



SKiM® 4

IGBT Modules

SKiM 300GD063D

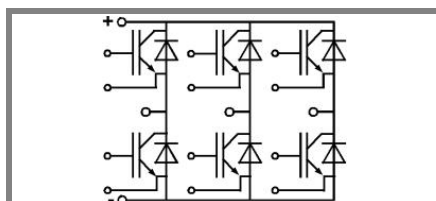
Preliminary Data

Features

- NPT-IGBT with positive temperature coefficient of V_{CEsat}
- Short circuit, self limiting to $6 \times I_C$
- DBC substrate : Al_2O_3
- Corresponds to standards IEC 60721-3-3 (humidity) class 3K7/IE32 and IEC 68T.1 (climate) 40/125/56

Typical Applications

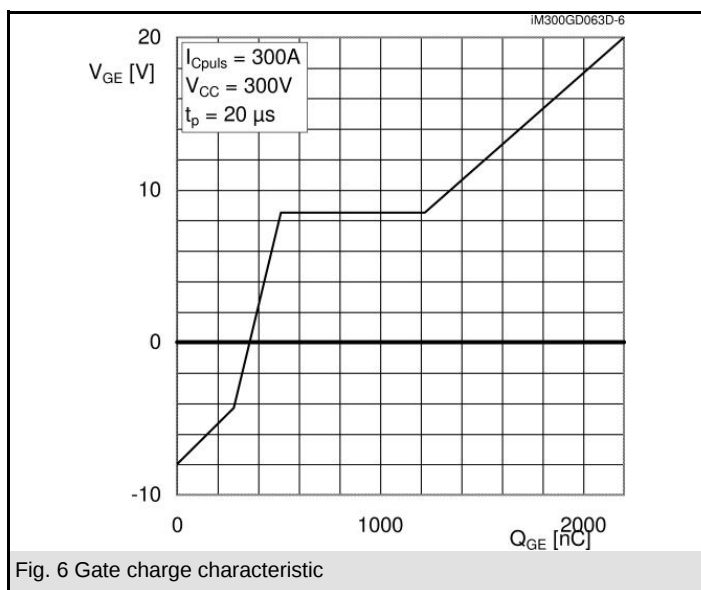
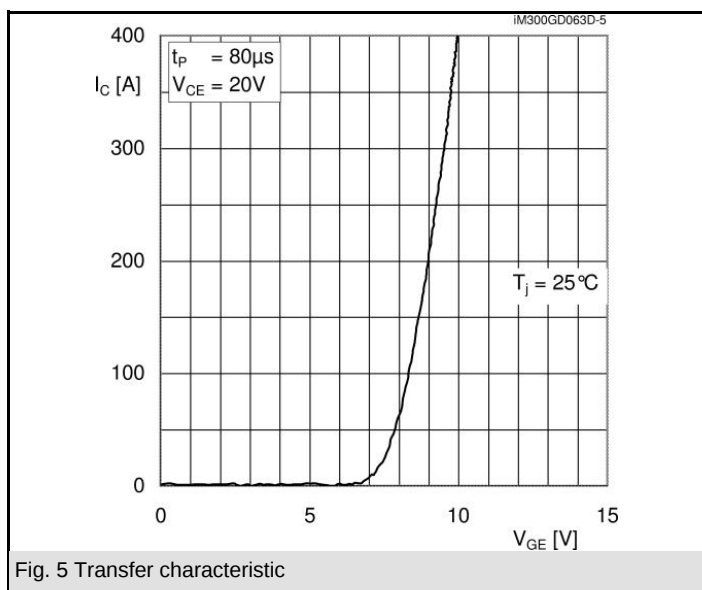
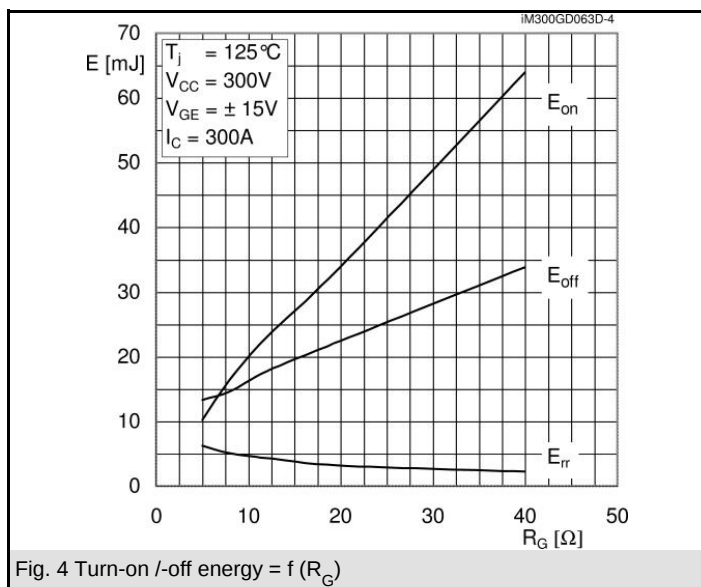
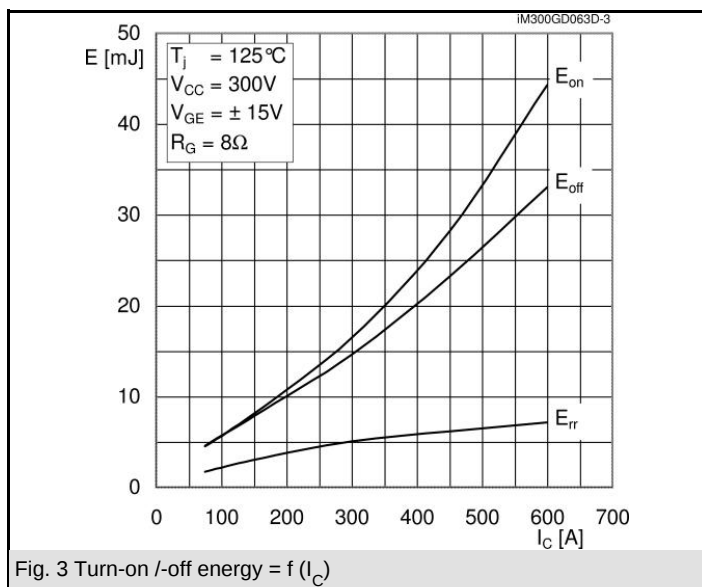
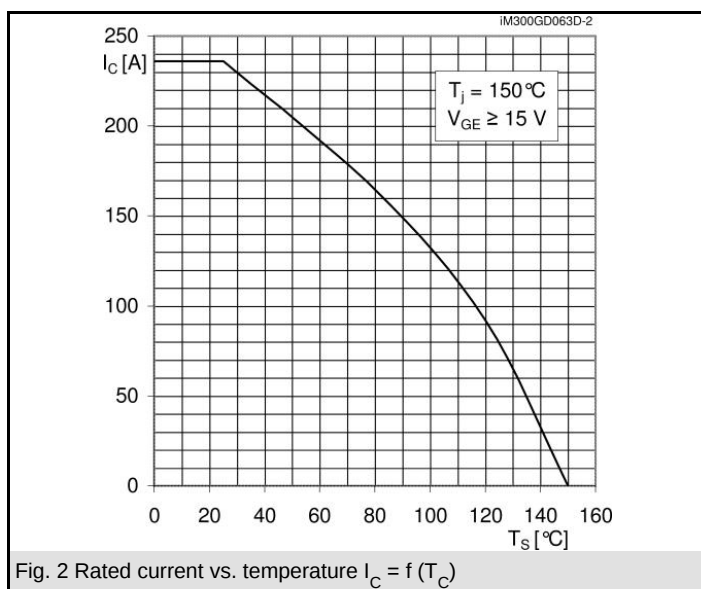
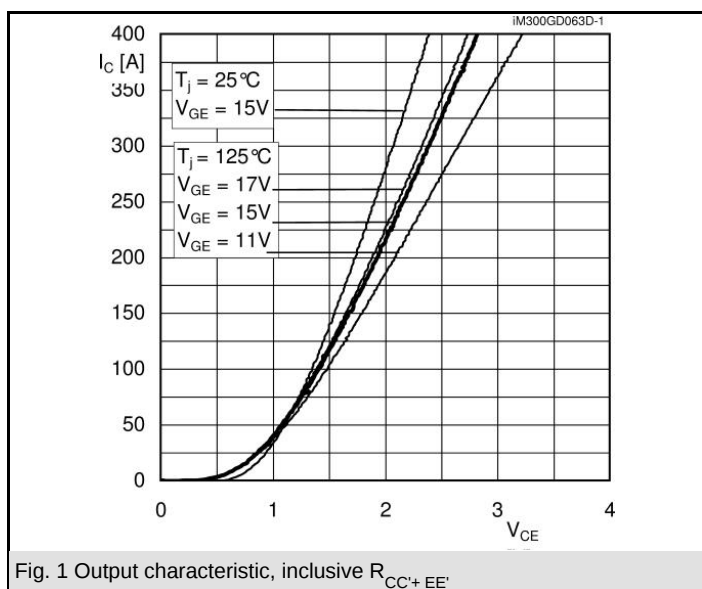
- Resonant inverters up to 100 kHz
- Inductive heating
- Electronic welders at f_{sw} up to 20 kHz



GD

Absolute Maximum Ratings		$T_c = 25^\circ C$, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V_{CES}		600	V
I_C	$T_s = 25 (70)^\circ C$	240 (180)	A
I_{CM}	$T_s = 25 (70)^\circ C$, $t_p = 1$ ms	480 (360)	A
V_{GES}		± 20	V
$T_j (T_{stg})$		- 40 ... + 150 (125)	$^\circ C$
T_{cop}	max. case operating temperature		$^\circ C$
V_{isol}	AC, 1 min.	2500	V
Inverse diode			
I_F	$T_s = 25 (70)^\circ C$	244 (185)	A
$I_{FM} = -I_{CM}$	$T_s = 25 (70)^\circ C$, $t_p = 1$ ms	480 (360)	A
I_{FSM}	$t_p = 10$ ms; sin.; $T_j = 150^\circ C$	2900	A

Characteristics		$T_c = 25^\circ C$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$; $I_C = 8$ mA	4,5	5,5	6,5	V
I_{CES}	$V_{GE} = 0$; $V_{CE} = V_{CES}$; $T_j = 25^\circ C$			0,3	mA
V_{CEO}	$T_j = 25^\circ C$		0,9 (0,8)		V
r_{CE}	$T_j = 25 ()^\circ C$		2,9 (3,9)		m Ω
V_{CEsat}	$I_C = 200$ A; $V_{GE} = 15$ V, $T_j = 25 (125)^\circ C$ on chip level		1,5 (1,6)	1,7	V
C_{ies}	$V_{GE} = 0$; $V_{CE} = 25$ V; $f = 1$ MHz		23		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		1,5		nF
L_{CE}				20	nH
$R_{CC'+EE'}$	resistance, terminal-chip $T_c = 25 (125)^\circ C$		1,5 (1,6)		m Ω
$t_{d(on)}$	$V_{CC} = 300$ V		130		ns
t_r	$I_C = 300$ A		75		ns
$t_{d(off)}$	$R_{Gon} = R_{Goff} = 8 \Omega$		700		ns
t_f	$T_j = 125^\circ C$		50		ns
$E_{on} (E_{off})$	$V_{GE} \pm 15$ V		16,5 (14,5)		mJ
$E_{on} (E_{off})$	with SKHI 6; $T_j = 25^\circ C$ $V_{CC} = V$; $I_C = A$				mJ
Inverse diode					
$V_F = V_{EC}$	$I_F = 200$ A; $V_{GE} = 0$ V; $T_j = 25 (125)^\circ C$		1,25 (1,2)	1,4	V
V_{TO}	$T_j = 25 (125)^\circ C$		(0,85)	(0,9)	V
r_T	$T_j = 25 (125)^\circ C$		(1,6)	(2,75)	m Ω
I_{RRM}	$I_F = 300$ A; $T_j = 125^\circ C$		225		A
Q_{rr}	$V_{GE} = 0$ V di/dt = 3700 A/ μ s		30		μ C
E_{rr}	$R_{Gon} = R_{Goff} = 8 \Omega$		5		mJ
Thermal characteristics					
$R_{th(j-s)}$	per IGBT			0,2	K/W
$R_{th(j-s)}$	per FWD			0,285	K/W
Temperature Sensor					
R_{TS}	$T = 25 (100)^\circ C$		1 (1,67)		k Ω
tolerance	$T = 25 (100)^\circ C$		3 (2)		%
Mechanical data					
M_1	to heatsink (M5)	2		3	Nm
M_2	for terminals (M6)	4		5	Nm
w				310	g



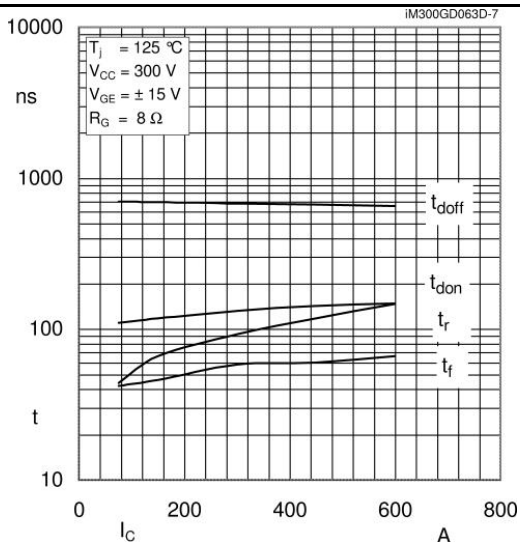


Fig. 7 Switching times vs. I_C

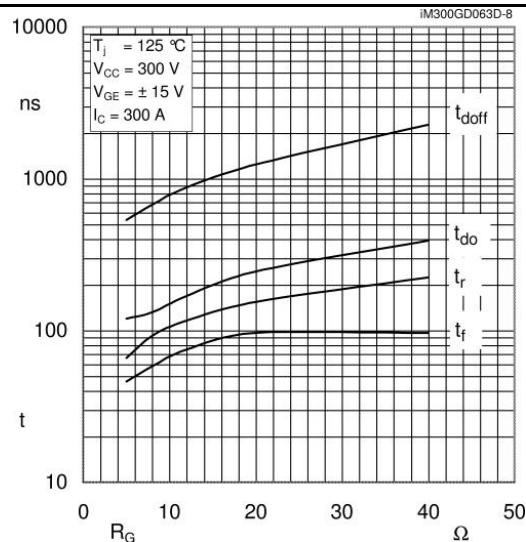


Fig. 8 Switching times vs. gate resistor R_G

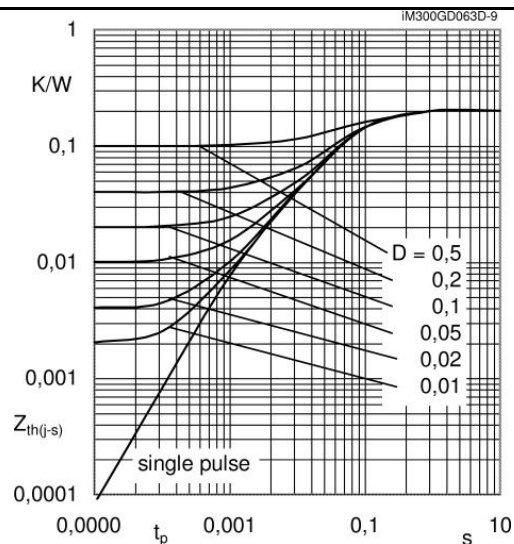


Fig. 9 Transient thermal impedance of IGBT

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

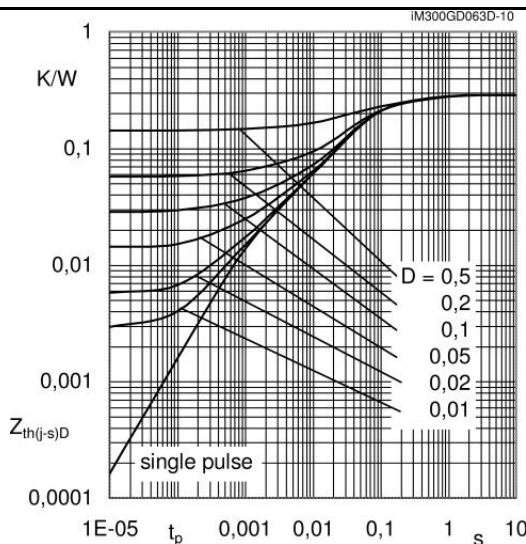


Fig. 10 Transient thermal impedance of FWD

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

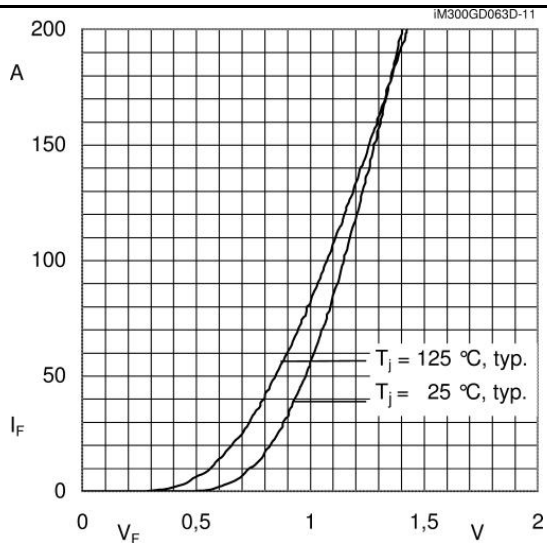


Fig. 11 CAL diode forward characteristic, incl. $R_{CC'+EE'}$

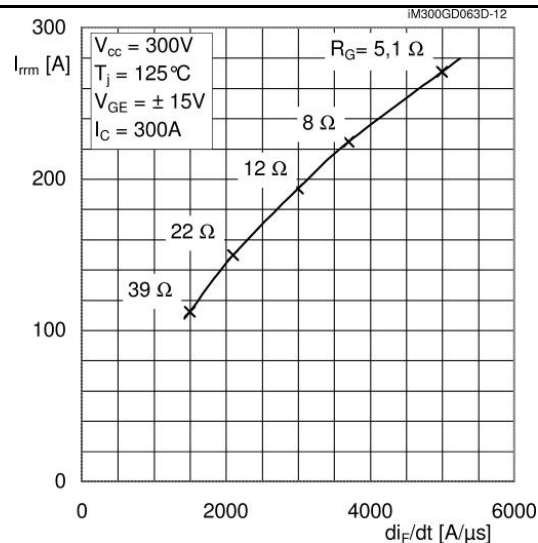
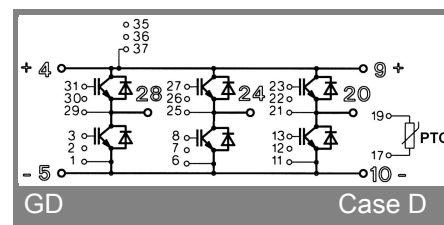
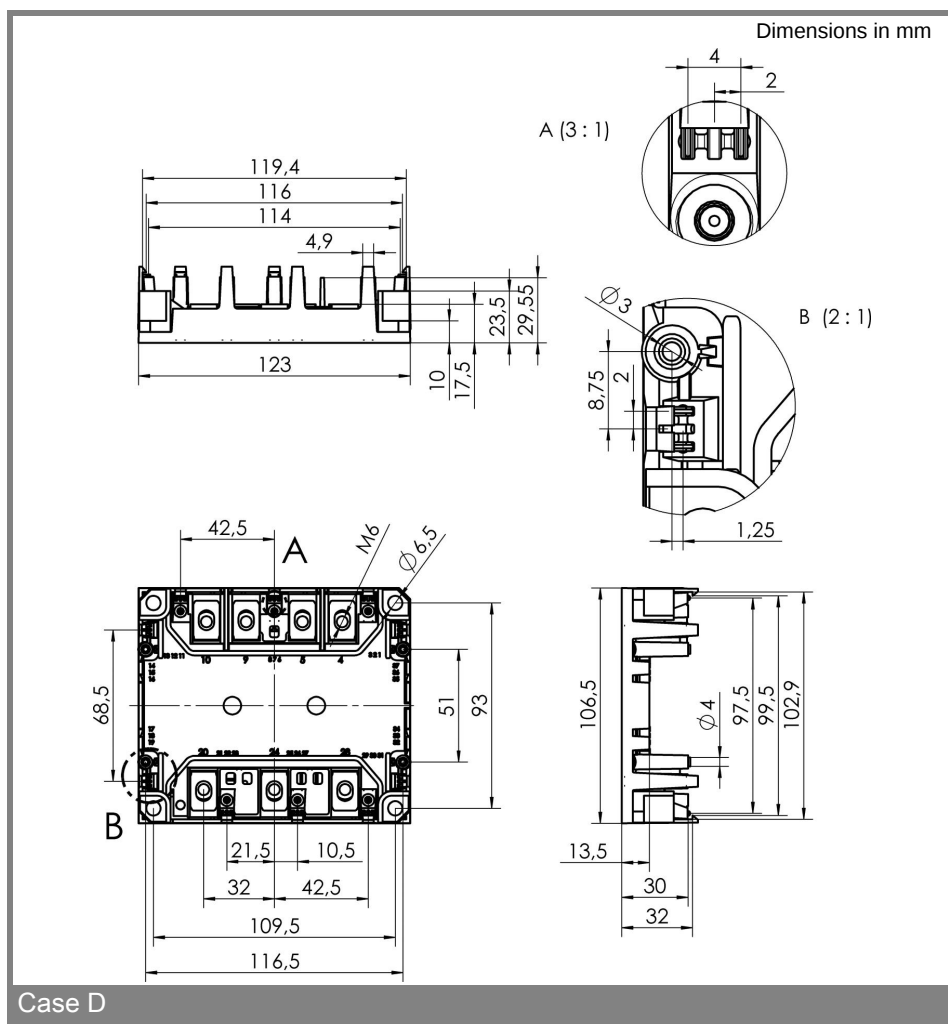
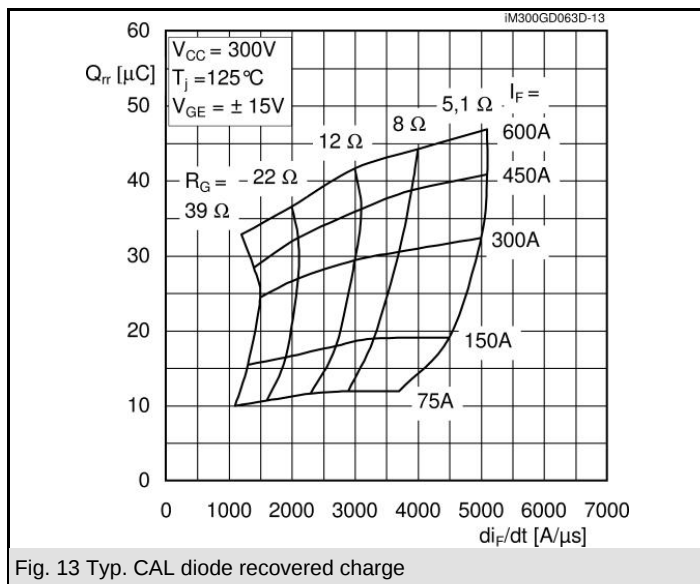


Fig. 12 CAL diode peak reverse recovery current



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

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