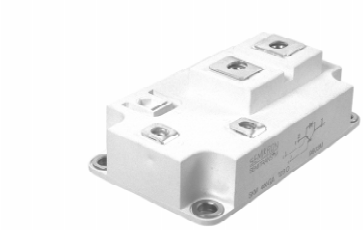
SEMIKRON

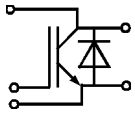
SEMITRANS® M
Low Loss IGBT Modules

SKM 400 GA 174 D

Preliminary Data



SEMITRANS 4



GA

Absolute Maximum Ratings		Values	Units
Symbol	**Conditions** [1]		
V_{CES}		1700	V
V_{CGR}	R_{GE} = 20 kΩ	1700	V
I_C; I_{CN}	T_{case} = 25/**75** °C	540 / **400**	A
I_{CM}	T_{case} = 25/75 °C; t_p = 1 ms	1080 / 800	A
V_{GES}		± 20	V
P_{tot}	per IGBT, T_{case} = 25 °C	2780	W
T_j, (T_{stg})		–40 ... +150 (125)	°C
V_{isol}	AC, 1 min. [4]	3400	V
humidity	DIN 40 040	Class F	
climate	DIN IEC 68 T.1	40/125/56	
Inverse Diode [8]			
$I_F = -I_C$	T_{case} = 25/75 °C	380 / 275	A
$I_{FM} = -I_{CM}$	T_{case} = 25/75 °C; t_p = 1 ms	1080/ 800	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 150 °C	2900	A
I^2t	t_p = 10 ms; T_j = 150 °C	42000	A^2s

Characteristics					
Symbol	**Conditions** [1]	**min.**	**typ.**	**max.**	**Units**
$V_{(BR)CES}$	V_{GE} = 0, I_C = 6 mA	≥ V_{CES}	–	–	V
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 20 mA	4,8	5,5	6,2	V
I_{CES}	V_{GE} = 0, T_j = 25 °C	–	0,1	0,6	mA
	V_{CE} = V_{CES}, T_j = 125 °C	–	8	–	mA
I_{GES}	V_{GE} = 20 V, V_{CE} = 0	–	–	100	nA
V_{CEsat}	I_C = 300 A; V_{GE} = 15 V; T_j = 25 (125) °C	–	2,8(3,25)	–	V
	I_C = 400 A; V_{GE} = 15 V; T_j = 25 (125) °C	–	3,3(3,6)	–	V
g_{fs}	V_{CE} = 20 V, I_C = 300 A	108	150	–	S
C_{CHC}	per IGBT	–	–	1,4	nF
C_{ies}	V_{GE} = 0, V_{CE} = 25 V, f = 1 MHz	–	22	–	nF
C_{oes}		–	3	–	nF
C_{res}		–	1	–	nF
L_{CE}		–	–	20	nH
$t_{d(on)}$	V_{CC} = 1200 V	–	120	–	ns
t_r	V_{GE} = –15 V / +15 V [3]	–	130	–	ns
$t_{d(off)}$	I_C = 300 A, ind. load	–	1000	–	ns
t_f	R_{Gon} = R_{Goff} = 5,6 Ω	–	140	–	ns
E_{on}	T_j = 125 °C	–	220	–	mWs
E_{off}	L_S = 60 nH	–	150	–	mWs
Inverse Diode [8]					
$V_F = V_{EC}$	I_F = 300 A; V_{GE} = 0 V; T_j = 25 (125) °C	–	2,2(1,9)	2,7(2,4)	V
$V_F = V_{EC}$	I_F = 400 A; V_{GE} = 0 V; T_j = 25 (125) °C	–	2,4(2,25)	–	V
V_{TO}	T_j = 125 °C	–	1,3	1,5	V
r_t	T_j = 125 °C	–	3	3,2	mΩ
I_{RRM}	I_F = 300 A; T_j = 25 (125) °C [2]	–	120(170)	–	A
Q_{rr}	I_F = 300 A; T_j = 25 (125) °C [2]	–	30(72)	–	µC
Thermal characteristics					
R_{thjc}	per IGBT	–	–	0,045	°C/W
R_{thjc}	per diode D	–	–	0,125	°C/W
R_{thch}	per module	–	–	0,038	°C/W

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_{cnom}
- Latch-up free
- Fast & soft inverse CAL diodes [8]
- Isolated copper baseplate using DCB Direct Copper Bonding
- Large clearance (13 mm) and creepage distances (20 mm)

Typical Applications

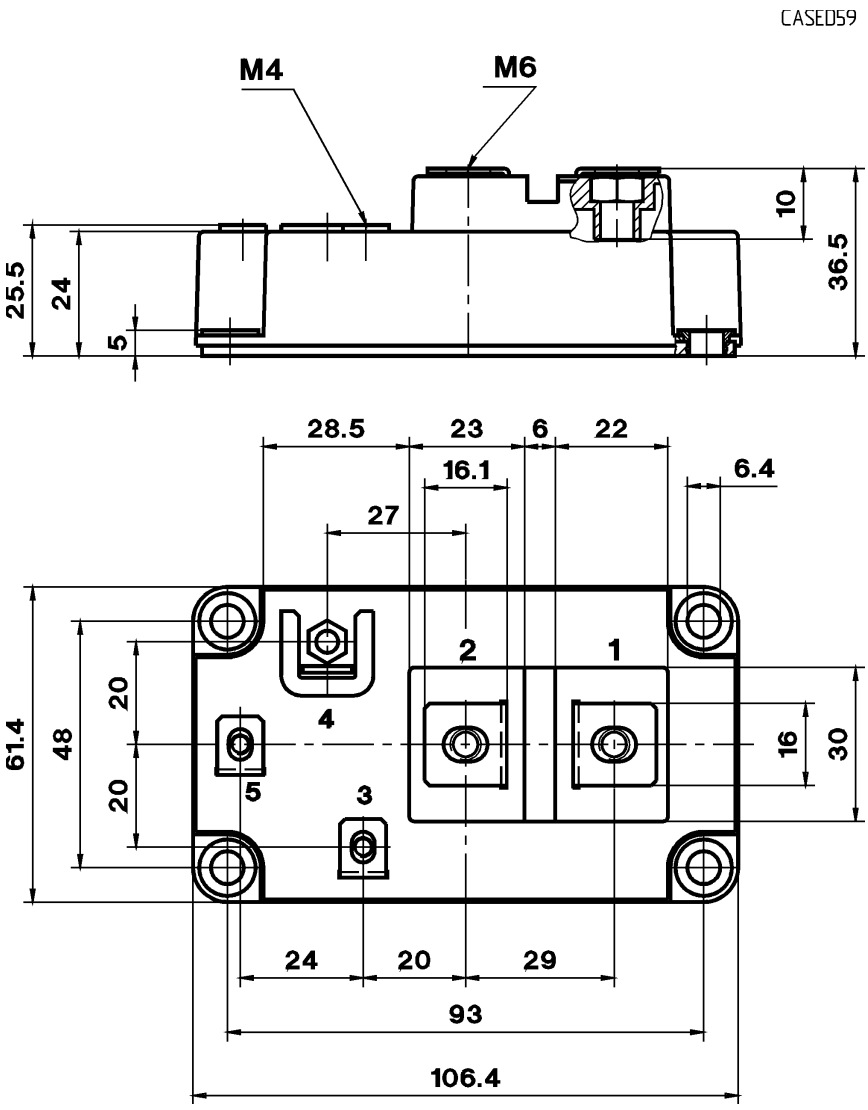
- AC inverter drives on mains 575 - 750 V_{AC}
- DC bus voltage 750 - 1200 V_{DC}
- Public transport (auxiliary syst.)
- Switching (not for linear use)

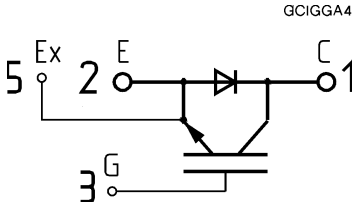
[1] T_{case} = 25 °C, unless otherwise specified
[2] I_F = – I_C, V_R = 1200 V, $-di_F/dt$ = 1500 A/µs, V_{GE} = 0 V
[3] Use V_{GEoff} = -5 ... -15 V
[4] Option V_{isol} = 4000V/1 min add suffix „H4“ - on request
[8] CAL = Controlled Axial Lifetime Technology

Cases and mech. data → B6-278

SEMITRANS 4
Case D 59
UL Recognition
File no. E 63 532
applied for

SKM 400 GA 174 D





Dimensions in mm

Option SKM 400 GA 174 DS on request:
Terminal 4 = collector sense V_{CE}, add suffix „S“. → B 6 – 212

Case outline and circuit diagram

Mechanical Data						
Symbol	Conditions		Values			Units
			min.	typ.	max.	
M_1	to heatsink, SI Units	(M6)	3	–	5	Nm
	to heatsink, US Units		27	–	44	lb.in.
M_2	for terminals, SI Units	(M6/M4)	2,5/1,1	–	5/2	Nm
	for terminals, US Units		22/10	–	44/18	lb.in.
a			–	–	5x9,81	m/s^2
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.

