SKIM® 4

IGBT Modules

SKiM 350GD128DM

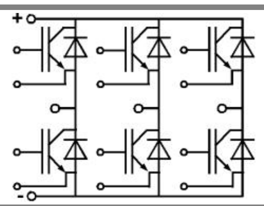
Preliminary Data

Features

- N channel, homogenous planar IGBT Silicon structure with n+ buffer layer in SPT (soft punch through) technology
- Low inductance case
- Fast & soft inverse CAL diodes
- Isolated by AIN DCB (Direct Copper Bonded) ceramic plate
- Pressure contact technology for thermal contacts
- Spring contact sysstem to attach driver PCB to the control terminals
- Integrated temperature sensor

Typical Applications

- Switched mode power supplies
- Three phase inverters for AC motor speed control
- Switching (not for linear use)



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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	300 (230)	A
I_{CM}	T_s = 25 (70) °C, t_p = 1 ms	600 (460)	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	300 (230)	A
I_{FM} = - I_{CM}	T_s = 25 (70) °C, t_p = 1 ms	600 (460)	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 = 8 mA	4,45	5,5	6,55	V
I_{CES}	V_{GE} = 0; V_{CE} = V_{CES}; T_j = 25 °C			0,3	mA
V_{CEO}	T_j = 25 °C		1 (0,9)	1,15 (1,05)	V
r_{CE}	T_j = 25 () °C		5 (7)	6 (7,5)	mΩ
V_{CEsat}	I_C = 200 A; V_{GE} = 15 V, T_j = 25 (125) °C on chip level		2 (2,3)	2,35 (2,55)	V
C_{ies}	V_{GE} = 0; V_{CE} = 25 V; f = 1 MHz		18		nF
C_{oes}	V_{GE} = 0; V_{CE} = 25 V; f = 1 MHz		4,3		nF
C_{res}	V_{GE} = 0; V_{CE} = 25 V; f = 1 MHz		3,6		nF
L_{CE}				20	nH
$R_{CC'+EE'}$	resistance, terminal-chip T_c= 25 °C		1,15		mΩ
$t_{d(on)}$	V_{CC} = 600 V		150		ns
t_r	I_C = 200 A		45		ns
$t_{d(off)}$	R_{Gon} = R_{Goff} = 5 Ω		700		ns
t_f	T_j = 125 °C		50		ns
E_{on} (E_{off})	V_{GE} ± 15 V		21 (20)		mJ
E_{on} (E_{off})	with SKHI 64; T_j = 125 °C V_{CC} = 600 V; I_C = 200 A				mJ
Inverse diode					
V_F = V_{EC}	I_F = 200 A; V_{GE} = 0 V; T_j = 25 (125) °C		2,3 (2,1)	2,65	V
V_{TO}	T_j = 125 °C		1,1		V
r_T	T_j = 125 °C		5		mΩ
I_{RRM}	I_F = 200 A; T_j = 125 °C				A
Q_{rr}	V_{GE} = V di/dt = A/µs				µC
E_{rr}	R_{Gon} = R_{Goff} =				mJ
Thermal characteristics					
$R_{th(j-s)}$	per IGBT			0,135	K/W
$R_{th(j-s)}$	per FWD			0,185	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				310	g

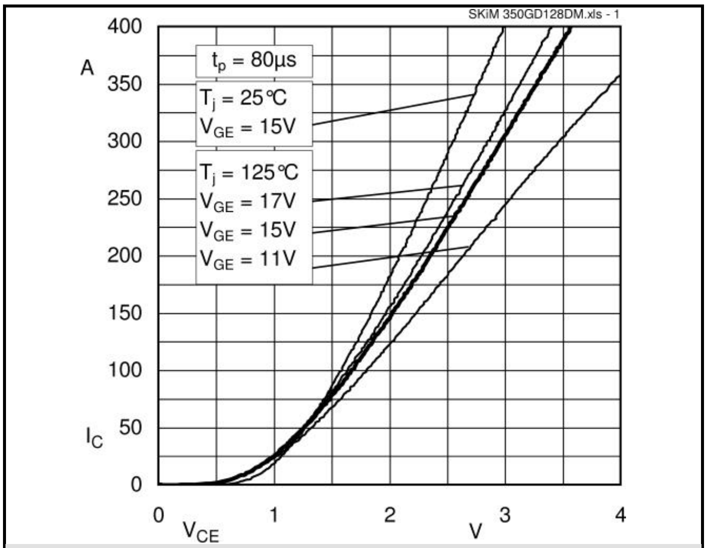


Fig. 1 Output characteristic, inclusive $R_{CC'+EE'}$

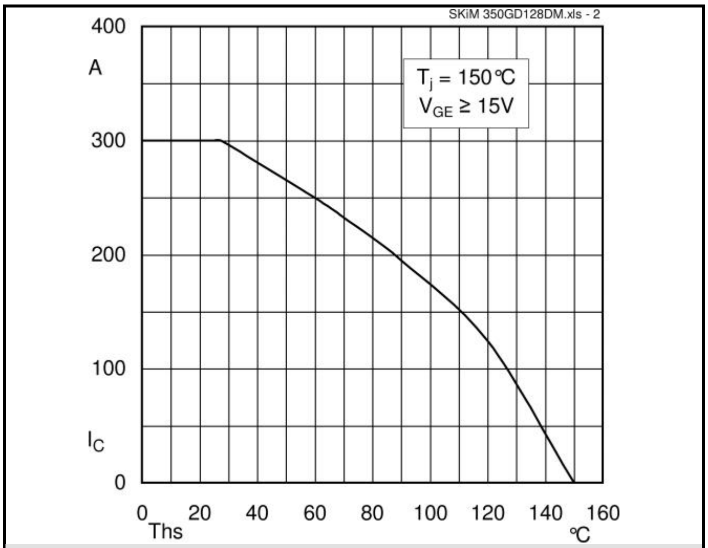


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

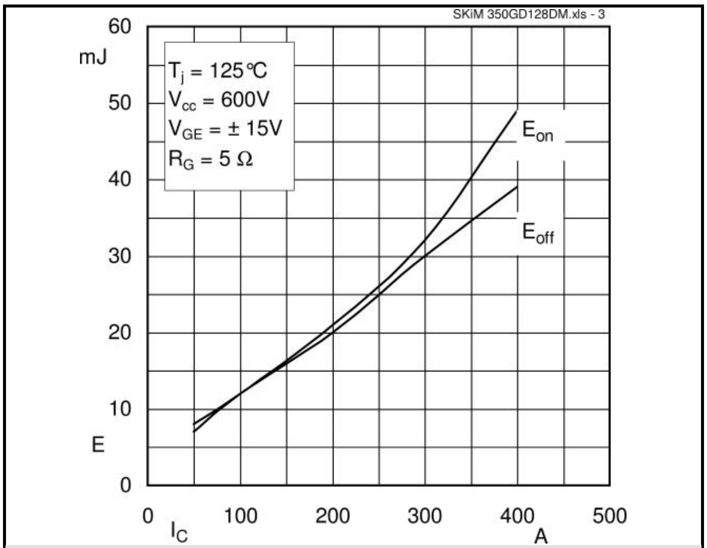


Fig. 3 Turn-on /-off energy = f (I_C)

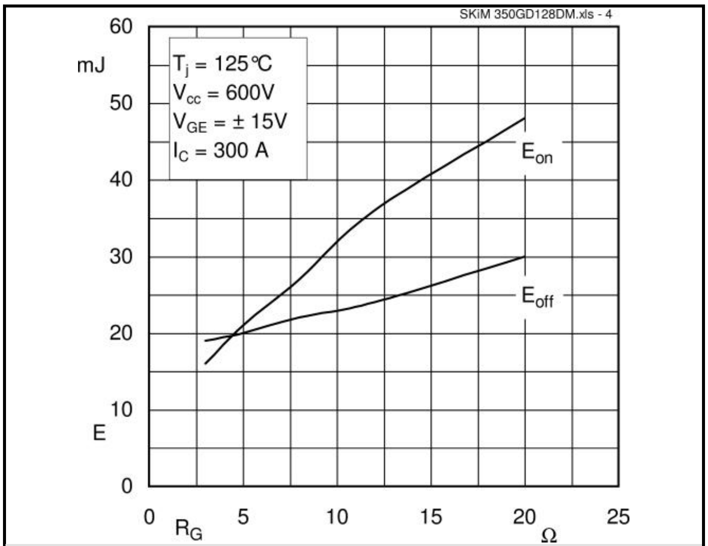


Fig. 4 Turn-on /-off energy = f (R_G)

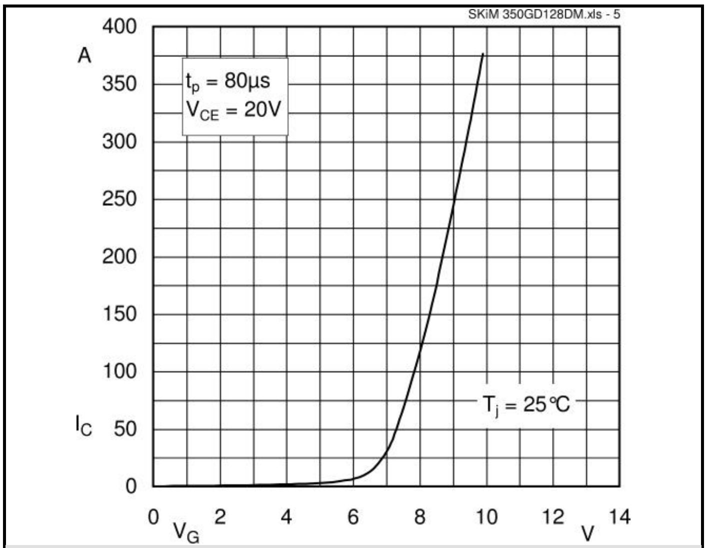


Fig. 5 Transfer characteristic

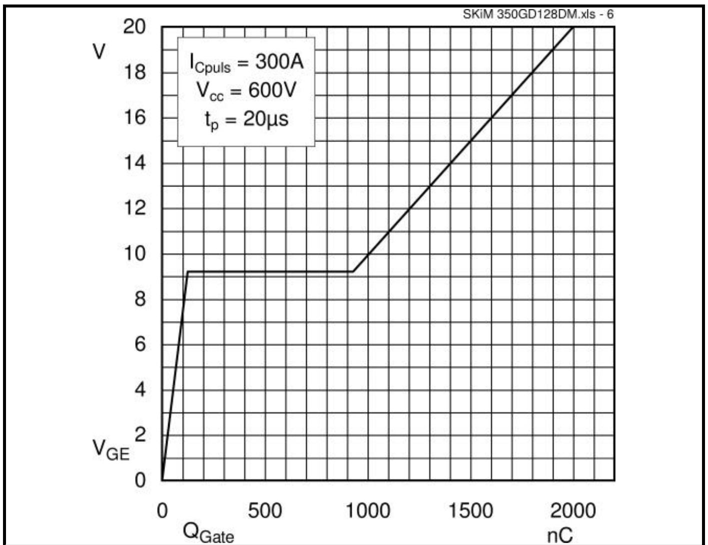


Fig. 6 Gate charge characteristic

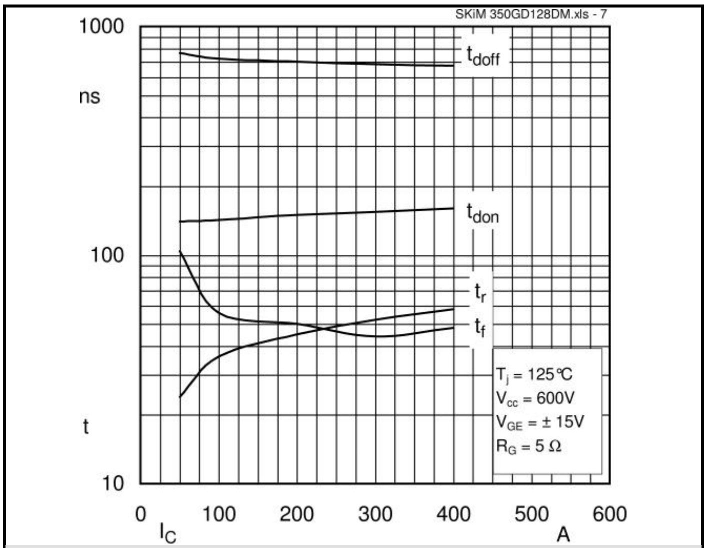


Fig. 7 Switching times vs. I_C

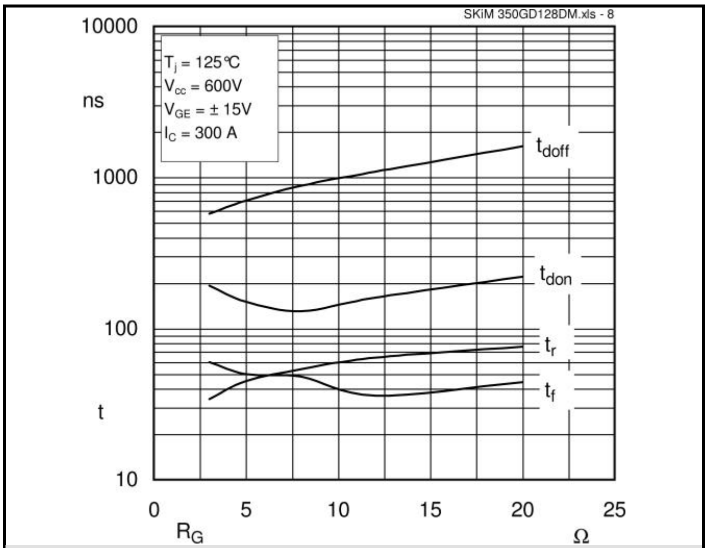


Fig. 8 Switching times vs. gate resistor R_G

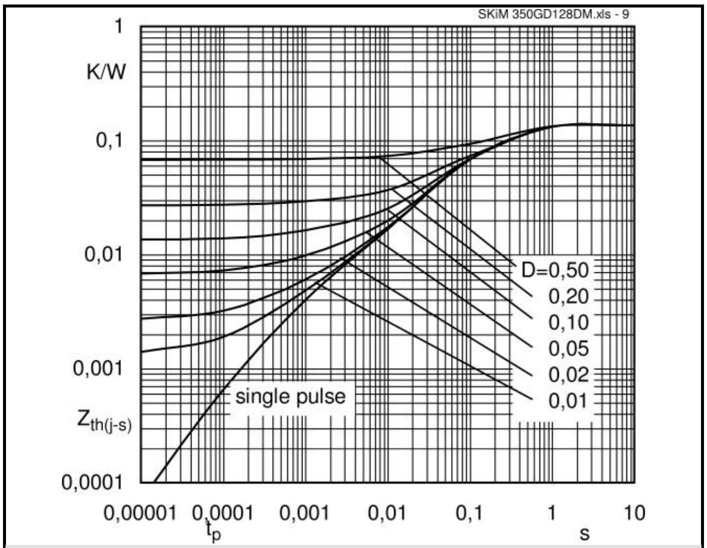


Fig. 9 Transient thermal impedance of IGBT

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

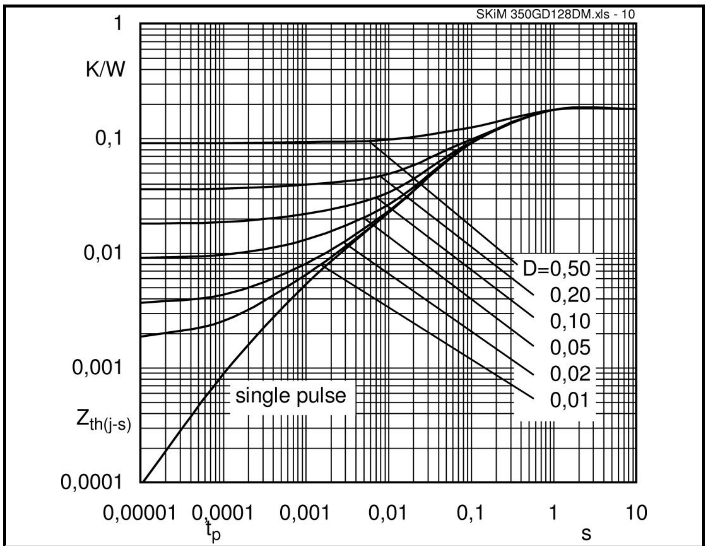


Fig. 10 Transient thermal impedance of FWD

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

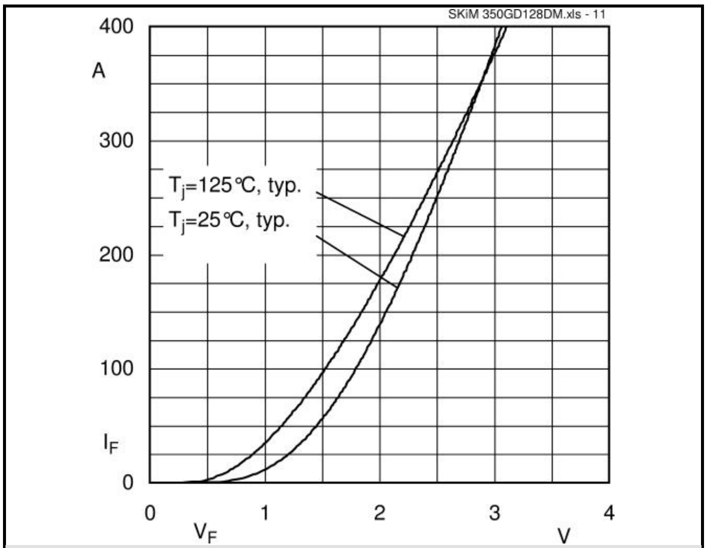
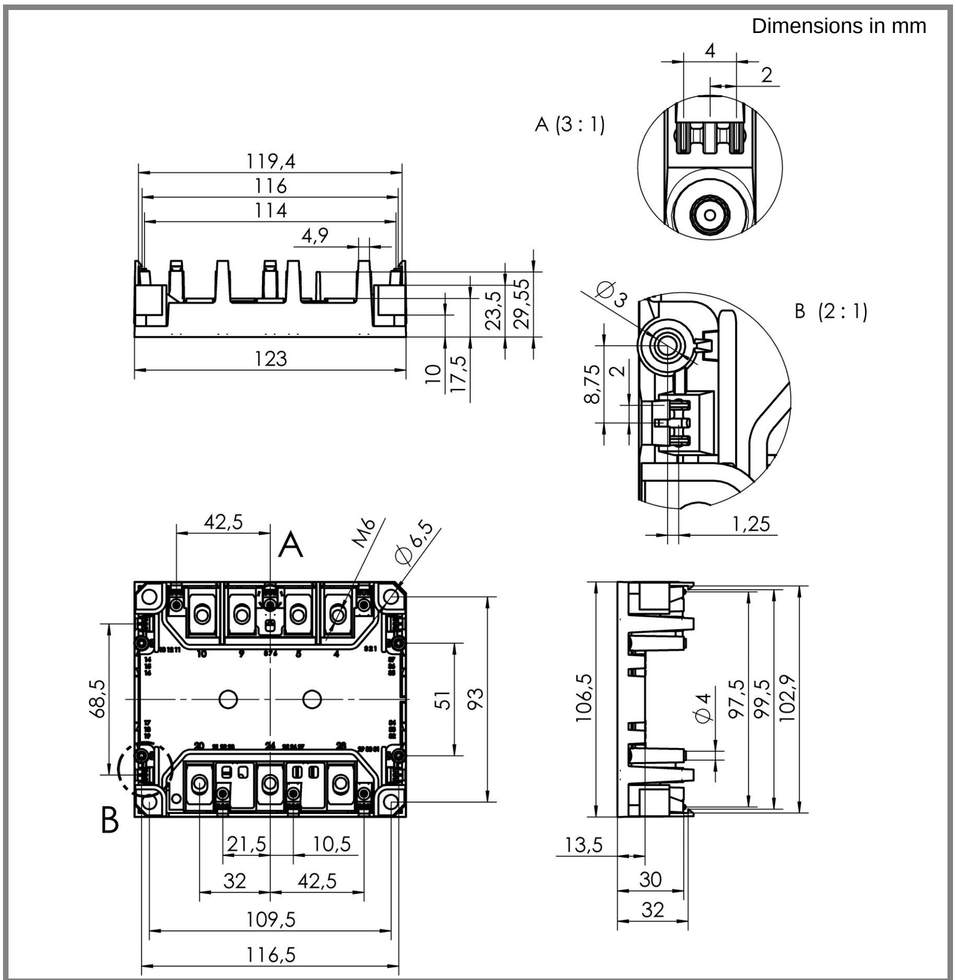
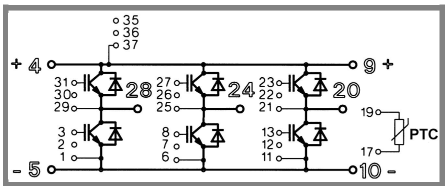


Fig. 11 CAL diode forward characteristic, incl. $R_{CC'+EE'}$



Case D



GD Case D

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

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