SEMIKRON

Absolute Maximum Ratings

T_h = 25 °C, unless otherwise specified

Symbol	Conditions	Values	Units
IGBT			
V_{CES}		600	V
I_C	T_S = 25 (70) °C	300 (230)	A
I_{CRM}	T_S = 25 (70) °C, t_p =1 ms	600 (460)	A
V_{GES}		± 20	V
T_j, (T_{stg})	$T_{OPERATION} \leq T_{stg}$	– 40 ... +150 (125)	°C
V_{isol}	AC, 1 min.	2500	V
Inverse Diode			
$I_{FAV} = -I_C$	T_S = 25 (70) °C	315 (240)	A
$I_{FRM} = -I_{CM}$	T_S = 25 (70) °C, t_p < 1 ms	630 (480)	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 150 °C	2900	A

Characteristics

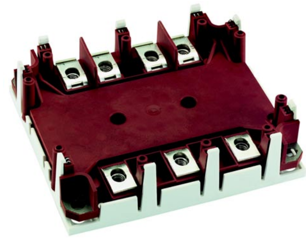
T_h = 25 °C, unless otherwise specified

Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(TO)}$	$V_{GE} = V_{CE}$, I_C = 8 mA	4,5	5,5	6,5	V
I_{CES}	V_{GE} = 0, $V_{CE} = V_{CES}$, T_j = 25 (125) °C		0,4 (24)		mA
$V_{CE(TO)}$			0,9 (0,8)		V
r_{CE}	V_{GE} = 15 V, T_j = 25 (125) °C		2,9 (3,9)		mΩ
$V_{CE(sat)}$	I_C = 200 A, V_{GE} = 15 V, T_j = 25 (125) °C on chip level		1,5 (1,6)	1,7	V
C_{ies}			23		nF
C_{oes}	V_{GE} = 0, V_{CE} = 25 V, f = 1 MHz		2,5		nF
C_{res}			1,5		nF
L_{CE}				20	nH
$R_{CC'+EE'}$	resistance, terminal-chip 25 (125) °C		1,35 (1,85)		mΩ
$t_{d(on)}$	V_{CC} = 300 V		130		ns
t_r	I_C = 200 A		75		ns
$t_{d(off)}$	$R_{Gon} = R_{Goff}$ = 8 Ω		700		ns
t_f	T_j = 125 °C		50		ns
E_{on}	V_{GE} ± 15 V		10		mJ
E_{off}			9		mJ
Inverse Diode					
$V_F = V_{EC}$	I_F = 200 A; V_{GE} = 0 V; T_j = 25 (125)°C on chip level		1,25 (1,2)	1,4	V
V_{TO}	T_j = 25 (125) °C		(0,85)	(0,9)	V
r_T	T_j = 25 (125) °C		(1,6)	(2,75)	mΩ
I_{rrm}	I_F = 300 A; T_j = 125 °C		204		A
Q_{rr}	V_{GE} = 0 V		27		µC
E_{rr}	$R_{Gon} = R_{Goff}$ = 8 Ω		4,6		mJ
Thermal Characteristics					
R_{thjh}	per IGBT			0,135	K/W
R_{thjh}	per FWD			0,185	K/W
Temperature Sensor					
R_{TS}	T = 25 °C / 100 °C		1,0 / 1,67		kΩ
tolerance	T = 25 °C / 100 °C		3,0 / 2,0		%
Mechanical Data					
M_1	to heatsink (M5)	2		3	Nm
M_2	for terminals (M6)	4		5	Nm
w				310	g

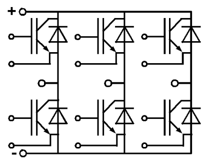
SKiM® 4 IGBT Module

SKiM 350 GD 063 DM

Preliminary Data



SKiM 4



GD

Features

- NPT-IGBT with positive temperature coefficient of V_{CEsat}
- Short circuit, self limiting to 6 x I_C
- 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} > 20 kHz

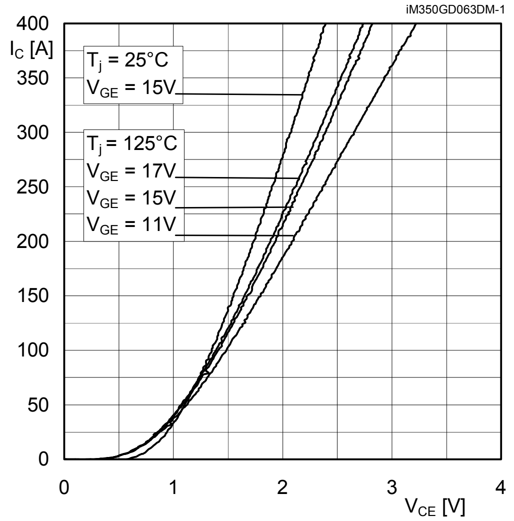


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

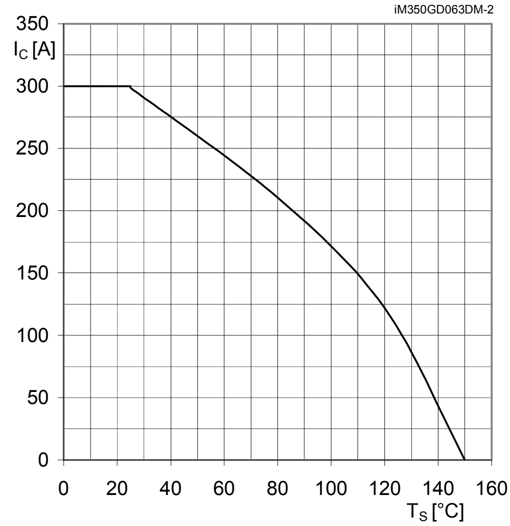


Fig. 2 Rated current vs. temperature $I_C = f(T_S)$

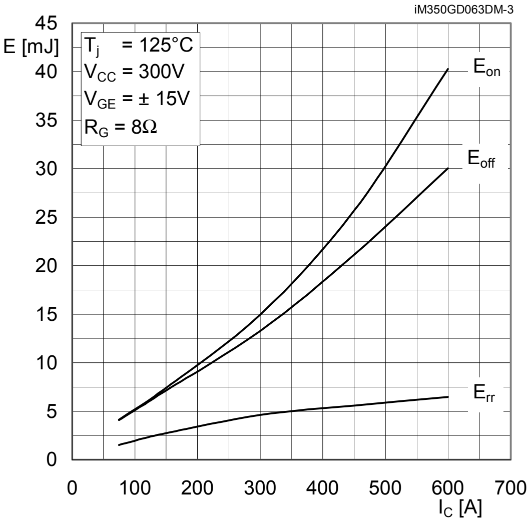


Fig. 3 Typ. turn-on /-off energy = f (I_C)

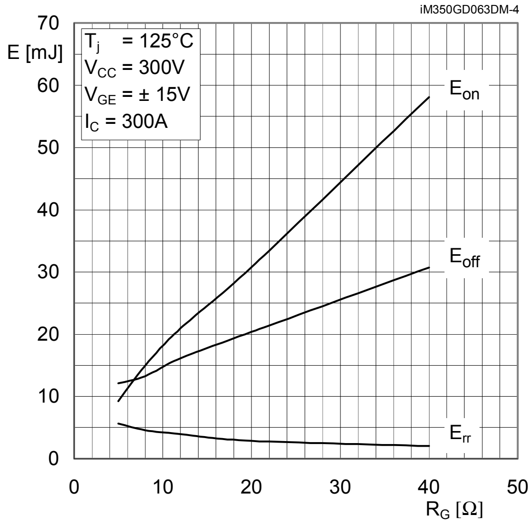


Fig. 4 Typ. turn-on /-off energy = f (R_G)

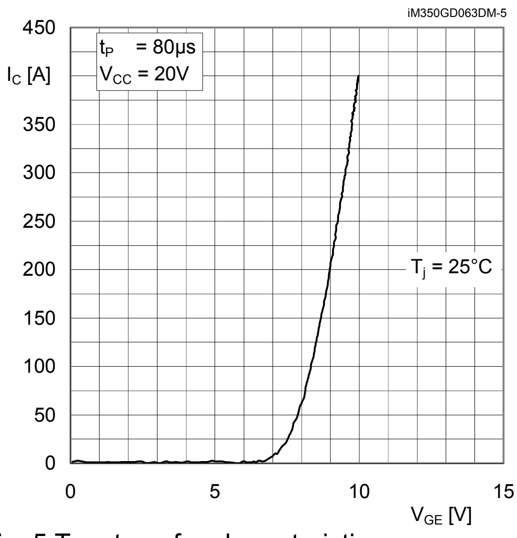


Fig. 5 Typ. transfer characteristic

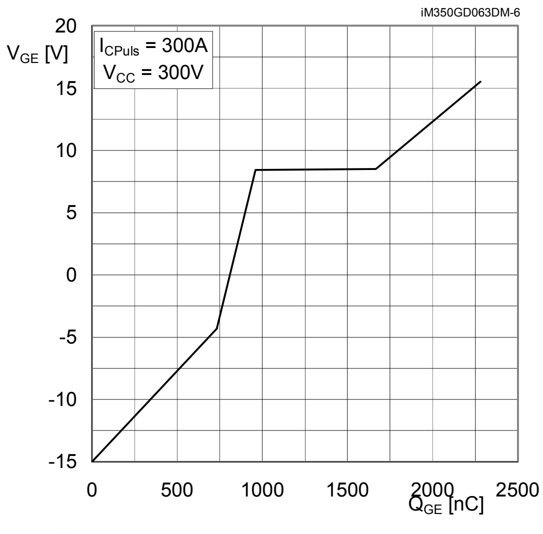


Fig. 6 Typ. gate charge characteristic

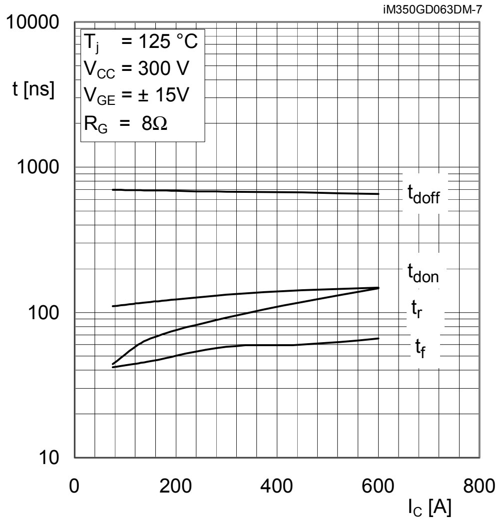


Fig. 7 Typ. switching times vs. I_C

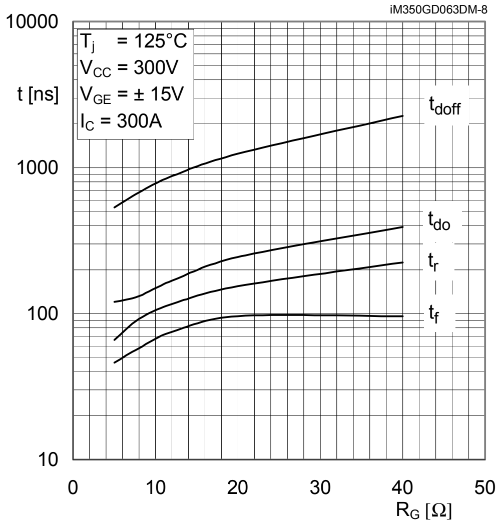


Fig. 8 Typ. switching times vs. gate resistor R_G

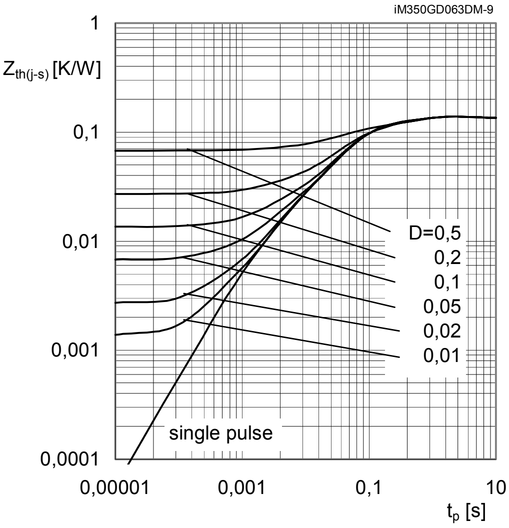


Fig. 9 Transient thermal impedance of IGBT
$Z_{thp(j-s)} = f(t_p)$; $D = t_p / t_c = t_p \cdot f$

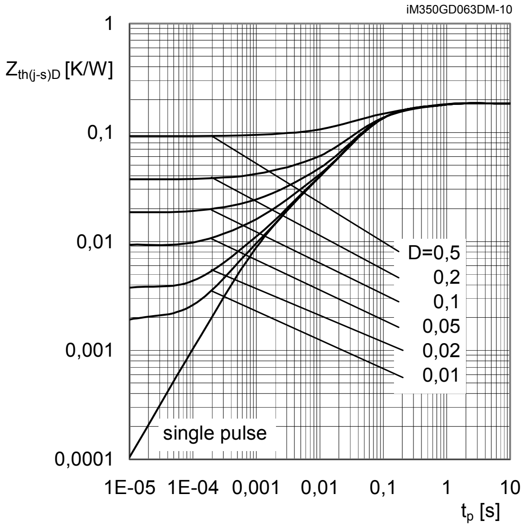


Fig. 10 Transient thermal impedance of FWD
$Z_{thp(j-s)D} = f(t_p)$; $D = t_p / t_c = t_p \cdot f$

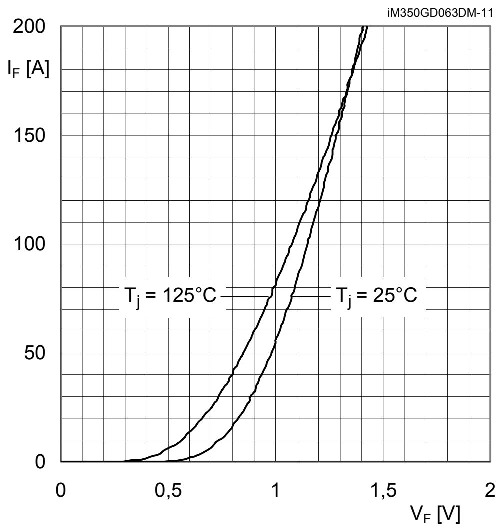


Fig. 11 CAL diode forward characteristic, inclusive $R_{CC'+EE'}$

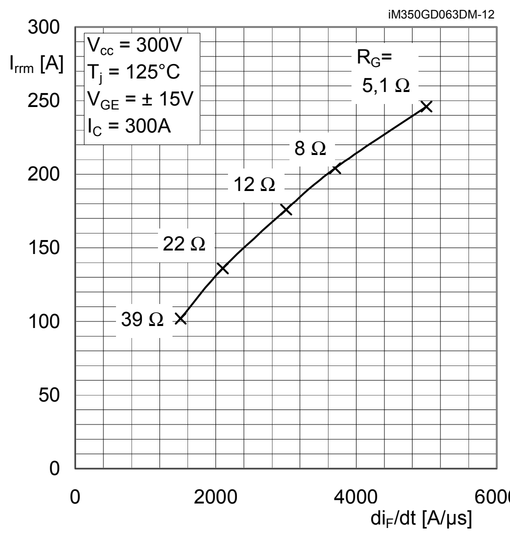


Fig. 12 CAL diode peak reverse recovery current

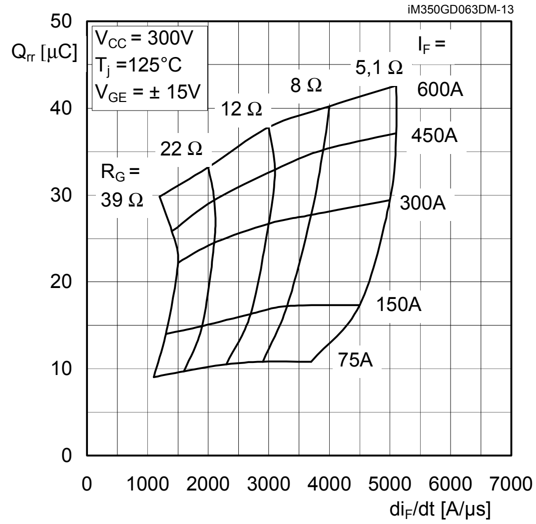


Fig. 13 Typ. CAL diode recovered charge

This is an electrostatic discharge sensitive device (ESDS).

Please observe the international standard IEC 747-1, Chapter IX.

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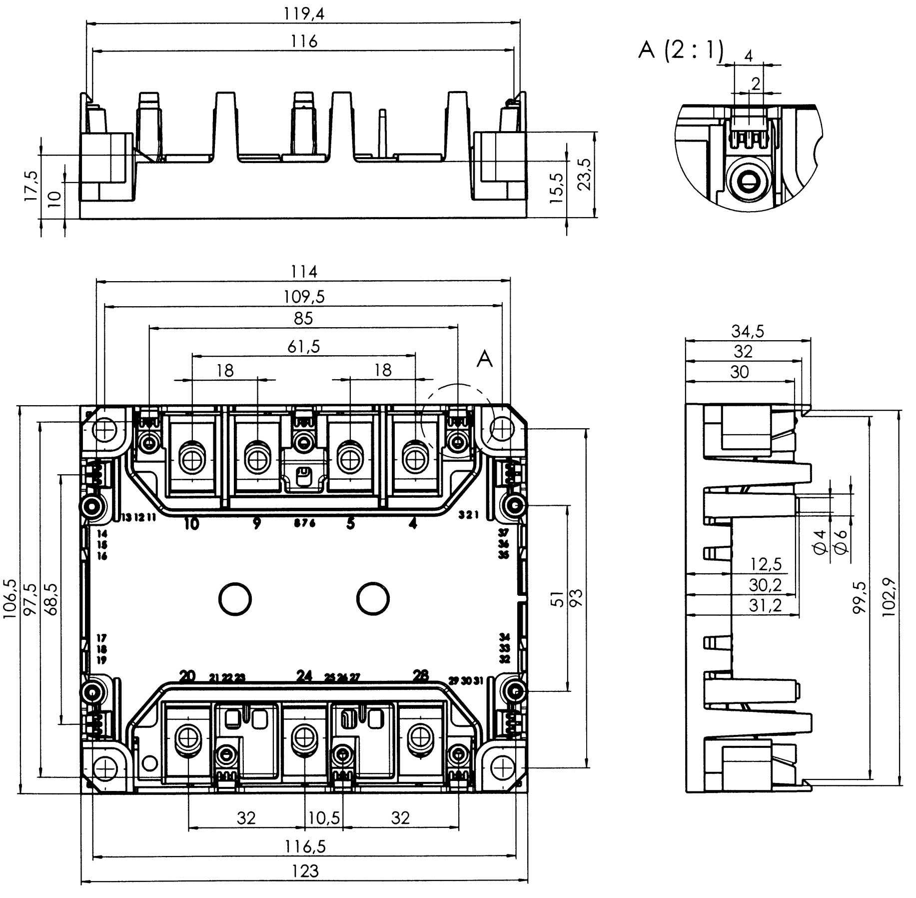

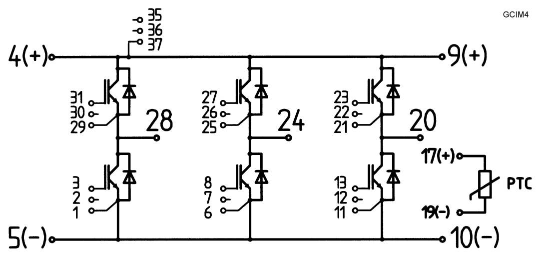

Dimensions in mm

Case outline and circuit diagrams