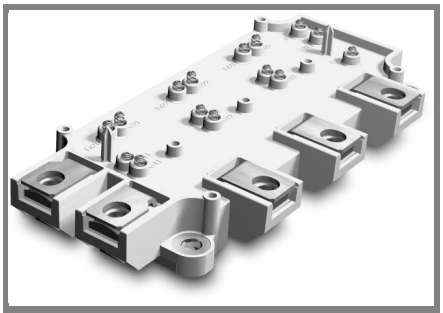
SEMiX 151GD066HDs



SEMiX®13s

Trench IGBT Modules

SEMiX 151GD066HDs

Preliminary Data

Features

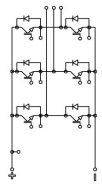
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient

Typical Applications

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

- Case temperatur 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, use of soft RG necessary
- take care of over-voltage caused by stray inductance



GD

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	180 (130)	A
I_C	T_c = 25 (80) °C, T_j = 175 °C	200 (150)	A
I_{CRM}	t_p = 1 ms	300	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	150 (100)	A
I_F	T_c = 25 (80) °C, T_j = 175 °C	170 (120)	A
I_{FRM}	t_p = 1 ms	300	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 25 °C	980	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 = 4,8 mA		5,8		V
I_{CES}	V_{GE} = 0, V_{CE} = V_{CES}, T_j = 25 () °C			0,25	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		3,7 (5,7)	6 (8)	mΩ
$V_{CE(sat)}$	I_{Cnom} = 150 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		9,2		nF
C_{oes}	V_{GE} = 0, V_{CE} = 25 V, f = 1 MHz		0,6		nF
C_{res}			0,28		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} = 150 A		140 / 40		ns
$t_{d(off)}$/t_f	V_{GE} = -8/+15V		385 / 40		ns
E_{on} (E_{off})	R_{Gon} = R_{Goff} = 4,5 Ω, T_j = 150 °C		3,8 (6,1)		mJ
Inverse diode					
V_F = V_{EC}	I_{Fnom} = 150 A; V_{GE} = 0 V; T_j = 25 (150) °C, chip level		1,4 (1,5)	1,6	V
$V_{(TO)}$	T_j = 25 (150) °C		1 (0,85)	1,1	V
r_T	T_j = 25 (150) °C		2,7 (4,3)	3,3	mΩ
I_{RRM}	I_{Fnom} = 150 A; T_j = 25 (150) °C		(155)		A
Q_{rr}	di/dt = 3000 A/µs		(24)		µC
E_{rr}	V_{GE} = -8 V		(5,8)		mJ
Thermal characteristics					
$R_{th(j-c)}$	per IGBT			0,3	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		0,04		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			290		g

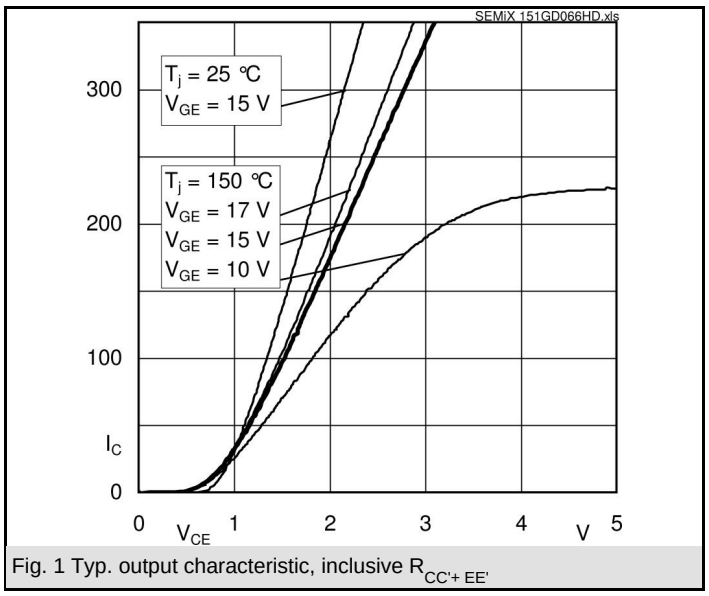


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

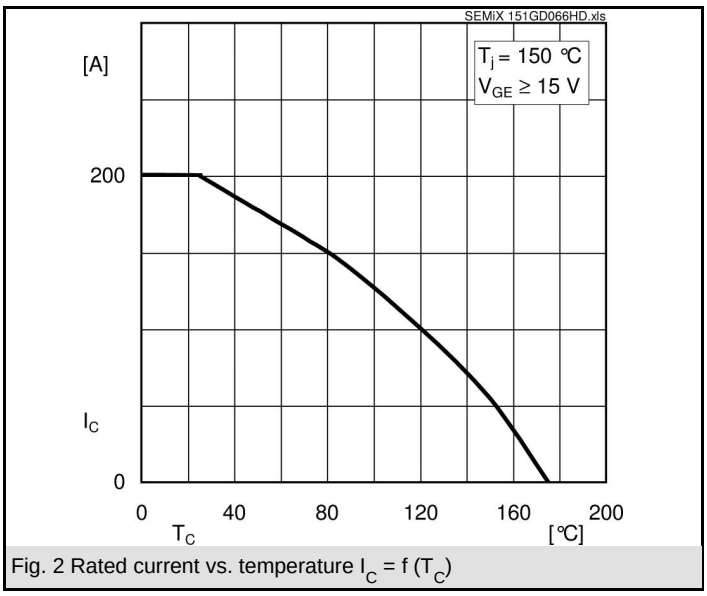


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

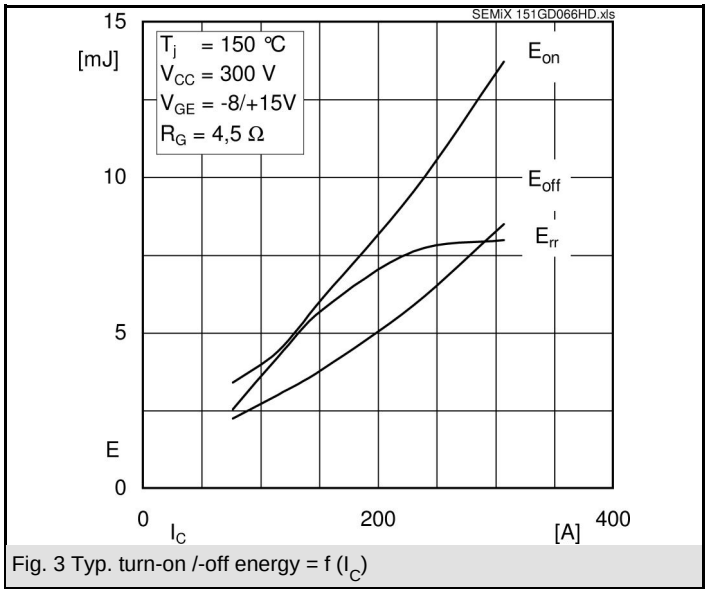


Fig. 3 Typ. turn-on /-off energy = f (I_C)

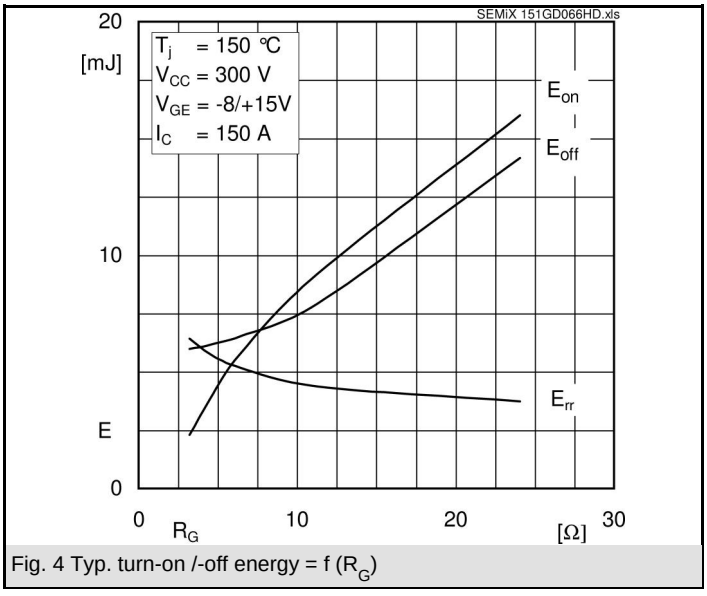


Fig. 4 Typ. turn-on /-off energy = f (R_G)

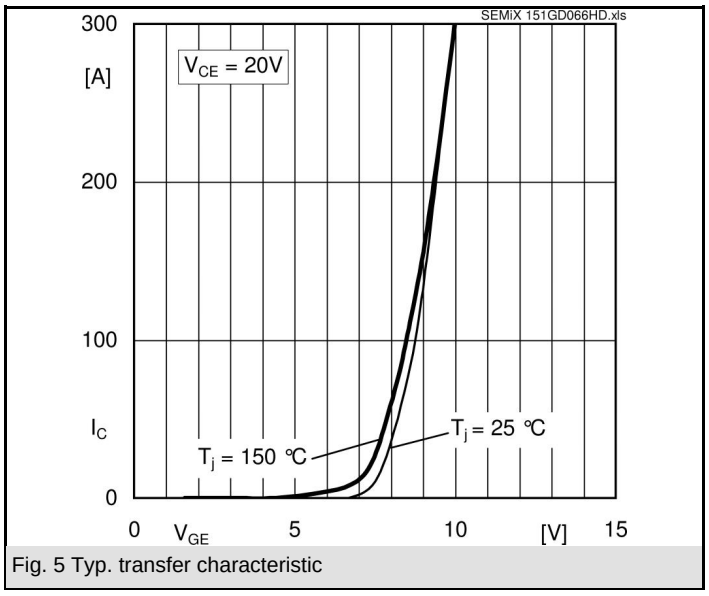


Fig. 5 Typ. transfer characteristic

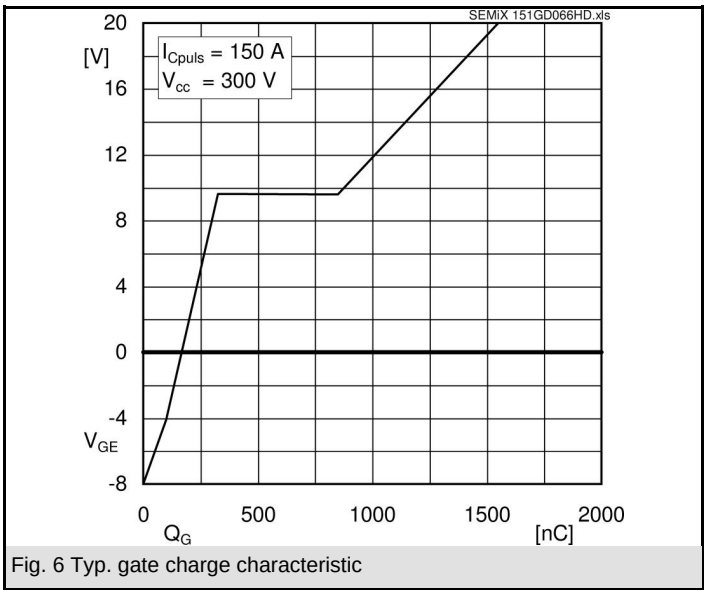


Fig. 6 Typ. gate charge characteristic

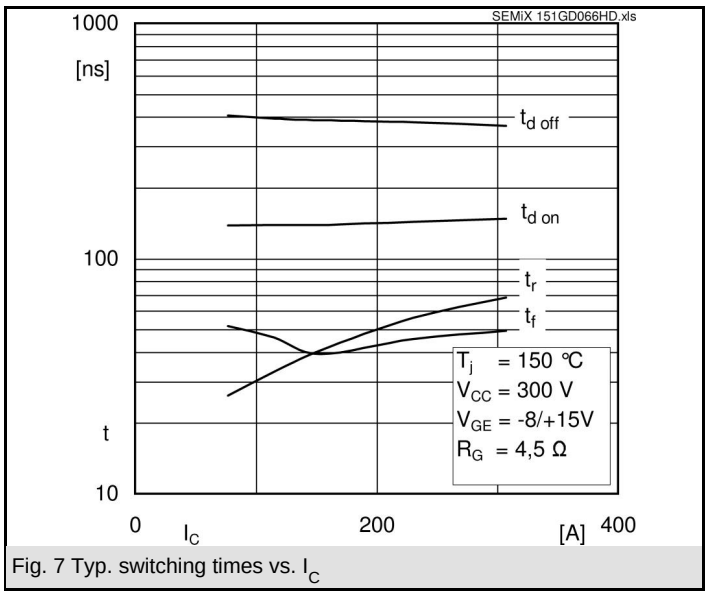


Fig. 7 Typ. switching times vs. I_C

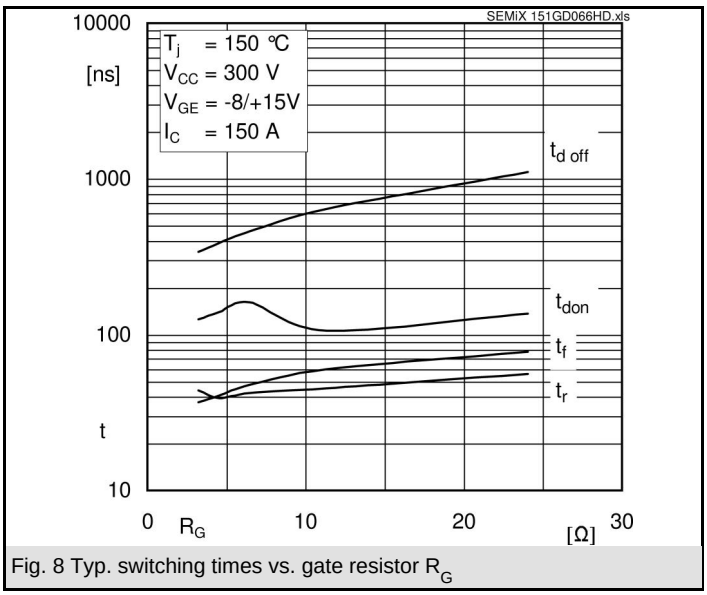


Fig. 8 Typ. switching times vs. gate resistor R_G

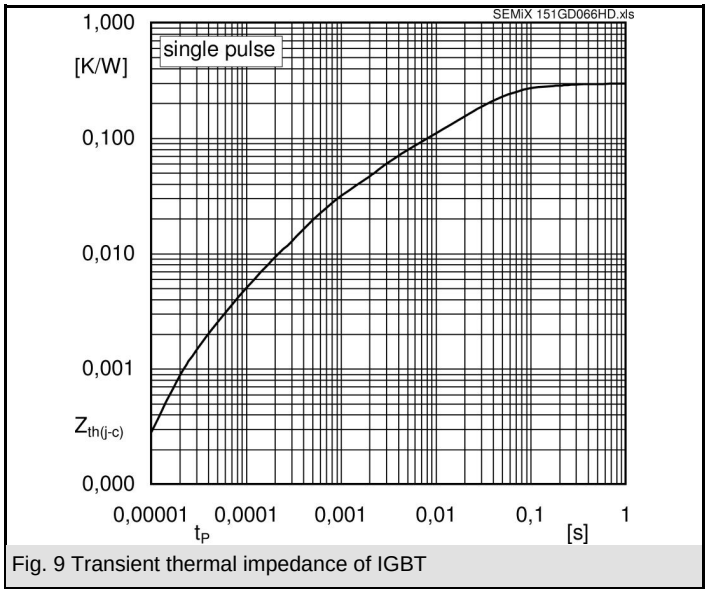


Fig. 9 Transient thermal impedance of IGBT

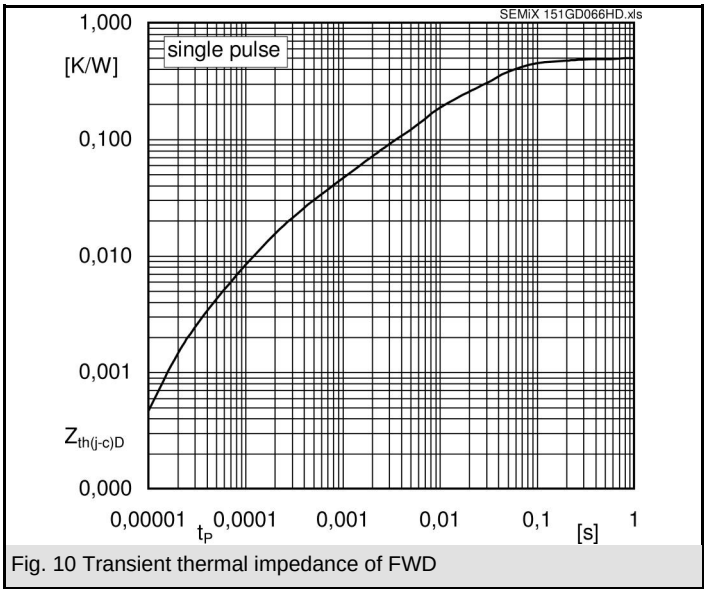


Fig. 10 Transient thermal impedance of FWD

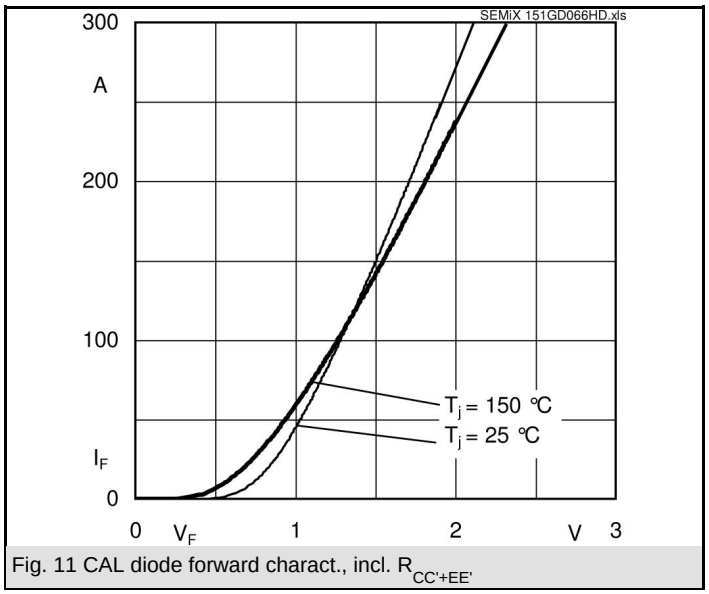


Fig. 11 CAL diode forward charact., incl. $R_{CC'+EE'}$

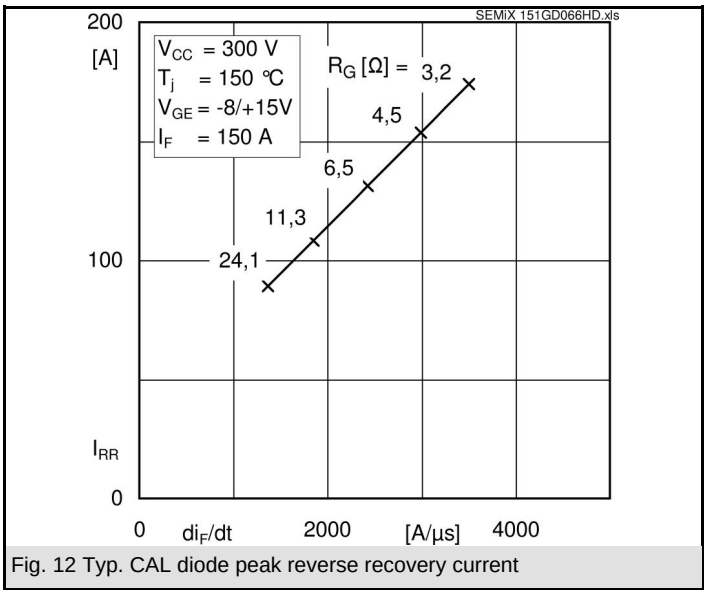


Fig. 12 Typ. CAL diode peak reverse recovery current

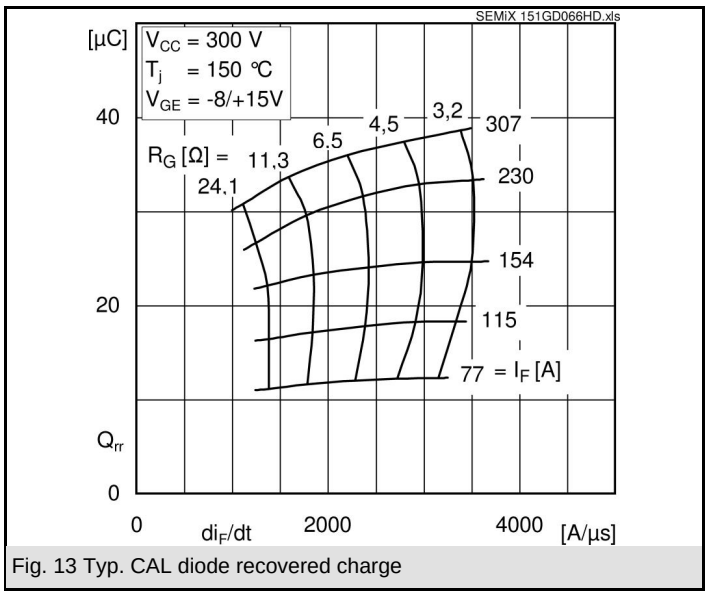
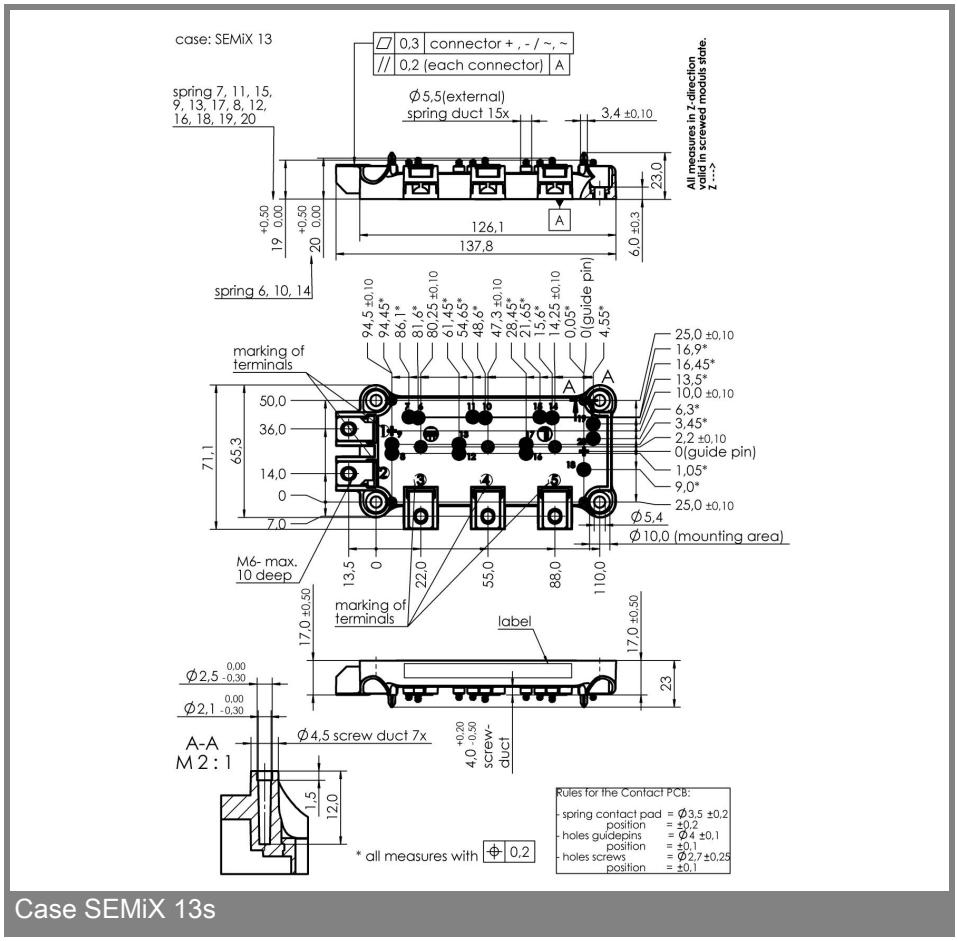
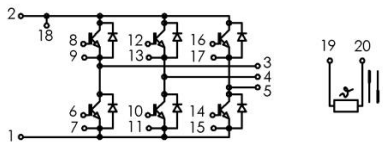


Fig. 13 Typ. CAL diode recovered charge



Case SEMiX 13s



GD pinout SEMiX 13s

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

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