



SEMITRANS® 2

IGBT Modules

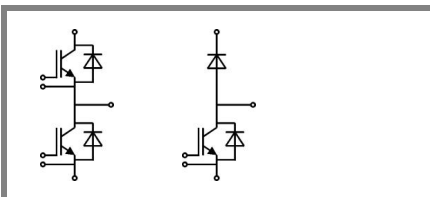
SKM 50GB123D
SKM 50GAL123D

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		$T_c = 25\text{ °C}$, 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		$^{\circ}\text{C}$
T_{stg}		125		$^{\circ}\text{C}$
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	$\text{m}\Omega$
		$T_j = 125\text{ °C}$	44	53	$\text{m}\Omega$
$V_{CE(\text{sat})}$	$I_{C\text{nom}} = 50\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}_{\text{chiplev.}}$	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	
$t_{d(\text{on})}$	$R_{Gon} = 27\ \Omega$	$V_{CC} = 600\text{ V}$ $I_C = 40\text{ A}$	70		ns
			$T_j = 125\text{ °C}$	60	
E_{on}	$R_{Goff} = 27\ \Omega$	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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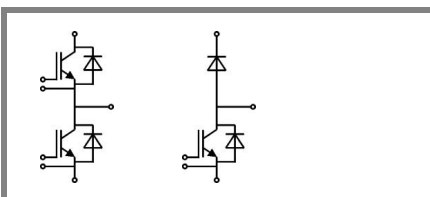
Typical Applications*

- AC inverter drives
- Power supplies

Characteristics			min.	typ.	max.	Units
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}	$I_F = 40 \text{ A}$ $di/dt = 800 \text{ A}/\mu\text{s}$ $V_{cc} = 600\text{V}$	$T_j = 125 \text{ }^\circ\text{C}$		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}	$I_F = 40 \text{ A}$ $di/dt = 800 \text{ A}/\mu\text{s}$ $V_{cc} = 600\text{V}$	$T_j = 125 \text{ }^\circ\text{C}$		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.

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.



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