



SEMITRANS® 3

IGBT Modules

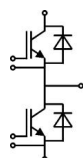
SKM 400GB123D

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

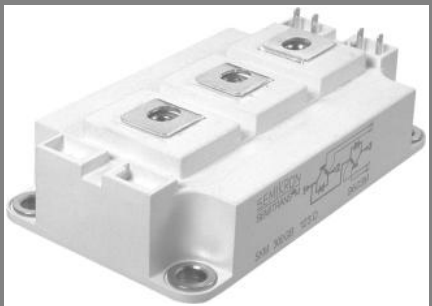


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Absolute Maximum Ratings				$T_c = 25^\circ\text{C}$, unless otherwise specified	
Symbol	Conditions			Values	Units
IGBT					
V_{CES}	$T_j = 25^\circ\text{C}$			1200	V
I_C	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$		400	A
		$T_{case} = 80^\circ\text{C}$		330	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$			600	A
V_{GES}				± 20	V
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1200\text{ V}$			10	μs
Inverse Diode					
I_F	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$		390	A
		$T_{case} = 80^\circ\text{C}$		260	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$			600	A
I_{FSM}	$t_p = 10\text{ ms; sin.}$	$T_j = 150^\circ\text{C}$		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 _C = 300A T _j = 125 °C V _{GE} = ± 15V		200	400	ns
t _r				115	220	ns
E _{on}			38		mJ	
t _{d(off)}	R _{Goff} = 3,3 Ω			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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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 300\text{ A}; V_{GE} = 0\text{ V}$ $T_j = 25\text{ }^{\circ}\text{C}_{chiplev.}$ $T_j = 125\text{ }^{\circ}\text{C}_{chiplev.}$		2 1,8	2,5	V V
V_{F0}	$T_j = 25\text{ }^{\circ}\text{C}$ $T_j = 125\text{ }^{\circ}\text{C}$		1,1	1,2	V V
r_F	$T_j = 25\text{ }^{\circ}\text{C}$ $T_j = 125\text{ }^{\circ}\text{C}$		3	4,3	mΩ mΩ
I_{RRM} Q_{rr} E_{rr}	$I_F = 300\text{ A}$ $di/dt = 2000\text{ A}/\mu\text{s}$ $V_{GE} = 0\text{ V}; V_{CC} = 600\text{ V}$ $T_j = 125\text{ }^{\circ}\text{C}$		140 13		A μC mJ
$R_{th(j-c)D}$	per diode			0,125	K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_{case} = 25\text{ }^{\circ}\text{C}$ $T_{case} = 125\text{ }^{\circ}\text{C}$		0,35 0,5		mΩ 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.

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.

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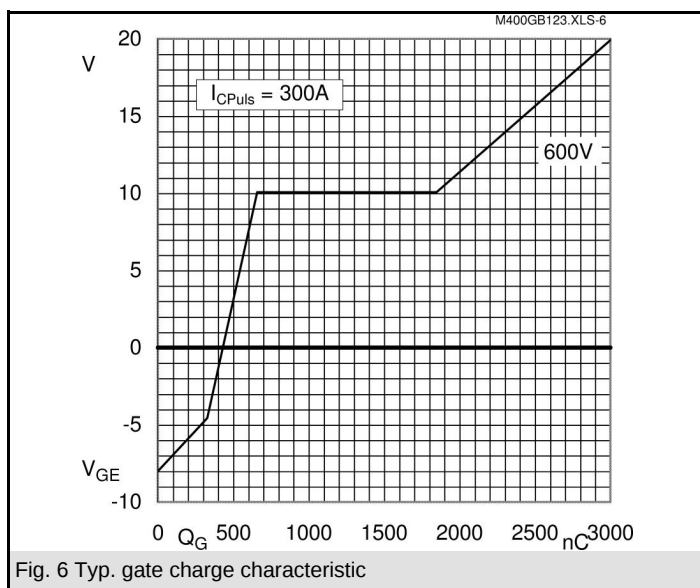
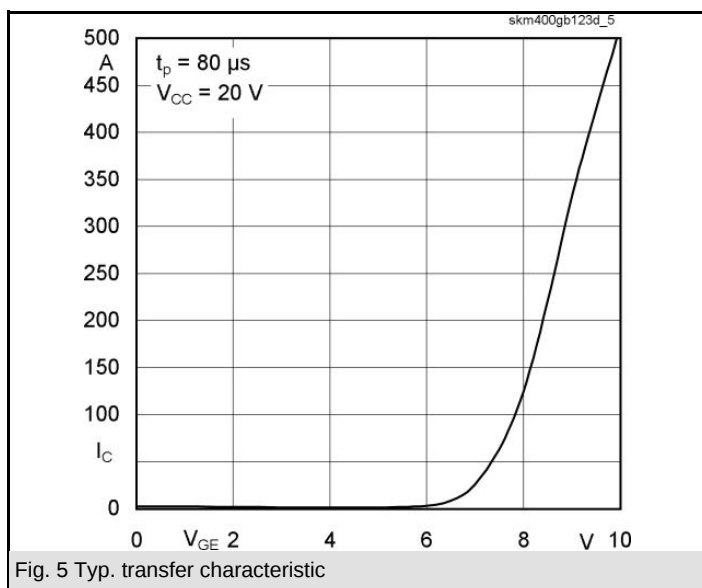
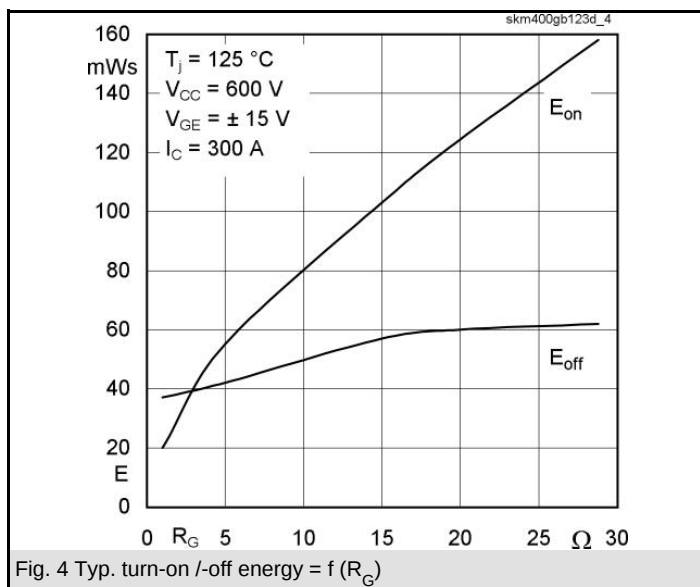
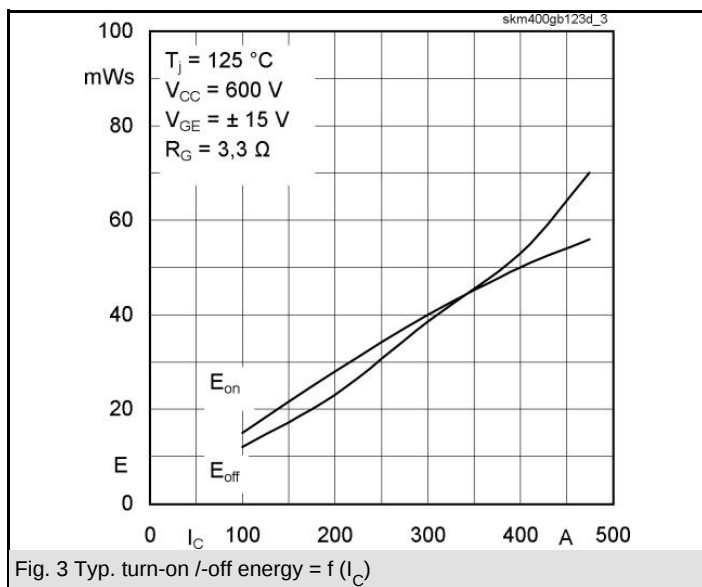
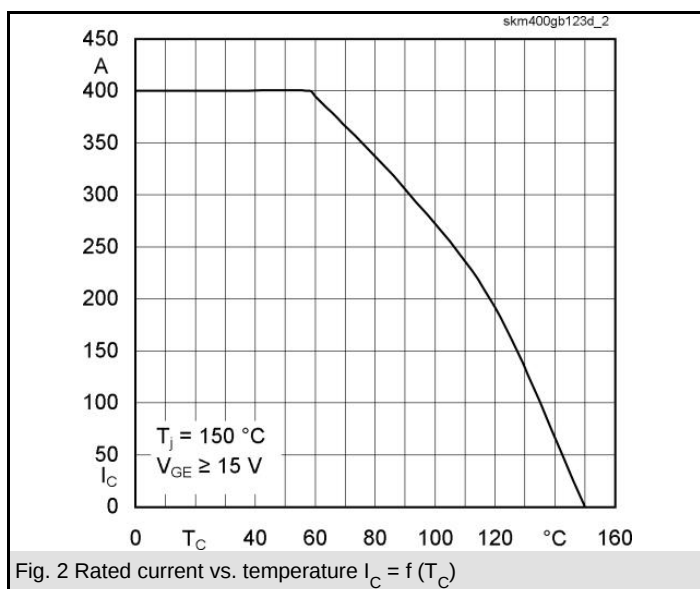
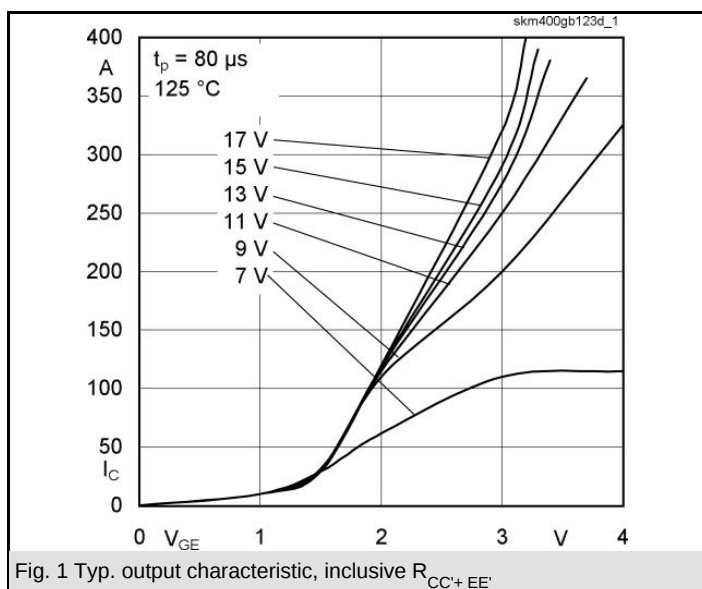
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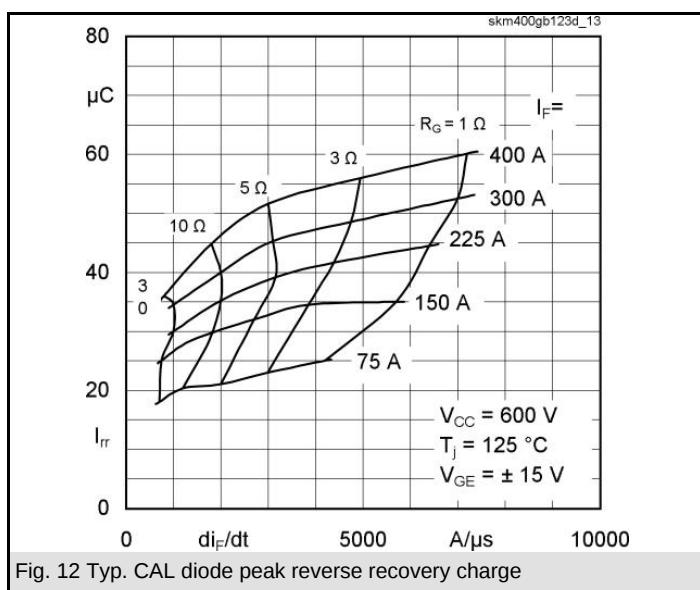
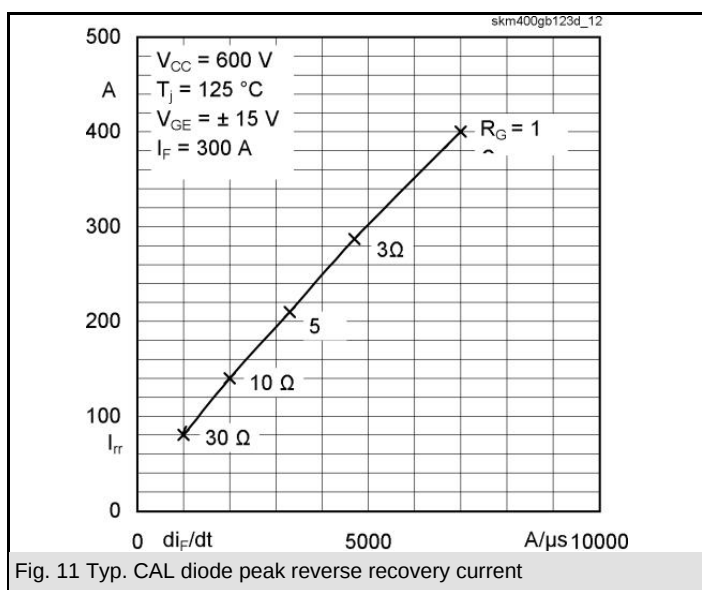
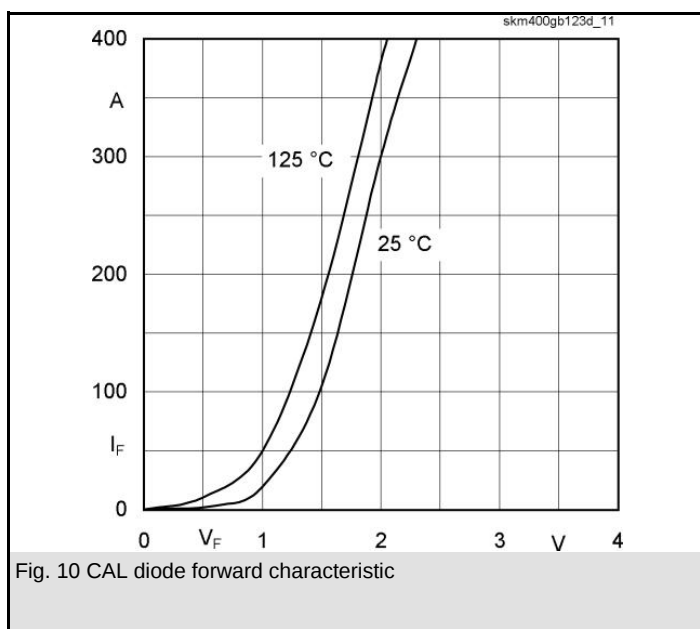
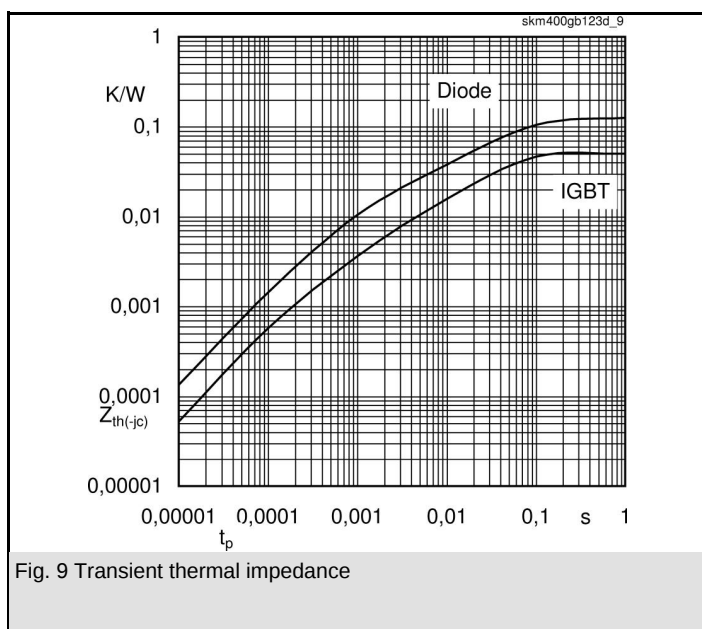
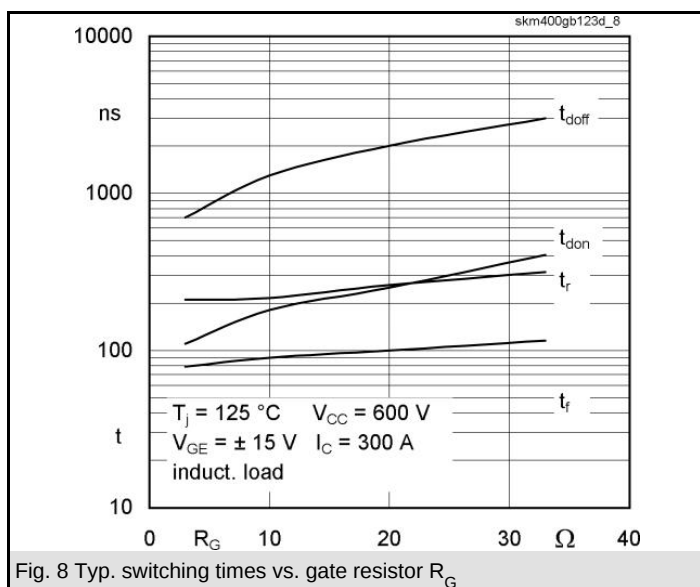
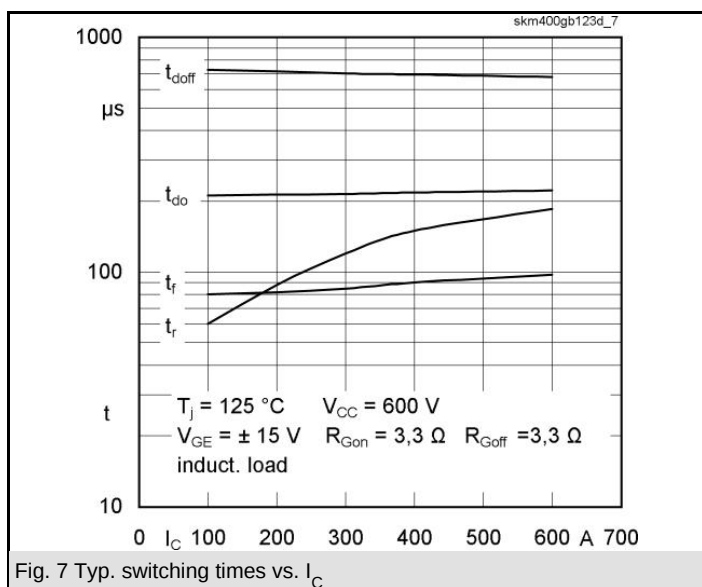
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Z_{th}			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	32	mk/W
R_i	$i = 2$	14	mk/W
R_i	$i = 3$	3,4	mk/W
R_i	$i = 4$	0,6	mk/W
τ_{ui}	$i = 1$	0,0447	s
τ_{ui}	$i = 2$	0,0122	s
τ_{ui}	$i = 3$	0,004	s
τ_{ui}	$i = 4$	0,0002	s
$Z_{th(j-c)D}$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