SKiM 450GD126D

SKiM® 5

IGBT Modules

SKiM 450GD126D

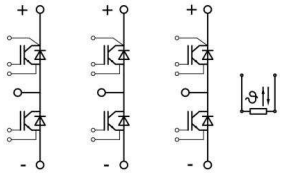
Preliminary Data

Features

- Trench gate IGBT with field stop layer
- Low inductance case
- Fast & soft inverse CAL diodes
- Isolated by Al_2O_3 DCB (Direct Copper Bonded) ceramic plate
- Pressure contact technology for thermal contacts
- Spring contact system to attach driver PCB to the control terminals
- Integrated temperature sensor

Typical Applications*

- Uninteruptable power supplies (UPS)
- Three phase inverters for AC motor speed control



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Absolute Maximum Ratings	T_c = 25 °C, unless otherwise specified		
Symbol	**Conditions**	**Values**	**Units**
IGBT			
V_{CES}		1200	V
I_C	T_s = 25 (70) °C	390 (300)	A
I_{CRM}	t_p = 1 ms	780	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.	2500	V
Inverse diode			
I_F	T_s = 25 (70) °C	345 (260)	A
I_{FRM}	t_p = 1 ms	780	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 150 °C	3300	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 = 18 mA	4,95	5,8	6,55	V
I_{CES}	V_{GE} = 0; V_{CE} = V_{CES}; T_j = 25 °C			0,6	mA
V_{CEO}	T_j = 25 (125) °C		1 (0,9)	1,2 (1,1)	V
r_{CE}	T_j = 25 (125) °C		1,6 (2,4)	2,1 (3)	mΩ
V_{CEsat}	I_{Cnom} = 450 A; V_{GE} = 15 V, T_j = 25 (125) °C on chip level		1,7 (2)	2,15 (2,45)	V
C_{ies}	V_{GE} = 0; V_{CE} = 25 V; f = 1 MHz		35		nF
C_{oes}	V_{GE} = 0; V_{CE} = 25 V; f = 1 MHz		2,5		nF
C_{res}	V_{GE} = 0; V_{CE} = 25 V; f = 1 MHz		2,4		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} = 600 V		250		ns
t_r	I_{Cnom} = 450 A		55		ns
$t_{d(off)}$	R_{Gon} = R_{Goff} = 3 Ω		800		ns
t_f	T_j = 125 °C		120		ns
E_{on} (E_{off})	V_{GE} ± 15 V		42 (70)		mJ
E_{on} (E_{off})	with SKHI 65; T_j = 125 °C V_{CC} = 600 V; I_C = 450 A				mJ
Inverse diode					
V_F = V_{EC}	I_{Fnom} = 300 A; V_{GE} = 0 V; T_j = 25 (125) °C		2 (1,8)	2,55 (2,3)	V
V_{TO}	T_j = 25 (125) °C		1,1	1,45 (1,25)	V
r_T	T_j = 25 (125) °C		3	3,5 (3,5)	mΩ
I_{RRM}	I_F = 450 A; T_j = 125 °C				A
Q_{rr}	V_{GE} = V di/dt = A/µs				µC
E_{rr}	R_{Gon} = R_{Goff} = 3 Ω				mJ
Thermal characteristics					
$R_{th(j-s)}$	per IGBT			0,13	K/W
$R_{th(j-s)}$	per FWD			0,19	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

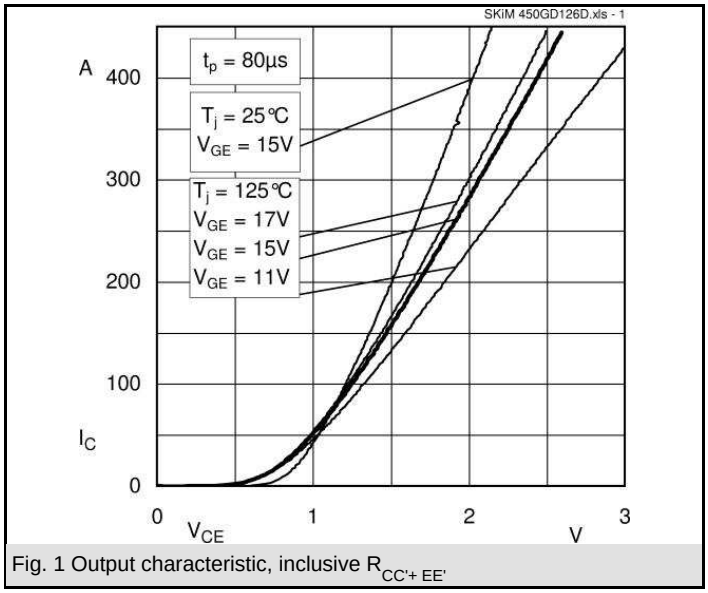


Fig. 1 Output characteristic, inclusive $R_{CC'+ EE'}$

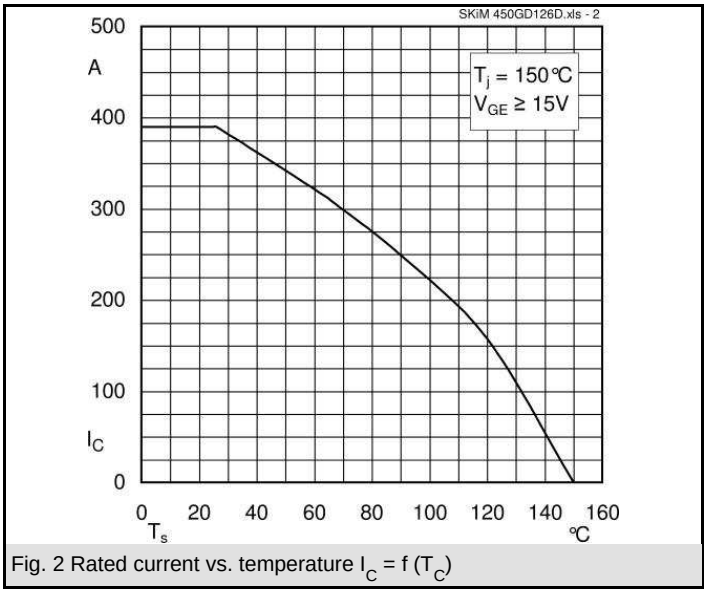


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

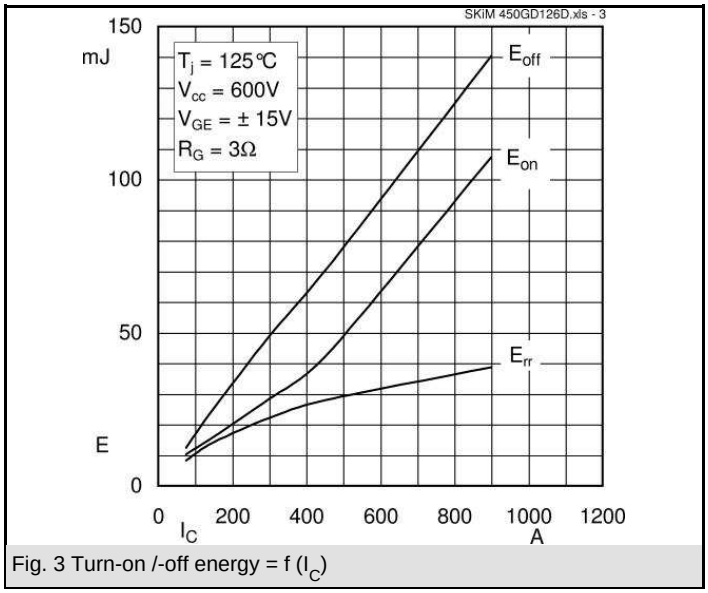


Fig. 3 Turn-on /-off energy = f (I_C)

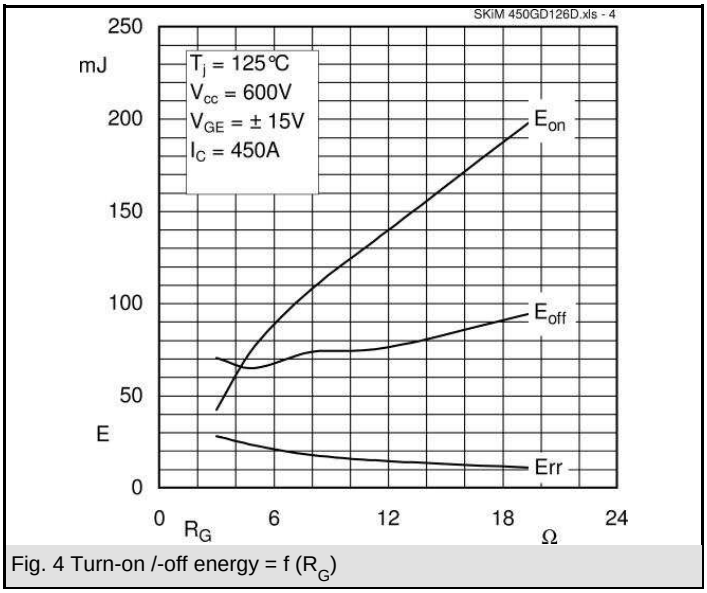


Fig. 4 Turn-on /-off energy = f (R_G)

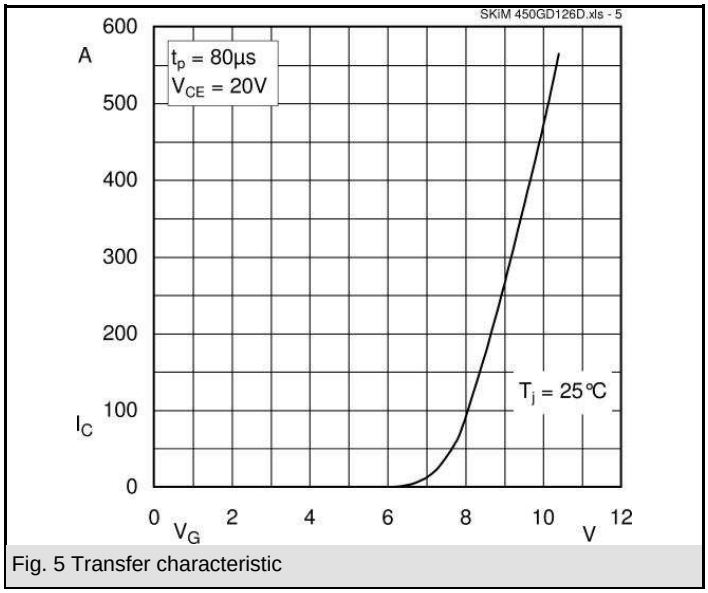


Fig. 5 Transfer characteristic

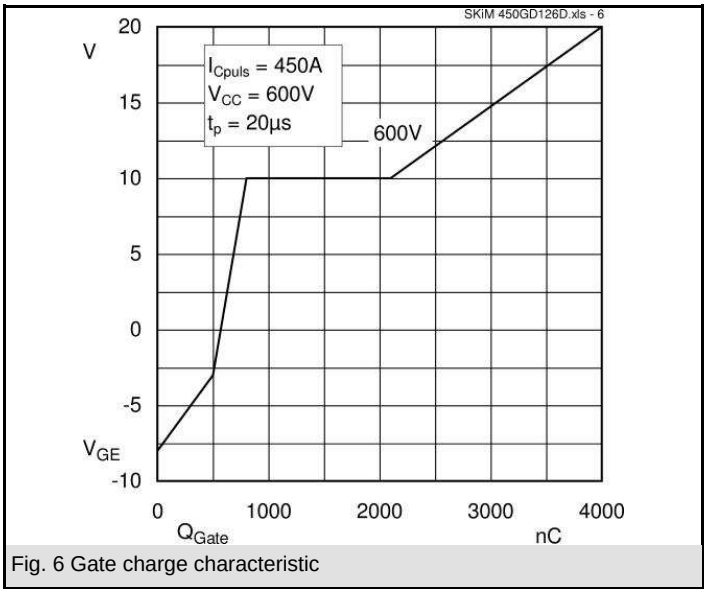


Fig. 6 Gate charge characteristic

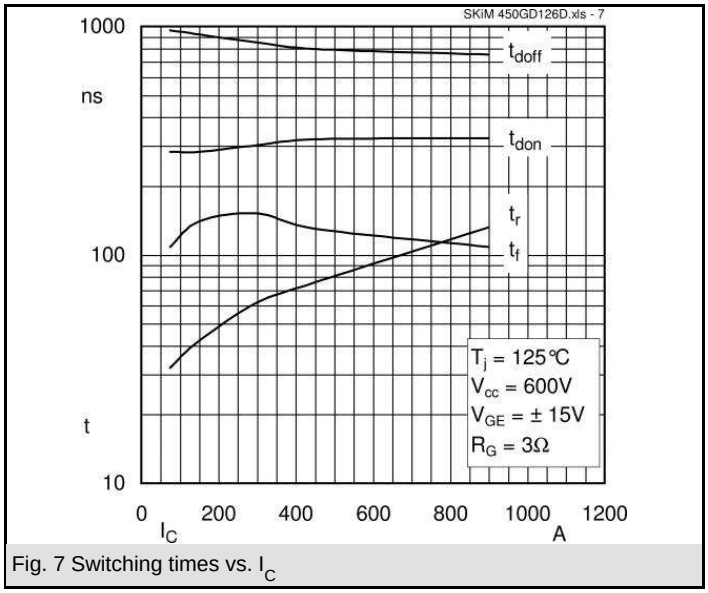


Fig. 7 Switching times vs. I_C

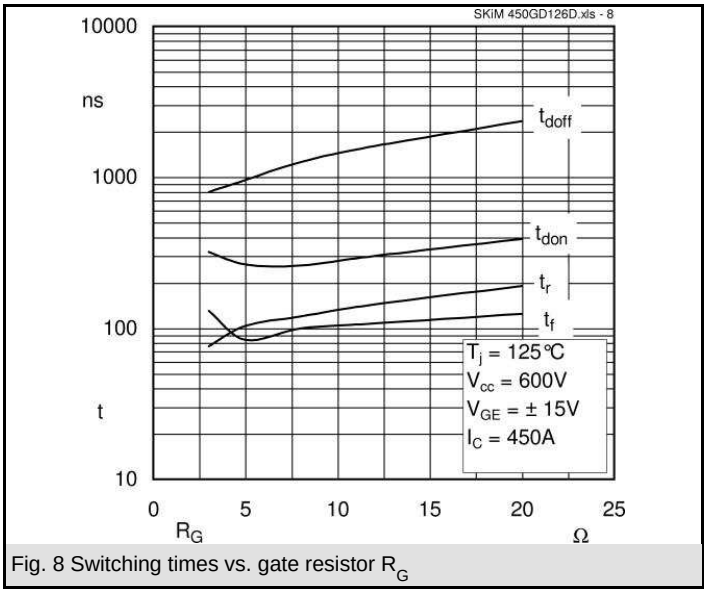


Fig. 8 Switching times vs. gate resistor R_G

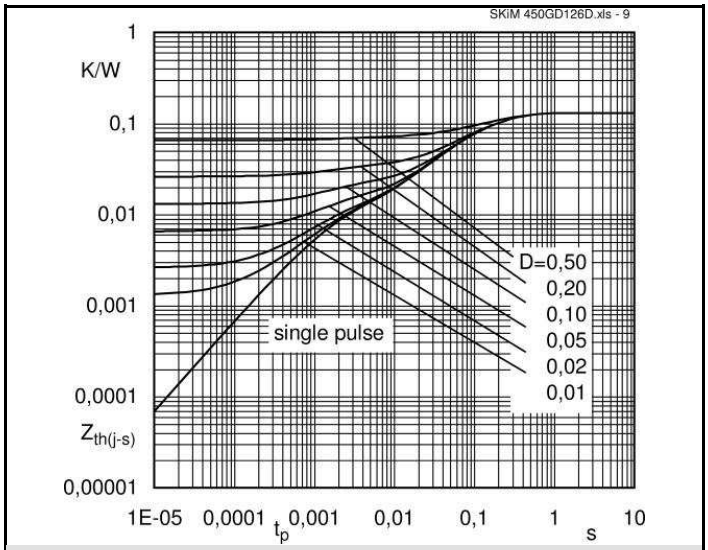


Fig. 9 Transient thermal impedance of IGBT

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

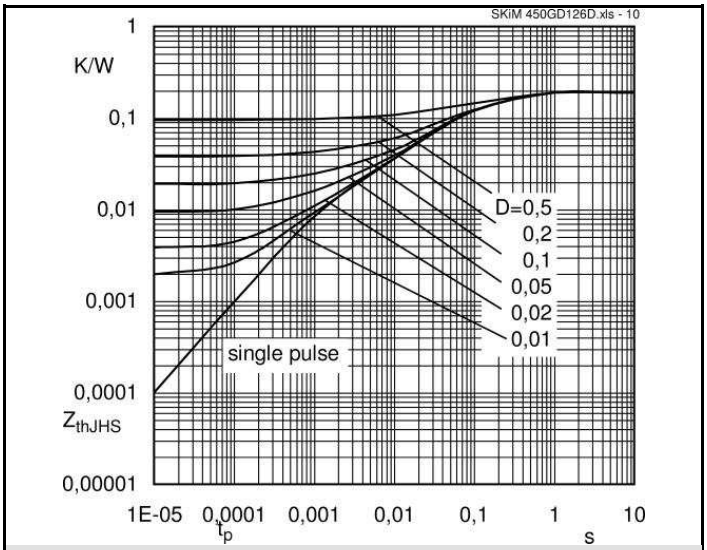


Fig. 10 Transient thermal impedance of FWD

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

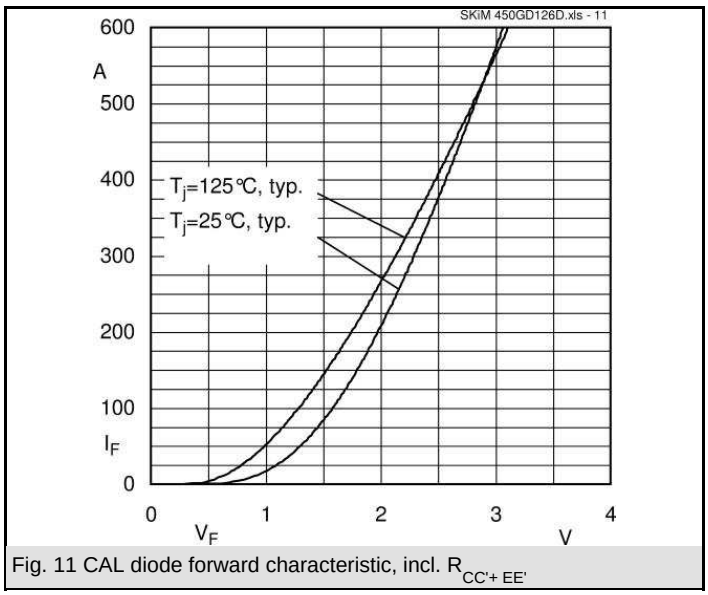
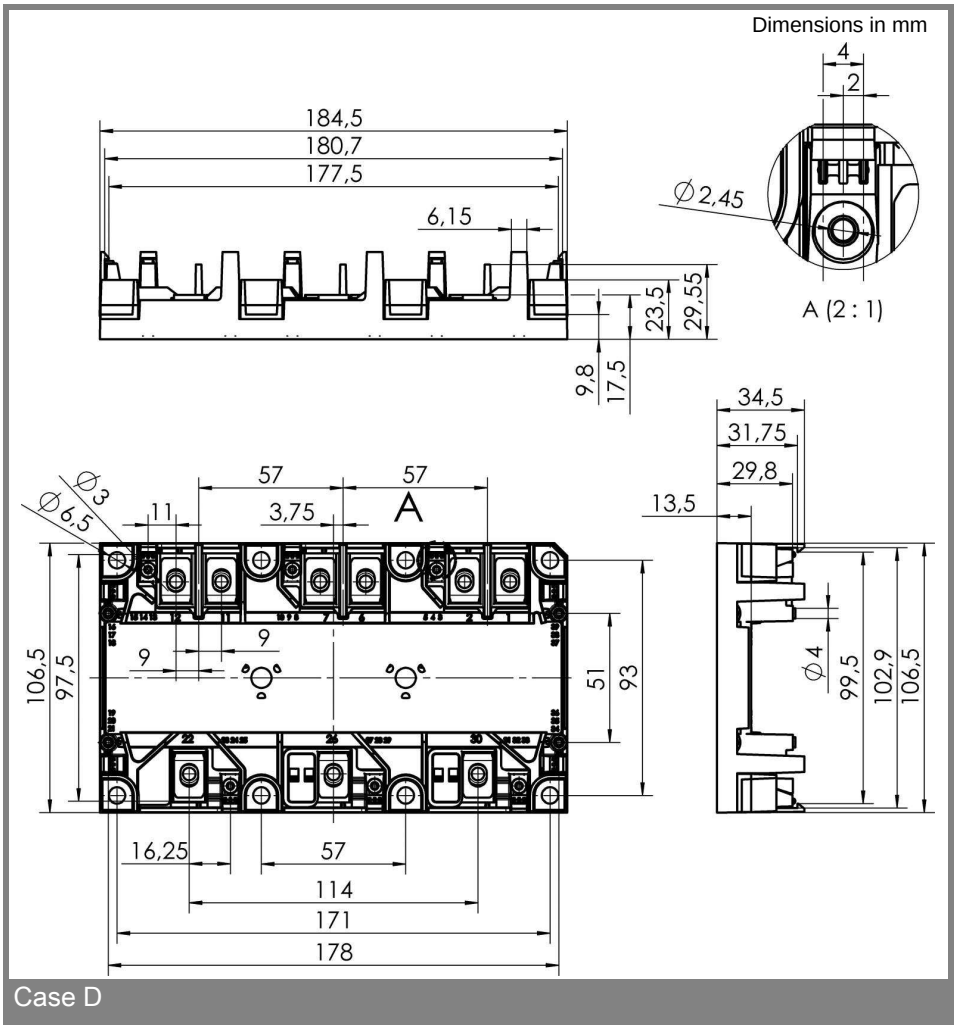
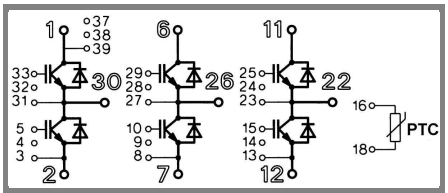


Fig. 11 CAL diode forward characteristic, incl. $R_{CC'+ EE'}$



Case D



GD Case D

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.

