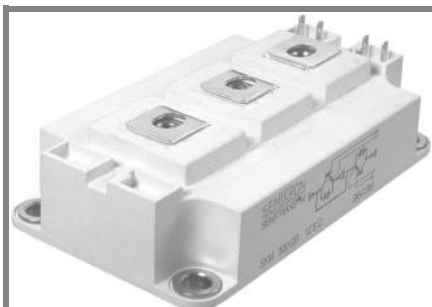


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SEMITRANS® 3

Trench IGBT Modules

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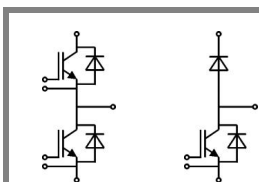
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Features

- Homogeneous Si
- Trench = Trenchgate technology
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications*

- AC inverter drives mains 575 - 750 V AC
- Public transport (auxiliary syst.)



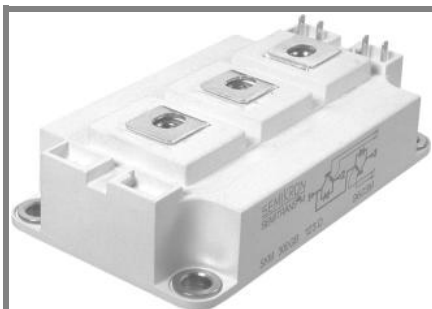
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Absolute Maximum Ratings			T _c = 25 °C, unless otherwise specified	
Symbol	Conditions		Values	Units
IGBT				
V _{CES}	T _j = 25 °C		1700	V
I _C	T _j = 150 °C	T _c = 25 °C	260	A
		T _c = 80 °C	180	A
I _{CRM}	I _{CRM} =2xI _{Cnom}		300	A
V _{GES}			± 20	V
t _{psc}	V _{CC} = 1200 V; V _{GE} ≤ 20 V; T _j = 125 °C V _{CES} < 1700 V		10	μs
Inverse Diode				
I _F	T _j = 150 °C	T _c = 25 °C	210	A
		T _c = 80 °C	140	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		300	A
I _{FSM}	t _p = 10 ms; sin.	T _j = 150 °C	1100	A
Freewheeling Diode				
I _F	T _j = 150 °C	T _{case} = 25 °C	210	A
		T _{case} = 80 °C	140	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		300	A
I _{FSM}	t _p = 10 ms; sin.	T _j = 150 °C	1100	A
Module				
I _{t(RMS)}			500	A
T _{vj}			- 40 ... + 150	°C
T _{stg}			-40...+125	°C
V _{isol}	AC, 1 min.		4000	V

Characteristics			T _c = 25 °C, unless otherwise specified			
Symbol	Conditions		min.	typ.	max.	Units
IGBT						
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 6 mA		5,2	5,8	6,4	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C				3	mA
V _{CE0}	T _j = 25 °C			1	1,2	V
	T _j = 125 °C			0,9	1,1	V
r _{CE}	V _{GE} = 15 V T _j = 25°C			6,7	8,3	mΩ
	T _j = 125°C			10	12	mΩ
V _{CE(sat)}	I _{Cnom} = 150 A, V _{GE} = 15 V T _j = 25°C _{chiplev.}			2	2,45	V
	T _j = 125°C _{chiplev.}			2,4	2,9	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz			11,4		nF
C _{oes}				0,55		nF
C _{res}				0,44		nF
Q _G	V _{GE} = -8V...+15V			1200		nC
R _{Gint}	T _j = 25 °C			4,25		Ω
t _{d(on)}	R _{Gon} = 5 Ω	V _{CC} = 1200V I _C = 150A		360		ns
t _r				45		ns
E _{on}				93		mJ
t _{d(off)}	R _{Goff} = 5 Ω	T _j = 125 °C V _{GE} = ± 15V		760		ns
t _f				140		ns
E _{off}				58		mJ
R _{th(j-c)}	per IGBT				0,12	K/W

SKM 200GB176D



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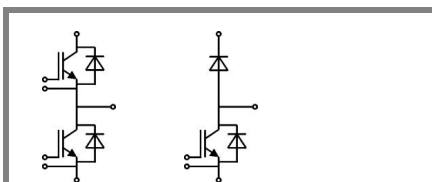
Typical Applications*

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- Public transport (auxiliary syst.)

Characteristics						
Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
V _F = V _{EC}	I _{Fnom} = 150 A; V _{GE} = 0 V	T _j = 25 °C _{chiplev.}		1,7	1,9	V
		T _j = 125 °C _{chiplev.}		1,7	1,9	V
V _{F0}		T _j = 25 °C		1,1	1,3	V
		T _j = 125 °C		0,9	1,1	V
r _F		T _j = 25 °C		4	4	mΩ
		T _j = 125 °C		5,3	5,3	mΩ
I _{RRM}	I _F = 150 A	T _j = 125 °C		195		A
Q _{rr}	di/dt = 3700 A/μs			52		μC
E _{rr}	V _{GE} = -15 V; V _{CC} = 1200 V			31		mJ
R _{th(j-c)D}	per diode				0,25	K/W
FWD						
V _F = V _{EC}	I _{Fnom} = 150 A; V _{GE} = 0 V	T _j = 25 °C _{chiplev.}		1,7	1,9	V
		T _j = 125 °C _{chiplev.}		1,7	1,9	V
V _{F0}		T _j = 25 °C		1,1	1,3	V
		T _j = 125 °C		0,9	1,1	V
r _F		T _j = 25 °C		4	4	V
		T _j = 125 °C		5,3	5,3	V
I _{RRM}	I _F = 150 A	T _j = 125 °C		195		A
Q _{rr}	di/dt = 3700 A/μs			52		μC
E _{rr}	V _{GE} = -15 V; V _{CC} = 1200 V			31		mJ
R _{th(j-c)FD}	per diode				0,25	K/W
Module						
L _{CE}				15	20	nH
R _{CC'+EE'}	res., terminal-chip	T _{case} = 25 °C		0,35		mΩ
		T _{case} = 125 °C		0,5		mΩ
R _{th(c-s)}	per module				0,038	K/W
M _s	to heat sink M6		3		5	Nm
M _t	to terminals M6		2,5		5	Nm
w					325	g

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

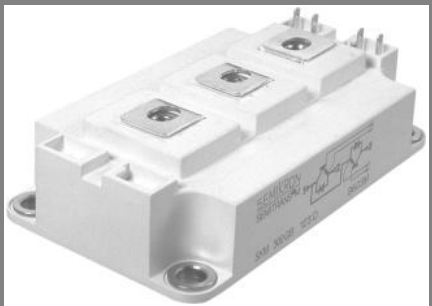
* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.



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Z_{th}			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	80	mk/W
R_i	$i = 2$	30	mk/W
R_i	$i = 3$	8,2	mk/W
R_i	$i = 4$	1,8	mk/W
τ_{ui}	$i = 1$	0,0753	s
τ_{ui}	$i = 2$	0,01	s
τ_{ui}	$i = 3$	0,0008	s
τ_{ui}	$i = 4$	0,0003	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	160	mk/W
R_i	$i = 2$	67	mk/W
R_i	$i = 3$	20	mk/W
R_i	$i = 4$	3	mk/W
τ_{ui}	$i = 1$	0,0382	s
τ_{ui}	$i = 2$	0,009	s
τ_{ui}	$i = 3$	0,0009	s
τ_{ui}	$i = 4$	0,005	s

