SKM 145GB063DN

SEMITRANS™ 2N

Superfast NPT-IGBT Modules

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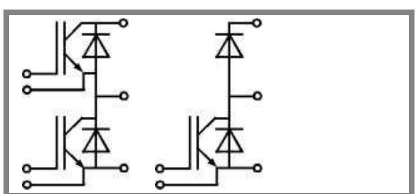
SKM 145GAL063DN

Features

- N channel, Homogeneous Silicon structure (NPT - Non punch-through IGBT)
- Low tail current with low temperature dependence
- High short circuit capability, self limiting if term. G is clamped to E
- Pos. temp.-coeff- of V_{CEsat}
- Very low C_{ies}, C_{oes}, C_{res}
- Fast & soft inverse CAL diodes
- Without hard mould
- Large clearance (10 mm) and creepage distances (20 mm)

Typical Applications

- Switching (not for linear use)
- Switched mode power supplies
- UPS
- AC inverter servo drives
- Pulse frequencies also above 10 kHz
- Welding inverters



Absolute Maximum Ratings T_c = 25 °C, unless otherwise specified

Symbol	Conditions	Values	Units
IGBT			
V_{CES}		600	V
I_C	T_c = 25 (80) °C	200 (140)	A
I_{CRM}	t_p = 1 ms	300	A
V_{GES}		± 20	V
T_{vj}, (T_{stg})	$T_{OPERATION} \leq T_{stg}$	- 40 ... +150 (125)	°C
V_{isol}	AC, 1 min.	2500	V
Inverse diode			
I_F	T_c = 25 (80) °C	130 (90)	A
I_{FRM}	t_p = 1 ms	300	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 150 °C	880	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 = 3 mA	4,5	5,5	6,5	V
I_{CES}	V_{GE} = 0, $V_{CE} = V_{CES}$, T_j = 25 (125) °C		0,2	0,6	mA
$V_{CE(TO)}$	T_j = (125) °C		1,05 (1)		V
r_{CE}	V_{GE} = 15 V, T_j = 25 (125) °C		7 (9,3)		mΩ
$V_{CE(sat)}$	I_C = 150 A, V_{GE} = 15 V, chip level		2,1 (2,4)	2,5 (2,8)	V
C_{ies}	under following conditions		8,4		nF
C_{oes}	V_{GE} = 0, V_{CE} = 25 V, f = 1 MHz		1		nF
C_{res}			0,6		nF
L_{CE}				25	nH
$R_{CC'+EE'}$	res., terminal-chip T_c= 25 (125) °C		0,75 (1)		mΩ
$t_{d(on)}$	V_{CC} = 300 V, I_C = 150 A		130		ns
t_r	$R_{Gon} = R_{Goff}$ = 10 Ω, T_j = 125 °C		65		ns
$t_{d(off)}$	V_{GE} = ± 15 V		450		ns
t_f			40		ns
E_{on} (E_{off})			8,5 (5,5)		mJ
Inverse diode					
$V_F = V_{EC}$	I_F = 150 A; V_{GE} = 0 V; T_j = 25 (125) °C		1,55 (1,55)	1,9	V
$V_{(TO)}$	T_j = 125 () °C			0,9	V
r_T	T_j = 125 () °C		6	8	mΩ
I_{RRM}	I_F = 150 A; T_j = 125 ( ) °C		53		A
Q_{rr}	di/dt = A/µs		8,1		µC
E_{rr}	V_{GE} = 0 V				mJ
FWD					
$V_F = V_{EC}$	I_F = 150 A; V_{GE} = 0 V, T_j = 25 (125) °C		1,55 (1,55)	1,9	V
$V_{(TO)}$	T_j = 125 () °C			0,9	V
r_T	T_j = 125 () °C		6	8	mΩ
I_{RRM}	I_F = 150 A; T_j = 125 ( ) °C		53		A
Q_{rr}	di/dt = 0 A/µs		8,1		µC
E_{rr}	V_{GE} = V				mJ
Thermal characteristics					
$R_{th(j-c)}$	per IGBT			0,18	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,5	K/W
$R_{th(c-s)}$	per module			0,05	K/W
Mechanical data					
M_s	to heatsink M6	3		5	Nm
M_t	to terminals M5	2,5		5	Nm
w				160	g

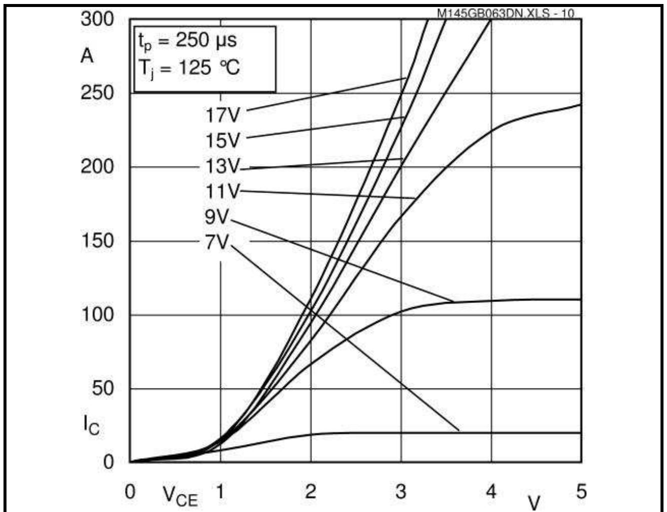


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

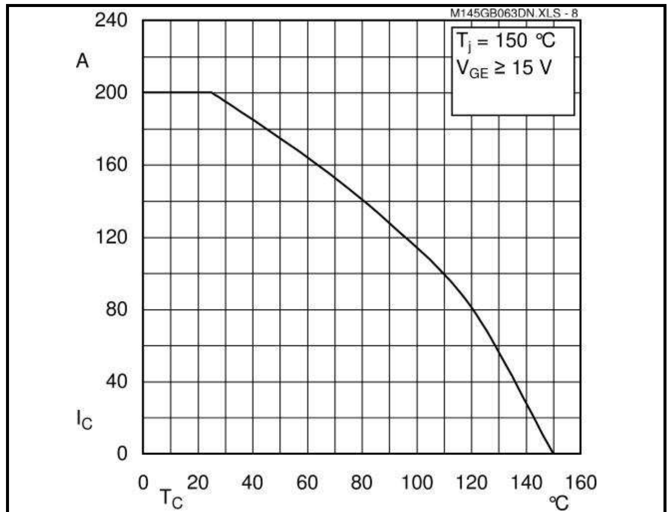


Fig. 2 Rated current vs. temperature $I_C = f (T_C)$

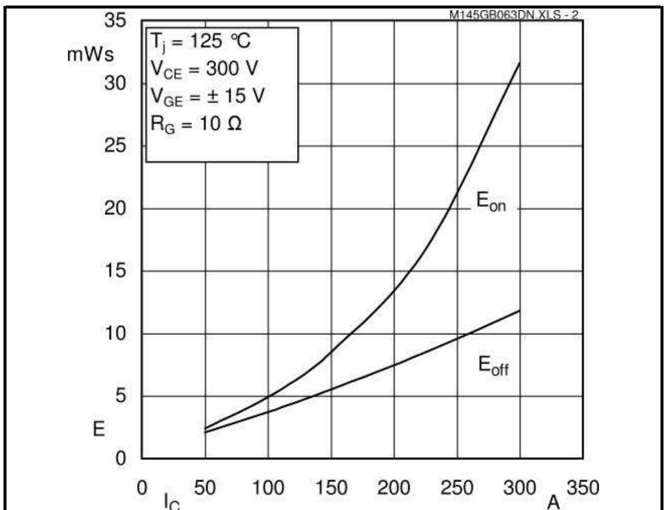


Fig. 3 Typ. turn-on /-off energy = f (I_C)

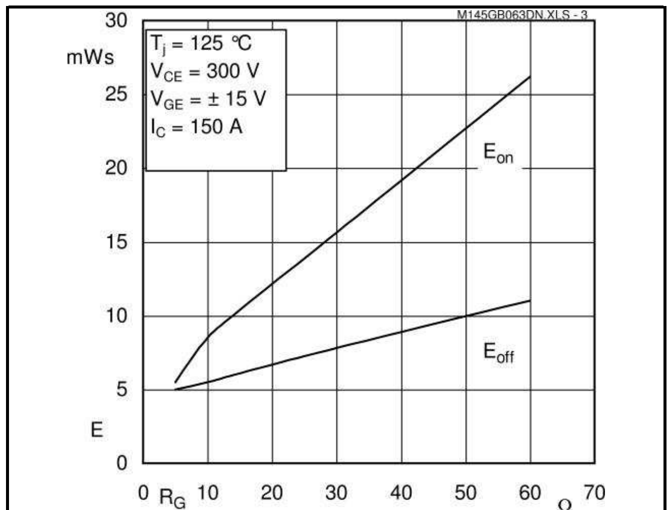


Fig. 4 Typ. turn-on /-off energy = f (R_G)

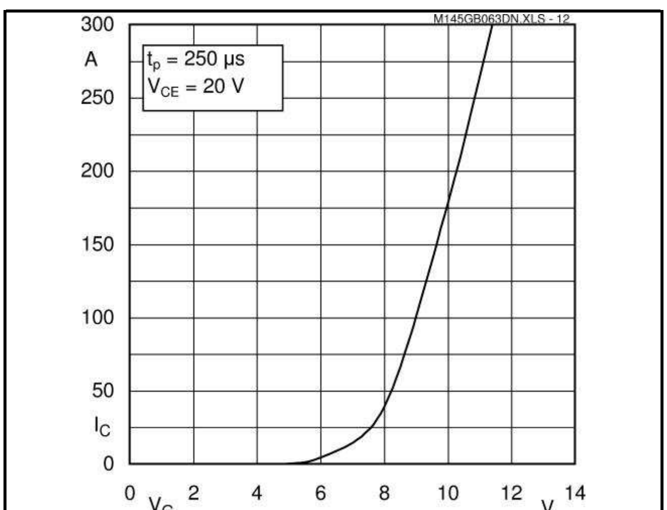


Fig. 5 Typ. transfer characteristic

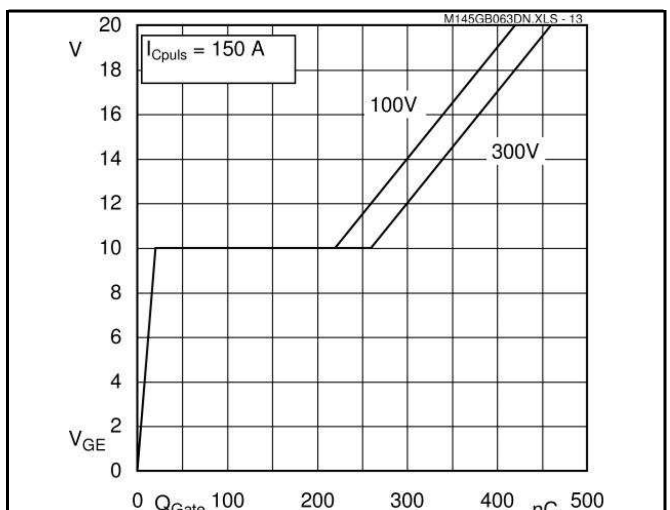


Fig. 6 Typ. gate charge characteristic

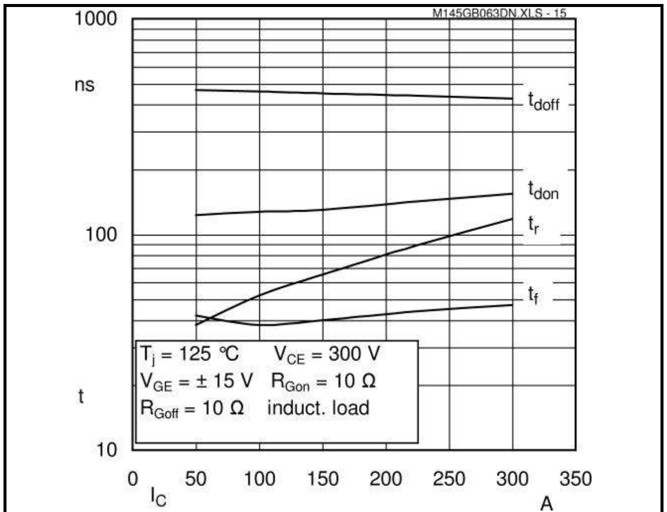


Fig. 7 Typ. switching times vs. I_C

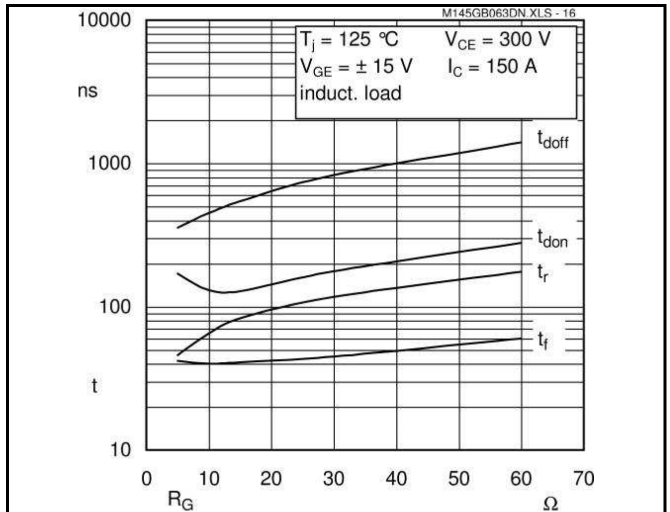


Fig. 8 Typ. switching times vs. gate resistor R_G

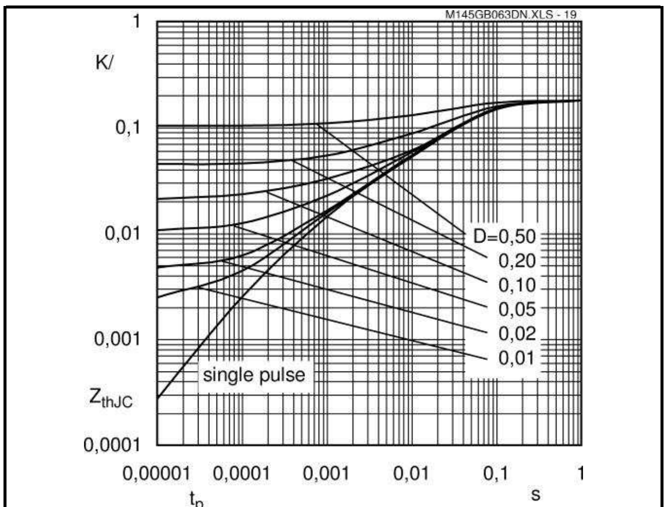


Fig. 9 Transient thermal impedance of IGBT

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

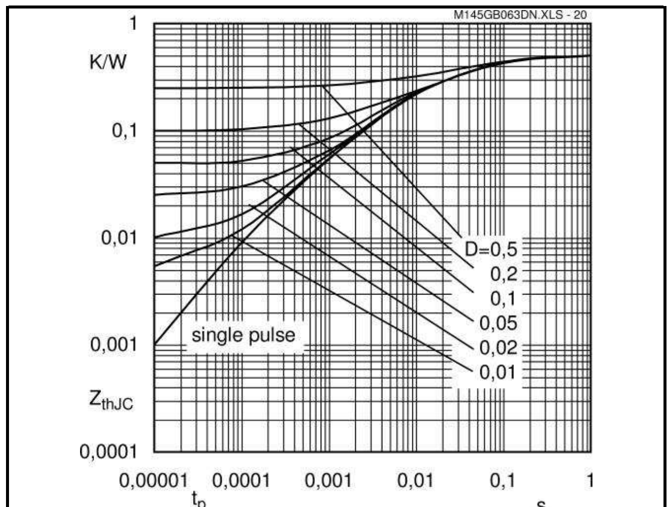


Fig. 10 Transient thermal impedance of FWD

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

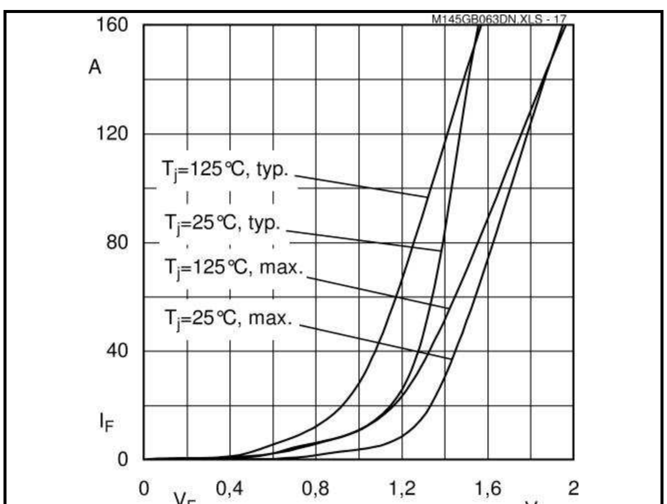


Fig. 11 CAL diode forward characteristic

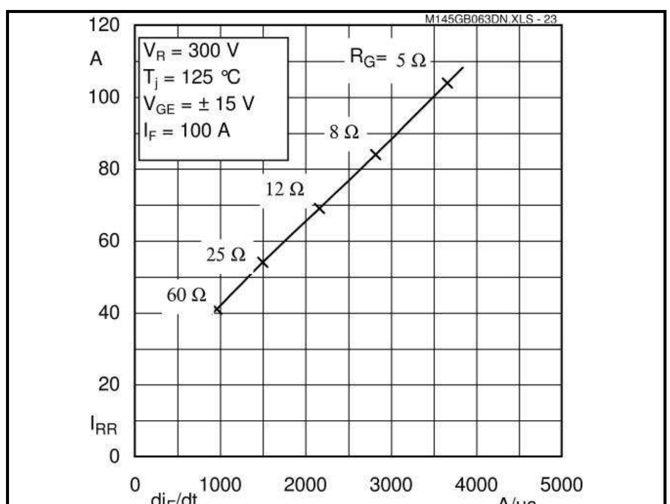


Fig. 12 Typ. CAL diode peak reverse recovery current

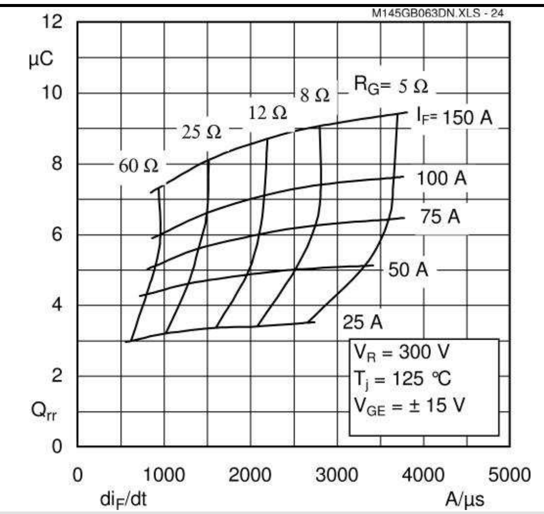
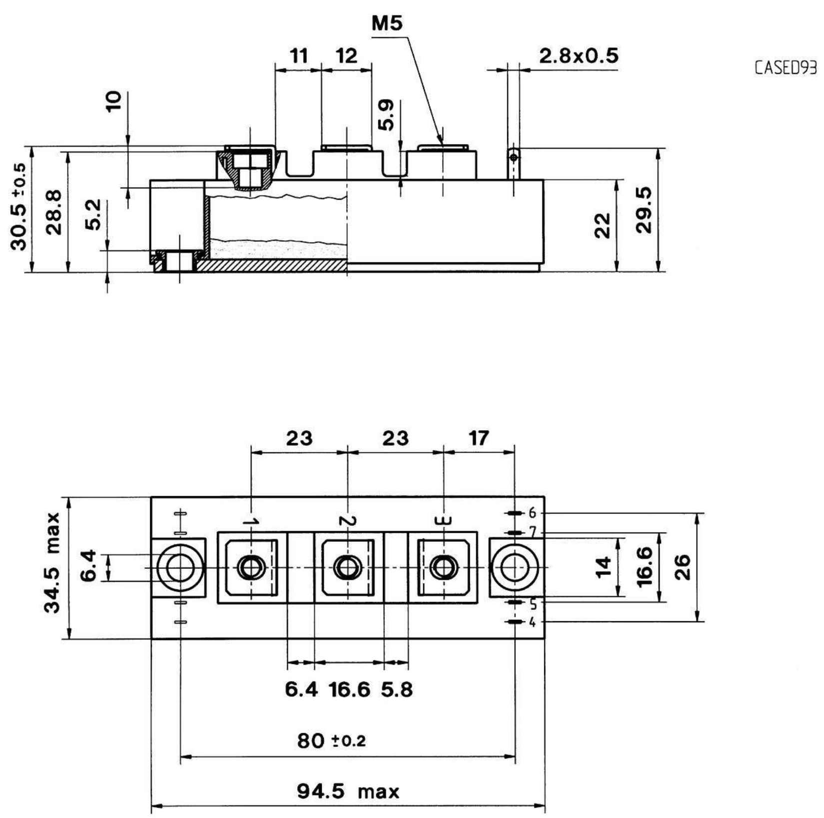


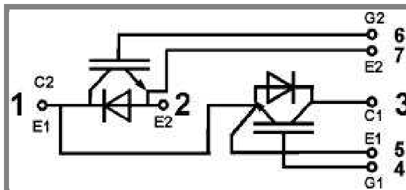
Fig. 13 Typ. CAL diode recovered charge

UL Recognized
File no. E 63 532

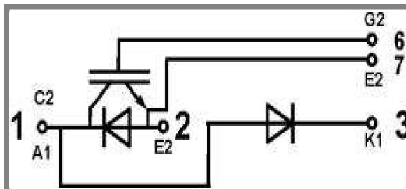
Dimensions in mm



Case D 93



GB Case D 93



GAL Case D 94 (➞ D 93)

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

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