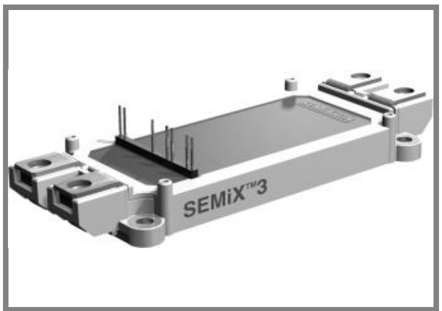


SEMiX®3

Trench IGBT Modules

SEMiX 603GB066HD

SEMiX 603GAL066HD

SEMiX 603GAR066HD

Target Data

Features

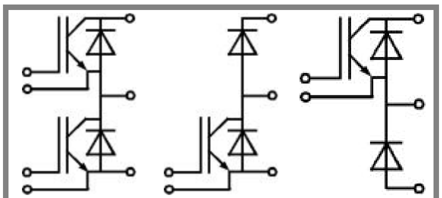
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient

Typical Applications

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

- Case temperature limited to T_C= 125°C max.
- Product reliability results are valid for T_j=150°C
- SC data: $t_p \leq 6$ µs; $V_{GE} \leq 15$ V; T_j = 150°C; V_{CC} = 360 V
-



Absolute Maximum Ratings		T_{case} = 25°C, unless otherwise specified	
Symbol	**Conditions**	**Values**	**Units**
IGBT			
V_{CES}		600	V
I_C	T_c = 25 (80) °C, T_j = 150 °C	730 (520)	A
I_C	T_c = 25 (80) °C, T_j = 175 °C	800 (610)	A
I_{CRM}	t_p = 1 ms	1200	A
V_{GES}		± 20	V
T_j, (T_{stg})		- 40 ... + 175 (125)	°C
V_{isol}	AC, 1 min.	4000	V
Inverse diode			
I_F	T_c = 25 (80) °C, T_j = 150 °C	530 (350)	A
I_F	T_c = 25 (80) °C, T_j = 175 °C	590 (430)	A
I_{FRM}	t_p = 1 ms	1200	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 25 °C	2700	A
Freewheeling diode			
I_F	T_c = 25 (80) °C, T_j = 150 °C	640 (430)	A
I_F	T_c = 25 (80) °C, T_j = 150 °C	710 (520)	A
I_{FSM}	t_p = 10 ms; ; T_j = 175 °C		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 = 4 mA		5,8		V
I_{CES}	V_{GE} = 0, V_{CE} = V_{CES}, T_j = 25 () °C			0,1	mA
$V_{CE(TO)}$	T_j = 25 (150) °C		0,9 (0,85)	1 (0,9)	V
r_{CE}	V_{GE} = 15 V, T_j = 25 (150) °C		0,9 (1,4)	1,5 (2)	mΩ
$V_{CE(sat)}$	I_{Cnom} = 600 A, V_{GE} = 15 V, T_j = 25 (150) °C, chip level		1,45 (1,7)	1,9 (2,1)	V
C_{ies}	under following conditions		37		nF
C_{oes}	V_{GE} = 0, V_{CE} = 25 V, f = 1 MHz		2,3		nF
C_{res}			1,1		nF
L_{CE}			20		nH
$R_{CC'+EE'}$	terminal-chip, T_c= 25 (125) °C		0,7 (1)		mΩ
$t_{d(on)}/t_r$	V_{CC} = 300 V, I_{Cnom} = 600 A		145 / 145		ns
$t_{d(off)}/t_f$	V_{GE} = ±15V		1030 / 105		ns
E_{on} (E_{off})	R_{Gon} = R_{Goff} = 3 Ω, T_j = 150 °C		11 (41)		mJ
Inverse diode, Freewheeling diode					
V_F = V_{EC}	I_{Fnom} = 600 A; V_{GE} = 0 V; T_j = 25 (150) °C, chip level		1,4 (1,4)	1,6	V
$V_{(TO)}$	T_j = 25 (150) °C		1 (0,85)	1,1	V
r_T	T_j = 25 (150) °C		0,7 (0,9)	0,83	mΩ
I_{RRM}	I_{Fnom} = 600 A; T_j = 25 (150) °C		352		A
Q_{rr}	di/dt = 3800 A/µs		63		µC
E_{rr}	V_{GE} = -15 V		13		mJ
Thermal characteristics					
$R_{th(j-c)}$	per IGBT			0,073	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,15	K/W
$R_{th(j-c)FD}$	per FWD				K/W
$R_{th(c-s)}$	per module		0,04		K/W
Temperature sensor					
R_{25}	T_c = 25 °C		5 ±5%		kΩ
$B_{25/85}$	R_2=R_1exp[B(1/T_2-1/T_1)] ; T[K];B		3420		K
Mechanical data					
M_s/M_t	to heatsink (M5) / for terminals (M6)	3/2,5		5 /5	Nm
w			289		g

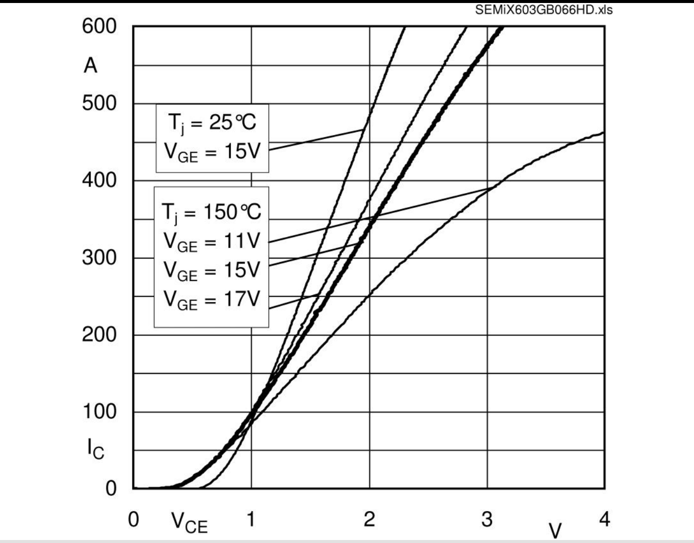


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

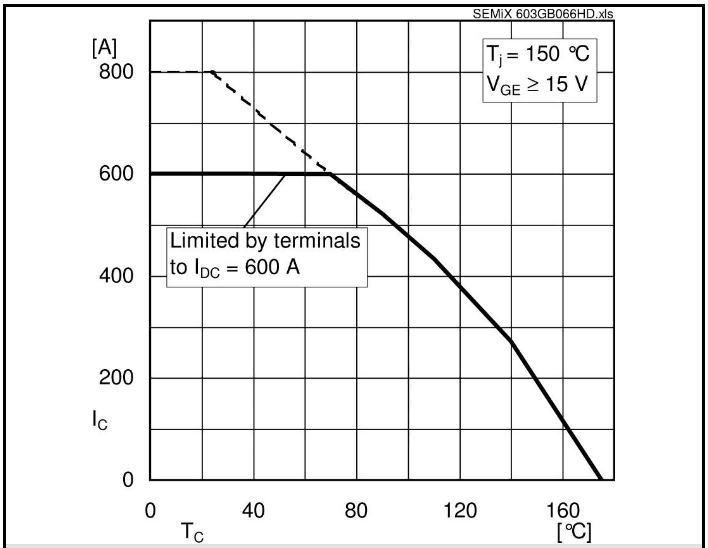


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

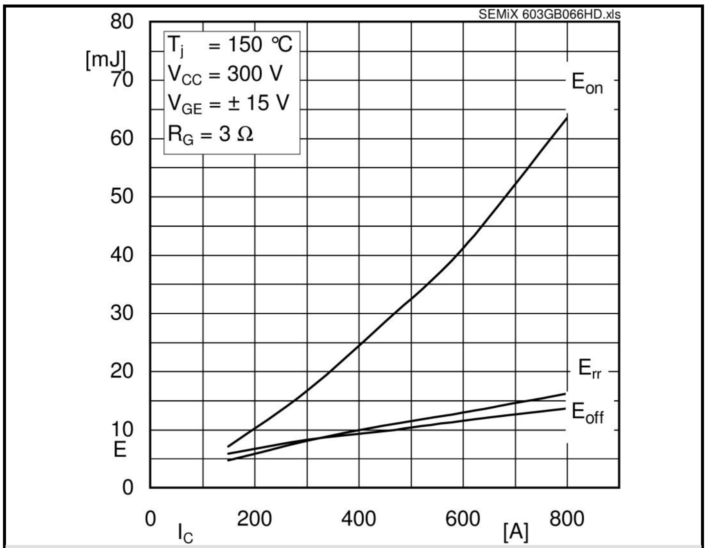


Fig. 3 Typ. turn-on /-off energy = f (I_C)

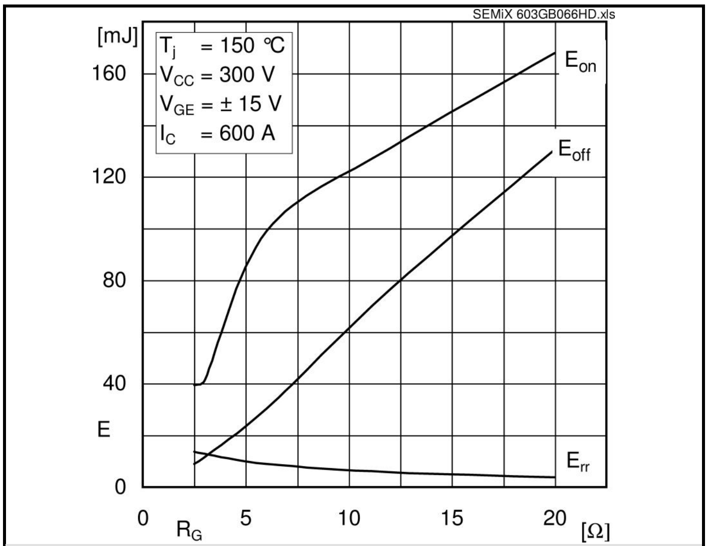


Fig. 4 Typ. turn-on /-off energy = f (R_G)

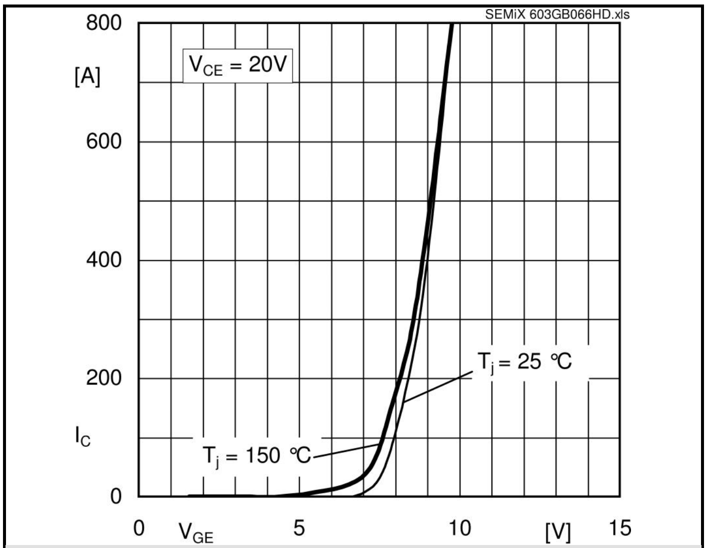


Fig. 5 Typ. transfer characteristic

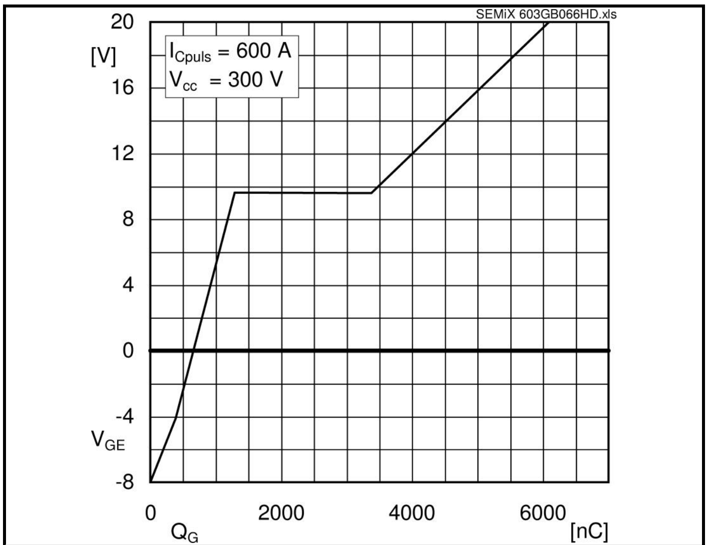


Fig. 6 Typ. gate charge characteristic

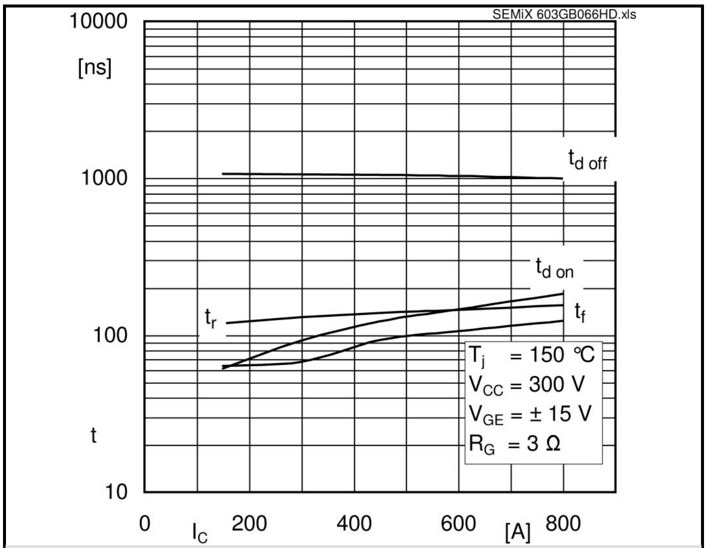


Fig. 7 Typ. switching times vs. I_C

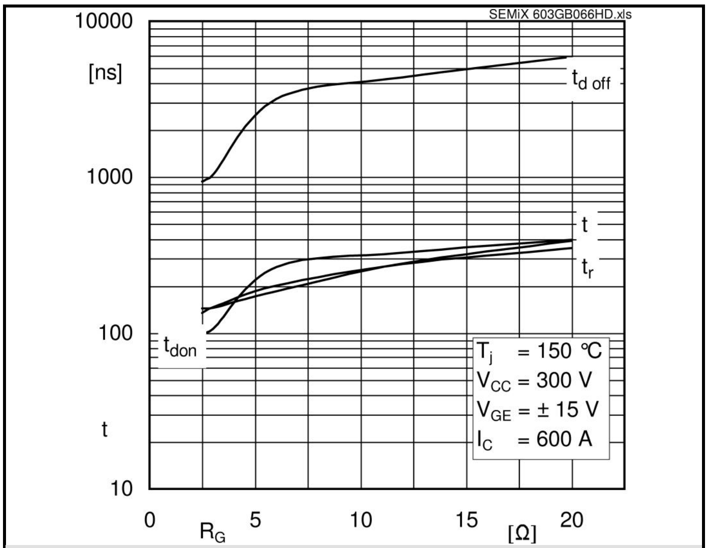


Fig. 8 Typ. switching times vs. gate resistor R_G

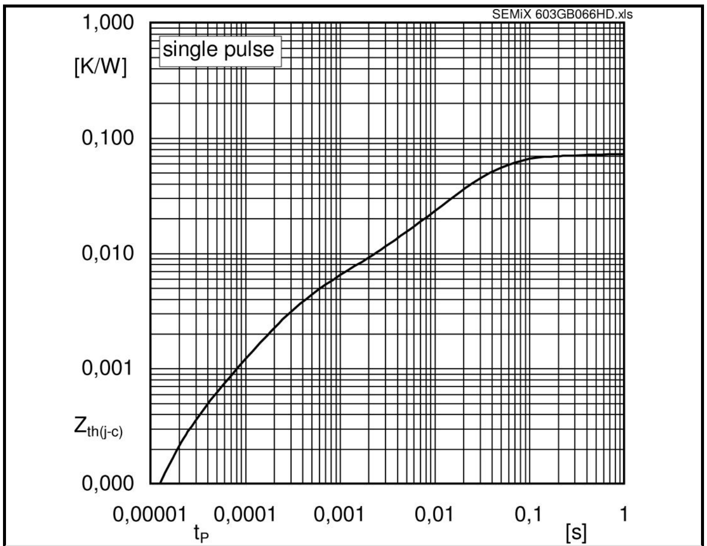


Fig. 9 Transient thermal impedance of IGBT

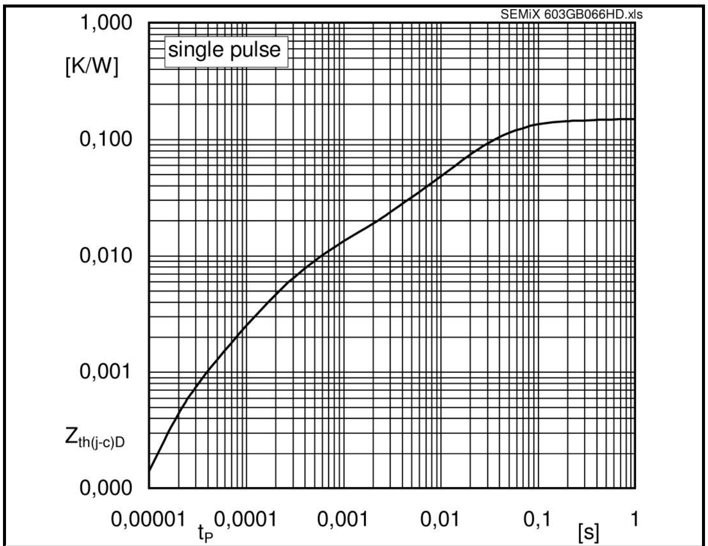


Fig. 10 Transient thermal impedance of FWD

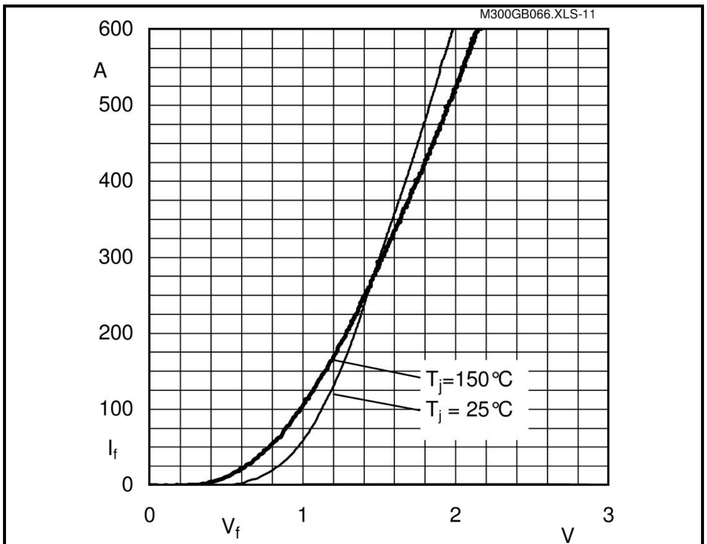


Fig. 11 CAL diode forward characteristic

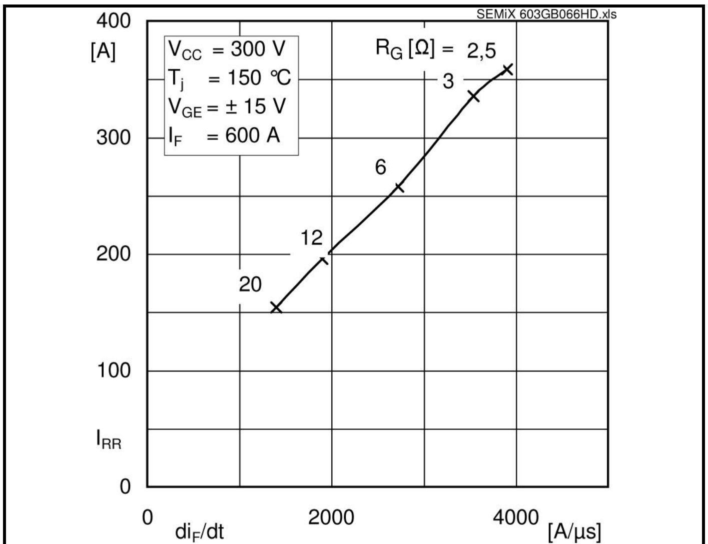


Fig. 12 Typ. CAL diode peak reverse recovery current

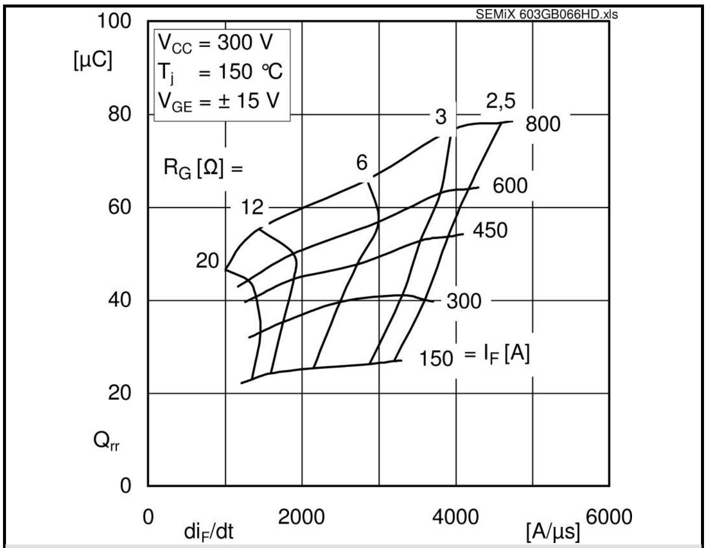
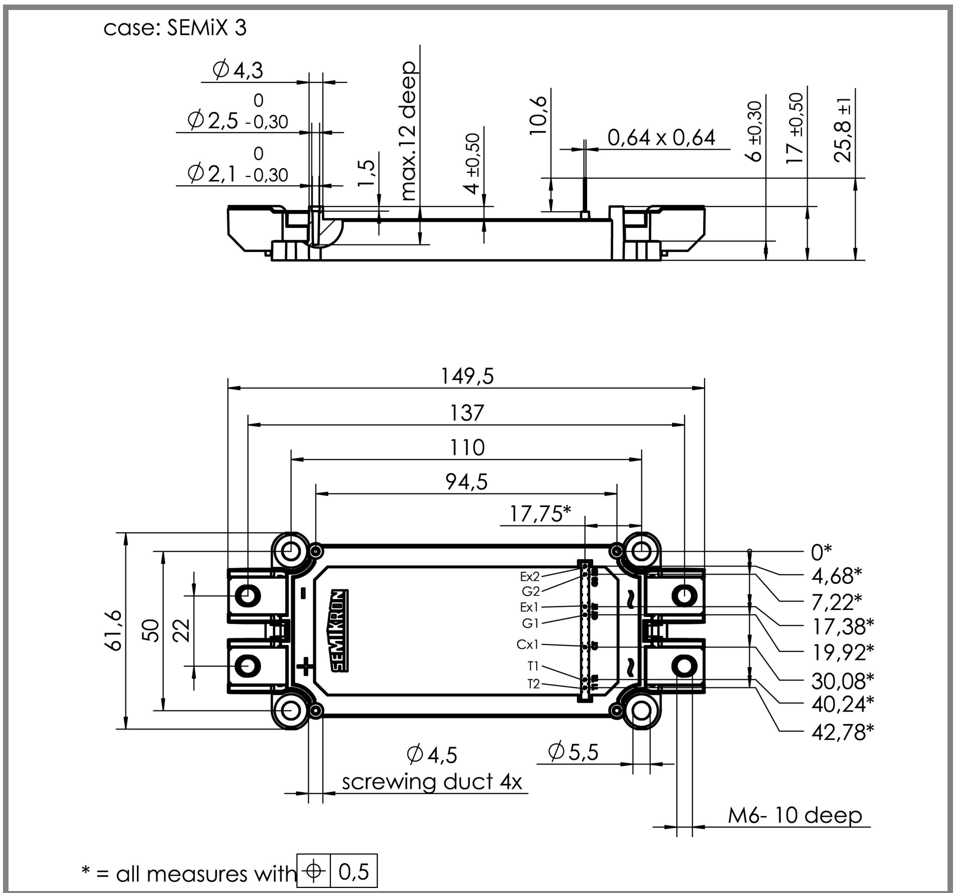
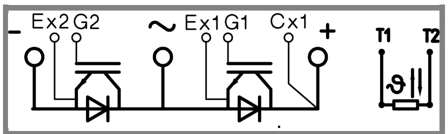


Fig. 13 Typ. CAL diode recovered charge



Case SEMiX3



GB pinout SEMiX 3

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

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

