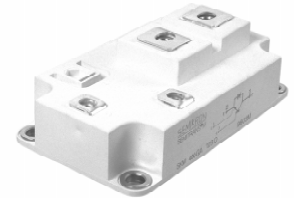


Absolute Maximum Ratings		Values	Units
Symbol	Conditions <sup>1)</sup>		
V <sub>CES</sub>		1700	V
V <sub>CGR</sub>	R <sub>GE</sub> = 20 kΩ	1700	V
I <sub>C</sub> ; I <sub>CN</sub>	T <sub>case</sub> = 25/70 °C	600 / 500	A
I <sub>CM</sub>	T <sub>case</sub> = 25/70 °C; t <sub>p</sub> = 1 ms	1200 / 1000	A
V <sub>GES</sub>		± 20	V
P <sub>tot</sub>	per IGBT, T <sub>case</sub> = 25 °C	3000	W
T <sub>j</sub> , (T <sub>stg</sub> )		-40 ... +150 (125)	°C
V <sub>isol</sub>	AC, 1 min. <sup>4)</sup>	3400	V
humidity	DIN 40 040	Class F	
climate	DIN IEC 68 T.1	40/125/56	
Inverse Diode <sup>8)</sup>			
I <sub>F</sub> = -I <sub>C</sub>	T <sub>case</sub> = 25/70 °C	550 / 420	A
I <sub>FM</sub> = -I <sub>CM</sub>	T <sub>case</sub> = 25/70 °C; t <sub>p</sub> = 1 ms	1200/ 1000	A
I <sub>FSM</sub>	t <sub>p</sub> = 10 ms; sin.; T <sub>j</sub> = 150 °C	4400	A
I <sup>2</sup> t	t <sub>p</sub> = 10 ms; T <sub>j</sub> = 150 °C	96800	A <sup>2</sup> s

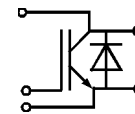
## SEMITRANS® M Low Loss IGBT Modules

### SKM 500 GA 174 D

Preliminary Data



### SEMITRANS 4



GA

### Features

- MOS input (voltage controlled)
- N channel, homogeneous Silicon structure (NPT- Non punch-through IGBT)
- Low inductance case
- Low tail current with low temperature dependence
- High short circuit capability, self limiting to 4 \* I<sub>Cnom</sub>
- Latch-up free
- Fast & soft inverse CAL diodes <sup>8)</sup>
- Isolated copper baseplate using DCB Direct Copper Bonding
- Large clearance (13 mm) and creepage distances (20 mm)

### Typical Applications

- AC inverter drives on mains 575 - 750 V<sub>AC</sub>
- DC bus voltage 750 - 1200 V<sub>DC</sub>
- Public transport (auxiliary syst.)
- Switching (not for linear use)

Characteristics		min.	typ.	max.	Units
Symbol	Conditions <sup>1)</sup>				
V <sub>(BR)CES</sub>	V <sub>GE</sub> = 0, I <sub>C</sub> = 8 mA	≥ V <sub>CES</sub>	-	-	V
V <sub>GE(th)</sub>	V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 24 mA	4,8	5,5	6,2	V
I <sub>CES</sub>	V <sub>GE</sub> = 0 } T <sub>j</sub> = 25 °C	-	0,1	0,8	mA
	V <sub>CE</sub> = V <sub>CES</sub> } T <sub>j</sub> = 125 °C	-	16	-	mA
I <sub>GES</sub>	V <sub>GE</sub> = 20 V, V <sub>CE</sub> = 0	-	-	100	nA
V <sub>CESat</sub>	I <sub>C</sub> = 400 A } V <sub>GE</sub> = 15 V;	-	2,8(3,25)	3,3	V
	I <sub>C</sub> = 500 A } T <sub>j</sub> = 25 (125) °C }	-	3,0(3,6)	-	V
g <sub>fs</sub>	V <sub>CE</sub> = 20 V, I <sub>C</sub> = 400 A	-	220	-	S
C <sub>CHC</sub>	per IGBT	-	-	1,4	nF
C <sub>ies</sub>	V <sub>GE</sub> = 0	-	20	-	nF
C <sub>oes</sub>	V <sub>CE</sub> = 25 V	-	3,8	-	nF
C <sub>res</sub>	f = 1 MHz	-	1,3	-	nF
L <sub>CE</sub>		-	-	20	nH
t <sub>d(on)</sub>	V <sub>CC</sub> = 1200 V	-	150	-	ns
t <sub>r</sub>	V <sub>GE</sub> = -15 V / +15 V <sup>3)</sup>	-	120	-	ns
t <sub>d(off)</sub>	I <sub>C</sub> = 400 A, ind. load	-	1000	-	ns
t <sub>f</sub>	R <sub>Gon</sub> = R <sub>Goff</sub> = 4,7 Ω	-	150	-	ns
E <sub>on</sub>	T <sub>j</sub> = 125 °C	-	280	-	mWs
E <sub>off</sub>	L <sub>S</sub> = 60 nH	-	160	-	mWs
Inverse Diode <sup>8)</sup>					
V <sub>F</sub> = V <sub>EC</sub>	I <sub>F</sub> = 400 A } V <sub>GE</sub> = 0 V;	-	2,2(1,9)	2,7(2,4)	V
V <sub>F</sub> = V <sub>EC</sub>	I <sub>F</sub> = 500 A } T <sub>j</sub> = 25 (125) °C }	-	2,4(2,3)	-	V
V <sub>TO</sub>	T <sub>j</sub> = 125 °C	-	1,3	1,5	V
r <sub>t</sub>	T <sub>j</sub> = 125 °C	-	2	2,5	mΩ
I <sub>RRM</sub>	I <sub>F</sub> = 400 A; T <sub>j</sub> = 25 (125) °C <sup>2)</sup>	-	200(300)	-	A
Q <sub>rr</sub>	I <sub>F</sub> = 400 A; T <sub>j</sub> = 25 (125) °C <sup>2)</sup>	-	48(116)	-	μC
Thermal characteristics					
R <sub>thjc</sub>	per IGBT	-	-	0,041	°C/W
R <sub>thjc</sub>	per diode D	-	-	0,075	°C/W
R <sub>thch</sub>	per module	-	-	0,038	°C/W

<sup>1)</sup> T<sub>case</sub> = 25 °C, unless otherwise specified

<sup>2)</sup> I<sub>F</sub> = -I<sub>C</sub>, V<sub>R</sub> = 1200 V, -di<sub>F</sub>/dt = 1500 A/μs, V<sub>GE</sub> = 0 V

<sup>3)</sup> Use V<sub>GEoff</sub> = -5 ... -15 V

<sup>4)</sup> Option V<sub>isol</sub> = 4000V/1 min add suffix „H4“ - on request

<sup>8)</sup> CAL = Controlled Axial Lifetime Technology

Cases and mech. data → B6-280

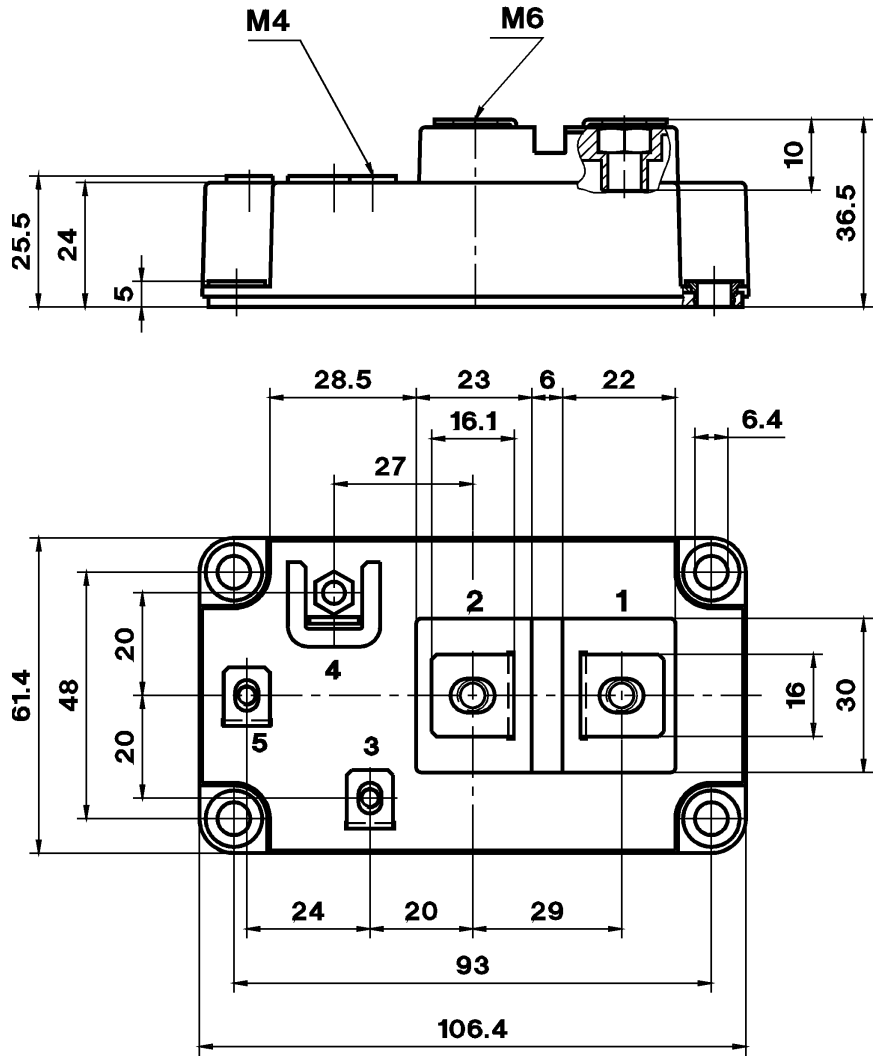
**SEMITRANS 4**

**Case D 59**

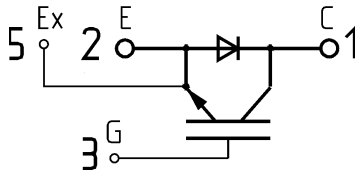
UL Recognition  
File no. E 63 532  
applied for

CASED59

**SKM 500 GA 174 D**



GCIGGA4



Dimensions in mm

Option SKM 500 GA 174 DS on request:  
Terminal 4 = collector sense  $V_{CE}$ , add suffix „S“. → B 6 – 212

Case outline and circuit diagram

Mechanical Data			Values			Units
Symbol	Conditions		min.	typ.	max.	
M <sub>1</sub>	to heatsink, SI Units to heatsink, US Units	(M6)	3 27	–	5 44	Nm lb.in.
M <sub>2</sub>	for terminals, SI Units for terminals, US Units	(M6/M4)	2,5/1,1 22/10	–	5/2 44/18	Nm lb.in.
a			–	–	5x9,81	m/s <sup>2</sup>
w			–	–	330	g

**This is an electrostatic discharge sensitive device (ESDS). Please observe the international standard IEC 747-1, Chapter IX.**

Three devices are supplied in one SEMIBOX B without mounting hardware, which can be ordered separately under Ident No. 33321100 (for 10 SEMITRANS 4)

Larger packing units of 12 or 20 pieces are used if suitable  
Accessories → B 6 – 4  
SEMIBOX → C – 1.