



SEMITRANS® 2

IGBT Modules

SKM 50GB123D

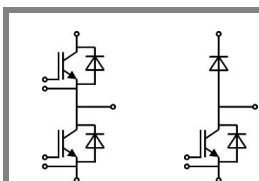
SKM 50GAL123D

Features

- MOS input (voltage controlled)
- Low inductance case
- Low tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{C\text{NOM}}$
- Fast and soft CAL diodes
- Isolated copper base plate using DCB (Direct Copper Bonding Technology)

Typical Applications

- AC inverter drives
- Power supplies

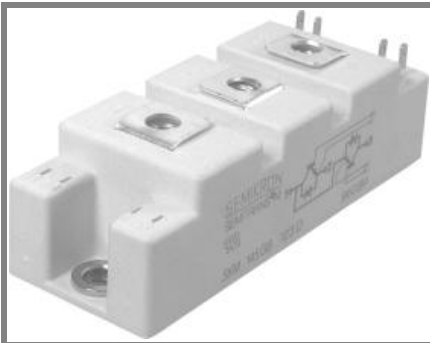


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Absolute Maximum Ratings		$T_c = 25\text{ °C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25\text{ °C}$	1200		V
I_C	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	50	A
		$T_{case} = 80\text{ °C}$	40	A
I_{CRM}	$I_{CRM} = 2 \times I_{C\text{nom}}$	100		A
V_{GES}		± 20		V
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ °C}$ $V_{CES} < 1200\text{ V}$	10		µs
Inverse Diode				
I_F	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	50	A
		$T_{case} = 80\text{ °C}$	40	A
I_{FRM}	$I_{FRM} = 2 \times I_{F\text{nom}}$	100		A
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150\text{ °C}$	550	A
Freewheeling Diode				
I_F	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	50	A
		$T_{case} = 80\text{ °C}$	40	A
I_{FRM}	$I_{FRM} = 2 \times I_{F\text{nom}}$	100		A
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150\text{ °C}$	550	A
Module				
$I_{t(\text{RMS})}$		200		A
T_{vj}		- 40 ... +150		°C
T_{stg}		125		°C
V_{isol}	AC, 1 min.	2500		V

Characteristics		$T_c = 25\text{ °C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(\text{th})}$	$V_{GE} = V_{CE}, I_C = 2\text{ mA}$	4,5	5,5	6,5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25\text{ °C}$	0,1	0,3	mA
		$T_j = 125\text{ °C}$			mA
V_{CE0}		$T_j = 25\text{ °C}$	1	1,15	V
		$T_j = 125\text{ °C}$	0,9	1,05	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$	30	37	mΩ
		$T_j = 125\text{ °C}$	44	53	mΩ
$V_{CE(\text{sat})}$	$I_{C\text{nom}} = 50\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}_{\text{chiplev.}}$	2,5	3	V
		$T_j = 125\text{ °C}_{\text{chiplev.}}$	3,1	3,7	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	3,3		nF
C_{oes}			0,5		nF
C_{res}			0,2		nF
Q_G	$V_{GE} = -8\text{ V} - +20\text{ V}$	500		nC	
R_{Gint}	$T_j = \text{°C}$	2,5		Ω	
$t_{d(\text{on})}$	$R_{Gon} = 27\text{ Ω}$	$V_{CC} = 600\text{ V}$ $I_{C\text{nom}} = 40\text{ A}$ $T_j = 125\text{ °C}$	70		ns
t_r			60		ns
E_{on}	$R_{Goff} = 27\text{ Ω}$	$V_{CC} = 600\text{ V}$ $I_{C\text{nom}} = 40\text{ A}$ $T_j = 125\text{ °C}$	7		mJ
$t_{d(\text{off})}$			400		ns
t_f			45		ns
E_{off}			4,5		mJ
$R_{th(j-c)}$	per IGBT			0,4	K/W



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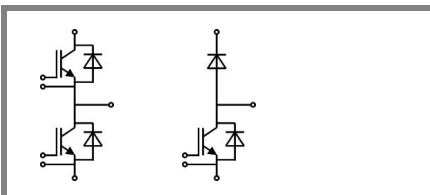
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Typical Applications

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Characteristics			min.	typ.	max.	Units
Symbol	Conditions					
Inverse Diode						
$V_F = V_{EC}$	$I_{Fnom} = 50 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$ $T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		2 1,8	2,5	V V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$ $T_j = 125 \text{ }^\circ\text{C}$		1,1	1,2	V V
r_F		$T_j = 25 \text{ }^\circ\text{C}$ $T_j = 125 \text{ }^\circ\text{C}$		18	26 22	mΩ mΩ
I_{RRM} Q_{rr} E_{rr}	$I_{Fnom} = 40 \text{ A}$ $di/dt = 800 \text{ A}/\mu\text{s}$ $V_{cc} = 600 \text{ V}$	$T_j = 125 \text{ }^\circ\text{C}$		35 7 2		A μC mJ
$R_{th(j-c)}$	per diode				0,7	K/W
Freewheeling Diode						
$V_F = V_{EC}$	$I_{Fnom} = 50 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$ $T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		2 1,8	2,5	V V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$ $T_j = 125 \text{ }^\circ\text{C}$		1,1	1,2	V V
r_F		$T_j = 25 \text{ }^\circ\text{C}$ $T_j = 125 \text{ }^\circ\text{C}$		18	26	V V
I_{RRM} Q_{rr} E_{rr}	$I_{Fnom} = 40 \text{ A}$ $di/dt = 800 \text{ A}/\mu\text{s}$ $V_{cc} = 600 \text{ V}$	$T_j = 125 \text{ }^\circ\text{C}$		35 7 2		A μC mJ
$R_{th(j-c)}$	per diode				0,7	K/W
Module						
L_{CE}					30	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$ $T_{case} = 125 \text{ }^\circ\text{C}$		0,75 1		mΩ mΩ
$R_{th(c-s)}$	per module				0,05	K/W
M_s	to heat sink M6			3	5	Nm
M_t	to terminals M5			2,5	5	Nm
w					160	g

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

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

