

SKiM 270GD176D



SKiM[®] 5

IGBT Modules

SKiM 270GD176D

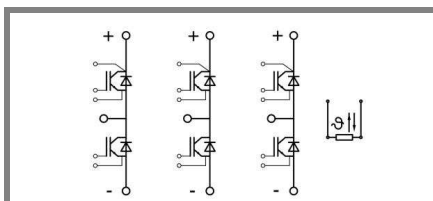
Preliminary Data

Features

- Homogenous Si
- Trench = Trenchgate Technology
- Low inductance case
- Isolated by Al₂O₃ 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*

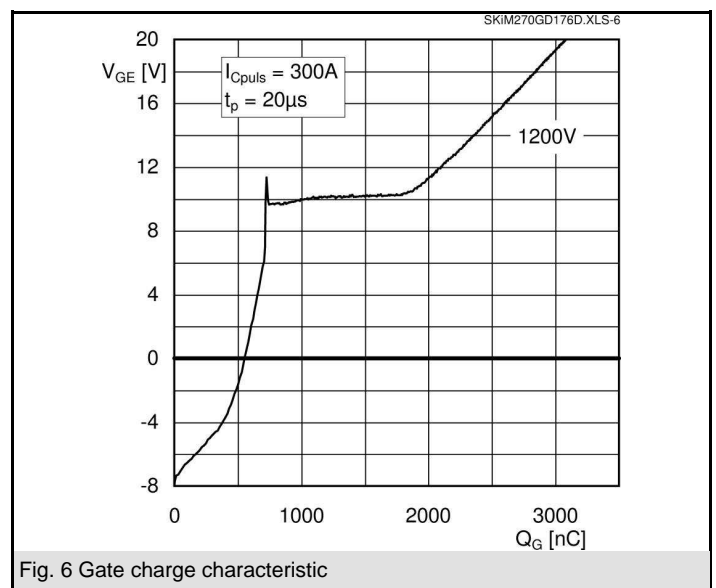
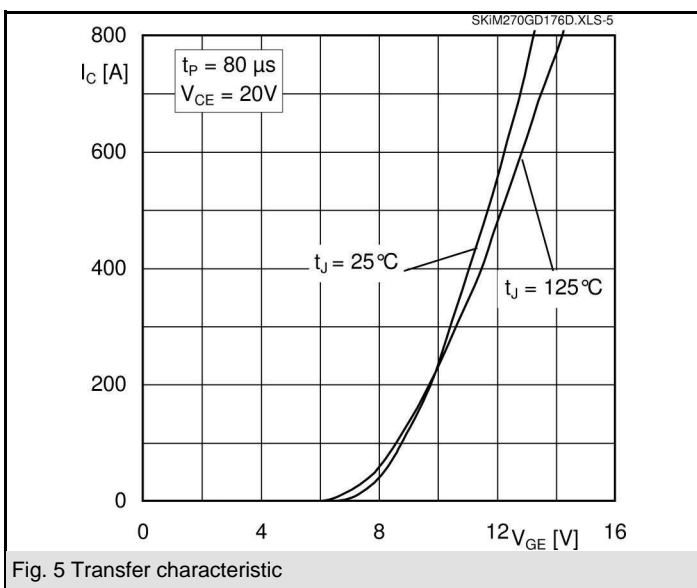
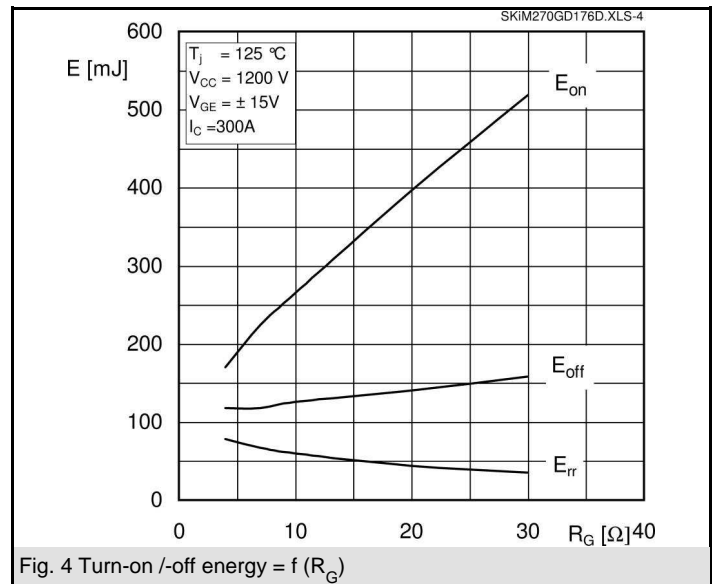
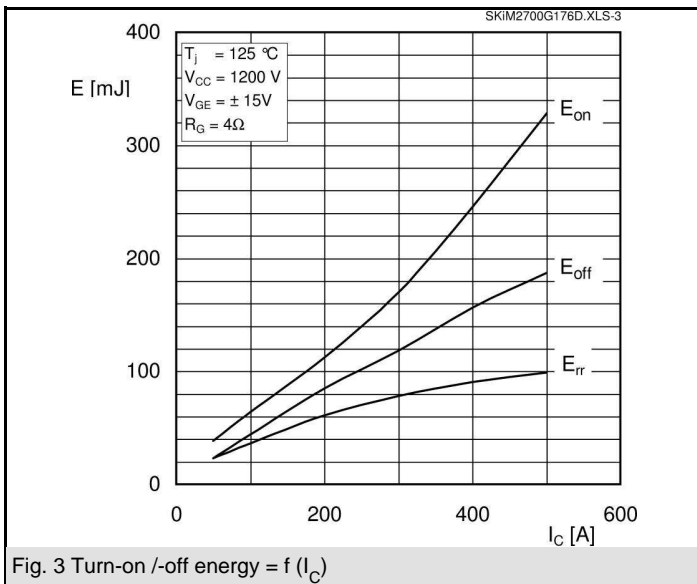
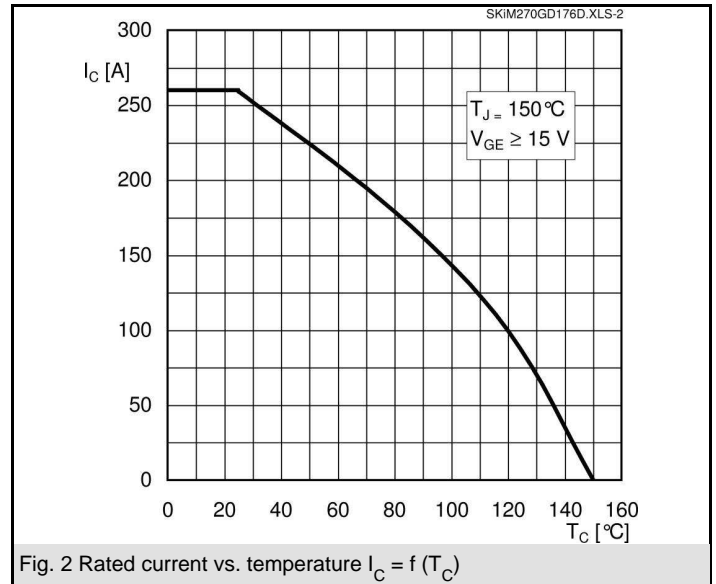
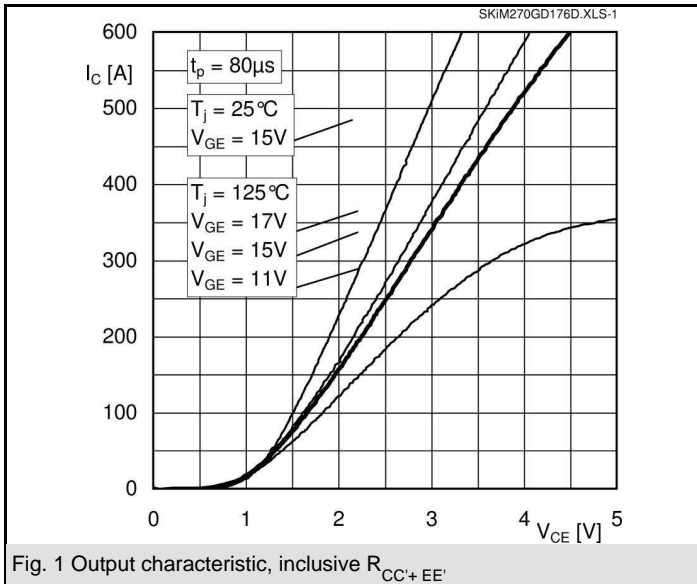
- AC inverter drives mains 575 - 750 V AC
- public transport (auxiliary syst.)



GD

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



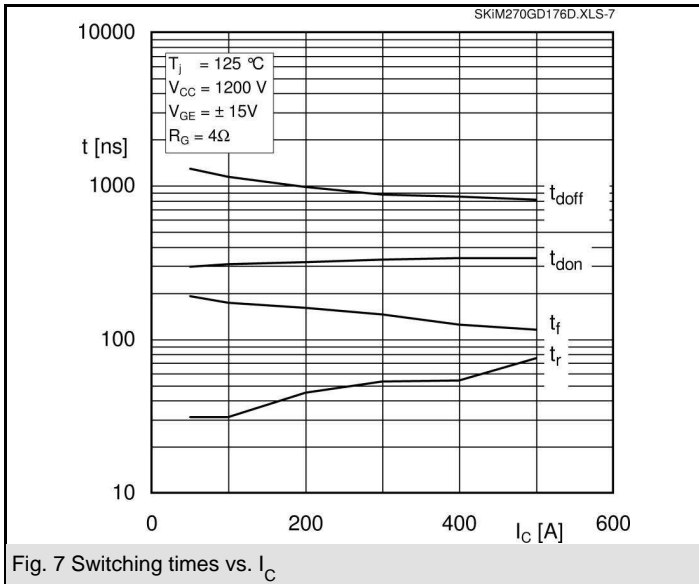


Fig. 7 Switching times vs. I_C

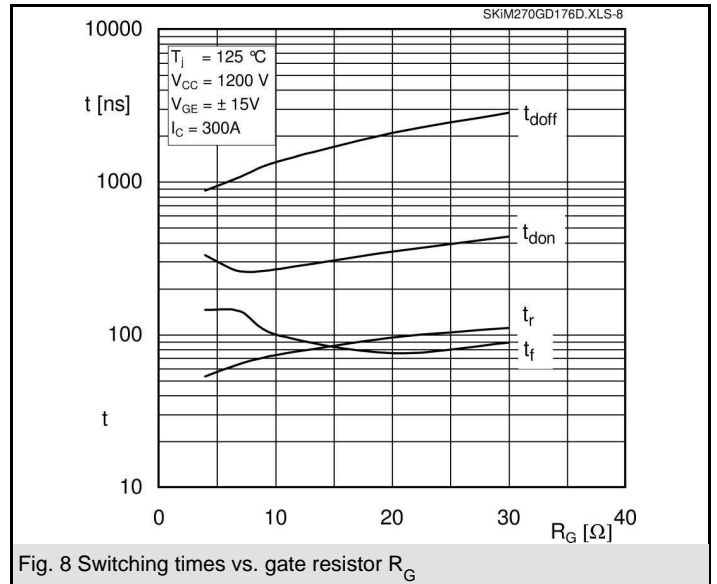


Fig. 8 Switching times vs. gate resistor R_G

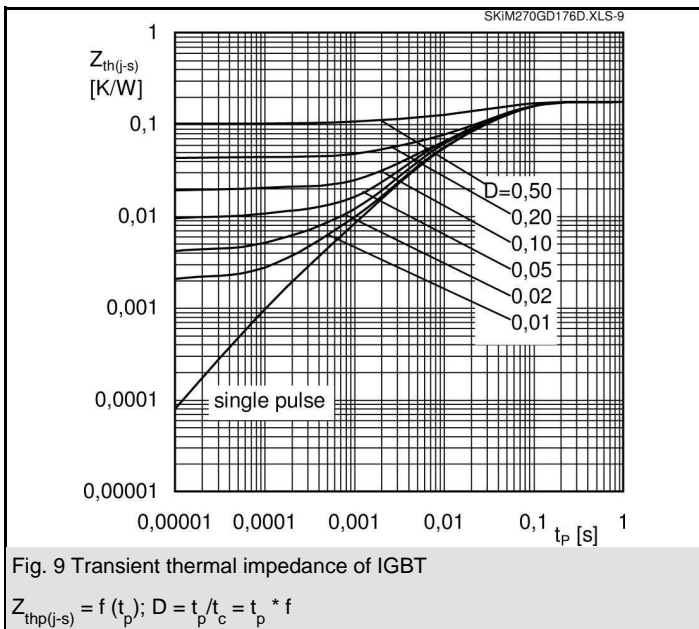


Fig. 9 Transient thermal impedance of IGBT

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

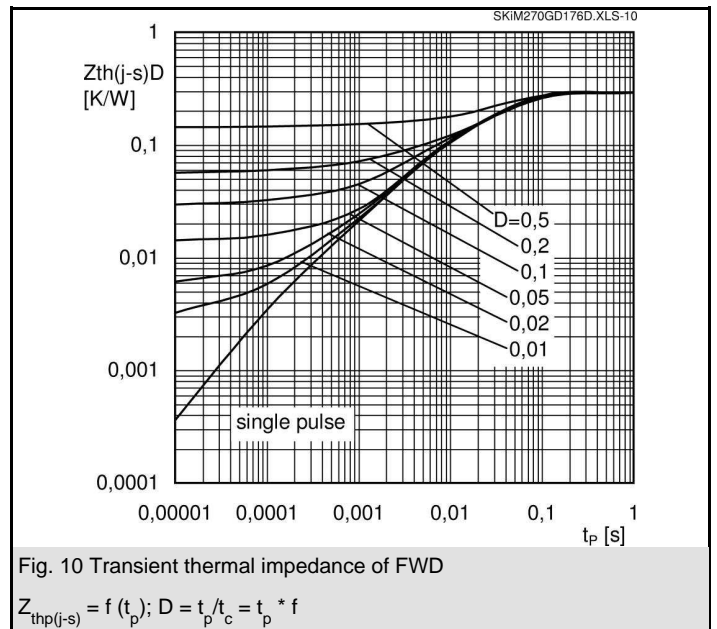


Fig. 10 Transient thermal impedance of FWD

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

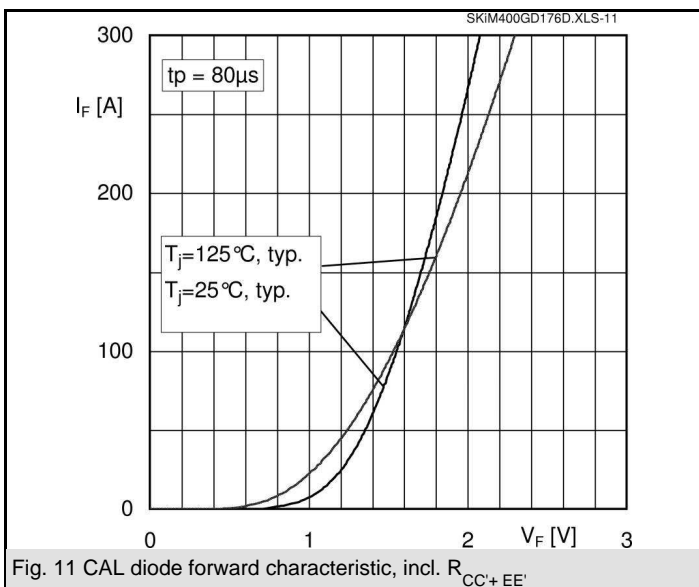
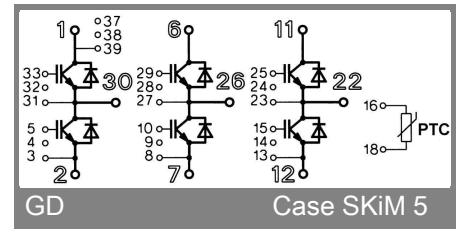
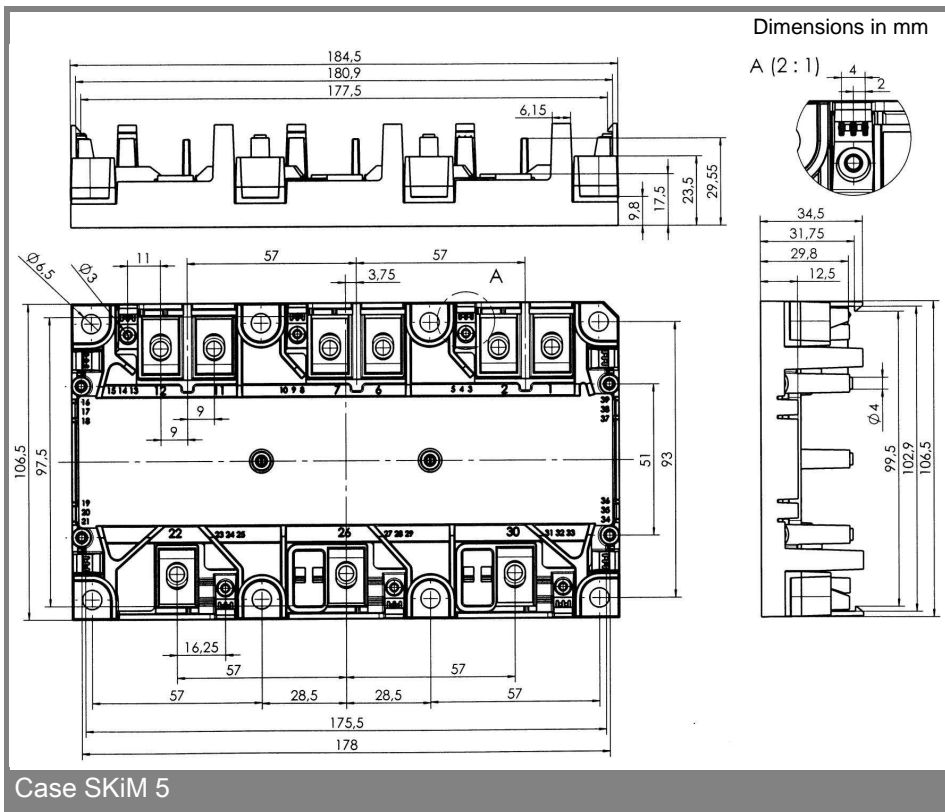


Fig. 11 CAL diode forward characteristic, incl. R_{CC+EE}



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.