



Electric and Electrified Vehicles

Power Electronics for Vehicles



Power Modules

SEMITOP E1/E2

SEMiX Spring

SEMiX 3 Press-fit

SEMiX 5

SKiM 5

SKiM 63/93

Systems

SKAI 2 HV

SKAI 3 LV

Electric and Electrified Vehicles

Electrical vehicles require highly reliable power electronics. SEMIKRON, a leading supplier of power electronics, has been supplying products to the EV markets for more than 10 years. From chips and modules to entire converters, the full range of SEMIKRON products can be found in passenger cars, utility vehicles, trucks, buses as well as industrial and material handling vehicles.

Applications

SEMIKRON offers products for every possible application in the automotive environment. The dedicated automotive portfolio includes power modules and systems.

Our power modules are found in light duty vehicles such as passenger cars and lightweight trucks up to 7 tons. Our SEMiX baseplate modules are used by leading Chinese manufacturers of electric vehicles. For higher power density, SKiM63/93 is the first choice for electric as well as plug-in electric vehicles. The SKAI 3 LV, a MOSFET based inverter stack, is perfect for mild hybrid vehicles based on 48VDC bus systems.

For heavy duty vehicles SEMIKRON offers not only the SEMiX and SKiM63/93 power modules, but also a full inverter system the SKAI 2 HV for up to 850VDC bus. Heavy duty vehicles refer to heavy duty trucks and buses in electric or hybrid configurations.

Battery vehicles such as forklifts, agricultural and construction vehicles, race cars and motorcycles are powered by SEMiX and SKiM63/93 power modules as well as by the low-voltage MOSFET system SKAI 3 LV.

References

- **150,000** SKiM 63/93 drive electric and hybrid buses, passenger cars and electric motorbikes
- **10,000** buses use SKiM 5 in pre-assembled stacks: power module + driver + heat sink
- More than **200,000** hybrid and all-electric cars are powered by SEMiX power modules
- **53,000** SKAI 2 HV drive electric and hybrid buses
- **1.5 million** SKAI LV drive vehicles for material handling

AUTOMOTIVE



Light Duty Vehicles

Applications

Passenger Cars
Light Trucks

Products

SEMiX Spring
SEMiX 3 Press-Fit
SEMiX 5
SKiM 63/93
SEMITOP E1/E2

INDUSTRIAL



Heavy Duty Vehicles

Applications

Buses
Large Trucks

Products

SKAI 2 HV
SKiM 63/93
SEMiX Spring
SEMiX Press-Fit
SEMiX 5



Battery Vehicles

Applications

Forklifts
Motorcycles
Race Cars
Agricultural Vehicles
Construction Vehicles
Carts

Products

SKAI 3 LV
SKiM 63/93
SEMiX Spring
SEMiX Press-Fit
SEMiX 5
SEMITOP E1/E2

Power Modules

SKiM63/93

Completely solder-free 6-packs:

- Maximum reliability in power and thermal cycling tests thanks to sintered chips, AlCu wire bonds and pressure contacts
- Increased power density thanks to baseplate-less module design
- Hybrid silicon carbide power modules for maximum efficiency and power density
- Applications: traction inverter

SEMiX 3 Press-fit / SEMiX Spring / SEMiX 5

Baseplate industry standard power module range:

- Standard high-performance power modules with excellent cost/performance ratio
- Multiple sourcing thanks to industry standard design
- Exceeding the standard thanks to packaging design optimisations
- Applications: traction inverter

SEMITOP E1/E2

The flexible standard:

- Industry standard baseplate-less package
- Fully flexible pin-out thanks to the pin-grid structure
- Customer-specific chipsets, including latest technologies, e.g. silicon carbide MOSFETs
- Applications: on-board chargers, DC/DC converters, compressors, exciters

Systems

SKAI 2 HV

1200V full inverter system

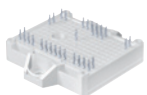
- Plug & Play inverter system up to 250kW and 850V_{DC} bus, 21kVA/l power density
- Utilizing high reliability SKiM 93 power modules
- Applications: heavy duty vehicles

SKAI 3 LV

Low-voltage system for battery vehicles and mild hybrid electric vehicles

- Single and dual inverter configuration
- Up to 50kVA and up to 144V battery voltage
- Flexible cooling options: water and air-cooled systems possible
- Applications: battery vehicles

Product range



SEMITOP E1/E2



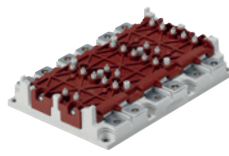
SEMiX 5



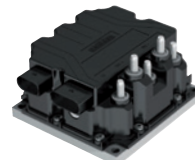
SEMiX 3 Press-Fit



SEMiX spring



SKiM 63/93



SKAI 3 LV



SKAI 2 HV

1kW

250kW

Application Range

Peak e-motor power	15kW	30kW	60kW	90kW	120kW	150kW	200kW	250kW
Mild Hybrid Electric Vehicle	■							
Plug-in Hybrid Electric Vehicle			■					
Battery Electric Vehicle			■					
Hybrid Electric Vehicle		■						
SKAI 3 LV	■							
SEMiX 5	■							
SEMiX 3 Press-Fit / SEMiX spring		■						
SKiM 63/93			■					
SKAI 2 HV					■			
SEMITOP E1/E2	■							


■ = Traction Inverter


■ = Auxiliary Inverter (DC/DC, AC compressor, exciter, etc)



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