SKiM 270GD176D

SKiM® 5

IGBT Modules

SKiM 270GD176D

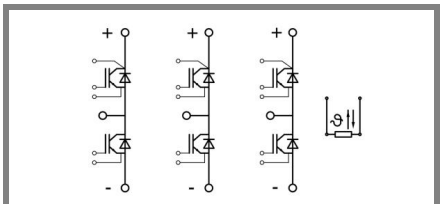
Preliminary Data

Features

- Homogenous Si
- Trench = Trenchgate Technology
- Low inductance case
- Isolated by Al_2O_3 DCB (Direct Copper Bonded) ceramic plate
- Pressure contact technology for thermal contacts
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to 6x I_C
- Vf value is specified on chip level
- Integrated temperature sensor
- Spring contact system to attach driver PCB to the auxiliary terminals

Typical Applications*

- AC inverter drives mains 575 - 750 V AC
- public transport (auxiliary syst.)



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Absolute Maximum Ratings		T_c = 25 °C, unless otherwise specified	
Symbol	**Conditions**	**Values**	**Units**
IGBT			
V_{CES}		1700	V
I_C	T_s = 25 (70) °C	260 (180)	A
I_{CRM}	t_p = 1 ms	600	A
V_{GES}		± 20	V
T_j (T_{stg})		- 40 ... 150 (125)	°C
T_{cop}	max. case operating temperature	125	°C
V_{isol}	AC, 1 min.	3300	V
Inverse diode			
I_F	T_s = 25 (70) °C	215 (155)	A
I_{FRM}	t_p = 1 ms	540	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 150 °C	2200	A

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	5,15	5,8	6,45	V
I_{CES}	V_{GE} = 0; V_{CE} = V_{CES}; T_j = 25 °C		0,1	0,3	mA
V_{CEO}	T_j = 25 (125) °C		1 (0,9)	1,2 (1,1)	V
r_{CE}	T_j = 25 (125) °C		3,3 (5)	4,2 (6)	mΩ
V_{CEsat}	I_{Cnom} = 300 A; V_{GE} = 15 V, T_j = 25 (125) °C on chip level		2 (2,4)	2,45 (2,9)	V
C_{ies}	V_{GE} = 0; V_{CE} = 25 V; f = 1 MHz		21,3		nF
C_{oes}	V_{GE} = 0; V_{CE} = 25 V; f = 1 MHz		1,1		nF
C_{res}	V_{GE} = 0; V_{CE} = 25 V; f = 1 MHz		0,9		nF
L_{CE}				20	nH
$R_{CC'+EE'}$	resistance, terminal-chip T_c= 25 (125) °C		0,9 (1,1)		mΩ
$t_{d(on)}$	V_{CC} = 1200 V				ns
t_r	I_{Cnom} = 300 A				ns
$t_{d(off)}$	R_{Gon} = R_{Goff} = 4 Ω				ns
t_f	T_j = 125 °C				ns
E_{on} (E_{off})	V_{GE} ± 15 V		170 (120)		mJ
E_{on} (E_{off})	with SKHI 65; T_j = 125 °C V_{CC} = 1200 V; I_C = 300 A				mJ
Inverse diode					
V_F = V_{EC}	I_{Fnom} = 225 A; V_{GE} = 0 V; T_j = 25 (125) °C		1,7 (1,8)	1,9 (2)	V
V_{TO}	T_j = 25 (125) °C		1,2 (0,9)	1,4 (1,1)	V
r_T	T_j = 25 (125) °C		2,2 (4)	2,2 (4)	mΩ
I_{RRM}	I_F = 225 A; T_j = 125 °C				A
Q_{rr}	V_{GE} = 1200 V di/dt = A/µs				µC
E_{rr}	R_{Gon} = R_{Goff} = 4 Ω				mJ
Thermal characteristics					
$R_{th(j-s)}$	per IGBT			0,175	K/W
$R_{th(j-s)}$	per FWD			0,29	K/W
Temperature Sensor					
R_{TS}	T = 25 (100) °C		1 (1,67)		kΩ
tolerance	T = 25 (100) °C		3 (2)		%
Mechanical data					
M_1	to heatsink (M5)	2		3	Nm
M_2	for terminals (M6)	4		5	Nm
w				460	g

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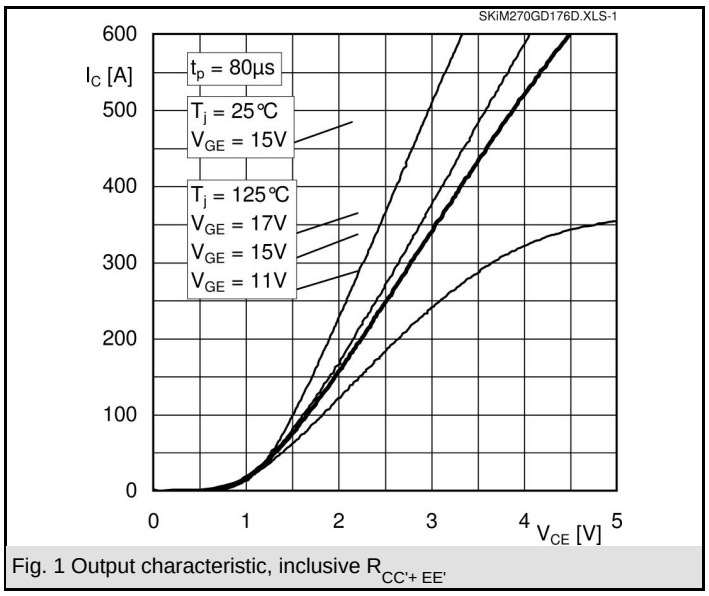

Fig. 1 Output characteristic, inclusive $R_{CC'+ EE'}$

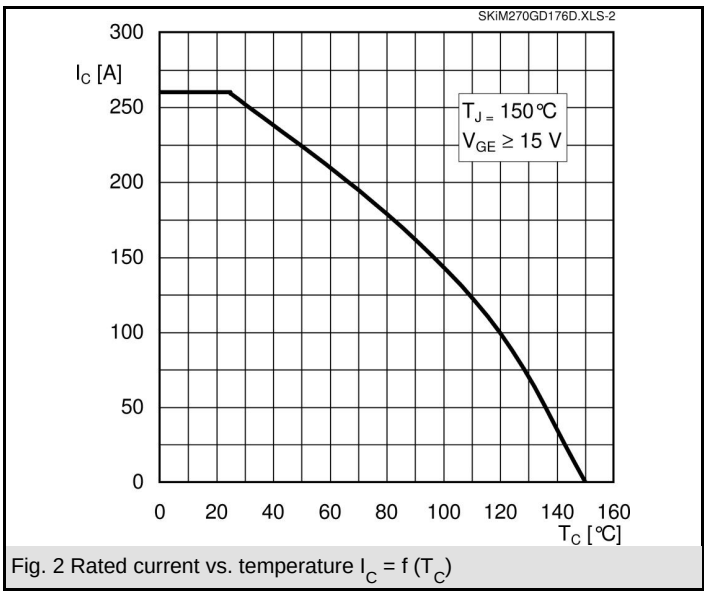

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

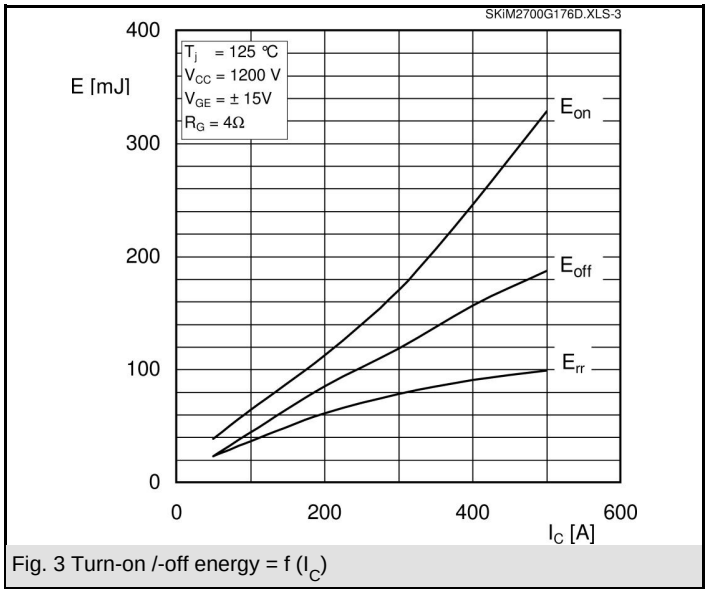

Fig. 3 Turn-on /-off energy = f (I_C)

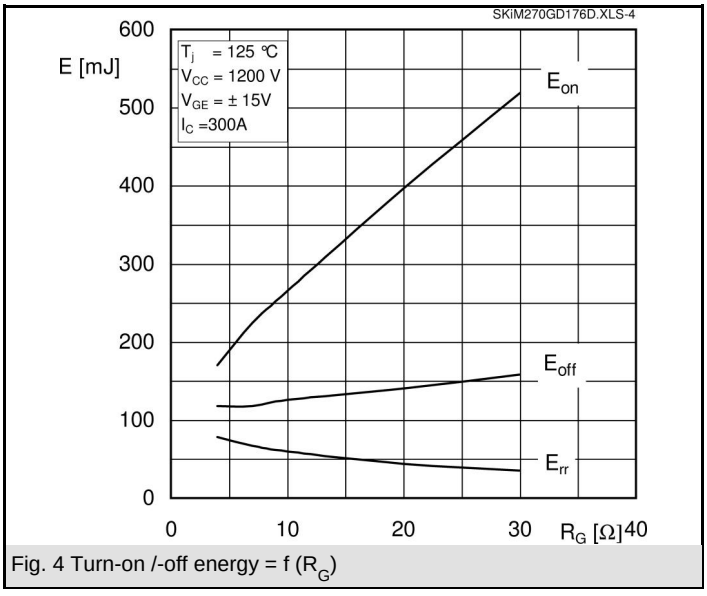

Fig. 4 Turn-on /-off energy = f (R_G)

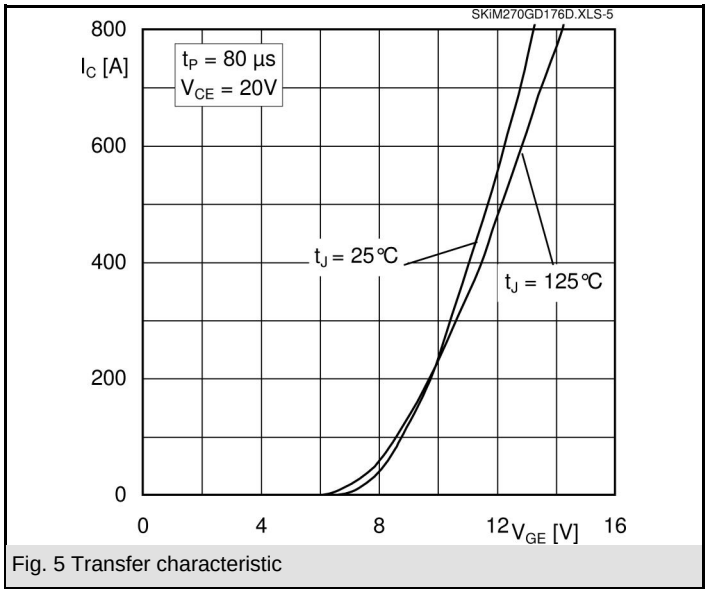

Fig. 5 Transfer characteristic

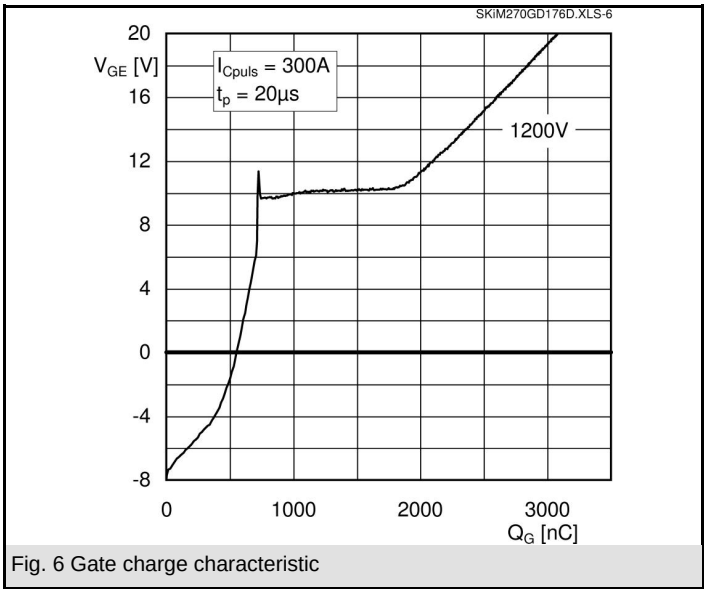

Fig. 6 Gate charge characteristic

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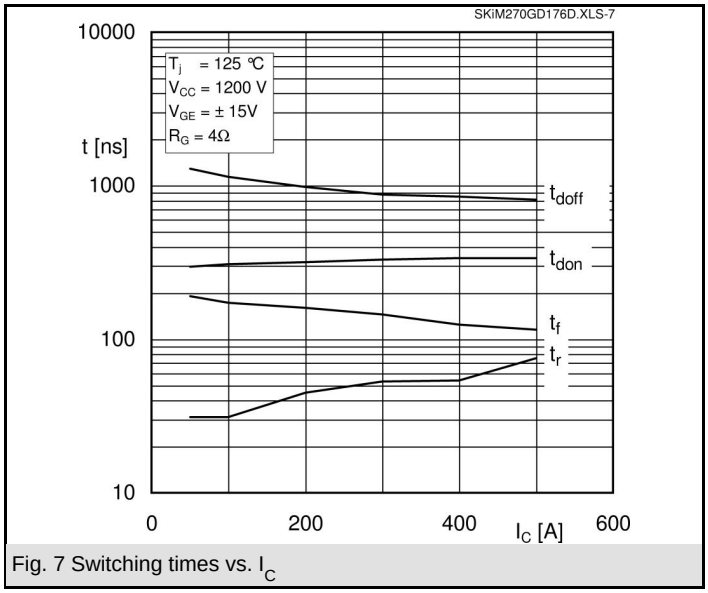

Fig. 7 Switching times vs. I_C

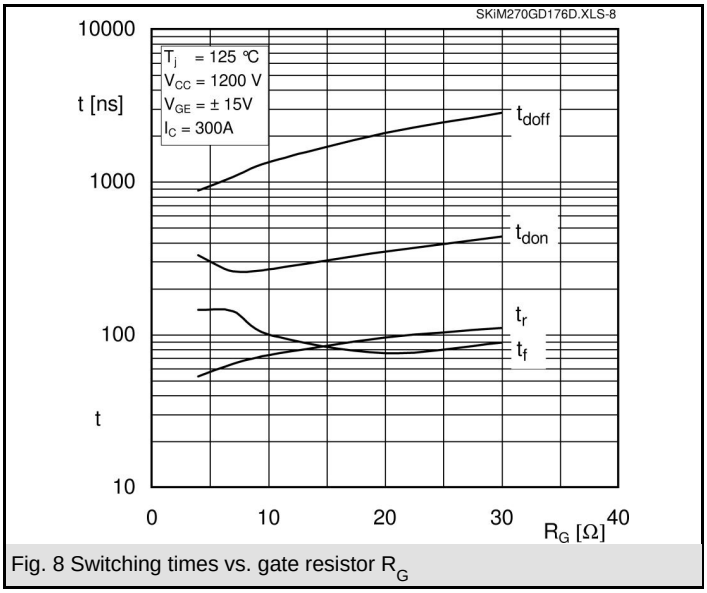

Fig. 8 Switching times vs. gate resistor R_G

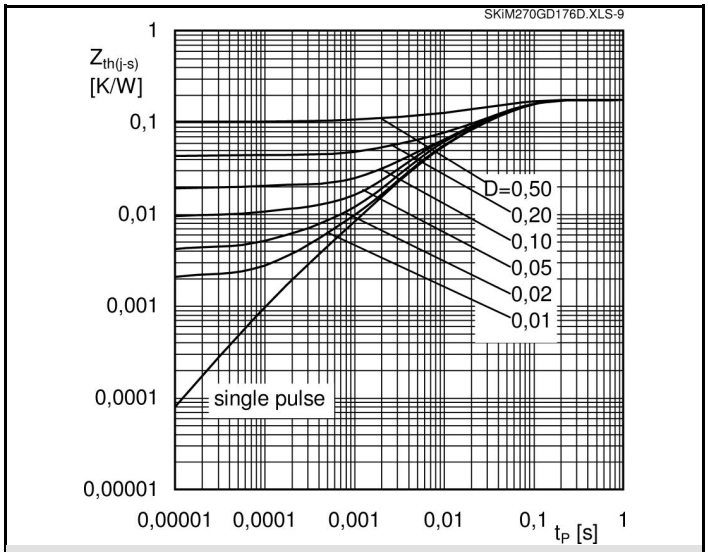

Fig. 9 Transient thermal impedance of IGBT

$Z_{thp(j-s)} = f(t_p)$; $D = t_p/t_c = t_p * f$

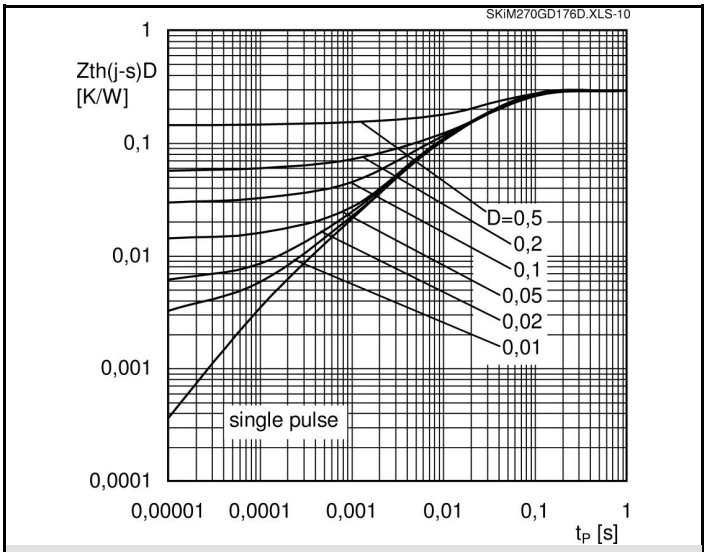

Fig. 10 Transient thermal impedance of FWD

$Z_{thp(j-s)} = f(t_p)$; $D = t_p/t_c = t_p * f$

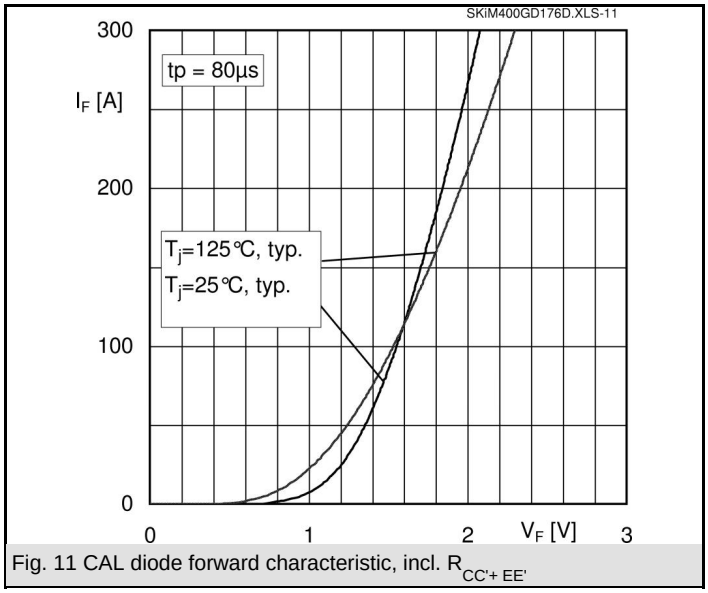

Fig. 11 CAL diode forward characteristic, incl. $R_{CC'+ EE'}$

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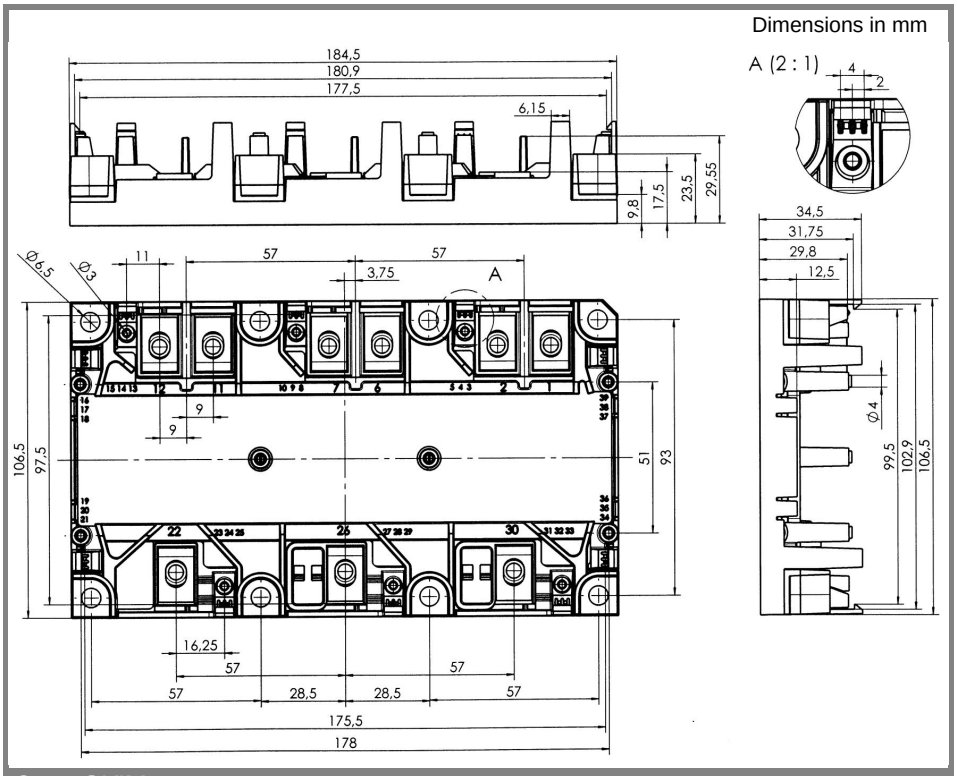
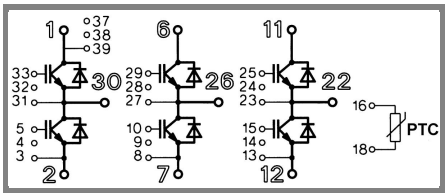


Case SKiM 5



GD Case SKiM 5

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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