t.b.d.	22	2.38	t.b.d.	220	II 2	P12, HPTP	
SKiiP 23NAB12T4V2 <sup>2)</sup>	37	25	1.85	3.1	2.56	32	2.41	1.4	370	II 2	P12, HPTP	
SKiiP 24NAB12T4V4 <sup>2)</sup>	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 <sup>2)</sup>	28	15	1.85	2.1	1.6	23	2.38	0.8	60	II 1	P12, HPTP	
SKiiP 23ACC12T4V10 <sup>2)</sup>	41	25	1.85	3.5	2.7	32	2.41	1.15	65	II 2	P12, HPTP	
SKiiP 24ACC12T4V10 <sup>2)</sup>	52	35	1.85	3.9	3.5	44	2.30	2.3	100	II 2	P12, HPTP	
SKiiP 24ACC12T4V1 <sup>2)</sup>	38	25	1.85	3.2	3	31	2.41	1.4	-	II 2	P12, HPTP	
<b>1200V - IGBT4 (Fast Trench)</b>												
SKiiP 26GB12F4V1 <sup>2)</sup>	197	200	2.05	16.8	16.3	194	2.20	11.7	-	II 2	P12, HPTP	
SKiiP 28TMLI12F4V1 <sup>2)</sup>	93	80	2.05	3.4	2.2	76	2.17	1.7	-	II 2	P12, HPTP	
SKiiP 29TMLI12F4V1 <sup>2)</sup>	144	150	2.05	5.2	6.1	148	2.17	6.5	-	II 2	P12, HPTP	
SKiiP 35ACC12F4V1 <sup>2)</sup>	54	50	2.05	4.8	3.4	58	2.22	3	270	II 3	P12, HPTP	
SKiiP39MLIT12F4V1 <sup>1)</sup>	409	400	2.05	t.b.d.	t.b.d.	193	2.20	t.b.d.	-	II 3	P12, HPTP	
SKiiP39MLIT12F4V22 <sup>1)</sup>	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

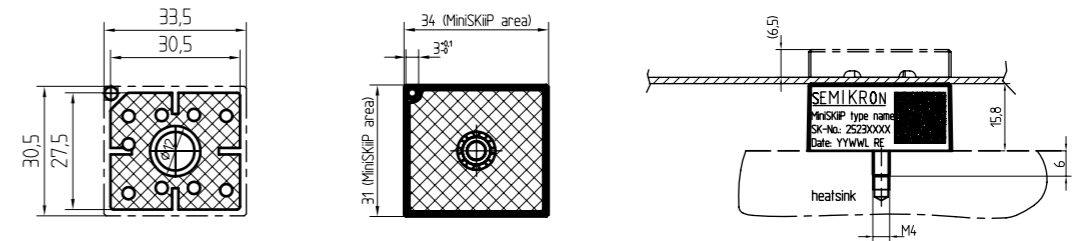
Type	IGBT			Diode			Rectifier	Module		Topology		
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{cnom}$ A	$V_{CE(keep)} @ T_j = 25^\circ\text{C typ.}$ V	$E_{on}$ mJ	$E_{off}$ mJ	$I_f @ T_s = 25^\circ\text{C}$ A	$V_F @ T_j = 25^\circ\text{C typ.}$ V	$E_{rr}$ mJ	$I_{FSM} @ T_j = 25^\circ\text{C}$ A		Package	Thermal Interface Material
<b>1200V - IGBT4 (Fast Trench)</b>												
SKiiP39MLIB12F4V1 <sup>1)</sup>	409	400	2.05	t.b.d.	t.b.d.	193	2.20	t.b.d.	-	II 3	P12, HPTP	
SKiiP39MLIB12F4V22 <sup>1)</sup>	409	400	2.05	t.b.d.	t.b.d.	193	2.20	t.b.d.	-	II 3	P12, HPTP	
SKiiP 37AC12F4V1 <sup>1)</sup>	81	75	2.05	t.b.d.	t.b.d.	83	2.17	t.b.d.	-	II 3	P12, HPTP	
<b>1700V - IGBT3 (Trench)</b>												
SKiiP 38AC176V2 <sup>2)</sup>	118	100	2.00	23.8	32.2	115	1.76	26.2	-	II 3	P12, HPTP	
SKiiP 24NAB176V1 <sup>2)</sup>	38	29	2.00	5.1	6.3	48	2.00	4.9	370	II 2	P12, HPTP	
SKiiP 34NAB176V3 <sup>2)</sup>	67	58	2.00	11.2	12.8	66	2.06	6.6	635	II 3	P12, HPTP	
<b>1700V - IGBT4 (Trench)</b>												
SKiiP 22GB17E4V1 <sup>2)</sup>	117	100	1.90	22.2	30.7	91	2.00	20.9	-	II 2	P12, HPTP	
SKiiP 24GB17E4V1 <sup>2)</sup>	177	150	1.90	26	46	149	2.00	32.4	-	II 2	P12, HPTP	
SKiiP 36GB17E4V1 <sup>2)</sup>	224	200	1.90	37	66	193	2.00	47	-	II 3	P12, HPTP	
SKiiP 38GB17E4V1 <sup>2)</sup>	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

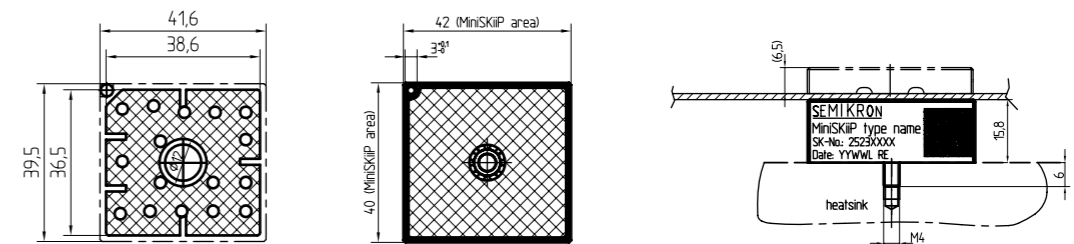
# IGBT Modules / MiniSKiiP

## Packages

### MiniSKiiP II 0

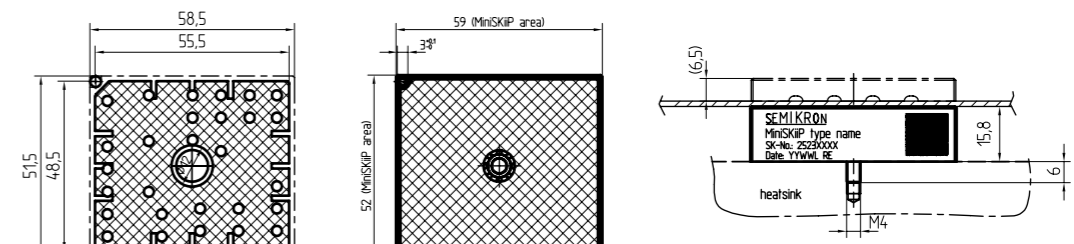


### MiniSKiiP II 1



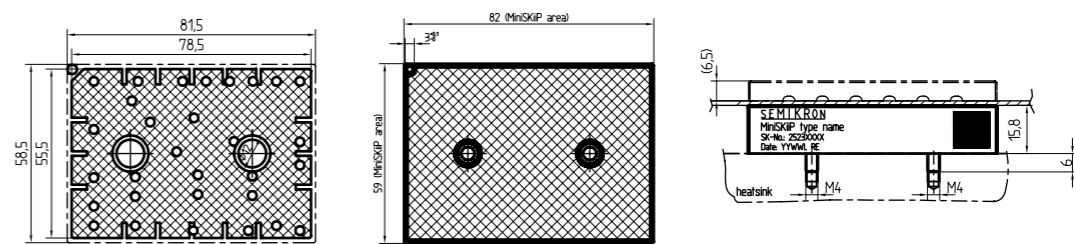
pin configuration depends on circuit (details in data sheet)

### MiniSKiiP II 2



pin configuration depends on circuit (details in data sheet)

### MiniSKiiP II 3



pin configuration depends on circuit (details in data sheet)

Dimensions in mm



# IGBT Modules / SEMITOP

Type	IGBT					Diode		Rectifier	Module		Topology	
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{Cnom}$ A	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$ V	$E_{on}$ mJ	$E_{off}$ mJ	$I_f @ T_s = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V		$E_{rr}$ mJ	$I_{FSM} @ T_j = 25^\circ\text{C}$ A		Package
<b>600V - IGBT3 (Trench)</b>												
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 <sup>1)</sup>	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 <sup>1)</sup>	59	50	1.45	2.2	1.73	51	1.47	0.72	-	3p	P12, HPTP	
SK 30 GD 066 ETp <sup>1)</sup>	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 <sup>4)</sup>	174	200	1.45	13.9	12	99	1.30	3.4	-	4	P12, HPTP	
SK 20 DGD L 066 ET	30	20	1.45	0.3	0.6	27	1.40	0.2	220	3	P12, HPTP	
SK 30 DGD L 066 ET	40	30	1.45	0.55	1.15	36	1.50	0.53	370	3	P12, HPTP	
SK 50 DGD L 066 T	69	50	1.45	2.2	1.74	54	1.35	0.73	370	4	P12, HPTP	
SK 75 DGD L 066 T <sup>3)</sup>	81	75	1.45	3.1	2.8	64	1.35	0.9	700	4	P12, HPTP	
SK 100 DGD L 066 T <sup>4)</sup>	106	100	1.45	4.4	3.5	99	1.10	1.45	700	4	P12, HPTP	
SK 50 DGD L 066 ETE2 <sup>1)</sup>	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		Topology	
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{Cnom}$ A	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$ V	$E_{on}$ mJ	$E_{off}$ mJ	$I_f @ T_s = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V		$E_{rr}$ mJ	$I_{FSM} @ T_j = 25^\circ\text{C}$ A		Package
<b>600V - NPT IGBT (Standard)</b>												
SK 45 GAL 063 <sup>3)</sup>	45	50	2.10	1.4	1.2	57	1.45	0.25	-	2	P12	
SK 45 GAR 063 <sup>3)</sup>	45	50	2.10	1.4	1.2	57	1.45	0.25	-	2	P12	
SK 45 GB 063 <sup>4)</sup>	45	50	2.10	1.4	1.2	57	1.45	0.25	-	2	P12	
SK 80 GB 063 <sup>4)</sup>	81	100	2.10	4	3	79	1.40	1.2	-	3	P12, HPTP	
SK 80 GM 063 <sup>3)</sup>	81	100	2.00	3	2.3	105	1.30	0.2	-	2	P12	
SK 15 GH 063 <sup>3)</sup>	20	15	2.00	0.71	0.4	20	1.45	0.45	-	2	P12	
SK 25 GH 063 <sup>3)</sup>	30	30	2.10	1.1	0.8	36	1.45	0.25	-	2	P12	
SK 45 GH 063 <sup>3)</sup>	45	50	2.10	1.4	1.2	57	1.30	0.9	-	3	P12, HPTP	
SK 13 GD 063 <sup>3)</sup>	18	10	2.10	0.6	0.4	22	1.45	0.1	-	3	P12, HPTP	
SK 25 GD 063 <sup>3)</sup>	30	30	2.10	1.3	0.9	36	1.45	0.25	-	3	P12, HPTP	
SK 45 GD 063 <sup>3)</sup>	45	50	2.10	1.4	1.2	36	1.45	0.25	-	3	P12, HPTP	
SK 25 GAD 063 T <sup>4)</sup>	30	30	2.10	1.3	0.9	36	1.45	0.25	-	3	P12, HPTP	
<b>600V - NPT IGBT (Ultrafast)</b>												
SK 50 GB 065 <sup>4)</sup>	54	60	2.00	1.1	0.7	64	1.45	0.55	-	2	P12	
SK 50 GAL 065 <sup>3)</sup>	54	60	2.00	1.1	0.7	57	1.30	0.2	-	2	P12	
SK 50 GAR 065 <sup>3)</sup>	54	60	2.00	1.1	0.7	57	1.30	0.2	-	2	P12	
SK 50 GAR L 065 F <sup>4)</sup>	54	60	1.70	1.03	0.8	82	1.70	0.45	-	2	P12	
SK 50 GAR L 065 USA <sup>4)</sup>	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		Topology
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{c, \text{nom}}$ A	$V_{CE(\text{sat})} @ T_j = 25^\circ\text{C typ.}$ V	$E_{\text{on}}$ mJ	$E_{\text{off}}$ mJ	$I_f @ T_s = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V	$E_{rr}$ mJ	$I_{FSM} @ T_j = 25^\circ\text{C}$ A	Package	Thermal Interface Material	
<b>600V - NPT IGBT (Ultrafast)</b>												
SK 55 GARL 065 E <sup>3)</sup>	54	60	1.70	1.1	0.76	36	1.45	0.9	-	3	P12, HPTP	
SK 75 GARL 065 E <sup>3)</sup>	80	90	1.70	2.71	2.75	57	1.30	0.2	-	3	P12, HPTP	
<b>600V - IGBT3 (Trench)</b>												
SK 50 GH 065 F <sup>3)</sup>	54	60	2.00	1.07	1.76	82	1.10	0.42	-	3	P12, HPTP	
SK 35 GD 065 ET <sup>3)</sup>	45	50	2.00	1.3	0.6	36	1.90	0.9	-	3	P12, HPTP	
SK 10 BGD 065 ET <sup>4)</sup>	17	6	2.00	0.18	0.13	22	1.30	0.18	220	3	P12, HPTP	
SK 9 BGD 065 ET <sup>3)</sup>	12	6	2.00	0.22	0.12	20	1.35	0.31	220	3	P12, HPTP	
SK 9 DGD 065 ET <sup>3)</sup>	12	6	2.00	0.22	0.12	20	1.35	0.31	220	3	P12, HPTP	
SK 20 DGD 065 ET <sup>3)</sup>	26	20	2.00	0.66	0.4	25	1.60	t.b.d.	370	3	P12, HPTP	
SK 10 DGD 065 ET <sup>4)</sup>	17	6	2.00	0.18	0.13	22	1.30	0.18	220	3	P12, HPTP	
SK 20 DGD 065 ET <sup>3)</sup>	24	20	2.00	0.69	0.39	25	1.60	t.b.d.	220	3	P12, HPTP	
<b>650V - IGBT3 (Trench)</b>												
SK 75 GD 07E3 ETE <sup>2)</sup>	66	75	1.45	1.1	2.55	70	1.43	1.85	-	E2	HPTP, HT	
SK 50GD07E3ETE <sup>2)</sup>	60	50	1.45	1.4	1.3	67	1.37	0.8	-	E1	-	
SK 30GD07E3ETE1V1 <sup>1)</sup>	38	30	1.45	0.8	1.45	37	1.55	0.65	-	E1	-	
<b>650V - IGBT3 (Fast Trench)</b>												
SK 151 GALE 07F3 TUF <sup>2)</sup>	-	150	1.85	8.8	4	116	1.59	0.26	635	3	P12, HPTP	
SK 50 MLI 07F3 D1p <sup>1)</sup>	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

## IGBT Modules / SEMITOP

Type	IGBT					Diode		Rectifier		Module		Topology
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{c, \text{nom}}$ A	$V_{CE(\text{sat})} @ T_j = 25^\circ\text{C typ.}$ V	$E_{\text{on}}$ mJ	$E_{\text{off}}$ mJ	$I_f @ T_s = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V	$E_{rr}$ mJ	$I_{FSM} @ T_j = 25^\circ\text{C}$ A	Package	Thermal Interface Material	
<b>650V - IGBT3 (Fast Trench)</b>												
SK100MLI07F3TD1p <sup>2)</sup>	109	100	1.85	4.6	1	137	1.37	1.76	-	4p	P12, HPTP	
SK 150 MLI 07F3 TD1p <sup>2)</sup>	151	150	1.85	9.07	1.3	137	1.37	1.76	-	4p	P12, HPTP	
<b>650V - IGBT H5 (High speed Trench5 technology)</b>												
SK 100 GD 07F3 TD1 <sup>2)</sup>	104	100	1.85	3.92	2.1	95	1.35	0.92	-	4	P12, HPTP	
SK150DBB07F3TD1p <sup>2)</sup>	74	150	1.85	1.52	0.65	108	1.35	0.9	-	4p	P12, HPTP	
SK100DBB07F3TD1p <sup>2)</sup>	54	100	1.85	1	0.5	115	1.35	0.7	-	4p	P12, HPTP	
<b>650V - IGBT L5 (Low saturation voltage Trench5 technology)</b>												
SK225GH07H5TD1E2 <sup>1)</sup>	162	225	1.65	2.3	0.9	66	1.35	0.7	-	E2	HPTP, HT	
SK150MLI07L5TD1E2 <sup>1)</sup>	96	150	1.65	5.3	1.97	107	1.35	1.13	-	E2	HPTP, HT	
<b>650V-IGBT S5 (High Speed Soft Switching)</b>												
SK75GARL07S5TD1E1 <sup>1)</sup>	68	75	1.42	2.3	1	66	1.35	0.7	-	E1	-	
SK75MLI07S5TD1E1 <sup>1)</sup>	64	75	1.42	0.5	1.2	49	1.35	1.5	-	E1	-	
SK100MLI07S5TD1E2 <sup>1)</sup>	142	100	1.06	0.7	1.6	106	1.55	1.6	-	E2	HPTP, HT	
SK150MLI07S5TD1E2 <sup>1)</sup>	128	150	1.42	0.9	2.4	106	1.55	3	-	E2	HPTP, HT	
<b>1200V - IGBT3 (Trench)</b>												
SK 10 GD 126 ET <sup>3)</sup>	15	8	1.70	1	1	25	1.90	1.4	-	3	P12, HPTP	
SK 15 GD 126 ET <sup>3)</sup>	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		Topology
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{c,non}$ A	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$ V	$E_{on}$ mJ	$E_{off}$ mJ	$I_f @ T_s = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V	$E_{rr}$ mJ	$I_{FSM} @ T_j = 25^\circ\text{C}$ A	Package	Thermal Interface Material	
<b>1200V - IGBT3 (Trench)</b>												
SK 50 GD 126 T <sup>4)</sup>	68	50	1.70	4.6	6.3	62	1.35	3.6	-	4	P12, HPTP	
SK 75 GD 126 T <sup>4)</sup>	88	75	1.70	11.3	10	91	1.46	6	-	4	P12, HPTP	
SK 100 GD 126 T <sup>4)</sup>	114	100	1.70	9.8	11.7	118	1.50	7.3	-	4	P12, HPTP	
SK 10 DGD 126 ET <sup>3)</sup>	15	8	1.70	1	1	25	1.90	1.4	220	3	P12, HPTP	
SK 15 DGD 126 ET	22	15	1.70	2	1.8	25	1.60	1.1	220	3	P12, HPTP	
SK 25 DGD 126 T <sup>4)</sup>	41	25	1.70	2.8	3.1	30	1.50	2	370	4	P12, HPTP	
SK 35 DGD 126 T <sup>4)</sup>	52	35	1.70	3.7	4.8	38	1.50	3	370	4	P12, HPTP	
SK 50 DGD 126 T <sup>3)</sup>	68	50	1.70	4.6	6.3	62	1.35	3.6	700	4	P12, HPTP	
<b>1200V - IGBT4 (Trench)</b>												
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 <sup>1)</sup>	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 <sup>2)</sup>	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 <sup>2)</sup>	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 <sup>2)</sup>	100	100	1.85	16.6	10	85	2.25	5.2	-	3	P12, HPTP	
SK 200 GB 12T4 Tp <sup>1)</sup>	210	200	1.80	13.6	22.1	190	2.20	13.4	-	4p	P12, HPTP	
SK 150 GAH 12T4 Tp <sup>1)</sup>	167	150	1.85	10.8	15.6	33	2.33	0.82	-	4p	P12, HPTP	
SK 25 GH 12T4 <sup>2)</sup>	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		Topology
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{c,non}$ A	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$ V	$E_{on}$ mJ	$E_{off}$ mJ	$I_f @ T_s = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V	$E_{rr}$ mJ	$I_{FSM} @ T_j = 25^\circ\text{C}$ A	Package	Thermal Interface Material	
<b>1200V - IGBT4 (Trench)</b>												
SK 50 GH 12T4 T <sup>2)</sup>	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 <sup>1)</sup>	43	35	1.85	1.6	3.27	38	2.30	1.73	-	3p	P12, HPTP	
SK 70 MLI 12T4 Tp <sup>1)</sup>	90	70	1.85	13.5	8.5	78	2.30	2.73	-	4p	P12, HPTP	
SK 10 GD 12T4 ET <sup>2)</sup>	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 <sup>1)</sup>	35	25	1.85	2.27	2.7	28	2.41	1.28	-	3p	P12, HPTP	
SK 35 GD 12T4 ET <sup>2)</sup>	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 <sup>2)</sup>	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 <sup>1)</sup>	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 DGD 12T4 ET	17	8	1.85	0.41	0.75	15	2.38	0.41	220	3	P12, HPTP	
SK 15 DGD 12T4 ET	27	15	1.85	0.82	1.52	21	2.38	0.82	220	3	P12, HPTP	
SK 25 DGD 12T4 T	45	25	1.85	2.27	2.7	30	2.40	t.b.d.	370	4	P12, HPTP	
SK 25 DGD 12T4 ETE2 <sup>1)</sup>	33	25	1.85	2.6	2.35	53	1.00	2.05	520	E2	HPTP, HT	
SK 35 DGD 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		Topology
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{c, \text{nom}}$ A	$V_{CE(\text{sat})} @ T_j = 25^\circ\text{C typ.}$ V	$E_{\text{on}}$ mJ	$E_{\text{off}}$ mJ	$I_f @ T_s = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V	$E_{\text{rr}}$ mJ	$I_{\text{FSM}} @ T_j = 25^\circ\text{C}$ A	Package	Thermal Interface Material	
<b>1200V - IGBT4 (Trench)</b>												
SK 35 DGD1 12T4 ETE2 <sup>1)</sup>	43	35	1.85	3.15	3.2	53	1.00	2.6	520	E2	HPTP, HT	
SK 50 DGD1 12T4 T	75	50	1.85	8.3	5	60	2.22	2.15	700	4	P12, HPTP	
SK25GD12T4ETE1 <sup>1)</sup>	33	25	1.85	2.6	2.35	29	2.41	2.05	-	E1	-	
SK35GD12T4ETE1 <sup>1)</sup>	43	35	1.85	3.15	3.2	38	2.30	2.6	-	E1	-	
SK50GD12T4ETE2 <sup>1)</sup>	66	50	1.85	5.8	4.5	59	2.22	3.6	-	E2	HPTP, HT	
SK75GD12T4ETE2 <sup>1)</sup>	84	75	1.85	8	6.4	82	2.17	5.5	-	E2	HPTP, HT	
<b>1200V - IGBT4 (Fast Trench)</b>												
SK 120 GB 12F4 T <sup>1)</sup>	174	120	2.05	8.8	7.47	29	2.38	2.04	-	3	P12, HPTP	
SK80TMLI12F4Tp <sup>1)</sup>	88	80	2.05	1.9	2.04	83	2.17	1.6	-	3p	P12, HPTP	
SK 150 TMLI 12F4 Tp <sup>2)</sup>	180	150	2.05	3.13	5.29	100	2.20	4.8	-	4p	P12, HPTP	
SK200TMLI12F4TE2 <sup>2)</sup>	166	200	2.05	4.44	5.4	65	2.17	3.2	-	E2	HPTP, HT	
SK 150 MLIT 12F4 TE2 <sup>1)</sup>	149	150	2.05	12.6	11	80	2.20	8.3	-	E2	HPTP, HT	
SK 150 MLIB 12F4 TE2 <sup>1)</sup>	149	150	2.05	12.6	11	80	2.20	8.3	-	E2	HPTP, HT	
<b>1200V - NPT IGBT (Ultrafast)</b>												
SK 60 GAL 125 <sup>3)</sup>	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

# IGBT Modules / SEMITOP

Type	IGBT					Diode		Rectifier		Module		Topology
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{c, \text{nom}}$ A	$V_{CE(\text{sat})} @ T_j = 25^\circ\text{C typ.}$ V	$E_{\text{on}}$ mJ	$E_{\text{off}}$ mJ	$I_f @ T_s = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V	$E_{\text{rr}}$ mJ	$I_{\text{FSM}} @ T_j = 25^\circ\text{C}$ A	Package	Thermal Interface Material	
<b>1200V - NPT IGBT (Ultrafast)</b>												
SK 60 GAR 125 <sup>4)</sup>	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	

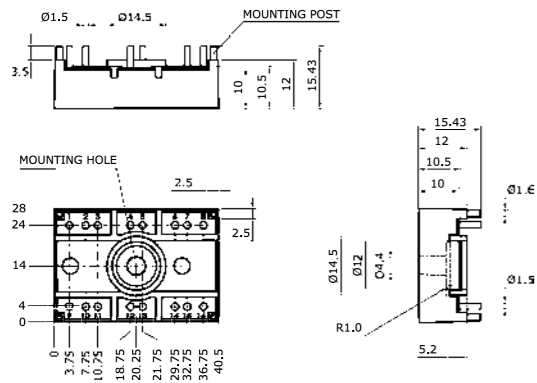
Footnotes: 1) Sample status / 2) In production new / 3) Not for new designs / 4) Discontinued

# IGBT Modules / SEMITOP

Packages

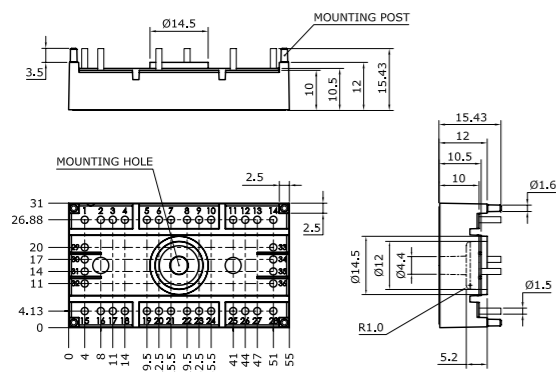
SEMISTOP 2

Dimensions: mm  
Tolerance system: ISO 2768-m



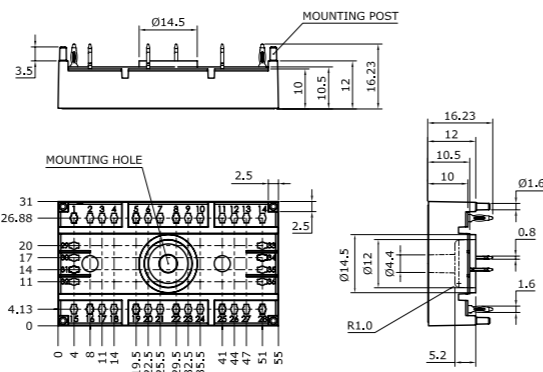
SEMISTOP 3

Dimensions: mm  
Tolerance system: ISO 2768-m



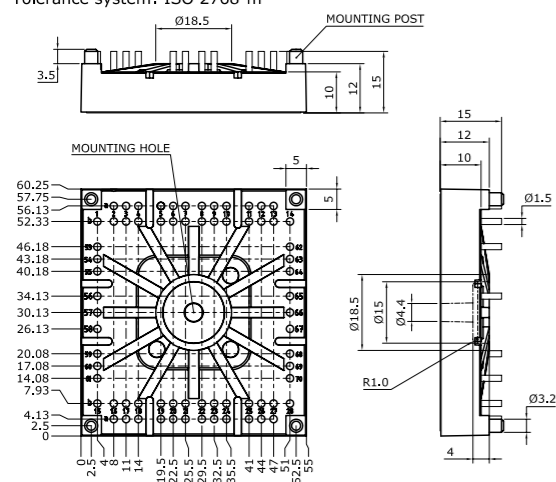
SEMISTOP 3 Press-Fit

Dimensions: mm  
Tolerance system: ISO 2768-m



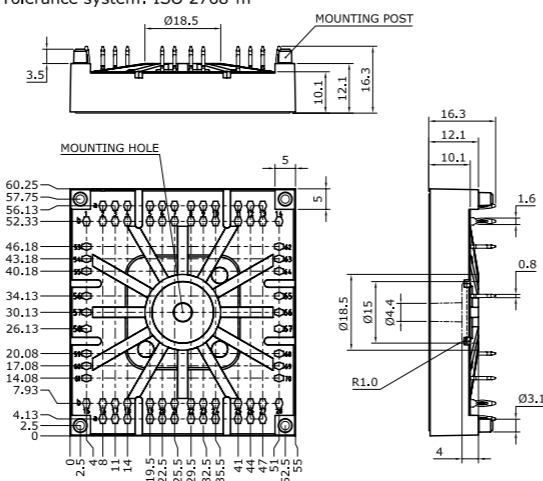
SEMISTOP 4

Dimensions: mm  
Tolerance system: ISO 2768-m



SEMISTOP 4 Press-Fit

Dimensions: mm  
Tolerance system: ISO 2768-m

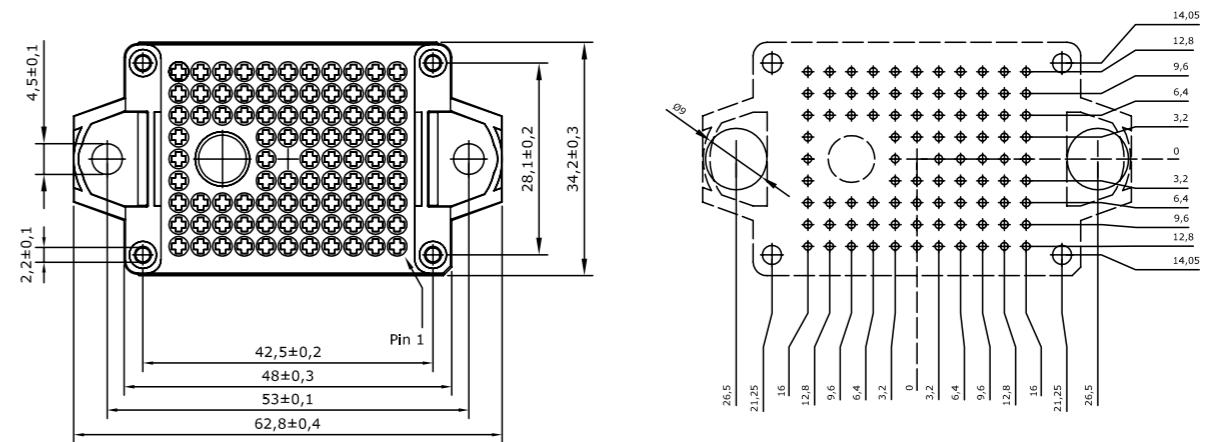


Dimensions in mm

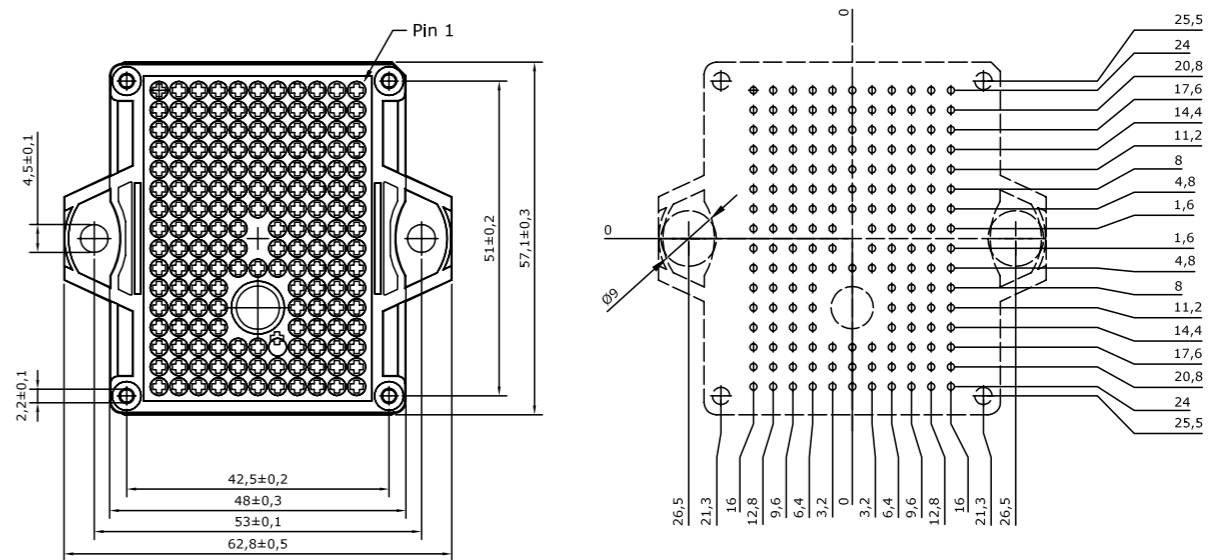
# IGBT Modules / SEMITOP

Packages

SEMISTOP E1



SEMISTOP E2



Dimensions in mm

# IGBT Modules / SEMiX

Type	IGBT					Diode			Module			Topology
	$I_C @ T_C = 25^\circ\text{C}$ A	$I_{Cnom}$ A	$V_{CE(sat)} @ T_J = 25^\circ\text{C typ.}$ V	$E_{on}$ mJ	$E_{off}$ mJ	$I_F @ T_C = 25^\circ\text{C}$ A	$V_F @ T_J = 25^\circ\text{C typ.}$ V	$E_{rr}$ mJ	Package	Thermal Interface Material		
<b>600V - IGBT3 (Trench)</b>												
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		
SEMiX301GD066HDs	379	300	1.45	12	15	419	1.40	7.5	13	P8		
<b>650V - IGBT4 (Trench)</b>												
SEMiX405GARL07E3 <sup>1)</sup>	457	400	1.45	28	28	86	1.37	-	5p	P8, HT		
SEMiX453GB07E3p <sup>2)</sup>	558	450	1.45	8	20	591	1.40	9	3p	P8, HT		
SEMiX155MLI07E4 <sup>2)</sup>	187	150	1.55	1.5	8.6	145	1.40	2.3	5p	P8, HT		
SEMiX205MLI07E4 <sup>2)</sup>	262	200	1.55	2	10	294	1.40	4.5	5p	P8, HT		
SEMiX305MLI07E4 <sup>2)</sup>	388	300	1.55	2.5	16	294	1.40	7.7	5p	P8, HT		
SEMiX405MLI07E4 <sup>2)</sup>	474	400	1.55	5.3	20	377	1.40	11	5p	P8, HT		
SEMiX305GD07E4 <sup>1)</sup>	372	300	1.55	5.5	16	335	1.40	5.2	5p	P8, HT		
<b>1200V - V-IGBT</b>												
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			Topology
	$I_C @ T_C = 25^\circ\text{C}$ A	$I_{Cnom}$ A	$V_{CE(sat)} @ T_J = 25^\circ\text{C typ.}$ V	$E_{on}$ mJ	$E_{off}$ mJ	$I_F @ T_C = 25^\circ\text{C}$ A	$V_F @ T_J = 25^\circ\text{C typ.}$ V	$E_{rr}$ mJ	Package	Thermal Interface Material		
<b>1200V - V-IGBT</b>												
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		
<b>1200V - IGBT4 (Trench)</b>												
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 <sup>2)</sup>	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 <sup>2)</sup>	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 <sup>1)</sup>	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 <sup>1)</sup>	678	450	1.80	11	66	544	2.14	32	3Ip	P8, HT		
SEMiX205MLI12E4 <sup>1)</sup>	313	200	1.80	13	25	229	2.20	5.8	5p	P8, HT		
SEMiX305MLI12E4 <sup>2)</sup>	451	300	1.80	17	39	344	2.14	22	5p	P8, HT		
SEMiX205TMLI12E4B <sup>2)</sup>	318	200	1.80	5	4	229	2.20	5.9	5p	P8, HT		
SEMiX305TMLI12E4B <sup>2)</sup>	479	300	1.80	4.5	21	363	2.20	8.8	5p	P8, HT		
SEMiX405TMLI12E4B <sup>2)</sup>	636	400	1.80	6	28	461	2.20	12	5p	P8, HT		

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

# IGBT Modules / SEMiX

Type	IGBT					Diode			Module			Topology
	$I_c @ T_c = 25^\circ\text{C}$ A	$I_{c, \text{nom}}$ A	$V_{cE(\text{sat})} @ T_j = 25^\circ\text{C typ.}$ V	$E_{\text{on}}$ mJ	$E_{\text{off}}$ mJ	$I_f @ T_c = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V	$E_{\text{rr}}$ mJ	Package	Thermal Interface Material		
<b>1200V - IGBT4 (Trench)</b>												
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 <sup>2)</sup>	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		
<b>1200V - IGBT4 (Fast Trench)</b>												
SEMiX155GD12T4 <sup>1)</sup>	219	150	1.80	13	21	175	2.14	14	5p	P8, HT		
SEMiX106GD12T4p <sup>1)</sup>	161	100	1.80	7.5	9.5	118	2.20	8	6p	HT		
SEMiX156GD12T4p <sup>1)</sup>	236	150	1.80	10	16	182	2.14	13.5	6p	HT		
SEMiX206GD12T4p <sup>1)</sup>	302	200	1.80	19	20	209	2.21	14.5	6p	HT		
<b>1200V - IGBT3 (Trench)</b>												
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			Topology
	$I_c @ T_c = 25^\circ\text{C}$ A	$I_{c, \text{nom}}$ A	$V_{cE(\text{sat})} @ T_j = 25^\circ\text{C typ.}$ V	$E_{\text{on}}$ mJ	$E_{\text{off}}$ mJ	$I_f @ T_c = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V	$E_{\text{rr}}$ mJ	Package	Thermal Interface Material		
<b>1200V - IGBT3 (Trench)</b>												
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		
<b>1700V - IGBT4 (Trench)</b>												
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 <sup>2)</sup>	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		
SEMiX305TML117E4C <sup>1)</sup>	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		
<b>1700V - IGBT3 (Trench)</b>												
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			
	$I_c @ T_c = 25^\circ\text{C}$	$I_{c, \text{nom}}$	$V_{cE(\text{sat})} @ T_j = 25^\circ\text{C typ.}$	$E_{\text{on}}$	$E_{\text{off}}$	$I_f @ T_c = 25^\circ\text{C}$	$V_f @ T_j = 25^\circ\text{C typ.}$	$E_{\text{rr}}$	Package	Thermal Interface Material	Topology
	A	A	V	mJ	mJ	A	V	mJ			

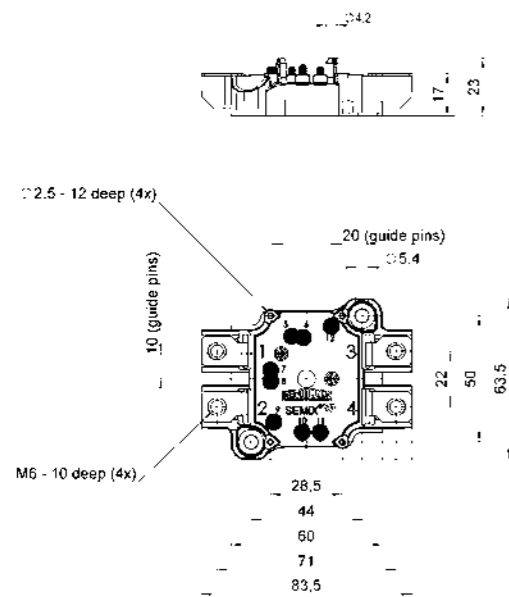
### 1700V - IGBT3 (Trench)

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

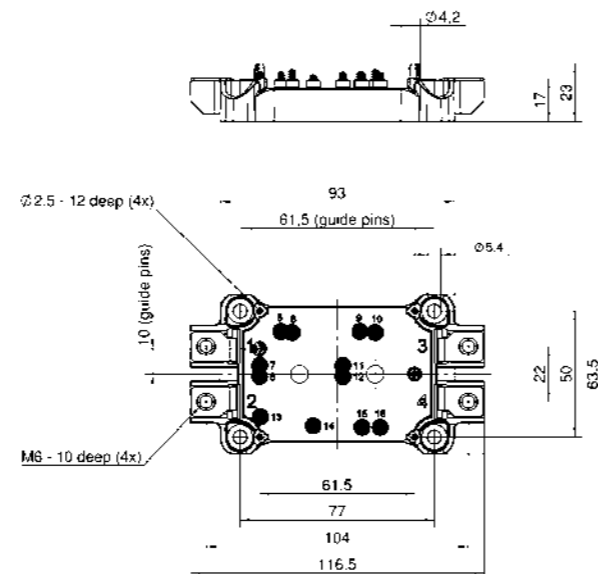
### Packages

#### SEMiX 1s



Dimensions in mm

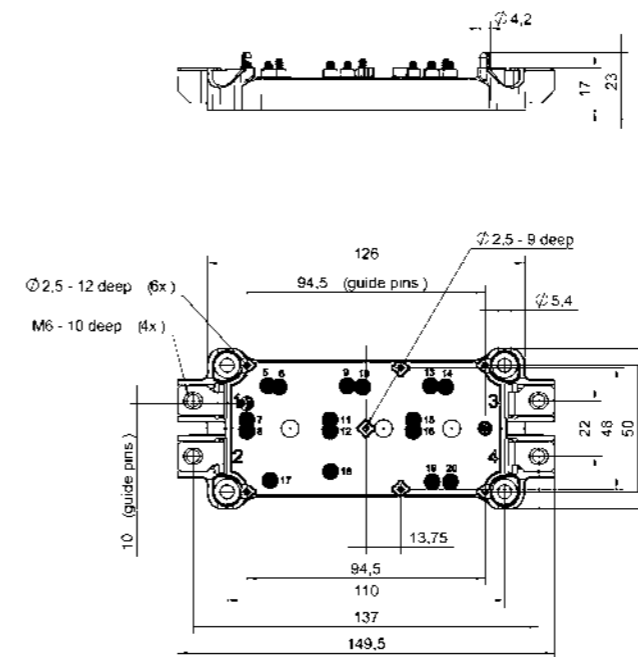
#### SEMiX 2s



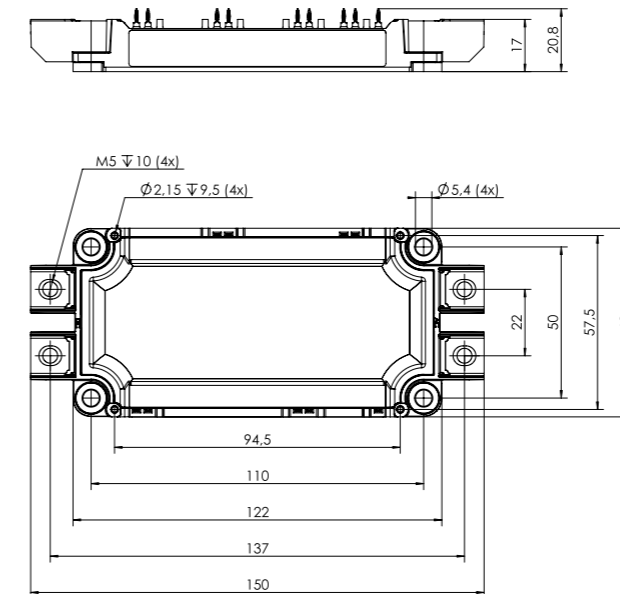
# IGBT Modules / SEMiX

### Packages

#### SEMiX 3s

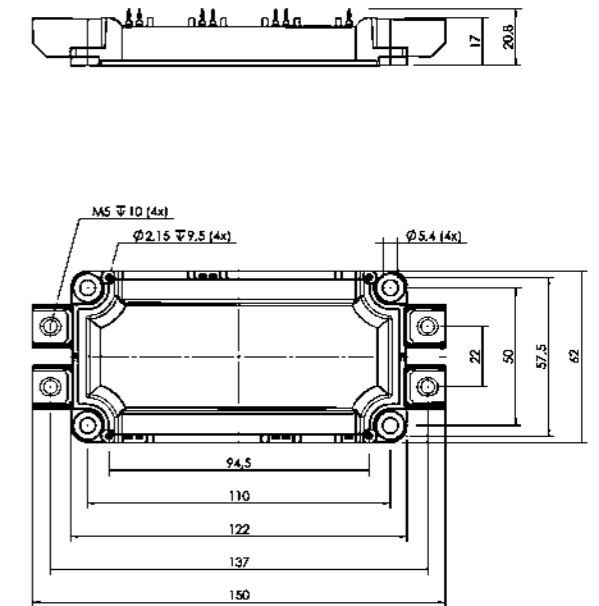


#### SEMiX 3Ip

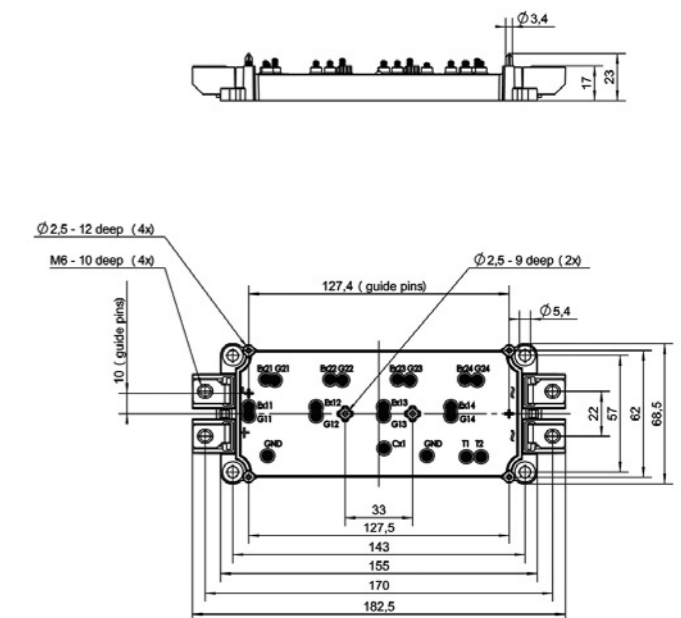


Dimensions in mm

#### SEMiX 3p



#### SEMiX 4s

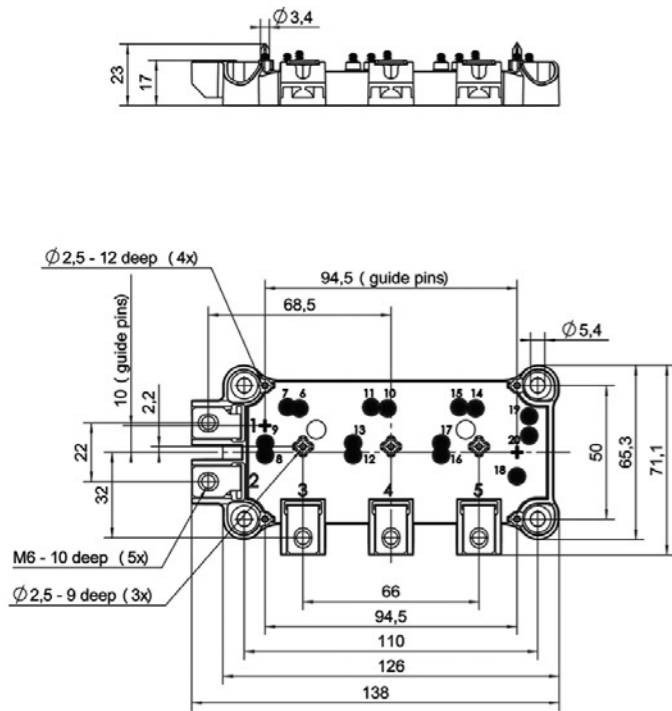




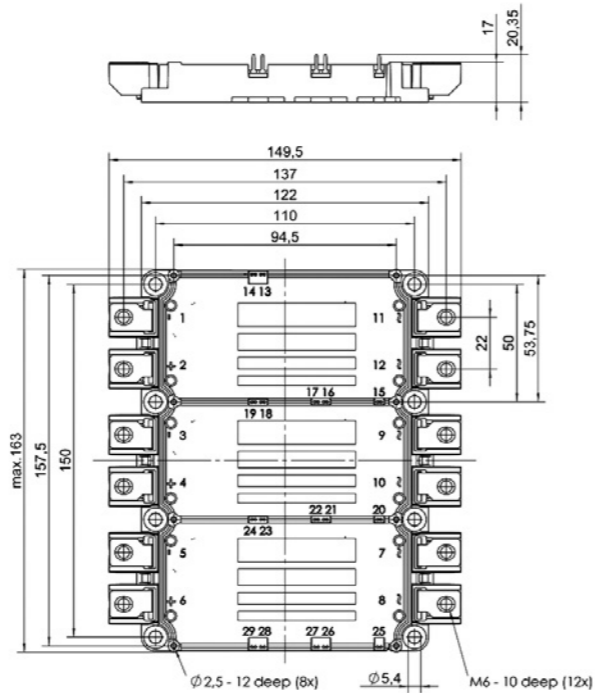
# IGBT Modules / SEMiX

Packages

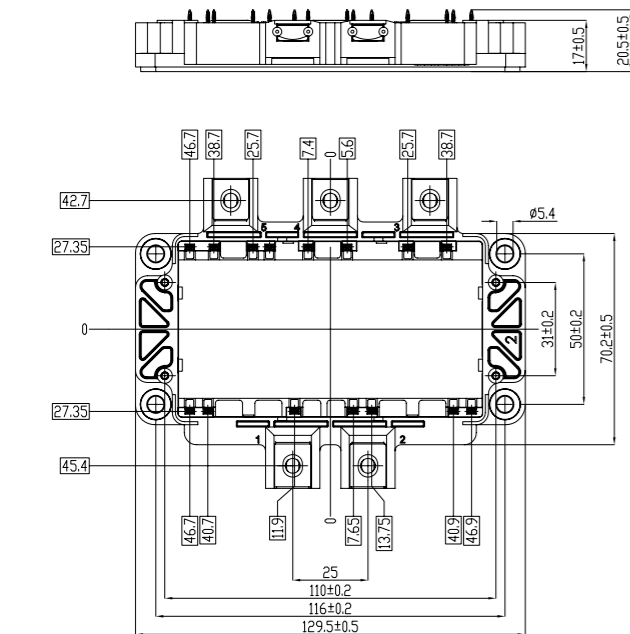
SEMIX 13



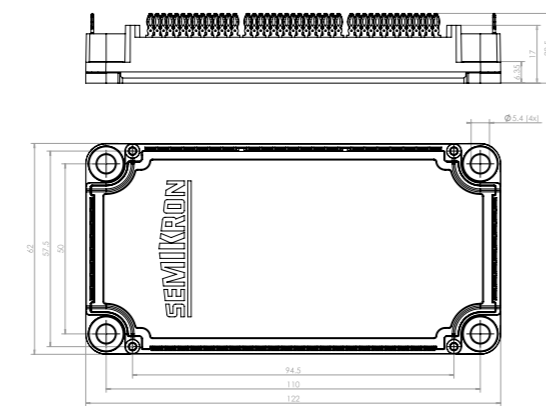
SEMIX 33c



SEMIX 5p



SEMIX 6p



Dimensions in mm

# IGBT Modules / SEMITRANS

Type	IGBT					Diode		Module			Topology
	$I_c @ T_c = 25^\circ\text{C}$ A	$I_{c, nom}$ A	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$ V	$E_{on}$ mJ	$E_{off}$ mJ	$I_f @ T_c = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V	$E_{rr}$ mJ	Package	Thermal Interface Material	
<b>600V - IGBT3 (Trench)</b>											
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 <sup>2)</sup>	280	200	1.45	2.24	7.89	270	1.45	4	5	-	
SKM300GARL066T <sup>2)</sup>	393	300	1.45	3.5	10.1	421	1.54	4	5	-	
SKM400GARL066T <sup>1)</sup>	504	400	1.45	4.48	15.78	421	1.54	8	5	-	
SKM300MLI066TAT <sup>2)</sup>	400	300	1.45	3.5	10.1	324	1.35	4	5	-	
<b>600V - NPT IGBT (Standard)</b>											
SKM75GAL063D <sup>3)</sup>	100	75	2.1	3	2.5	75	1.55	0.53	2	HT	
SKM300GAL063D <sup>3)</sup>	400	300	2.1	14	13	250	1.65	4	3	P8	
SKM75GAR063D <sup>3)</sup>	100	75	2.1	3	2.5	75	1.55	0.53	2	HT	
SKM300GAR063D <sup>3)</sup>	400	300	2.1	14	13	250	1.65	4	3	P8	
SKM50GB063D <sup>3)</sup>	70	50	2.10	2.5	1.8	75	1.35	0.48	2	HT	
SKM75GB063D <sup>3)</sup>	100	75	2.1	3	2.5	75	1.55	0.53	2	HT	
SKM100GB063D <sup>3)</sup>	130	100	2.1	4	3	100	1.55	1.5	2	HT	
SKM200GB063D <sup>3)</sup>	260	200	2.1	11	7.5	200	1.55	2.1	3	P8	
SKM300GB063D <sup>3)</sup>	400	300	2.1	14	13	250	1.65	4	3	P8	
<b>650V - IGBT3 (Trench)</b>											
SKM195GAL07E3 <sup>2)</sup>	266	200	1.46	6.3	8.3	217	1.39	4.5	2	HT	
SKM300GAL07E3 <sup>2)</sup>	382	300	1.45	3	14	335	1.40	6.4	3	P8	
SKM195GAR07E3 <sup>2)</sup>	266	200	1.46	6.3	8.3	217	1.39	4.5	2	HT	
SKM300GAR07E3 <sup>2)</sup>	382	300	1.45	3	14	335	1.40	6.4	3	P8	
SKM195GB07E3 <sup>2)</sup>	266	200	1.46	6.3	8.3	217	1.39	4.5	2	HT	
SKM300GB07E3 <sup>2)</sup>	382	300	1.45	3	14	335	1.40	6.4	3	P8	
SKM400GB07E3 <sup>2)</sup>	506	400	1.45	4	17	449	1.39	12	3	P8	
SKM600GB07E3 <sup>2)</sup>	758	600	1.45	4.7	37	770	1.40	9.3	3	P8	
<b>1200V - NPT IGBT (Ultrafast)</b>											
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<sub>j</sub>=150°C

## IGBT Modules / SEMITRANS

Type	IGBT					Diode			Module			Topology
	$I_c @ T_c = 25^\circ C$	$I_{cnom}$	$V_{CE(sat)} @ T_j = 25^\circ C$ typ.	$E_{on}$	$E_{off}$	$I_f @ T_c = 25^\circ C$	$V_f @ T_j = 25^\circ C$ typ.	$E_r$	Package	Thermal Interface Material		
	A	A	V	mJ	mJ	A	V	mJ				
<b>1200V - NPT IGBT (Ultrafast)</b>												
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 <sup>3)</sup>	39	25	3.20	3.9	1.6	47	2.13	1.1	6	-		
SKM25GD125D <sup>3)</sup>	39	25	3.20	3.9	1.6	47	2.13	1.1	6	-		
SKM50GD125D <sup>3)</sup>	73	50	3.20	8	3.2	77	2.00	2.1	6	-		
<b>1200V - IGBT3 (Trench)</b>												
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		
SKM195GAL126D	220	150	1.71	16	24.5	143	2.00	5.8	2	HT		
<b>1200V - V-IGBT</b>												
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 <sup>2)</sup>	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 <sup>2)</sup>	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  $T_j=150^\circ C$ 

## IGBT Modules / SEMITRANS

Type	IGBT					Diode			Module			Topology
	$I_c @ T_c = 25^\circ C$	$I_{cnom}$	$V_{CE(sat)} @ T_j = 25^\circ C$ typ.	$E_{on}$	$E_{off}$	$I_f @ T_c = 25^\circ C$	$V_f @ T_j = 25^\circ C$ typ.	$E_r$	Package	Thermal Interface Material		
	A	A	V	mJ	mJ	A	V	mJ				
<b>1200V - V-IGBT</b>												
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		
<b>1200V - IGBT4 (Trench)</b>												
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 <sup>2)</sup>	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 <sup>2)</sup>	860	600	1.80	30	77	623	2.28	39	3	P8		
SKM450GM12E4 <sup>1)</sup>	700	450	1.84	32	60	461	2.31	28	3	P8		
SKM1200MLI12TE4 <sup>2)</sup>	2082	1200	1.80	108	189	1065	2.46	76	10	HT		
SKM1200MLI12BE4 <sup>2)</sup>	2082	1200	1.80	108	189	1065	2.46	76	10	HT		
<b>1200V - IGBT4 Fast (Trench)</b>												
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  $T_j=150^\circ C$



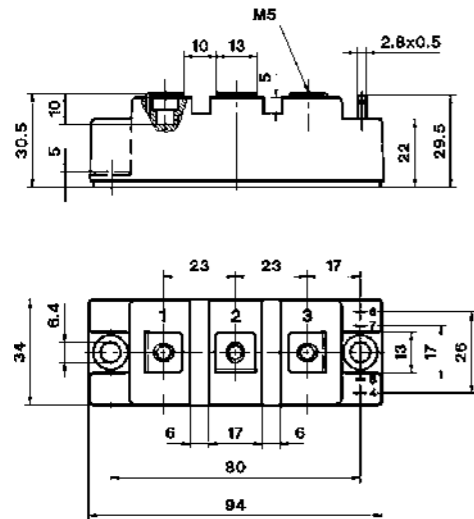
# IGBT Modules / SEMITRANS

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

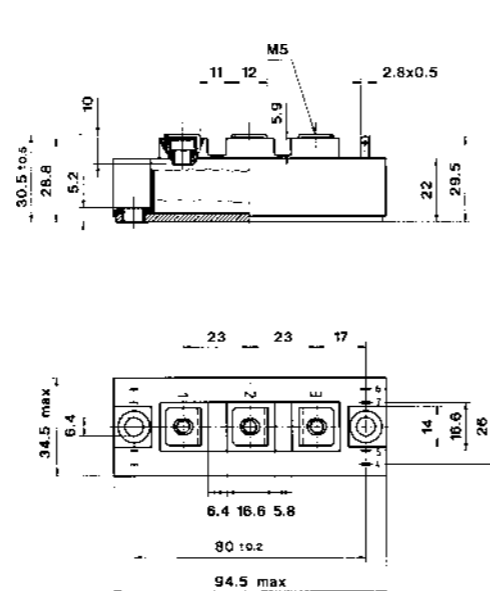
Footnotes: 1) Sample status / 2) In production new / 3) Not for new designs / 11) Values at  $T_j=150^\circ C$

## Packages

### SEMISTRANS 2



### SEMISTRANS 2N

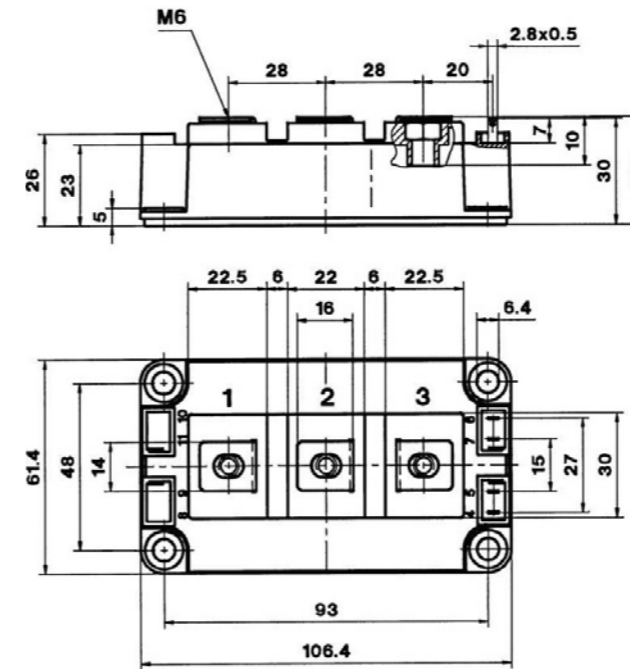


Dimensions in mm

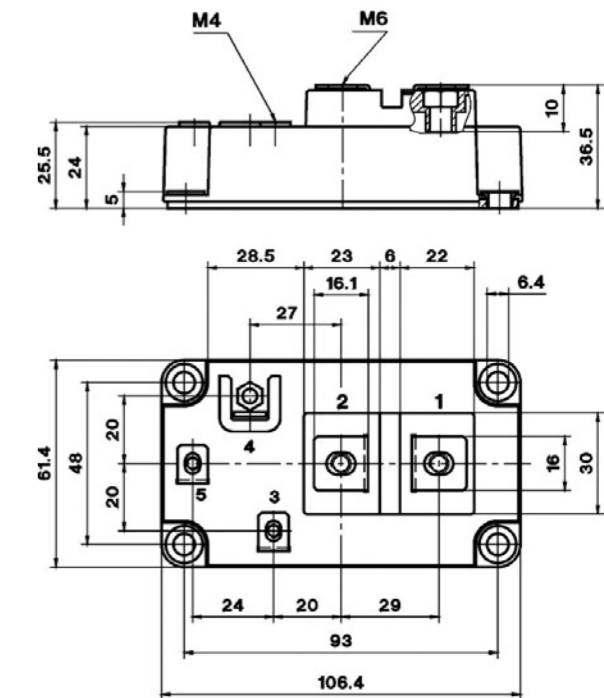
# IGBT Modules / SEMITRANS

## Packages

### SEMISTRANS 3

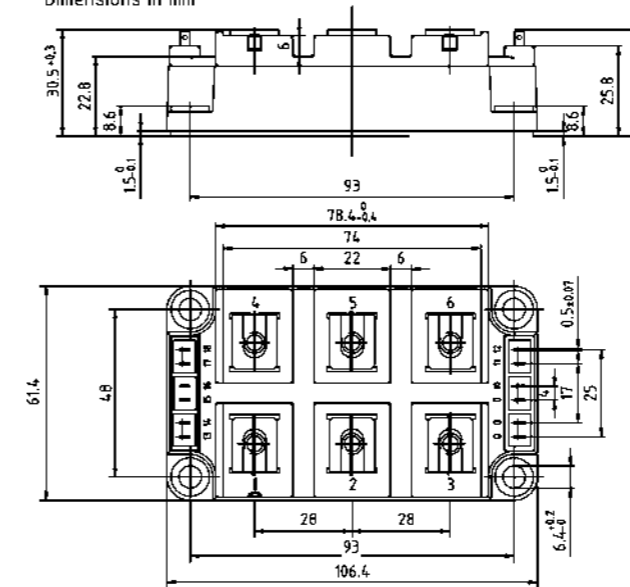


### SEMISTRANS 4

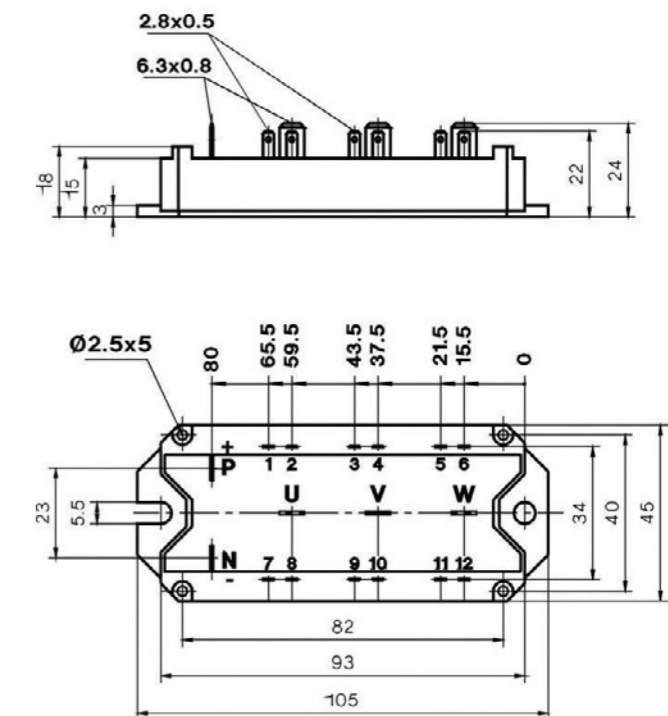


### SEMISTRANS 5

Dimensions in mm



### SEMISTRANS 6

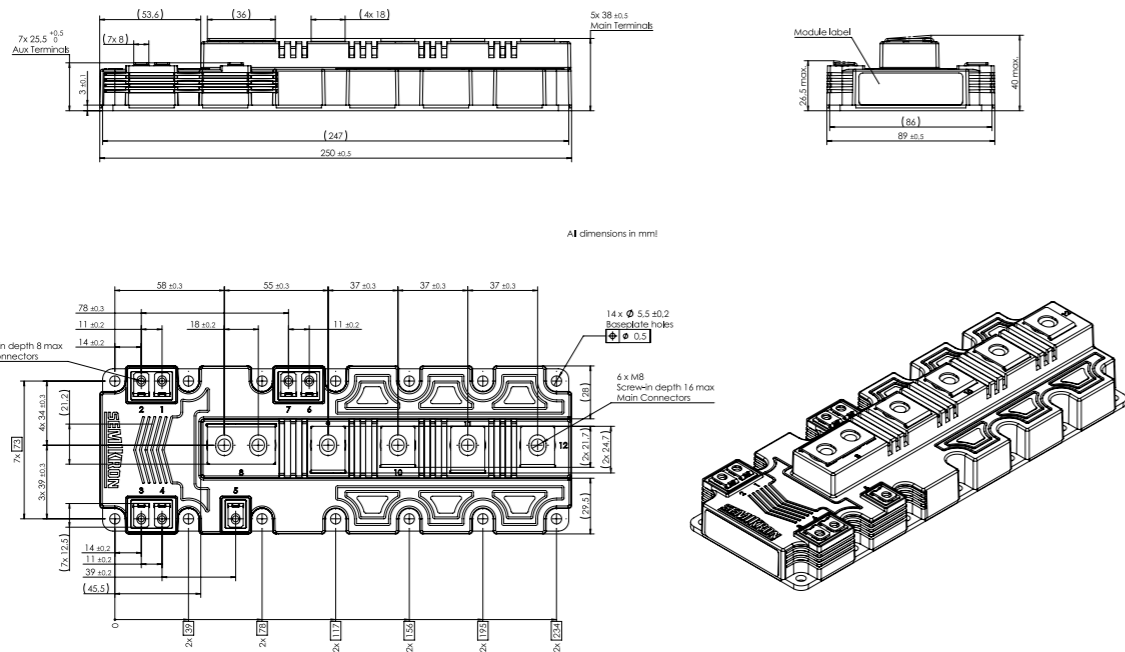


Dimensions in mm

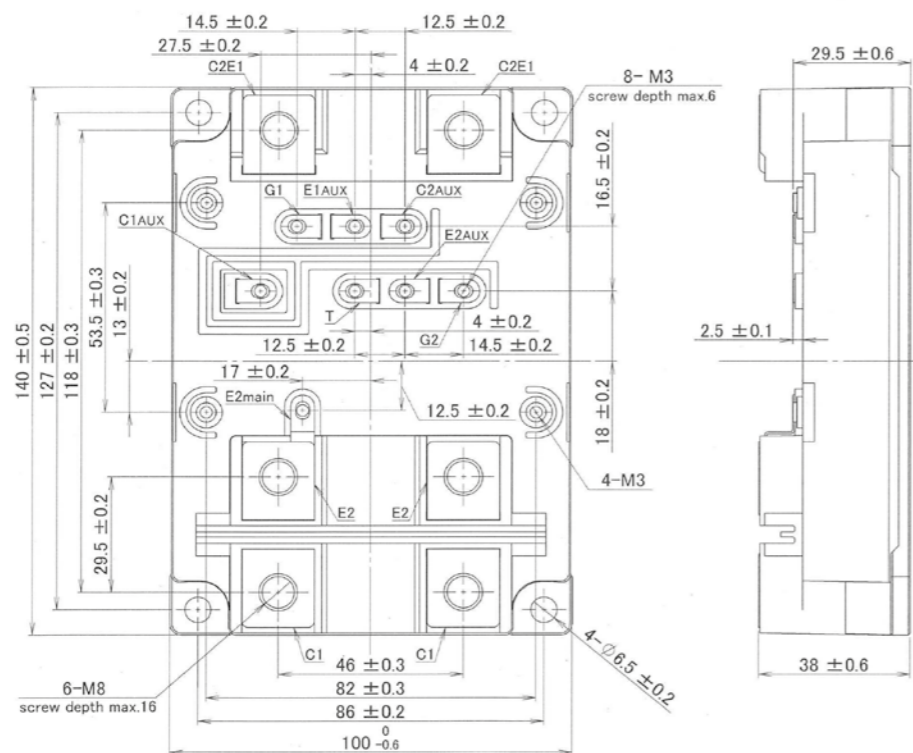
# IGBT Modules / SEMITRANS

Packages

SEMISTRANS 10



SEMISTRANS 20



Dimensions in mm

# IGBT Modules / SKiM 4/5

Type	IGBT					Diode			Module		
	$I_c @ T_c = 25^\circ\text{C}$	$I_{cnom}$	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$	$E_{on}$	$E_{off}$	$I_s @ T_s = 25^\circ\text{C}$	$V_f @ T_j = 25^\circ\text{C typ.}$	$E_{rr}$	Package	Thermal Interface Material	Topology
	A	A	V	mJ	mJ	A	V	mJ			
<b>600V - IGBT3 (Trench)</b>											
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	
<b>1200V - IGBT3 (Trench)</b>											
SKiM200GD126D <sup>3)</sup>	-	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 <sup>3)</sup>	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	
<b>1200V - IGBT4 (Trench)</b>											
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 <sup>3)</sup>	400	450	1.80	34	40	295	2.33	28	5	HPTP	
SKiM304GD12T4D <sup>3)</sup>	312	300	1.80	-	-	221	2.33	-	4	P12 + HPTP	

Footnotes: 3) Not for new designs

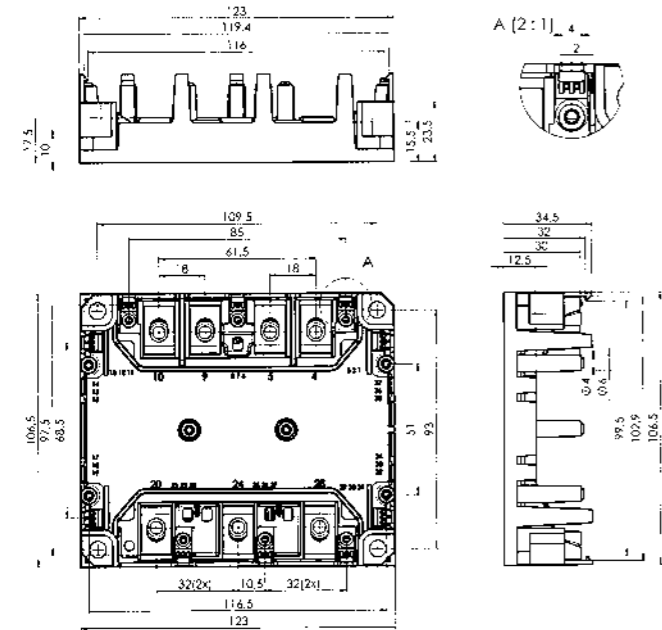
# IGBT Modules / SKiM 4/5

Type	IGBT					Diode		Module			Topology
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{cnom}$ A	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$ V	$E_{on}$ mJ	$E_{off}$ mJ	$I_f @ T_s = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V	$E_{rr}$ mJ	Package	Thermal Interface Material	
<b>1700V - IGBT3 (Trench)</b>											
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	
<b>SKiM270GD176D</b>											
SKiM270GD176D	260	300	2.00	170	120	215	1.7	-	5	HPTP	

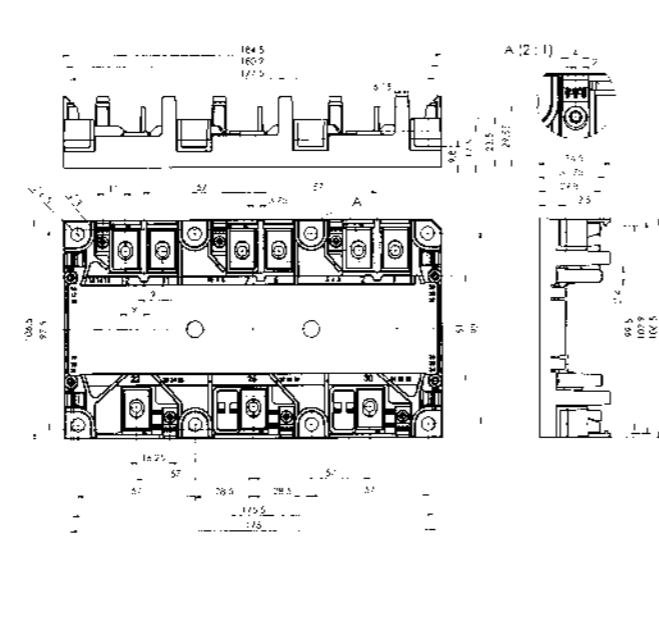
Footnotes: 3) Not for new designs

### Packages

#### SKiM 4



#### SKiM 5



Dimensions in mm

# IGBT Modules / SKiM 63/93

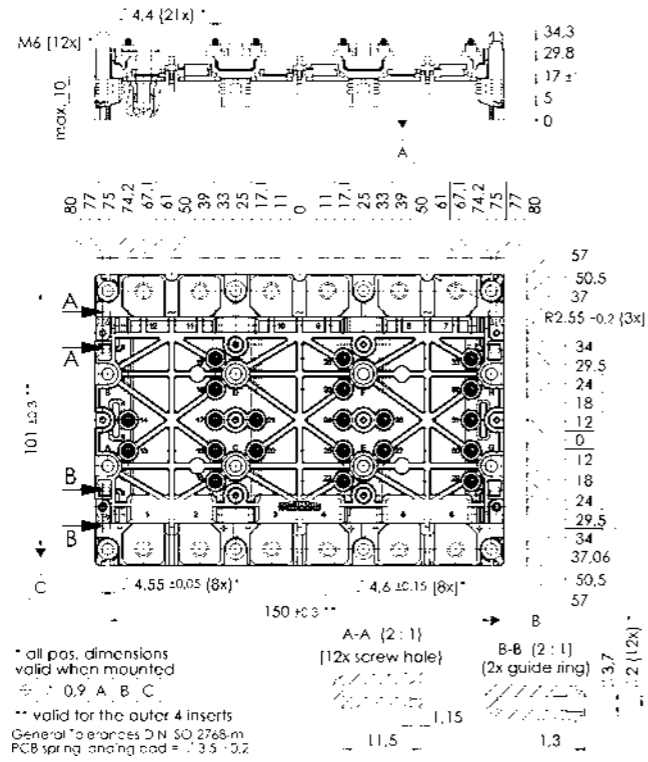
Type	IGBT					Diode		Module			Topology
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{cnom}$ A	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$ V	$E_{on}$ mJ	$E_{off}$ mJ	$I_f @ T_s = 25^\circ\text{C}$ A	$V_f @ T_j = 25^\circ\text{C typ.}$ V	$E_{rr}$ mJ	Package	Thermal Interface Material	
<b>600V - IGBT3 (Trench)</b>											
SKiM406GD066HD <sup>10)</sup>	468	400	1.45	8	25	360	1.53	12	63	P12, HPTP	
SKiM606GD066HD <sup>10)</sup>	640	600	1.45	16	53	462	1.52	21	63	P12, HPTP	
SKiM909GD066HD <sup>10)</sup>	897	900	1.45	36	88	690	1.52	29	93	P12, HPTP	
<b>650V - IGBT3 (Trench)</b>											
SKiM606GD07V1 <sup>10)</sup>	-	600	1.45	14	39	-	1.57	15	63	P12, HPTP	
SKiM909GD07V1 <sup>10)</sup>	-	900	1.45	30	57	573	1.57	19	93	P12, HPTP	
<b>1200V - IGBT4 (Trench)</b>											
SKiM459GD12E4 V2 <sup>10)</sup>	554	450	1.85	22	57	438	2.14	40	93	P12, HPTP	
SKiM306GD12E4 V2 <sup>10)</sup>	410	300	1.85	19	39	305	2.14	21	63	P12, HPTP	
<b>SKiM609GAL12E4<sup>10)</sup></b>											
SKiM609GAL12E4 <sup>10)</sup>	748	600	1.85	136	83	1397	1.7	39	93	P12, HPTP	
<b>SKiM609GAR12E4<sup>10)</sup></b>											
SKiM609GAR12E4 <sup>10)</sup>	748	600	1.85	136	83	1397	1.7	39	93	P12, HPTP	
<b>1700V - IGBT4 (Trench)</b>											
SKiM429GD17E44F <sup>10)</sup>	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

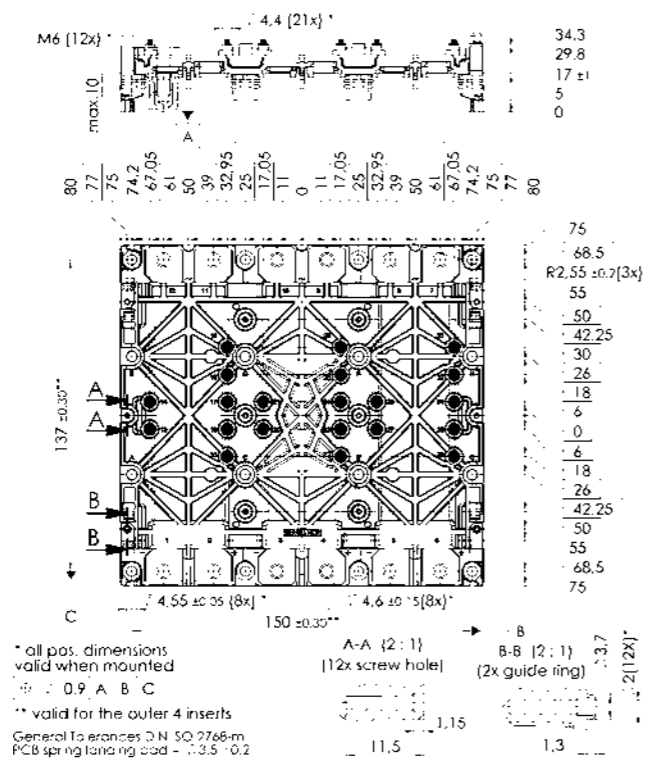
# IGBT Modules / SKiM 63/93

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>

## Full SiC

### MiniSKiiP®

Sixpack

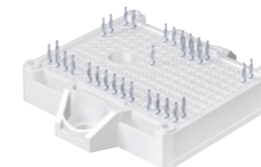


1200V

I in A 0 40 60 80 100 200 300 400 500 600

### SEMITOP®

Sixpack  
Chopper  
H-Bridge  
Half-Bridge  
Rectifier



1200V

I in A 0 40 60 80 100 200 300 400 500 600

### SEMITRANS®

Half-Bridge



1200V

I in A 0 40 60 80 100 200 300 400 500 600

### SEMIPACK® 2

Rectifier



1200V

I in A 0 40 60 80 100 200 300 400 500 600



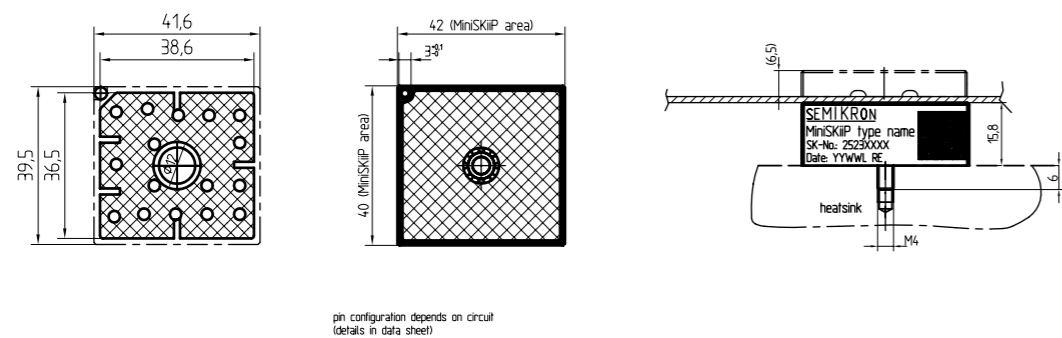
# SiC Modules / Full SiC / MiniSKiiP

Type	$V_{DS}$ V	$I_D @ T_C = 25^\circ\text{C}$ A	$R_{DS(on)} @ T_J = 25^\circ\text{C typ.}$ m $\Omega$	Package	Thermal Interface Material	Topology
<b>1200V - SiC MOSFET</b>						
SKiiP 13ACM12V17 <sup>1)</sup>	1200	25	80	II 1	P12, HPTP	
SKiiP 13ACM12V18 <sup>1)</sup>	1200	25	80	II 1	P12, HPTP	
SKiiP 26ACM12V17 <sup>1)</sup>	1200	72	23	II 2	P12, HPTP	

Footnotes: 1) Sample status

## Packages

### MiniSKiiP II 1

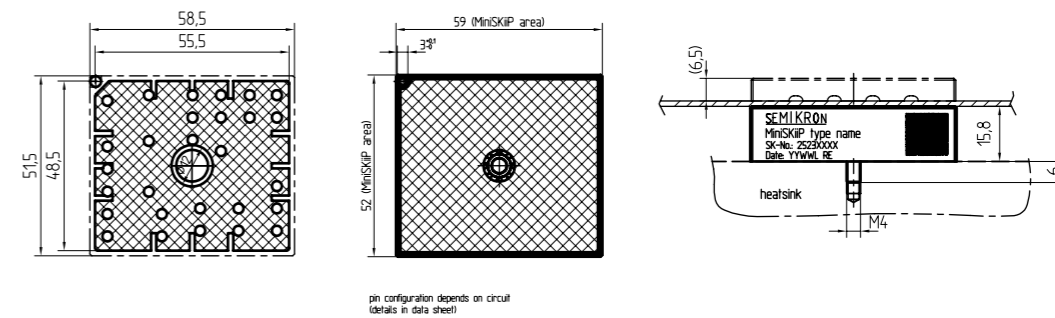


Dimensions in mm

# SiC Modules / Full SiC / MiniSKiiP

## Packages

### MiniSKiiP II 2



Dimensions in mm

# SiC Modules / Full SiC / SEMITOP

Type	$V_{DS}$ V	$I_b @ T_c = 25^\circ\text{C}$ A	$R_{DS(on)} @ T_j = 25^\circ\text{C typ.}$ mΩ	Package	Thermal Interface Material	Topology
<b>1200V - SiC MOSFET</b>						
SK45MH120TSCp <sup>1)</sup>	1200	40	45	2p	P12	
SK25MH120SCTp <sup>1)</sup>	1200	26	80	2p	P12	
SK45MAHT12SCp <sup>2)</sup>	1200	39	45	3p	P12, HPTP	
SK45MLET12SCp <sup>1)</sup>	1200	39	45	3p	P12, HPTP	
SK35MLLE120SCp <sup>1)</sup>	1200	36	40	2p	P12	
SK250MB120SCTE2 <sup>1)</sup>	1200	251	3.7	E2	HPTP, HT	
SK50BMB120SCTE2 <sup>1)</sup>	1200	52	80	E2	HPTP, HT	
<b>SEMITOP rectifier module</b>						
SK20KDD12SCp <sup>1)</sup>	1200	18	-	2p	P12	

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

# SiC Modules / Full SiC / SEMITOP

Type	$V_{DS}$ V	$I_b @ T_c = 25^\circ\text{C}$ A	$R_{DS(on)} @ T_j = 25^\circ\text{C typ.}$ mΩ	Package	Thermal Interface Material	Topology
<b>SEMITOP rectifier module</b>						
SK70B12SCTE1 <sup>1)</sup>	1200	54	-	E1	-	

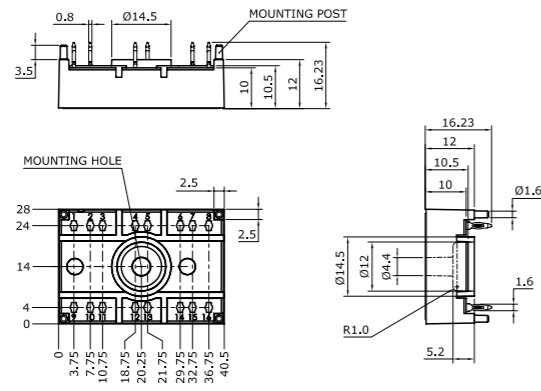
Footnotes: 1) Sample status / 2) In production new

# SiC Modules / Full SiC / SEMITOP

Packages

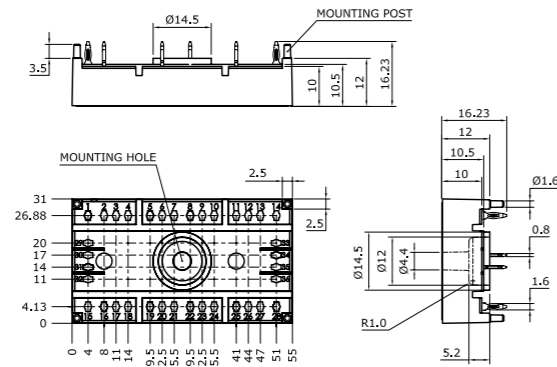
SEMITOP 2 Press-Fit

Dimensions: mm  
Tolerance system: ISO 2768-m

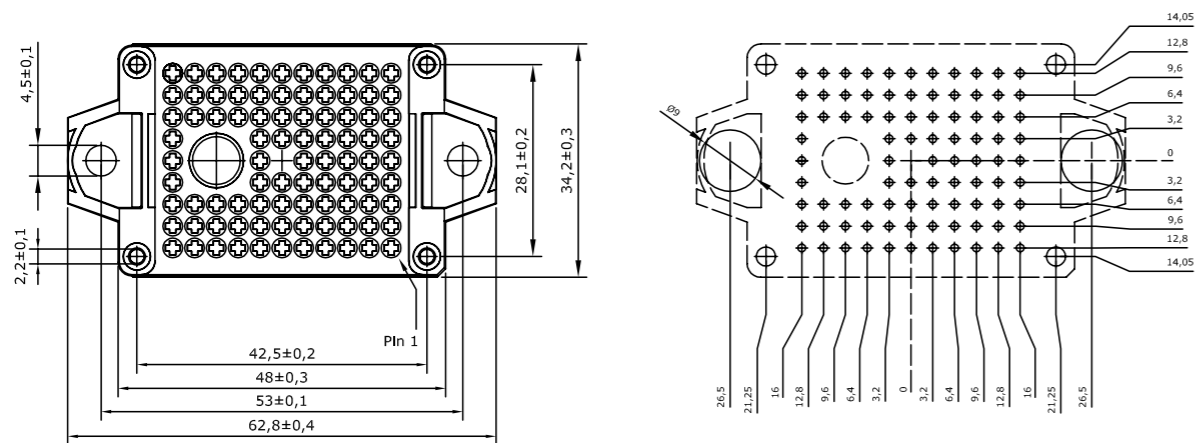


SEMITOP 3 Press-Fit

Dimensions: mm  
Tolerance system: ISO 2768-m



SEMITOP E1

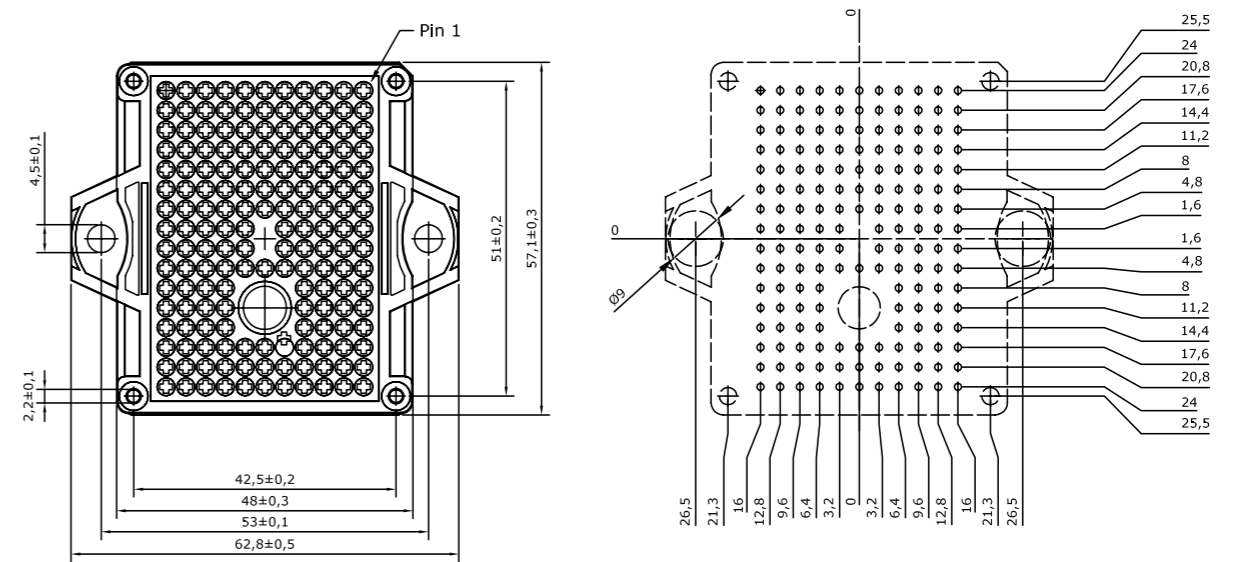


Dimensions in mm

# SiC Modules / Full SiC / SEMITOP

Packages

SEMITOP E2



Dimensions in mm

1

2

3

4

5

6

7

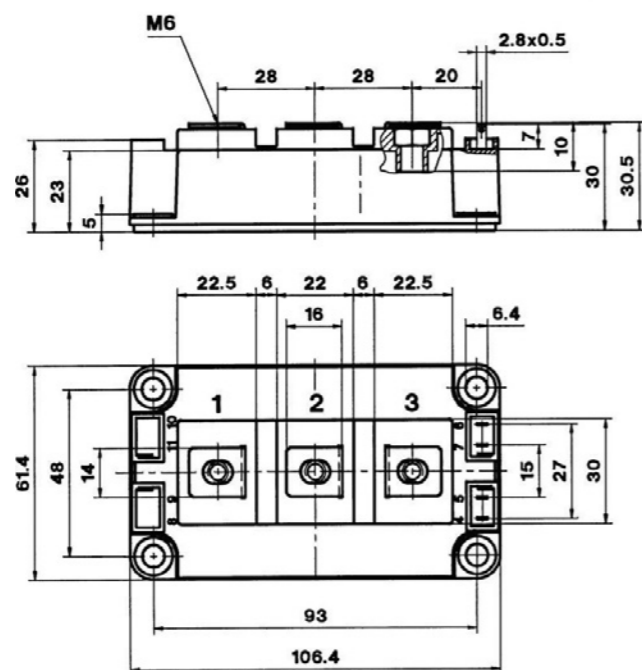
# SiC Modules / Full SiC / SEMITRANS

Type	$V_{DS}$ V	$I_F @ T_c = 25^\circ\text{C}$ A	$R_{DS(on)} @ T_j = 25^\circ\text{C typ.}$ mΩ	Package	Thermal Interface Material	Topology
<b>1200V - SiC MOSFET</b>						
SKM350MB120SCH15 <sup>1)</sup>	1200	523	5.6	3	P8	
SKM500MB120SC <sup>1)</sup>	1200	541	3.8	3	P8	
<b>1200V - SiC Rectifier</b>						
SKM125KD12SC <sup>1)</sup>	1200	236	-	3	P8	

Footnotes: 1) Sample status

**Packages**

SEMITRANS 3



Dimensions in mm

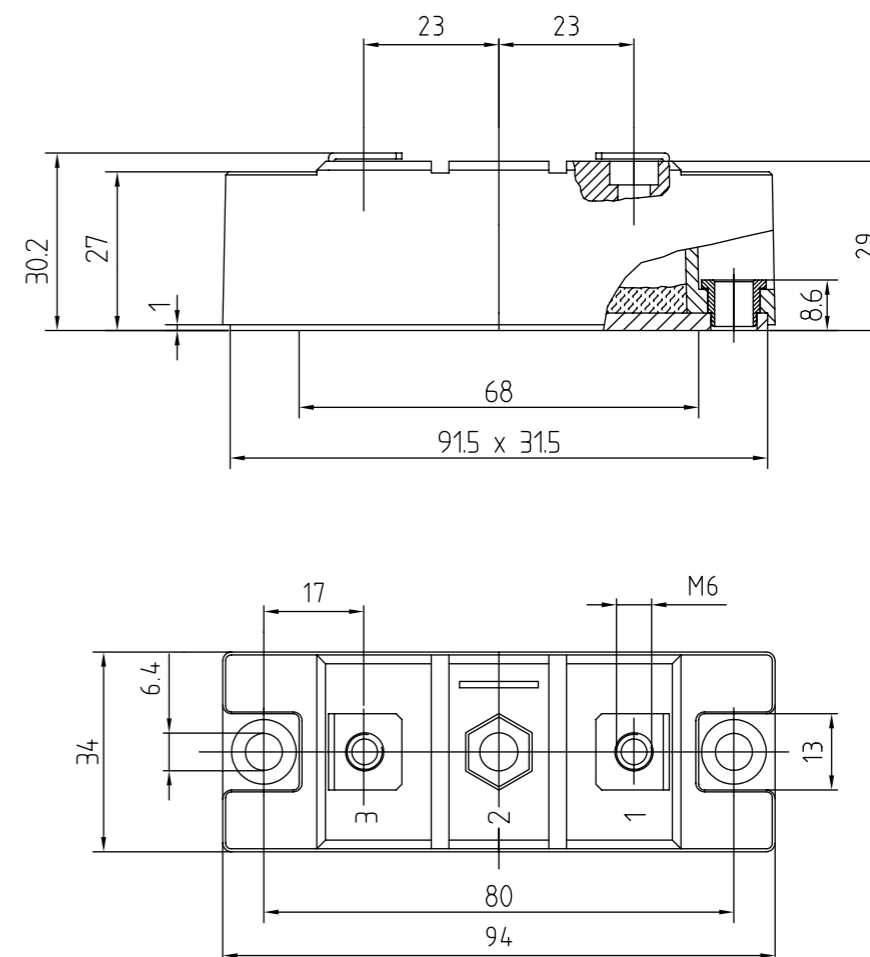
# SiC Modules / Full SiC / SEMIPACK

Type	$V_{RRM} V_{DRM}$ V	$I_{FAV} @ T_c$ A	$T_c$ °C	$V_{FO} @ T_j = 150^\circ\text{C max.}$ V	$r_f @ T_j = 150^\circ\text{C max.}$ mΩ	$T_j$ °C	Package	Thermal Interface Material	Topology
SKKE60S12 <sup>1)</sup>	1200	64	85	0.90	15	-40 ... +175	2	-	
SKKE300S12 <sup>1)</sup>	1200	400	85	0.90	3.0	-40 ... +175	2	-	

Footnotes: 1) Sample status

**Packages**

SEMIPACK 2



Dimensions in mm

# 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>

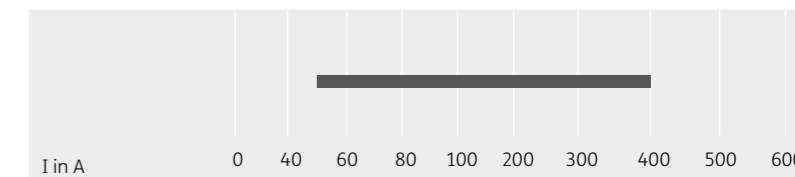
## Hybrid SiC

### MiniSKiiP®

Half-Bridge  
Sixpack  
3-level

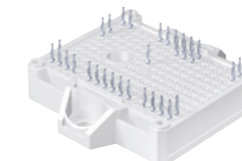


1200V

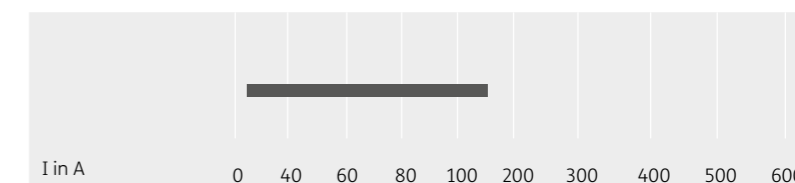


### SEMITOP®

Chopper  
3-level



1200V

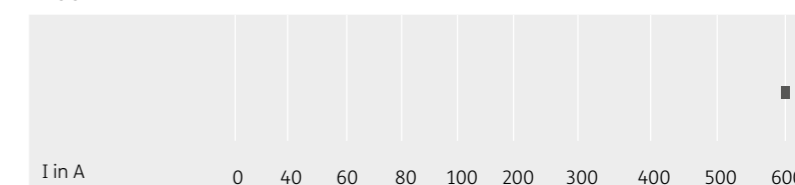


### SEMIX Press-Fit®

Half-Bridge



1200V

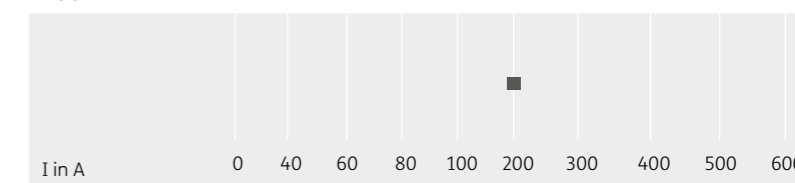


### SEMITRANS®

Half-Bridge



1200V

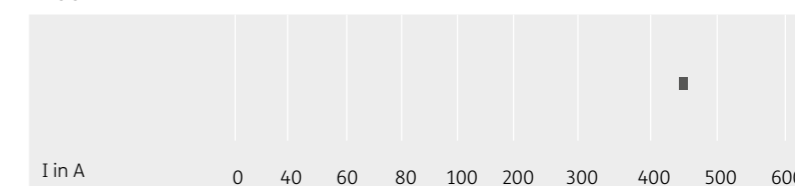


### SKiM® 63/93

Sixpack



1200V



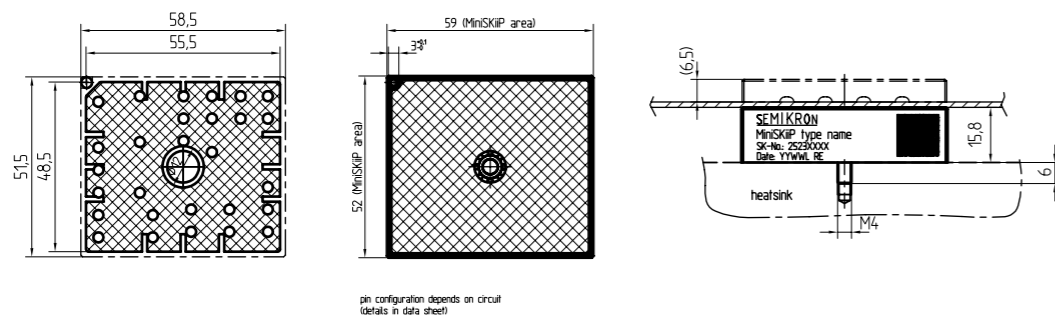
# SiC Modules / Hybrid SiC / MiniSKiiP

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

Footnotes: 1) Sample status

## Packages

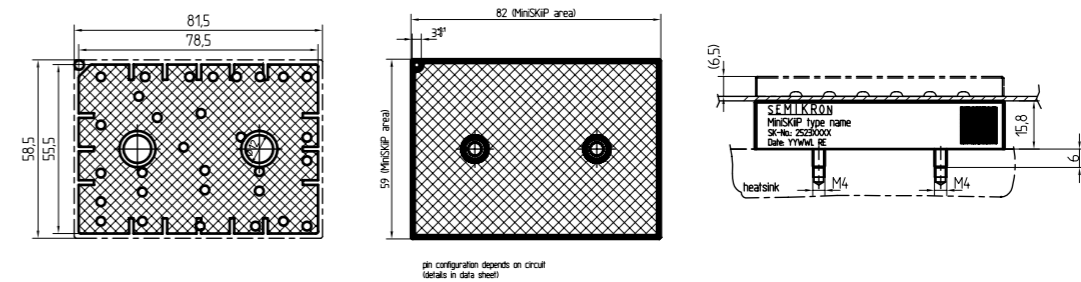
### MiniSKiiP II 2



# SiC Modules / Hybrid SiC / MiniSKiiP

## Packages

### MiniSKiiP II 3



# SiC Modules / Hybrid SiC / SEMITOP

Type	IGBT					Diode		Module		Topology
	$I_c @ T_s = 25^\circ\text{C}$ A	$I_{cnom}$ A	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$ V	$E_{on}$ mJ	$E_{off}$ mJ	$I_s @ T_s = 25^\circ\text{C}$ A	$V_f$ V	Package	Thermal Interface Material	
<b>1200V - IGBT4 Fast (Trench)</b>										
SK 25 GAR 12F4 TSC <sup>1)</sup>	33	25	2.05	2.27	2.7	21	1.40	2	P12	
SK 50 GLLE 12F4 TSC <sup>1)</sup>	56	50	2.05	4.5	5.4	67	1.00	2	P12	
<b>600V - CoolMOS</b>										
SK150MLIT12F4TSCE2 <sup>1)</sup>	149	150	2.05	8.9	11	80	2.20	E2	HPTP, HT	
SK150MLIB12F4TSCE2 <sup>1)</sup>	149	150	2.05	8.9	11	80	2.20	E2	HPTP, HT	
SK35MLT60SCKE1 <sup>1)</sup>	-	45	-	t.b.d.	t.b.d.	-	1.35	E1	-	

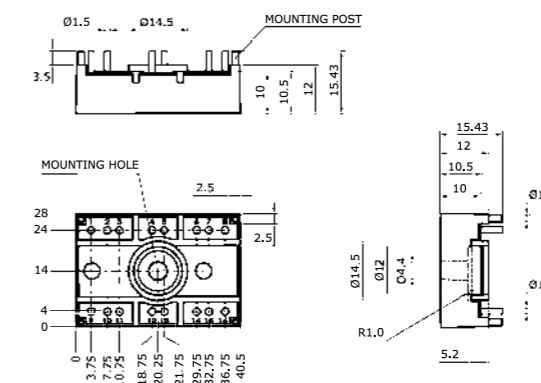
Footnotes: 1) Sample status

# SiC Modules / Hybrid SiC / SEMITOP

## Packages

### SEMITOP 2

Dimensions: mm  
Tolerance system: ISO 2768-m

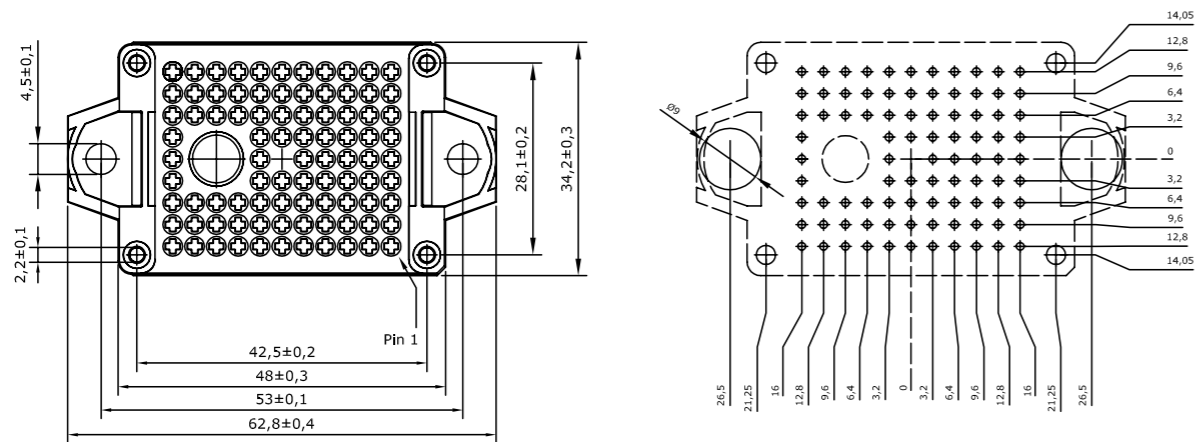


Dimensions in mm

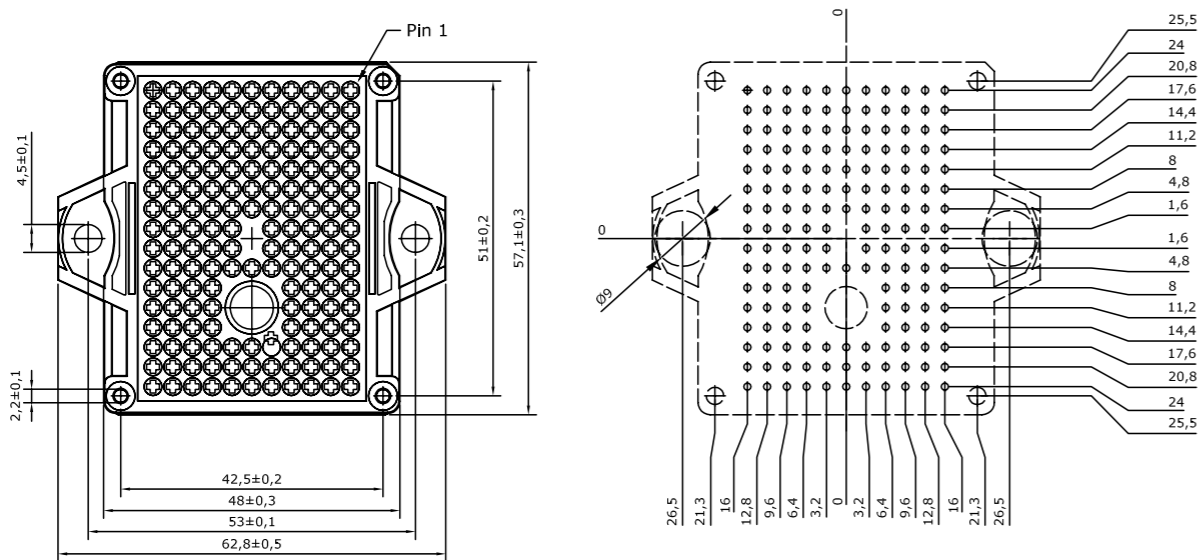
# SiC Modules / Hybrid SiC / SEMITOP

Packages

SEMISTOP E1



SEMISTOP E2



Dimensions in mm

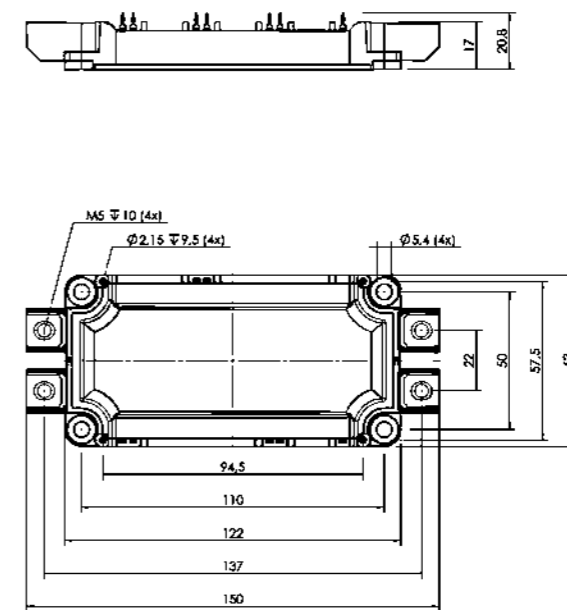
# SiC Modules / Hybrid SiC / SEMIX

Type	IGBT					Diode		Module		
	$I_c @ T_c = 25^\circ\text{C}$	$I_{cnom}$	$V_{c(EM)} @ T_j = 25^\circ\text{C typ.}$	$E_{on}$	$E_{off}$	$I_f @ T_c = 25^\circ\text{C}$	$V_f$	Package	Thermal Interface Material	Topology
<b>1200V - IGBT4 (Trench)</b>										
SEMIx603GB12E4SiCp <sup>1)</sup>	1110	600	1.80	17	72	404	1.40	3p	P8, HT	

Footnotes: 1) Sample status

Packages

SEMIX 3p



Dimensions in mm



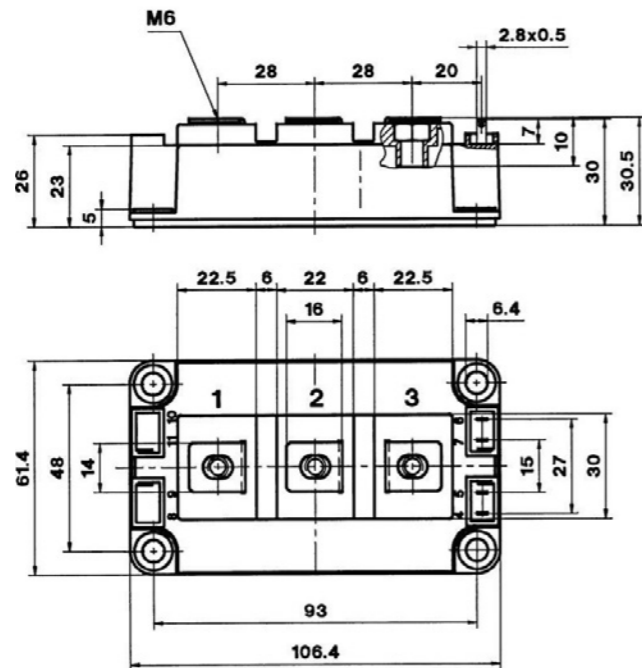
# SiC Modules / Hybrid SiC / SEMITRANS

Type	IGBT					Diode		Module		
	$I_c @ T_c = 25^\circ\text{C}$	$I_{c, nom}$	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$	$E_{on}$	$E_{off}$	$I_f @ T_c = 25^\circ\text{C}$	$V_f$	Package	Thermal Interface Material	Topology
	A	A	V	mJ	mJ	A	V			
<b>1200V - IGBT4 (Trench)</b>										
SKM200GB12T4SiC2 <sup>1)</sup>	313	200	1.80	7	20	246	1.40	3	P8	
<b>1200V - IGBT4 (Fast Trench)</b>										
SKM200GB12F4SiC2 <sup>1)</sup>	279	200	2.06	7	17	246	1.40	3	P8	
SKM200GB12F4SiC3 <sup>1)</sup>	279	200	2.06	7	17	123	1.40	3	P8	

Footnotes: 1) Sample status

**Packages**

**SEMISTRANS 3**



Dimensions in mm

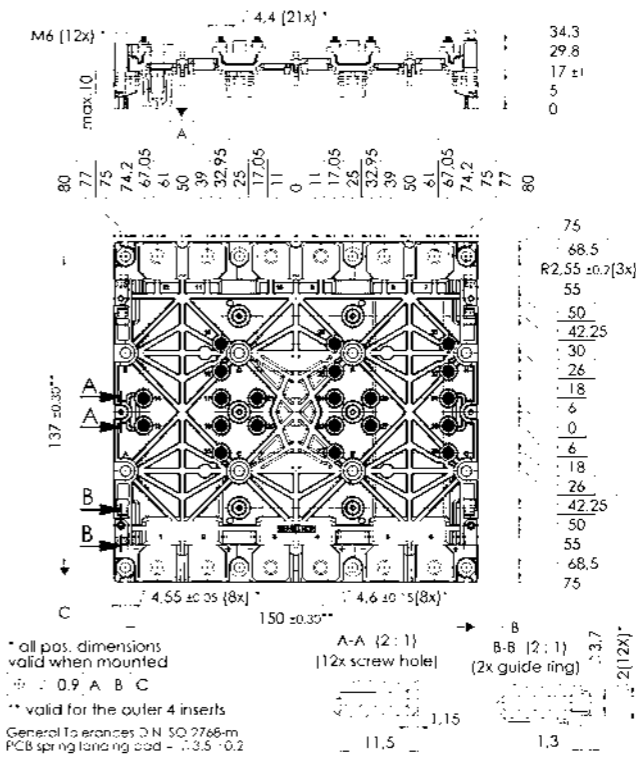
# SiC Modules / Hybrid SiC / SKiM 63/93

Type	IGBT					Diode		Module		
	$I_c @ T_c = 25^\circ\text{C}$	$I_{c, nom}$	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$	$E_{on}$	$E_{off}$	$I_f @ T_c = 25^\circ\text{C}$	$V_f$	Package	Thermal Interface Material	Topology
	A	A	V	mJ	mJ	A	V			
<b>1200V - IGBT4 (Fast Trench)</b>										
SKiM459GD12F4V3 <sup>1)</sup>	476	450	2.05	2	11	214	1.33	93	P12, HPTP	
SKiM459GD12F4V4 <sup>1)</sup>	476	450	2.05	5	20	357	1.33	93	P12, HPTP	

Footnotes: 1) Sample status

**Packages**

**SKiM 93**



Dimensions in mm

# MOSFET Modules

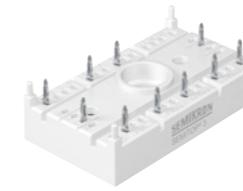
## Best in Class Switching Performance

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.

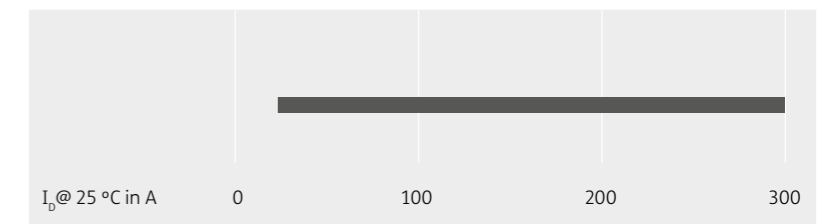
The available MOSFET modules in the voltage range from 55V up to 600V and current ratings of 40A up to 290A are designed for high-speed switching applications, in particular, and boast low switching losses.

### SEMISTOP®

Sixpack  
H-Bridge  
Half-Bridge



60V up to 100V

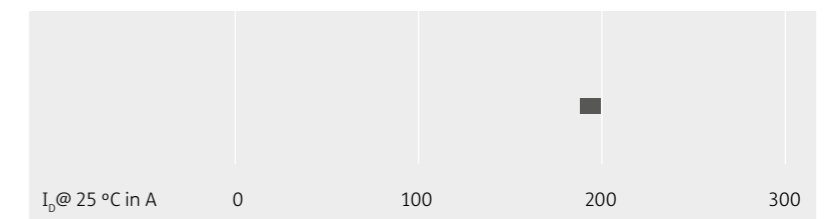


### SEMISTRANS®

Single Switch



100V up to 200V



SEMISTOP	100
SEMISTRANS	102

For detailed information please refer to data sheets.

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

# MOSFET Modules / SEMITOP

Type	$V_{DS}$ V	$I_D @ T_C = 25^\circ C$ A	$R_{DS(on)} @ T_J = 25^\circ C \text{ typ.}$ mΩ	Package	Thermal Interface Material	Topology
<b>80V</b>						
SK300MB080 <sup>1)</sup>	80	317	0.90	3	P12, HPTP	
<b>100V</b>						
SK 85 MH 10 T <sup>3)</sup>	100	80	-	2	P12	
<b>280V</b>						
SK280MB10 <sup>1)</sup>	100	278	1.15	3	P12, HPTP	
<b>600V</b>						
SK35MLT60SCKE1 <sup>1)</sup>	600	45	37	E1	-	
SK50MH65TE1 <sup>1)</sup>	650	55	9.8	E1	-	

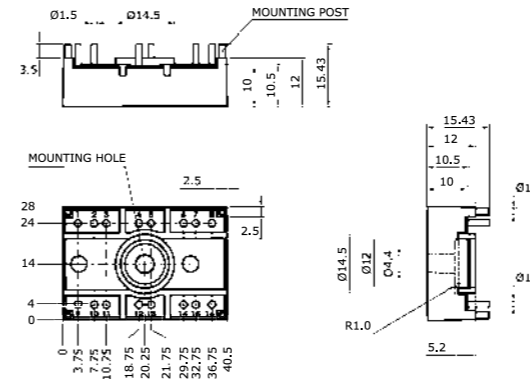
Footnotes: 1) Sample status / 3) Not for new designs

# MOSFET Modules / SEMITOP

## Packages

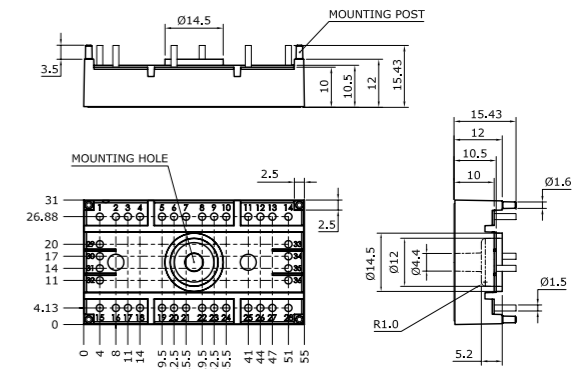
### SEMITOP 2

Dimensions: mm  
Tolerance system: ISO 2768-m



### SEMITOP 3

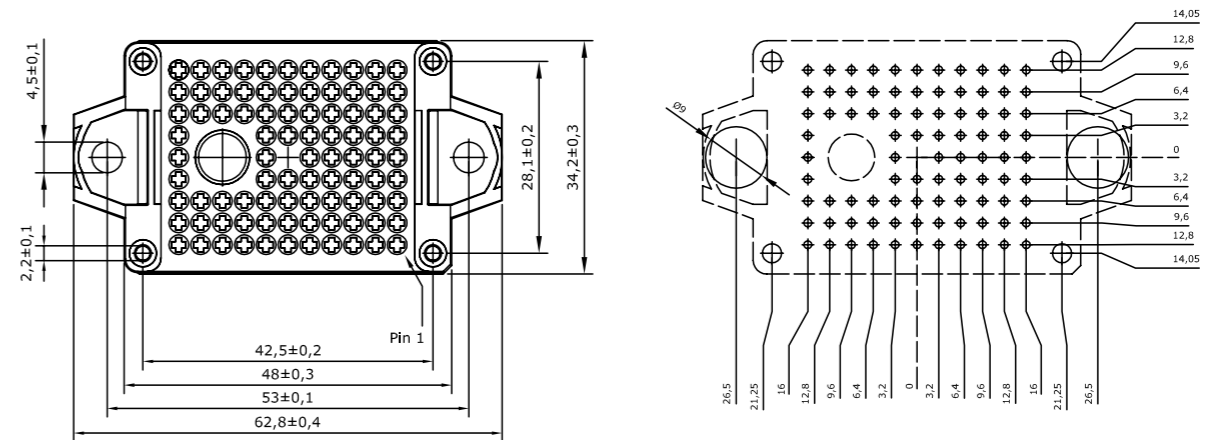
Dimensions: mm  
Tolerance system: ISO 2768-m



Dimensions in mm

## Packages

### SEMITOP E1



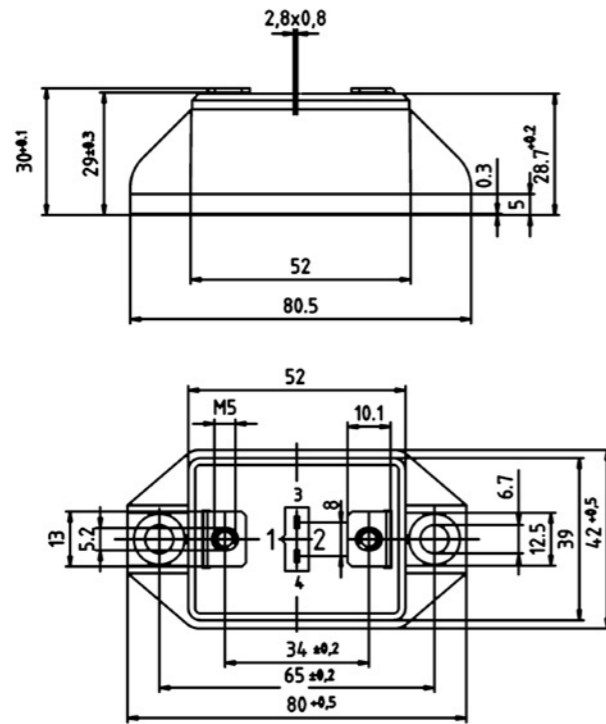
Dimensions in mm

# MOSFET Modules / SEMITRANS

Type	$V_{DS}$ V	$I_D @ T_c = 25^\circ C$ A	$R_{DS(on)} @ T_j = 25^\circ C \text{ typ.}$ mΩ	Package	Thermal Interface Material	Topology
<b>100V</b>						
SKM 111 AR	100	200	7	M1	-	
SKM 111 RZR	100	200	7	M1	-	
<b>200V</b>						
SKM 180 A020	200	180	9	M1	-	

**Packages**

SEMISTRANS M1



Dimensions in mm

# 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.

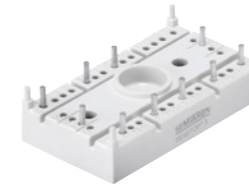
SEMITOP	106
SEMiX	108
SEMIPONT	110
SEMIPACK	111
SEMIPACK Fast	115
SEMiSTART	117

For detailed information please refer to data sheets.

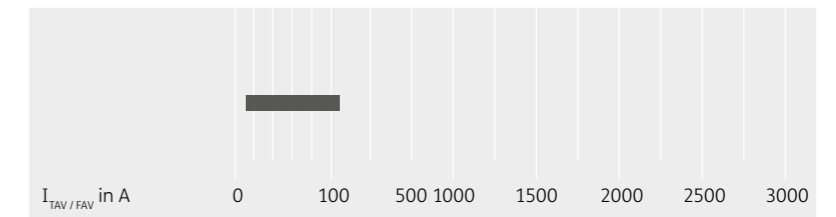
**Further information:** [www.semikron.com/thyristor-diode-modules](http://www.semikron.com/thyristor-diode-modules)

## SEMITOP®

Rectifier  
Thyristor



800V up to 1600V

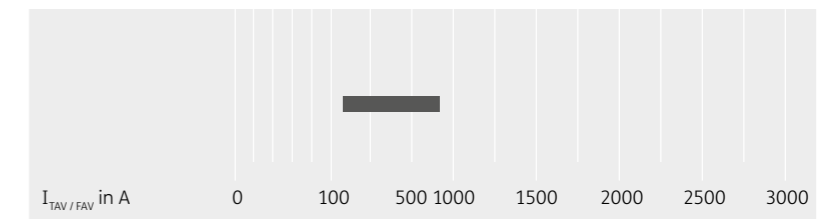


## SEMiX®

Rectifier  
Thyristor



1600V up to 2200V

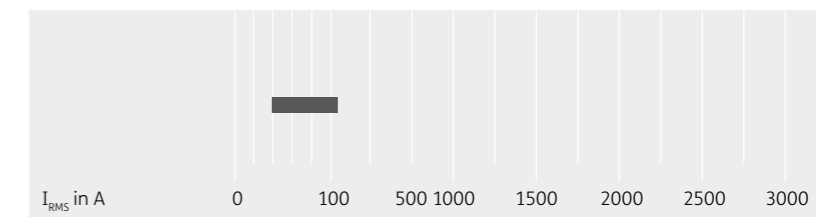


## SEMIPONT®

Rectifier  
Thyristor



800V up to 2200V

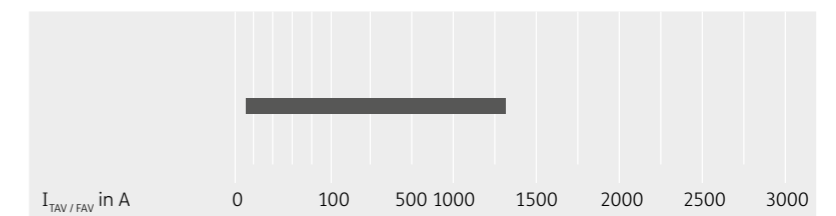


## SEMIPACK®

Rectifier  
Thyristor

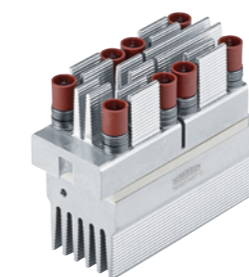


400V up to 2200V

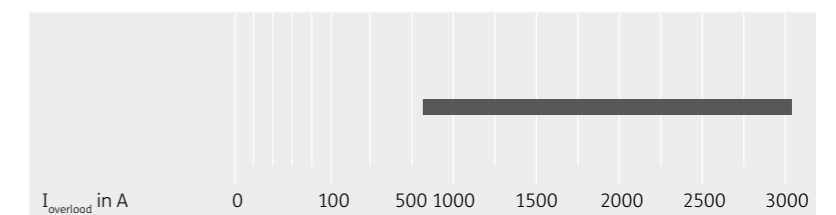


## SEMiSTART®

Thyristor



1400V up to 1800V



# Thyristor / Diode Modules / SEMITOP

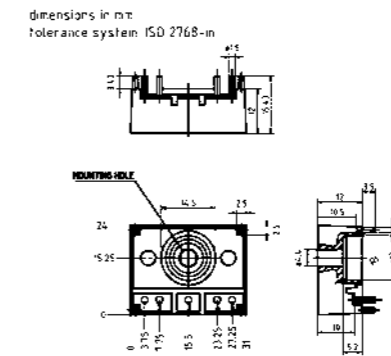
Type	$V_{RRM} V_{DRM}$ V	$I_{FAV} I_{FAV} @ T_S$ A	$T_S$ °C	$I_{FSM} I_{FSM} @ T_{jmax}$ A	$V_{T(TD)} @ T_{jmax}$ V	$r_T @ T_{jmax}$ mΩ	$T_j$ °C	Package	Thermal Interface Material	Topology
SK 35 TAA <sup>2)</sup>	800-1600	35	80	380	0.85	9.10	-40 ... +130	2	P12	
SK 55 TAA	800-1600	55	80	900	0.85	5.70	-40 ... +130	2	P12	
SK 75 TAA <sup>2)</sup>	800-1600	75	80	1500	0.90	4.50	-40 ... +130	2	P12	
SK 100 TAA <sup>2)</sup>	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 <sup>2)</sup>	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

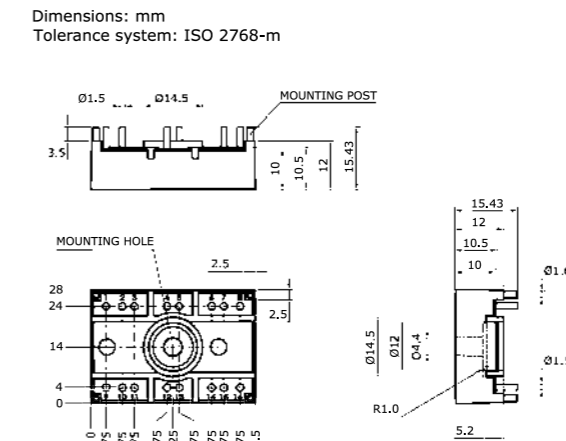
# Thyristor / Diode Modules / SEMITOP

## Packages

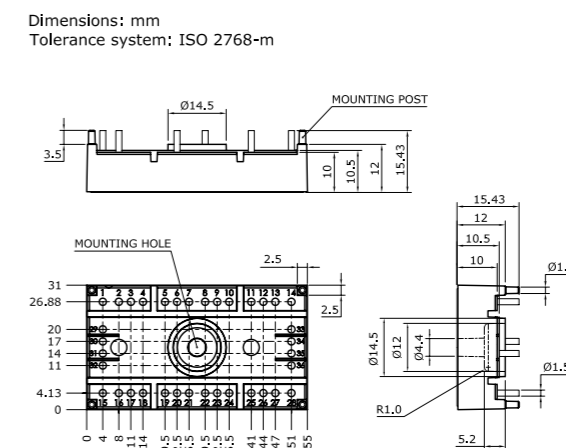
### SEMITOP 1



### SEMITOP 2



### SEMITOP 3



Dimensions in mm

# Thyristor / Diode Modules / SEMiX

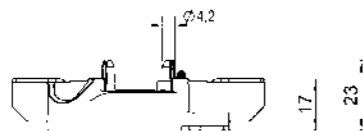
Type

	$V_{RRM}$ $V_{DRM}$ <b>V</b>	$I_{FAV}$ $I_{FAV} @ T_c$ <b>A</b>	$T_c$ <b>°C</b>	$I_{FSM}$ $I_{FSM} @ T_{jmax}$ <b>A</b>	$V_{T(10)}$ $V_{T(10)} @ T_{jmax}$ <b>V</b>	$r_f$ $r_f @ T_{jmax}$ <b>mΩ</b>	$T_j$ <b>°C</b>	Package	Thermal Interface Material	Topology
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 <sup>1)</sup>	1600	585	85	8200	0.916	2.0	-40 ... +175	3Ip	P8, HT	
SEMiX603KD16p <sup>2)</sup>	1600	732	85	9000	0.916	1.9	-40 ... +175	3Ip	P8, HT	
SEMiX443KD22p <sup>2)</sup>	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	

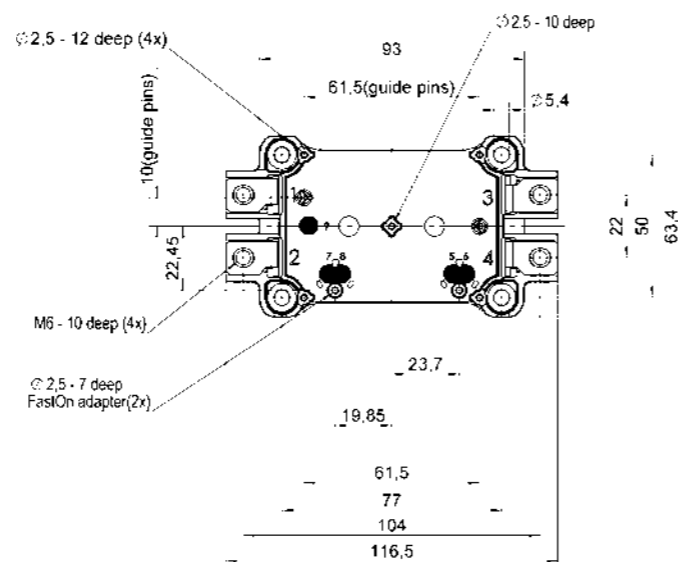
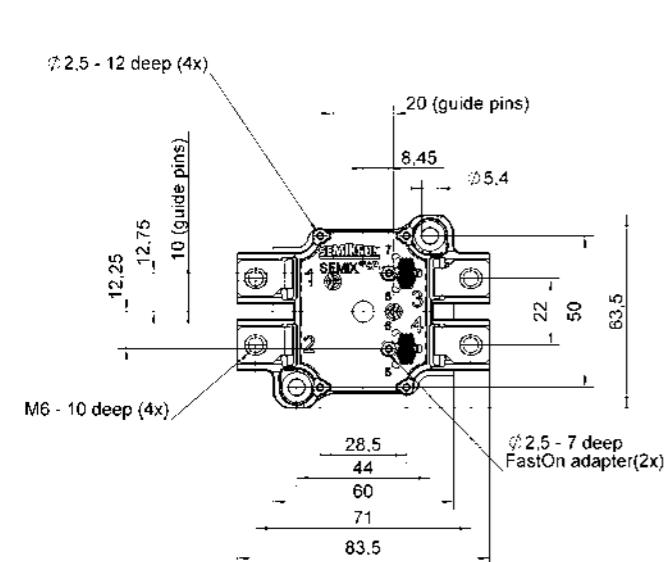
Footnotes: 1) Sample status / 2) In production new

Packages

SEMiX 1s



SEMiX 2s

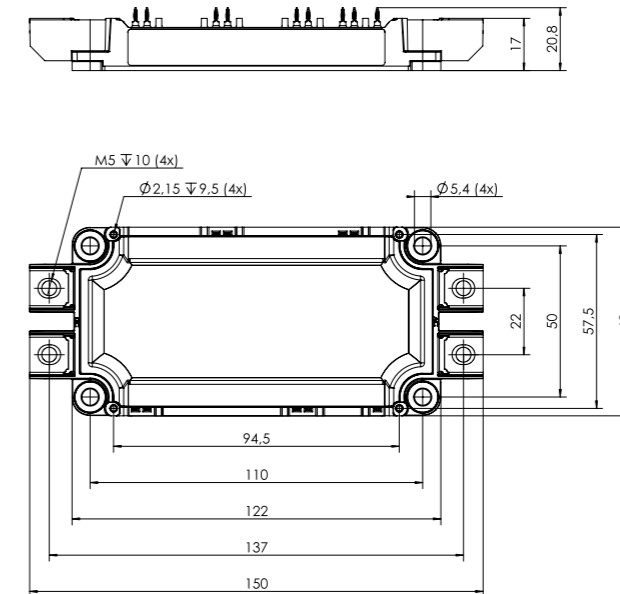


Dimensions in mm

# Thyristor / Diode Modules / SEMiX

Packages

SEMiX 3Ip



Dimensions in mm

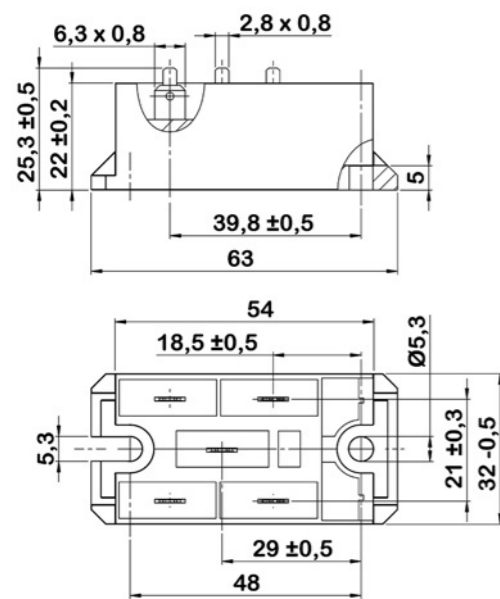
# Thyristor / Diode Modules / SEMIPONT

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

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

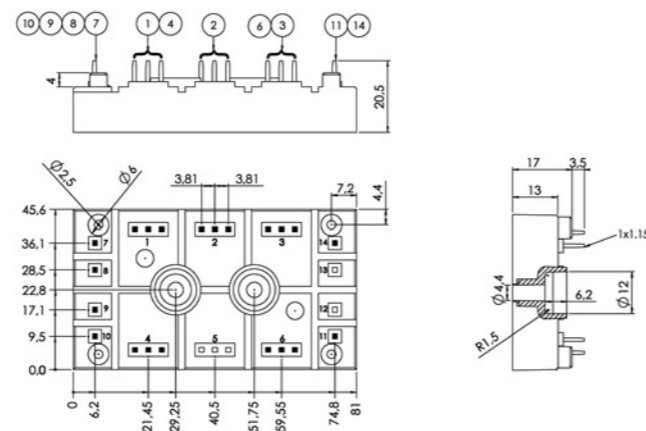
## Packages

### SEMIPONT 1



Dimensions in mm

### SEMIPONT 5



# Thyristor / Diode Modules / SEMIPACK

Type	$V_{RRM}$ V	$I_{TAV}$ $I_{FAV}$ @ $T_c$ A	$T_c$ °C	$I_{FSM}$ $I_{FSM}$ @ $T_{jmax}$ A	$V_{T(RO)}$ @ $T_{jmax}$ 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	



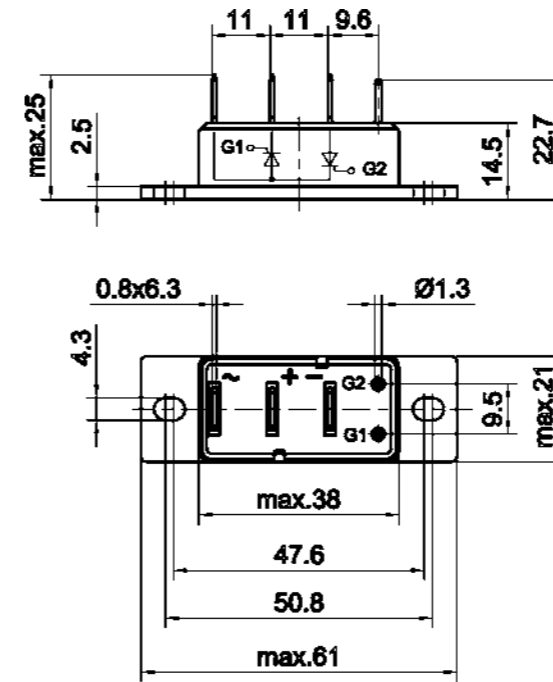
# Thyristor / Diode Modules / SEMIPACK

# Thyristor / Diode Modules / SEMIPACK

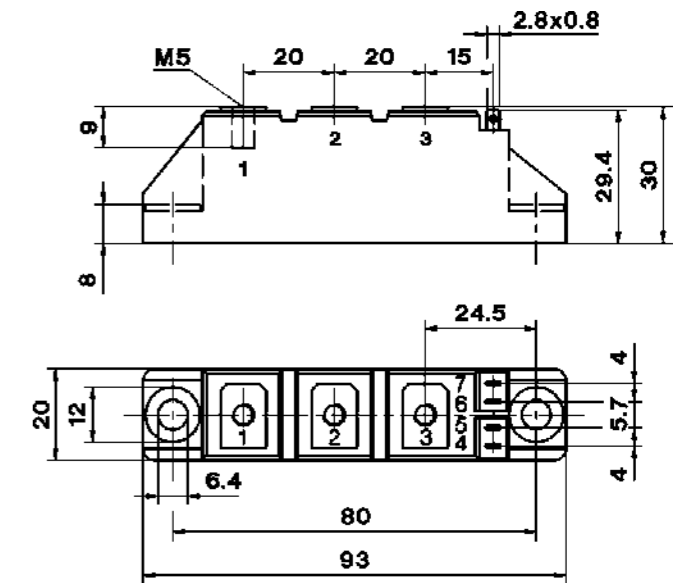
Type	$V_{RRM}$ $V_{DRM}$ <b>V</b>	$I_{FAV}$ @ $T_c$ <b>A</b>	$T_c$ <b>°C</b>	$I_{FSM}$ @ $T_{jmax}$ <b>A</b>	$V_{TR(T0)}$ @ $T_{jmax}$ <b>V</b>	$r_f$ @ $T_{jmax}$ <b>mΩ</b>	$T_j$ <b>°C</b>	Package	Thermal Interface Material	Topology
SKKH 250	1200-1800	250	85	8000	0.93	0.45	-40 ... +130	3	-	
SKKH 273	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	-	

## Packages

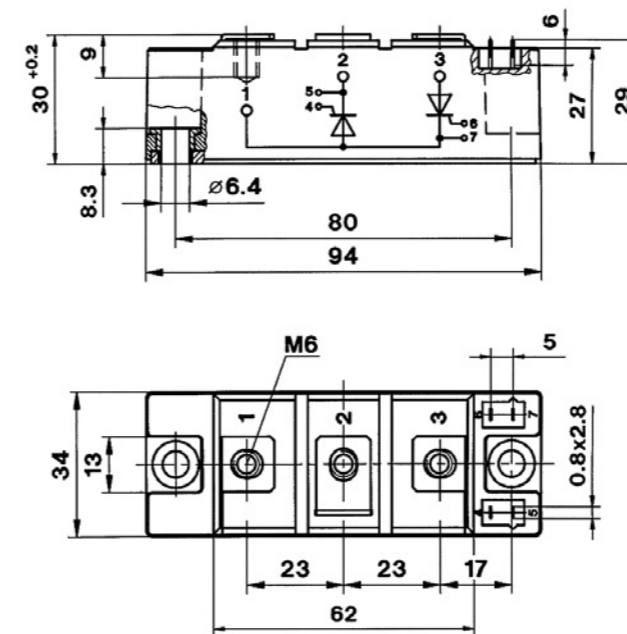
### SEMIPACK 0



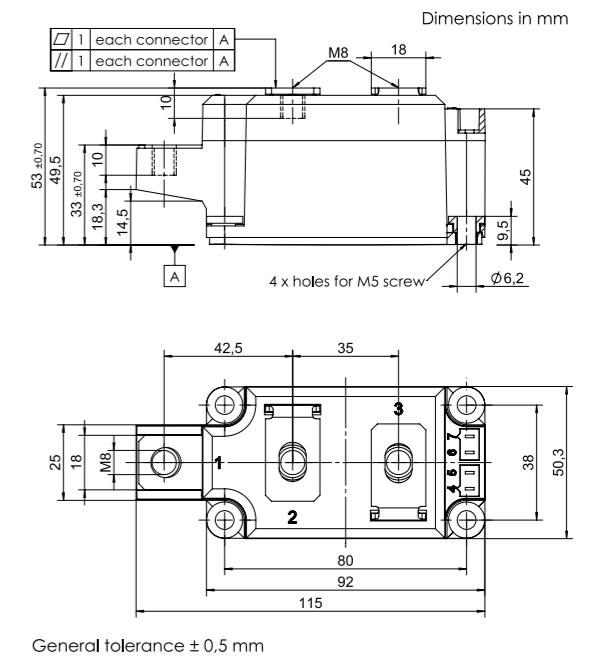
### SEMIPACK 1



### SEMIPACK 2



### SEMIPACK 3



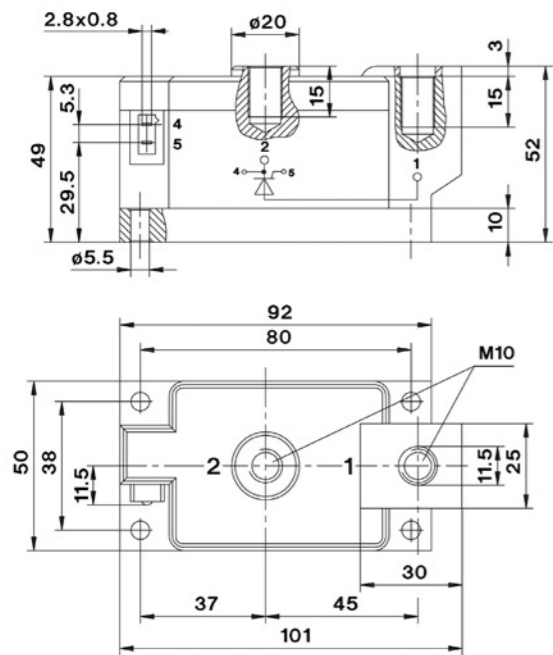
Dimensions in mm

General tolerance ± 0,5 mm

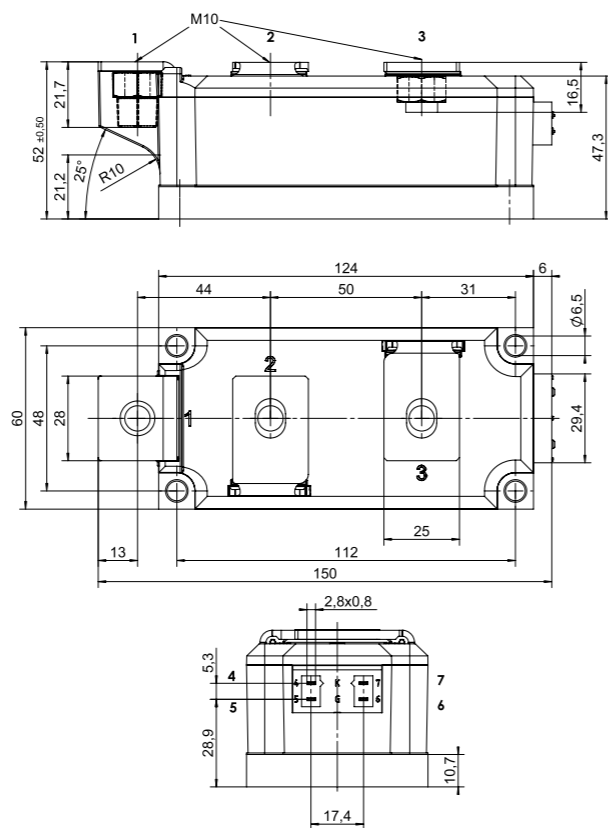
# Thyristor / Diode Modules / SEMIPACK

Packages

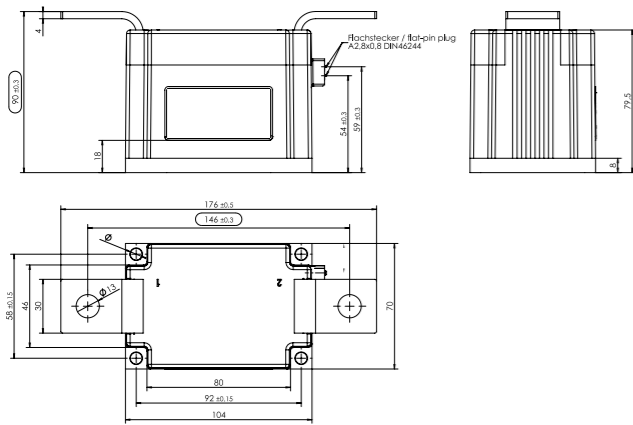
SEMIPACK 4



SEMIPACK 5



SEMIPACK 6



Dimensions in mm

# Thyristor / Diode Modules / SEMIPACK FAST

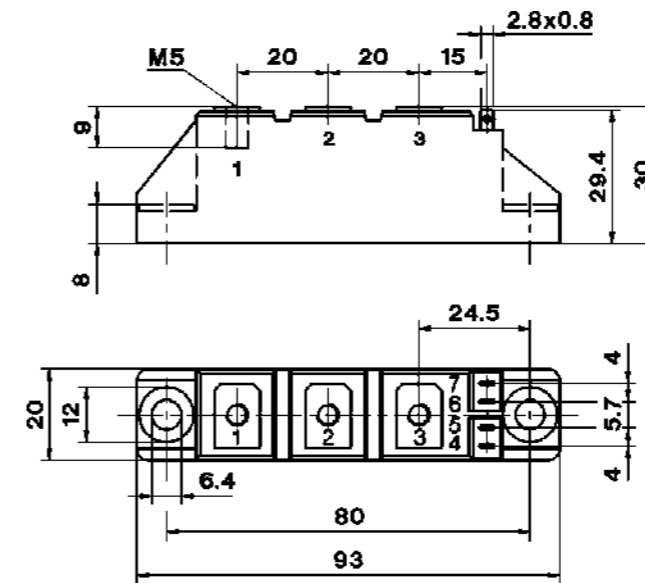
Type

Type	$V_{RRM}$	$V_{DRM}$	$I_{FAV}$	$I_{FAV} @ T_C$	$T_C$	$I_{FSM} @ T_{jmax}$	$V_{T(T0)} @ T_{jmax}$	$r_T @ T_{jmax}$	$T_j$	Package	Thermal Interface Material	Topology	
	V	V	A	A	°C	A	V	mΩ	°C				
SKKE 120F17	1700	1700	120	120	82	1800	1.5	4.5	-40 ... +150	2	-		
SKKE 290F06	600	600	290	290	109	6000	0.9	1.2	-40 ... +150	2	-		
SKKE 301F12	1200	1200	300	300	43	3600	1.2	2.75	-40 ... +150	2	-		
SKKE 310F12	1200	1200	310	310	84	5500	1.2	1.9	-40 ... +150	2	-		
SKKE 330F17 <sup>5)</sup>	1700	1700	330	330	70	5200	1.5	1.9	-40 ... +150	4	-		
SKKE 600F12 <sup>5)</sup>	1200	1200	600	600	85	5800	1.2	1.9	-40 ... +150	4	-		
SKKD 40F	600-1000	600-1000	40	40	80	940	1.2	4	-40 ... +125	1	-		
SKKD 42F	1200-1400	1200-1400	42	42	85	1100	1	5	-40 ... +130	1	-		
SKKD 60F	1700	1700	60	60	83	900	1.5	9	-40 ... +150	2	-		
SKKD 75F12	1200	1200	75	75	55	900	1.2	11	-40 ... +150	2	-		
SKKD 105F16	1600	1600	105	105	83	2100	1.2	2.5	-40 ... +130	1	-		
SKKD 150F12	1200	1200	150	150	54	1800	1.2	5.5	-40 ... +150	2	-		
SKKD 170F	1200	1200	170	170	85	2300	1.2	3.5	-40 ... +150	2	-		
SKKD 205F06	600	600	205	205	87	3000	0.9	2	-40 ... +150	2	-		
SKMD 150F12	1200	1200	150	150	54	1800	1.2	5.5	-40 ... +150	2	-		
SKND 150F12	1200	1200	150	150	54	1800	1.2	5.5	-40 ... +150	2	-		
SKND 205F06	600	600	205	205	87	3000	0.9	2	-40 ... +150	2	-		

Footnotes: 5) SEMIPACK Fast in SEMITRANS 4 case

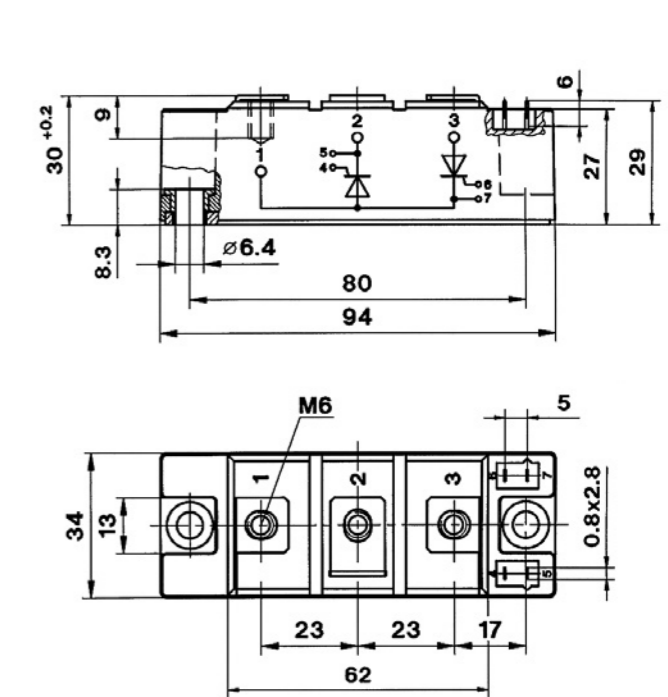
Packages

SEMIPACK 1



Dimensions in mm

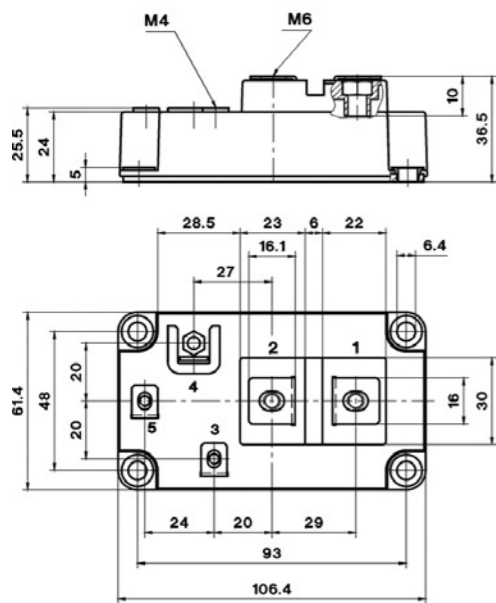
SEMIPACK 2



# Thyristor / Diode Modules / SEMIPACK FAST

Packages

SEMIPACK Fast in SEMITRANS 4



Dimensions in mm

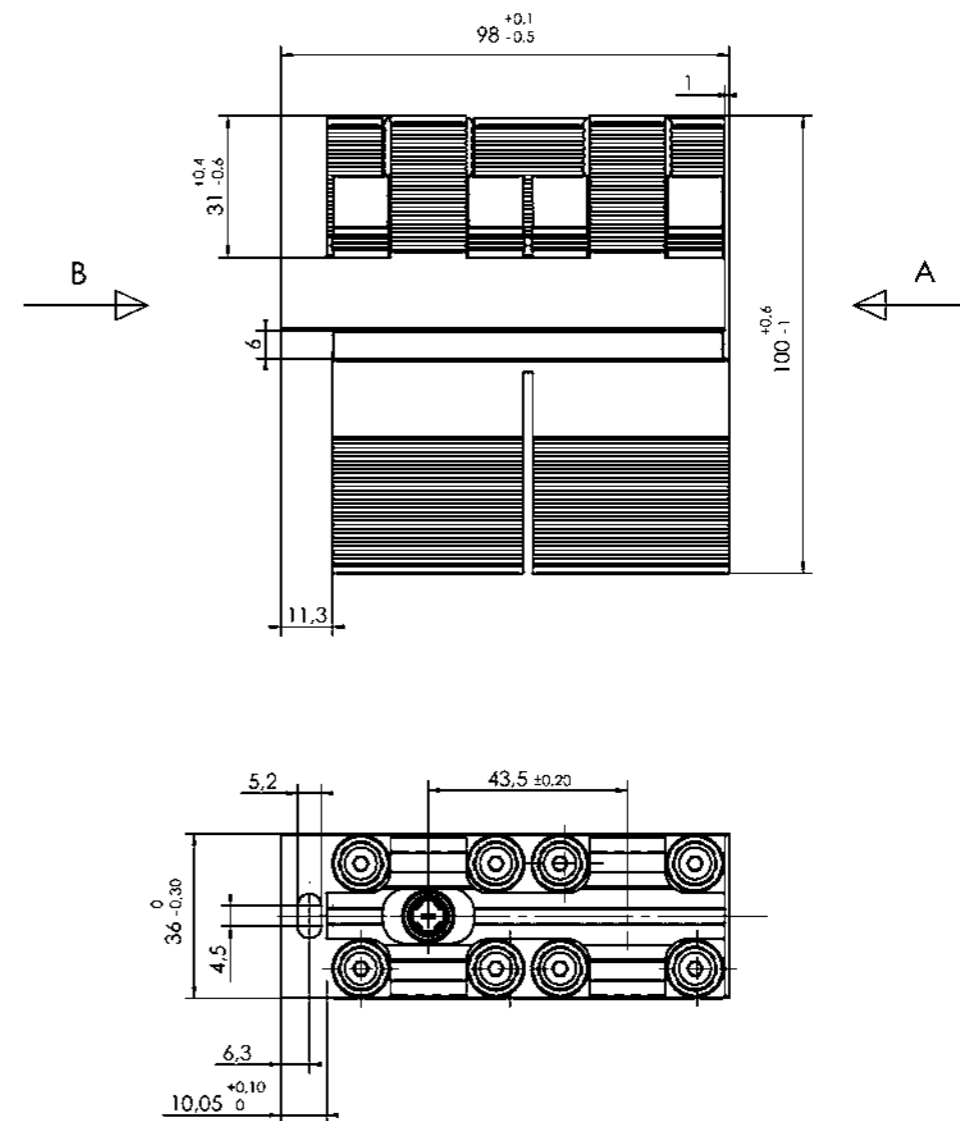
# Thyristor Modules / SEMiSTART

Type

Type	$V_{RRM}$ $V_{DRM}$ V	$I_{overload}$ WIC (for 20s) A	$T_c$ °C	$I_{FSM}$ @ $T_j = 125^\circ\text{C}$ A	$V_{T(RO)}$ @ $T_{jmax} = 125^\circ\text{C}$ V	$r_f$ @ $T_{jmax} = 125^\circ\text{C}$ mΩ	$T_{jmax}$ (for 20s) °C	Package	Thermal Interface Material	Topology
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

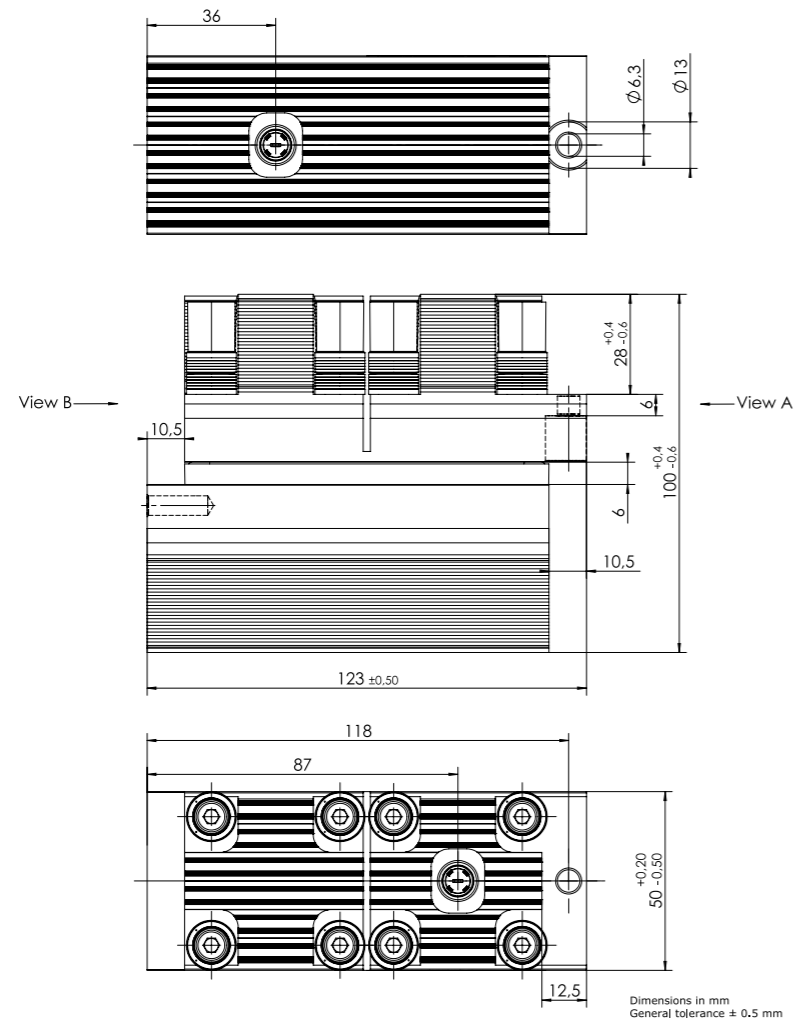


Dimensions in mm

# Thyristor Modules / SEMiSTART

Packages

SEMISTART 2

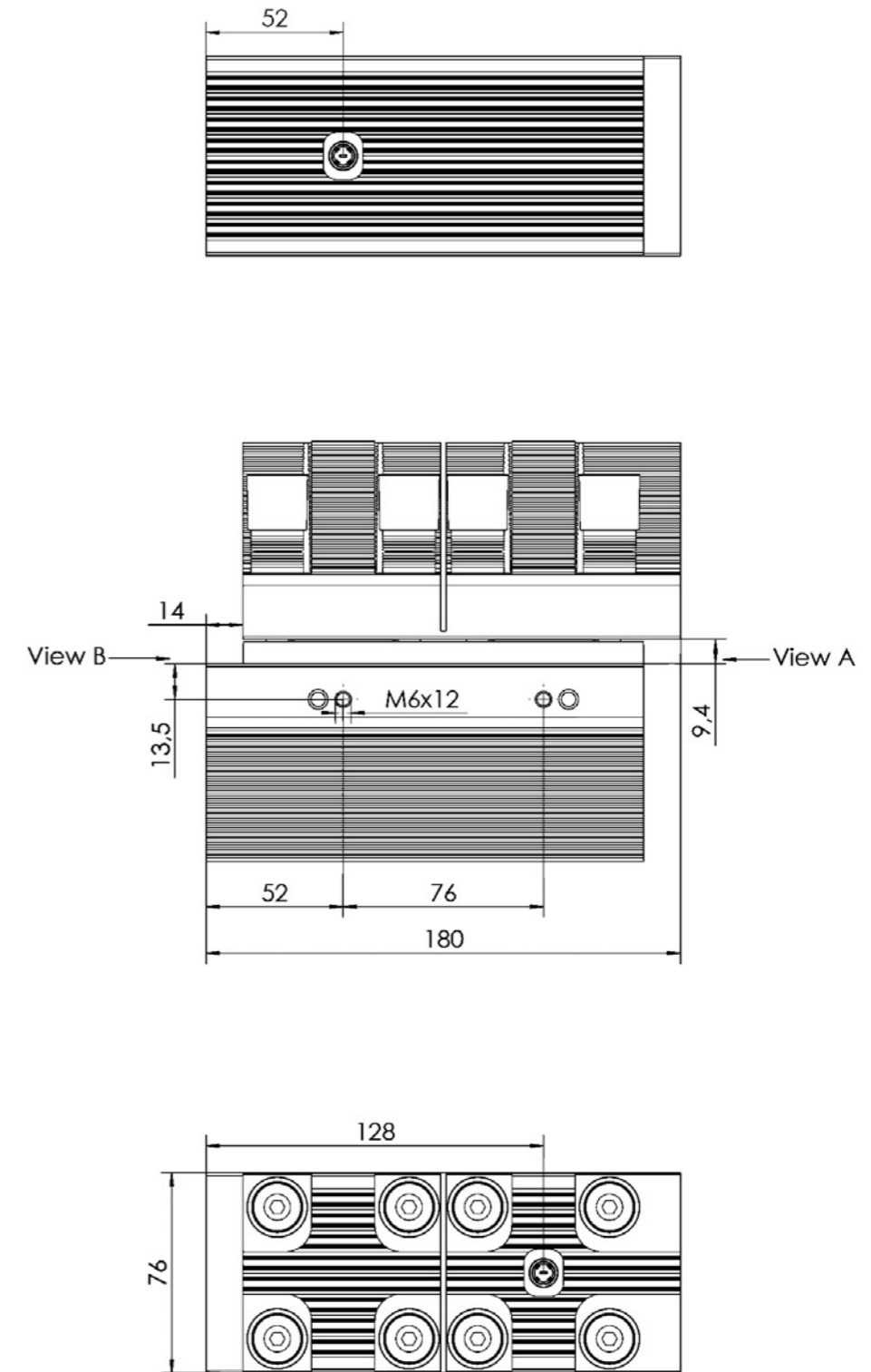


Dimensions in mm

# Thyristor Modules / SEMiSTART

Packages

SEMISTART 3



Dimensions in mm

# 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.

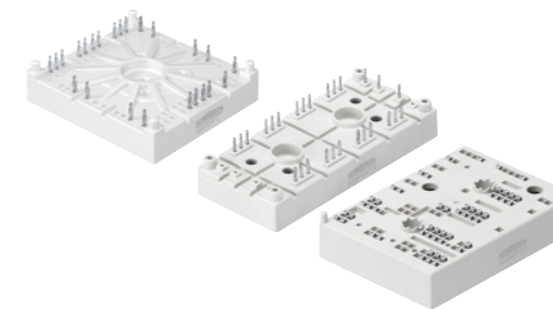
MiniSKiiP	122
SEMITOP	124
SEMIPONT	128
SEMIX	132
Power Bridge	134

For detailed information please refer to data sheets.

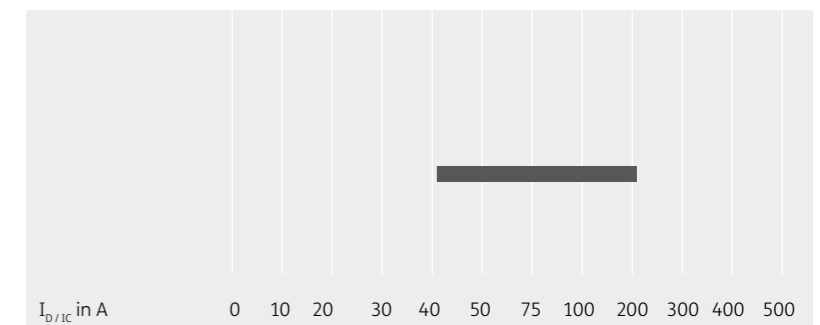
**Further information:** [www.semikron.com/bridge-rectifier-modules](http://www.semikron.com/bridge-rectifier-modules)

## SEMITOP®/SEMIPONT®/MiniSKiiP®

**Rectifier with  
Brake Chopper**

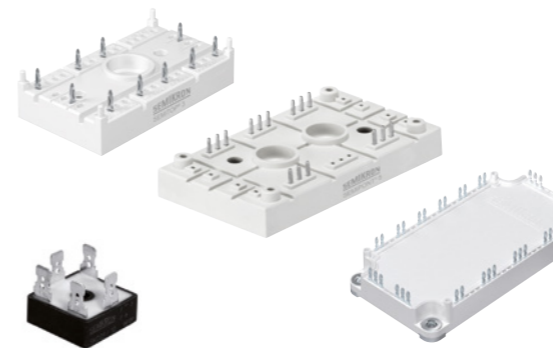


**600V up to 1800V**

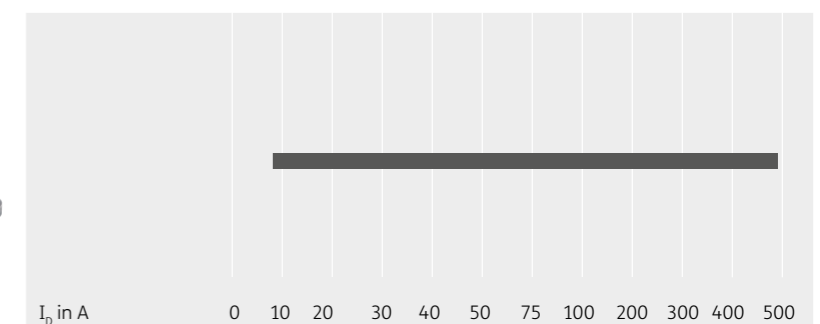


## SEMITOP®/SEMIPONT®/SEMIX®/ Power Bridge

**Three Phase Rectifier**

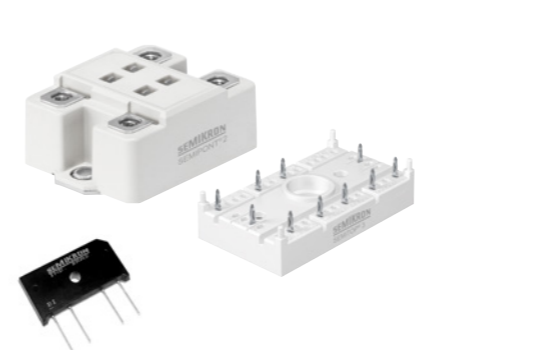


**200V up to 2200V**

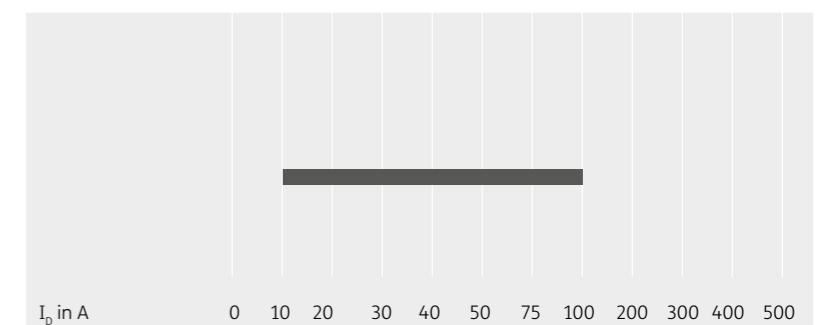


## SEMIPONT®/SEMITOP®/ Power Bridge

**Single Phase Rectifier**



**100V up to 2200V**



# Bridge Rectifier Modules / MiniSKiiP

Type	$V_{RRM}$ V	$I_F@T_s$ A	$T_s$ °C	$I_{FSM@T_s@T_s=25^\circ C}$ A	$V_{T(TO)}$ V	$r_f@T_{jmax}$ mΩ	$T_j$ °C	Package	Thermal Interface Material	Topology
<b>3-phase Rectifier</b>										
SKiiP 28AN16V2 <sup>2)</sup>	1200	86	70	890	0.83	6	-40 ... +150	II 2	P12, HPTP	
SKiiP 39AN16V1 <sup>1)</sup>	1600	179	70	3200	0.83	2.5	-40 ... +150	II 3	P12, HPTP	
SKiiP 39AH16V1 <sup>1)</sup>	1600	112	70	2900	0.85	2.4	-40 ... +130	II 3	P12, HPTP	
<b>3-phase Rectifier + Chopper</b>										
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 <sup>2)</sup>	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

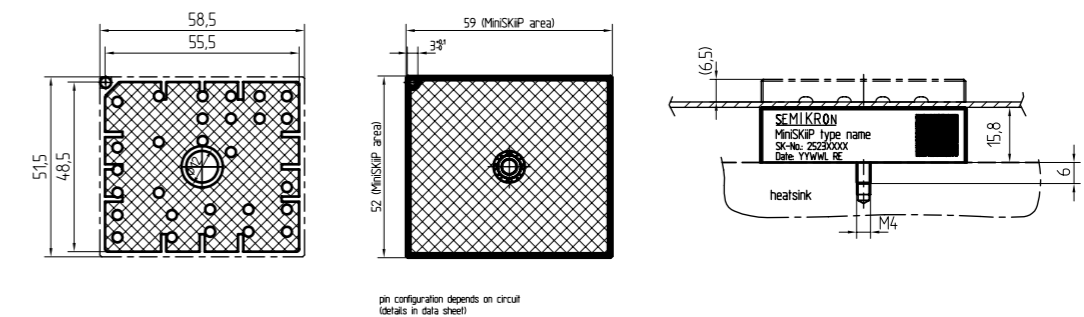
# Bridge Rectifier Modules / MiniSKiiP

Type	$V_{RRM}$ V	$I_F@T_s$ A	$T_s$ °C	$I_{FSM@T_s@T_s=25^\circ C}$ A	$V_{T(TO)}$ V	$r_f@T_{jmax}$ mΩ	$T_j$ °C	Package	Thermal Interface Material	Topology
<b>3-phase Rectifier + Chopper</b>										
SKiiP 39AHB16V3 <sup>1)</sup>	1600	126	70	1250	0.85	2.8	-40 ... +130	II 3	P12, HPTP	

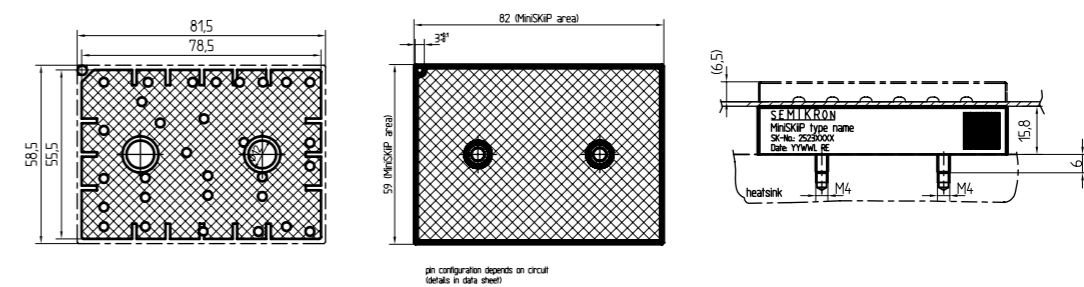
Footnotes: 1) Sample status / 2) In production new

## Packages

### MiniSKiiP II 2



### MiniSKiiP II 3



Dimensions in mm

# Bridge Rectifier Modules / SEMITOP

Type	$V_{RRM}$ V	$I_P @ T_S$ 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
<b>1 and 3 phase</b>										
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	
SK40BB07TD1E2 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

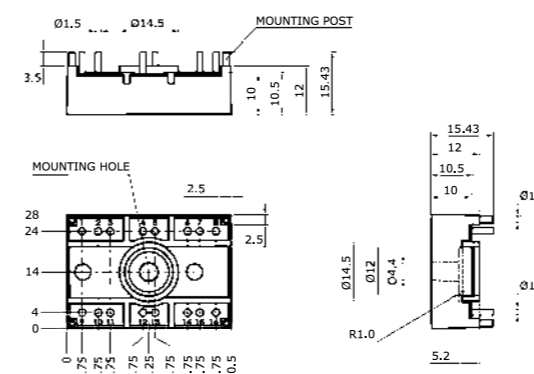
Type	$V_{RRM}$ V	$I_P @ T_S$ A	$T_S$ °C	$I_{TSM} I_{FSM} @ T_{jmax}$ A	$V_{T(TO)} @ T_{jmax}$ V	$r_T @ T_{jmax}$ mΩ	$T_j$ °C	Package	Thermal Interface Material	Topology
<b>1 and 3 phase</b>										
SK60B12TUF1 1)	650	51	-	-	-	-	-40 ... +175	E1	-	
SK225BV07S5D1E2 1)	800	135	-	1250	0.83	3.09	-40 ... +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

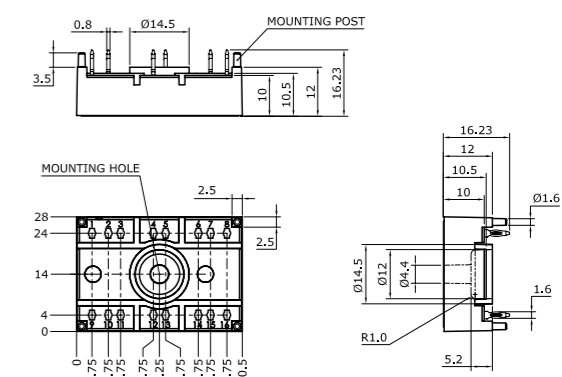
Dimensions: mm  
Tolerance system: ISO 2768-m



Dimensions in mm

### SEMITOP 2 Press-Fit

Dimensions: mm  
Tolerance system: ISO 2768-m

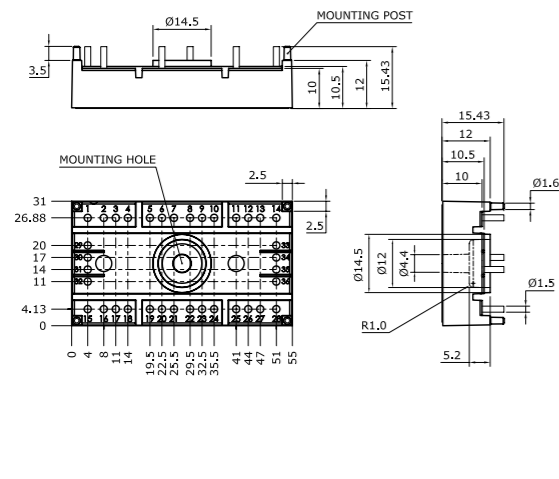


# Bridge Rectifier Modules / SEMITOP

Packages

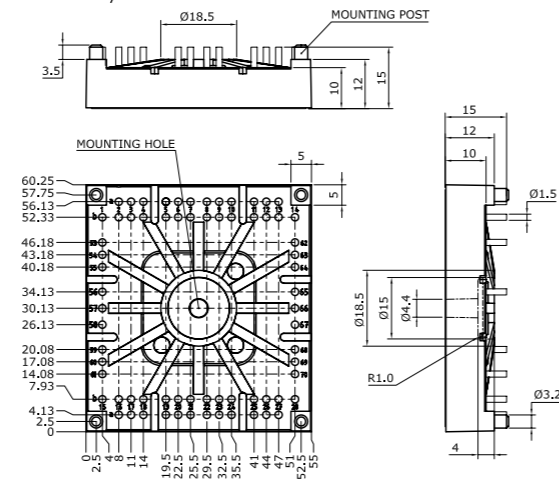
SEMITOP 3

Dimensions: mm  
Tolerance system: ISO 2768-m



SEMITOP 4

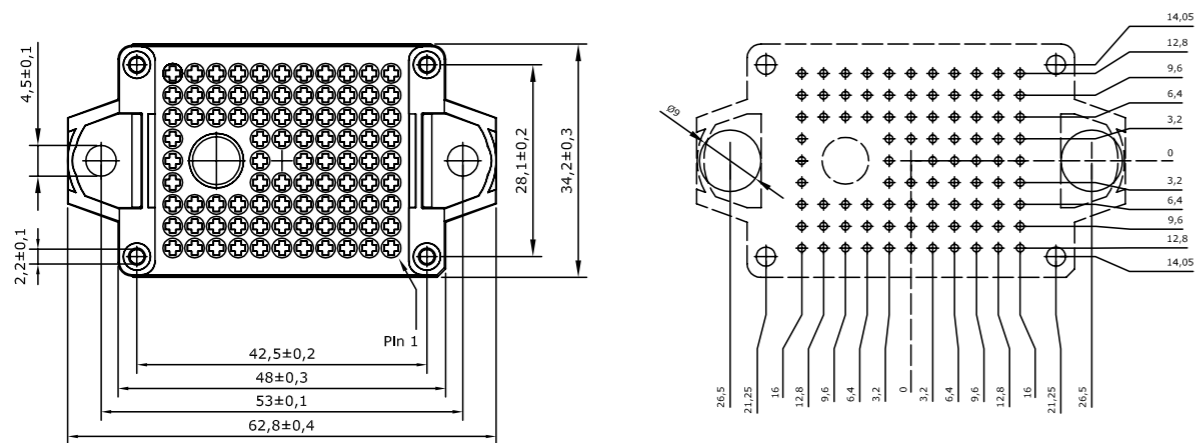
Dimensions: mm  
Tolerance system: ISO 2768-m



Dimensions in mm

Packages

SEMITOP E1

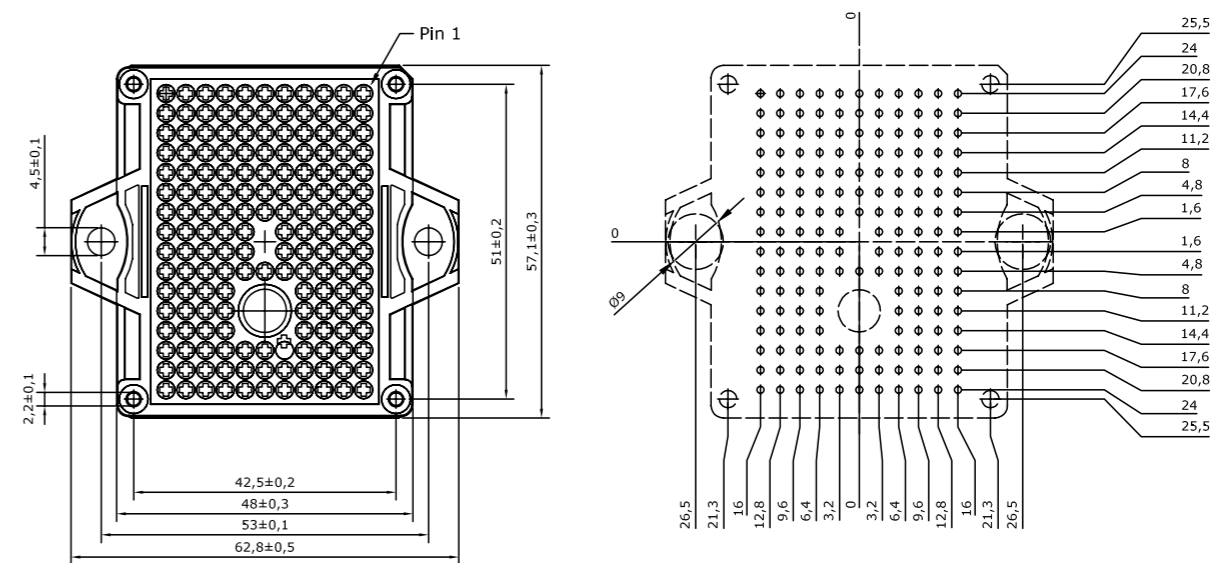


Dimensions in mm

# Bridge Rectifier Modules / SEMITOP

Packages

SEMITOP E2



Dimensions in mm



# Bridge Rectifier Modules / SEMIPONT

Type	$V_{RRM}$ $V_{DRM}$	$I_p$ @ $T_c$	$T_c$	$I_{FSM}$ @ $T_{jmax}$	$V_{T(ro)}$ @ $T_{jmax}$	$r_f$ @ $T_{jmax}$	$T_j$	Package	Thermal Interface Material	Topology
	V	A	°C	A	V	mΩ	°C			
<b>1 and 3 phase</b>										
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 <sup>3)</sup>	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

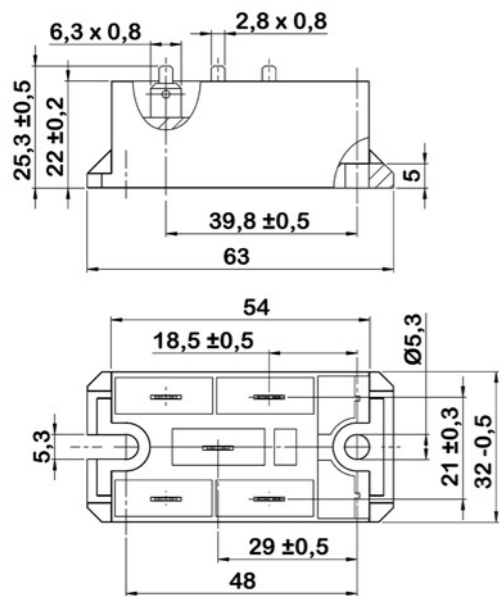
Type	$V_{RRM}$ $V_{DRM}$	$I_p$ @ $T_c$	$T_c$	$I_{FSM}$ @ $T_{jmax}$	$V_{T(ro)}$ @ $T_{jmax}$	$r_f$ @ $T_{jmax}$	$T_j$	Package	Thermal Interface Material	Topology
	V	A	°C	A	V	mΩ	°C			
<b>1 and 3 phase</b>										
SKD 31	200-1600	31	100	320	0.85	12.0	-40 ... +125	1	-	
SKD 60	400-1600	60	102	850	0.85	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	-	
<b>3 phase with brake chopper</b>										
SKD 116/...L105 <sup>2)</sup>	1200-1600	110	85	1050	0.8	7.0	-40 ... +125	6	-	
SKD 116/...L140 <sup>2)</sup>	1200-1600	110	85	1050	0.8	7.0	-40 ... +125	6	-	
SKD 146/...L105 <sup>2)</sup>	1200-1600	140	85	1250	0.8	4.0	-40 ... +125	6	-	
SKD 146/...L140T4 <sup>2)</sup>	1200-1600	140	85	1250	0.8	4.0	-40 ... +125	6	-	
SKDH 116/...L105 <sup>2)</sup>	1200-1600	110	85	1000	0.8	7.0	-40 ... +125	6	-	
SKDH 116/...L140 <sup>2)</sup>	1200-1600	110	85	1000	0.8	7.0	-40 ... +125	6	-	
SKDH 146/...L105 <sup>2)</sup>	1200-1600	140	85	1250	0.8	4.0	-40 ... +125	6	-	
SKDH 146/...L140 <sup>2)</sup>	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 <sup>2)</sup>	1200	140	-	1250	0.83	-	-40 ... +150	6	-	

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

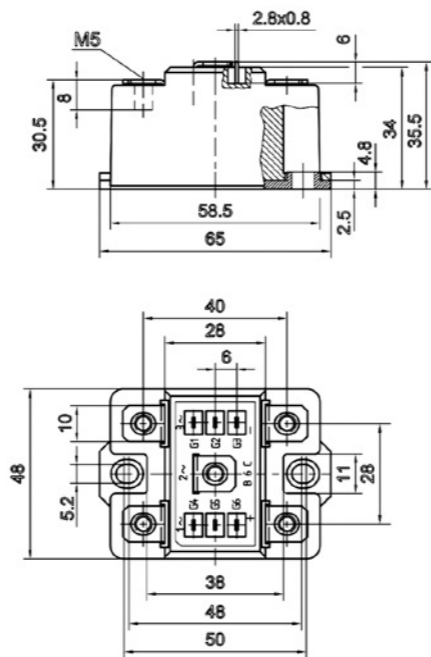
# Bridge Rectifier Modules / SEMIPONT

Packages

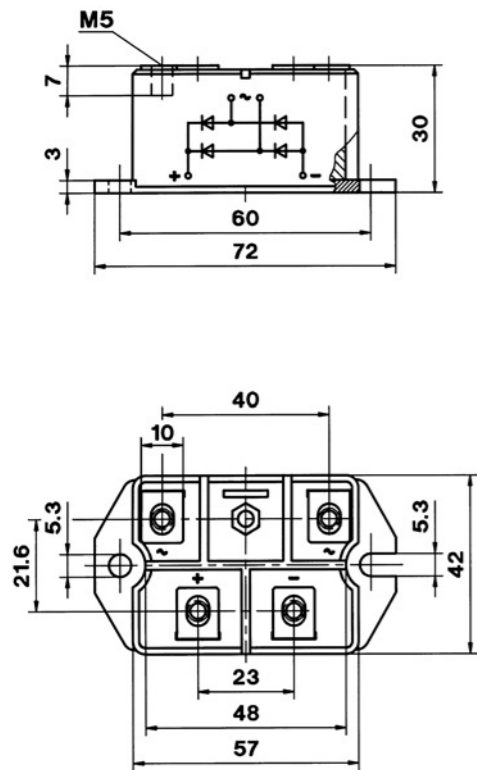
SEMIPONT 1



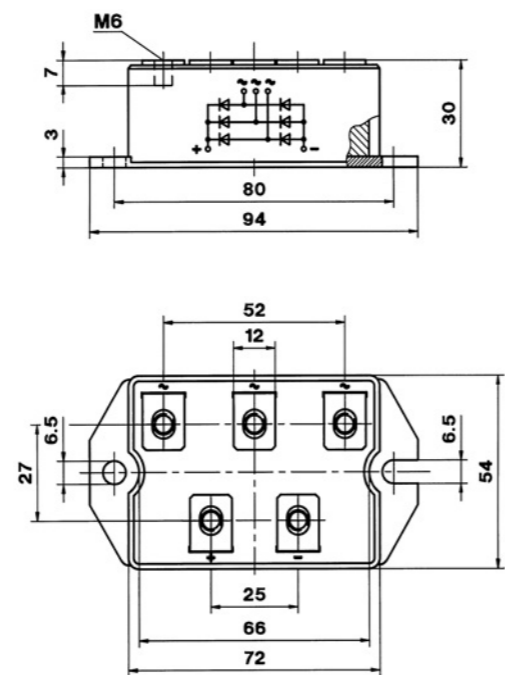
SEMIPONT 2



SEMIPONT 3



SEMIPONT 4

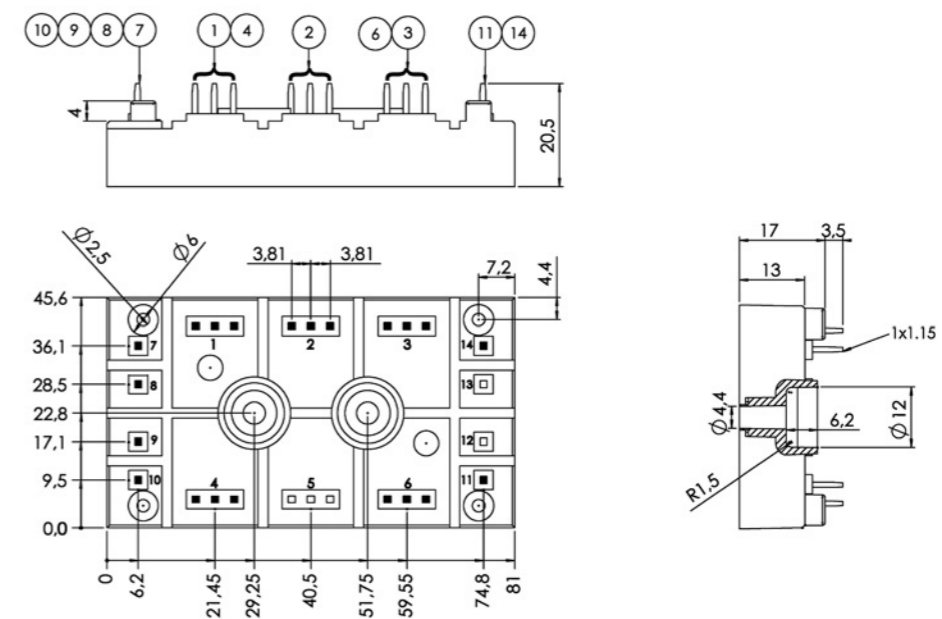


Dimensions in mm

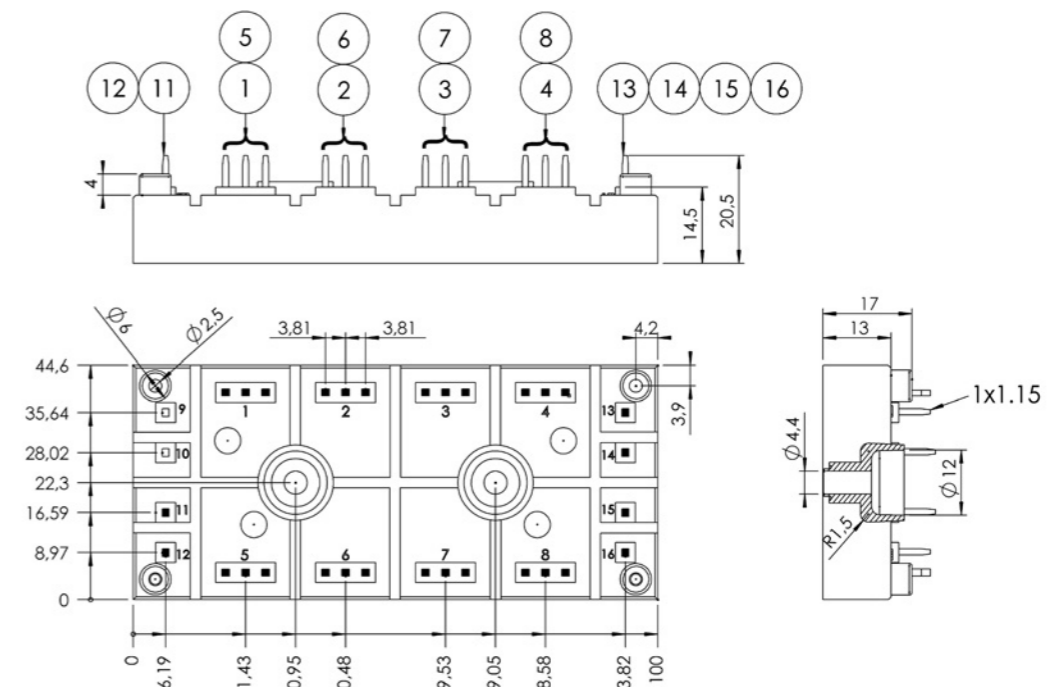
# Bridge Rectifier Modules / SEMIPONT

Packages

SEMIPONT 5



SEMIPONT 6



Dimensions in mm

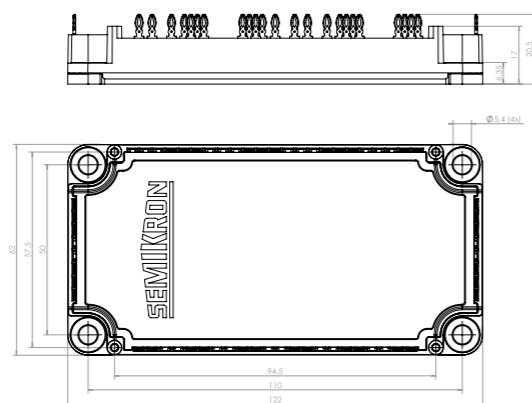
# Bridge Rectifier Modules / SEMiX

Type	$V_{RRM}$ V	$I_p @ T_c$ A	$T_c$ °C	$I_{FSM} - I_{FSM} @ T_{jmax}$ A	$V_{T(TO)} @ T_{jmax}$ V	$r_T @ T_{jmax}$ mΩ	$T_j$ °C	Package	Thermal Interface Material	Topology
<b>3 phase</b>										
SEMiX251D12Fs <sup>3)</sup>	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 <sup>1)</sup>	1600	700	85	4200	0.916	1.4	-40 ... +175	6p	HT	
SEMiX636D16p <sup>1)</sup>	1600	700	85	5500	0.916	1.3	-40 ... +175	6p	HT	
SEMiX526D22p <sup>1)</sup>	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 <sup>2)</sup>	1600	336	96	1800	0.91	3.0	-40 ... +130	5p	P8, HT	
SEMiX365DH16 <sup>2)</sup>	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

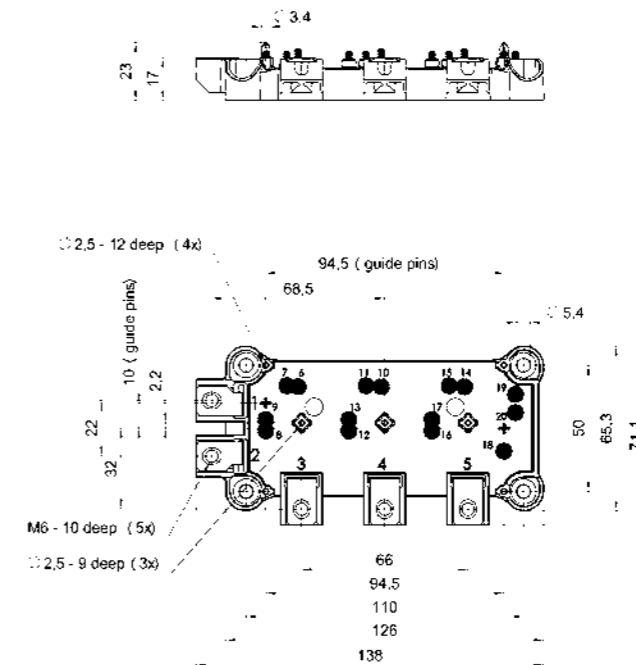


Dimensions in mm

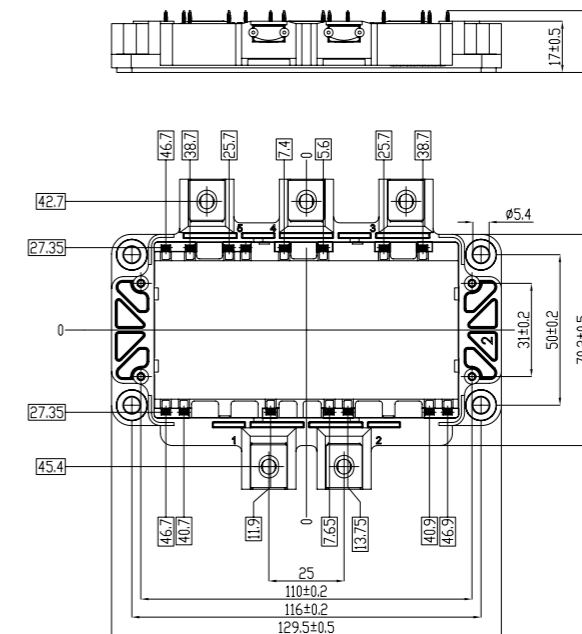
# Bridge Rectifier Modules / SEMiX

## Packages

### SEMiX 13



### SEMiX 5p



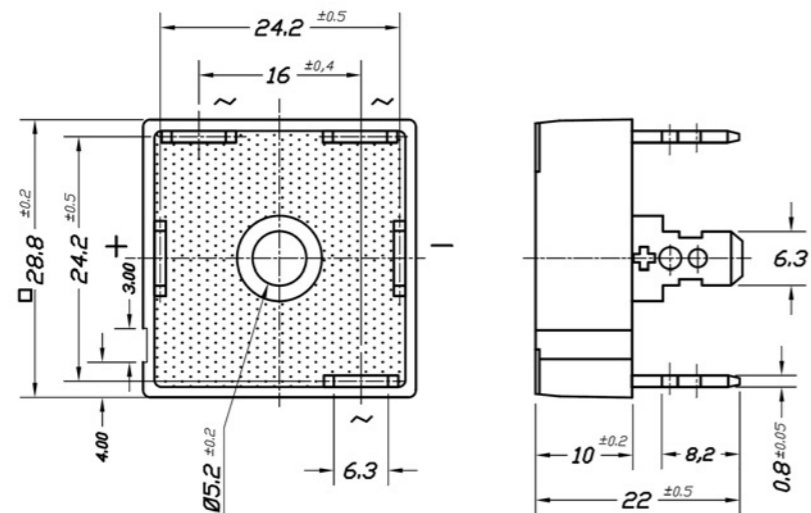
Dimensions in mm

# Bridge Rectifier Modules / Power Bridge

Type	$V_{RRM}$ V	$V_{DRM}$ V	$I_p @ T_c$ A	$T_c$ °C	$I_{FSM} @ T_{jmax}$ A	$V_{T(170)} @ T_{jmax}$ V	$r_f @ T_{jmax}$ mΩ	$T_j$ °C	Package	Thermal Interface Material	Topology
<b>1 phase</b>											
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	-	
<b>3 phase</b>											
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

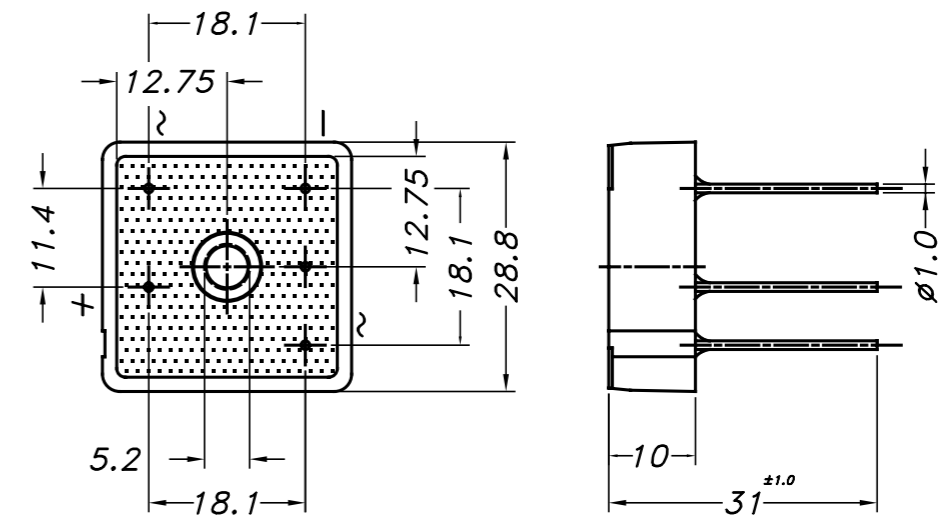


Dimensions in mm

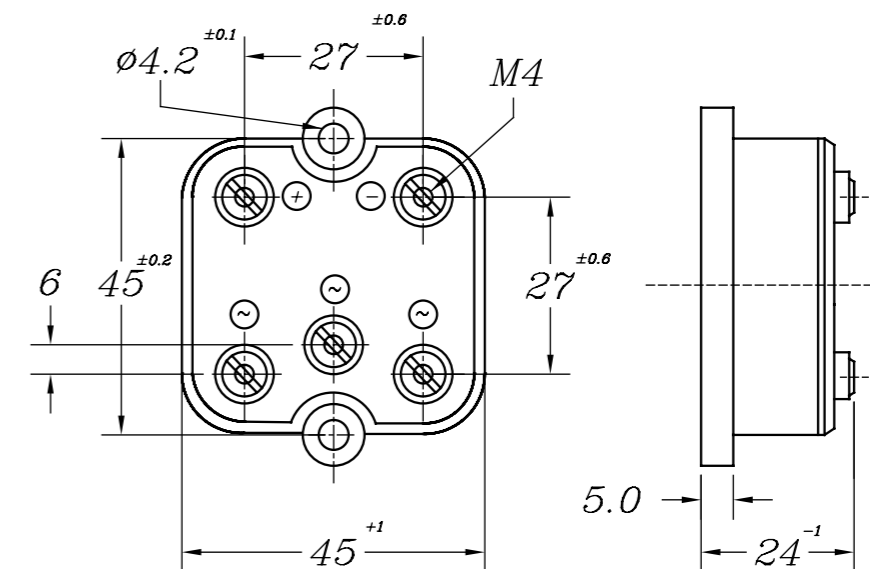
# Bridge Rectifier Modules / Power Bridge

**Packages**

G 50a, G 50b



G 12, G 13

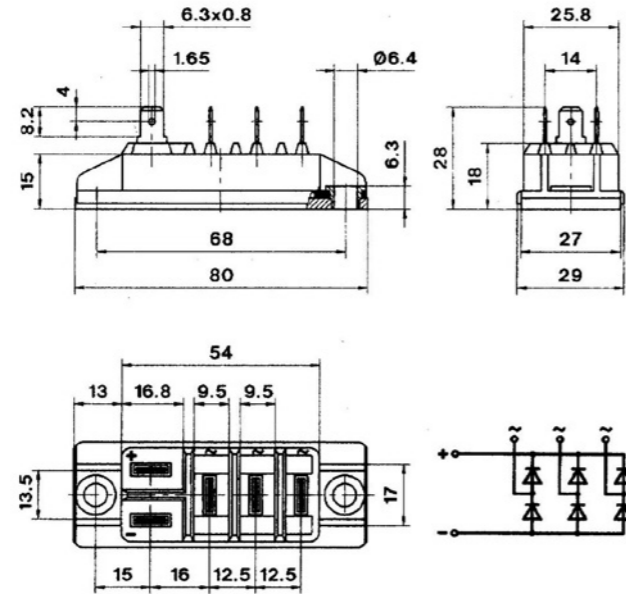


Dimensions in mm

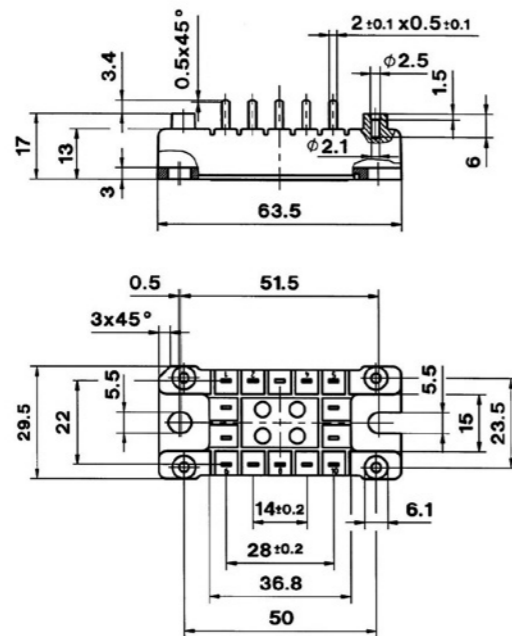
# Bridge Rectifier Modules / Power Bridge

Packages

G 51



G 55

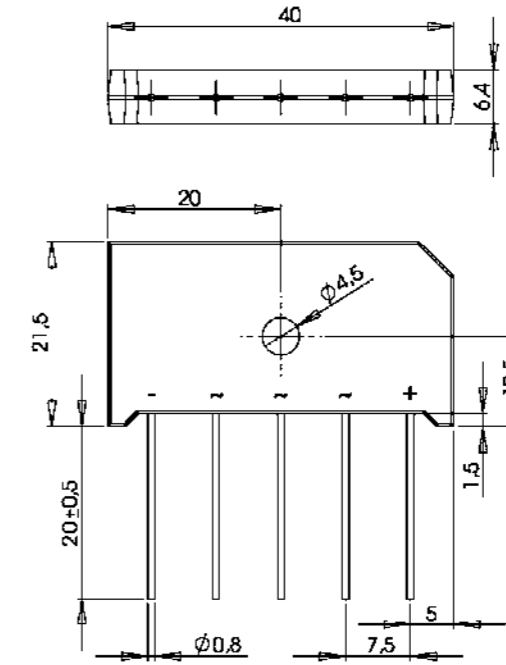


Dimensions in mm

# Bridge Rectifier Modules / Power Bridge

Packages

DBI P



Dimensions in mm



# Intelligent Power Modules

## IPMs

PAGE  
SKiiP 140

2

1

2

3

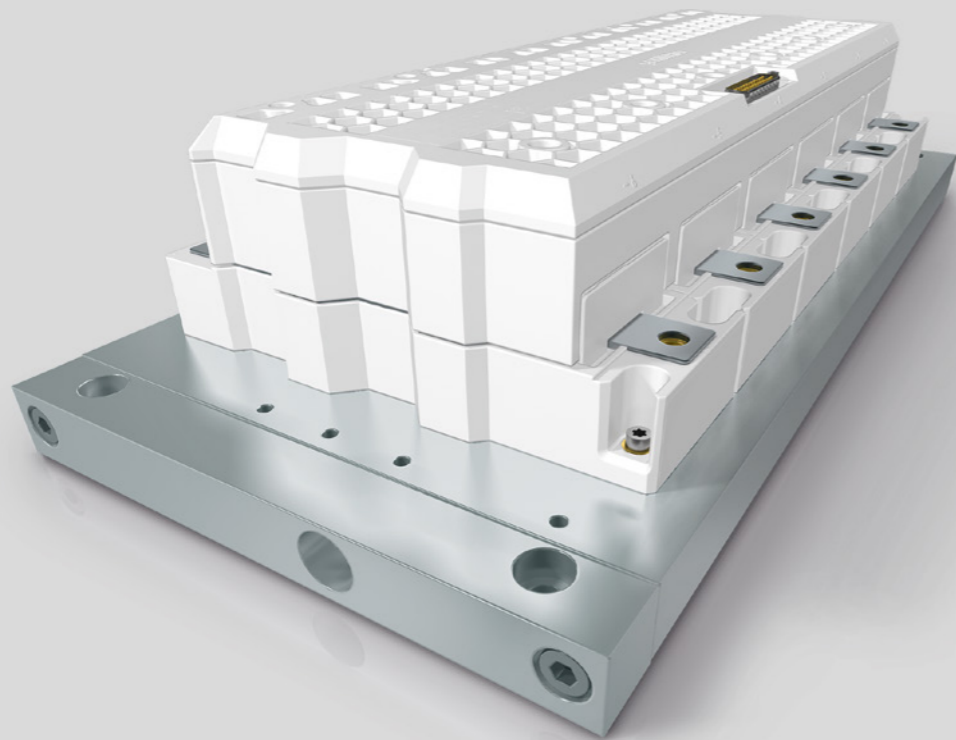
4

5

6

7

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, semiconductor 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](http://www.semikron.com/skiip)



# IPM

## SEMIKRON For Highly Integrated IPMs

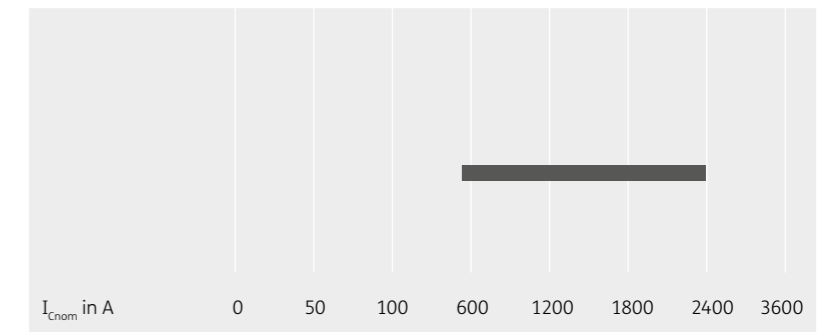
The SKiiP IPMs set a benchmark for high performance and robust converter designs. Especially the SKiiP 4 with its sintered chips is an enabler for maximum load cycle capability and lifetime for use in renewable energy converters such as wind turbines and solar inverters as well as for traction applications.

### SKiiP® 3

Sixpack  
Half-Bridge



1200V up to 1700V

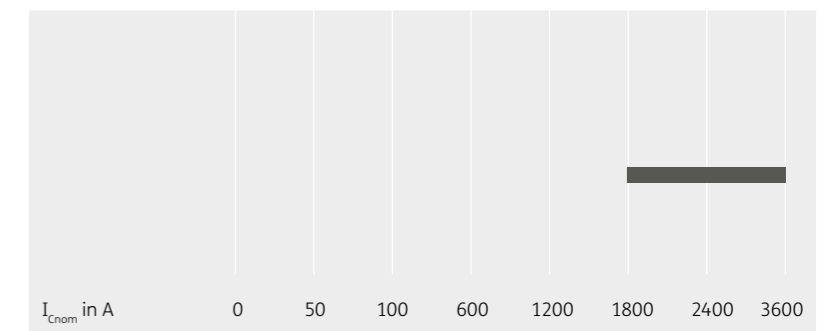


### SKiiP® 4

Half-Bridge



1200V up to 1700V



SKiiP 3/4	144
SKiiP Accessories	153

For detailed information please refer to data sheets.

**Further information:** [www.semikron.com/ipm](http://www.semikron.com/ipm)



## IPM / SKiiP

Type	IGBT		Diode		Module		Options F=F-Option U=U-Option S=Skiface Adapter	Package	Topology	
	$I_c @ T_s = 25^\circ\text{C}$	$I_{nom}$	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$	$E_{on} + E_{off}$	$I_f @ T_s = 25^\circ\text{C}$	$V_f @ T_j = 25^\circ\text{C typ.}$				$E_{rr}$
	A	A	V	mJ	A	V	mJ			
<b>1200V - IGBT 3 (Trench) - SKiiP3</b>										
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	
<b>1200V - IGBT 4 (Trench) - SKiiP4</b>										
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 GB12E4-4DULR	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	
<b>1700V - IGBT 3 (Trench) - SKiiP3</b>										
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	

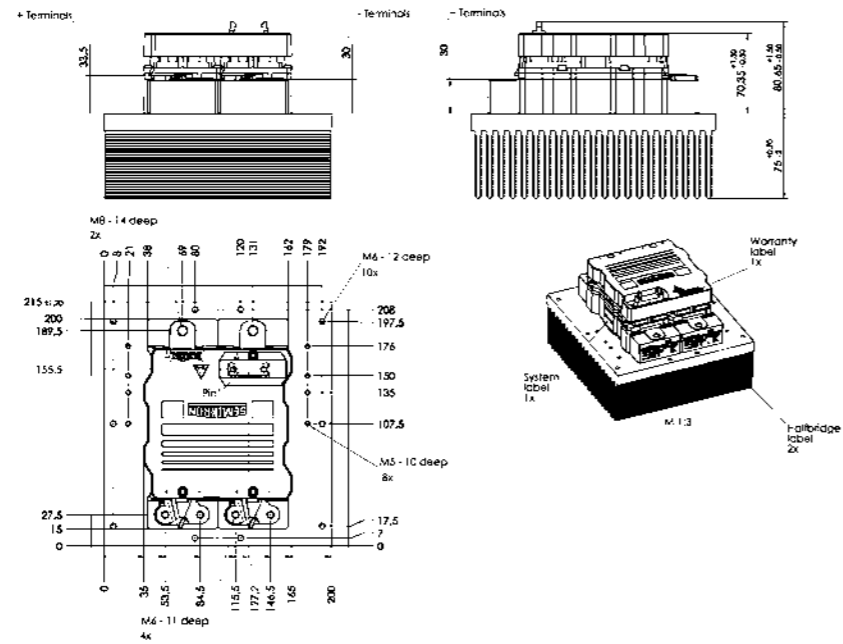
## IPM / SKiiP

Type	IGBT		Diode		Module		Options F=F-Option U=U-Option S=Skiface Adapter	Package	Topology	
	$I_c @ T_s = 25^\circ\text{C}$	$I_{nom}$	$V_{CE(sat)} @ T_j = 25^\circ\text{C typ.}$	$E_{on} + E_{off}$	$I_f @ T_s = 25^\circ\text{C}$	$V_f @ T_j = 25^\circ\text{C typ.}$				$E_{rr}$
	A	A	V	mJ	A	V	mJ			
<b>1700V - IGBT 3 (Trench) - SKiiP3</b>										
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	
<b>1700V - IGBT 4 (Trench) - SKiiP4</b>										
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	

# IPM / SKiIP

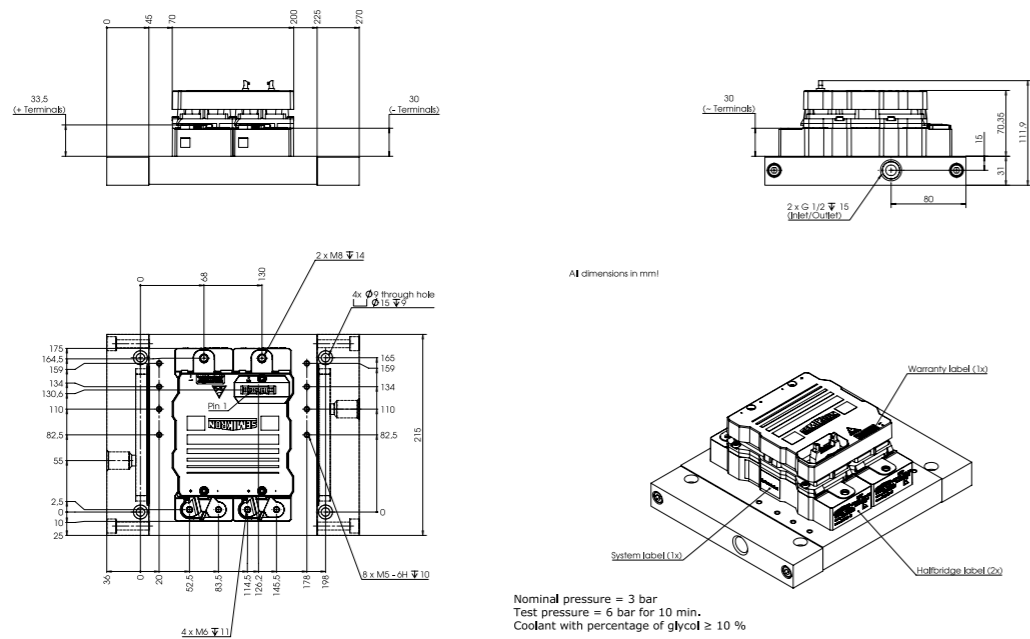
## SKiIP 3

### 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



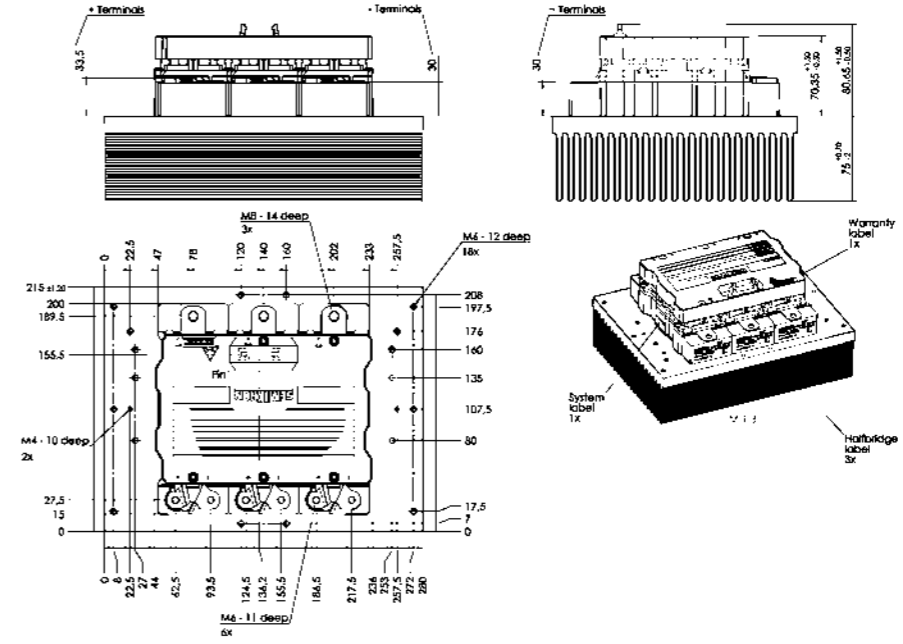
NWK 40: 2,8 kg

Dimensions in mm

# IPM / SKiIP

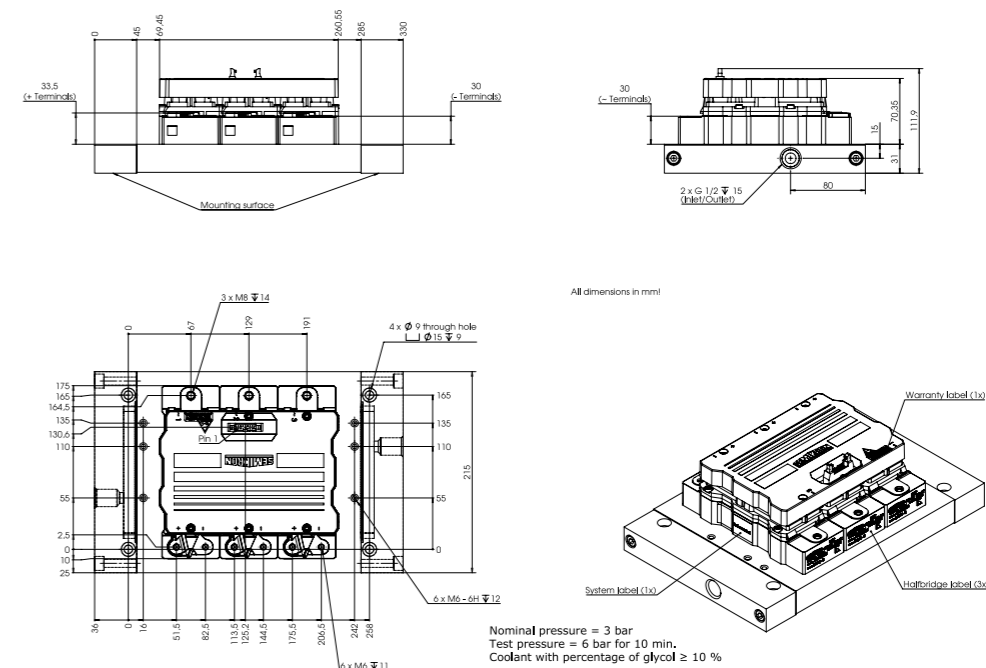
## SKiIP 3

### 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



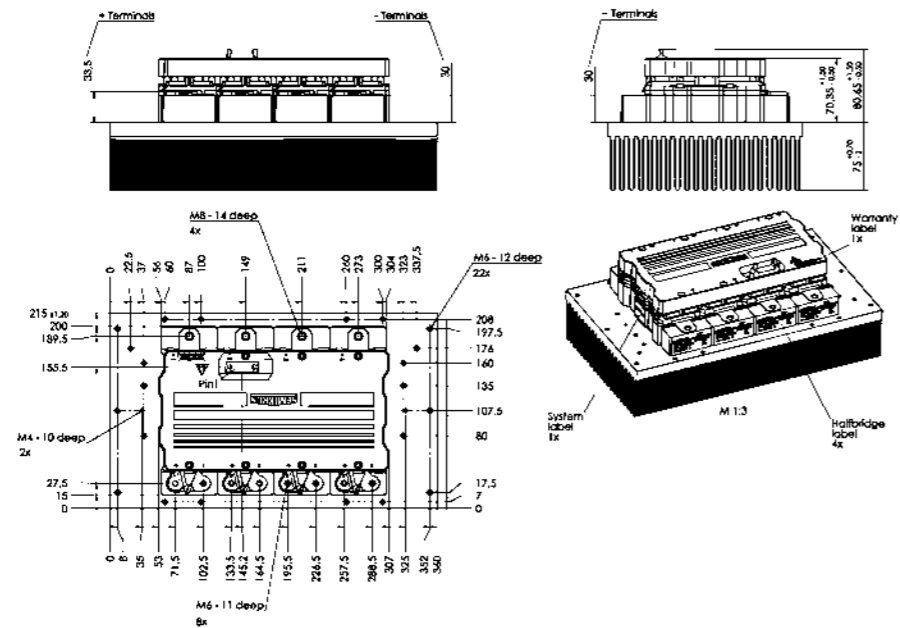
NWK 40: 5,2 kg

Dimensions in mm

# IPM / SKiIP

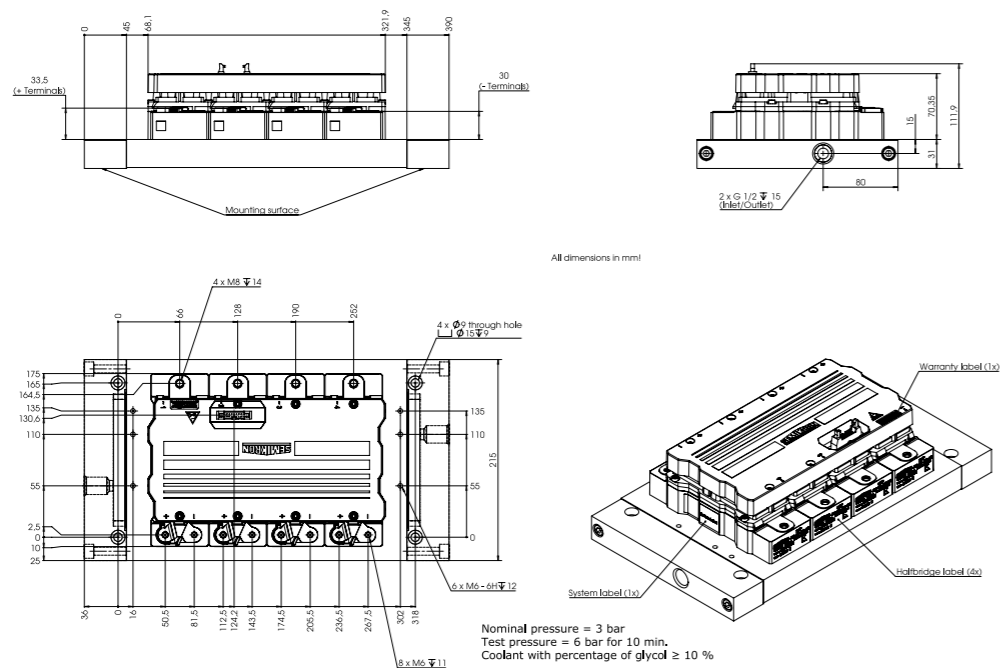
## SKiIP 3

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



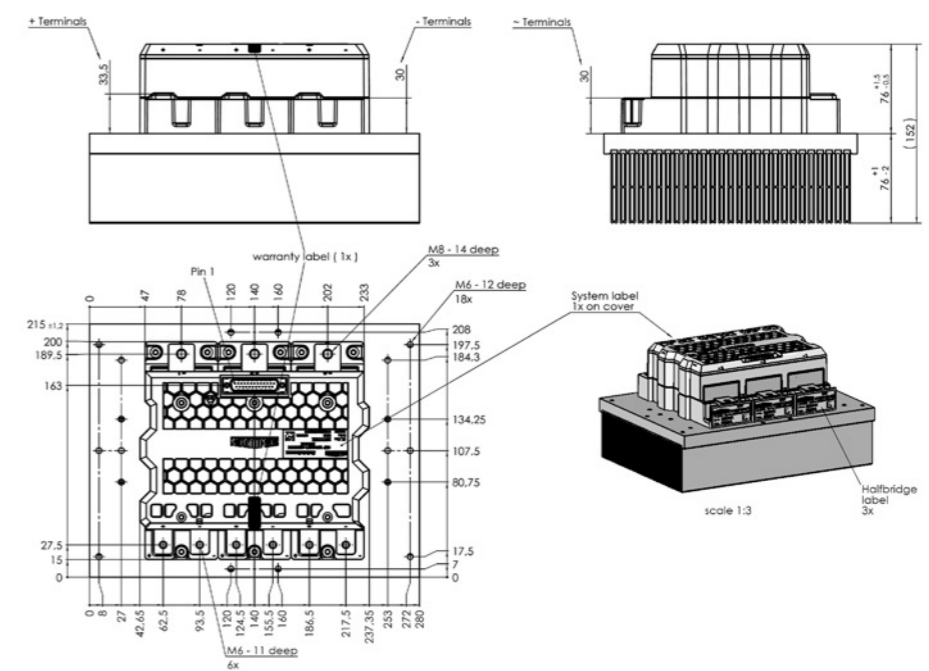
NWK 40: 6,2 kg

Dimensions in mm

# IPM / SKiIP

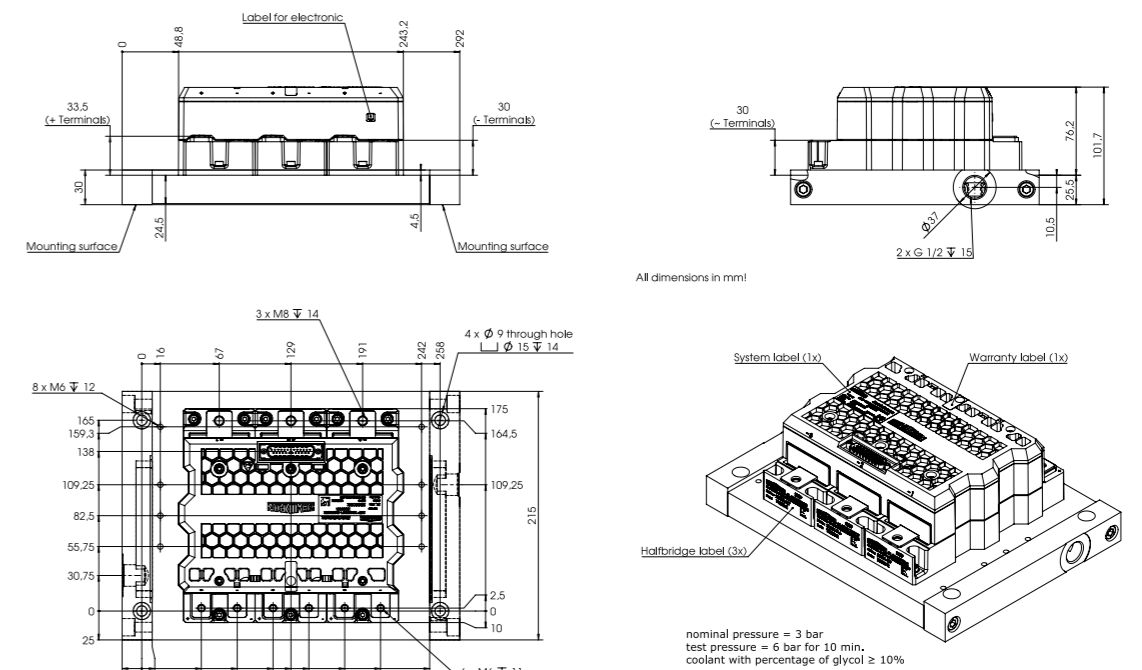
## SKiIP 4

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



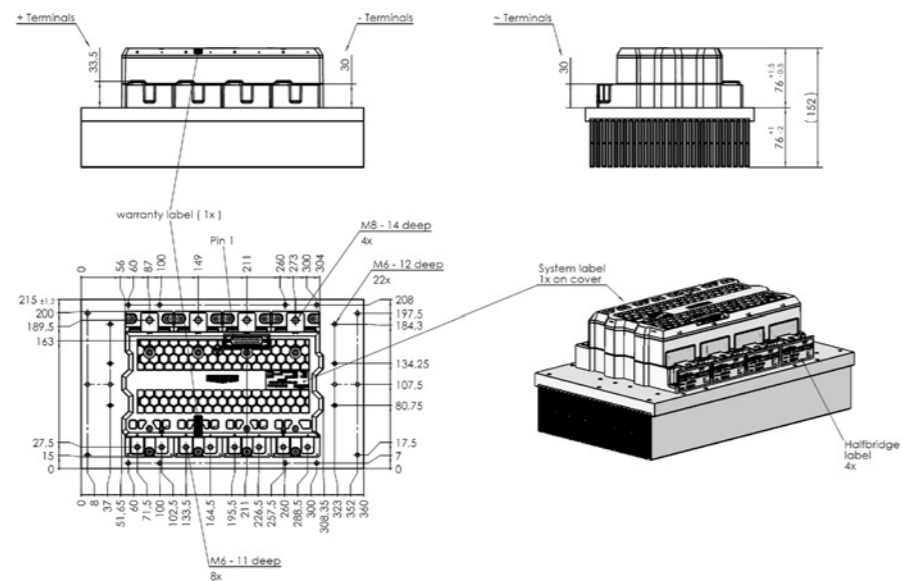
NHC: 3,49 kg

Dimensions in mm

# IPM / SKiIP

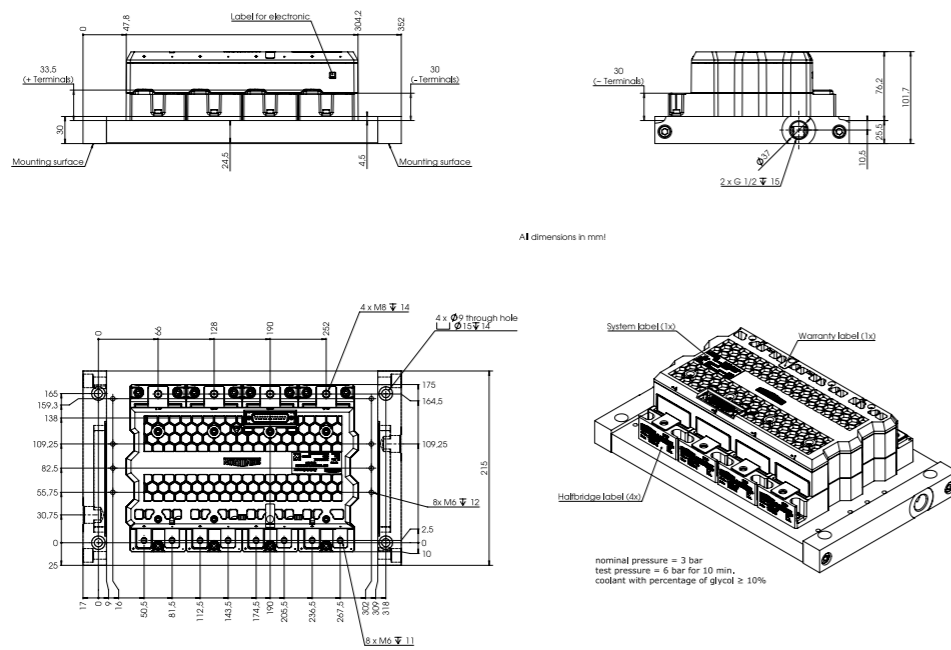
## SKiIP 4

### 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



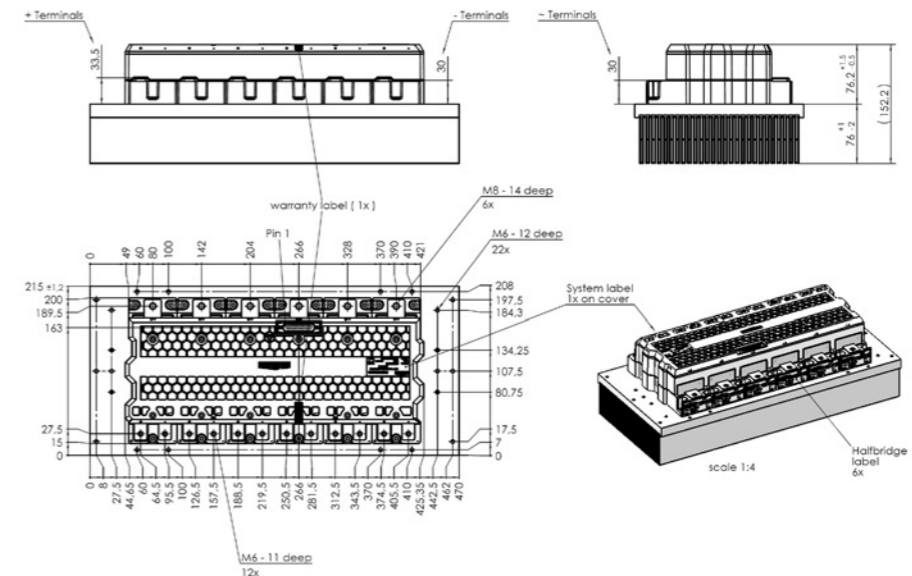
NHC: 4,25 kg

Dimensions in mm

# IPM / SKiIP

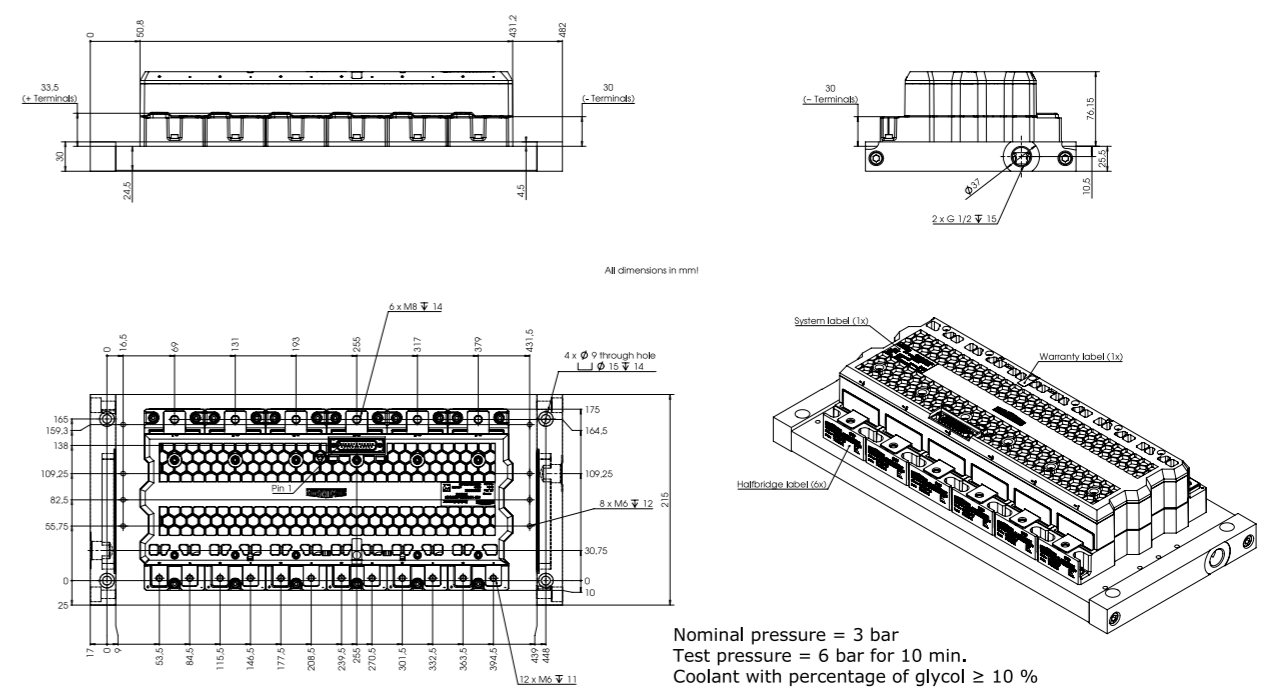
## SKiIP 4

### 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



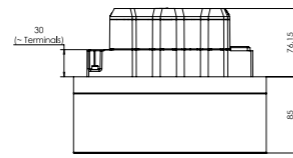
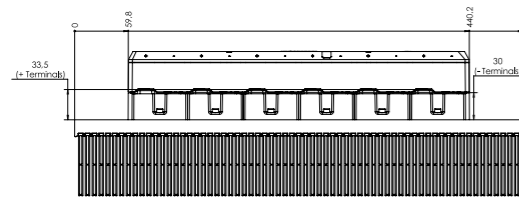
NHC: 5,77 kg

Dimensions in mm

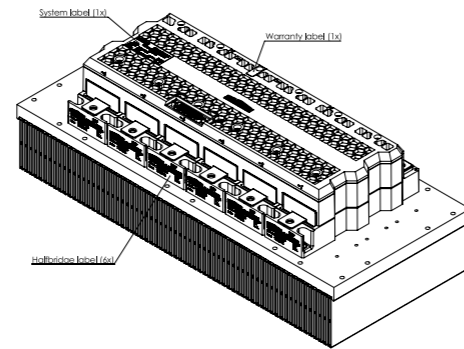
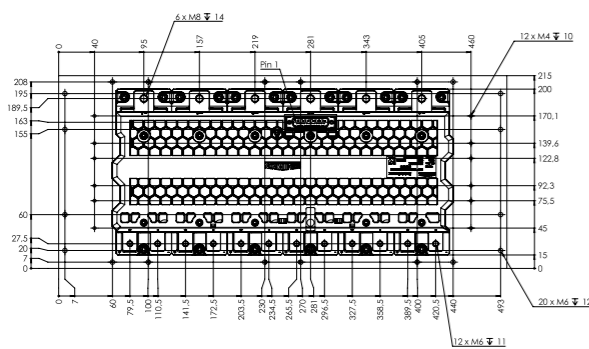
# IPM / SKiiP

## SKiiP 4

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

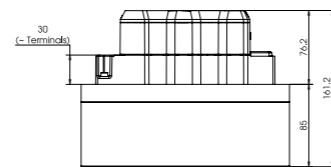
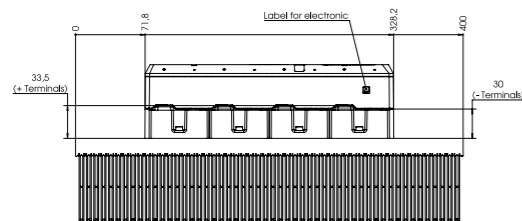


All dimensions in mm!

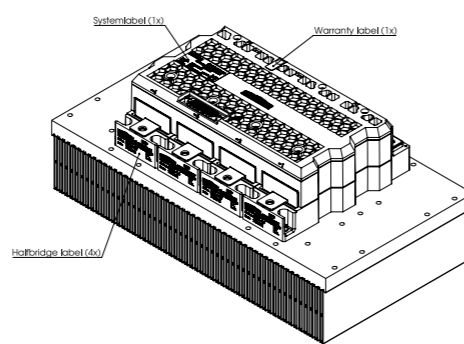
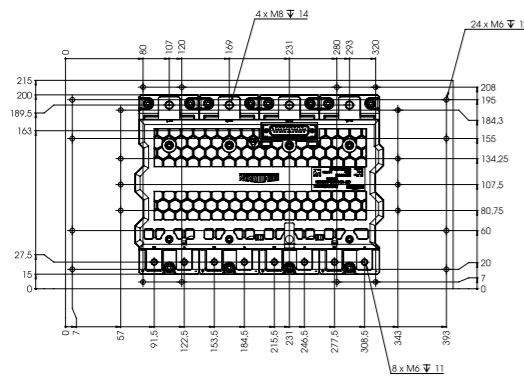


Weight without heat sink: 4,84 kg  
 P4016: 9,9 kg

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

<b>SKiiP3 F-Option</b>	Fiber optic control board for SKiiP3
------------------------	--------------------------------------

### F-Option SKiiP4

<b>SKiiP4 F-Option</b>	Fiber optic control board for SKiiP4
<b>SKiiP4 F-Option with D-Sub connector</b>	Fiber optic control board for SKiiP4

### SKiiP3 Parallel Board

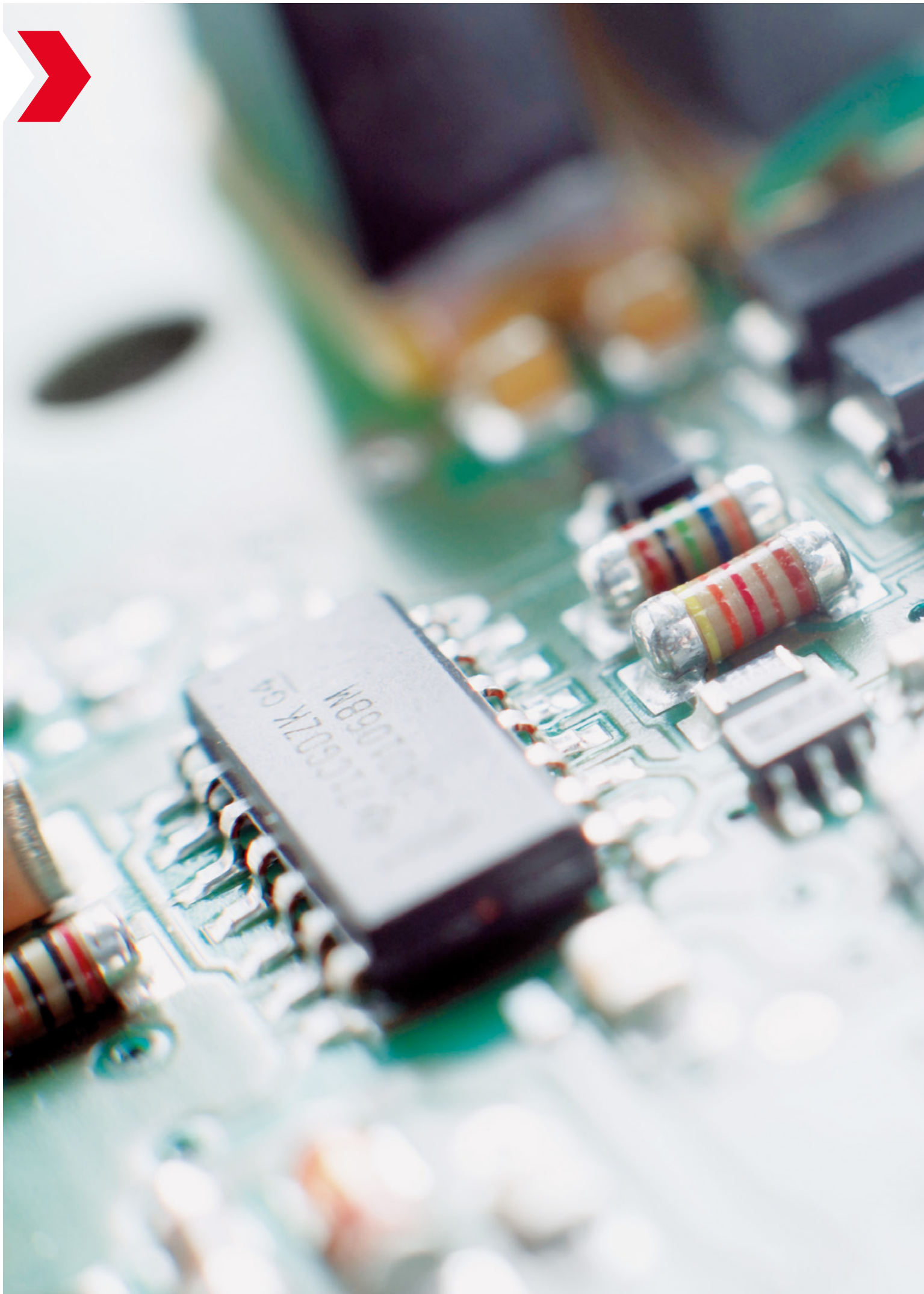
<b>SKiiP3 Parallel Board 4-fold</b>	Board for paralleling of 4 SKiiP3, F-Option usage possible
<b>SKiiP3 Parallel Board 3-fold</b>	Board for paralleling of 3 SKiiP3, F-Option usage possible
<b>SKiiP3 Parallel Board 2-fold</b>	Board for paralleling of 2 SKiiP3, F-Option usage possible

### SKiiP4 Parallel Board

<b>SKiiP4 Parallel Board 4-fold without F-Option</b>	Board for paralleling of 4 SKiiP4, F-Option usage not possible
<b>SKiiP4 Parallel Board 4-fold F-Option</b>	Board for paralleling of 4 SKiiP4, F-Option usage possible
<b>SKiiP4 Parallel Board 3-fold without F-Option</b>	Board for paralleling of 3 SKiiP4, F-Option usage not possible
<b>SKiiP4 Parallel Board 3-fold F-Option</b>	Board for paralleling of 3 SKiiP4, F-Option usage possible
<b>SKiiP4 Parallel Board 2-fold without F-Option</b>	Board for paralleling of 2 SKiiP4, F-Option usage not possible
<b>SKiiP4 Parallel Board 2-fold F-Option</b>	Board for paralleling of 2 SKiiP4, F-Option usage possible

### SKiFace Adapter Board

<b>SKiiP4 SKiFace Adapter UZK</b>	Adapter board to connect SKiiP4 to SKiiP3 controller with DC-Link voltage measurement function
<b>SKiiP4 SKiFace Adapter Temp</b>	Adapter board to connect SKiiP4 to SKiiP3 controller with temperatur measurement function



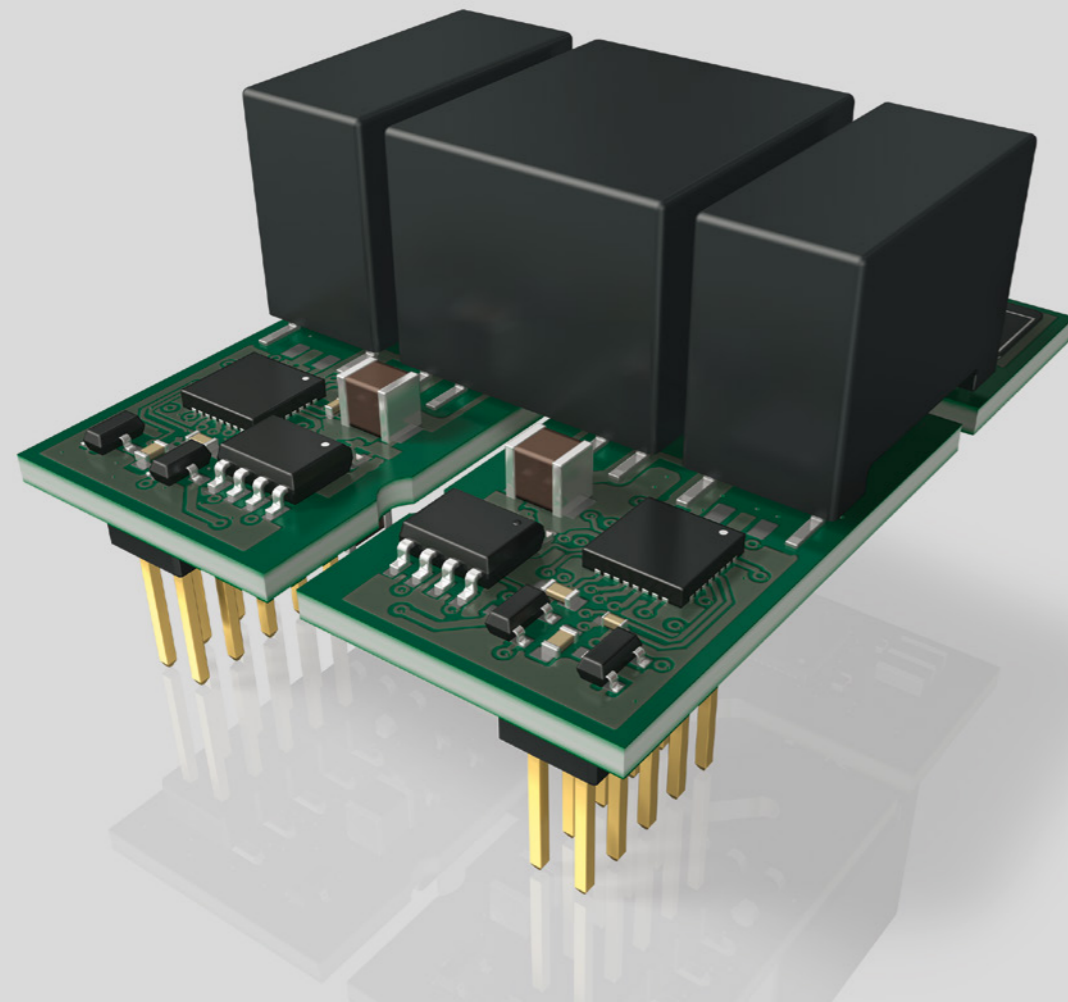
# IGBT Drivers

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SKYPER 156

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7

## Driver Cores Plug & Play Drivers Adapter Boards



## Drives 3 Times Longer

# SKYPER®

### Short facts

MTBF rate of  $5 \times 10^6$  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](http://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.

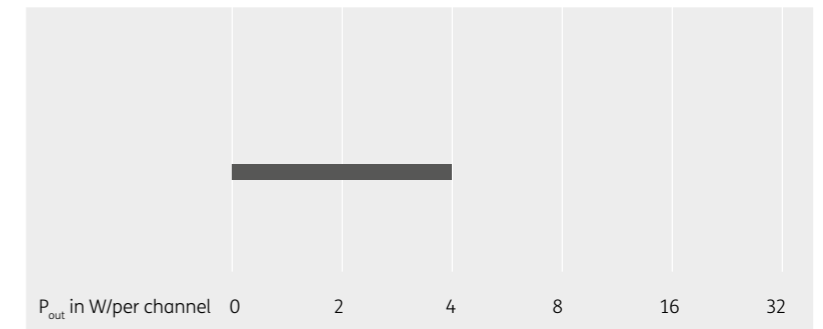
The latest highlights are the SKYPER 12 driver core and the plug & play driver SKYPER Prime that features electrical and optical interfaces. SKYPER 12 PV R is the latest driver core which delivers 20A output peak current and allows for operation at 1500VDC in an unrivalled compact design. Its features and the robustness makes it perfect for 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

#### Driver Cores

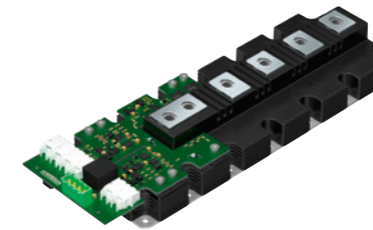


Up to 1700V

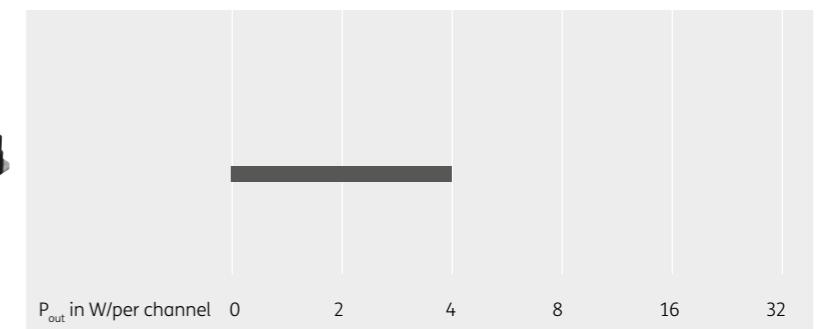


### SKYPER®

#### Plug & Play Driver

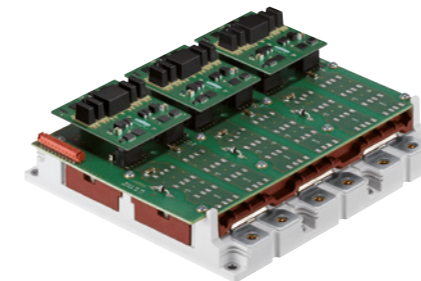


600V up to 1700V

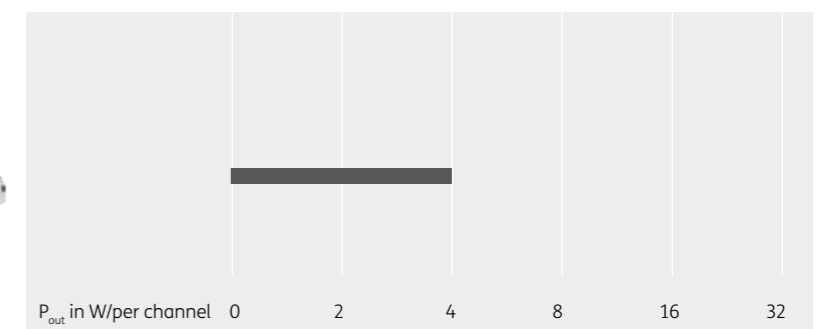


### SKYPER® & SKHI

#### Adapter Boards



Up to 1700V





# IGBT Driver

Type	Channels	V <sub>CE</sub> V	V <sub>CE(ON)</sub> V	V <sub>CE(EFF)</sub> V	I <sub>OUTPEAK</sub> A	Q <sub>OUT/pulse</sub> μC	f <sub>max</sub> kHz	VisolIO kV	dv/dt kV/μs
<b>Driver</b>									
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 <sup>7)</sup>	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 <sup>2)</sup>	2	1700	15	-8	15	10	10	5000	50
SKYPER PRIME 1000A / 1700V ST10 <sup>2)</sup>	2	1700	15	-8	15	7	10	5000	50
SKYPER PRIME 1400A / 1700V PP <sup>2)</sup>	2	1700	15	-8	15	13.5	7	5000	50
SKYPER PRIME 1400A / 1700V ST10 <sup>2)</sup>	2	1700	15	-8	15	10	10	5000	50
SKYPER PRIME 1400A / 1200V PP <sup>2)</sup>	2	1200	15	-8	15	10	10	5000	50
SKYPER PRIME 1400A / 1200V ST10 <sup>2)</sup>	2	1200	15	-8	15	7.5	10	5000	50
SKYPER PRIME O 1400A / 1200V PP <sup>2)</sup>	2	1200	15	-8	15	10	10	5000	50
SKYPER PRIME O 1400A / 1200V ST10 <sup>2)</sup>	2	1200	15	-8	15	7.5	10	5000	50
SKYPER PRIME O 1400A / 1700V PP <sup>2)</sup>	2	1700	15	-8	15	13.5	7.4	5000	50
SKYPER PRIME O 1400A / 1700V ST10 <sup>2)</sup>	2	1700	15	-8	15	10	10	5000	50
<b>Driver Core</b>									
SKHI 21A R <sup>8)</sup>	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 <sup>4)</sup>	6	900	15	-7	2	1	50	2500	15
SKHI 71 R <sup>4)</sup>	7	900	15	-7	2	1	50	2500	15
SKYPER 12 R <sup>2)</sup>	2	1700	15	-9	20	20	100	5000	50
SKYPER 12 PV R <sup>2)</sup>	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/O2 (coated) <sup>2)</sup>	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) <sup>2)</sup>	2	1700	14.8	-8	24	20	100	4000	100
<b>Adapter Board</b>									
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 <sup>2)</sup>	2	1700	15	-8	30	50	100	4000	100

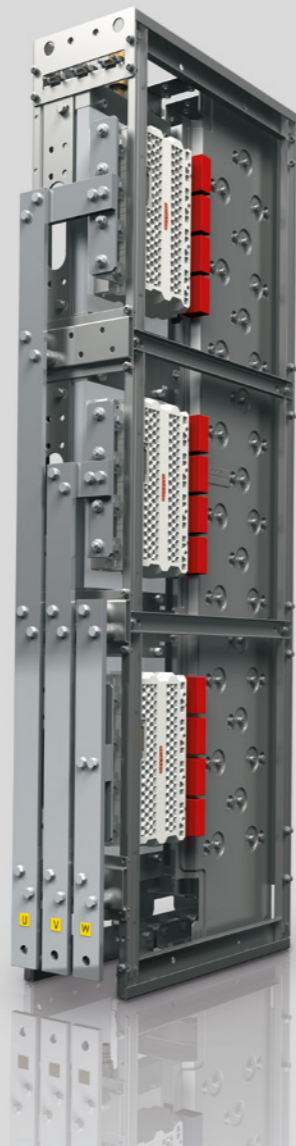
Footnotes: 2) In production new / 4) Discontinued / 7) Thyristor Driver / 8) MOSFET Driver



# Stacks

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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 1400A<sub>RMS</sub>

DC bus voltage of up to 1250V<sub>DC</sub>

Inverter output voltage of up to 690V<sub>AC</sub>

DC bus polypropylene capacitor bank lifetime rates at 100,000 hours at 40°C

Analogue measurements for  $T_{\text{heatsink}}$ ,  $V_{\text{bus}}$ ,  $I_{\text{out}}$

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 900V<sub>DC</sub>. 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.

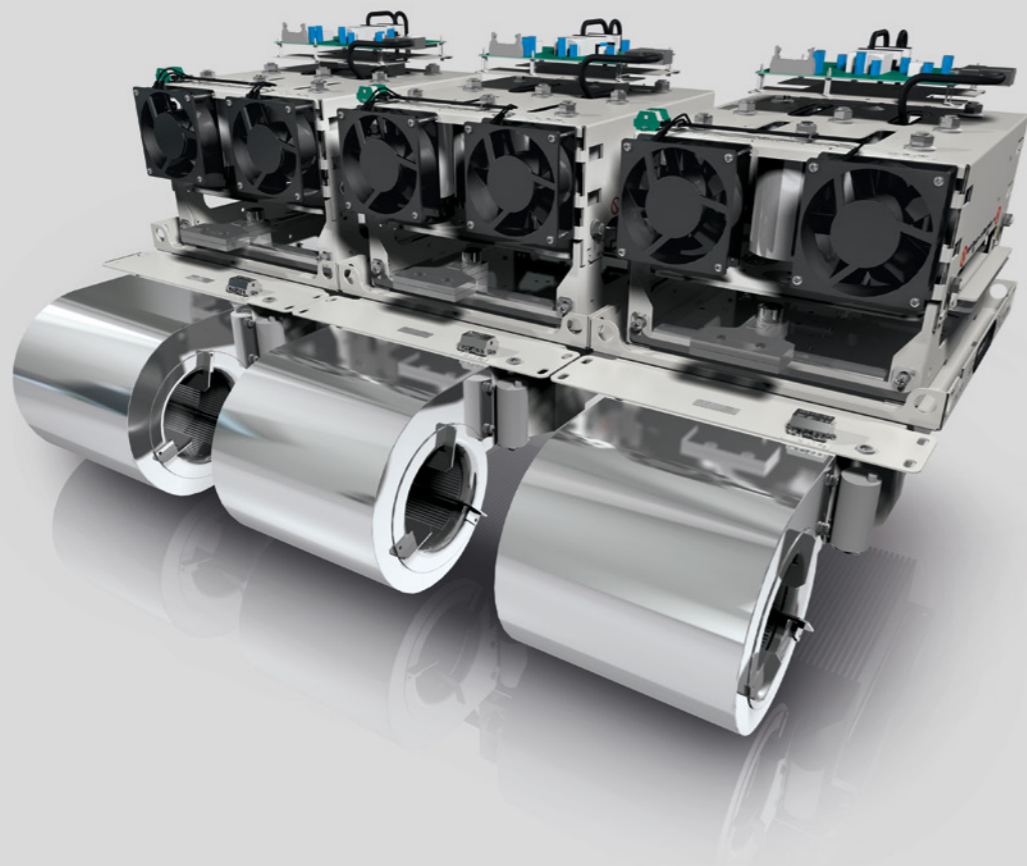
### Product range

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 1400A<sub>RMS</sub>. 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 900A<sub>RMS</sub>. 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](http://www.semikron.com/water-cooled-igbt-stacks)



SEMIKUBE®  
SEMIKUBE® SlimLine  
SEMIKUBE® 1500V



AC | DC



## 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 690V<sub>Ac</sub>

Current measurement accuracy <1%

Analogue measurements or CAN monitoring for  $T_{\text{heatsink}}$ ,  $V_{\text{bus}}$ ,  $I_{\text{out}}$

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 1500V<sub>DC</sub> 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.

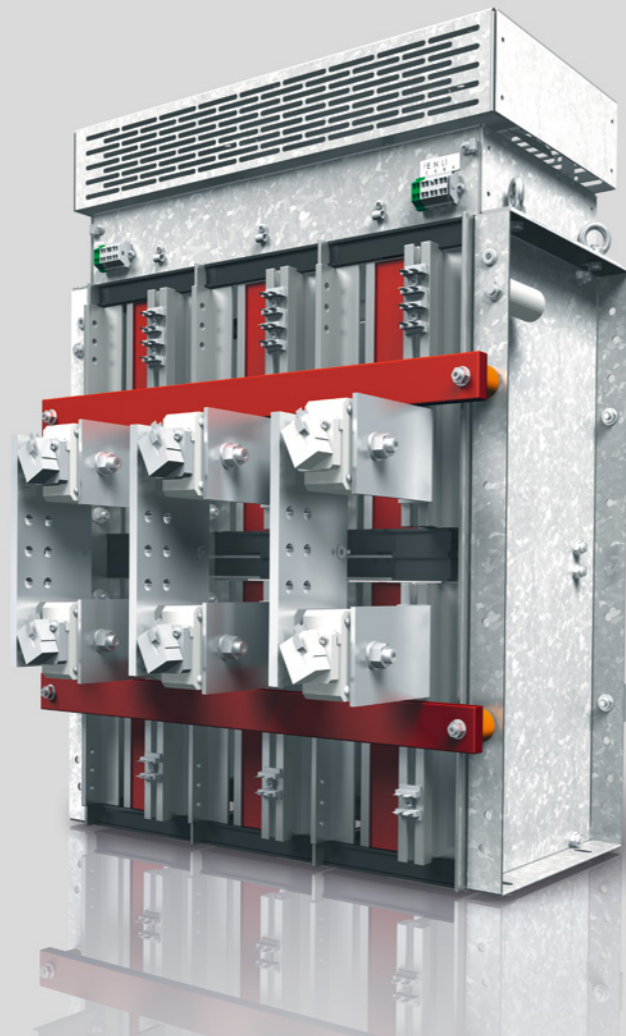
### Product range

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](http://www.semikron.com/air-cooled-igbt-stacks)



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 500V<sub>AC</sub>  
DC bus voltage of up to 670V<sub>DC</sub>  
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.

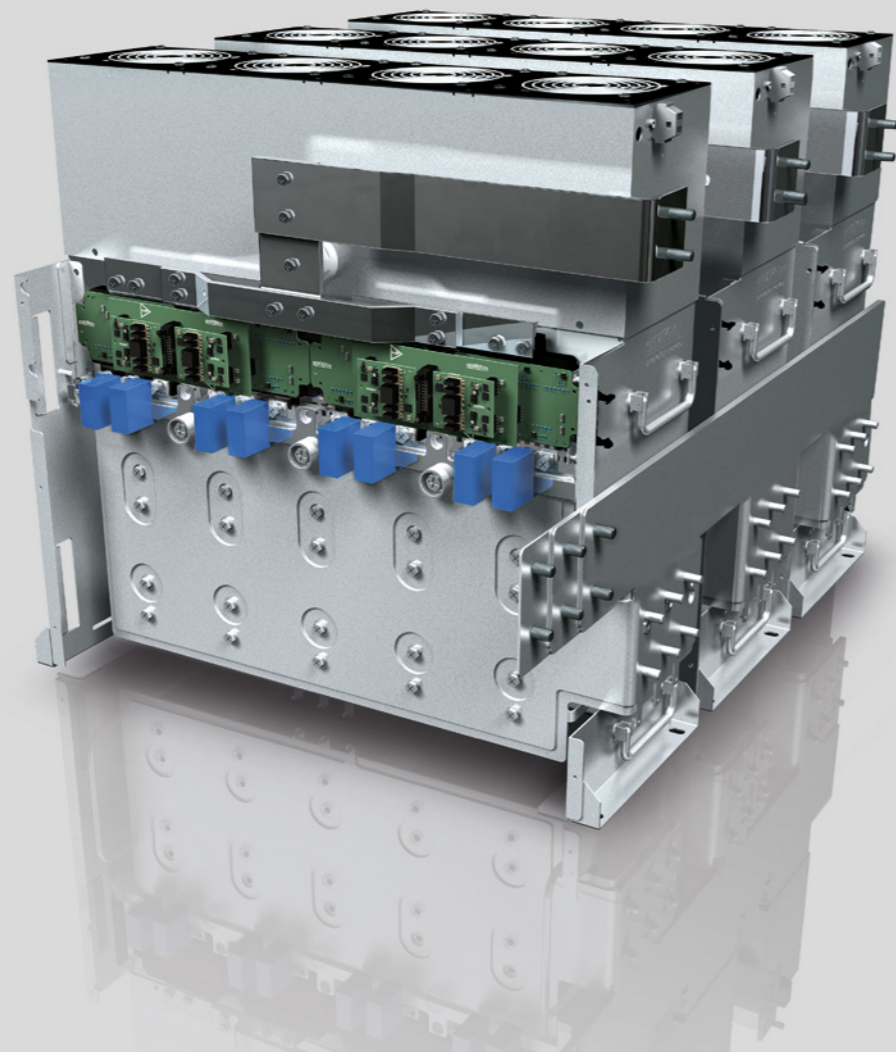
### Product range

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](http://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.



# 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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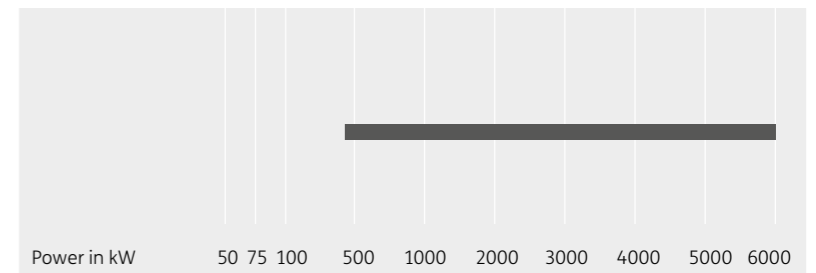
For detailed information please refer to data sheets.

Further information: [www.semikron.com/stacks](http://www.semikron.com/stacks)

## Water-cooled IGBT

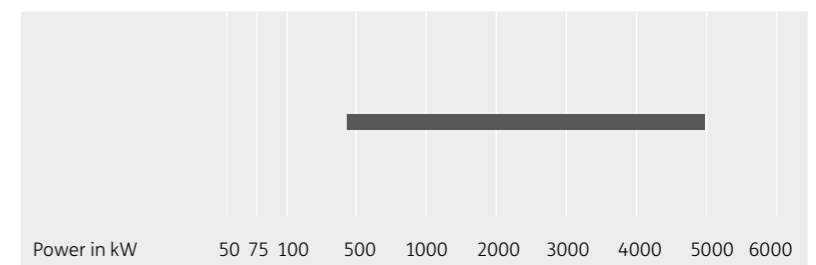
### SEMISTACK® RE

- Synchronous wind generators
- Double-fed wind generators
- Solar inverters



### SKiiPRACK®

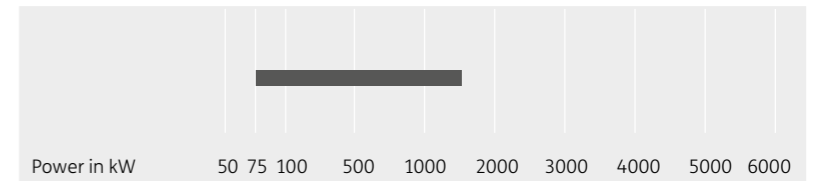
- Synchronous wind generators
- Double-fed wind generators
- High power AC drives



## Air-cooled IGBT

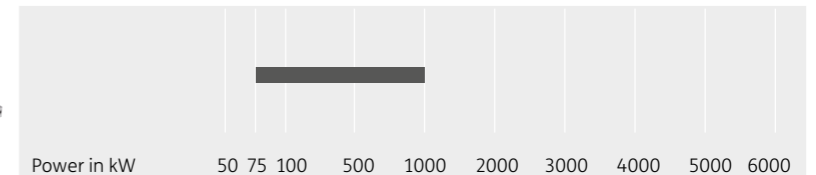
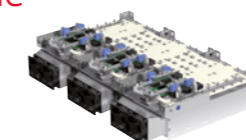
### SEMIKUBE®

- Solar inverters
- Pump and compressor drives



### SEMIKUBE® SlimLine

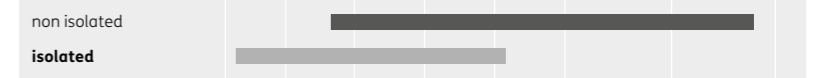
- Solar inverters
- AC drives and servos



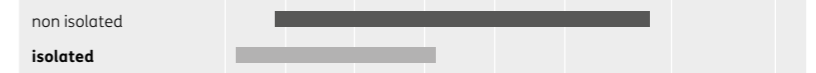
## Diode/Thyristor

### SEMISTACK® CLASSICS

- B6U**  
3-phase uncontrolled rectifier



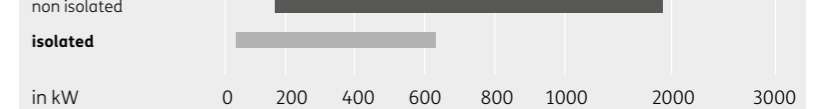
- B6HK**  
3-phase half controlled rectifier



- B6C**  
3-phase fully controlled rectifier



- W3C**  
3-phase reverse parallel thyristor converter



# Stacks / SEMISTACK RE

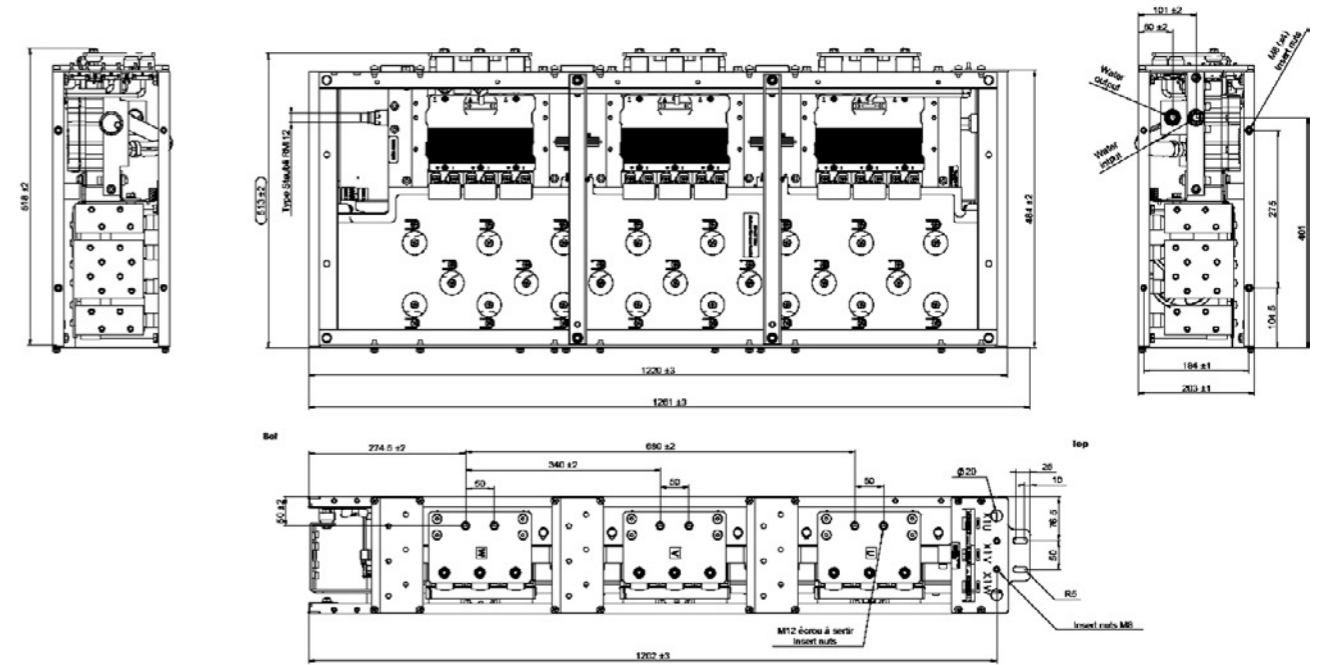
Type

	V <sub>Ac</sub> V	V <sub>Dc</sub> V	Current A	Component Family	Cooling	Heatsink profile	Isolated	Topology
<b>4-Quadrant converter</b>								
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	
<b>3-phase inverter</b>								
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	

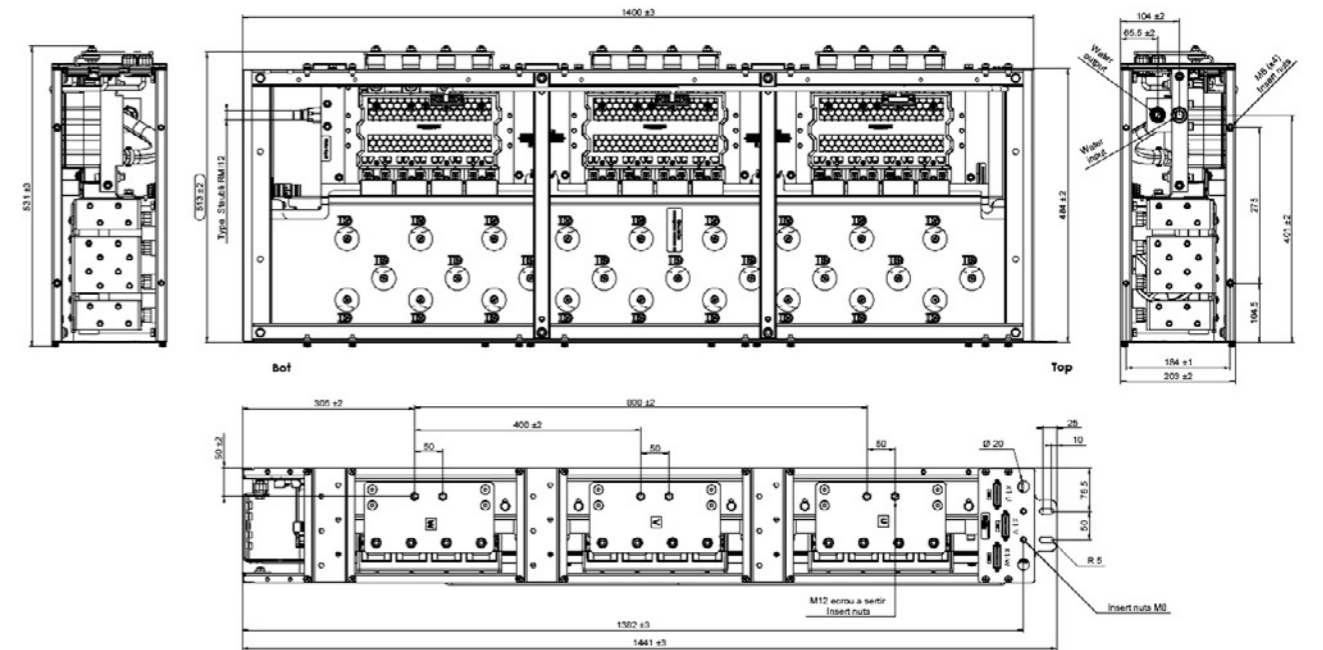
# Stacks / SEMISTACK RE

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

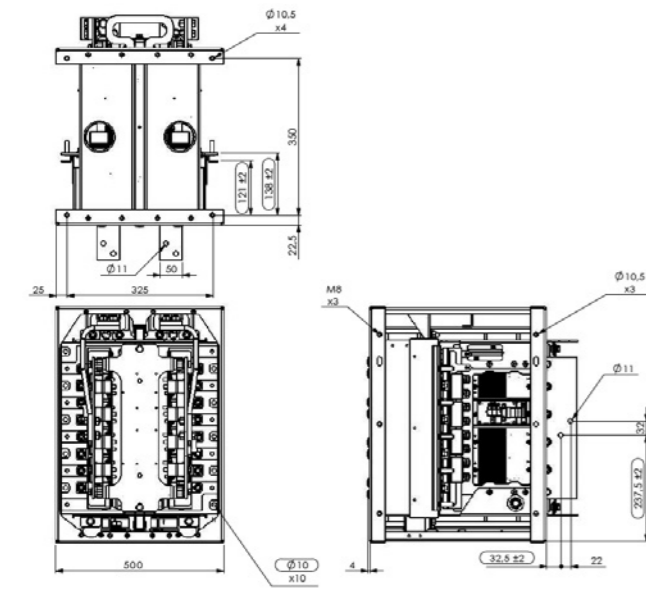


# Stacks / SKiiPRACK

Type	V <sub>Ac</sub> V	V <sub>Dc</sub> V	Current A	Component Family	Cooling	Heatsink profile	Isolated	Topology
<b>4-Quadrant converter</b>								
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



Dimensions in mm

3-Cell vertical integration



# Stacks / SEMIKUBE

Type	V <sub>Ac</sub> V	V <sub>Dc</sub> V	Current A	Component Family	Cooling	Heatsink profile	Isolated	Topology
<b>3-phase inverter</b>								
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 <sup>2)</sup>	690	1250	1300	SEMITRANS	Forced-air cooled	PX 308	yes	

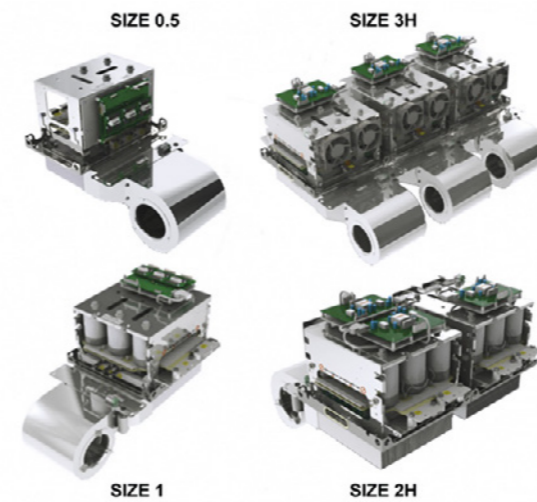
**3-phase rectifier and inverter**

IGDD6-1-326-D1616-E1N6-DL-FA	460	750	150	SEMITRANS/SEMI-PAK	Forced-air cooled	PX 308	yes	
IGDD6-1-426-D1616-E1N6-DL-FA	460	750	180	SEMITRANS/SEMI-PAK	Forced-air cooled	PX 308	yes	
IGDD6-2-326-D1616-E1F12-DH-FA	460	750	280	SEMITRANS/SEMI-PAK	Forced-air cooled	PX 308	yes	
IGDD6-2-426-D1616-E1F12-DH-FA	460	750	330	SEMITRANS/SEMI-PAK	Forced-air cooled	PX 308	yes	
IGDD6-4-326-D3816-E1F12-BL-FA	460	750	570	SEMITRANS/SEMI-PAK	Forced-air cooled	PX 308	yes	
IGDD6-4-426-D3816-E1F12-BL-FA	460	750	680	SEMITRANS/SEMI-PAK	Forced-air cooled	PX 308	yes	

Footnotes: 2) In production new

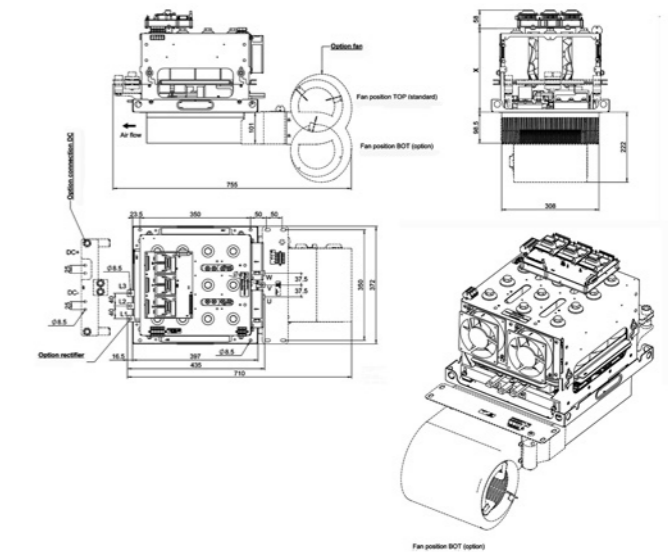
**Packages**

Frames



Dimensions in mm

Size 1



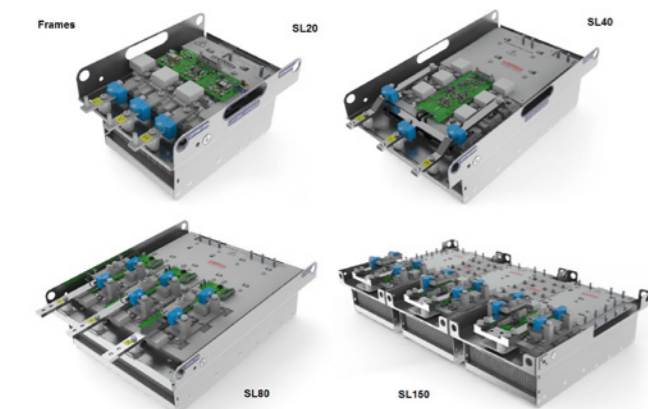
# Stacks / SEMIKUBE SlimLine

Type	V <sub>Ac</sub> V	V <sub>Dc</sub> V	Current A	Component Family	Cooling	Frame	Isolated	Topology
<b>3-phase inverter</b>								
SKS SL 20 GD 50/10 - E4 P1 G <sup>2)</sup>	500	1000	230	SEMITRANS	Forced-air cooled	SL20	-	
SKS SL 40 GD 50/10 - E4 P1 G <sup>2)</sup>	500	1000	440	SEMITRANS	Forced-air cooled	SL40	-	
SKS SL 80 GD 50/10 - E4 P1 G <sup>2)</sup>	500	1000	750	SEMITRANS	Forced-air cooled	SL80	-	
SKS SL 150 GD 50/10 - E4 P1 G <sup>2)</sup>	500	1000	1500	SEMITRANS	Forced-air cooled	SL150	-	
SKS SL 20 GD 50/10 - E4 P1 AF <sup>2)</sup>	500	1000	230	SEMITRANS	Forced-air cooled	SL20	-	
SKS SL 40 GD 50/10 - E4 P1 AF <sup>2)</sup>	500	1000	440	SEMITRANS	Forced-air cooled	SL40	-	
SKS SL 80 GD 50/10 - E4 P1 AF <sup>2)</sup>	500	1000	750	SEMITRANS	Forced-air cooled	SL80	-	
SKS SL 150 GD 50/10 - E4 P1 AF <sup>2)</sup>	500	1000	1500	SEMITRANS	Forced-air cooled	SL150	-	

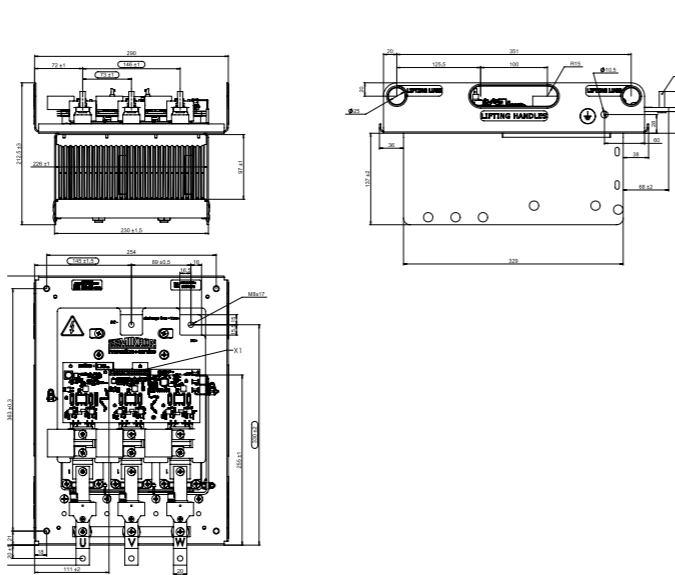
Footnotes: 2) In production new

## Packages

### Semikube SlimLine



### SL 20



Dimensions in mm

# Stacks / SEMISTACK CLASSICS

Type	V <sub>Ac</sub> V	V <sub>Dc</sub> V	DC Current A	Component Family	Cooling	Heatsink profile	Isolated	Topology
<b>3-phase fully-controlled thyristor bridge rectifier</b>								
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 <sup>2)</sup>	500	670	2580	Capsules	Forced-air cooled	Z5/120	no	
SKSE 2580F B6C 1730 V16 ZU <sup>2)</sup>	500	670	2580	Capsules	Forced-air cooled	Z5/120	no	
SKSE 1890F B6C 1270 V16 ZU <sup>2)</sup>	500	670	1890	Capsules	Forced-air cooled	Z5/90	no	
SKSE 1890F B6C 1270 V16 <sup>2)</sup>	500	670	1890	Capsules	Forced-air cooled	Z5/90	no	
SKSE 1500F B6C 1010 V16 SU <sup>2)</sup>	500	670	1500	Capsules	Forced-air cooled	Z5/60	no	
SKSE 1500F B6C 1010 V16 <sup>2)</sup>	500	670	1500	Capsules	Forced-air cooled	Z5/60	no	
SKSE 1200F B6C 800 V16 SU <sup>2)</sup>	500	670	1200	Capsules	Forced-air cooled	Z5/60	no	
SKSE 1200F B6C 800 V16 <sup>2)</sup>	500	670	1200	Capsules	Forced-air cooled	Z5/60	no	
<b>3-phase half-controlled bridge rectifier</b>								
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 <sub>Ac</sub>	V <sub>Dc</sub>	DC Current	Component Family	Cooling	Heatsink profile	Isolated	Topology
	V	V	A					
<b>3-phase half-controlled bridge rectifier</b>								
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	
<b>3-phase uncontrolled bridge rectifier</b>								
SKS 91N B6U 60 V16	500	670	91	SEMIPACK 1	Natural cooled	P3/180	yes	
SKS 91N B6U 60 V16 SU	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 <sup>2)</sup>	500	670	2300	Capsules	Forced-air cooled	Z5/120	no	
SKSE 2300F B6U 1540 V16 <sup>2)</sup>	500	670	2300	Capsules	Forced-air cooled	Z5/120	no	
SKSE 1950F B6U 1305 V16 ZU <sup>2)</sup>	500	670	1950	Capsules	Forced-air cooled	Z5/90	no	
SKSE 1950F B6U 1305 V16 <sup>2)</sup>	500	670	1950	Capsules	Forced-air cooled	Z5/90	no	

Footnotes: <sup>2)</sup> In production new

# Stacks / SEMISTACK CLASSICS

Type

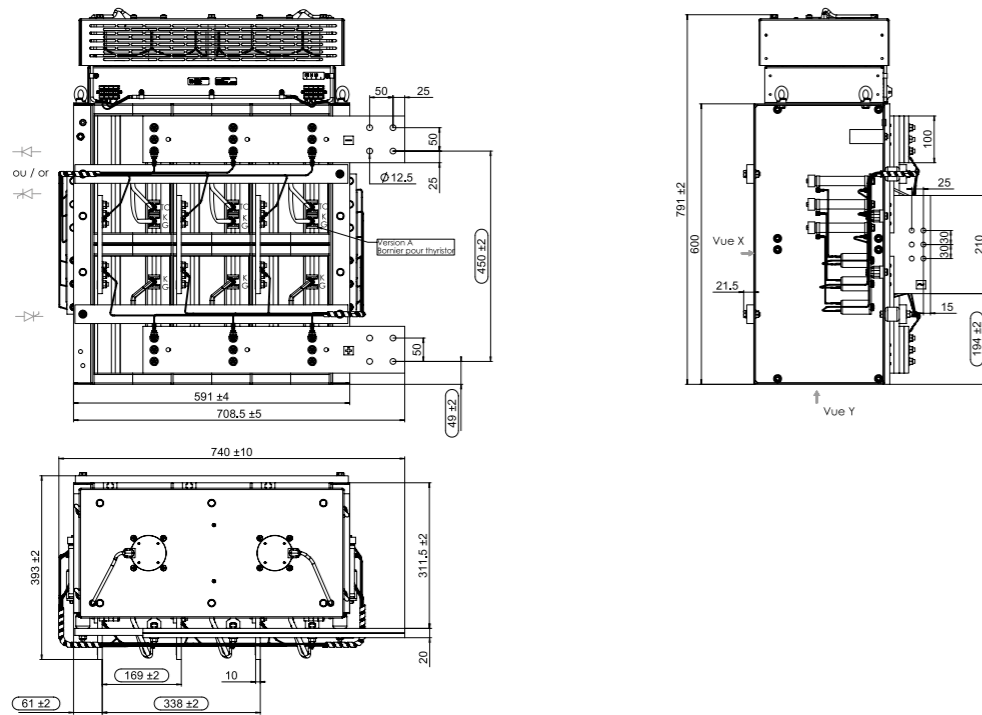
	V <sub>Ac</sub>	V <sub>Dc</sub>	DC Current	Component Family	Cooling	Heatsink profile	Isolated	Topology
	V	V	A					
<b>3-phase reverse parallel thyristor converter</b>								
SKS 67N W3C 60 V16	500	-	67	SEMIPACK 1	Natural cooled	P3/180	yes	
SKS 67N W3C 60 V16 SU	500	-	67	SEMIPACK 1	Natural cooled	P3/180	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: <sup>2)</sup> In production new

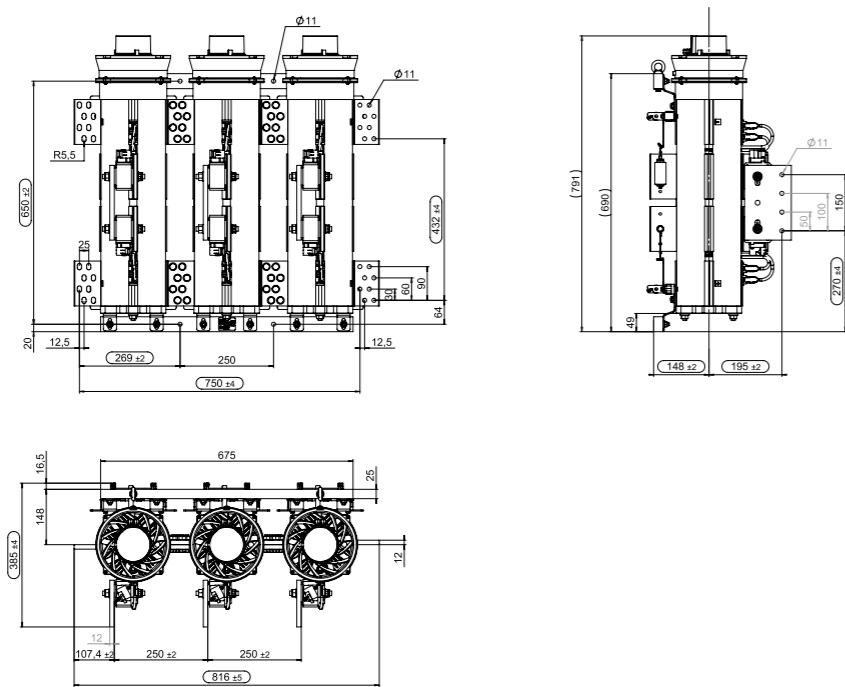
# Stacks / SEMISTACK CLASSICS

Packages

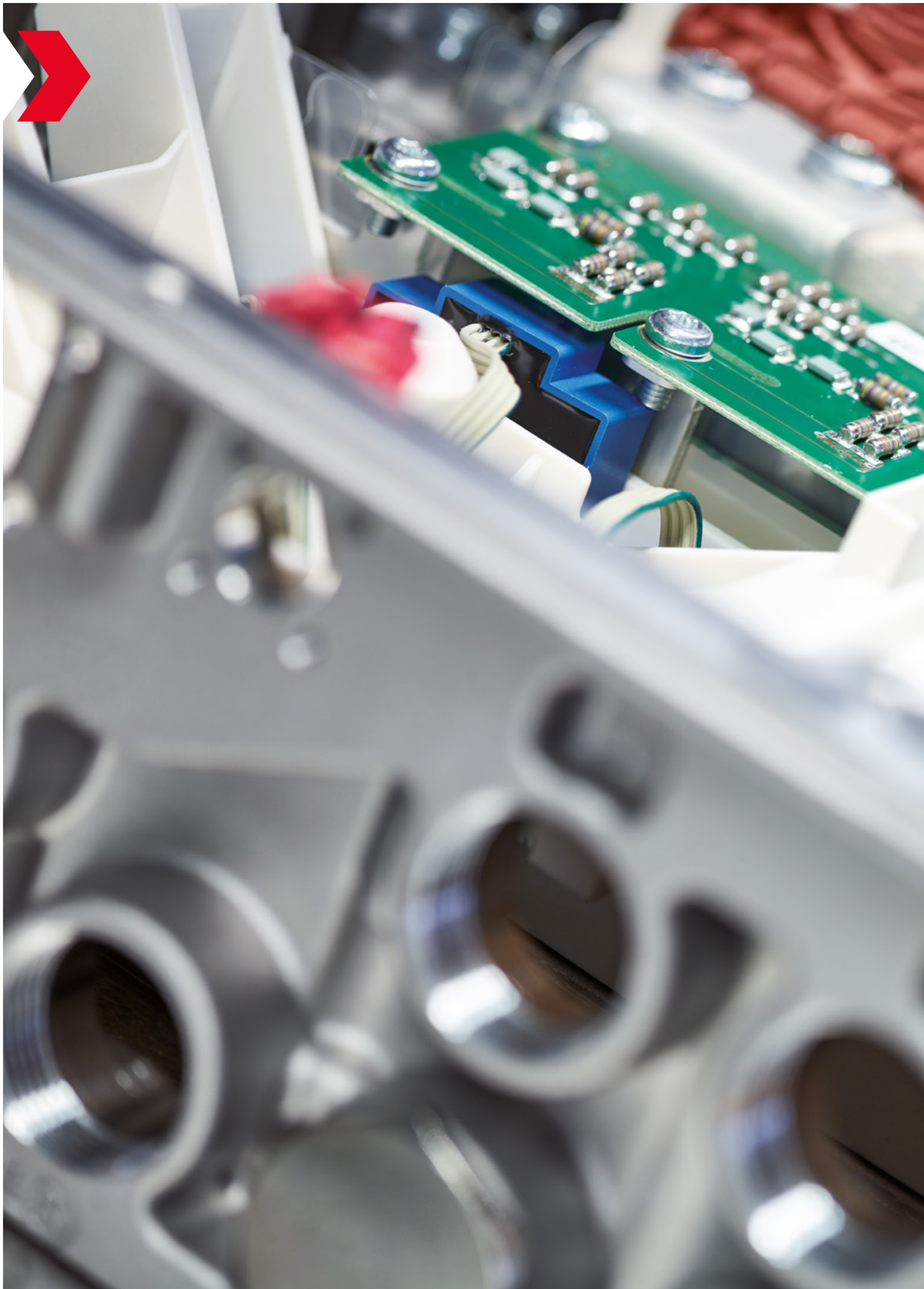
SKS



SKSE



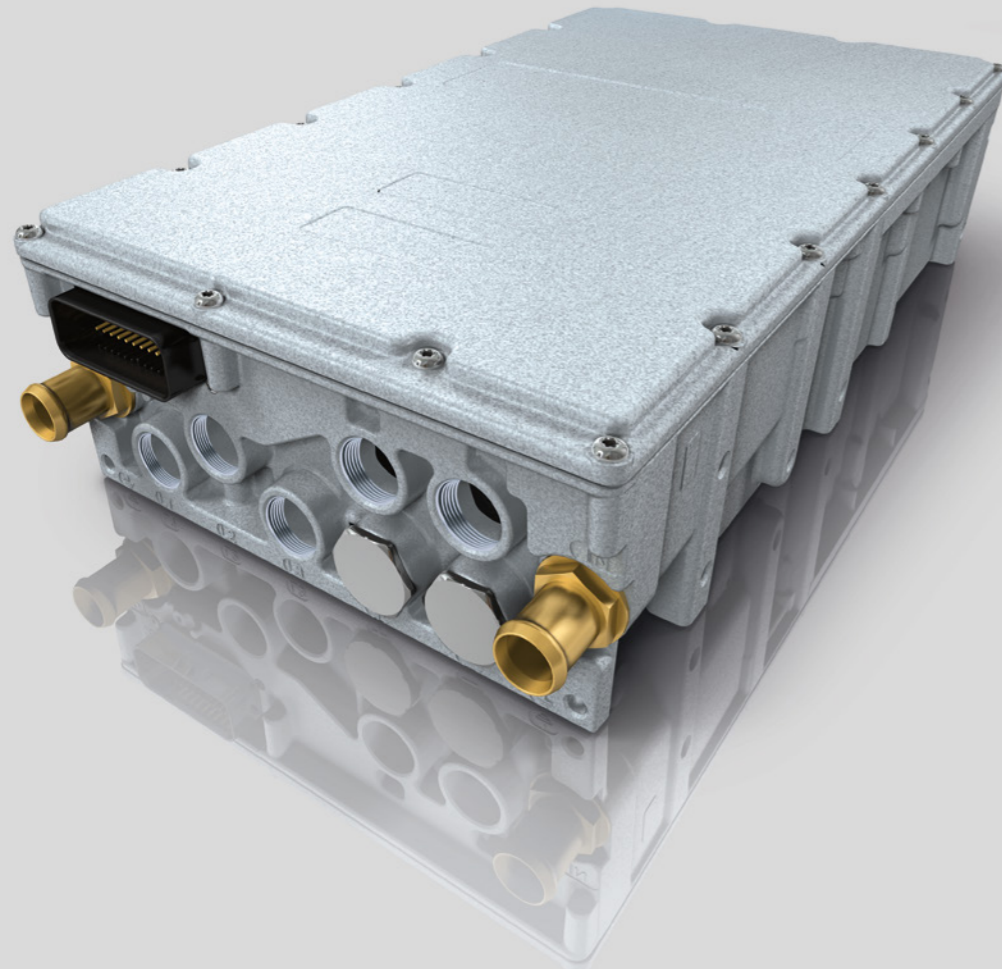
Dimensions in mm



# Systems

	PAGE
SKAI <sup>®</sup> 2 HV	188
SKAI <sup>®</sup> 3 LV	188

SKAI® 2 HV  
SKAI® 3 LV



## 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 base-plate. Various optional services also exist, 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](http://www.semikron.com/skai)



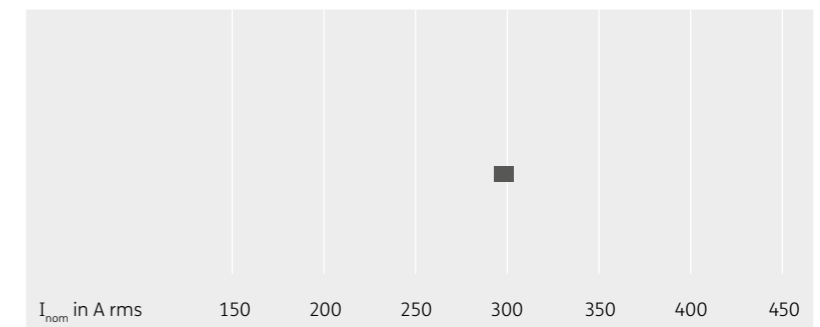
## Systems – Ultra Compact Power Electronics System for Utility Vehicles

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.

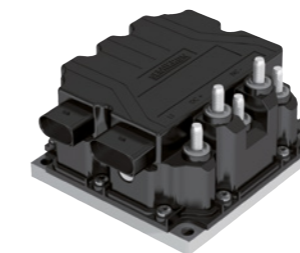
### SKAI®2 HV IGBT Motor Controller



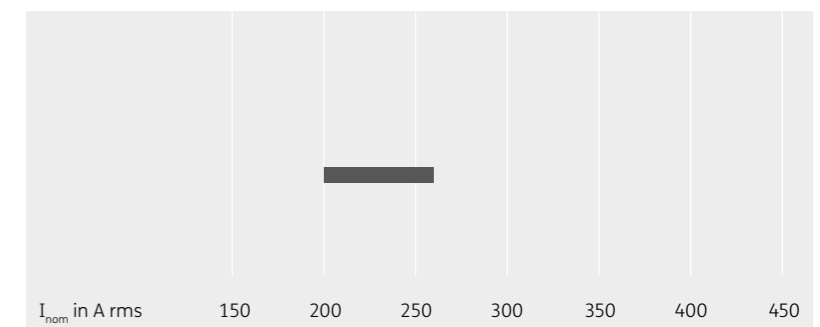
**115V up to 800V**



### SKAI®3 LV MOSFET Sixpack Stack



**24V up to 115V**



# Systems / SKAI

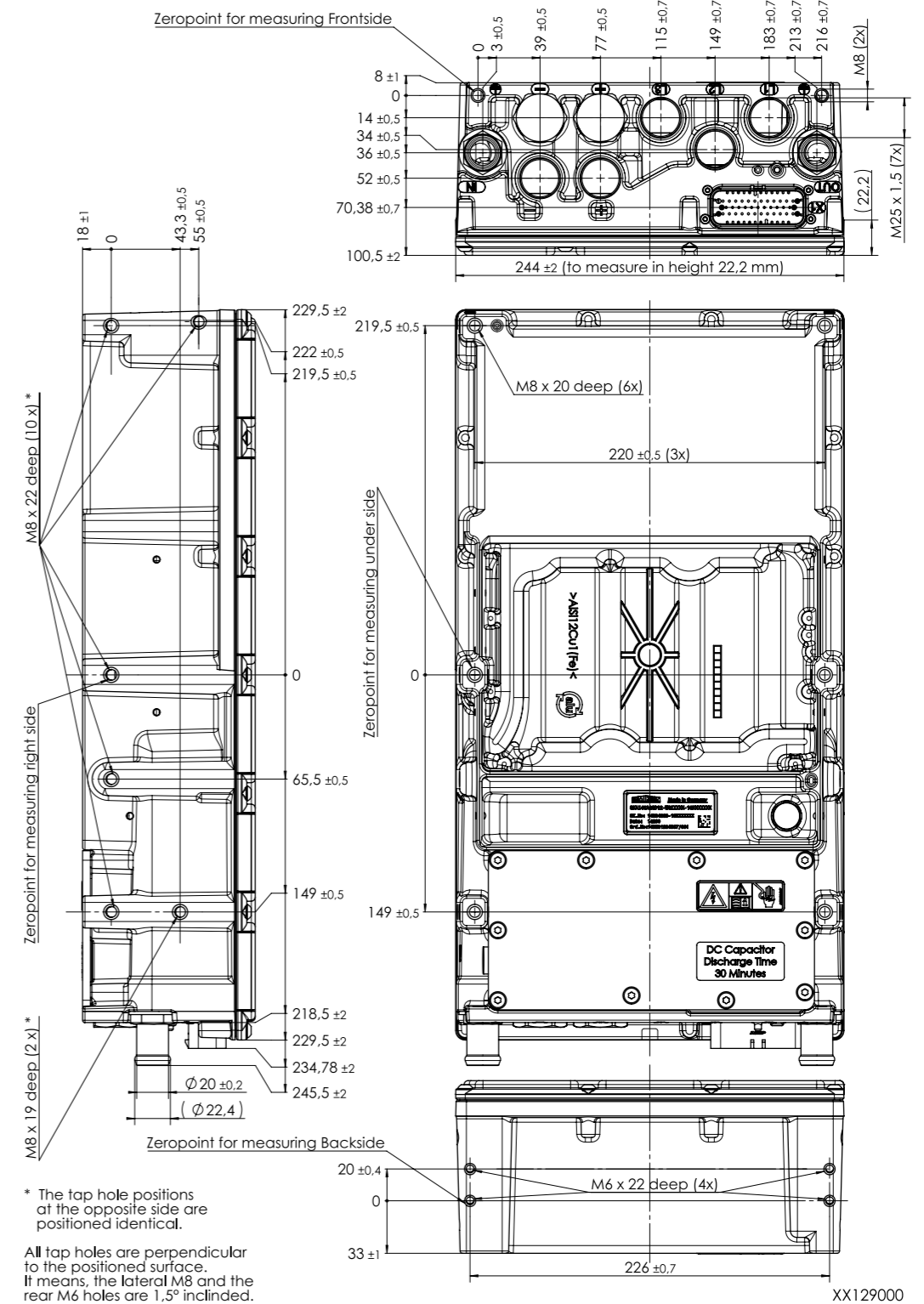
Type	$V_{\text{battery (max)}}$ V	$I_{\text{nom}}$ $A_{\text{rms}}$	Topology	Cooling	DSP	Package	Topology
<b>IGBT - Motor Controller</b>							
SKAI 90 A2 GD06-WCI	450	300	3-Phase	Liquid	Yes	7	
SKAI 45 A2 GD12-WCI	800	300	3-Phase	Liquid	Yes	7	
<b>MOSFET - Motor Controller</b>							
SKAI 90 A2 GD06-WDI <sup>3)</sup>	450	300	3-Phase	Liquid	No	7	
SKAI 45 A2 GD12-WDI	800	300	3-Phase	Liquid	No	7	
SKAI 41 A3 MD10-PE <sup>1)</sup>	72	240	3-Phase	Baseplate	No	A P	
SKAI 41 E3 MD10-PE <sup>1)</sup>	72	240	3-Phase	Baseplate	No	E P	
SKAI 48 A3 MD15-PE <sup>1)</sup>	120	230	3-Phase	Baseplate	No	A P	
SKAI 48 E3 MD15-PE <sup>1)</sup>	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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2

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4

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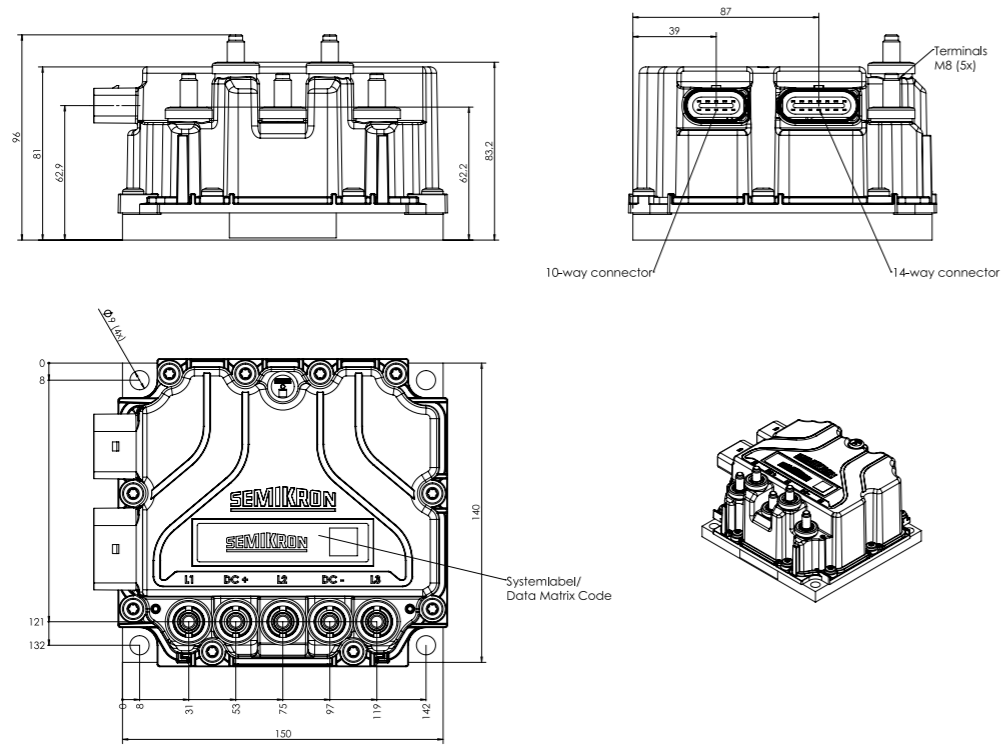
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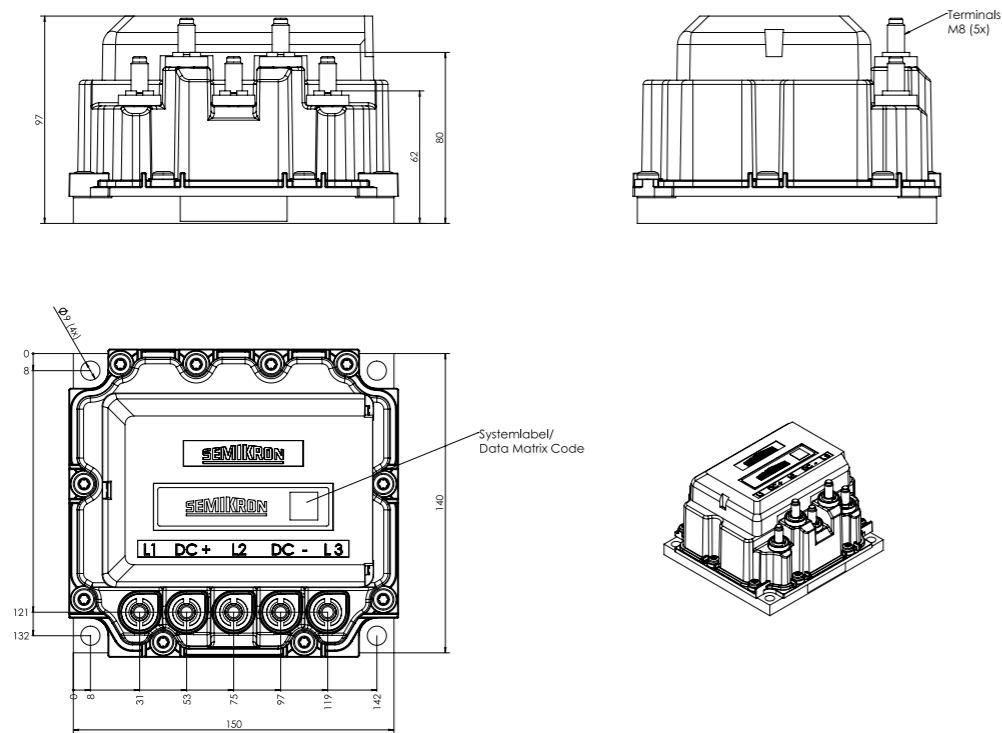
# Systems / SKAI

Packages

AP



EP



Dimensions in mm

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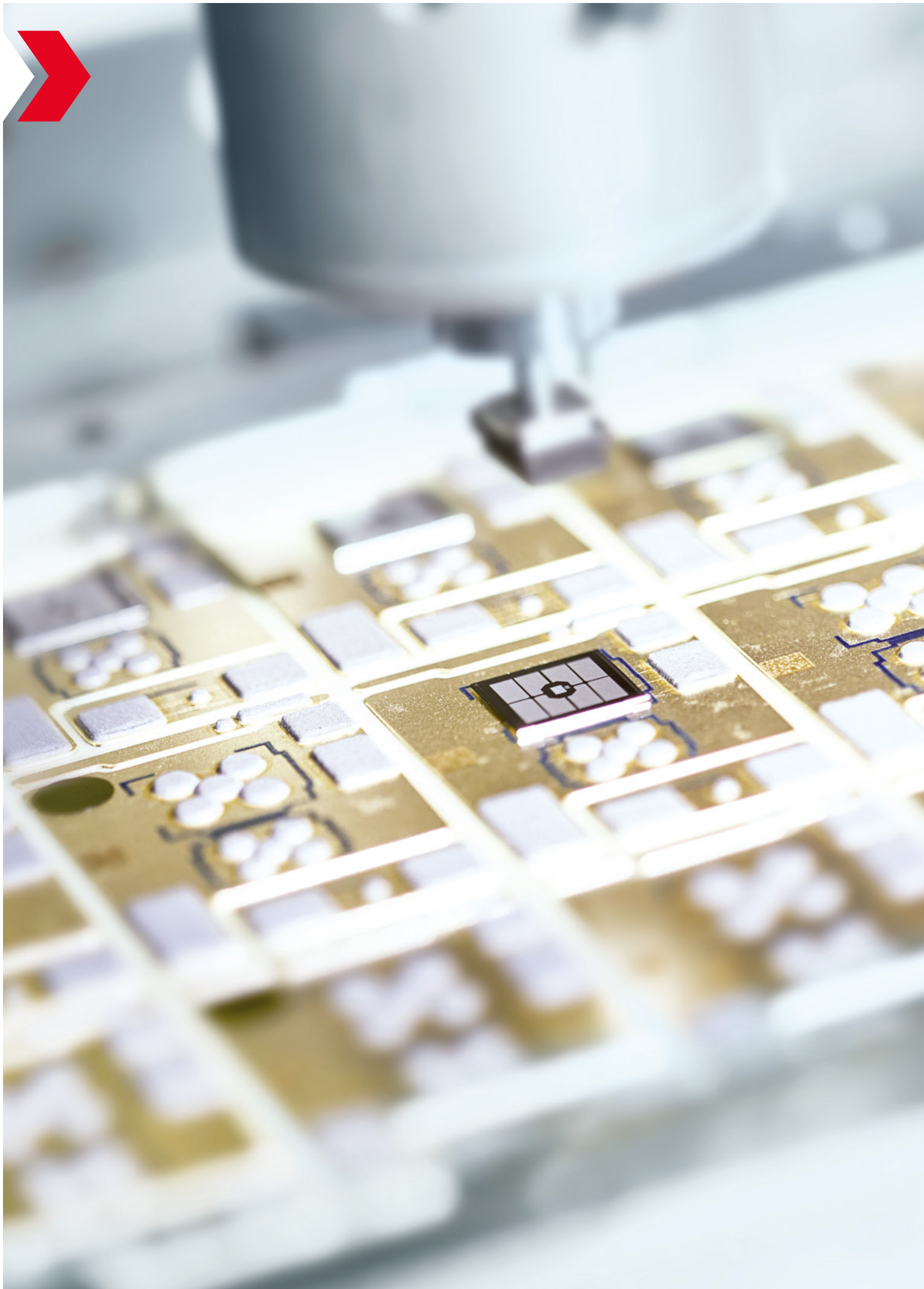
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# Discretes

	PAGE
Discretes	198
Chips	210
Accessories	216

1

2

3

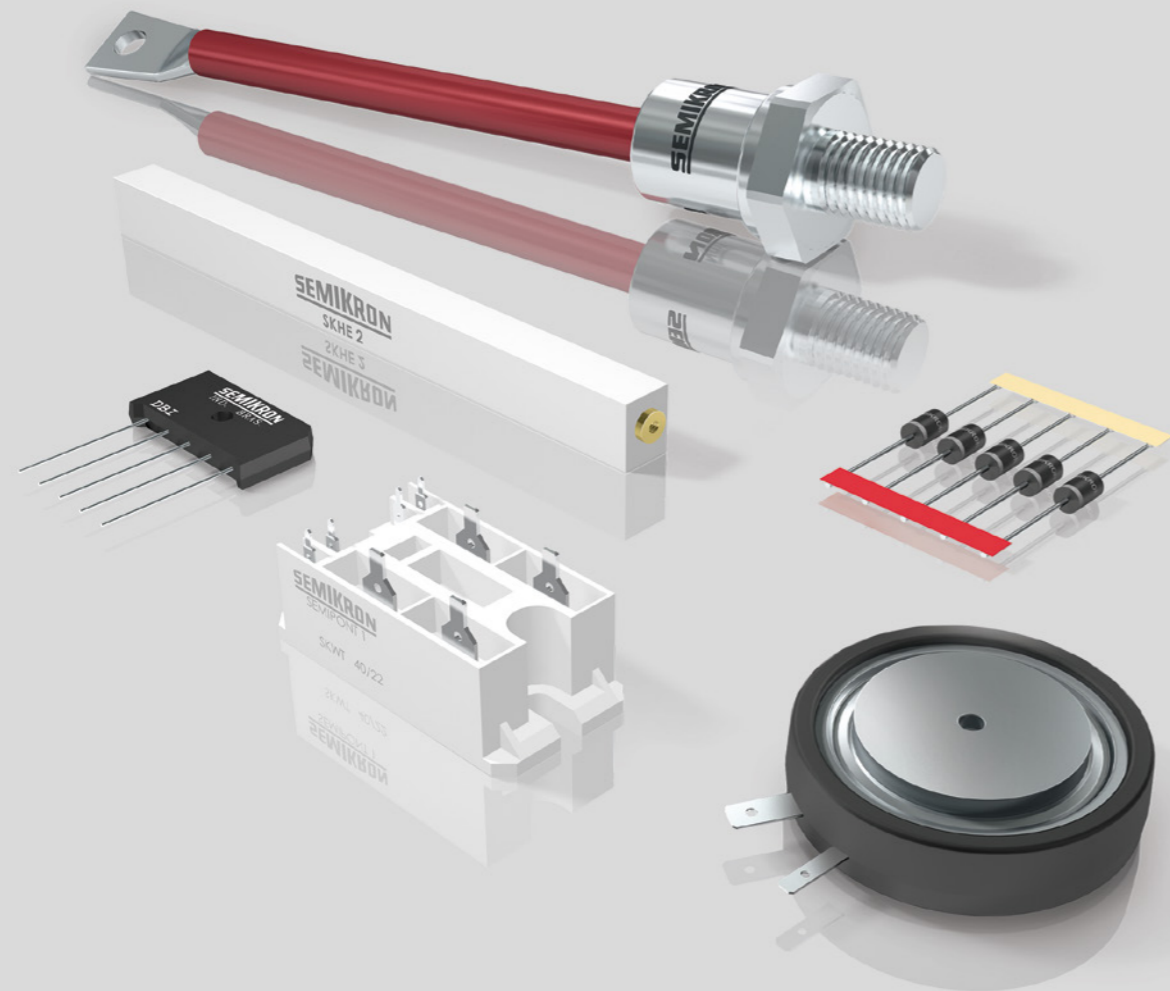
4

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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](http://www.semikron.com/discrete-diodes-thyristors)  
[www.semikron.com/rectifier-bridges](http://www.semikron.com/rectifier-bridges)



# Discrettes

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.

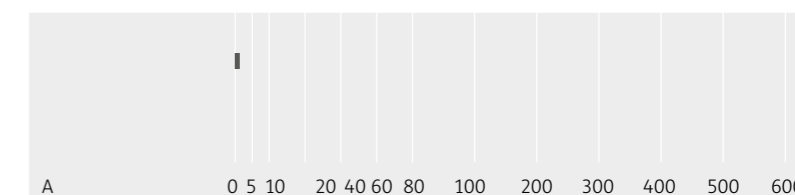
## Further information

[www.semikron.com/discrete-diodes](http://www.semikron.com/discrete-diodes)  
[www.semikron.com/discrete-thyristors](http://www.semikron.com/discrete-thyristors)

## Discrete Diodes

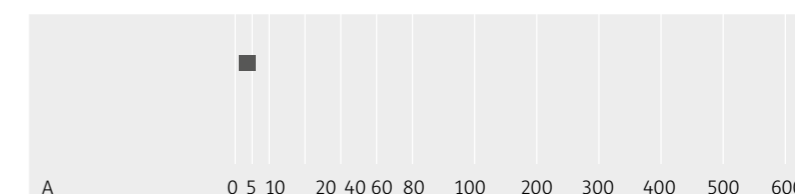
### HV Screw-Axial

4800V up to 8000V



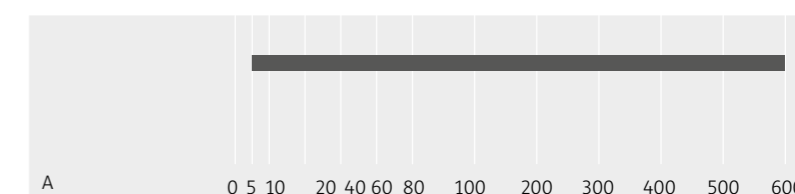
### Leaded

100V up to 2000V



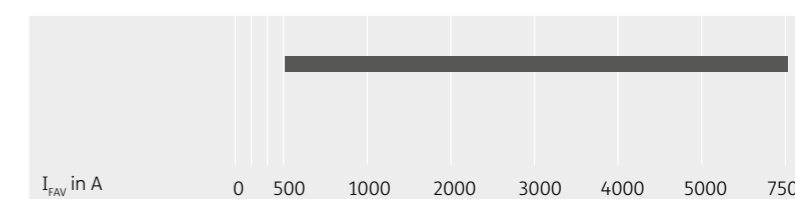
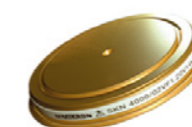
### Stud Screw-Fit

400V up to 5000V



### Capsules

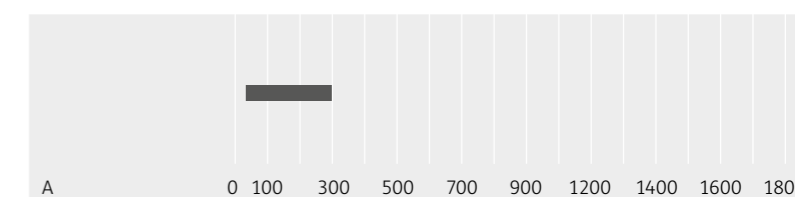
200V up to 2200V



## Discrete Thyristors

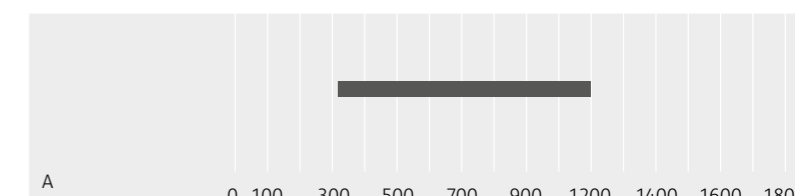
### Stud Screw-Fit

400V up to 1800V



### Capsules

400V up to 1800V

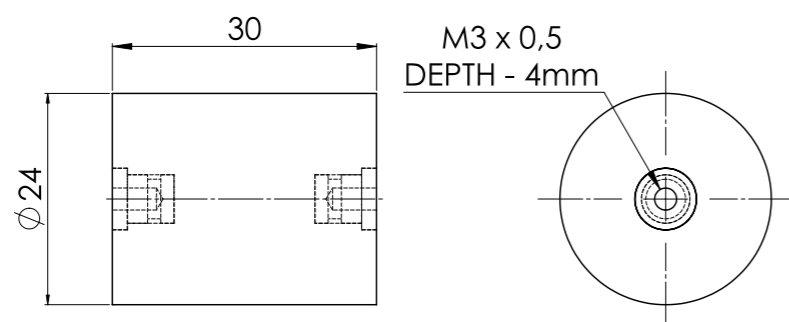


# Discretes / Diodes / HV Screw Axial

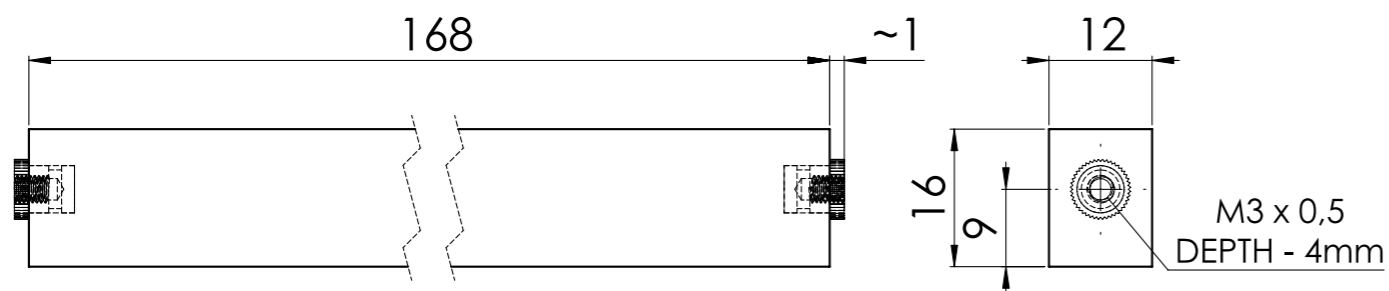
Type	Voltage (V)	$I_{FAV} @ T_{oil}$	$T_{oil}$	$I_{FSM} @ T_J = 25^\circ C$	$V_F$	$R_{th(j-c)}$ per chip	$T_J$	Package	Topology
	V	A	°C	A	V	K/W	°C		
SKHE 2000/900-1,2	4800	1.5	75	135	3.60	21	-40 ... +150	SKHE 1	
SKHE 3500/1550-2,0	8000	2.5	75	270	6.70	8	-40 ... +150	SKHE 2	

**Packages**

**SKHE 1**



**SKHE 2**



Dimensions in mm

# Discretes / Diodes / Leaded

Type	Voltage (V)	Current (A)	$T_c$	$I_{FSM} @ T_J = 25^\circ C$	$V_F$	$R_{th(j-c)}$ per chip	$T_J$	Package	Topology
	V	A	°C	A	V	K/W	°C		
<b>Standard recovery</b>									
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 <sup>2)</sup>	400-1600	6	46	375	1.10	55	-40 ... +150	SK6	

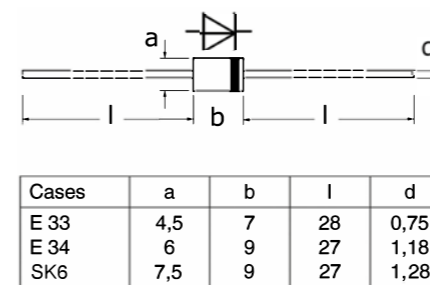
**Avalanche**

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 <sup>2)</sup>	1300-2000	6	46	375	1.10	55	-40 ... +150	SK6	

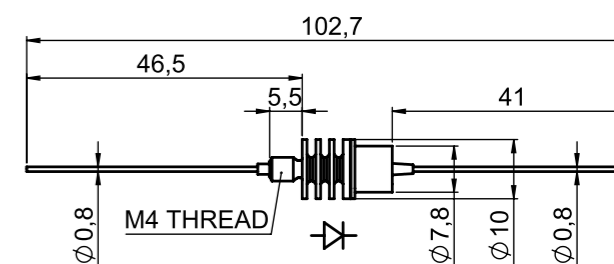
Footnotes: 2) In production new

**Packages**

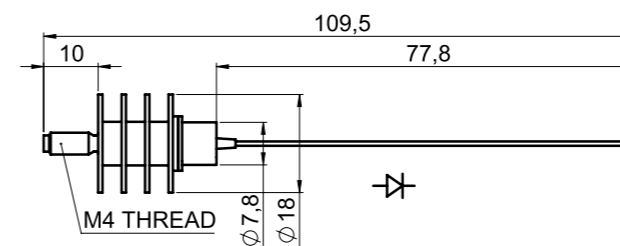
**E33 / E34 / SK6**



**E5**



**E6**



Dimensions in mm

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## Discretes / Diodes / Stud Screw Fit

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

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

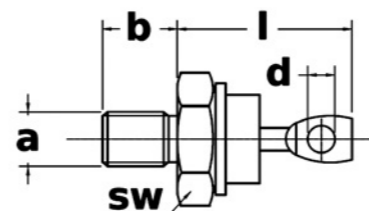
## Discretes / Diodes / Stud Screw Fit

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

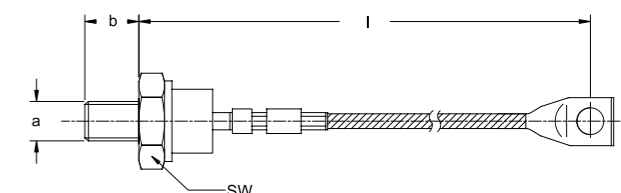
Footnotes: 1) Sample status / 2) In production new

## Packages

## E7 / E8 / E10 / E11 / E31



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



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

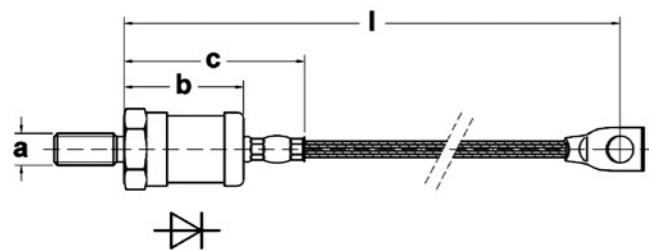
Cases	a	b	l	SW
E9	M6	11	130	11
E12	M8	11	135	17
E13	M12	18	165	24
E14	M12	18	165	24
E15	M16 x 1.5	20	190	32
E16, E17	M24 x 1.5	20	230	41
DO-8	3/8 - 24 UNF 2A	16	112	27

Dimensions in mm

# 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

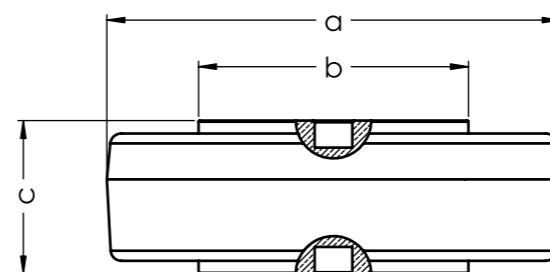
**Type**

Type	Voltage (V) V	Current (A) A	T <sub>c</sub> °C	I <sub>FSM</sub> @T <sub>J</sub> =25°C A	V <sub>F</sub> V	R <sub>th(j-c)</sub> per chip K/W	T <sub>J</sub> °C	Package	Topology
SKN 503 SG <sup>1)</sup>	400-2200	503	120	7000	1.50	0.075	-40 ... +180	E25	
SKN 1503 SG <sup>1)</sup>	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 <sup>1)</sup>	600	7500	85	60000	1.12	0.009	-40 ... +180	E28	

Footnotes: 1) Sample status

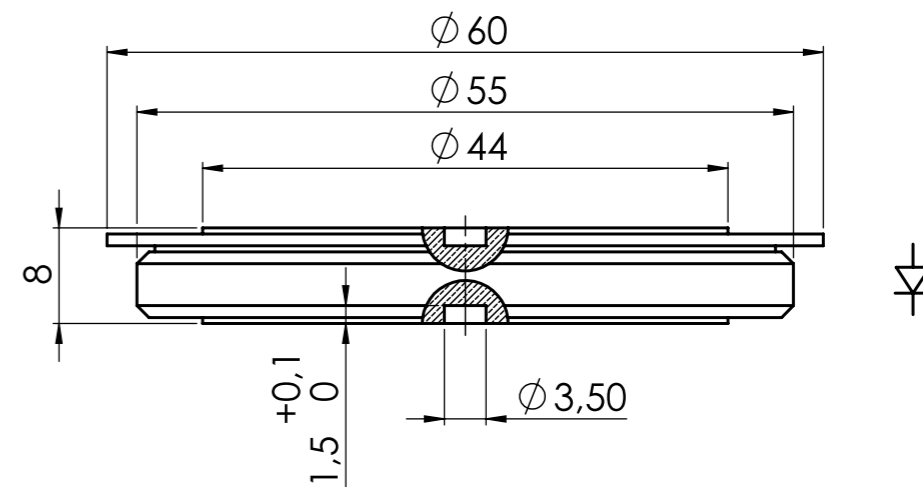
**Packages**

E25, E26, E27



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

E35

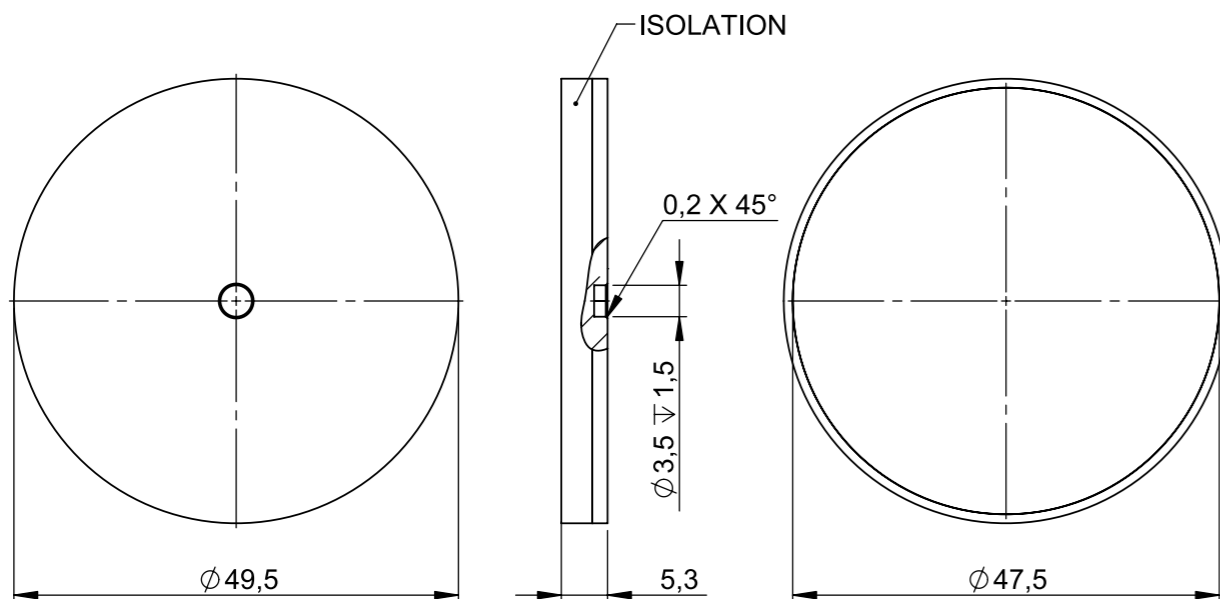


Dimensions in mm

# Discretes / Diodes / Capsules

Packages

E28



Dimensions in mm

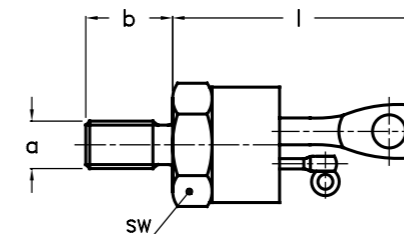
# Discretes / Thyristors / Stud Screw Fit

Type

	Voltage (V)	Current (A)	T <sub>c</sub>	I <sub>FSM</sub> @T <sub>J</sub> =25°C	V <sub>T</sub> @ I <sub>F</sub> , T <sub>J</sub> =25°C	I <sub>F</sub> @V <sub>T</sub>	R <sub>th(j-c)</sub> per chip	T <sub>J</sub>	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	

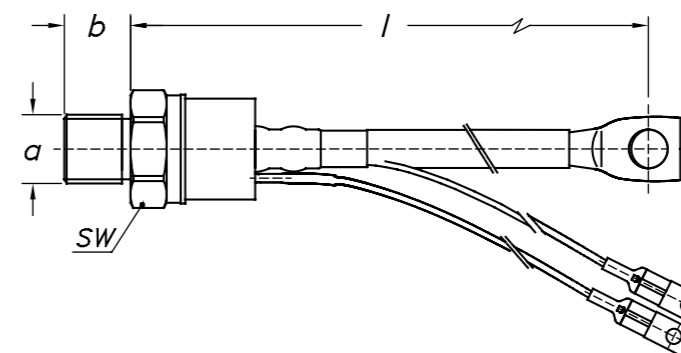
Packages

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

1  
2  
3  
4  
5  
6  
7

6

6



# Discretes / Thyristors / Capsules

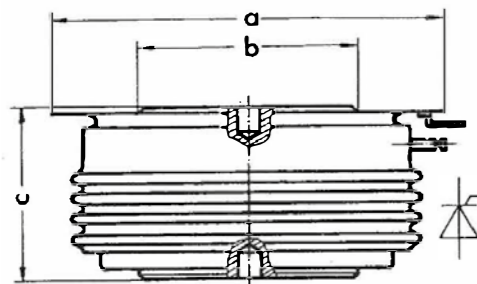
Type

	Voltage (V)	Current (A)	T <sub>c</sub>	I <sub>SM</sub> @T <sub>J</sub> =25°C	V <sub>T</sub> @ I <sub>T</sub> , T <sub>J</sub> =25°C	I <sub>T</sub> @V <sub>T</sub>	R <sub>th(j-c)</sub> per chip	T <sub>J</sub>	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 <sup>2)</sup>	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 <sup>2)</sup>	400-1800	855	85	15000	1.65	2400	0.03	-40 ... +125	B21	
SKT 883 <sup>1)</sup>	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

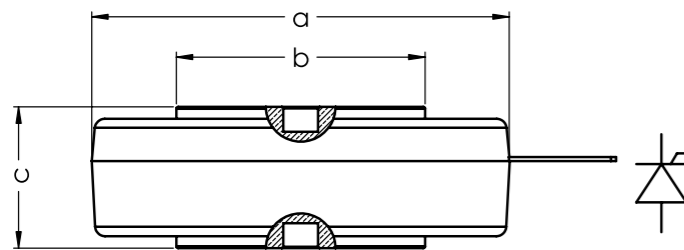
Packages

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

1

2

3

4

5

6

7

## 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 500mm<sup>2</sup>. 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.

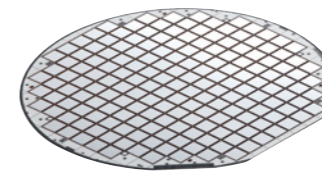
Freewheeling Diode CAL	212
Rectifier Diode	215
Thyristor	215

For detailed information please refer to data sheets.

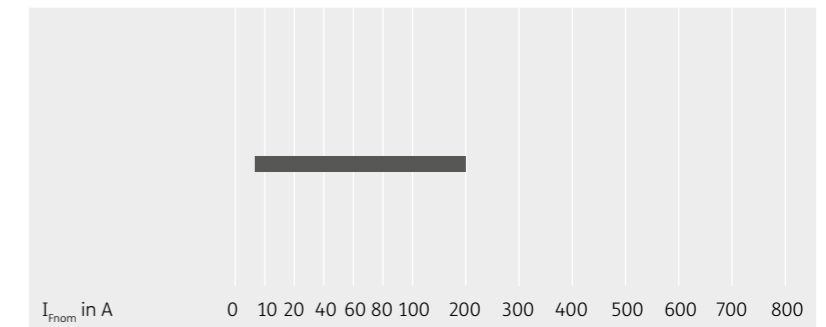
**Further information:** [www.semikron.com/chips](http://www.semikron.com/chips)

## Chips SEMICELL

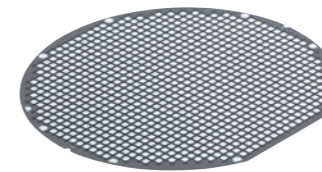
### Freewheeling Diode CAL



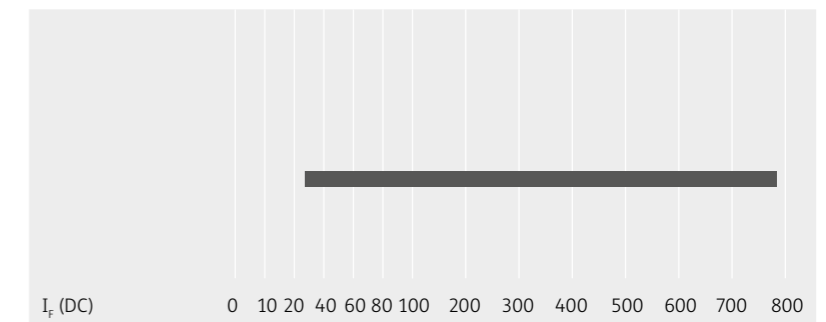
600V up to 1700V



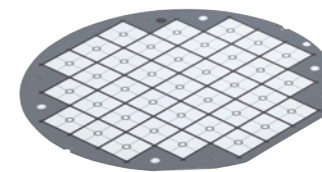
### Rectifier Diode



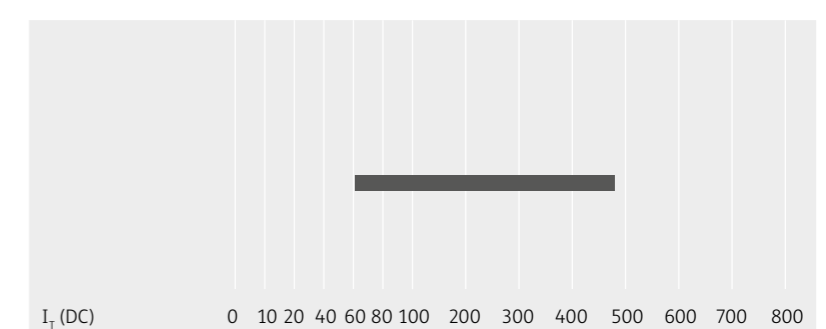
1600V



### Thyristor



1600V



## Discretes / Chips / SEMICELL

Type	$V_{RRM}$ V	$I_F @ T_J=150^\circ\text{C}$ A	$I_{FSM} @ T_J=150^\circ\text{C}$ A	$V_F @ T_J=25^\circ\text{C}$ V	$I_F @ V_F, T_J=25^\circ\text{C}$ A	$Q_{rr} @ T_J=125^\circ\text{C}$ µC
<b>600V - Freewheeling Diodes CAL I3 Fast</b>						
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	$V_{RRM}$ V	$I_F @ T_J=175^\circ\text{C}$ A	$I_{FSM} @ T_J=150^\circ\text{C}$ A	$V_F @ T_J=25^\circ\text{C}$ V	$I_F @ V_F, T_J=25^\circ\text{C}$ A	$Q_{rr} @ T_J=150^\circ\text{C}$ µC
<b>600V - Freewheeling Diodes CAL High Density</b>						
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	$V_{RRM}$ V	$I_F @ T_J=175^\circ\text{C}$ A	$I_{FSM} @ T_J=150^\circ\text{C}$ A	$V_F @ T_J=25^\circ\text{C}$ V	$I_F @ V_F, T_J=25^\circ\text{C}$ A	$E_{rr} @ T_J=150^\circ\text{C}$ mJ
<b>650V - Freewheeling Diodes CAL I4 Fast</b>						
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	$V_{RRM}$ V	$I_F @ T_J=150^\circ\text{C}$ A	$I_{FSM} @ T_J=150^\circ\text{C}$ A	$V_F @ T_J=25^\circ\text{C}$ V	$I_F @ V_F, T_J=25^\circ\text{C}$ A	$Q_{rr} @ T_J=125^\circ\text{C}$ µC
<b>1200V - Freewheeling Diodes CAL I3 Fast</b>						
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

Type	$V_{RRM}$ V	$I_F @ T_J=175^\circ\text{C}$ A	$I_{FSM} @ T_J=150^\circ\text{C}$ A	$V_F @ T_J=25^\circ\text{C}$ V	$I_F @ V_F, T_J=25^\circ\text{C}$ A	$E_{rr} @ T_J=150^\circ\text{C}$ mJ
<b>1200V - Freewheeling Diodes CAL High Density</b>						
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	$V_{RRM}$ V	$I_F @ T_J=175^\circ\text{C}$ A	$I_{FSM} @ T_J=150^\circ\text{C}$ A	$V_F @ T_J=25^\circ\text{C}$ V	$I_F @ V_F, T_J=25^\circ\text{C}$ A	$E_{rr} @ T_J=150^\circ\text{C}$ mJ
<b>1200V - Freewheeling Diodes CAL I4 Fast</b>						
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	$I_F @ T_J=150^\circ\text{C}$ A	$I_{FSM} @ T_J=150^\circ\text{C}$ A	$V_F @ T_J=25^\circ\text{C}$ V	$I_F @ V_F, T_J=25^\circ\text{C}$ A	$Q_{rr} @ T_J=125^\circ\text{C}$ nC
<b>1700V - Freewheeling Diodes CAL Fast</b>						
SKCD 47 C 170 I	1700	55	550	2.05	55	15
SKCD 61 C 170 I	1700	75	720	2.05	75	24
<b>1700V - Freewheeling Diodes CAL High Density</b>						
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	$I_F @ T_J=175^\circ\text{C}$ A	$I_{FSM} @ T_J=150^\circ\text{C}$ A	$V_F @ T_J=25^\circ\text{C}$ V	$I_F @ V_F, T_J=25^\circ\text{C}$ A	$E_{rr} @ T_J=150^\circ\text{C}$ mJ
<b>1700V - Freewheeling Diodes CAL I4 Fast</b>						
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	$T_{Jmax}$ °C	$I_{F(DC)} @ T_{Jmax}$ A	$I_{F(AV)} @ T_{Jmax}$ A	$I_{FSM} @ T_J=150^\circ\text{C}$ A	$V_F @ T_J=25^\circ\text{C}$ V	$I_F @ V_F, T_J=25^\circ\text{C}$ A
<b>1600V - Rectifier - Standard</b>							
SKR 3,5 Qu bond <sup>6)</sup>	1600	150	25	18	200	1.00	8
SKR 4,2 Qu bond <sup>6)</sup>	1600	150	35	28	270	1.00	13
SKR 4,8 Qu bond <sup>6)</sup>	1600	150	45	35	350	1.00	18
SKR 5,6 Qu bond <sup>6)</sup>	1600	150	50	40	490	1.00	25
SKR 6,2 Qu bond <sup>6)</sup>	1600	150	65	50	600	1.00	33
SKR 7,0 Qu bond <sup>6)</sup>	1600	150	75	60	890	1.00	45
SKR 8,9 Qu bond <sup>6)</sup>	1600	150	140	110	1380	1.00	77
SKR 10,3 Qu bond <sup>6)</sup>	1600	150	170	135	1650	1.00	106
SKR 12,4 Qu bond <sup>6)</sup>	1600	150	235	190	2300	1.00	160
SKR 15,2 Qu bond <sup>6)</sup>	1600	150	330	270	3800	1.00	245
SKR 16,3 x 18,2 Qu bond <sup>6)</sup>	1600	150	365	305	5100	1.00	320
SKN 18,2 Qu bond <sup>6)</sup>	1600	150	380	318	5500	1.00	360
SKN 22,4 Qu bond <sup>6)</sup>	1600	150	770	634	9450	1.00	550
<b>1600V - Rectifier - PEP</b>							
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	$I_{T(DC)} @ T_J=130^\circ\text{C}$ A	$I_{FSM} @ T_J=130^\circ\text{C}$ A	$V_{GT} @ T_J=25^\circ\text{C}$ V	$I_{GT} @ T_J=25^\circ\text{C}$ A	$t_q @ T_J=130^\circ\text{C}$ µs
<b>1600V - Thyristor Central Gate</b>						
SKT 8,9 Qu ZG bond <sup>6)</sup>	1600	105	1000	1.65	100	150
SKT 10,3 Qu ZG bond <sup>6)</sup>	1600	125	1250	1.65	100	150
SKT 12,4 Qu ZG bond <sup>6)</sup>	1600	165	1800	1.65	100	150
SKT 13,5 Qu ZG bond <sup>6)</sup>	1600	185	2300	1.65	100	135
SKT 15,2 Qu ZG bond <sup>6)</sup>	1600	215	3200	1.65	100	150
SKT 18,2 Qu ZG bond <sup>6)</sup>	1600	250	5000	1.65	100	150
SKT 24,3 Qu ZG bond SG <sup>6)</sup>	1600	480	8200	1.65	150	150
<b>1600V - Thyristor Corner Gate</b>						
SKT 5,6 Qu RG bond <sup>6)</sup>	1600	60	280	1.65	100	150
SKT 7,0 Qu RG bond <sup>6)</sup>	1600	75	450	1.65	100	150
SKT 8,9 Qu RG bond <sup>6)</sup>	1600	105	1000	1.65	100	150
SKT 10,3 Qu RG bond <sup>6)</sup>	1600	125	1250	1.65	100	150
SKT 12,4 Qu RG bond <sup>6)</sup>	1600	165	1800	1.65	100	150

Footnotes: 6) solderable top metallization on request

## Accessories

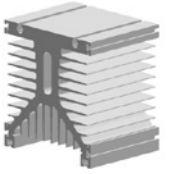
### Heatsinks / Fans

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.

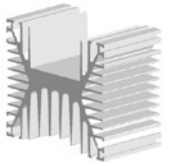
SEMIKRON offers a broad range of axial, centrifugal and radial fans for different inverter designs.

### Heatsinks

#### Forced air-cooled



#### Natural cooled



### Fans

#### Axial



#### Centrifugal



#### Radial

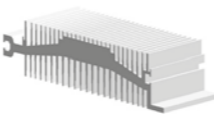
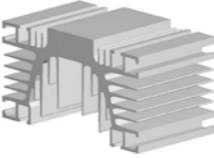
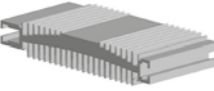
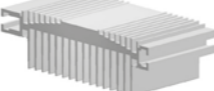
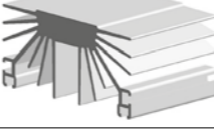
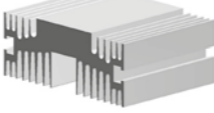


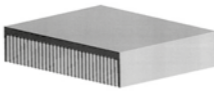



Heatsinks	218
Fans	220

For detailed information please refer to data sheets.

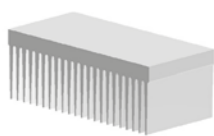
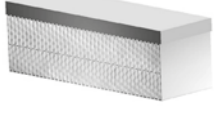

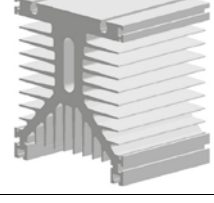
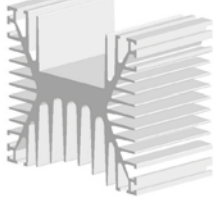
**Further information**  
[www.semikron.com/heatsinks](http://www.semikron.com/heatsinks)  
[www.semikron.com/fans](http://www.semikron.com/fans)

# 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
<b>Forced-air cooled</b>						
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 <sup>9)</sup>	Capsules	0.35	0.07	1.7	9.6	
P 8,5 <sup>9)</sup>	Capsules	0.3	0.08	1.5	9.5	
P 9 <sup>9)</sup>	Capsules	0.21	0.06	4.1	17.8	
U 3	Capsules	0.14	0.06	7.1	23.7	
P 21 <sup>9)</sup>	Isolated base modules	-	0.02	4.1	40.8	
R 4A	Isolated base modules	1.4	0.38	0.6	-	




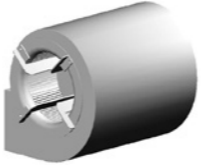


Footnotes: 9) Non standard item, available on request only, typical minimum batch quantities of 60 pieces will apply

# 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
<b>Forced-air cooled</b>						
P 16	SKiiP or modules	-	0.06	1.3	23.5	
Px 308 <sup>9)</sup>	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	
<b>Natural cooled</b>						
P 4 <sup>9)</sup>	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	$V_{in}$ V	f Hz	$V_{air/t}$ m <sup>3</sup> /h	$P_{max}$ W	$T_{Amax}$ °C	Weight kg	Noise dB	Produkt Picture
<b>Axial Fans</b>								
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	
<b>Centrifugal Fans</b>								
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 <sup>2)</sup>	230	-	1500 / 1700	250 / 390	80 / 80	3.1	76 / 78	
<b>Radial Fans</b>								
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

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INFORMATION

# Service & Contact



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## 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](http://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.

### Press-Fit Technology

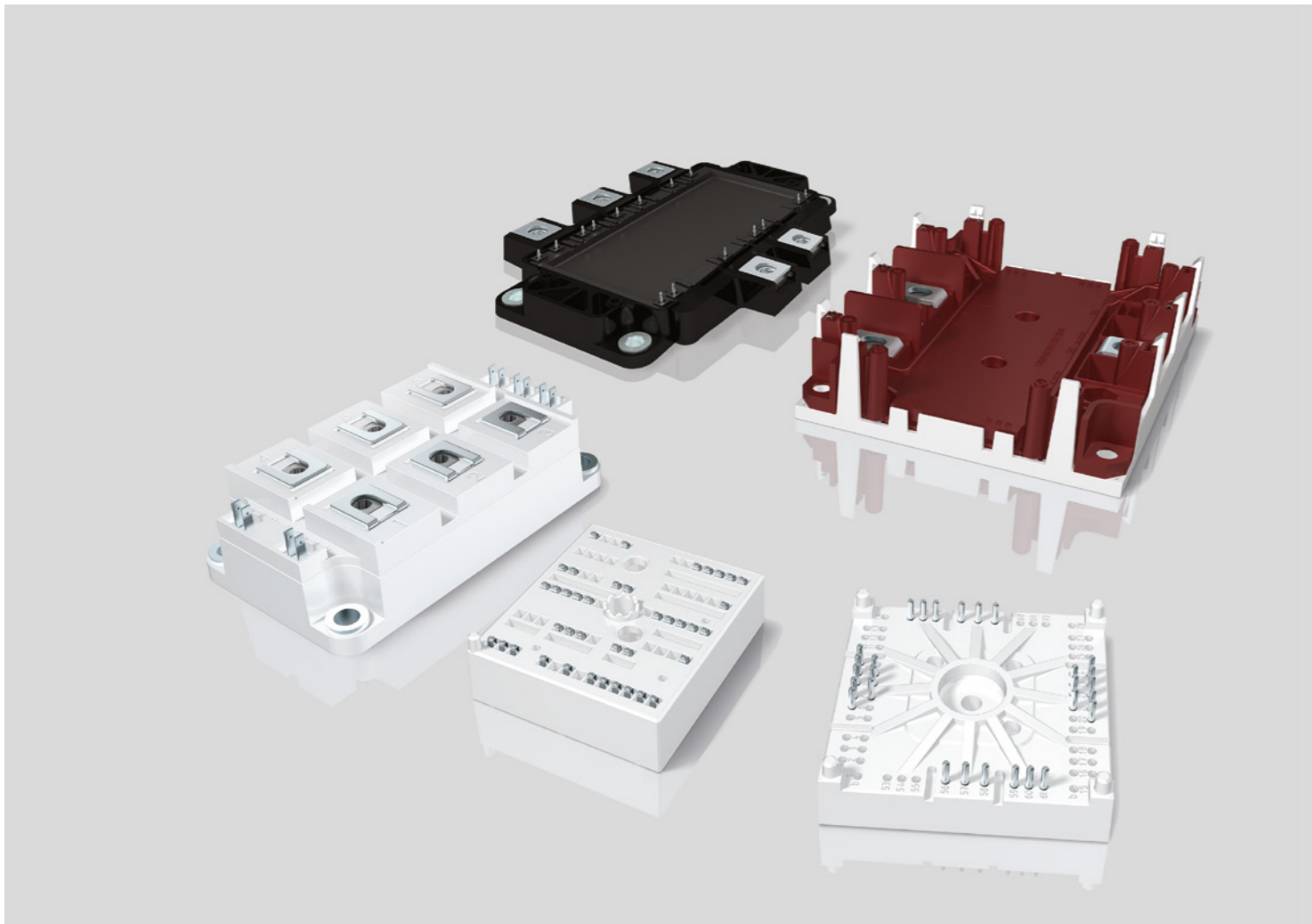
Alternative concept to solder for module to PCB assembly press-fit pins ensure a reliable connection in a solder-free production process.

### 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
- **Dispatch** SEMIKRON sends the sample without lengthy waits

**Further information:** [www.semikron.com/sample-request](http://www.semikron.com/sample-request)



## 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](http://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.

**Further information:** [www.semikron.com/semisel](http://www.semikron.com/semisel)

### 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.



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 semi-conductors 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](http://www.semikron.com/application-manual)

## Abbreviations

Acronym	English	Acronym	English
$E_{off}$	Energy dissipation during turn-off	$R_{th(c-s)}$	Thermal resistance case to heat sink
$E_{on}$	Energy dissipation during turn-on	$R_{th(j-a)}$	Thermal resistance junction to ambient
$E_{rr}$	Energy dissipation during reverse recovery (diode)	$R_{th(j-c)}$	Thermal resistance junction to case
$f$	Operating frequency	$R_{th(j-s)}$	Thermal resistance junction to sink
$f_{max}$	Maximum frequency	$R_{th(s-a)}$	Thermal resistance heat sink to ambient
$I_C$	Continuous collector current	$T_c$	Case temperature
$I_{Cnom}$	Nominal collector current	$T_j$	Junction temperature
$I_D$	Direct output current (of a rectifier connection)	$t_q$	Circuit commutated turn-off time (thyristor)
$I_D$	Continuous drain current (MOSFET)	$T_s$	Heatsink temperature
$I_F$	Forward current (actual value)	$V_{air}/t$	Air flow
$I_{FAV}$	Mean forward current	$V_{CE}$	Collector-emitter voltage
$I_{FSM}$	Surge forward current	$V_{CEsat}$	Collector-emitter saturation voltage
$I_{GT}$	Minimum guaranteed gate trigger current	$V_{DRM}$	Repetitive peak off-state voltage
$I_{outPEAK}$	Output peak current (driver)	$V_{DS}$	Drain-source voltage
$I_{overload}$	Overload current for a specified time	$V_F$	Forward voltage
$i_T$	On-State current (instantaneous value)	$V_{G(off)}$	Turn-off gate voltage level (driver)
$I_{TAV}$	Mean on-state current	$V_{G(on)}$	Turn-on gate voltage level (driver)
$I_{TSM}$	Surge on-state current	$V_{GT}$	Gate trigger voltage
$Q_{out/pulse}$	Output charge per pulse (Driver)	$V_{in}$	Input voltage
$Q_{rr}$	Reverse recovery charge	$V_{isol(10)}$	Isolation test voltage (r.m.s. /1 min.) input-output (driver)
$R_{DS(on)}$	Drain-source on-resistance (MOSFET)	$V_{RRM}$	Repetitive peak reverse voltage
$r_T$	On-state slope resistance, forward slope resistance (Thyristor)	$V_T$	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.



## SEMIKRON Online Shop

### Delivering expert support

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

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<i>Distributor</i>	<b>CS Component</b> GA-4303, Jungang Circulation Comlex Guro-2-dong, Guro-guo, Seoul South Korea	Phone : +82 266 794 630~1 Fax : +82 226 860 291 E-mail : art21-j@icscom.co.kr
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## Contact Europe

### SEMIKRON Online Shop Global Direct Sales

Online  
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### SEMIKRON Online Shop Global Direct Sales

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## Contact North America

### SEMIKRON Online Shop Global Direct Sales

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# Contact South America

## SEMIKRON Online Shop Global Direct Sales

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For reasons of readability, separate gender-specific nouns are not used in the text.  
The text nonetheless always refers to all genders.


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Full Silicon Carbide Modules  
Highest Power Output and Efficiency

SEMIKRON offers full silicon carbide power modules in MiniSKIP, 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**


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For detailed information please refer to data sheets.


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

**Full SiC**


**MiniSKIP® Sixpack** 1200V




**SEMITOP® Chopper M-Bridge Half-Bridge Rectifier** 1200V




**SEMITRANS® Half-Bridge** 1200V



**SEMI-PACK®2 Rectifier** 1200V



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  - Fast shipping to more than 100 countries
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