SEMIKRON

Absolute Maximum Ratings
T_{case} = 25 °C, unless otherwise specified

Symbol	Conditions	Values	Units
IGBT			
V_{CES}		1200	V
I_C	T_{case} = 25 (80) °C	135 (100)	A
I_{CRM}	T_{case} = 25 (80) °C, t_p =1 ms	270 (200)	A
V_{GES}		± 20	V
T_{vj}, (T_{stg})	$T_{OPERATION} \leq T_{stg}$	– 40 ... +150 (125)	°C
V_{isol}	AC, 1 min.	4000	V
Inverse Diode			
$I_{FAV} = -I_C$	T_{case} = 25 (80) °C	95 (65)	A
I_{FRM}	T_{case} = 25 (80) °C, t_p < 1 ms	270 (200)	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 150 °C	720	A
Freewheeling Diode			
$I_{FAV} = -I_C$	T_{case} = 25 (80) °C		A
I_{FRM}	T_{case} = 25 (80) °C, t_p < 1 ms		A
I_{FSM}	t_p = 10 ms; sin.; T_j = 150 °C		A

Characteristics
T_{case} = 25 °C, unless otherwise specified

Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(TO)}$	$V_{GE} = V_{CE}$, I_C = 3 mA	4,5	5,5	6,45	V
I_{CES}	V_{GE} = 0, $V_{CE} = V_{CES}$, T_j = 25 (125) °C			tbd	mA
$V_{CE(TO)}$	T_j = 25 (125) °C		1,0 (0,9)	1,15	V
r_{CE}	V_{GE} = 15 V, T_j = 25 (125) °C		13 (19)	17	mΩ
$V_{CE(sat)}$	I_C = 75 A, V_{GE} = 15 V, chip level		2,0 (2,3)	2,4	V
C_{ies}			6,2		nF
C_{oes}	V_{GE} = 0, V_{CE} = 25 V, f = 1 MHz		0,74		nF
C_{res}			0,71		nF
L_{CE}				25	nH
$R_{CC'+EE'}$	resistance, terminal-chip 25 (125) °C		0,75 (1)		mΩ
$t_{d(on)}$	under following conditions:		150		ns
t_r	V_{CC} = 600 V, I_C = 75 A,		45		ns
$t_{d(off)}$	$R_{Gon} = R_{Goff}$ = 12 Ω, T_j = 125 °C,		560		ns
t_f	V_{GE} ± 15 V		50		ns
E_{on} (E_{off})			8,5 (7,5)		mJ
Inverse Diode					
$V_F = V_{EC}$	I_F = 75 A; V_{GE} = 0 V; T_j = 25 (125) °C		2,0 (1,8)	2,5	V
$V_{T(TO)}$	T_j = 25 (125) °C		1,05 (tbd)	1,3 (tbd)	V
r_T	T_j = 25 (125) °C		13 (tbd)	16 (tbd)	mΩ
I_{RRM}	I_F = 75 A; T_j = 125 °C		105		A
Q_{rr}	di/dt = 3100 A/µs		10,5		µC
E_{rr}	V_{GE} = 0 V		3,4		mJ
Freewheeling Diode of GAL/GAR type					
$V_F = V_{EC}$	I_F = A; V_{GE} = 0 V; T_j = 25 (125) °C				V
V_{TO}	T_j = 25 (125) °C				V
r_T	T_j = 25 (125) °C				mΩ
I_{RRM}	I_F = A; T_j = 125 °C				A
Q_{rr}	V_{GE} = 0 V				µC
E_{rr}					mJ
Thermal Characteristics					
$R_{th(j-c)}$	per IGBT			0,21	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,5	K/W
$R_{th(j-c)FD}$	per FWD				K/W
$R_{th(c-s)}$	per module			0,05	K/W
Mechanical Data					
M_s	to heatsink (M6)	3		5	Nm
M_t	for terminals (M5)	2,5		5	Nm
w				160	g

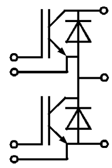
SEMITRANS™ M
SPT IGBT Module

SKM 100 GB 128 DN

Preliminary Data

SEMITRANS 2N

low inductance case



GB

Features

- Homogeneous Si
- SPT = Soft-Punch-Through technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to 6 x I_C

Typical Applications

- AC inverter drives
- UPS
- Electronic welders at f_{sw} > 20 kHz

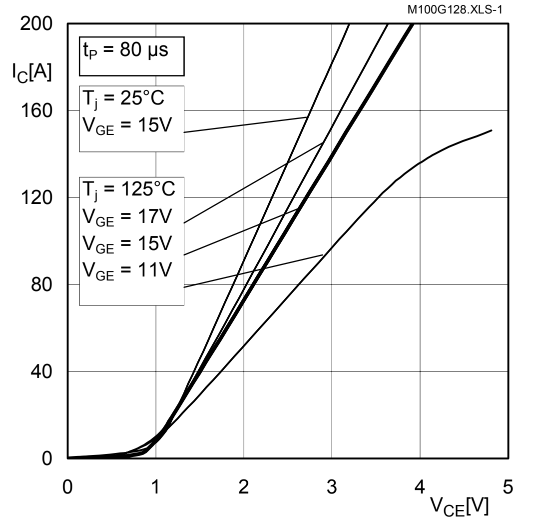


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

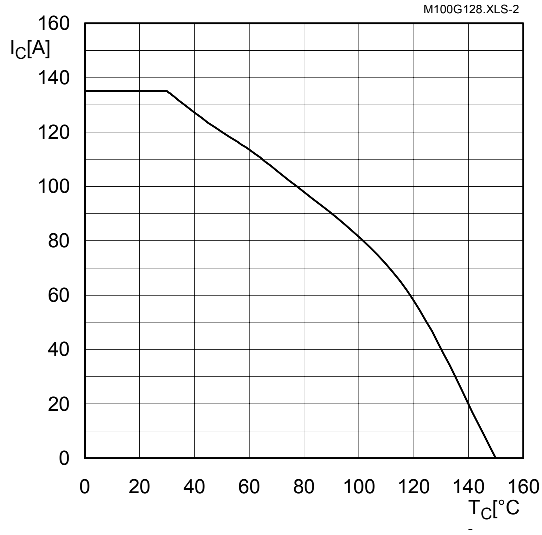


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

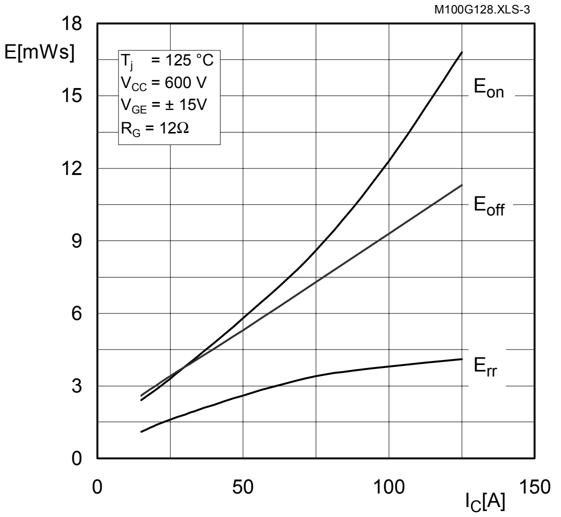


Fig. 3Typ. turn-on /-off energy = f (I_C)

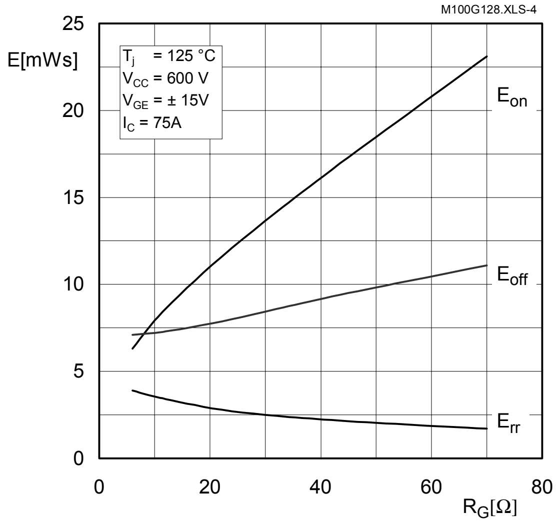


Fig. 4 Typ. turn-on /-off energy = f (R_G)

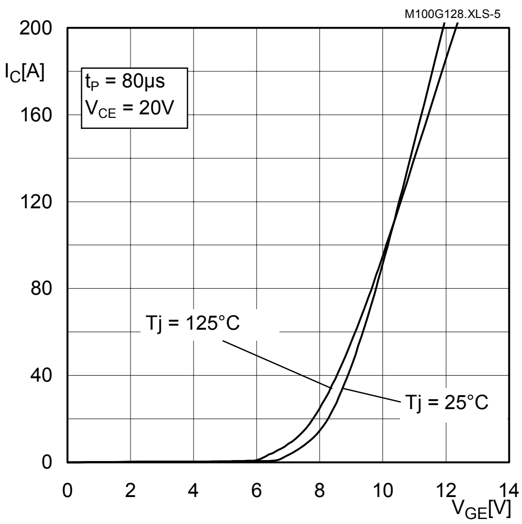


Fig. 5 Typ. transfer characteristic

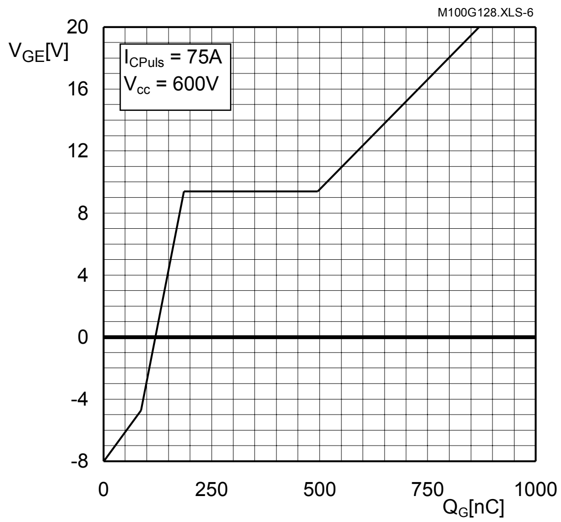


Fig. 6 Typ. gate charge characteristic

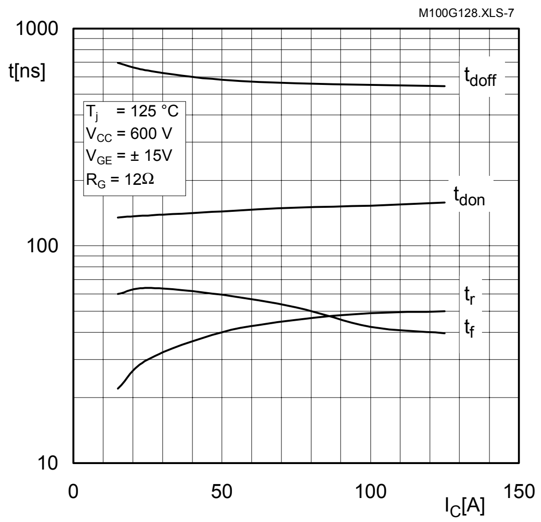


Fig. 7 Typ. switching times vs. I_C

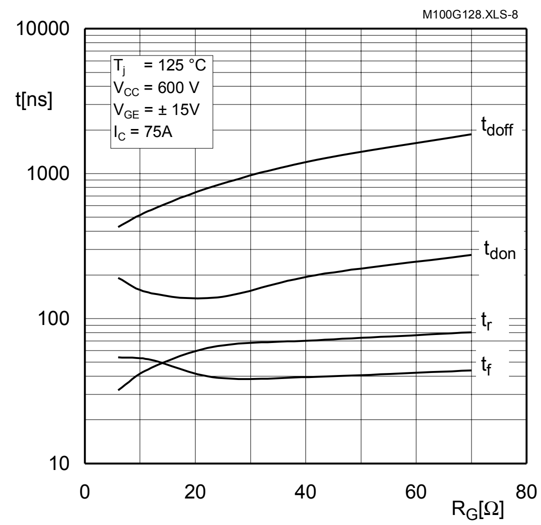


Fig. 8 Typ. switching times vs. gate resistor R_G

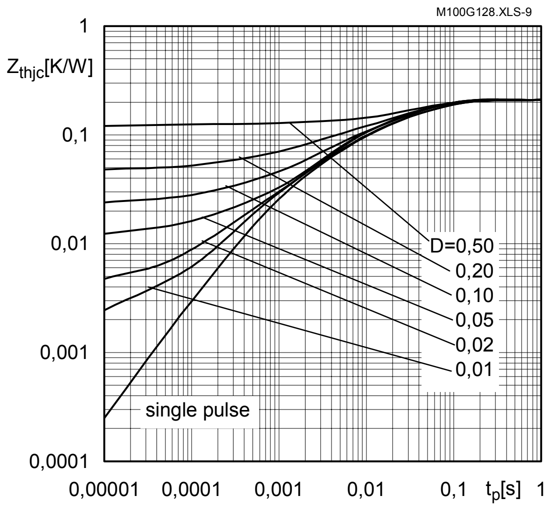


Fig. 9 Transient thermal impedance of IGBT $Z_{thp(j-c)} = f(t_p)$; $D = t_p / t_c = t_p \cdot f$

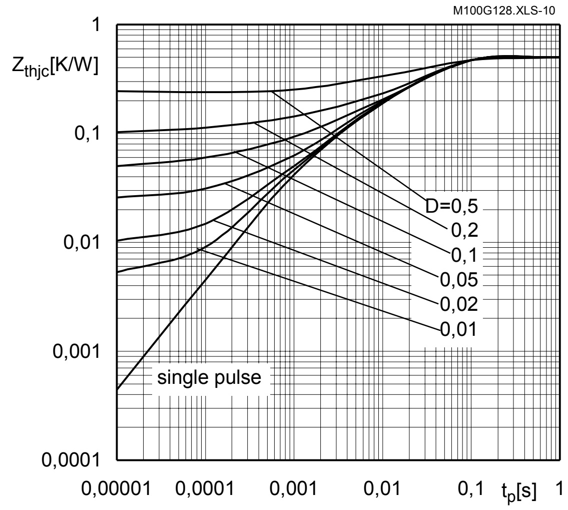


Fig. 10 Transient thermal impedance of FWD $Z_{thp(j-c)D} = f(t_p)$; $D = t_p / t_c = t_p \cdot f$

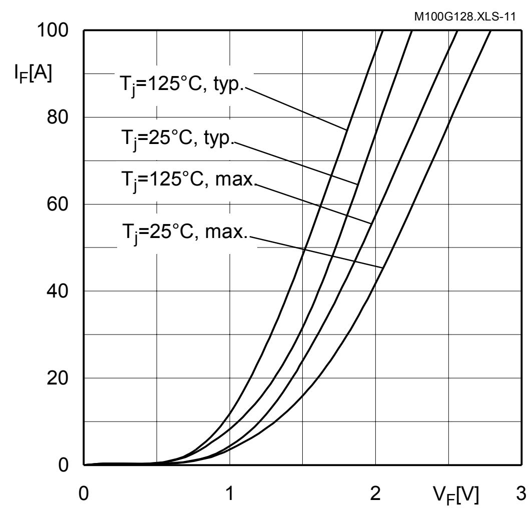


Fig. 11 CAL diode forward characteristic

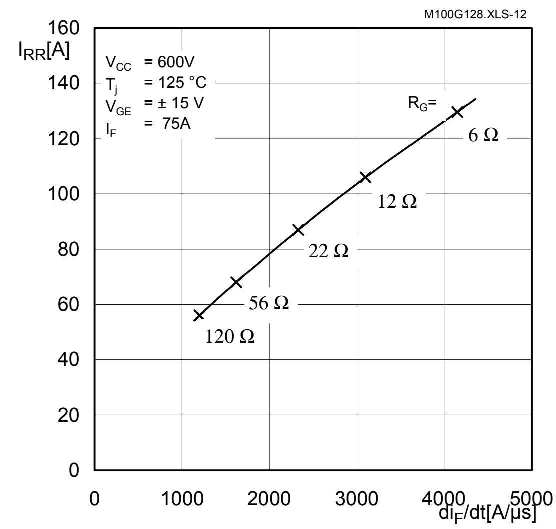


Fig. 12 Typ. CAL diode peak reverse recovery current

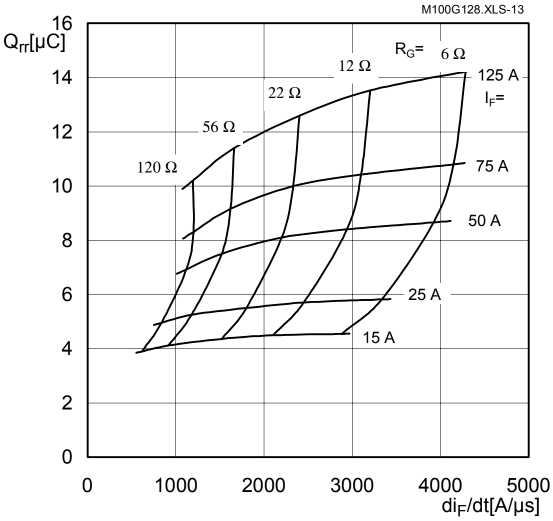


Fig. 13 Typ. CAL diode recovered charge

This is an electrostatic discharge sensitive device (ESDS).

Please observe the international standard IEC 60747-1, Chapter IX.

Packing Unit	8 pcs	SEMIBOX A
Mounting Kit	10 pcs	Ident-No. 33321100

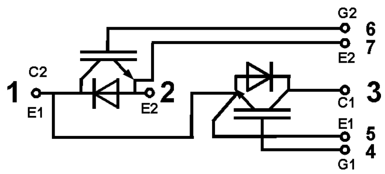
SEMITRANS 2

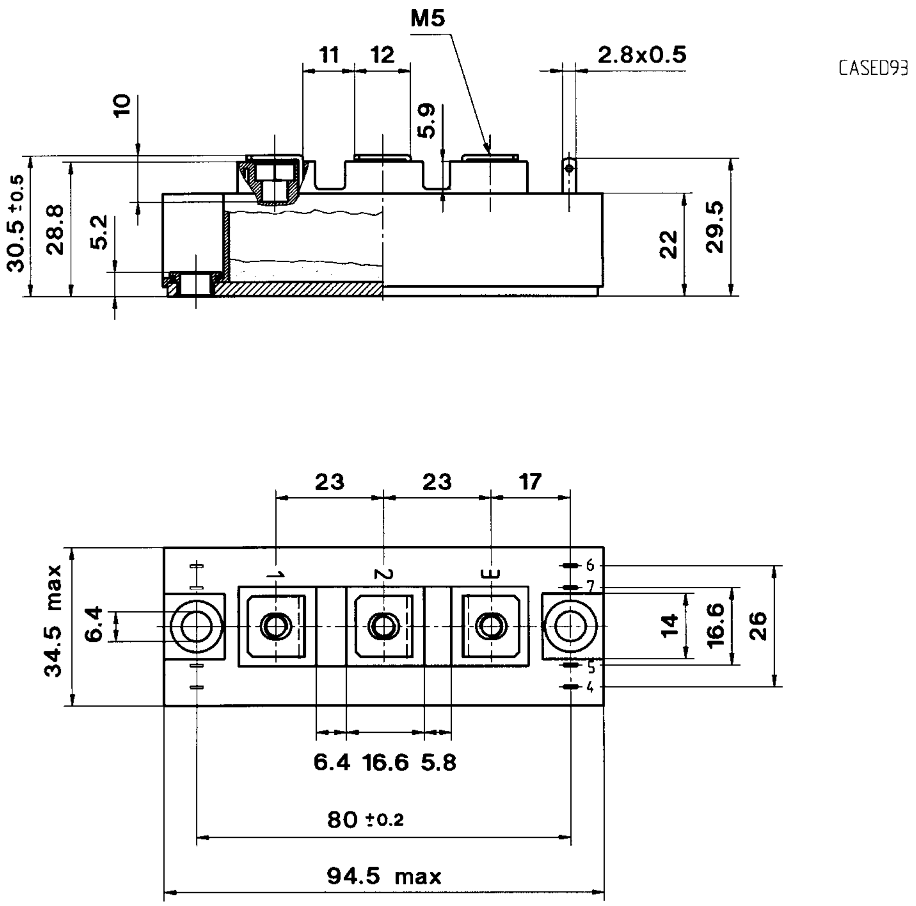
Case D 93

UL Recognized

File no. E 63 532

SKM 100 GB 128 DN





Dimensions in mm

Case outline and circuit diagrams

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