



SEMITRANS® 4

IGBT4 Modules

SKM 600GA12T4

Target Data

Features

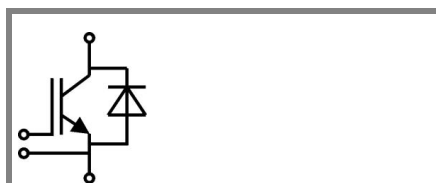
- IGBT4 = 4. Generation (Trench) IGBT
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_{CNOM}$
- Soft switching 4. Generation CAL diode (CAL4)

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			$T_c = 25\text{ }^{\circ}\text{C}$, unless otherwise specified	
Symbol	Conditions		Values	Units
IGBT				
V_{CES}	$T_j = 25\text{ }^{\circ}\text{C}$		1200	V
I_C	$T_j = 175\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	910	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	700	A
I_{CRM}	$I_{CRM} = 3 \times I_{CNOM}$		1800	A
V_{GES}			± 20	V
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 15\text{ V}; T_j = 150\text{ }^{\circ}\text{C}$ $V_{CES} < 1200\text{ V}$		10	μs
Inverse Diode				
I_F	$T_j = 175\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	705	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	530	A
I_{FRM}	$I_{FRM} = 3x\text{ }I_{FNOM}$		1800	A
I_{FSM}	$t_p = 10\text{ ms}; \text{si}n.$	$T_j = 175\text{ }^{\circ}\text{C}$	3600	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 °C, unless otherwise specified			
Symbol	Conditions		min.	typ.	max.	Units
IGBT						
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 24 mA		5	5,8	6,5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C					mA
V _{CE0}	T _j = 25 °C		0,8			V
	T _j = 150 °C		0,7			V
r _{CE}	V _{GE} = 15 V T _j = 25°C		1,7			mΩ
	T _j = 150°C		2,5			mΩ
V _{CE(sat)}	I _{Cnom} = 600 A, V _{GE} = 15 V T _j = 25°C _{chiplev.}		1,8			V
	T _j = 150°C _{chiplev.}		2,2			V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz		37,2			nF
C _{oes}			2,3			nF
C _{res}			2,04			nF
Q _G	V _{GE} = -8V /15V		3400			nC
R _{Gint}	T _j = 25 °C		1,25			Ω
t _{d(on)}	R _{Gon} = Ω	V _{CC} = 600V I _{Cnom} = 600A T _j = 150 °C V _{GE} = -8V	66			ns
t _r						ns
E _{on}	mJ					
t _{d(off)}	R _{Goff} = Ω		66			ns
t _f						ns
E _{off}						mJ
R _{th(j-c)}	per IGBT		0,049			K/W



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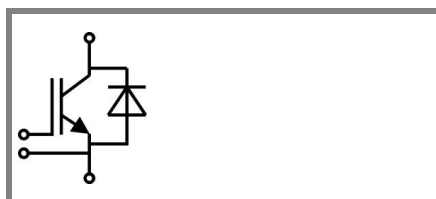
Remarks

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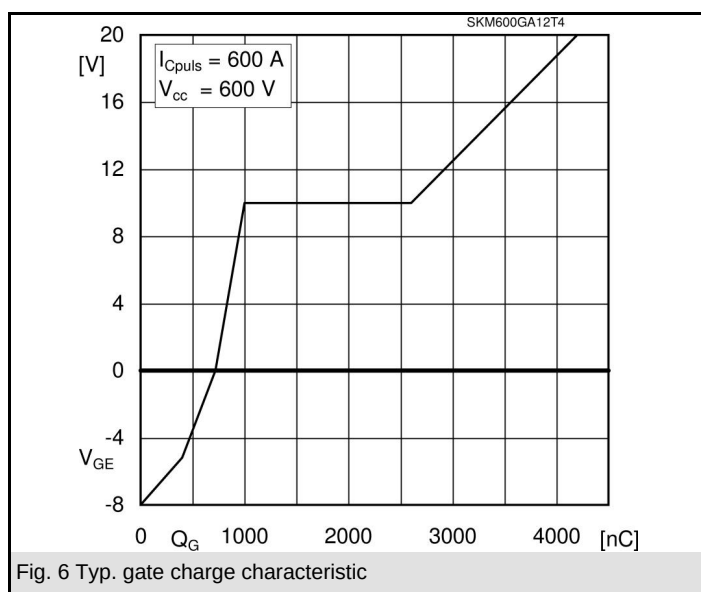
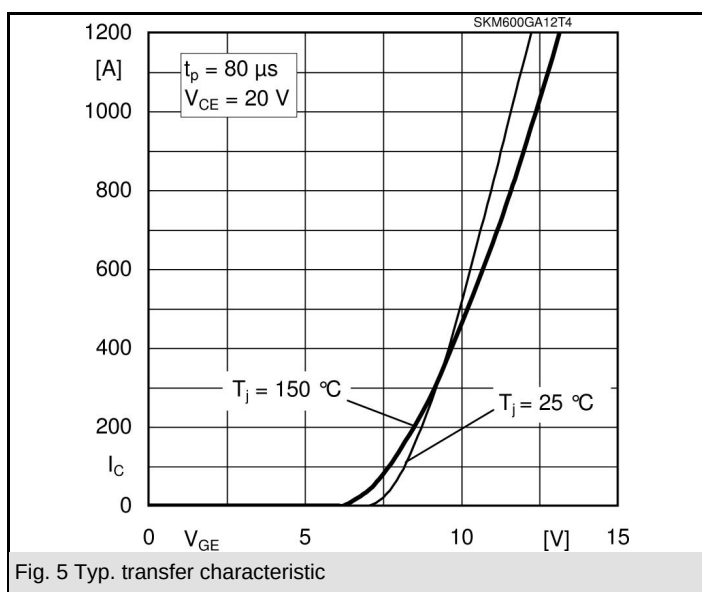
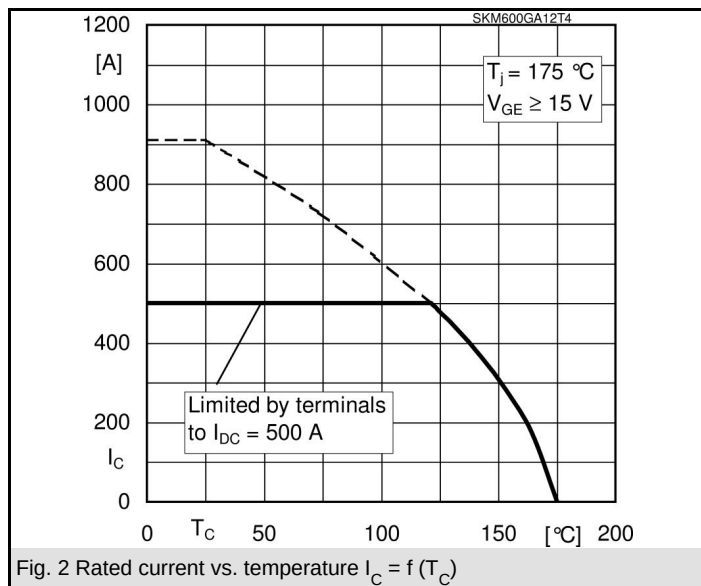
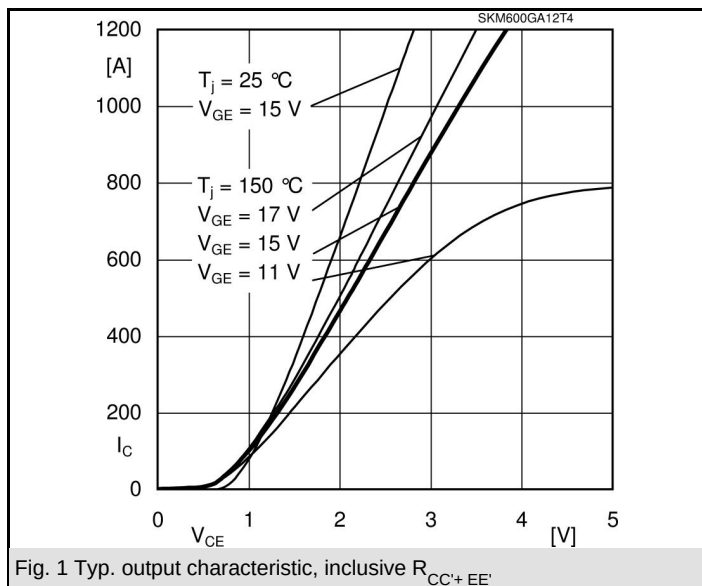
Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 600 \text{ A}; V_{GE} = 0 \text{ V}$				
	$T_j = 25^\circ\text{C}_{chiplev.}$		2,15	2,45	V
	$T_j = 150^\circ\text{C}_{chiplev.}$		2,05	2,4	V
V_{F0}	$T_j = 25^\circ\text{C}$		1,3	1,5	V
	$T_j = 150^\circ\text{C}$		0,9	1,1	V
r_F	$T_j = 25^\circ\text{C}$		1,42	1,58	mΩ
	$T_j = 150^\circ\text{C}$		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
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = \text{A}; V_{GE} = \text{V}$				V
V_{F0}	$T_j = ^\circ\text{C}$				V
r_F	$T_j = ^\circ\text{C}$				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

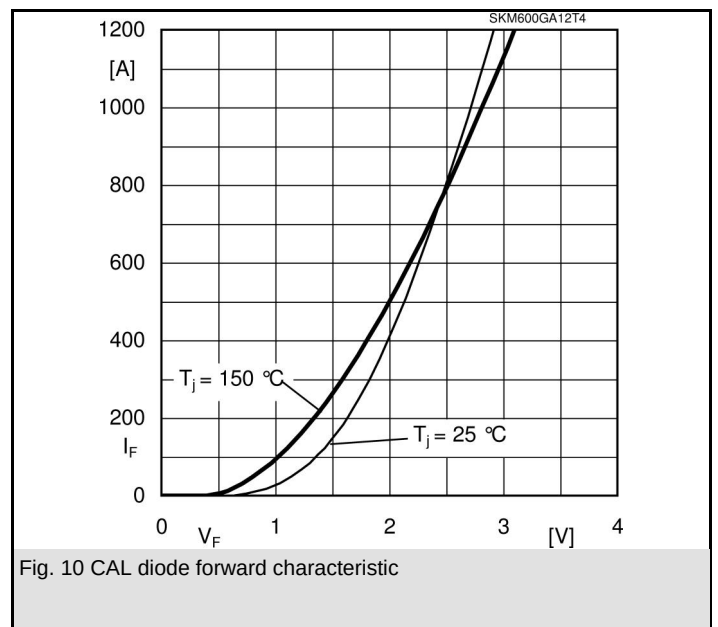
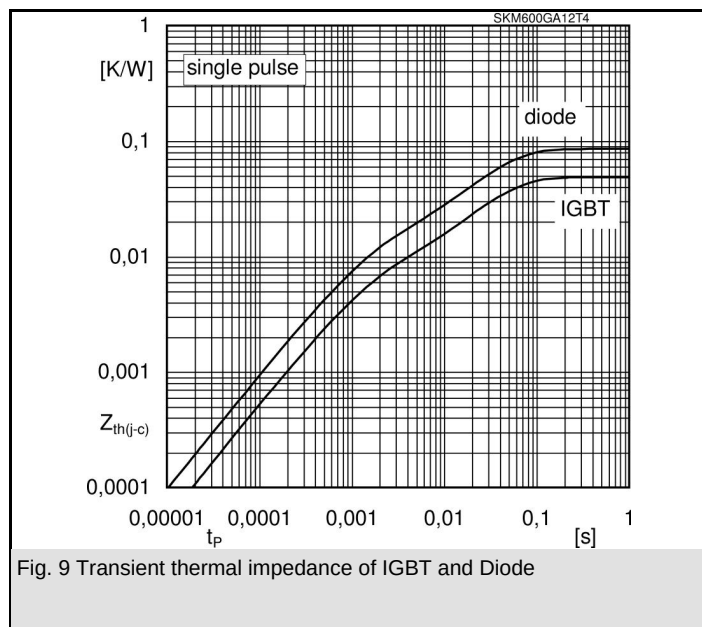
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

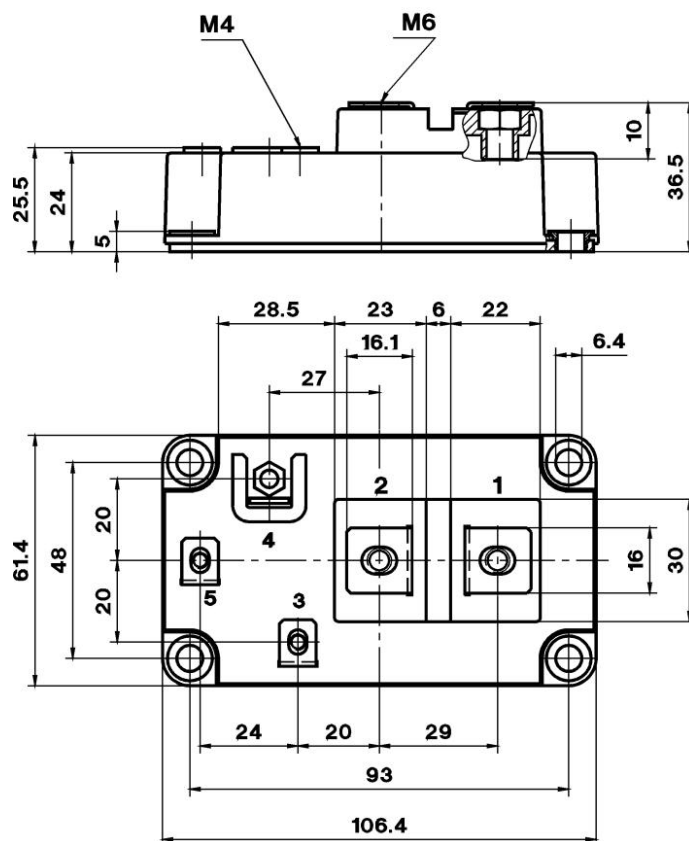
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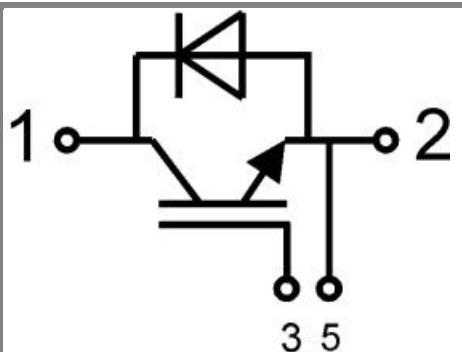
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Case D59



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Vase D59