

SKM75GB07E3



SEMITRANS® 2

Trench IGBT Modules

SKM75GB07E3

Target Data

Features*

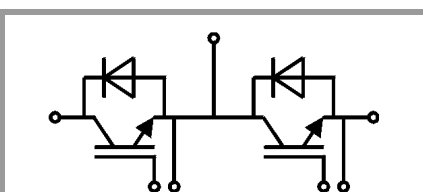
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Fast & soft switching inverse CAL diodes
- Insulated copper baseplate using DCB Technology (Direct Copper Bonding)
- With integrated gate resistor

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 $T_j = 150^\circ\text{C}$
- Use of soft R_G necessary



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Absolute Maximum Ratings				
Symbol	Conditions	Values	Unit	
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	650	V	
I_C	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	99	A
		$T_c = 80^\circ\text{C}$	74	A
I_{Cnom}		75	A	
I_{CRM}		225	A	
V_{GES}		-20 ... 20	V	
t_{psc}	$V_{CC} = 360\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 650\text{ V}$	$T_j = 150^\circ\text{C}$	6	μs
T_j		-40 ... 175	$^\circ\text{C}$	
Inverse diode				
V_{RRM}	$T_j = 25^\circ\text{C}$	650	V	
I_F	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	84	A
		$T_c = 80^\circ\text{C}$	62	A
I_{FRM}		100	A	
I_{FSM}	$t_p = 10\text{ ms, sin } 180^\circ, T_j = 25^\circ\text{C}$	550	A	
T_j		-40 ... 175	$^\circ\text{C}$	
Module				
$I_{t(RMS)}$		200	A	
T_{stg}	module without TIM	-40 ... 125	$^\circ\text{C}$	
V_{isol}	AC sinus 50 Hz, $t = 1\text{ min}$	4000	V	

Characteristics						
Symbol	Conditions	min.	typ.	max.	Unit	
IGBT						
$V_{CE(sat)}$	$I_C = 75\text{ A}$ $V_{GE} = 15\text{ V}$ chiplevel	$T_j = 25^\circ\text{C}$	1.45	1.77	V	
		$T_j = 150^\circ\text{C}$	1.72	2.10	V	
V_{CE0}	chiplevel	$T_j = 25^\circ\text{C}$	0.90	1.00	V	
		$T_j = 150^\circ\text{C}$	0.82	0.90	V	
r_{CE}	$V_{GE} = 15\text{ V}$ chiplevel	$T_j = 25^\circ\text{C}$	7.3	10	$\text{m}\Omega$	
		$T_j = 150^\circ\text{C}$	12	16	$\text{m}\Omega$	
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 1.2\text{ mA}$	5.1	5.8	6.4	V	
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = 650\text{ V}, T_j = 25^\circ\text{C}$				mA	
C_{ies}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	4.6		nF	
C_{oes}		$f = 1\text{ MHz}$	0.30		nF	
C_{res}		$f = 1\text{ MHz}$	0.14		nF	
Q_G	$V_{GE} = -8\text{ V} \dots +15\text{ V}$		680		nC	
R_{Gint}	$T_j = 25^\circ\text{C}$		4.0		Ω	
$t_{d(on)}$	$V_{CC} = 300\text{ V}$	$T_j = 150^\circ\text{C}$	t.b.d.		ns	
t_r	$I_C = 75\text{ A}$ $V_{GE} = +15/-15\text{ V}$	$T_j = 150^\circ\text{C}$	t.b.d.		ns	
E_{on}	$R_{G on} = 2.7\ \Omega$	$T_j = 150^\circ\text{C}$	2.4		mJ	
$t_{d(off)}$	$R_{G off} = 15\ \Omega$	$T_j = 150^\circ\text{C}$	t.b.d.		ns	
t_f		$T_j = 150^\circ\text{C}$	t.b.d.		ns	
E_{off}		$T_j = 150^\circ\text{C}$	3.1		mJ	
$R_{th(j-c)}$	per IGBT			0.591	K/W	
$R_{th(c-s)}$	per IGBT ($\lambda_{grease} = 0.81\text{ W}/(\text{m}^2\text{K})$)		0.064		K/W	
$R_{th(c-s)}$	per IGBT, pre-applied phase change material		0.054		K/W	



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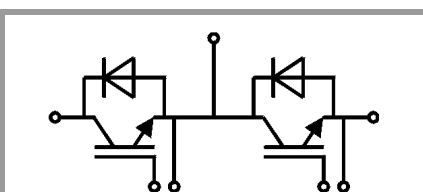
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	$I_F = 50 \text{ A}$ $V_{GE} = 0 \text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		1.37	1.73	V
		$T_j = 150^\circ\text{C}$		1.35	1.72	V
V_{F0}	chipelevel	$T_j = 25^\circ\text{C}$		1.04	1.24	V
		$T_j = 150^\circ\text{C}$		0.85	0.99	V
r_F	chipelevel	$T_j = 25^\circ\text{C}$		6.7	9.8	mΩ
		$T_j = 150^\circ\text{C}$		10.0	15	mΩ
I_{RRM}	$I_F = 50 \text{ A}$	$T_j = 150^\circ\text{C}$		t.b.d.		A
Q_{rr}	$V_{GE} = -7.5 \text{ V}$ $V_{CC} = 300 \text{ V}$	$T_j = 150^\circ\text{C}$		t.b.d.		μC
E_{rr}		$T_j = 150^\circ\text{C}$		1.24		mJ
$R_{th(j-c)}$	per diode				0.85	K/W
$R_{th(c-s)}$	per diode ($\lambda_{grease}=0.81 \text{ W/(m}^2\text{K)}$)			t.b.d.		K/W
$R_{th(c-s)}$	per diode, pre-applied phase change material			t.b.d.		K/W
Module						
L_{CE}				30		nH
R_{CC+EE}	measured per switch	$T_c = 25^\circ\text{C}$		0.65		mΩ
		$T_c = 125^\circ\text{C}$		1.09		mΩ
$R_{th(c-s)1}$	calculated without thermal coupling			t.b.d.		K/W
$R_{th(c-s)2}$	including thermal coupling, T_s underneath module ($\lambda_{grease}=0.81 \text{ W/(m}^2\text{K)}$)			t.b.d.		K/W
$R_{th(c-s)2}$	including thermal coupling, T_s underneath module, pre-applied phase change material			-		K/W
M_s	to heat sink M6		3		5	Nm
M_t		to terminals M5	2.5		5	Nm
						Nm
w					160	g



GB

This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

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