



SEMITRANS® 3

## IGBT4 Modules

### SKM150GB17E4G

#### Target Data

#### Features

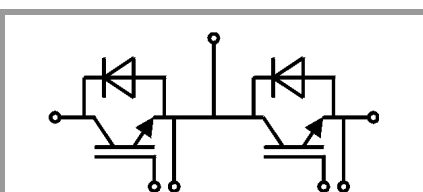
- IGBT4 = 4. generation medium fast trench IGBT (Infineon)
- CAL4 = Soft switching 4. Generation CAL-Diode
- Insulated copper baseplate using DBC Technology (Direct Copper Bonding)
- With integrated Gate resistor
- For switching frequencies up to 8kHz
- UL recognized, file no. E63532

#### Typical Applications\*

- AC inverter drives
- UPS
- Electronic welders
- Wind power
- Public transport

#### Remarks

- Case temperature limited to  $T_c = 125^\circ\text{C}$  max.
- Recommended  $T_{op} = -40 \dots +150^\circ\text{C}$
- Product reliability results valid for  $T_j = 150^\circ\text{C}$



GB

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V <sub>CES</sub>	T <sub>j</sub> = 25 °C		1700	V
I <sub>C</sub>	T <sub>j</sub> = 175 °C	T <sub>c</sub> = 25 °C	242	A
		T <sub>c</sub> = 80 °C	187	A
I <sub>Cnom</sub>			150	A
I <sub>CRM</sub>	I <sub>CRM</sub> = 3xI <sub>Cnom</sub>		450	A
V <sub>GES</sub>			-20 ... 20	V
t <sub>psc</sub>	V <sub>CC</sub> = 1000 V V <sub>GE</sub> ≤ 15 V V <sub>CES</sub> ≤ 1700 V	T <sub>j</sub> = 150 °C	10	µs
T <sub>j</sub>			-40 ... 175	°C
Inverse diode				
V <sub>RRM</sub>	T <sub>j</sub> = 25 °C		1700	V
I <sub>F</sub>	T <sub>j</sub> = 175 °C	T <sub>c</sub> = 25 °C	163	A
		T <sub>c</sub> = 80 °C	121	A
I <sub>Fnom</sub>			150	A
I <sub>FRM</sub>	I <sub>FRM</sub> = 2xI <sub>Fnom</sub>		300	A
I <sub>FSM</sub>	t <sub>p</sub> = 10 ms, sin 180°, T <sub>j</sub> = 25 °C		918	A
T <sub>j</sub>			-40 ... 175	°C
Module				
I <sub>t(RMS)</sub>			500	A
T <sub>stg</sub>			-40 ... 125	°C
V <sub>isol</sub>	AC sinus 50 Hz, t = 1 min		4000	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
V <sub>CE(sat)</sub>	I <sub>C</sub> = 150 A	T <sub>j</sub> = 25 °C		1.90	2.21	V
	V <sub>GE</sub> = 15 V chiplevel	T <sub>j</sub> = 150 °C		2.35	2.60	V
V <sub>CE0</sub>	chiplevel	T <sub>j</sub> = 25 °C		0.80	0.90	V
		T <sub>j</sub> = 150 °C		0.70	0.80	V
r <sub>CE</sub>	V <sub>GE</sub> = 15 V chiplevel	T <sub>j</sub> = 25 °C		7.3	8.7	mΩ
		T <sub>j</sub> = 150 °C		11	12	mΩ
V <sub>GE(th)</sub>	V <sub>GE</sub> =V <sub>CE</sub> , I <sub>C</sub> = 6 mA		5.2	5.8	6.4	V
I <sub>CES</sub>	V <sub>GE</sub> = 0 V	T <sub>j</sub> = 25 °C			2.0	mA
	V <sub>CE</sub> = 1700 V	T <sub>j</sub> = 150 °C		-		mA
C <sub>ies</sub>	V <sub>CE</sub> = 25 V V <sub>GE</sub> = 0 V	f = 1 MHz		13.6		nF
C <sub>oes</sub>		f = 1 MHz		0.53		nF
C <sub>res</sub>		f = 1 MHz		0.44		nF
Q <sub>G</sub>	V <sub>GE</sub> = - 8 V...+ 15 V			1200		nC
R <sub>Gint</sub>	T <sub>j</sub> = 25 °C			4.3		Ω
t <sub>d(on)</sub>	V <sub>CC</sub> = 1200 V	T <sub>j</sub> = 150 °C		205		ns
t <sub>r</sub>	I <sub>C</sub> = 150 A	T <sub>j</sub> = 150 °C		23.5		ns
E <sub>on</sub>	V <sub>GE</sub> = +15/-15 V	T <sub>j</sub> = 150 °C		39		mJ
t <sub>d(off)</sub>	R <sub>G on</sub> = 1 Ω	T <sub>j</sub> = 150 °C		550		ns
t <sub>f</sub>	R <sub>G off</sub> = 1 Ω	T <sub>j</sub> = 150 °C		150		ns
E <sub>off</sub>		T <sub>j</sub> = 150 °C		59		mJ
R <sub>th(j-c)</sub>	per IGBT				0.161	K/W
R <sub>th(c-s)</sub>	per IGBT (λ <sub>grease</sub> =0.81 W/(m*K))			0.035		K/W



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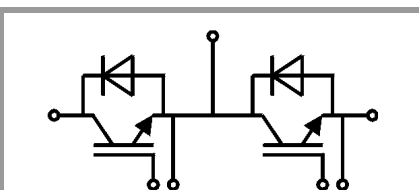
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V <sub>F</sub> = V <sub>EC</sub>	I <sub>F</sub> = 150 A	T <sub>j</sub> = 25 °C		2.00	2.40	V
	V <sub>GE</sub> = 0 V chipelevel	T <sub>j</sub> = 150 °C		2.14	2.56	V
V <sub>F0</sub>	chipelevel	T <sub>j</sub> = 25 °C		1.32	1.56	V
		T <sub>j</sub> = 150 °C		1.08	1.22	V
r <sub>F</sub>	chipelevel	T <sub>j</sub> = 25 °C		4.5	5.6	mΩ
		T <sub>j</sub> = 150 °C		7.1	9.0	mΩ
I <sub>RRM</sub>	I <sub>F</sub> = 150 A	T <sub>j</sub> = 150 °C		185		A
Q <sub>rr</sub>	V <sub>GE</sub> = ±15 V V <sub>CC</sub> = 1200 V	T <sub>j</sub> = 150 °C		49		μC
E <sub>rr</sub>		T <sub>j</sub> = 150 °C		33		mJ
R <sub>th(j-c)</sub>	per diode				0.356	K/W
R <sub>th(c-s)</sub>	per diode (λ <sub>grease</sub> =0.81 W/(m*K))			0.039		K/W
Module						
L <sub>CE</sub>				15		nH
R <sub>CC'+EE'</sub>	measured per switch	T <sub>C</sub> = 25 °C		0.55		mΩ
		T <sub>C</sub> = 125 °C		0.85		mΩ
R <sub>th(c-s)1</sub>	calculated without thermal coupling			0.009		K/W
R <sub>th(c-s)2</sub>	including thermal coupling, Ts underneath module (λ <sub>grease</sub> =0.81 W/ (m*K))			0.015		K/W
M <sub>s</sub>	to heat sink M6		3		5	Nm
M <sub>t</sub>		to terminals M6	2.5		5	Nm
						Nm
w					325	g



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

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

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