



SEMITRANS® 2

IGBT Modules

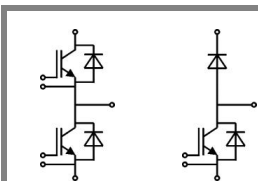
SKM 50GB123D
SKM 50GAL123D

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



GB

GAL

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

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



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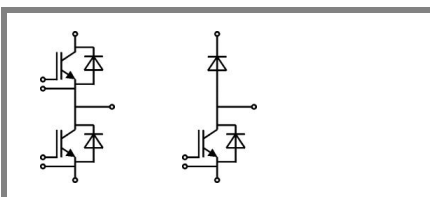
SKM 50GAL123D

Features

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- High short circuit capability, self limiting to $6 \times I_{CNOM}$
- Fast and soft CAL diodes
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Typical Applications

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GB

GAL

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

