

# SKM 600GA12T4



**SEMITRANS® 4**

## IGBT4 Modules

**SKM 600GA12T4**

Target Data

### Features

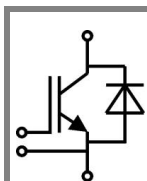
- IGBT4 = 4. Generation (Trench) IGBT
- $V_{CEsat}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6 \times I_{CNOM}$
- Soft switching 4. Generation CAL diode (CAL4)

### 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
<b>IGBT</b>				
$V_{CES}$	$T_j = 25^\circ\text{C}$	1200		V
$I_C$	$T_j = 175^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	910	A
		$T_{case} = 80^\circ\text{C}$	700	A
$I_{CRM}$	$I_{CRM} = 3 \times I_{CNOM}$	1800		A
$V_{GES}$		$\pm 20$		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		$\mu\text{s}$
<b>Inverse Diode</b>				
$I_F$	$T_j = 175^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	705	A
		$T_{case} = 80^\circ\text{C}$	530	A
$I_{FRM}$	$I_{FRM} = 3 \times I_{FNOM}$	1800		A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{si.jn.}$	$T_j = 175^\circ\text{C}$	3600	A
<b>Module</b>				
$I_{t(RMS)}$		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
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 24\text{ mA}$	5	5,8	6,5	V
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25^\circ\text{C}$			mA
		$T_j = 150^\circ\text{C}$	0,8	0,9	V
$V_{CE0}$			0,7	0,8	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	1,7	1,8	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	2,5	2,7	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 600\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,8	2	V
		$T_j = 150^\circ\text{C}_{chiplev.}$	2,2	2,4	V
$C_{res}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	37,2		nF
$C_{oes}$			2,3		nF
$C_{res}$			2,04		nF
$Q_G$	$V_{GE} = -8\text{ V} / 15\text{ V}$	3400		nC	
$R_{Gint}$	$T_j = 25^\circ\text{C}$	1,25		$\Omega$	
$t_{d(on)}$	$R_{Gon} = \Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 600\text{ A}$			ns
$t_r$			66		ns
$E_{on}$	$R_{Goff} = \Omega$	$T_j = 150^\circ\text{C}$ $V_{GE} = -8\text{ V}$			mJ
$t_{d(off)}$					ns
$t_f$			66		ns
$E_{off}$					mJ
$R_{th(j-c)}$	per IGBT			0,049	K/W



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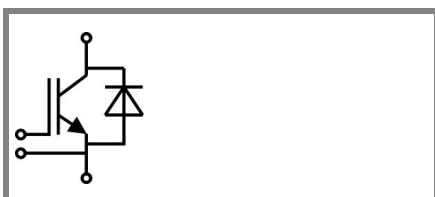
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 600 \text{ A}; V_{GE} = 0 \text{ V}$				
			2,15	2,45	V
			2,05	2,4	V
$V_{F0}$			1,3	1,5	V
			0,9	1,1	V
$r_F$			1,42	1,58	mΩ
			1,92	2,2	mΩ
$I_{RRM}$	$I_{Fnom} = 600 \text{ A}$				A
$Q_{rr}$					μC
$E_{rr}$	$V_{GE} = -8 \text{ V}$		45		mJ
$R_{th(j-c)}$	per diode			0,086	K/W
<b>Freewheeling Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = \text{A}; V_{GE} = \text{V}$				V
$V_{F0}$					V
$r_F$					V
$I_{RRM}$	$I_{Fnom} = \text{A}$				A
$Q_{rr}$					μC
$E_{rr}$					mJ
	per diode				K/W
<b>Module</b>					
$L_{CE}$			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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