

# SKM50GB063D



SEMITRANS® 2

## Superfast NPT-IGBT Modules

### SKM50GB063D

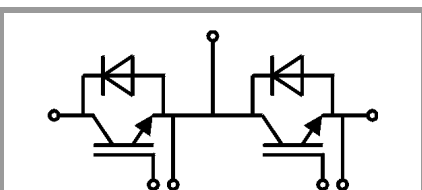
#### Target Data

#### Features

- NPT = non punch-through IGBT technology
- High short circuit capability, self limiting to 6 x IC
- Pos. temp.-coeff. of VCEsat
- Isolated copper baseplate

#### Typical Applications\*

- Switched mode power supplies
- UPS
- Three phase inverters for servo / AC motor speed control



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Absolute Maximum Ratings				
Symbol	Conditions	Values	Unit	
<b>IGBT</b>				
V <sub>CEs</sub>	T <sub>j</sub> = 25 °C	600	V	
I <sub>C</sub>	T <sub>j</sub> = 150 °C	T <sub>c</sub> = 25 °C	70	A
		T <sub>c</sub> = 75 °C	51	A
I <sub>Cnom</sub>		50	A	
I <sub>CRM</sub>	I <sub>CRM</sub> = 2xI <sub>Cnom</sub>	100	A	
V <sub>GES</sub>		-20 ... 20	V	
t <sub>psc</sub>	V <sub>CC</sub> = 300 V	T <sub>j</sub> = 125 °C	10	µs
	V <sub>GE</sub> ≤ 20 V			
	V <sub>CEs</sub> ≤ 600 V			
T <sub>j</sub>		-55 ... 150	°C	
<b>Inverse diode</b>				
I <sub>F</sub>		T <sub>c</sub> = 25 °C	75	A
		T <sub>c</sub> = 80 °C	45	A
I <sub>Fnom</sub>		50	A	
I <sub>FRM</sub>	I <sub>FRM</sub> = 2xI <sub>Fnom</sub>	100	A	
I <sub>FSM</sub>	t <sub>p</sub> = 10 ms, sin 180°, T <sub>j</sub> = 25 °C		A	
T <sub>j</sub>		-40 ... 150	°C	
<b>Module</b>				
I <sub>t(RMS)</sub>	T <sub>terminal</sub> < 80 °C	200	A	
T <sub>stg</sub>		-40 ... 125	°C	
V <sub>isol</sub>	AC sinus 50Hz, t = 1 min	2500	V	

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
<b>IGBT</b>					
V <sub>CE(sat)</sub>	I <sub>C</sub> = 50 A V <sub>GE</sub> = 15 V chipelevel	T <sub>j</sub> = 25 °C	2.1	2.5	V
		T <sub>j</sub> = 125 °C	2.4	2.8	V
V <sub>CE0</sub>		T <sub>j</sub> = 25 °C	1.05	1.3	V
		T <sub>j</sub> = 125 °C	1	1.2	V
r <sub>CE</sub>	V <sub>GE</sub> = 15 V	T <sub>j</sub> = 25 °C	21.0	24.0	mΩ
		T <sub>j</sub> = 125 °C	28.0	32.0	mΩ
V <sub>GE(th)</sub>	V <sub>GE</sub> =V <sub>CE</sub> , I <sub>C</sub> = 1 mA	4.5	5.5	6.5	V
I <sub>CES</sub>	V <sub>GE</sub> = 0 V V <sub>CE</sub> = 600 V	T <sub>j</sub> = 25 °C	0.1	0.3	mA
					mA
C <sub>ies</sub>	V <sub>CE</sub> = 25 V		2.2		nF
C <sub>oes</sub>	V <sub>GE</sub> = 0 V				nF
C <sub>res</sub>			0.2		nF
Q <sub>G</sub>	V <sub>GE</sub> = - 8 V...+ 20 V				nC
R <sub>Gint</sub>	T <sub>j</sub> = 25 °C				Ω
t <sub>d(on)</sub>	V <sub>CC</sub> = 300 V	T <sub>j</sub> = 125 °C	50		ns
t <sub>r</sub>	I <sub>C</sub> = 50 A V <sub>GE</sub> = ±15 V	T <sub>j</sub> = 125 °C	40		ns
E <sub>on</sub>	R <sub>G on</sub> = 22 Ω	T <sub>j</sub> = 125 °C	2.5		mJ
t <sub>d(off)</sub>	R <sub>G off</sub> = 22 Ω	T <sub>j</sub> = 125 °C	300		ns
t <sub>f</sub>		T <sub>j</sub> = 125 °C	30		ns
E <sub>off</sub>		T <sub>j</sub> = 125 °C	1.8		mJ
R <sub>th(j-c)</sub>	per IGBT			0.5	K/W



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#### Target Data

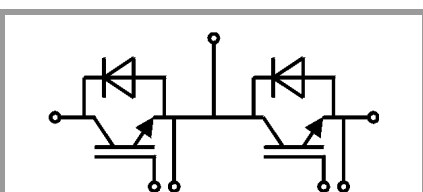
#### Features

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#### Typical Applications\*

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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
<b>Inverse diode</b>						
$V_F = V_{EC}$	$I_F = 50\text{ A}$ $V_{GE} = 0\text{ V}$ chip	$T_j = 25\text{ °C}$		1.35	1.60	V
		$T_j = 125\text{ °C}$		1.35	1.60	V
$V_{F0}$		$T_j = 25\text{ °C}$		1.05	1.2	V
		$T_j = 125\text{ °C}$		0.9	1	V
$r_F$		$T_j = 25\text{ °C}$		6.0	8.0	mΩ
		$T_j = 125\text{ °C}$		9.0	12.0	mΩ
$I_{RRM}$	$I_F = 50\text{ A}$ $di/dt_{off} = 50\text{ A}/\mu\text{s}$ $V_{GE} = \pm 15\text{ V}$ $V_{CC} = 300\text{ V}$	$T_j = 125\text{ °C}$		31		A
$Q_{rr}$		$T_j = 125\text{ °C}$		3.2		μC
$E_{rr}$		$T_j = 125\text{ °C}$		0.48		mJ
$R_{th(j-c)}$	per diode				1	K/W
<b>Module</b>						
$L_{CE}$					30	nH
$R_{CC'+EE'}$	terminal-chip	$T_C = 25\text{ °C}$		0.65		mΩ
		$T_C = 125\text{ °C}$		1		mΩ
$R_{th(c-s)}$	per module			0.04	0.05	K/W
$M_s$	to heat sink M6			3	5	Nm
$M_t$		to terminals M5		2.5	5	Nm
						Nm
$w$					160	g



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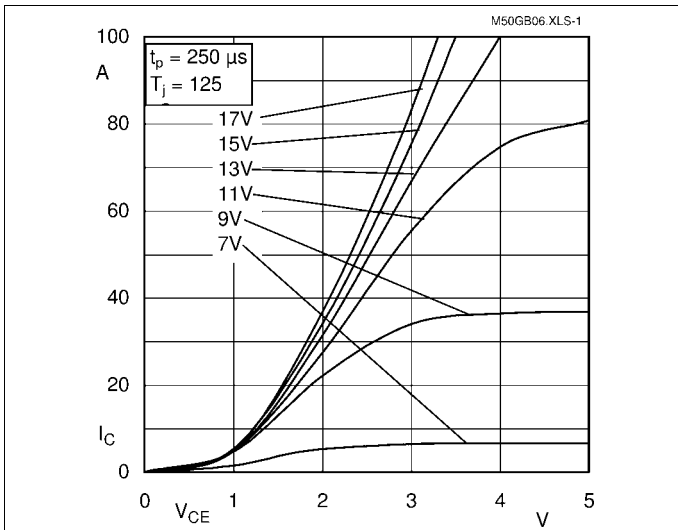


Fig. 1: Typ. output characteristic, inclusive  $R_{CC'+EE'}$

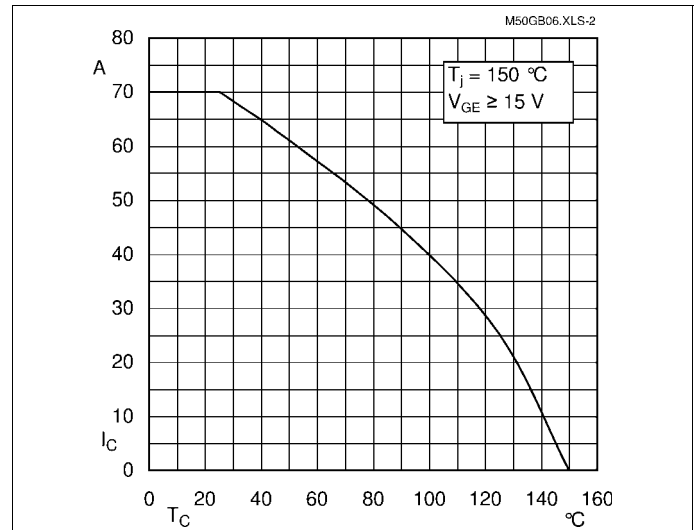


Fig. 2: Rated current vs. temperature  $I_C = f(T_C)$

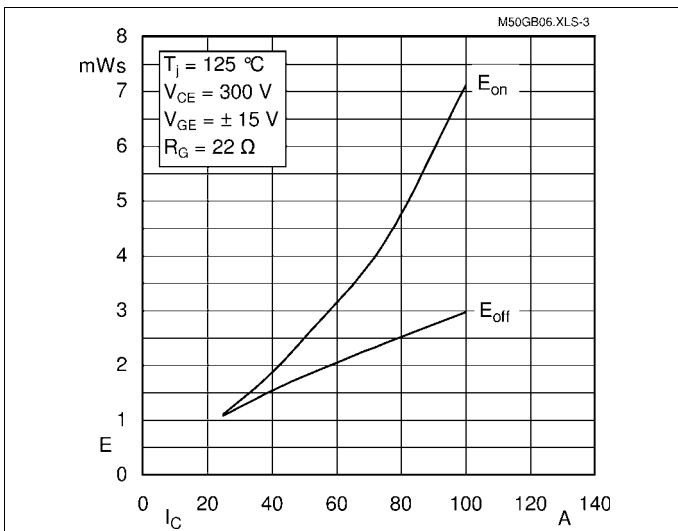


Fig. 3: Typ. turn-on /-off energy =  $f(I_C)$

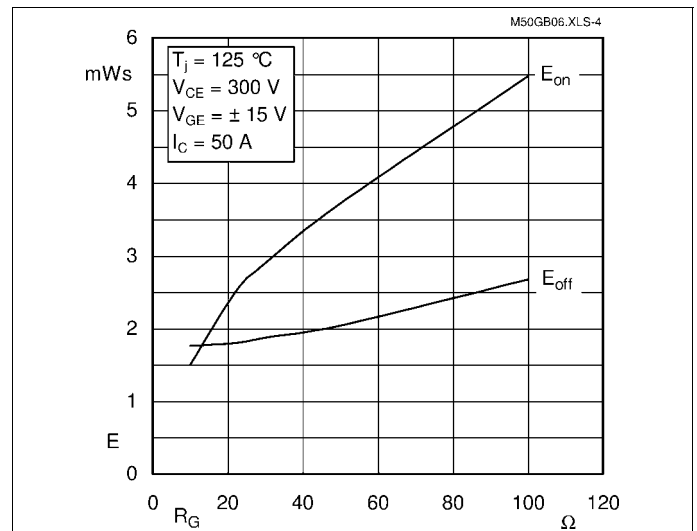


Fig. 4: Typ. turn-on /-off energy =  $f(R_G)$

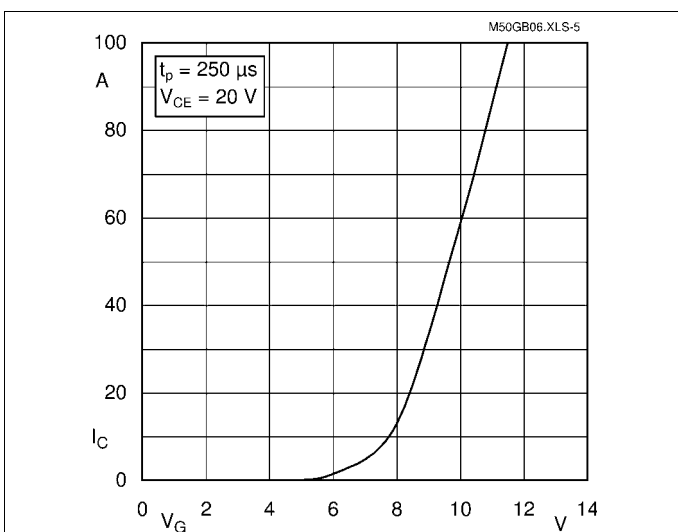


Fig. 5: Typ. transfer characteristic

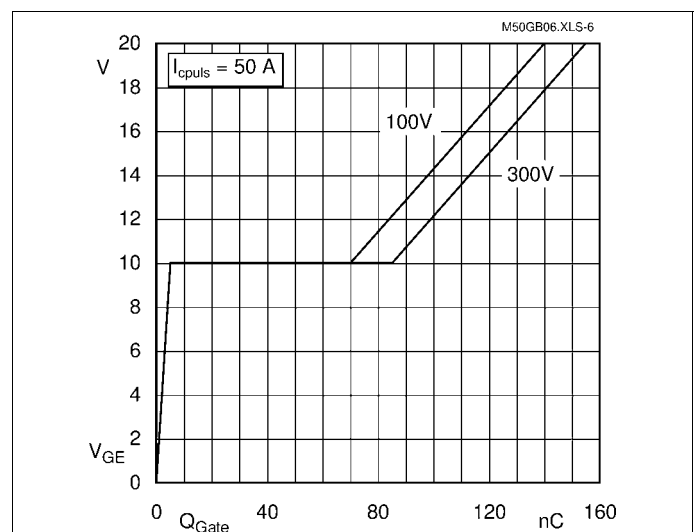


Fig. 6: Typ. gate charge characteristic

