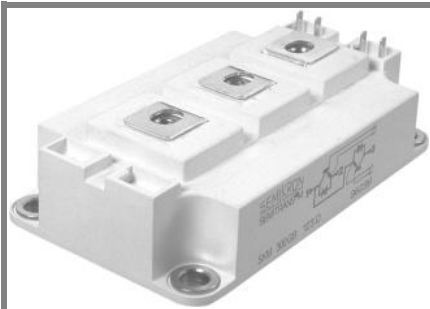


SKM 400GB12T4



SEMITRANS® 3

IGBT4 Modules

SKM 400GB12T4

Target Data

Features

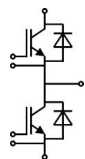
- IGBT4 = 4. Generation (Trench) IGBT
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_{CNOM}$
- Electronic welders at f_{sw} up to 20 kHz

Typical Applications

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

Remarks

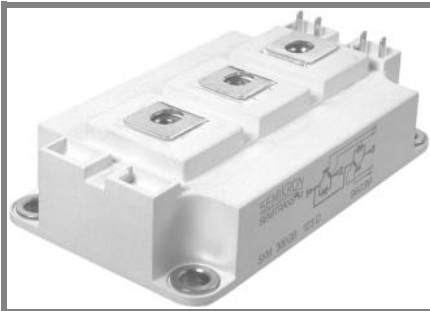
- Case temperature limited to $T_c = 125^\circ\text{C}$ max, recomm. $T_{op} = -40 \dots +150^\circ\text{C}$, product rel. results valid for $T_j \leq 150^\circ$



GB

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}	$V_{CC} = V; V_{GE} \leq V; V_{CES} < V; T_j = ^\circ\text{C}$		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}	$t_p = 10 \text{ ms; sin.}$	$T_j = 175^\circ\text{C}$	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}	$V_{GE} = 0 \text{ V}; V_{CE} = V_{CES}$		$T_j = 25^\circ\text{C}$		mA	
			$T_j = 150^\circ\text{C}$			
V_{CE0}			$T_j = 25^\circ\text{C}$	0,8	0,9	V
			$T_j = 150^\circ\text{C}$	0,7	0,8	V
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_{ies}	$V_{CE} = 25; V_{GE} = 0 \text{ V}$	$f = 1 \text{ MHz}$		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}	$T_j = 25^\circ\text{C}$		1,9		Ω	
$t_{d(on)}$	$R_{Gon} = 1 \Omega$				ns	
t_r						
E_{on}	$R_{Goff} = 1 \Omega$				mJ	
$t_{d(off)}$						
t_f						
E_{off}						
$R_{th(j-c)}$	per IGBT			0,072	K/W	



SEMITRANS® 3

IGBT4 Modules

SKM 400GB12T4

Target Data

Features

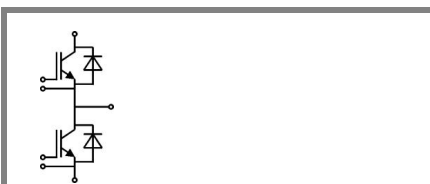
- IGBT4 = 4. Generation (Trench) IGBT
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_{CNOM}$
- Electronic welders at f_{sw} up to 20 kHz

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 $T_j \leq 150^\circ$

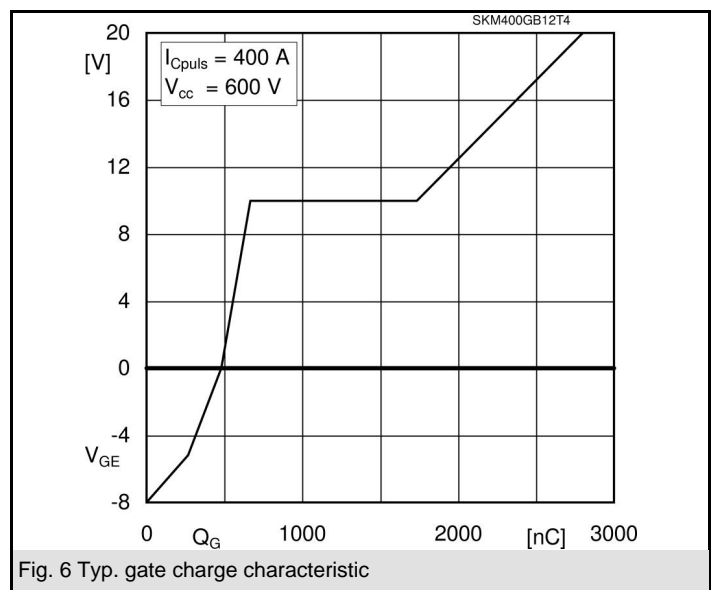
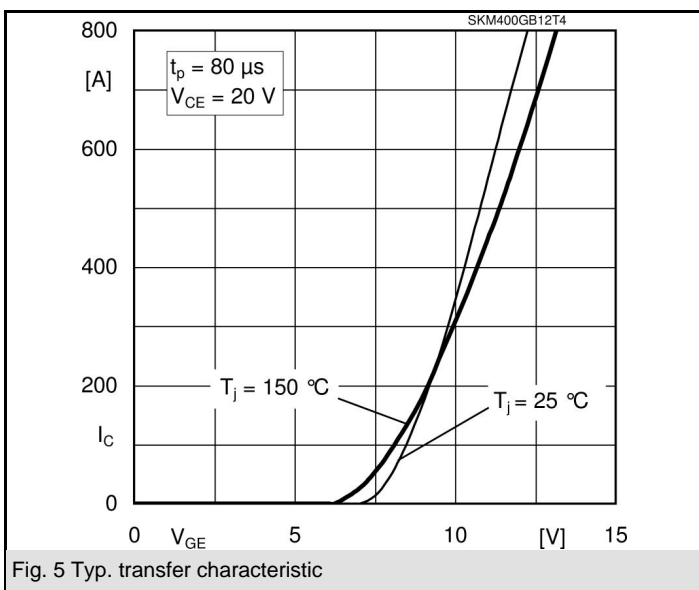
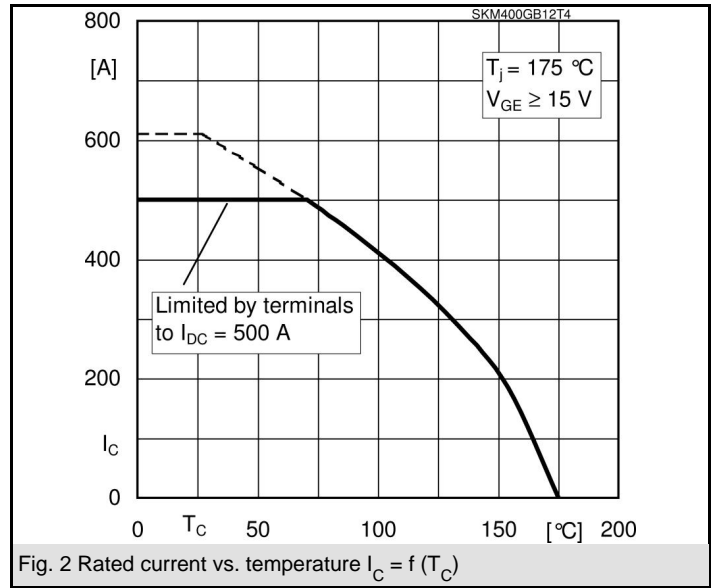
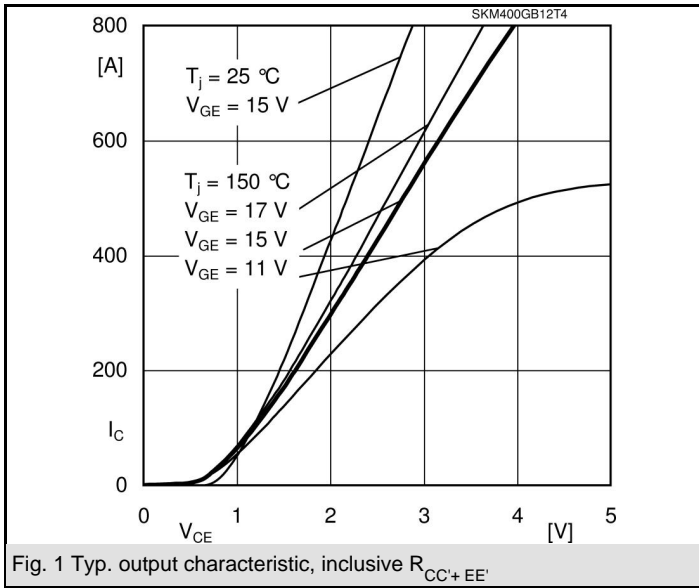


GB

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
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}	$V_{GE} = -8 \text{ V}$		33		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	$T_{case} = 25^\circ\text{C}$		0,35	mΩ
		$T_{case} = 125^\circ\text{C}$		0,5	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		2,5	5	Nm
w				325	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.



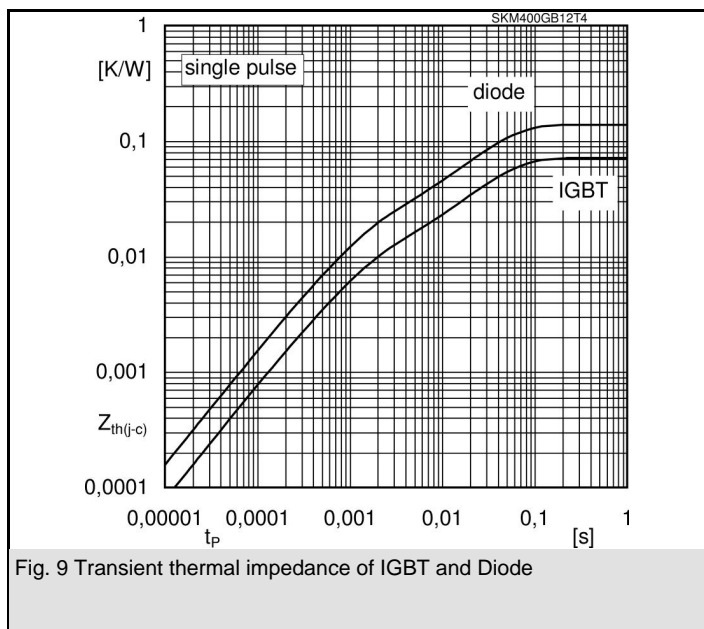


Fig. 9 Transient thermal impedance of IGBT and Diode

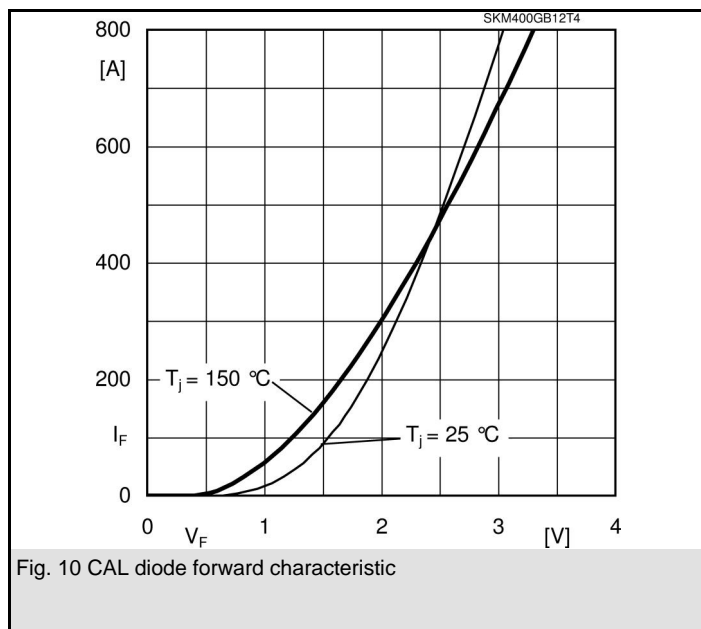


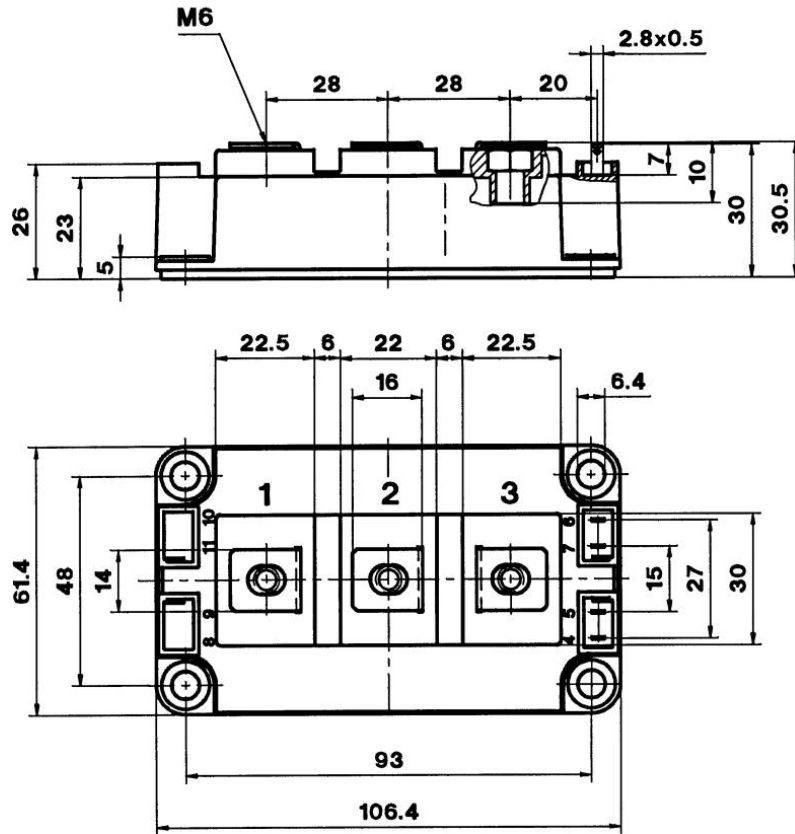
Fig. 10 CAL diode forward characteristic

SKM 400GB12T4

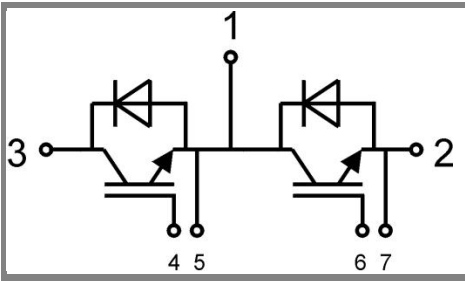
UL recognized file

CASED56

no. E 63 532



Case D56



GB

Case D56