

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

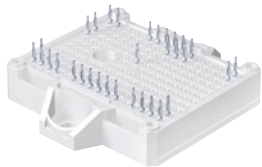


I in A

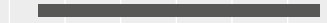
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SEMITOP®

Sixpack
Chopper
H-Bridge
Half-Bridge
Rectifier



1200V



I in A

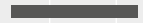
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SEMITRANS®

Half-Bridge



1200V



I in A

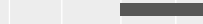
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SEMIPACK® 2

Rectifier



1200V



I in A

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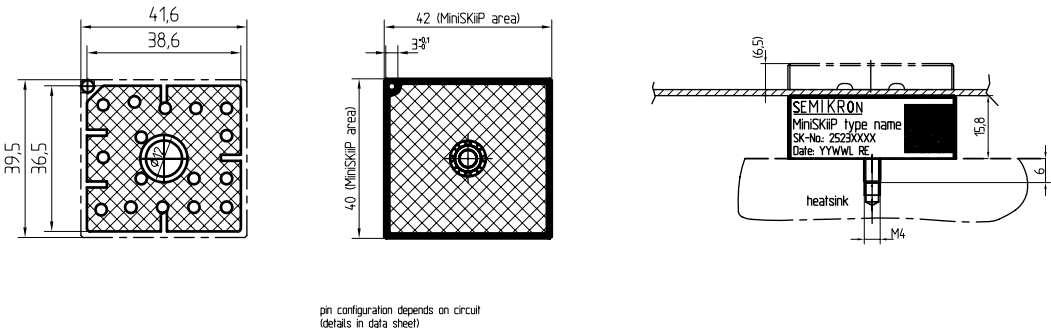
SiC Modules / Full SiC / MiniSKiiP

Type						
	V_{DS} V	$I_D @ T_c = 25^\circ\text{C}$ A	$R_{DS(on)} @ T_j = 25^\circ\text{C typ.}$ mΩ	Package	Thermal Interface Material	Topology
1200V - SiC MOSFET						
SKiiP 13ACM12V17 ¹⁾	1200	25	80	II 1	P12, HPTP	
SKiiP 13ACM12V18 ¹⁾	1200	25	80	II 1	P12, HPTP	
SKiiP 26ACM12V17 ¹⁾	1200	72	23	II 2	P12, HPTP	

Footnotes: 1) Sample status

Packages

MiniSKiiP II 1

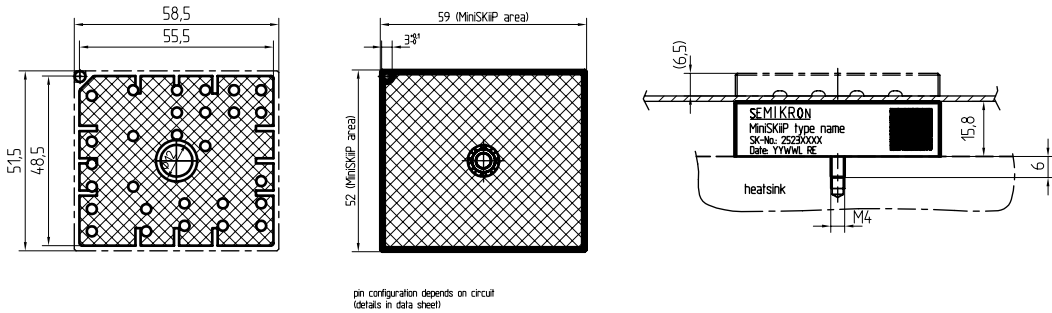


Dimensions in mm

SiC Modules / Full SiC / MiniSKiiP

Packages

MiniSKiiP II 2



Dimensions in mm

SiC Modules / Full SiC / SEMITOP

Type						
	V_{DS} V	I_D @ $T_C = 25^{\circ}C$ A	$R_{DS(on)}$ @ $T_J = 25^{\circ}C$ typ. mΩ	Package	Thermal Interface Material	Topology
1200V - SiC MOSFET						
SK45MH120TSCp ¹⁾	1200	40	45	2p	P12	
SK25MH120SCTp ¹⁾	1200	26	80	2p	P12	
SK45MAHT12SCp ²⁾	1200	39	45	3p	P12, HPTP	
SK45MLET12SCp ¹⁾	1200	39	45	3p	P12, HPTP	
SK35MLLE120SCp ¹⁾	1200	36	40	2p	P12	
SK250MB120SCTE2 ¹⁾	1200	251	3.7	E2	HPTR, HT	
SK508MB120SCTE2 ¹⁾	1200	52	80	E2	HPTR, HT	
SEMISTOP rectifier module						
SK20KDD12SCp ¹⁾	1200	18	-	2p	P12	

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

SiC Modules / Full SiC / SEMITOP

Type						
	V_{DS} V	I_D @ $T_C = 25^{\circ}C$ A	$R_{DS(on)}$ @ $T_J = 25^{\circ}C$ typ. mΩ	Package	Thermal Interface Material	Topology
SEMISTOP rectifier module						
SK70B12SCTE1 ¹⁾	1200	54	-	E1	-	

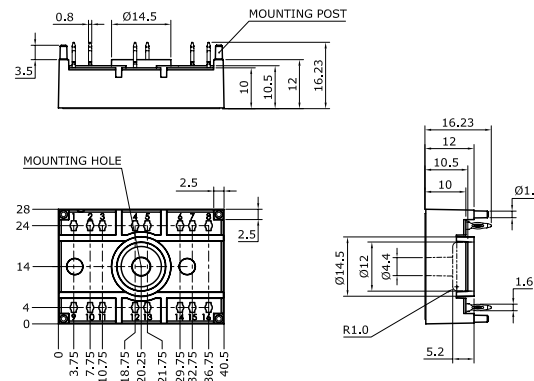
Footnotes: 1) Sample status / 2) In production new

SiC Modules / Full SiC / SEMITOP

Packages

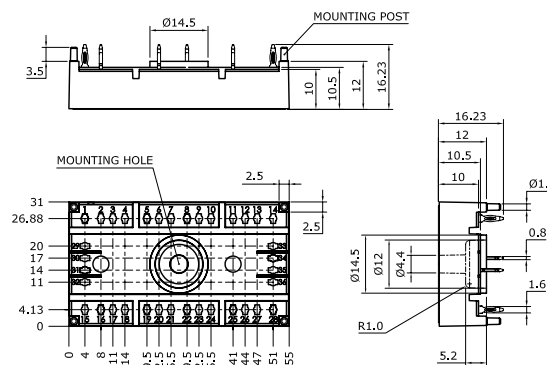
SEMISTOP 2 Press-Fit

Dimensions: mm
Tolerance system: ISO 2768-m

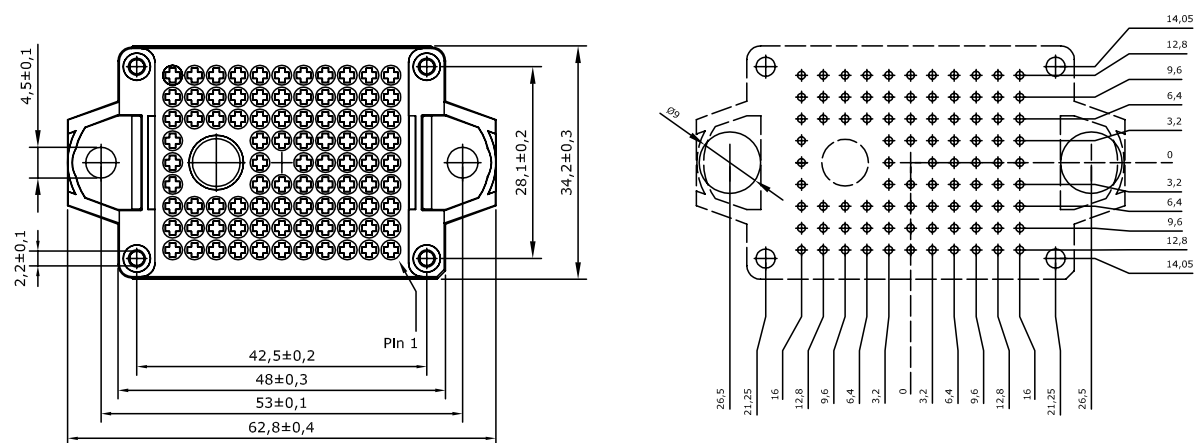


SEMISTOP 3 Press-Fit

Dimensions: mm
Tolerance system: ISO 2768-m



SEMISTOP E1

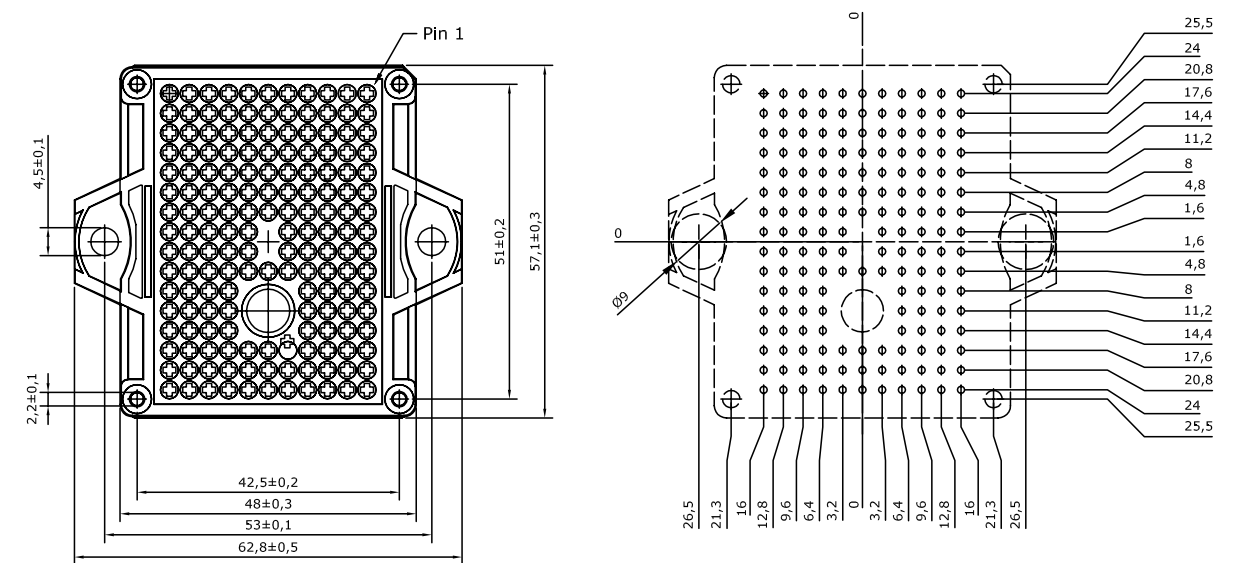


Dimensions in mm

SiC Modules / Full SiC / SEMITOP

Packages

SEMISTOP E2



Dimensions in mm

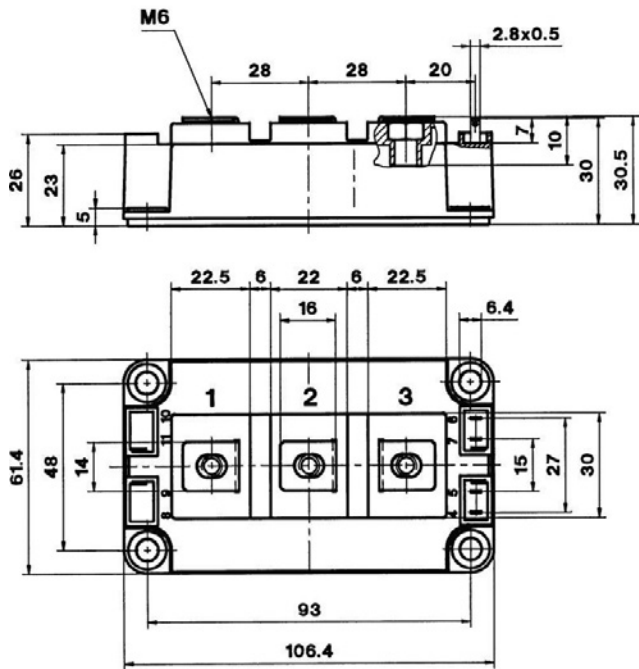
SiC Modules / Full SiC / SEMITRANS

Type							
	V_{DS}	$I_D @ T_c = 25^{\circ}C$	$R_{DS(on)} @ T_j = 25^{\circ}C \text{ typ.}$	Package	Thermal Interface Material	Topology	
	V	A	mΩ				
1200V - SiC MOSFET							
SKM350MB120SCH15 ¹⁾	1200	523	5.6	3	P8		
SKM500MB120SC ¹⁾	1200	541	3.8	3	P8		
SKM350MB120SCH17 ¹⁾	1200	523	5.6	3	P8		
1200V - SiC Rectifier							
SKM125KD12SC ¹⁾	1200	236	-	3	P8		

Footnotes: 1) Sample status

Packages

SEMISTRANS 3



Dimensions in mm

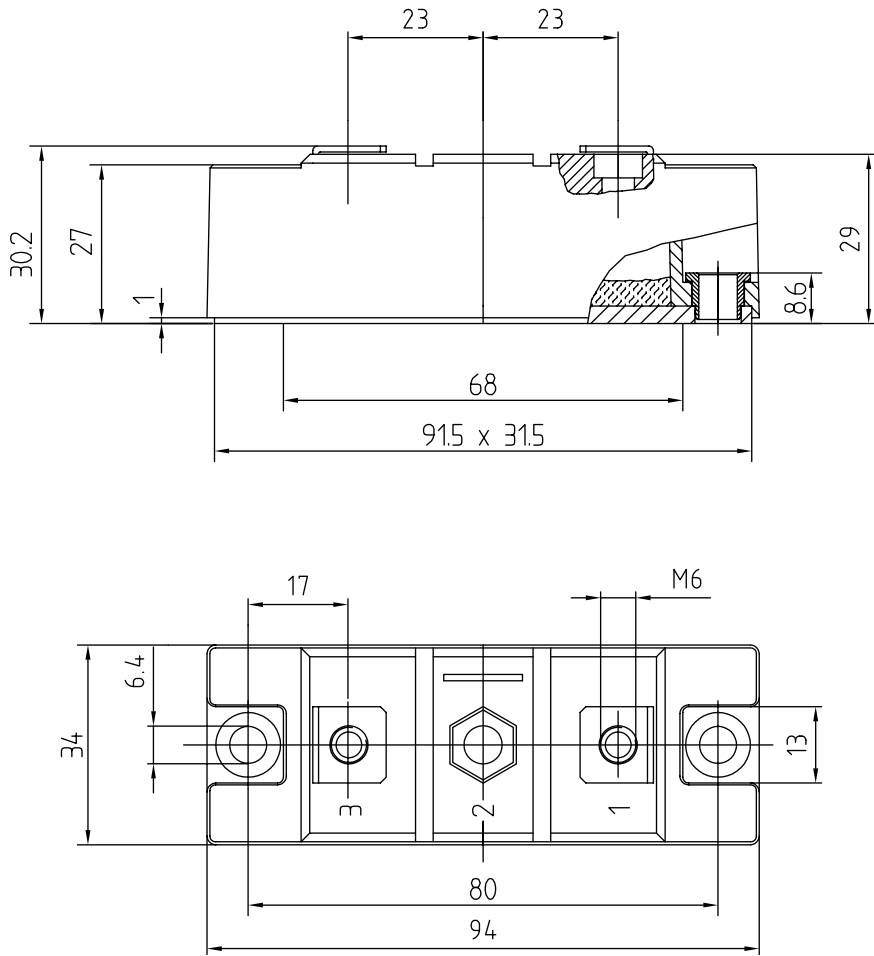
SiC Modules / Full SiC / SEMIPACK

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

Footnotes: 1) Sample status

Packages

SEMIPACK 2



Dimensions in mm

Hybrid Silicon Carbide Modules For Maximum Energy Efficiency

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

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

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

Hybrid SiC

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

For detailed information please refer to data sheets.

Further information

<http://www.semikron.com/hybrid-sic>

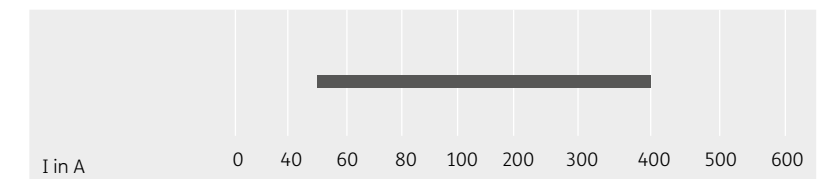
Hybrid SiC

MiniSKiiP®

Half-Bridge
Sixpack
3-level

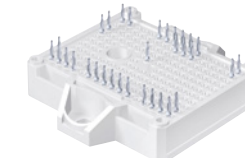


1200V

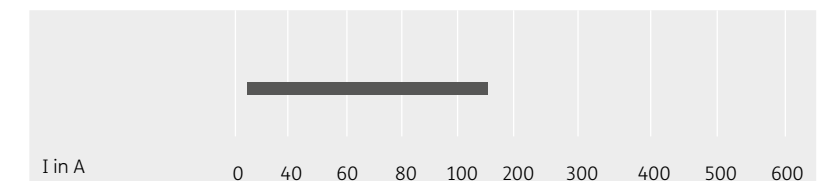


SEMITOP®

Chopper
3-level



1200V

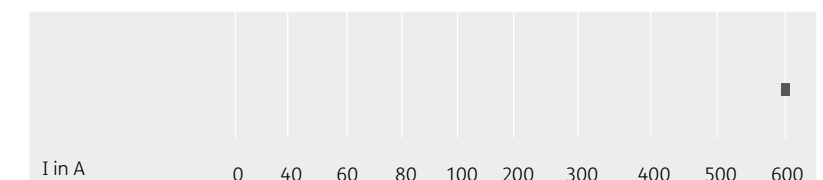


SEMiX Press-Fit®

Half-Bridge



1200V

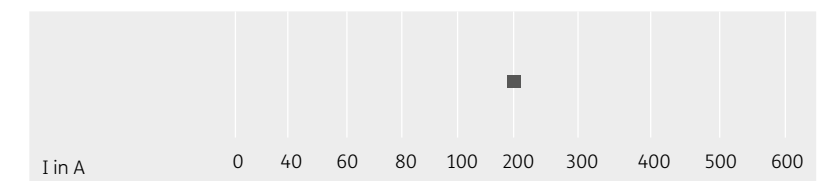


SEMITRANS®

Half-Bridge



1200V

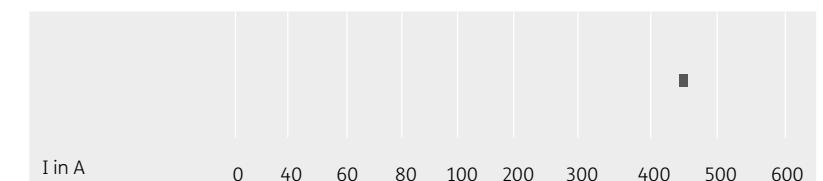


SKiM® 63/93

Sixpack



1200V



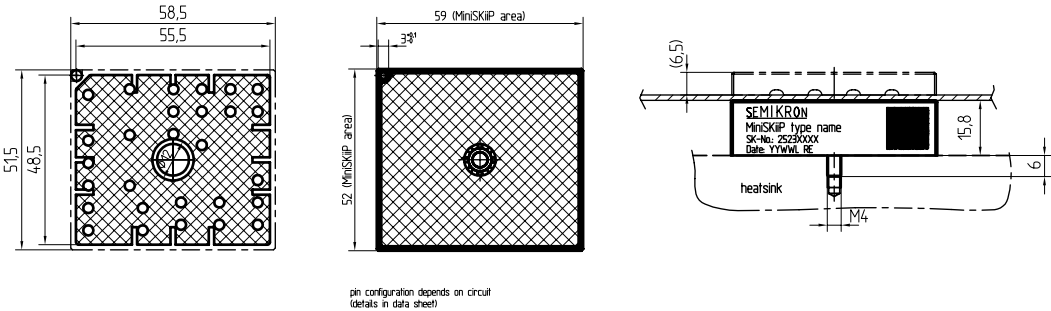
SiC Modules / Hybrid SiC / MiniSKiiP

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

Footnotes: 1) Sample status

Packages

MiniSKiiP II 2

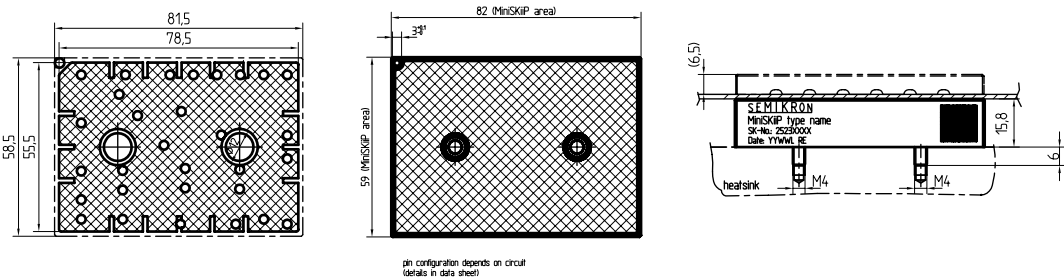


Dimensions in mm

SiC Modules / Hybrid SiC / MiniSKiiP

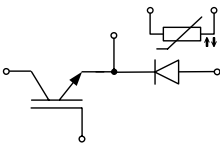
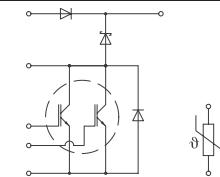
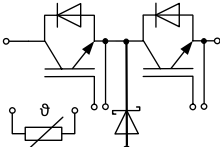
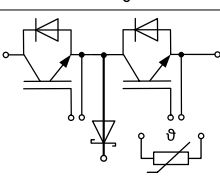
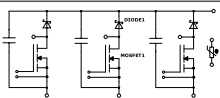
Packages

MiniSKiiP II 3



Dimensions in mm

SiC Modules / Hybrid SiC / SEMITOP

Type	IGBT					Diode		Module			
	$I_c @ T_s = 25^{\circ}\text{C}$ 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 V	Package	Thermal Interface Material	Topology	
1200V - IGBT4 Fast (Trench)											
SK 25 GAR 12F4 TSC ¹⁾	33	25	2.05	2.27	2.7	21	1.40	2	P12		
SK 50 GLL 12F4 TSC ¹⁾	56	50	2.05	4.5	5.4	67	1.00	2	P12		
600V - CoolMOS											
SK150MLIT12F4TSCE2 ¹⁾	149	150	2.05	8.9	11	80	2.20	E2	HPTP, HT		
SK150MLIB12F4TSCE2 ¹⁾	149	150	2.05	8.9	11	80	2.20	E2	HPTP, HT		
600V - CoolMOS											
SK35MLT60SCKE1 ¹⁾	-	45	-	t.b.d.	t.b.d.	-	1.35	E1	-		

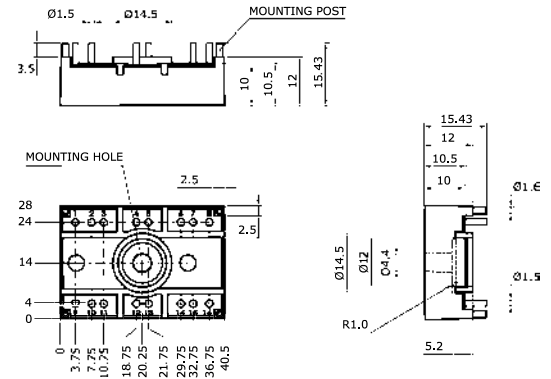
Footnotes: 1) Sample status

SiC Modules / Hybrid SiC / SEMITOP

Packages

SEMITOP 2

Dimensions: mm
Tolerance system: ISO 2768-m

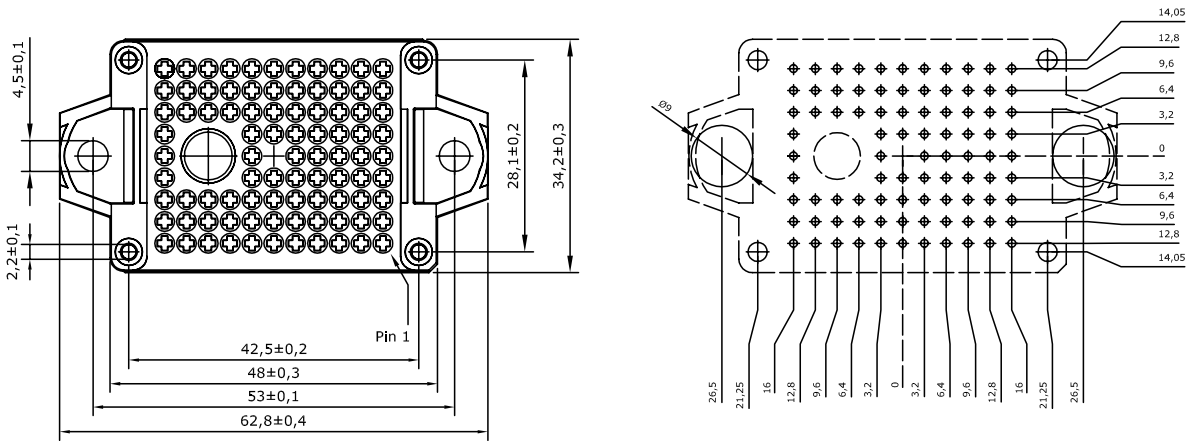


Dimensions in mm

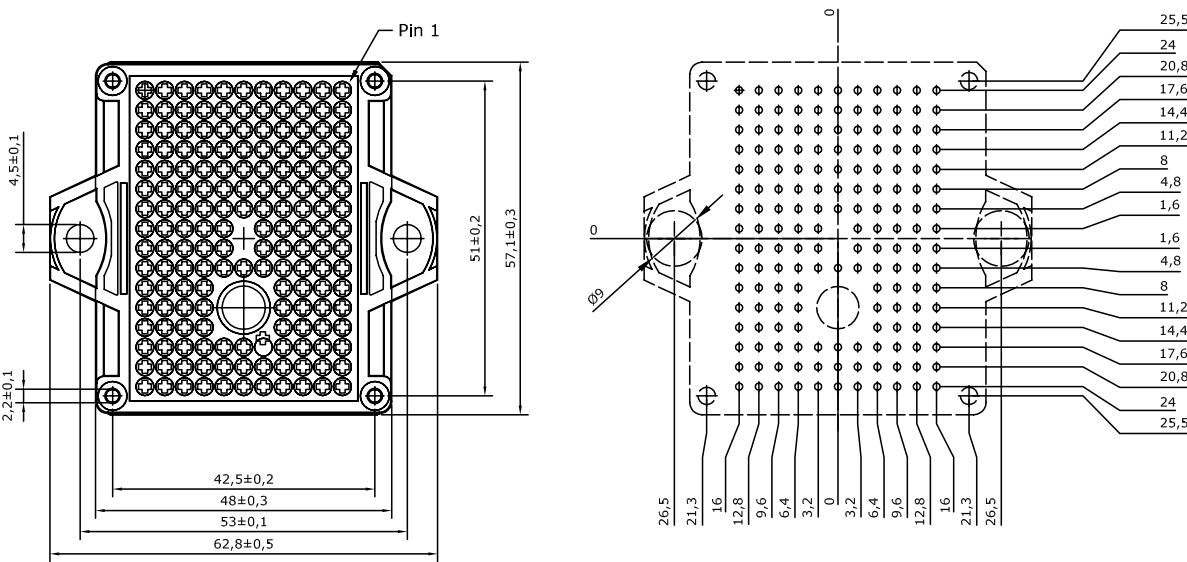
SiC Modules / Hybrid SiC / SEMITOP

Packages

SEMISTOP E1

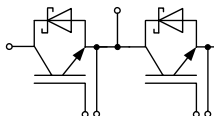


SEMISTOP E2



Dimensions in mm

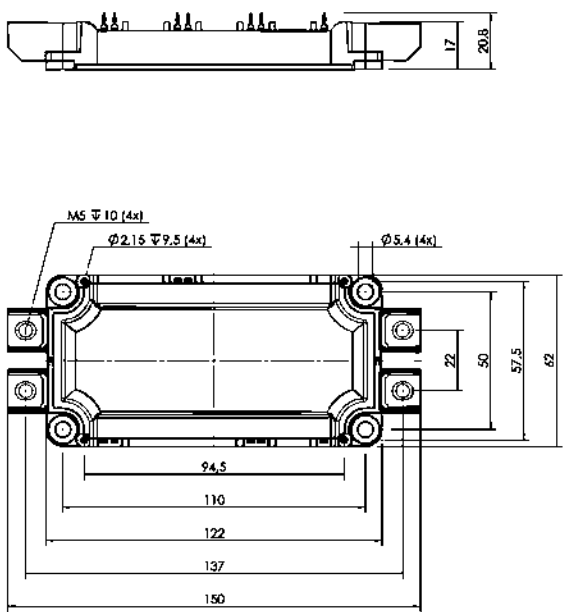
SiC Modules / Hybrid SiC / SEMIX

Type	IGBT					Diode		Module		
	$I_c @ T_c = 25^{\circ}\text{C}$ 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 V	Package	Thermal Interface Material	Topology
1200V - IGBT4 (Trench)										
SEMIx603GB12E4SiCp ¹⁾	1110	600	1.80	17	72	404	1.40	3p	P8, HT	

Footnotes: 1) Sample status

Packages

SEMIx 3p



Dimensions in mm

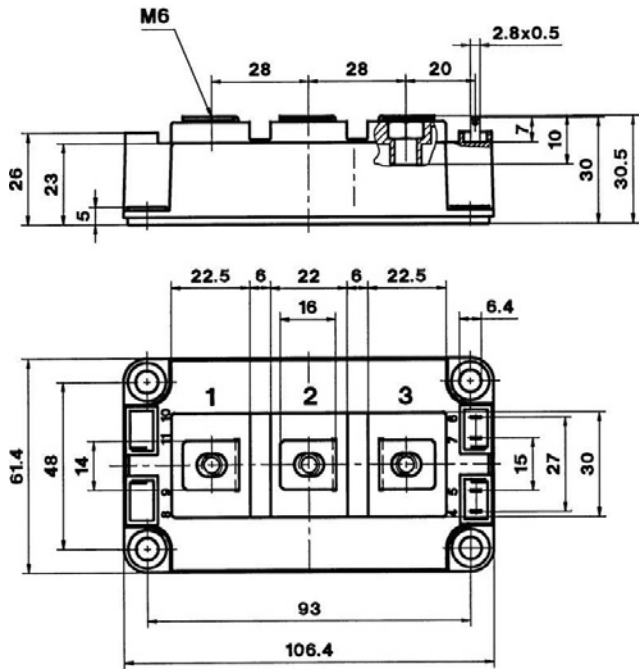
SiC Modules / Hybrid SiC / SEMITRANS

Type	IGBT					Diode	Module			
	$I_c @ T_c = 25^{\circ}\text{C}$ 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 V	Package	Thermal Interface Material	Topology
1200V - IGBT4 (Trench)										
SKM200GB12T4SiC2 ¹⁾	313	200	1.80	7	20	246	1.40	3	P8	
1200V - IGBT4 (Fast Trench)										
SKM200GB12F4SiC2 ¹⁾	279	200	2.06	7	17	246	1.40	3	P8	
SKM200GB12F4SiC3 ¹⁾	279	200	2.06	7	17	123	1.40	3	P8	

Footnotes: 1) Sample status

Packages

SEMITRANS 3



Dimensions in mm

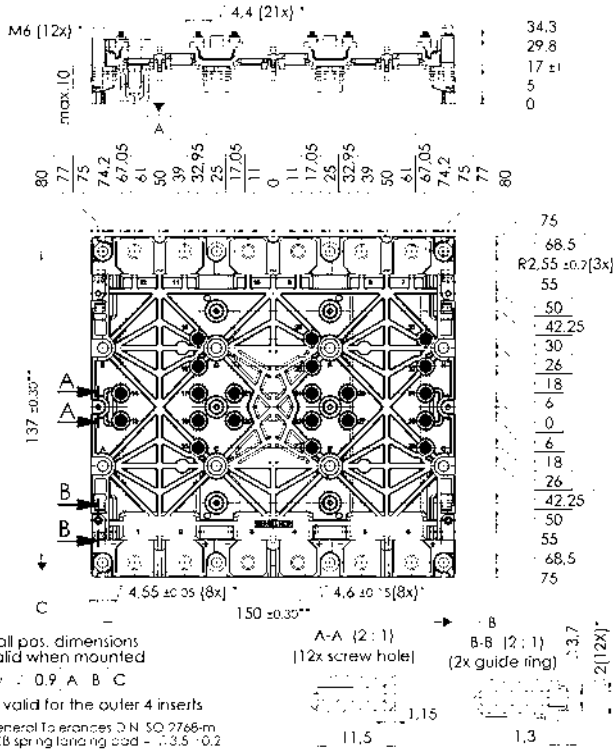
SiC Modules / Hybrid SiC / SKiM 63/93

Type	IGBT					Diode	Module			
	$I_c @ T_s = 25^{\circ}\text{C}$ 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 V	Package	Thermal Interface Material	Topology
1200V - IGBT4 (Fast Trench)										
SKiM459GD12F4V3 ¹⁾	476	450	2.05	2	11	214	1.33	93	P12, HPTP	
SKiM459GD12F4V4 ¹⁾	476	450	2.05	5	20	357	1.33	93	P12, HPTP	

Footnotes: 1) Sample status

Packages

SKiM 93



Dimensions in mm