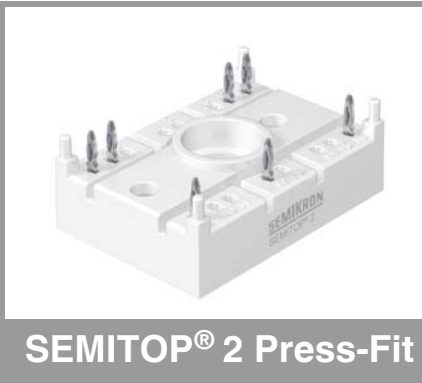


# SK35MLLE120SCp



## SiC MOSFET Module

### Evaluation Sample

### SK35MLLE120SCp

#### Target Data

#### Features

- One screw mounting module
- Fully compatible with other SEMISTOP® Press-Fit types
- Improved thermal performance by aluminum oxide substrate
- Double Boost in very compact solution
- Symmetrical layout
- Ultra Low inductance design
- SiC 1200V Trench MOSFET
- SiC 1200V Schottky FWD
- By-pass Rectifier diode
- Extremely high switching frequency
- UL recognized, file no. E63 532

#### Typical Applications\*

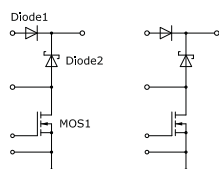
- Interleaved PFC
- Solar inverter
- Power Supply

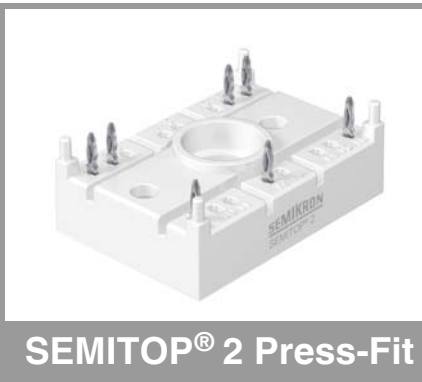
Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
MOSFET 1				
V <sub>DSS</sub>			1200	V
I <sub>D</sub>	T <sub>j</sub> = 175 °C	T <sub>s</sub> = 25 °C	36	A
		T <sub>s</sub> = 70 °C	30	A
I <sub>DM</sub>	PW ≤ 10μs, duty cycle ≤ 1%		137	A
I <sub>DRM</sub>			56	A
V <sub>GS</sub>			-4 ... 22	V
T <sub>j</sub>			-40 ... 175	°C
Integrated body diode				
I <sub>FM</sub>	PW ≤ 10μs, duty cycle ≤ 1%		137	A
I <sub>FRM</sub>			56	A

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
Diode 1				
V <sub>RRM</sub>	T <sub>j</sub> = 25 °C		1600	V
I <sub>F</sub>	T <sub>j</sub> = 150 °C	T <sub>s</sub> = 25 °C	45	A
		T <sub>s</sub> = 70 °C	33	A
I <sub>Fnom</sub>			35	A
I <sub>FSM</sub>	10 ms, sin 180°, T <sub>j</sub> = 150 °C		270	A
i <sup>2</sup> t	10 ms, sin 180°, T <sub>j</sub> = 150 °C		364	A <sup>2</sup> s
T <sub>j</sub>			-40 ... 150	°C

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
Diode 2				
V <sub>RRM</sub>	T <sub>j</sub> = 25 °C		1200	V
I <sub>F</sub>	T <sub>j</sub> = 175 °C	T <sub>s</sub> = 25 °C	41	A
		T <sub>s</sub> = 70 °C	33	A
I <sub>Fnom</sub>			30	A
I <sub>FRM</sub>			84	A
I <sub>FSM</sub>	8.3 ms sin 180°	T <sub>j</sub> = 25 °C	117	A
		T <sub>j</sub> = 150 °C	88	A
T <sub>j</sub>			-40 ... 175	°C

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
<b>Module</b>			
$I_{t(RMS)}$	$T_{terminal} = 100\text{ °C}$ , $T_s = 60\text{ °C}$ , per pin	40	A
$T_{stg}$		-40 ... 125	°C
$V_{isol}$	AC, sinusoidal, $t = 1\text{ min}$	2500	V





## SiC MOSFET Module

### Evaluation Sample

### SK35MLLE120SCp

#### Target Data

#### Features

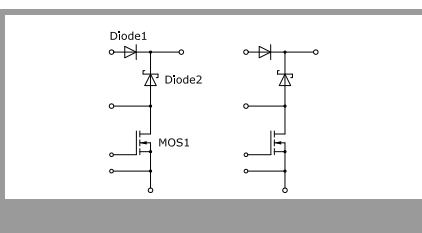
- One screw mounting module
- Fully compatible with other SEMISTOP® Press-Fit types
- Improved thermal performance by aluminum oxide substrate
- Double Boost in very compact solution
- Symmetrical layout
- Ultra Low inductance design
- SiC 1200V Trench MOSFET
- SiC 1200V Schottky FWD
- By-pass Rectifier diode
- Extremely high switching frequency
- UL recognized, file no. E63 532

#### Typical Applications\*

- Interleaved PFC
- Solar inverter
- Power Supply

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
<b>MOSFET 1</b>					
$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}, T_j = 25\text{ °C}$	1200			V
$V_{GS(th)}$	$V_{DS} = 10\text{ V}, I_D = 10\text{ mA}, T_j = 25\text{ °C}$	2.7	4.15	5.6	V
$I_{DSS}$	$V_{GS} = 0\text{ V}, V_{DS} = 1200\text{ V}, T_j = 25\text{ °C}$			1	mA
$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = 22\text{ V}, T_j = 25\text{ °C}$			100	nA
$R_{DS(on)}$	$V_{GS} = 18\text{ V}$				
	$I_D = 20\text{ A}$				
	$T_j = 25\text{ °C}$		40	50	mΩ
	$T_j = 150\text{ °C}$		69	79	mΩ
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 800\text{ V}, f = 1\text{ MHz}$		1337		pF
$C_{oss}$	$V_{GS} = 0\text{ V}, V_{DS} = 800\text{ V}, f = 1\text{ MHz}$		76		pF
$C_{rss}$	$V_{GS} = 0\text{ V}, V_{DS} = 800\text{ V}, f = 1\text{ MHz}$		27		pF
$R_{Gint}$	$T_j = 25\text{ °C}$		7.0		Ω
$Q_G$	$V_{GS} = 0V...18V, V_{DS} = 600V, I_D = 20\text{ A}$		107		nC
$t_{d(on)}$	$V_{DD} = 600\text{ V}$				
	$T_j = 150\text{ °C}$				ns
$t_{d(off)}$					ns
$t_r$	$I_D = 35\text{ A}$				ns
$t_f$					ns
$E_{on}$			0.4		mJ
$E_{off}$			0.15		mJ
$R_{th(j-s)}$	per MOSFET		1.4		K/W
<b>Integrated body diode</b>					
$V_F = V_{SD}$	$I_D = 20\text{ A}$				
	$V_{GS} = 0\text{ V}$				
	chipelevel				
	$T_j = 25\text{ °C}$		3.20		V
	$T_j = 150\text{ °C}$		3.40		V
$V_{F0} = V_{SD0}$					
	chipelevel				
	$T_j = 25\text{ °C}$		2.00		V
	$T_j = 150\text{ °C}$		1.60		V
$r_F = r_{SD}$					
	chipelevel				
	$T_j = 25\text{ °C}$		60		mΩ
	$T_j = 150\text{ °C}$		90		mΩ
$t_{rr}$	$V_{DD} = 600\text{ V}$				
$Q_{rr}$	$I_D = 35\text{ A}$				
$I_{rr}$					
$E_{rr}$					

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
<b>Diode 1</b>					
$V_F$	$I_F = 35\text{ A}$				
	$T_j = 25\text{ °C}$		1.20	1.60	V
	chipelevel		1.19	1.56	V
$V_{F0}$					
	chipelevel		0.88	0.98	V
	$T_j = 25\text{ °C}$		0.73	0.83	V
$r_F$					
	chipelevel				
	$T_j = 25\text{ °C}$		9.2	18	mΩ
	$T_j = 125\text{ °C}$		13	21	mΩ
$I_R$	$T_j = 145\text{ °C}, V_{RRM}$			1.1	mA
$R_{th(j-s)}$	per Diode		1.6		K/W



# SK35MLLE120SCp



## SiC MOSFET Module

### Evaluation Sample

### SK35MLLE120SCp

#### Target Data

#### Features

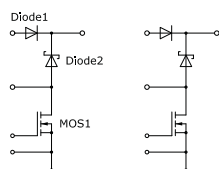
- One screw mounting module
- Fully compatible with other SEMISTOP® Press-Fit types
- Improved thermal performance by aluminum oxide substrate
- Double Boost in very compact solution
- Symmetrical layout
- Ultra Low inductance design
- SiC 1200V Trench MOSFET
- SiC 1200V Schottky FWD
- By-pass Rectifier diode
- Extremely high switching frequency
- UL recognized, file no. E63 532

#### Typical Applications\*

- Interleaved PFC
- Solar inverter
- Power Supply

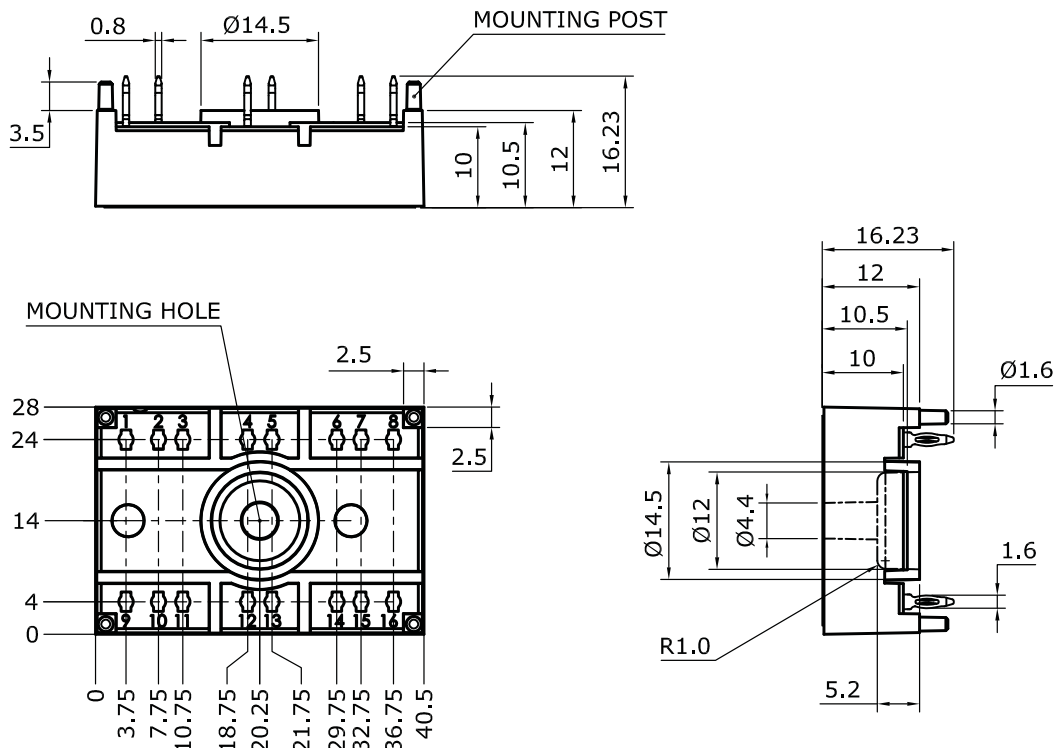
Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Diode 2						
V <sub>F</sub>	I <sub>F</sub> = 30 A	T <sub>j</sub> = 25 °C		1.40	1.60	V
	chiplevel	T <sub>j</sub> = 150 °C		1.80	2.10	V
V <sub>F0</sub>	chiplevel	T <sub>j</sub> = 25 °C		0.95	1.05	V
		T <sub>j</sub> = 150 °C		0.80	0.90	V
r <sub>F</sub>	chiplevel	T <sub>j</sub> = 25 °C		15	18	mΩ
		T <sub>j</sub> = 150 °C		33	40	mΩ
C <sub>j</sub>	V <sub>R</sub> = 800 V, f = 1 MHz, T <sub>j</sub> = 25 °C			0.1		nF
Q <sub>c</sub>	V <sub>R</sub> = 800 V, di/dt <sub>off</sub> = 500 A/μs, T <sub>j</sub> = 25 °C			0.10		μC
R <sub>th(j-s)</sub>	per Diode			1.35		K/W

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Module					
M <sub>s</sub>	to heatsink	1.8		2	Nm
w	weight	19			g



Dimensions: mm

Tolerance system: ISO 2768-m



Suggested drilled hole diameter for terminal pins in the circuit board:

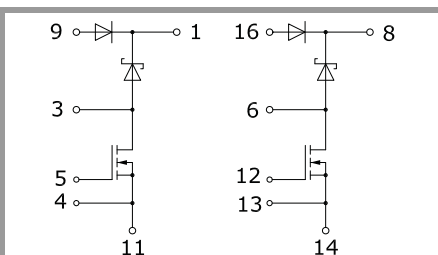
- minimum: 1.575 mm
- typical: 1.6 mm
- maximum: 1.625 mm

Suggested hole diameter for the mounting post in the circuit board:

- 2 mm

These documents are SEMIKRON properties. SEMIKRON reserves all copyrights. All copying and transmitting of this information requires written permission. For the case of industrial property rights, SEMIKRON reserves all rights.

SEMITOP 2 Press-Fit



This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, chapter IX.

## **\*IMPORTANT INFORMATION AND WARNINGS**

The specifications of SEMIKRON products may not be considered as guarantee or assurance of product characteristics ("Beschaffenheitsgarantie"). The specifications of SEMIKRON products describe only the usual characteristics of products to be expected in typical applications, which may still vary depending on the specific application. Therefore, products must be tested for the respective application in advance. Application adjustments may be necessary. The user of SEMIKRON products is responsible for the safety of their applications embedding SEMIKRON products and must take adequate safety measures to prevent the applications from causing a physical injury, fire or other problem if any of SEMIKRON products become faulty. The user is responsible to make sure that the application design is compliant with all applicable laws, regulations, norms and standards. Except as otherwise explicitly approved by SEMIKRON in a written document signed by authorized representatives of SEMIKRON, SEMIKRON products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury. No representation or warranty is given and no liability is assumed with respect to the accuracy, completeness and/or use of any information herein, including without limitation, warranties of non-infringement of intellectual property rights of any third party. SEMIKRON does not assume any liability arising out of the applications or use of any product; neither does it convey any license under its patent rights, copyrights, trade secrets or other intellectual property rights, nor the rights of others. SEMIKRON makes no representation or warranty of non-infringement or alleged non-infringement of intellectual property rights of any third party which may arise from applications. Due to technical requirements our products may contain dangerous substances. For information on the types in question please contact the nearest SEMIKRON sales office. This document supersedes and replaces all information previously supplied and may be superseded by updates. SEMIKRON reserves the right to make changes.

In accordance with the quality guidelines of SEMIKRON, we would like to point out that the products are evaluation samples. These evaluation samples are not produced under quality conditions approaching those of series production, and are at the present time not included in the SEMIKRON quality monitoring and control process. Neither the product nor the production process has to date gone through the SEMIKRON internal authorization procedure. The evaluation samples may differ from the final series product in terms of their performance, applicability and specification. SEMIKRON may make any amendments without any prior notification. SEMIKRON cannot and shall not promise or commit itself to release and/or make available a final version or series product after the development phase. Evaluation samples may only be used in line with their functionality and performance for function tests in the context of developments. Evaluation samples are not released for use in serial products.

**IMPORTANT:** Evaluation samples must be commissioned and operated by qualified persons only. The user is responsible to use and operate evaluation samples only in full accordance with all applicable regulations and standards, especially, but not limited to safety standards, accident prevention and environmental regulations. We explicitly recommend to follow the applicable local implementation of EN50191.

If and when the customer sells evaluation samples to any third party the customer must inform the third party in advance of all notes, warnings, reservations and obligations provided and imposed by SEMIKRON. SEMIKRON cannot and will not assume any responsibility with regard to freedom from defects, functionality, and adaptation to and interaction with possible applications of the user or with regard to any other potential risks resulting from use of evaluation samples. Therefore SEMIKRON explicitly excludes any warranty and liability; as far as legally possible. The customer shall fully indemnify and hold harmless SEMIKRON from any and all risks, damages, losses, expenses and costs directly or indirectly resulting out of or in connection with the commissioning, operation, system integration, sale, dissemination or any other kind of use of evaluation samples by the customer and/or any third party, which has come into possession of evaluation samples through or because of the customer. All know-how and all registerable and non-registerable copyrights and industrial property rights arising from or in connection with these evaluation samples remain the exclusive property of SEMIKRON.