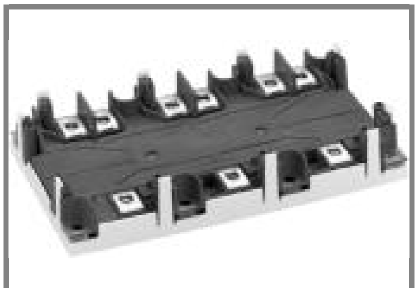
SKiM 500GD063DM



SKiM 5®

IGBT Modules

SKiM 500GD063DM

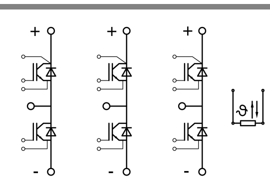
Preliminary Data

Features

- NPT-IGBT with positive temperature coefficient of V_{CEsat}
- Short circuit, self limiting to 6 x I_C
- DBC substrate : AlN
- Corresponds to standards IEC 60721-3-3 (humidity) class 3K7IE32 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



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Absolute Maximum Ratings		T_{case} = 25°C, unless otherwise specified	
Symbol	**Conditions**	**Values**	**Units**
IGBT			
V_{CES}		600	V
I_C	T_s = 25 (70) °C	530 (400)	A
I_{CRM}	t_p = 1 ms	600	A
V_{GES}		± 20	V
T_j (T_{stg})		- 40 ... + 125 °C (125)	°C
T_{cop}	max. case operating temperature		°C
V_{isol}	AC, 1 min.	2500	V
Inverse diode			
I_F	T_s = 25 (70) °C	490 (370)	A
I_{FRM}	t_p = 1 ms	600	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 150 °C	4300	A

Characteristics				T_{case} = 25°C, unless otherwise specified	
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Units**
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$; I_C = 12 mA	4,5	5,5	6,5	V
I_{CES}	V_{GE} = 0; $V_{CE} = V_{CES}$; T_j = 25 °C			0,3	mA
V_{CEO}	T_j = 25 (125) °C		0,9 (0,8)	1	V
r_{CE}	T_j = 25 (125) °C		2 (2,9)	2,7	mΩ
V_{CEsat}	I_{Cnom} = 300 A; V_{GE} = 15 V, T_j = 25 (125) °C on chip level		1,5 (1,7)	1,8	V
C_{ies}	V_{GE} = 0; V_{CE} = 25 V; f = 1 MHz		26,2		nF
C_{oes}	V_{GE} = 0; V_{CE} = 25 V; f = 1 MHz		3,7		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 (125) °C		0,9 (1,1)		mΩ
$t_{d(on)}$	V_{CC} = 300 V		160		ns
t_r	I_{Cnom} = 300 A		120		ns
$t_{d(off)}$	$R_{Gon} = R_{Goff}$ = 6,2 Ω		730		ns
t_f	T_j = 125 °C		60		ns
E_{on} (E_{off})	V_{GE} ± 15 V		16 (16)		mJ
E_{on} (E_{off})	with SKHI 6; T_j = °C V_{CC} = V; I_C = A				mJ
Inverse diode					
$V_F = V_{EC}$	I_{Fnom} = 300 A; V_{GE} = 0 V; T_j = 25 (125) °C		1,25 (1,2)	1,5	V
V_{TO}	T_j = 25 (125) °C		0,85	0,9	V
r_T	T_j = 25 (125) °C		1,3	2	mΩ
I_{RRM}	I_F = 300 A; T_j = 125 °C		220		A
Q_{rr}	V_{GE} = 0 V di/dt = 3000 A/µs		36,5		µC
E_{rr}	$R_{Gon} = R_{Goff}$ = 6,2 Ω		7,3		mJ
Thermal characteristics					
$R_{th(j-s)}$	per IGBT			0,09	K/W
$R_{th(j-s)}$	per FWD			0,125	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				325	g

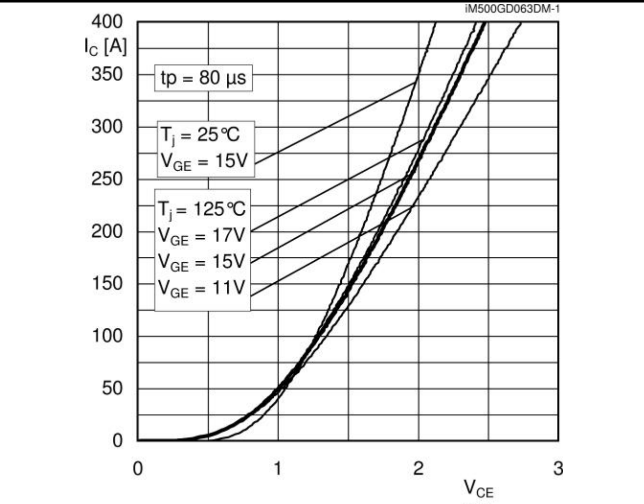


Fig. 1 Output characteristic, inclusive $R_{CC'+ EE'}$

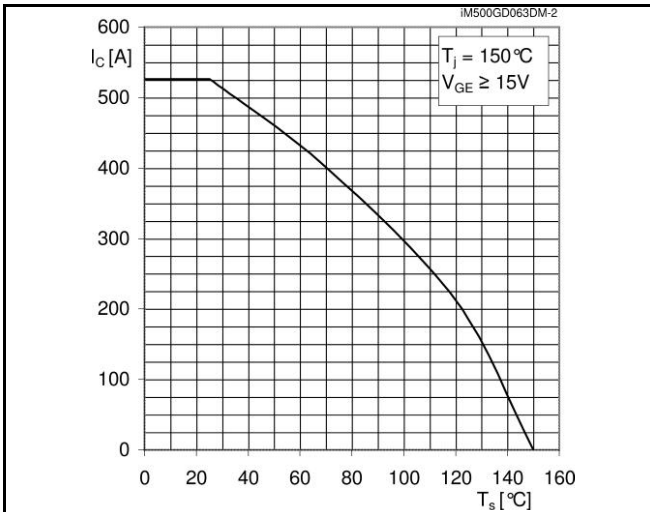


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

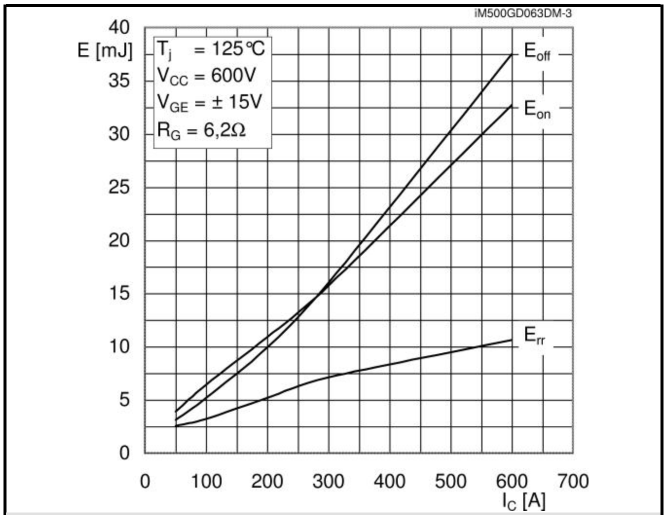


Fig. 3 Turn-on /-off energy = f (I_C)

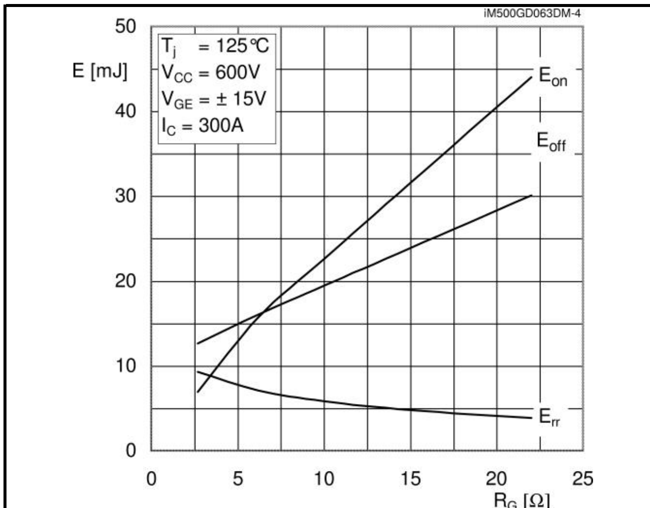


Fig. 4 Turn-on /-off energy = f (R_G)

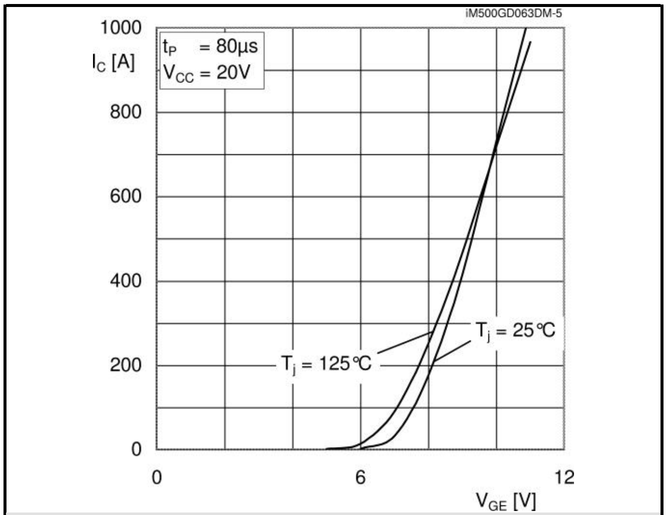


Fig. 5 Transfer characteristic

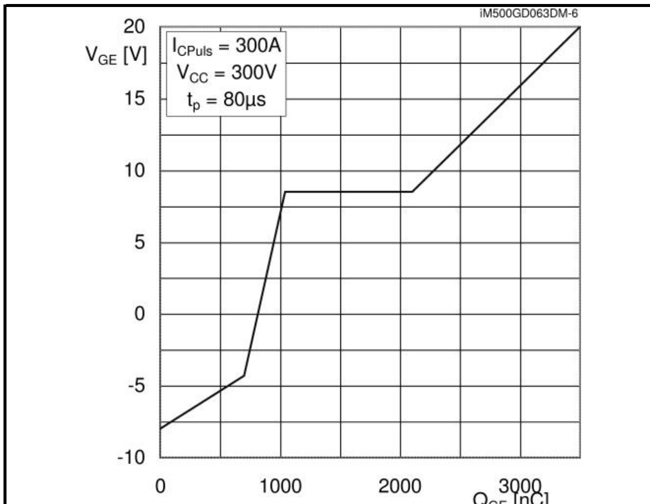


Fig. 6 Gate charge characteristic

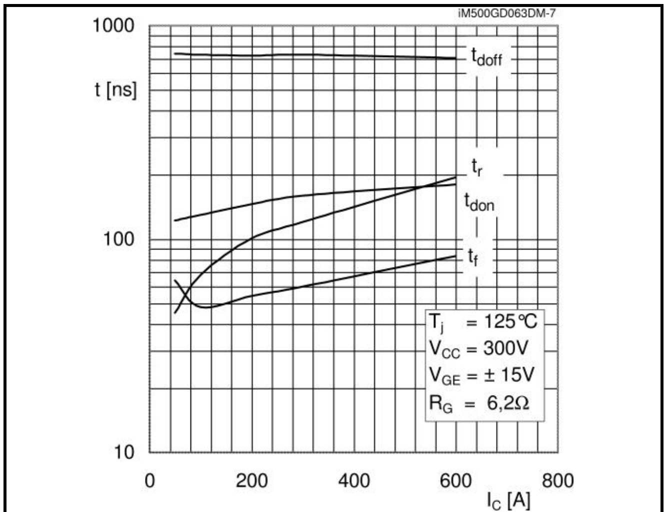


Fig. 7 Switching times vs. I_C

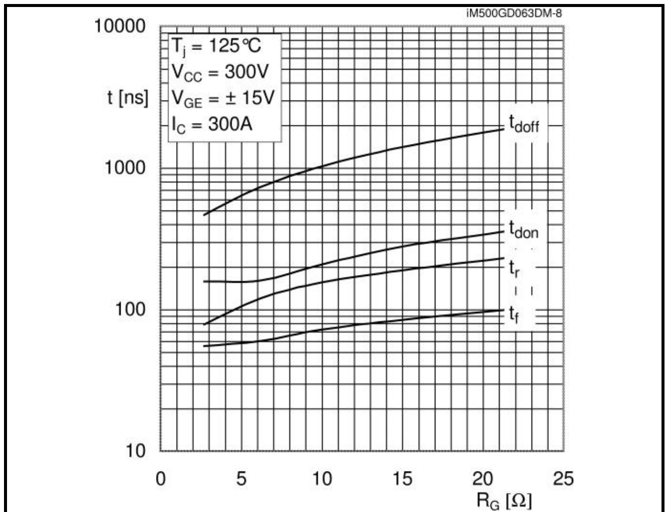


Fig. 8 Switching times vs. gate resistor R_G

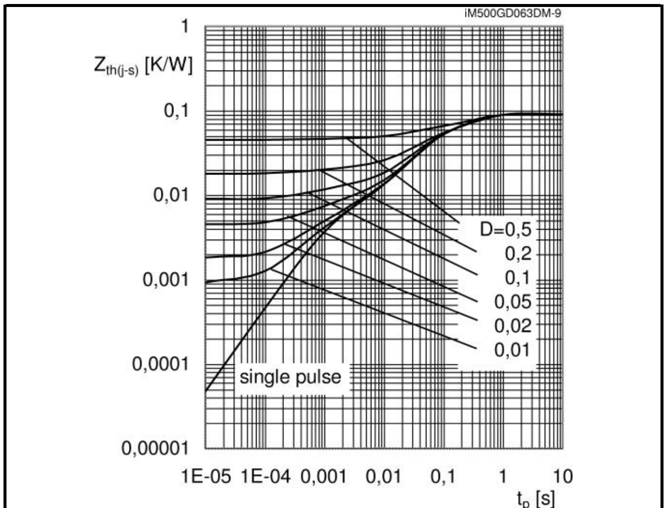


Fig. 9 Transient thermal impedance of IGBT

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

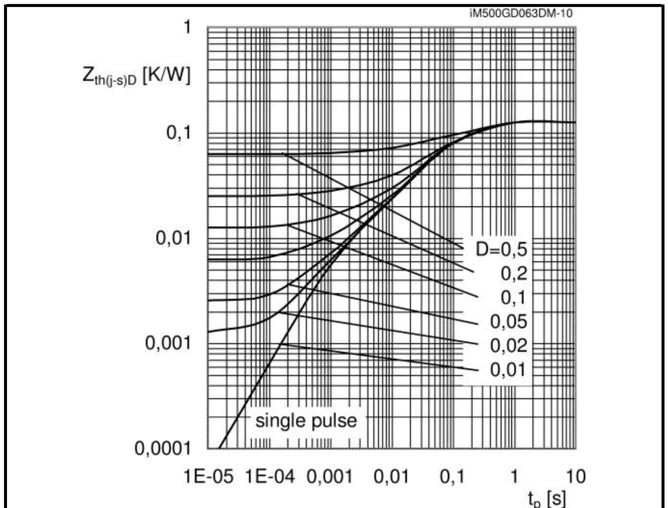


Fig. 10 Transient thermal impedance of FWD

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

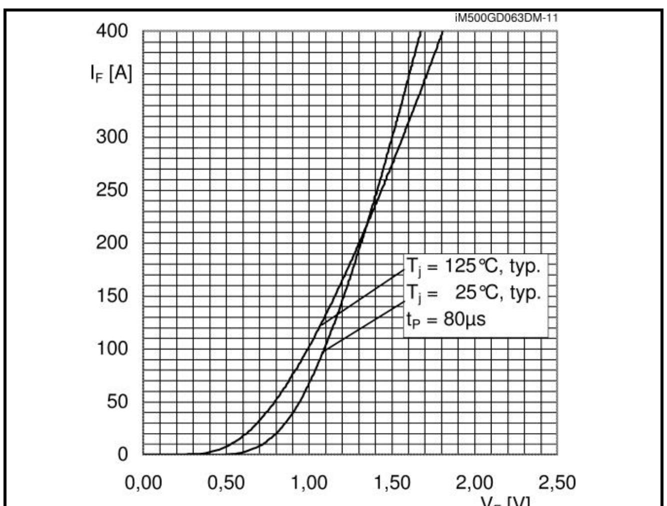


Fig. 11 CAL diode forward characteristic, incl. $R_{CC'+EE'}$

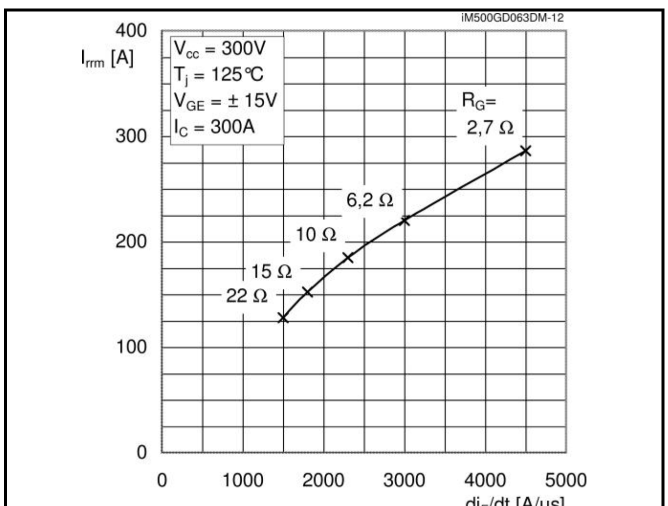


Fig. 12 CAL diode peak reverse recovery current

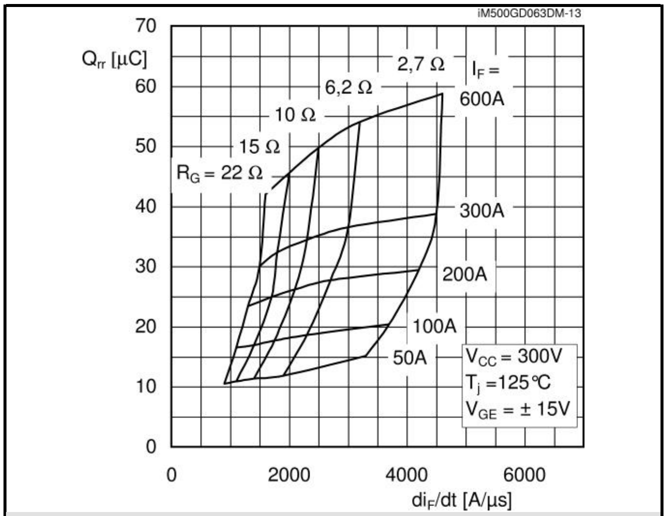
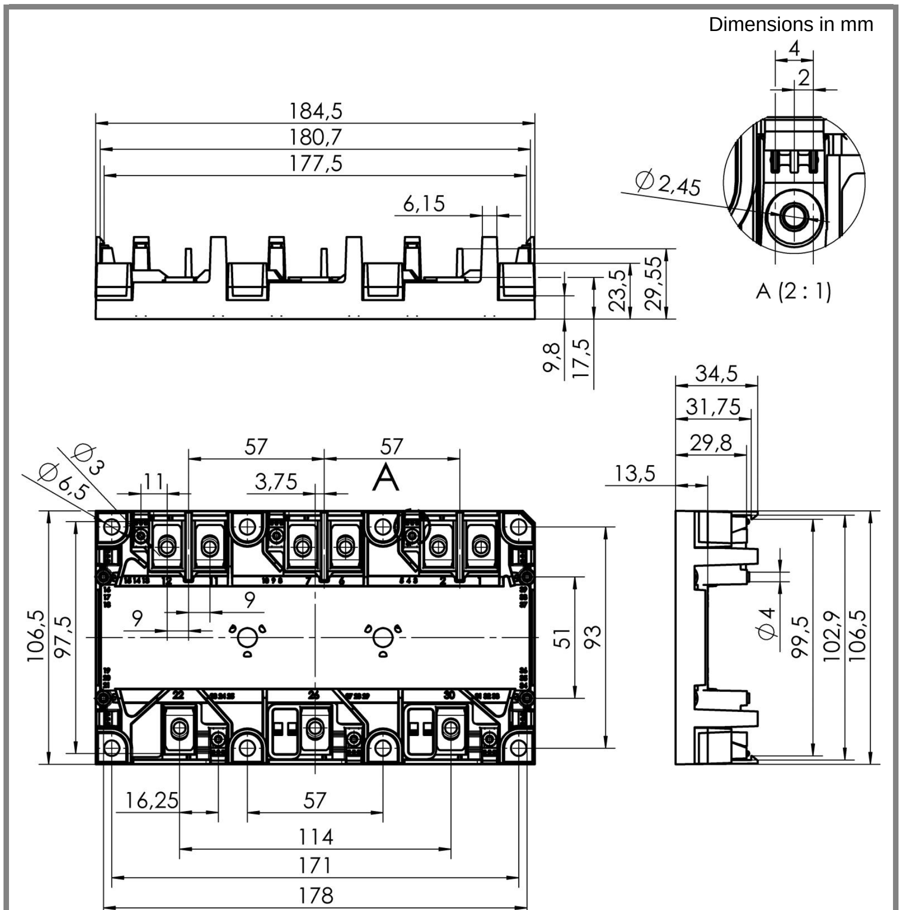


Fig. 13 Typ. CAL diode recovered charge



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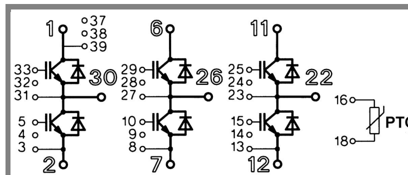

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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

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