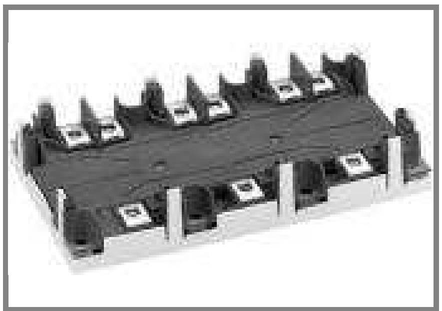
SKiM 450GD126D



SKiM® 5

IGBT Modules

SKiM 450GD126D

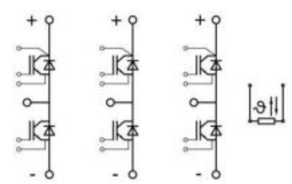
Preliminary Data

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



GD

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			5	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

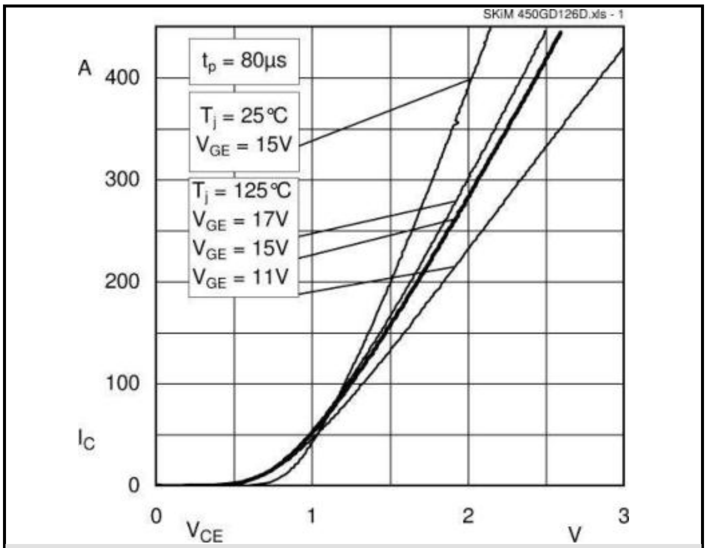


Fig. 1 Output characteristic, inclusive $R_{CC'+EE'}$

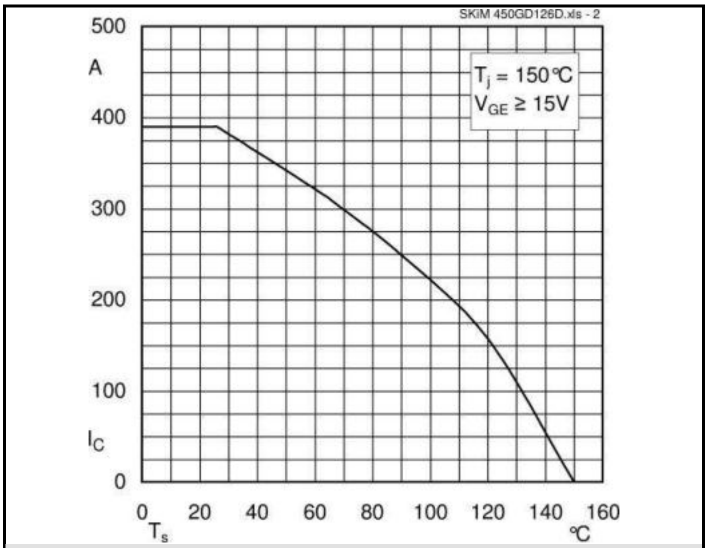


Fig. 2 Rated current vs. temperature I_C = f (T_C)

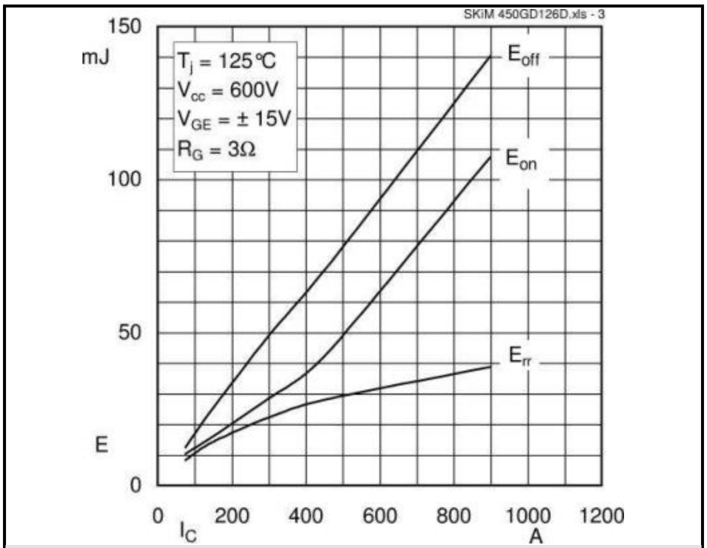


Fig. 3 Turn-on /-off energy = f (I_C)

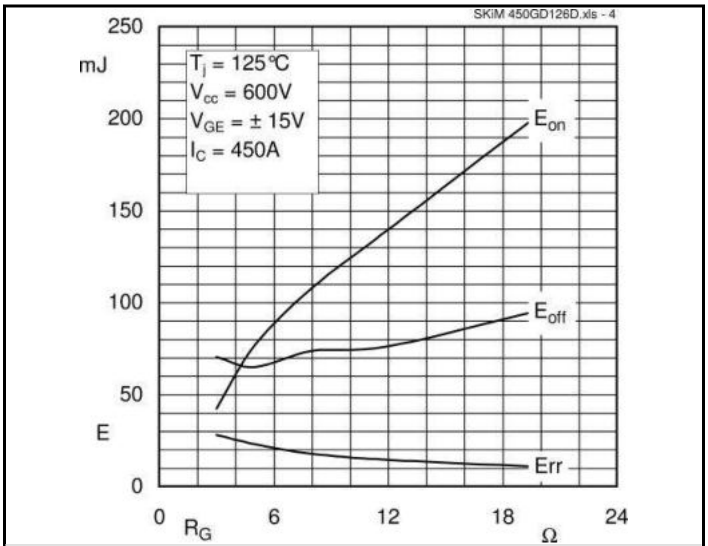


Fig. 4 Turn-on /-off energy = f (R_G)

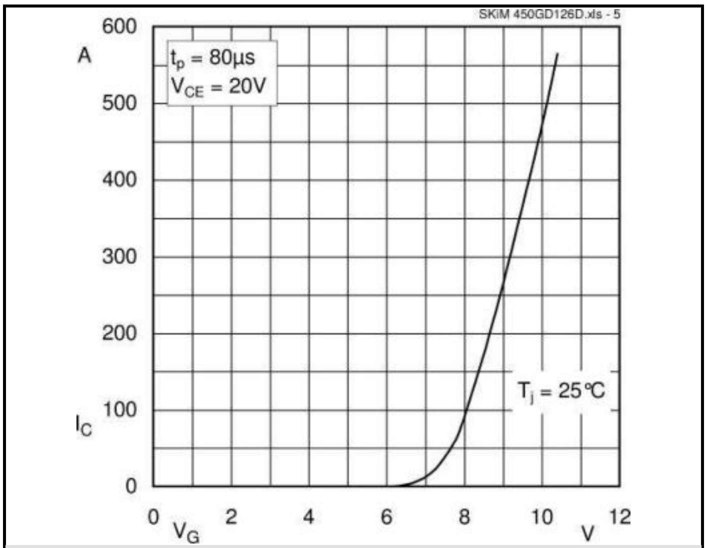


Fig. 5 Transfer characteristic

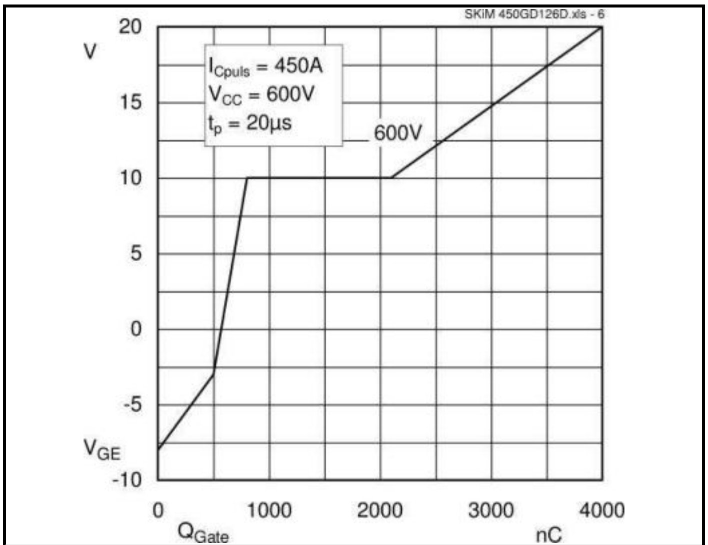


Fig. 6 Gate charge characteristic

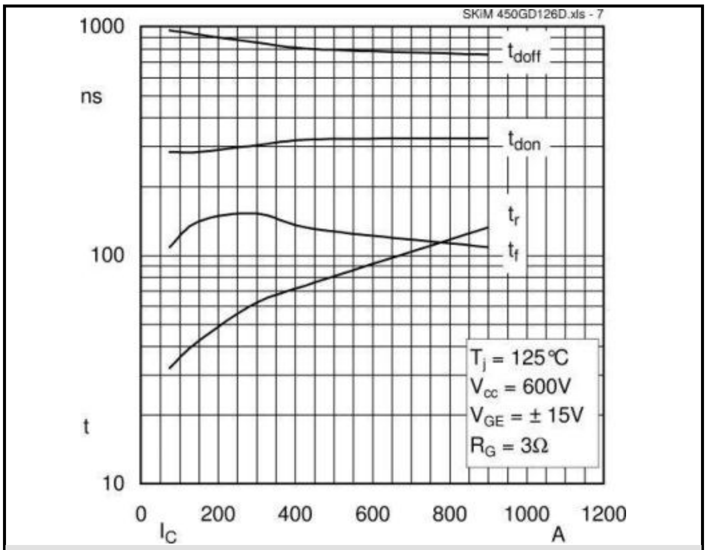


Fig. 7 Switching times vs. I_C

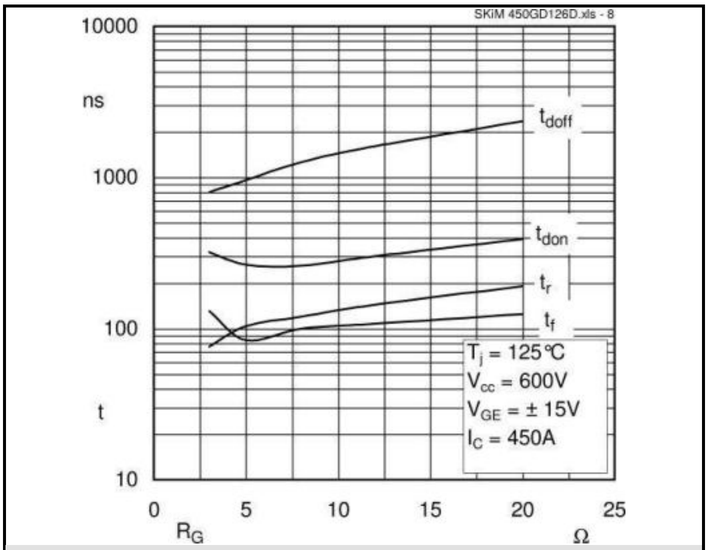


Fig. 8 Switching times vs. gate resistor R_G

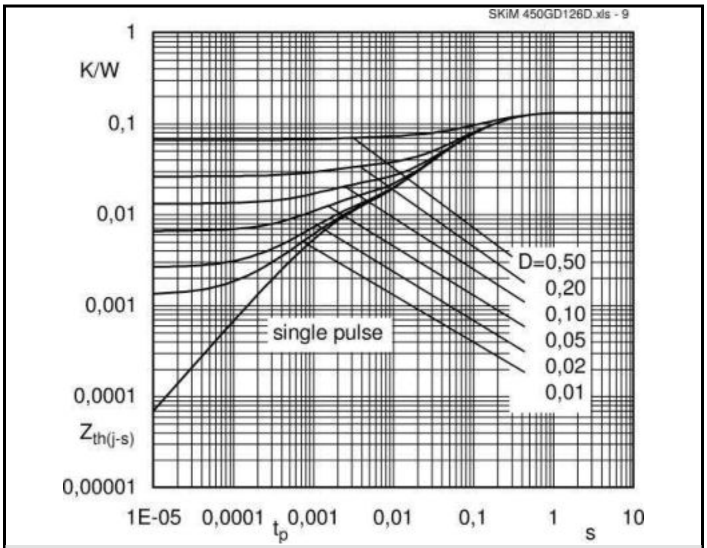


Fig. 9 Transient thermal impedance of IGBT

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

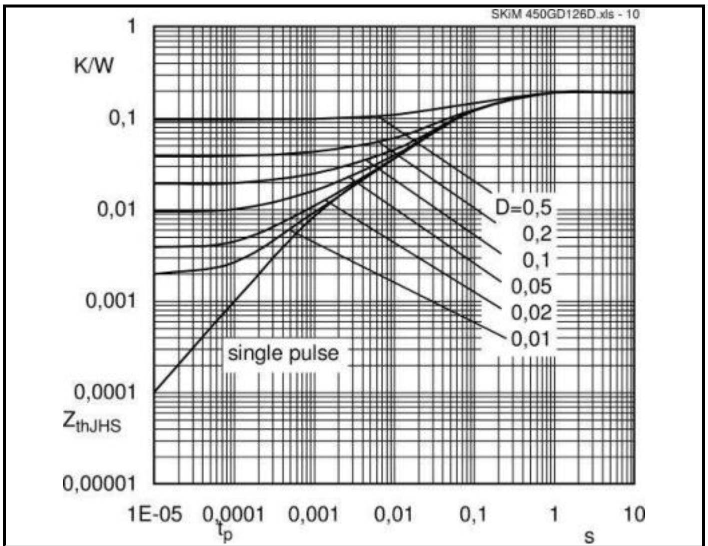


Fig. 10 Transient thermal impedance of FWD

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

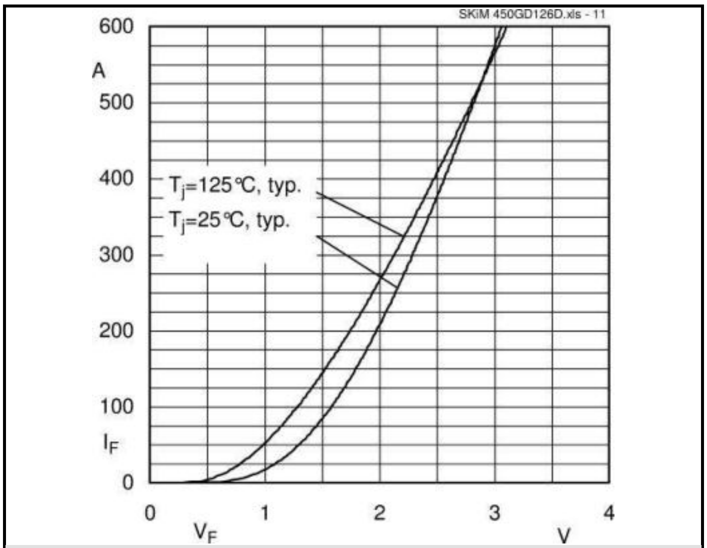
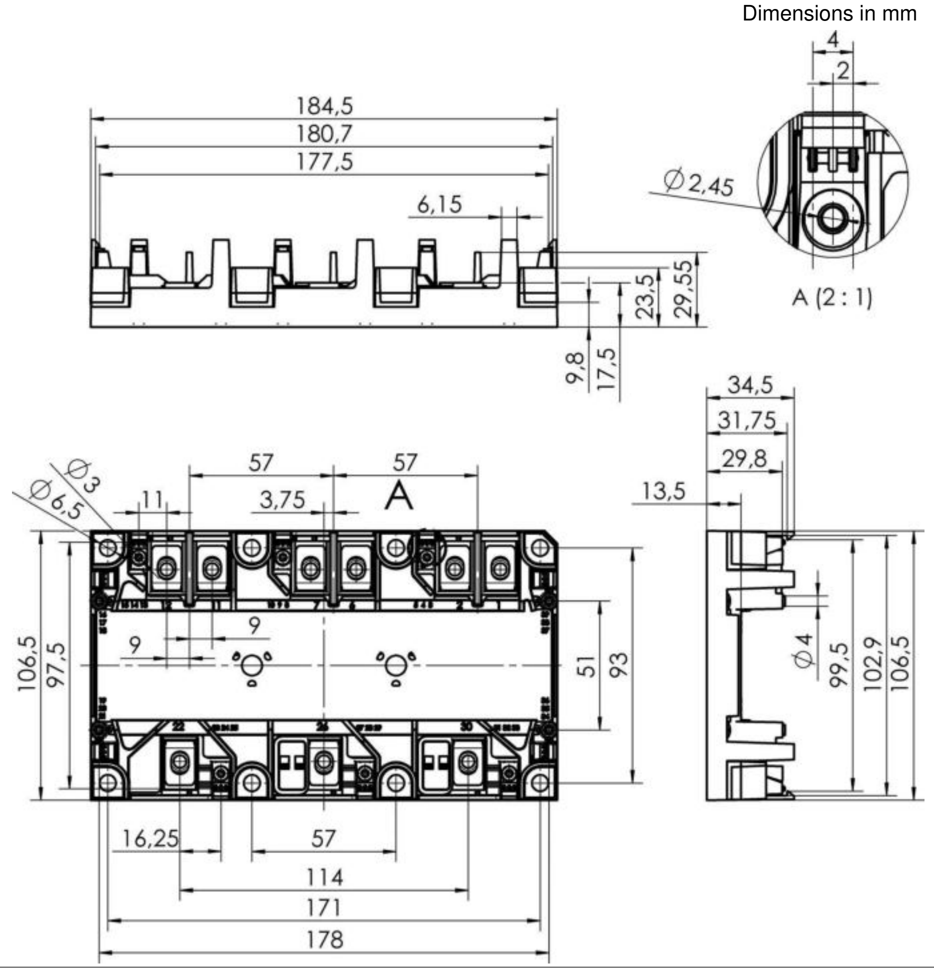
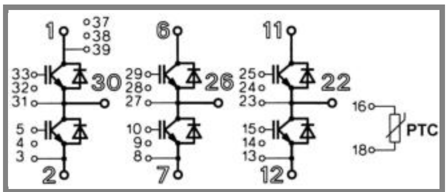


Fig. 11 CAL diode forward characteristic, incl. $R_{CC'+EE'}$



Case D



GD Case D

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, chapter IX.

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