

SKM 400GA12T4



SEMITRANS® 4

IGBT 4 Modules

SKM 400GA12T4

Target Data

Features

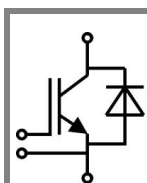
- IGBT4 = 4. Generation (Trench) IGBT
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_{CNOM}$
- Soft switching 4 Generation CAL diode (CAL4)

Typical Applications

- AC inverter drives
- UPS
- Electronic welders at f_{sw} up to 20 kHz

Remarks

- Case temperature limited to $T_c = 125^\circ\text{C}$ max, recomm. $T_{op} = -40 \dots +150^\circ\text{C}$, product rel. results valid for $T_j \leq 150^\circ$



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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	$T_j = 175^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	610	A
		$T_{case} = 80^\circ\text{C}$	475	A
I_{CRM}	$I_{CRM} = 3 \times I_{CNOM}$	1200		A
V_{GES}		± 20		V
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 15\text{ V}; T_j = 150^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10		μs
Inverse Diode				
I_F	$T_j = 175^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	440	A
		$T_{case} = 80^\circ\text{C}$	330	A
I_{FRM}	$I_{FRM} = 3 \times I_{FNOM}$	1200		A
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 175^\circ\text{C}$	2190	A
Module				
$I_{t(RMS)}$		500		A
T_{vj}		-40 ... +175		$^\circ\text{C}$
T_{stg}		-40 ... +125		$^\circ\text{C}$
V_{isol}	AC, 1 min.	4000		V

Characteristics		$T_c = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}; I_C = 16\text{ mA}$	5	5,8	6,5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 15^\circ\text{C}$			mA
		$T_j = 25^\circ\text{C}$	0,8	0,9	V
V_{CE0}		$T_j = 150^\circ\text{C}$	0,7	0,8	V
		$T_j = 25^\circ\text{C}$			
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	2,5	2,8	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	3,8	4	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 400\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,8	2	V
		$T_j = 150^\circ\text{C}_{chiplev.}$	2,2	2,4	V
C_{res}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	24,8		nF
C_{oes}			1,64		nF
C_{res}			1,4		nF
Q_G	$V_{GE} = -8\text{ V} / +15\text{ V}$	2250		nC	
R_{Gint}	$T_j = 25^\circ\text{C}$	1,88		Ω	
$t_{d(on)}$	$R_{Gon} = \Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 400\text{ A}$ $T_j = 150^\circ\text{C}$ $V_{GE} = -8\text{ V}$	44		ns
t_r					ns
E_{on}	$R_{Goff} = \Omega$		44		mJ
$t_{d(off)}$					ns
t_f					ns
E_{off}			44		mJ
$R_{th(j-c)}$	per IGBT			0,072	K/W



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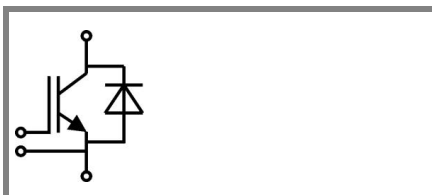
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 400 \text{ A}; V_{GE} = 0 \text{ V}$				
			2,2	2,5	V
			2,1	2,45	V
V_{F0}			1,3	1,5	V
			0,9	1,1	V
r_F			2,25	2,5	mΩ
			3	1,35	mΩ
I_{RRM}	$I_{Fnom} = 400 \text{ A}$				A
Q_{rr}					μC
E_{rr}	$V_{GE} = -8 \text{ V}$		30		mJ
$R_{th(j-c)}$	per diode			0,14	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = \text{A}; V_{GE} = \text{V}$				V
V_{F0}					V
r_F					V
I_{RRM}	$I_{Fnom} = \text{A}$				A
Q_{rr}					μC
E_{rr}					mJ
	per diode				K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25^\circ\text{C}$		0,18	mΩ
		$T_{case} = 125^\circ\text{C}$		0,22	mΩ
$R_{th(c-s)}$	per module		0,02	0,038	K/W
M_s	to heat sink M6		3	5	Nm
M_t	to terminals M6, M4		2,5 (1,1)	5 (2)	Nm
w				330	g

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

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