



SEMITRANS® 3

IGBT Modules

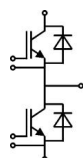
SKM 400GB123D

Features

- MOS input (voltage controlled)
- N channel, homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Latch-up free
- Fast & soft CAL diodes
- Isolated copper baseplate using DBC Direct Copper Bonding Technology
- Large clearance (12 mm) and creepage distances (20 mm)

Typical Applications

- AC inverter drives
- UPS

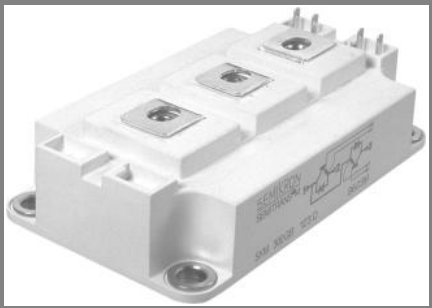


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Absolute Maximum Ratings			$T_c = 25\text{ }^{\circ}\text{C}$, unless otherwise specified	
Symbol	Conditions		Values	Units
IGBT				
V_{CES}	$T_j = 25\text{ }^{\circ}\text{C}$		1200	V
I_C	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	400	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	330	A
I_{CRM}	$I_{CRM}=2 \times I_{Cnom}$		600	A
V_{GES}			± 20	V
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ }^{\circ}\text{C}$ $V_{CES} < 1200\text{ V}$		10	μs
Inverse Diode				
I_F	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	390	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	260	A
I_{FRM}	$I_{FRM}=2 \times I_{Fnom}$		600	A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ }^{\circ}\text{C}$	2880	A
Module				
$I_{t(RMS)}$			500	A
T_{vj}			- 40...+ 150	$^{\circ}\text{C}$
T_{stg}			- 40...+ 125	$^{\circ}\text{C}$
V_{isol}	AC, 1 min.		2500	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 = 12 mA		4,5	5,5	6,5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES}	T _j = 25 °C		0,1	0,3	mA
V _{CE0}		T _j = 25 °C		1,4	1,6	V
		T _j = 125 °C		1,6	1,8	V
r _{CE}	V _{GE} = 15 V	T _j = 25°C		3,66	4,66	mΩ
		T _j = 125°C		5	6,33	mΩ
V _{CE(sat)}	I _{Cnom} = 300 A, V _{GE} = 15 V	T _j = °C _{chiplev.}		2,5	3	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V	f = 1 MHz		22	30	nF
C _{oes}				3,3	4	nF
C _{res}				1,2	1,6	nF
Q _G	V _{GE} = -8V - +20V			3000		nC
R _{Gint}	T _j = °C			1,25		Ω
t _{d(on)}	R _{Gon} = 3,3 Ω	V _{CC} = 600V I _{Cnom} = 300A		200	400	ns
t _r				115	220	ns
E _{on}				38		mJ
t _{d(off)}	R _{Goff} = 3,3 Ω	T _j = 125 °C V _{GE} = ± 15V		720	900	ns
t _f				80	100	ns
E _{off}				40		mJ
R _{th(j-c)}	per IGBT				0,05	K/W

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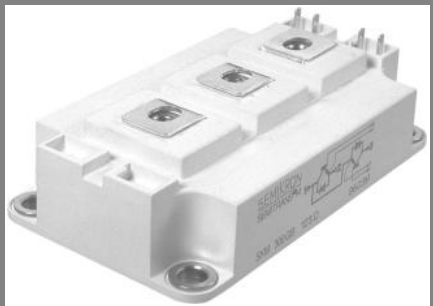
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
V _F = V _{EC}	I _{Fnom} = 300 A; V _{GE} = 0 V	T _j = 25 °C _{chiplev.}		2	2,5	V
		T _j = 125 °C _{chiplev.}		1,8		V
V _{F0}		T _j = 25 °C		1,1	1,2	V
		T _j = 125 °C				V
r _F		T _j = 25 °C		3	4,3	mΩ
		T _j = 125 °C				mΩ
I _{RRM}	I _{Fnom} = 300 A di/dt = 2000 A/μs V _{GE} = 0 V; V _{CC} = 600 V	T _j = 125 °C		140		A
Q _{rr}				13		μC
E _{rr}						
R _{th(j-c)D}	per diode				0,125	K/W
Module						
L _{CE}				15	20	nH
R _{CC'+EE'}	res., terminal-chip	T _{case} = 25 °C		0,35		mΩ
		T _{case} = 125 °C		0,5		mΩ
R _{th(c-s)}	per module				0,038	K/W
M _s	to heat sink M6		3		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.

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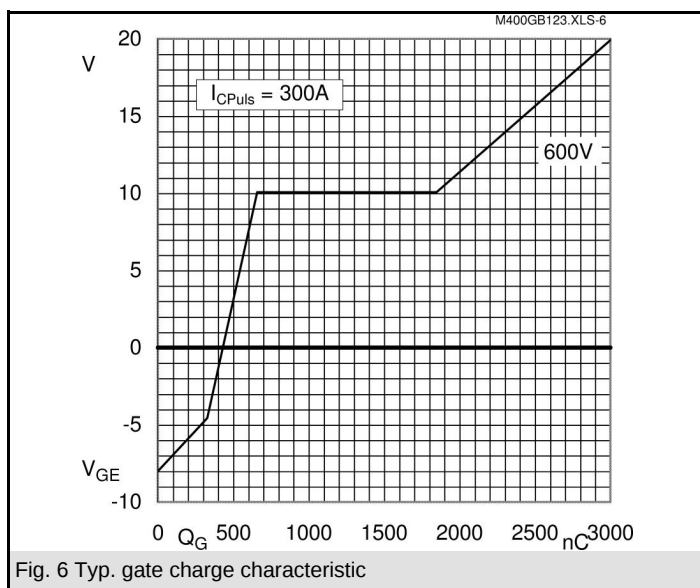
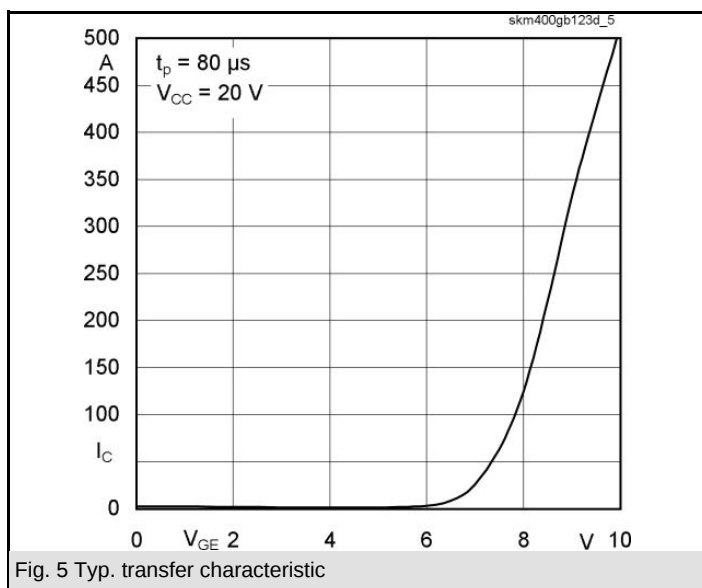
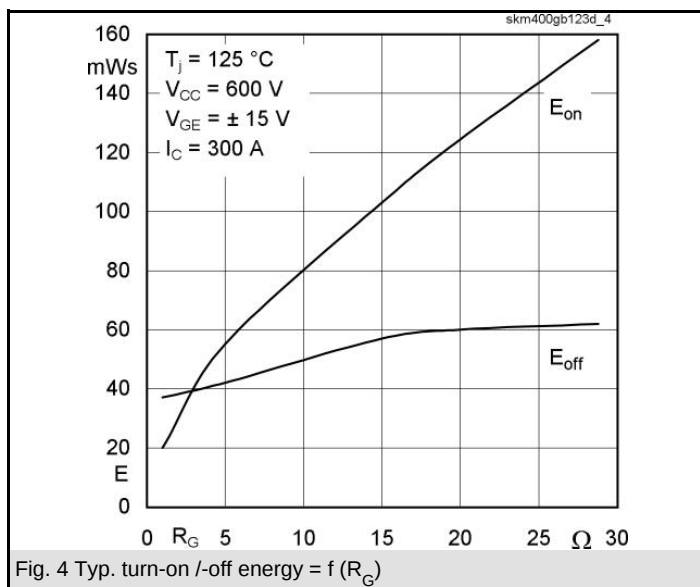
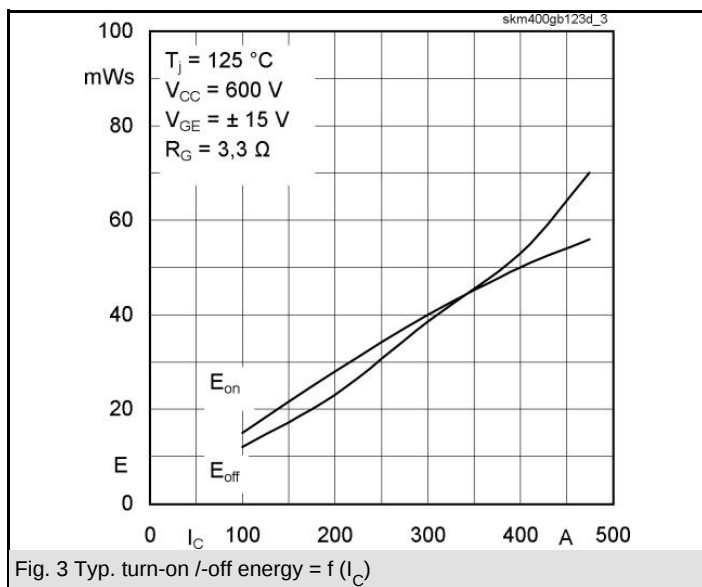
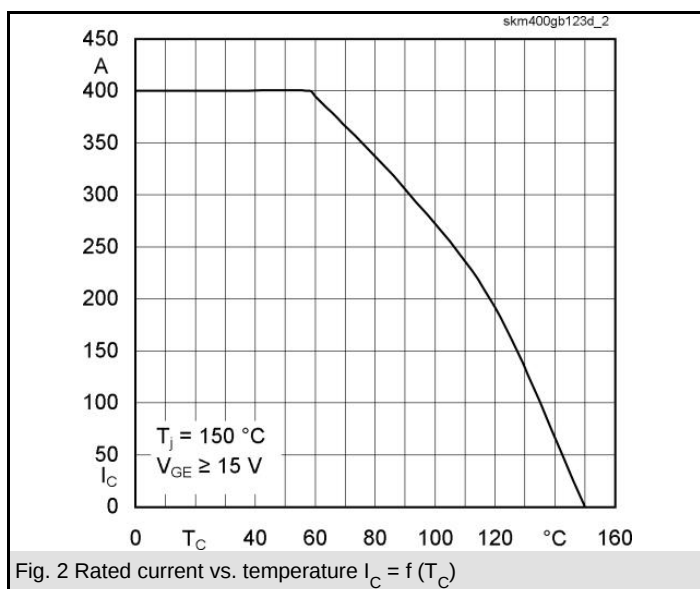
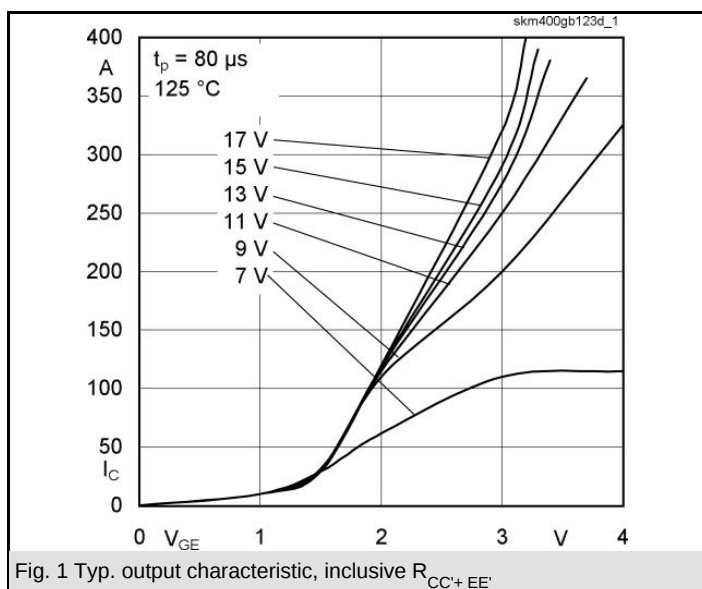
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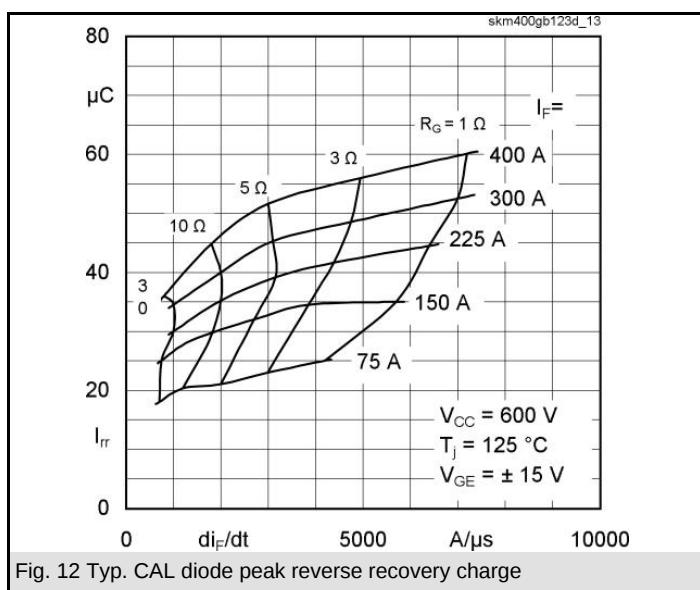
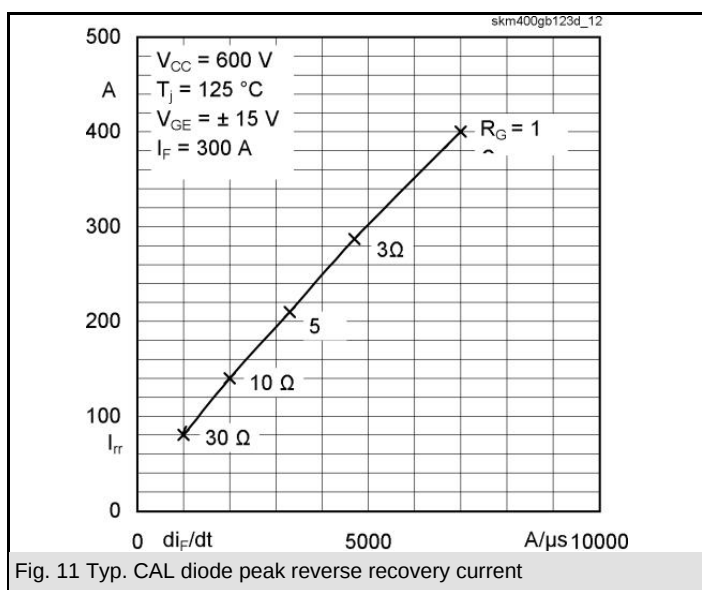
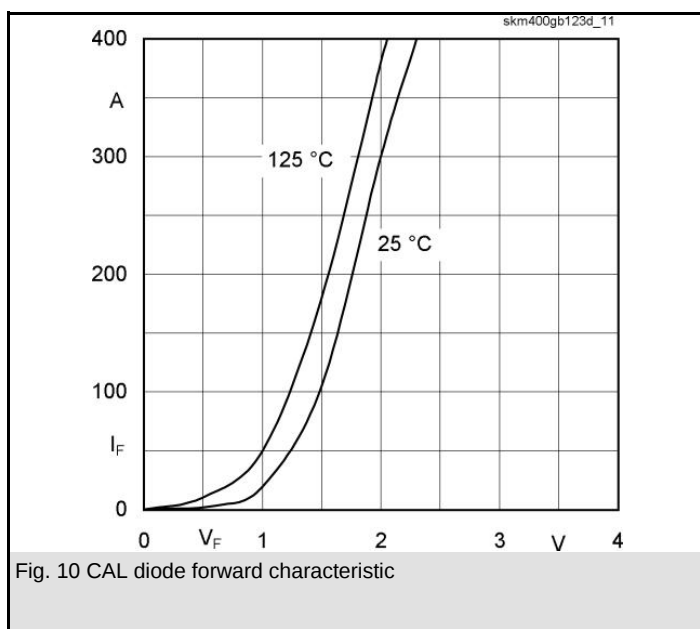
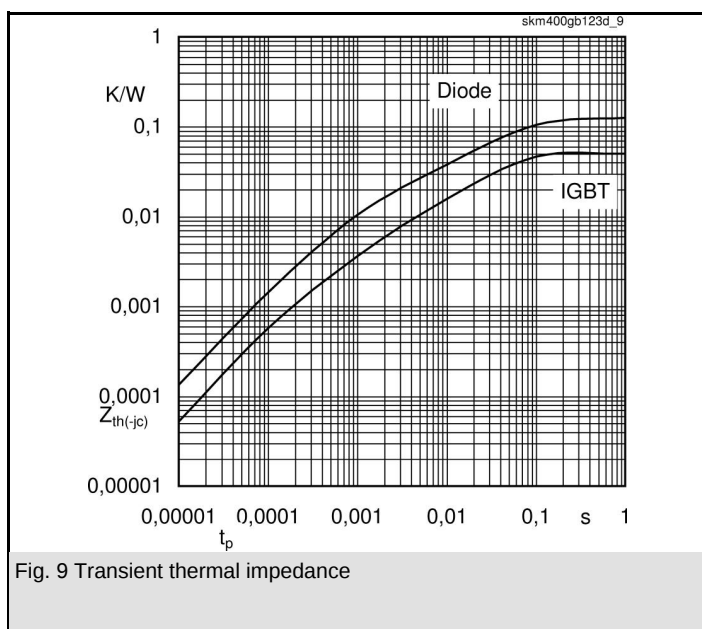
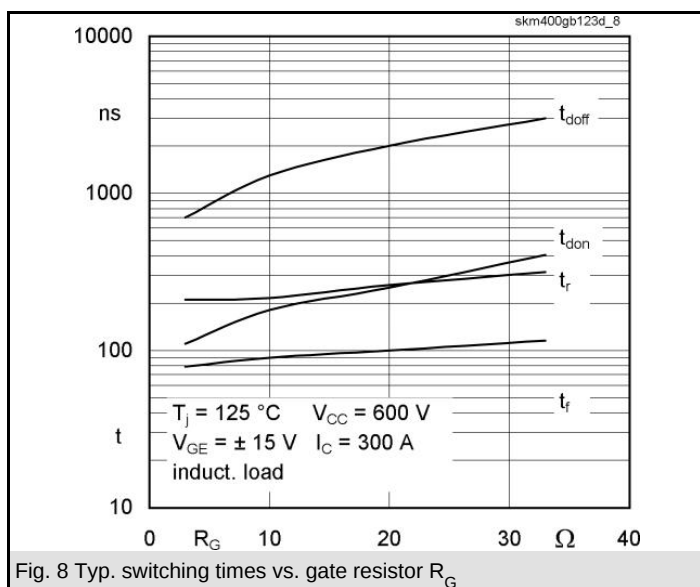
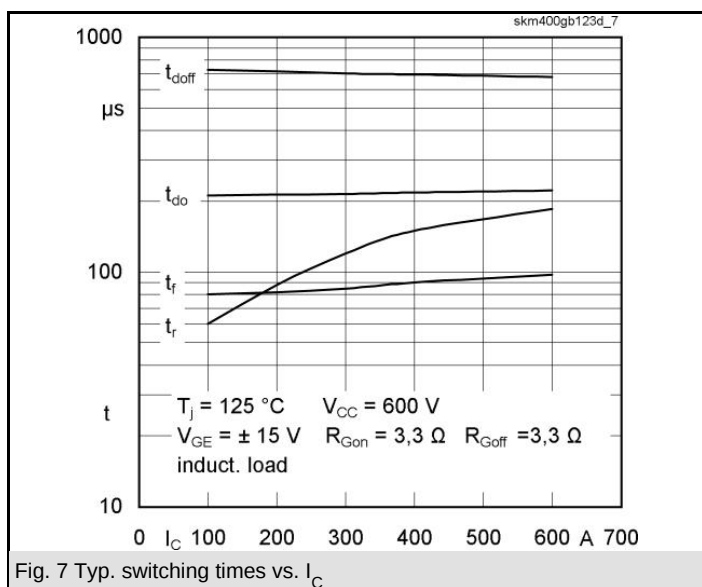
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Z_{th}			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	32	mk/W
R_i	$i = 2$	14	mk/W
R_i	$i = 3$	3,4	mk/W
R_i	$i = 4$	0,6	mk/W
τ_{ui}	$i = 1$	0,0447	s
τ_{ui}	$i = 2$	0,0122	s
τ_{ui}	$i = 3$	0,004	s
τ_{ui}	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	80	mk/W
R_i	$i = 2$	33	mk/W
R_i	$i = 3$	10,2	mk/W
R_i	$i = 4$	1,8	mk/W
τ_{ui}	$i = 1$	0,05	s
τ_{ui}	$i = 2$	0,0057	s
τ_{ui}	$i = 3$	0,0034	s
τ_{ui}	$i = 4$	0,0003	s





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