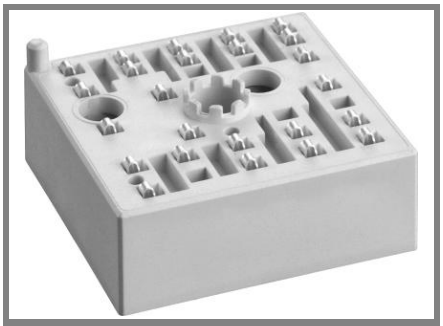
SKiiP 12NAB12T4V1



MiniSKiiP® 1

3-phase bridge rectifier + brake chopper + 3-phase bridge inverter

SKiiP 12NAB12T4V1

Preliminary Data

Features

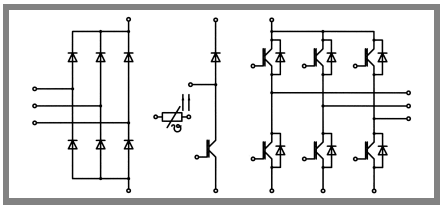
- Latest Trench IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Typical Applications

- Inverter up to 10 kVA
- Typical motor power 5,5 kW

Remarks

- V_{CEsat} , V_F = chip level value
- Case temperature limited to T_c = 125°C max.
- recomm. T_{op} = -40 ... +150°C
- product rel. results valid for $T_j \leq 150$



NAB

Absolute Maximum Ratings		T_s = 25 °C, unless otherwise specified	
Symbol	**Conditions**	**Values**	**Units**
IGBT - Inverter, Chopper			
V_{CES}		1200	V
I_C	T_s = 25 (70) °C	31 (25)	A
I_{CRM}	$t_p \leq$ 1 ms	45	A
V_{GES}		± 20	V
T_j		- 40 ... + 175	°C
Diode - Inverter, Chopper			
I_F	T_s = 25 (70) °C	24 (19)	A
I_{FRM}	$t_p \leq$ 1 ms	45	A
T_j		- 40 ... + 175	°C
Diode - Rectifier			
V_{RRM}		1600	V
I_F	T_s = 70 °C	35	A
I_{FSM}	t_p = 10 ms, sin 180 °, T_j = 25 °C	220	A
i^2t	t_p = 10 ms, sin 180 °, T_j = 25 °C	240	A^2s
T_j		- 40 ... + 150	°C
I_{tRMS}	per power terminal (20 A / spring)	20	A
T_{stg}		- 40 ... + 125	°C
V_{isol}	AC, 1 min.	2500	V

Characteristics		T_s = 25 °C, unless otherwise specified			
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Units**
IGBT - Inverter, Chopper					
V_{CEsat}	I_{Cnom} = 15 A, T_j = 25 (150) °C		1,85 (2,25)	2,1 (2,5)	V
$V_{GE(th)}$	$V_{GE} = V_{CE}$, I_C = mA	5	5,8	6,5	V
$V_{CE(TO)}$	T_j = 25 (150) °C		1,1 (1)	1,3 (1,2)	V
r_T	T_j = 25 (150) °C		50 (83)	53 (87)	mΩ
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		900		nF
C_{oes}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		80		nF
C_{res}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		55		nF
$R_{th(j-s)}$	per IGBT		1,22		K/W
$t_{d(on)}$	under following conditions		15		ns
t_r	V_{CC} = 600 V, V_{GE} = ± 15 V		25		ns
$t_{d(off)}$	I_{Cnom} = 15 A, T_j = 150°C		260		ns
t_f	$R_{Gon} = R_{Goff}$ = 16 Ω		75		ns
E_{on}	inductive load		1,4		mJ
E_{off}			1,3		mJ
Diode - Inverter, Chopper					
$V_F = V_{EC}$	I_{Fnom} = 15 A, T_j = 25 (150) °C		2,2 (2,1)	2,5 (2,45)	V
$V_{(TO)}$	T_j = 25 (150) °C		1,3 (0,9)	1,5 (1,1)	V
r_T	T_j = 25 (150) °C		60 (80)	67 (90)	mΩ
$R_{th(j-s)}$	per diode		2,02		K/W
I_{RRM}	under following conditions		28		A
Q_{rr}	I_{Fnom} = 15 A, V_R = 600 V		2,6		µC
E_{rr}	V_{GE} = 0 V, T_j = 150 °C		1,1		mJ
	di_F/dt = 1180 A/µs				
Diode - Rectifier					
V_F	I_{Fnom} = 15 A, T_j = 25 °C		1,1		V
$V_{(TO)}$	T_j = 150 °C		0,8		V
r_T	T_j = 150 °C		20		mΩ
$R_{th(j-s)}$	per diode		1,5		K/W
Temperature Sensor					
R_{ts}	3 %, T_r = 25 (100) °C		1000(1670)		Ω
Mechanical Data					
w			35		g
M_s	Mounting torque	2		2,5	Nm

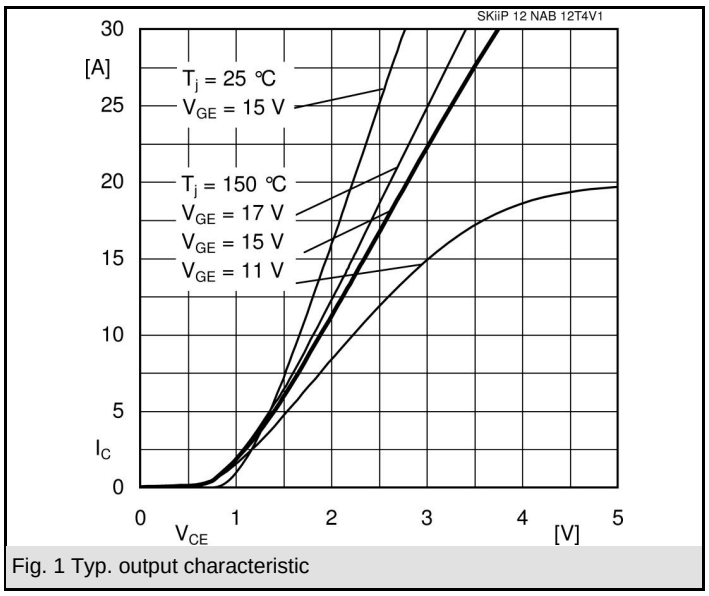


Fig. 1 Typ. output characteristic

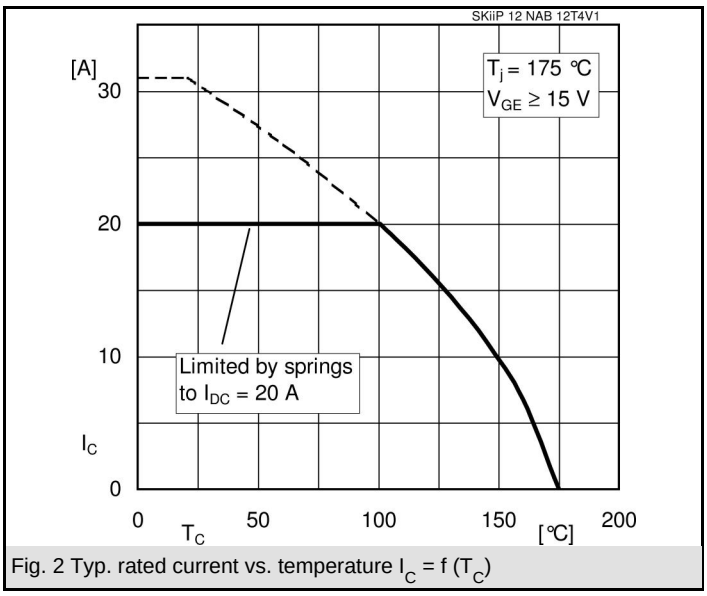


Fig. 2 Typ. rated current vs. temperature $I_C = f(T_C)$

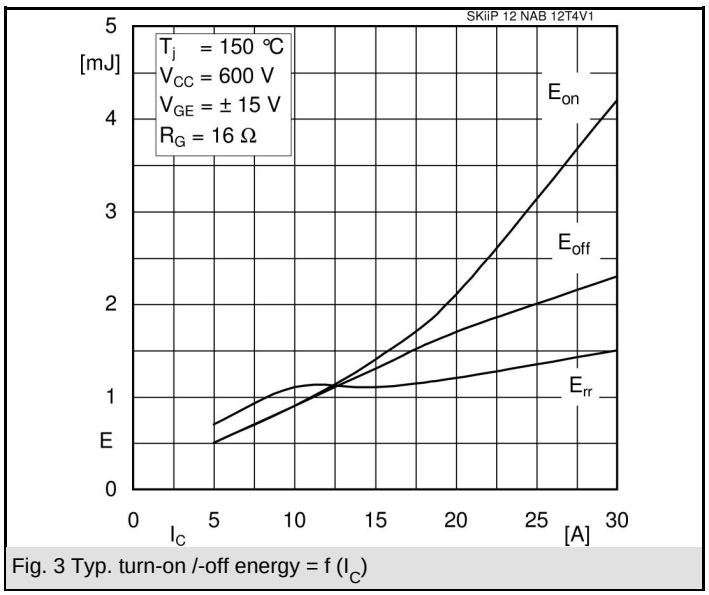


Fig. 3 Typ. turn-on /-off energy = f (I_C)

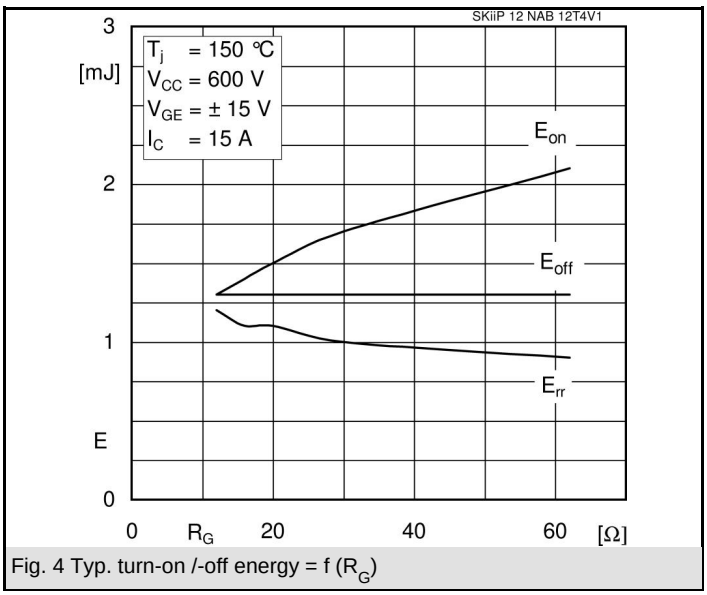


Fig. 4 Typ. turn-on /-off energy = f (R_G)

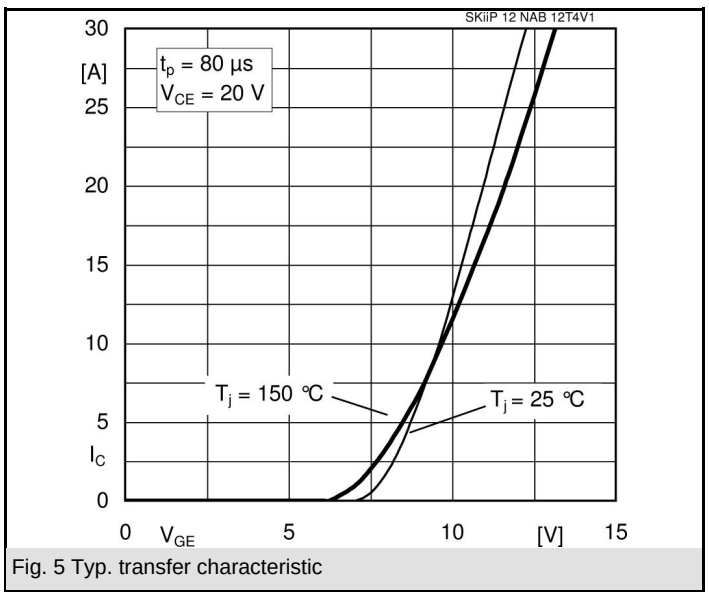


Fig. 5 Typ. transfer characteristic

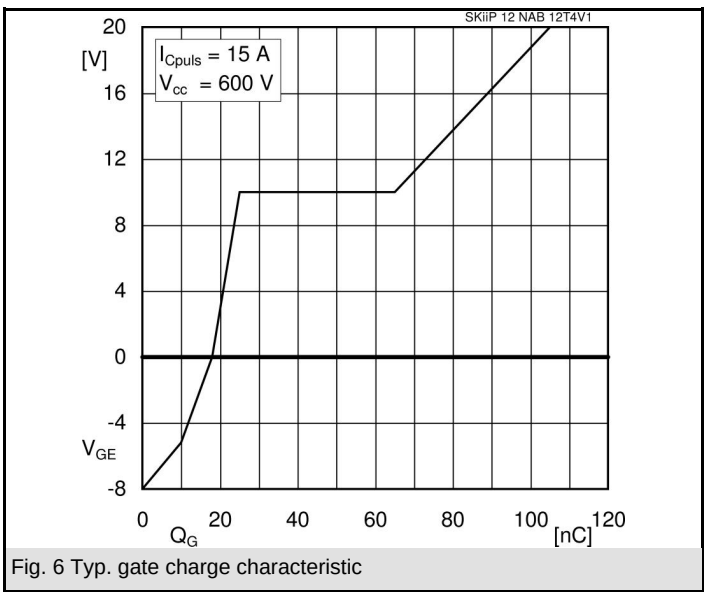


Fig. 6 Typ. gate charge characteristic

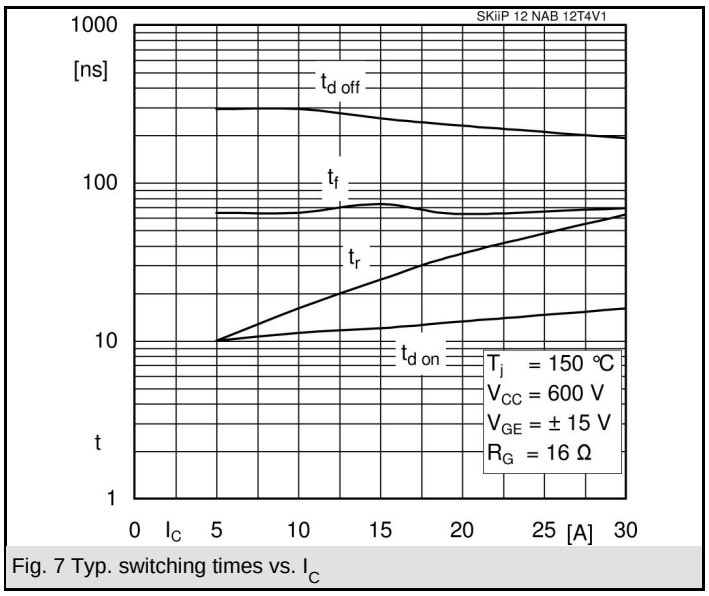


Fig. 7 Typ. switching times vs. I_C

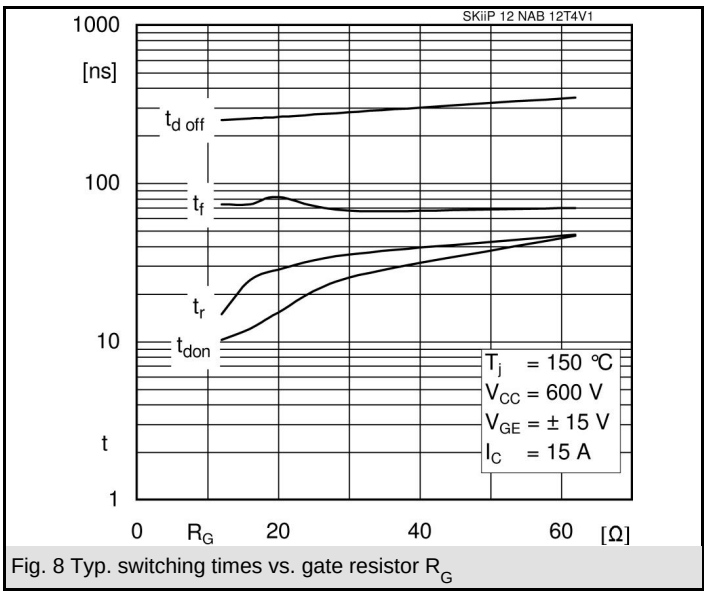


Fig. 8 Typ. switching times vs. gate resistor R_G

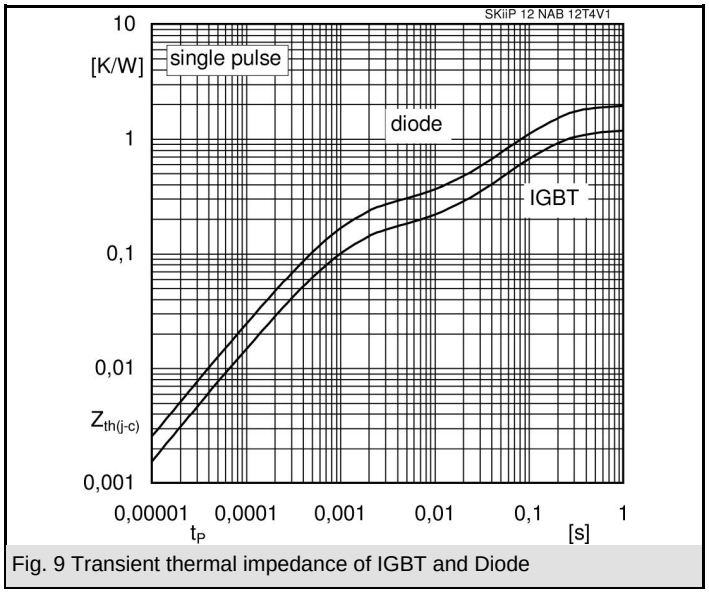


Fig. 9 Transient thermal impedance of IGBT and Diode

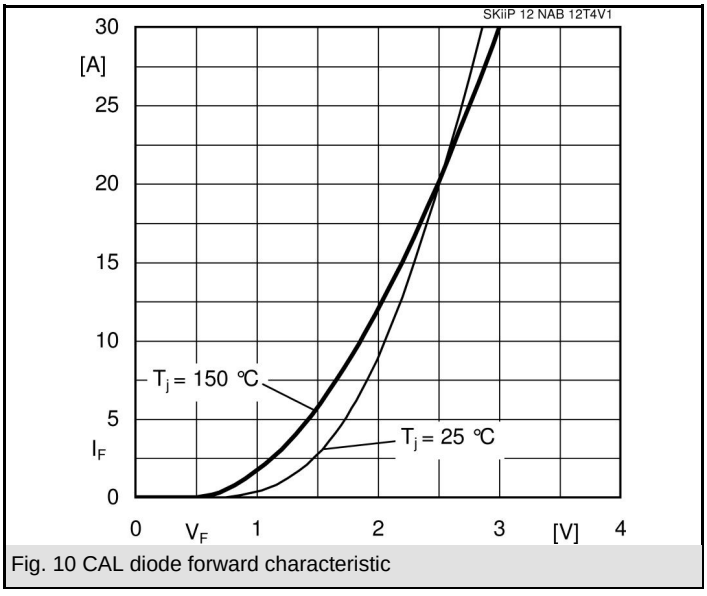


Fig. 10 CAL diode forward characteristic

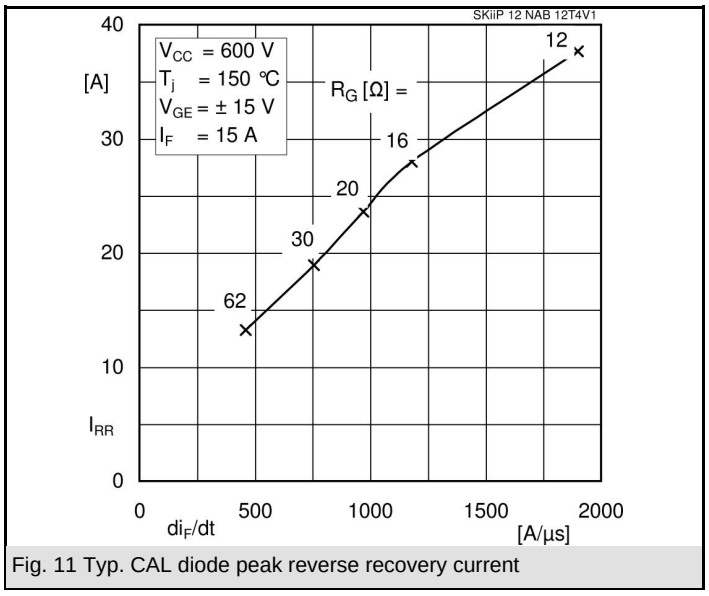


Fig. 11 Typ. CAL diode peak reverse recovery current

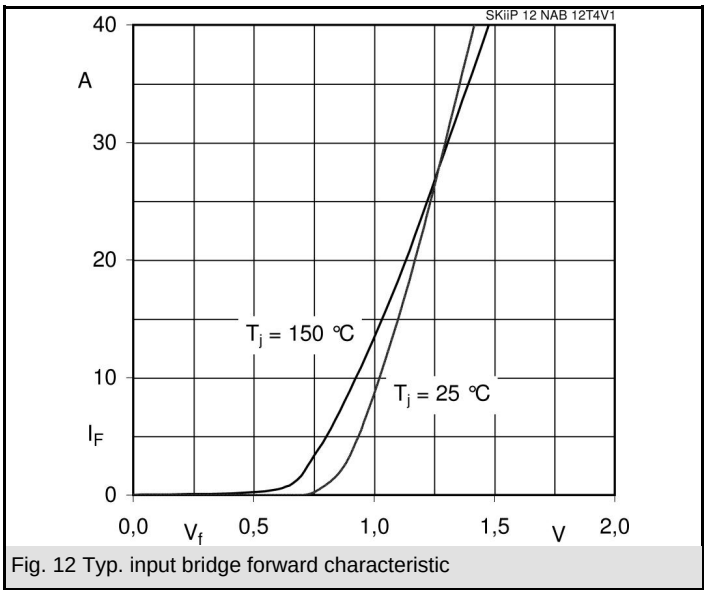
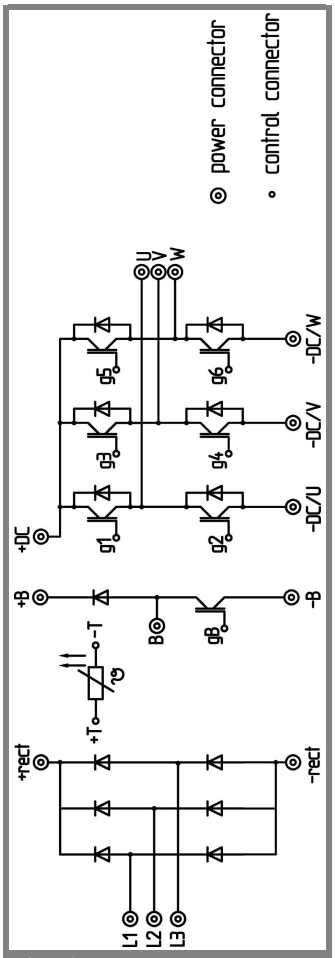
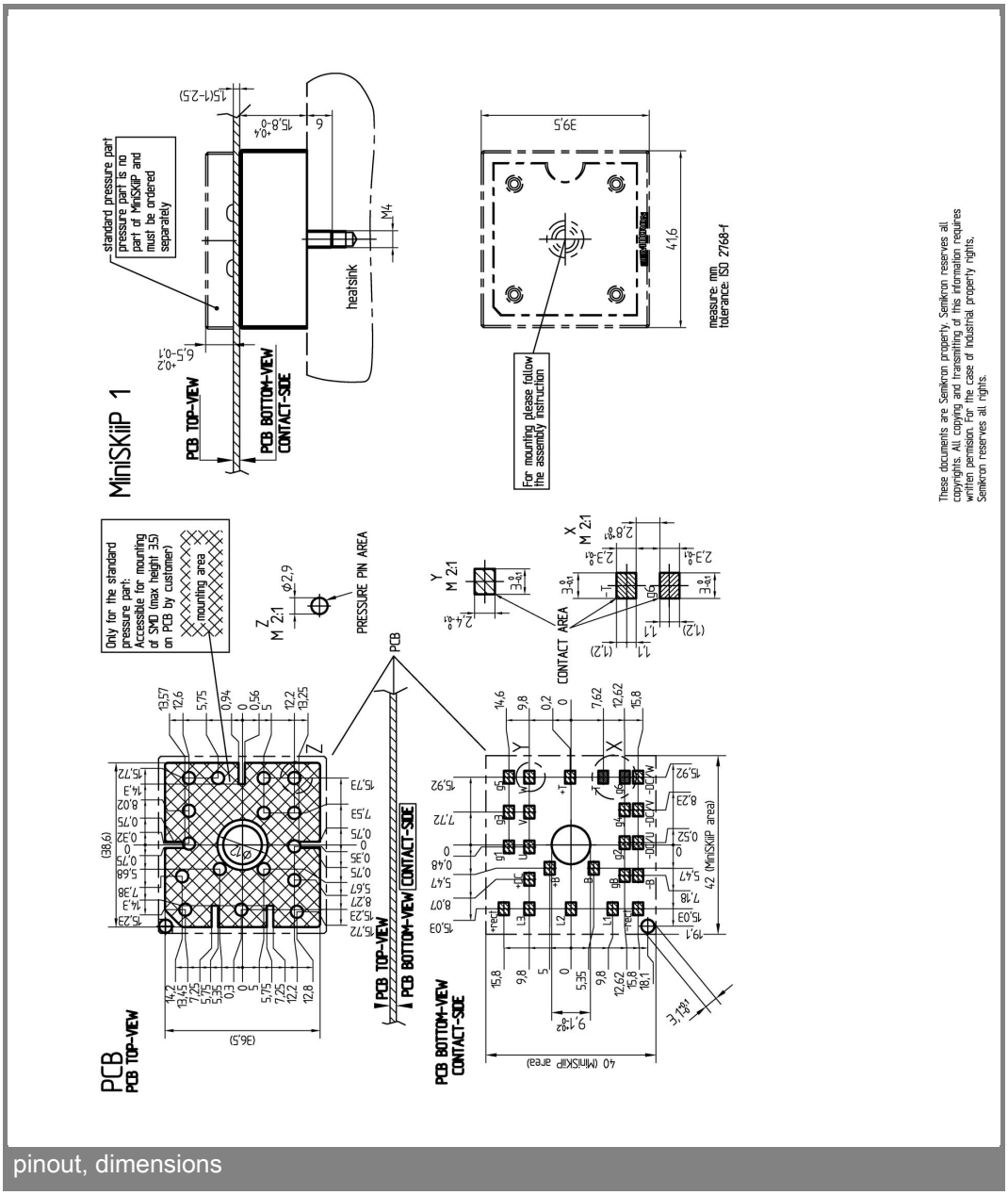


Fig. 12 Typ. input bridge forward characteristic



circuit



pinout, dimensions

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

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