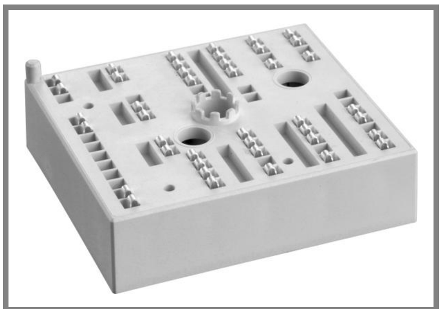
SKiiP 23NAB12T4V1 CONVERTER, INVERTER, BRAKE



MiniSKiiP® 2

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

SKiiP 23NAB12T4V1

Features

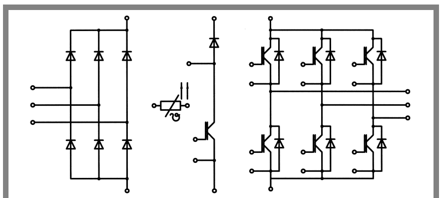
- Trench 4 IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Typical Applications*

- Inverter up to 14 kVA
- Typical motor power 7,5 kW

Remarks

- V_{CEsat} , V_F= chip level value
- Case temp. limited to T_C = 125°C max. (for baseplateless modules $T_C = T_S$)
- product rel. results valid for $T_j \leq 150$ (recomm. T_{op} = -40 ... +150°C)



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	37 (30)	A
I_{CRM}		75	A
V_{GES}		± 20	V
T_j		- 40 ... + 175	°C
Diode - Inverter, Chopper			
I_F	T_s = 25 (70) °C	30 (26)	A
I_{FRM}		75	A
T_j		- 40 ... + 175	°C
Diode - Rectifier			
V_{RRM}		1600	V
I_F	T_s = 70 °C	46	A
I_{FSM}	t_p = 10 ms, sin 180 °, T_j = 25 °C	370	A
i²t	t_p = 10 ms, sin 180 °, T_j = 25 °C	680	A²s
T_j		- 40 ... + 150	°C
Module			
I_{tRMS}	per power terminal (20 A / spring)	40	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} = 25 A, T_j = 25 (150) °C		1,85 (2,25)	2,05 (2,45)	V
$V_{GE(th)}$	$V_{GE} = V_{CE}$, I_C = 1 mA	5	5,8	6,5	V
$V_{CE(TO)}$	T_j = 25 (150) °C		0,8 (0,7)	0,9 (0,8)	V
r_T	T_j = 25 (150) °C		42 (62)	46 (66)	mΩ
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		1,4		nF
C_{oes}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		0,12		nF
C_{res}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		0,085		nF
$R_{th(j-s)}$	per IGBT		1,2		K/W
$t_{d(on)}$	under following conditions		28		ns
t_r	V_{CC} = 600 V, V_{GE} = ± 15 V		40		ns
$t_{d(off)}$	I_{Cnom} = 25 A, T_j = 150°C		295		ns
t_f	$R_{Gon} = R_{Goff}$ = 24 Ω		68		ns
E_{on}	inductive load		2,65		mJ
E_{off}			2,3		mJ
Diode - Inverter, Chopper					
$V_F = V_{EC}$	I_{Fnom} = 25 A, T_j = 25 (150) °C		2,4 (2,45)	2,75 (2,8)	V
$V_{(TO)}$	T_j = 25 (150) °C		1,3 (0,9)	1,5 (1,1)	V
r_T	T_j = 25 (150) °C		44 (62)	50 (68)	mΩ
$R_{th(j-s)}$	per diode		1,52		K/W
I_{RRM}	under following conditions		23,6		A
Q_{rr}	I_{Fnom} = 25 A, V_R = 600 V		3,7		µC
E_{rr}	V_{GE} = 0 V, T_j = 150 °C		1,6		mJ
	di_F/dt = 850 A/µs				
Diode - Rectifier					
V_F	I_{Fnom} = 25 A, T_j = 25 °C		1,1		V
$V_{(TO)}$	T_j = 150 °C		0,8		V
r_T	T_j = 150 °C		13		mΩ
$R_{th(j-s)}$	per diode		1,25		K/W
Temperature Sensor					
R_{ts}	3 %, T_r = 25 (100) °C		1000(1670)		Ω
Mechanical Data					
w			65		g
M_s	Mounting torque	2		2,5	Nm

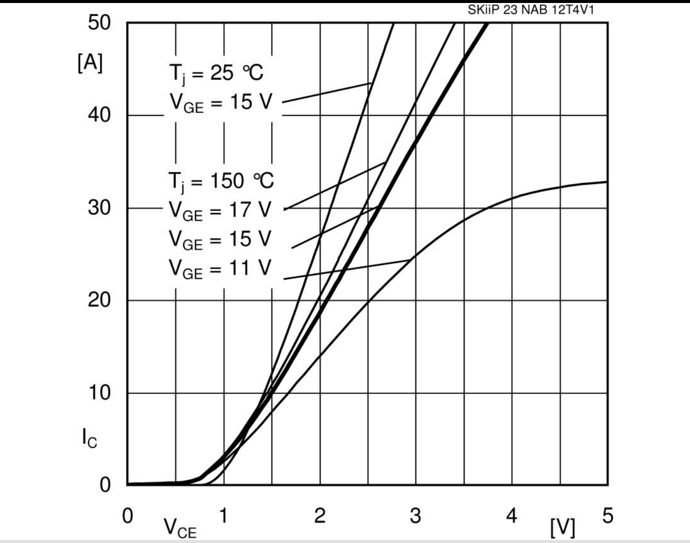


Fig. 1 Typ. output characteristic

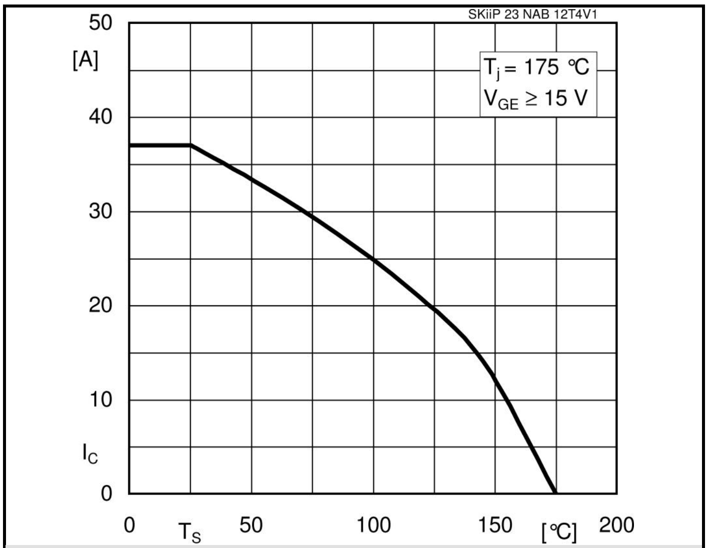


Fig. 2 Typ. rated current vs. temperature $I_C = f(T_S)$

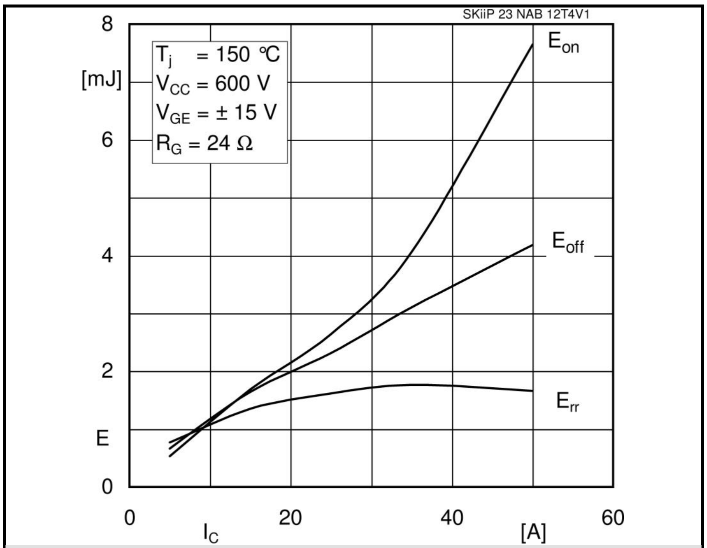


Fig. 3 Typ. turn-on /-off energy = f (I_C)

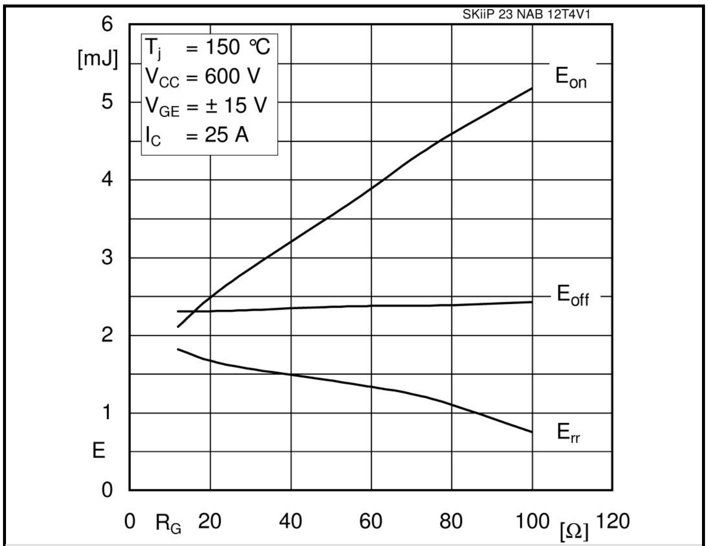


Fig. 4 Typ. turn-on /-off energy = f (R_G)

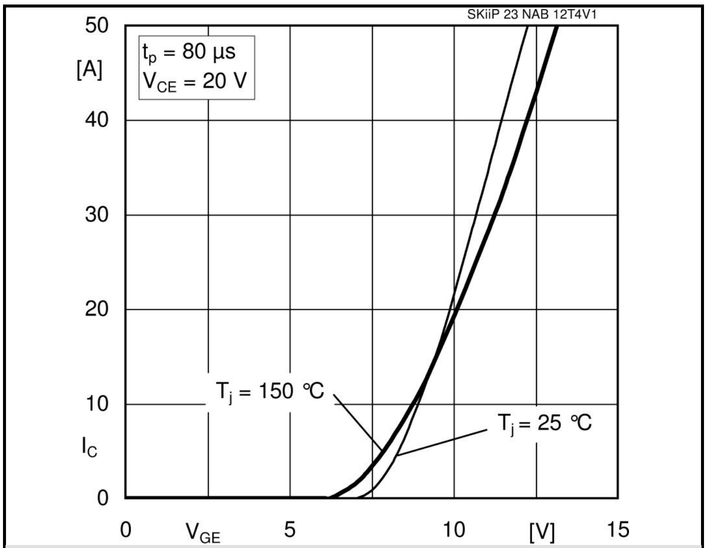


Fig. 5 Typ. transfer characteristic

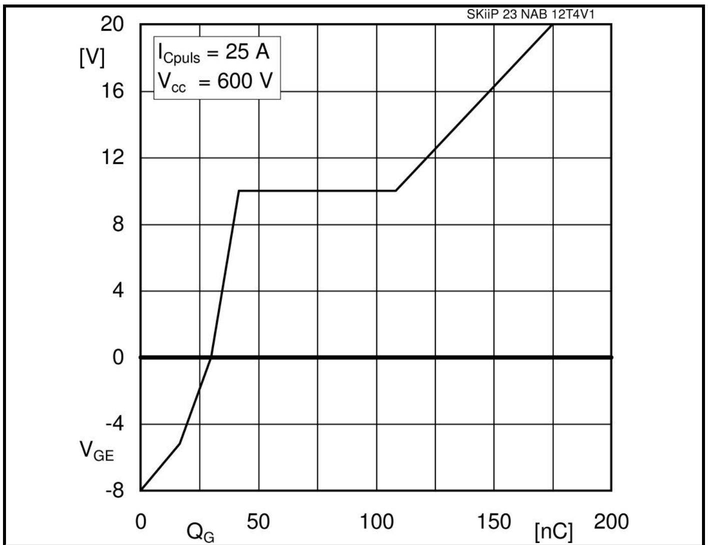


Fig. 6 Typ. gate charge characteristic

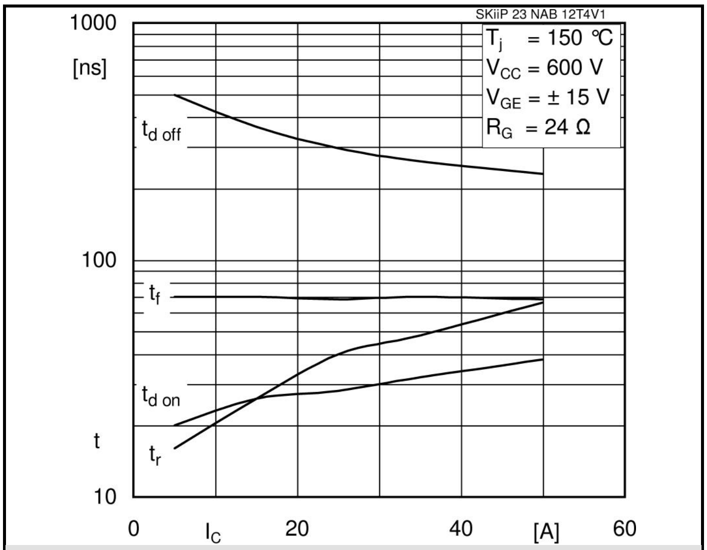


Fig. 7 Typ. switching times vs. I_C

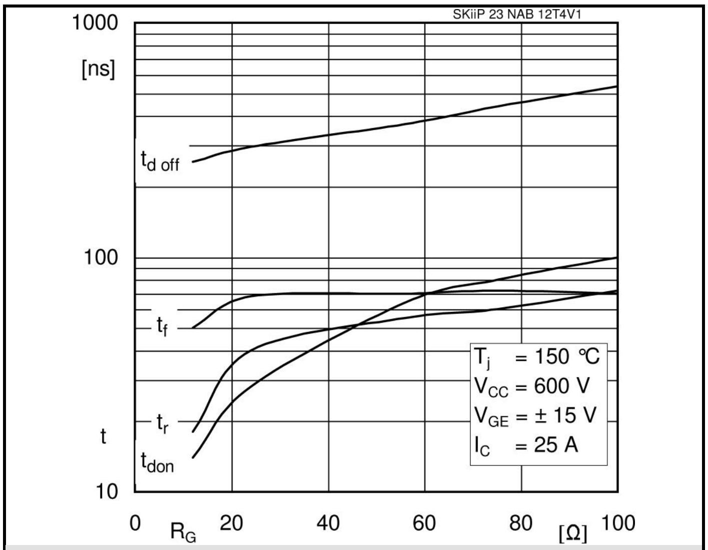


Fig. 8 Typ. switching times vs. gate resistor R_G

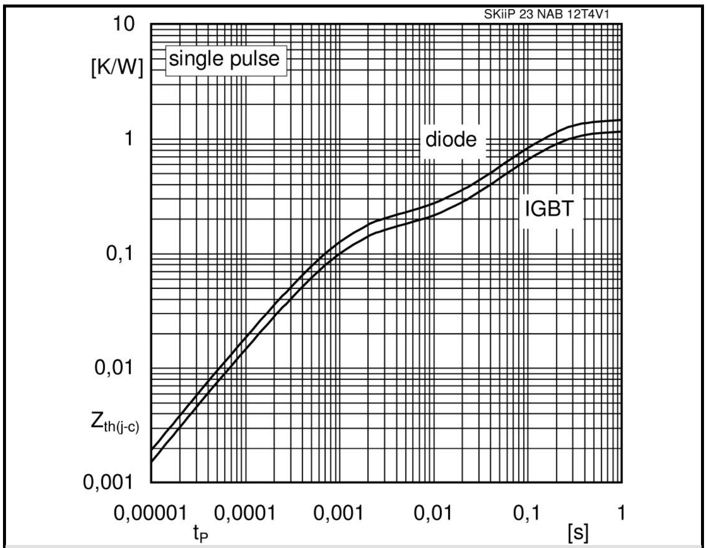


Fig. 9 Transient thermal impedance of IGBT and Diode

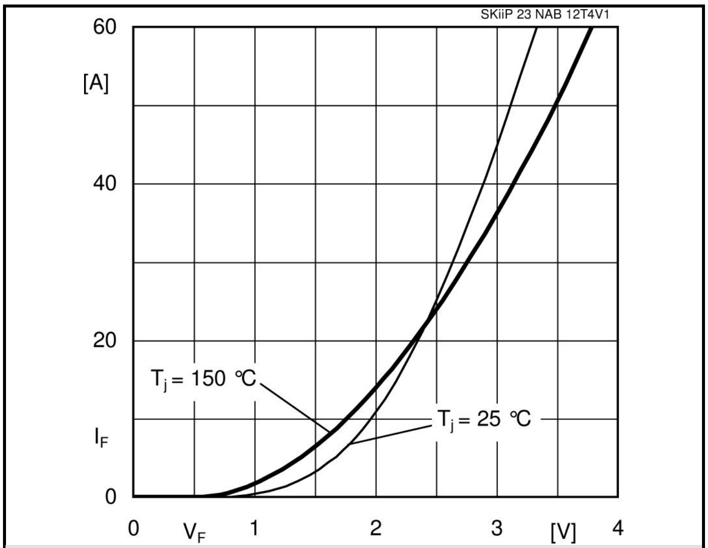


Fig. 10 CAL diode forward characteristic

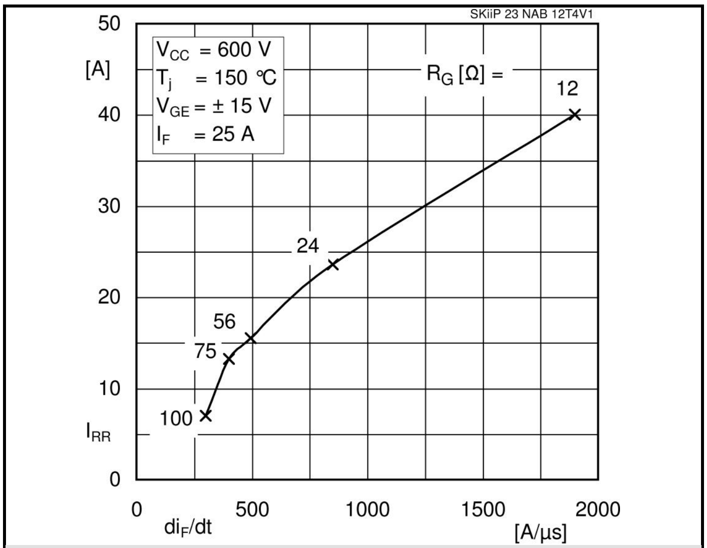


Fig. 11 Typ. CAL diode peak reverse recovery current

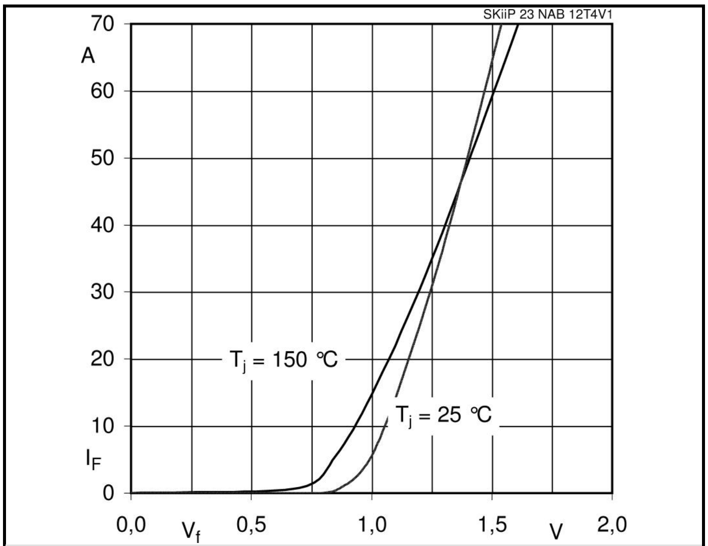
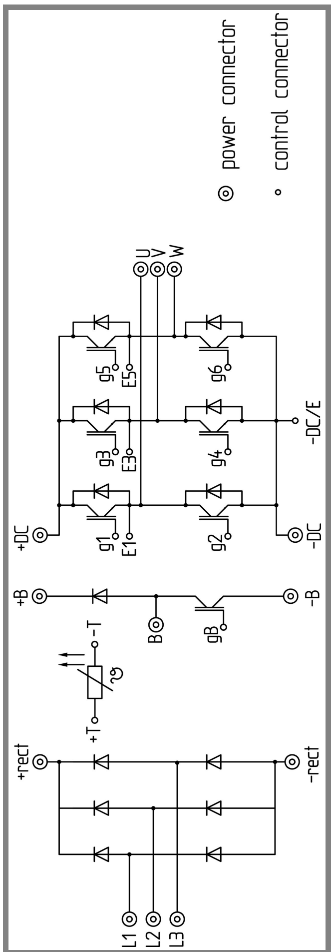
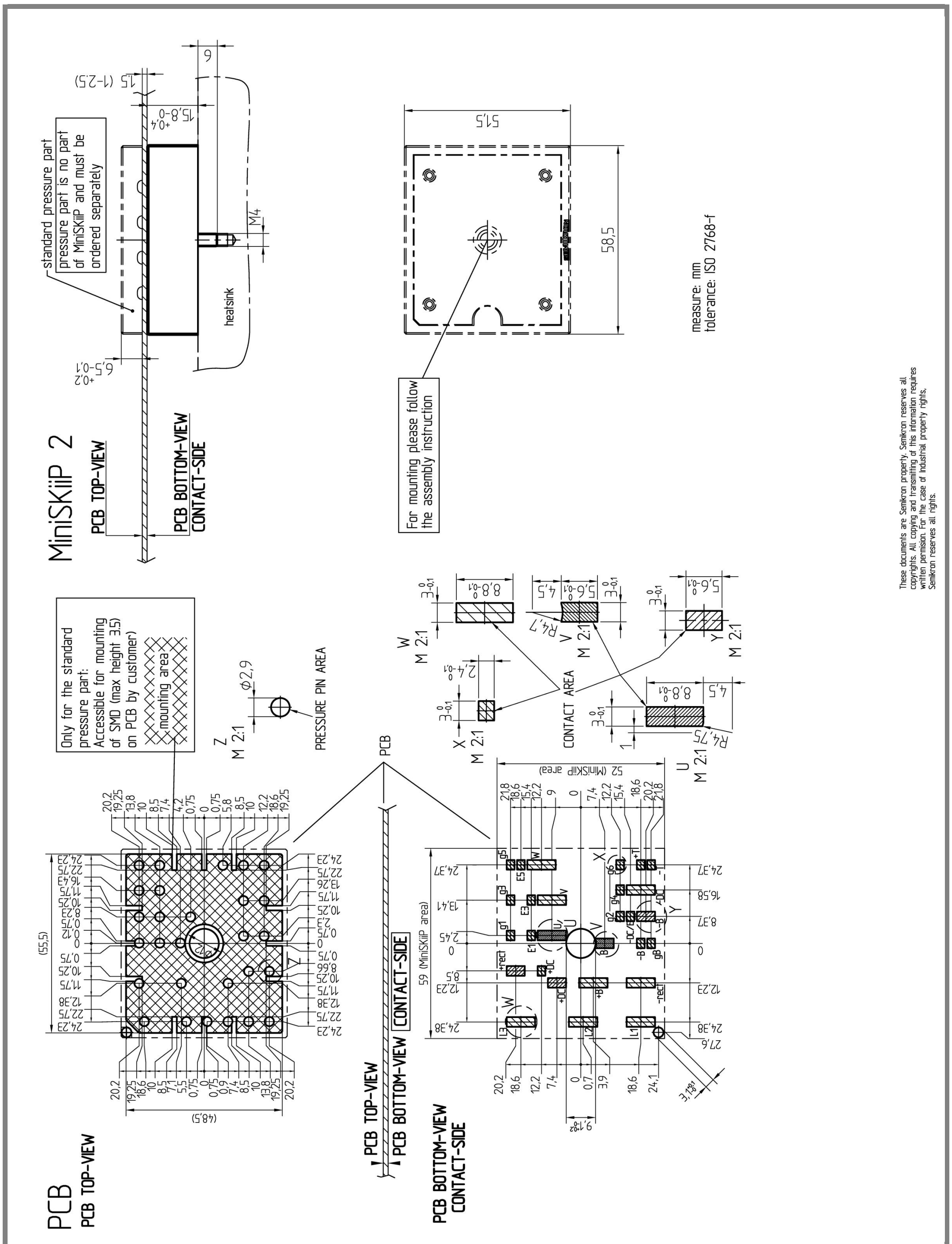


Fig. 12 Typ. input bridge forward characteristic



circuit



pinout, dimensions

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

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.