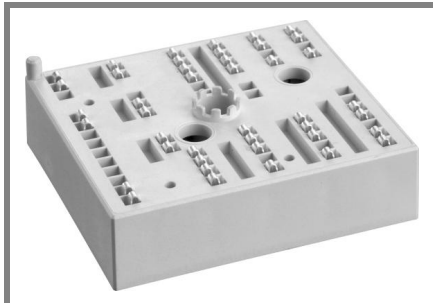


SKiiP 23NAB12T4V1



MiniSKiiP[®] 2

3-phase bridge rectifier +
brake chopper + 3-phase
bridge inverter
SKiiP 23NAB12T4V1

Features

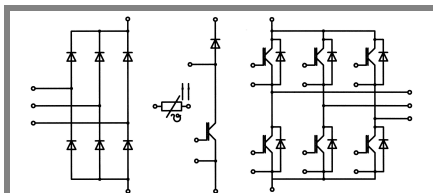
- Trench 4 IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Typical Applications*

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

Remarks

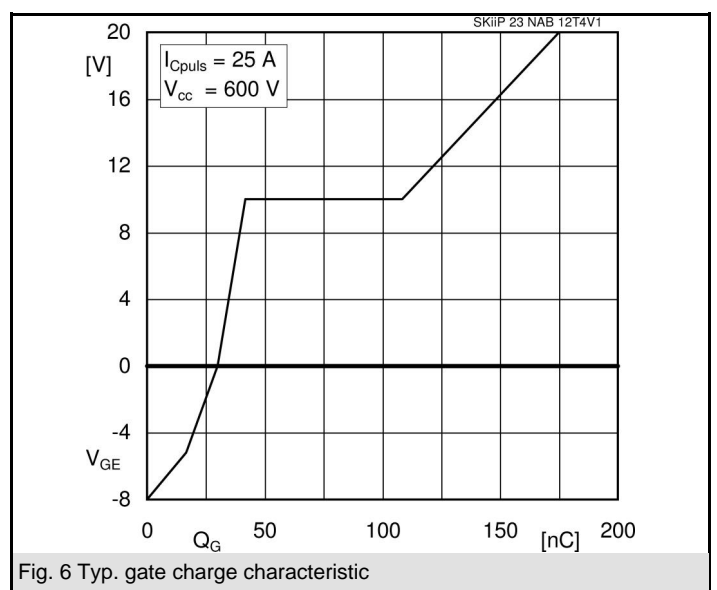
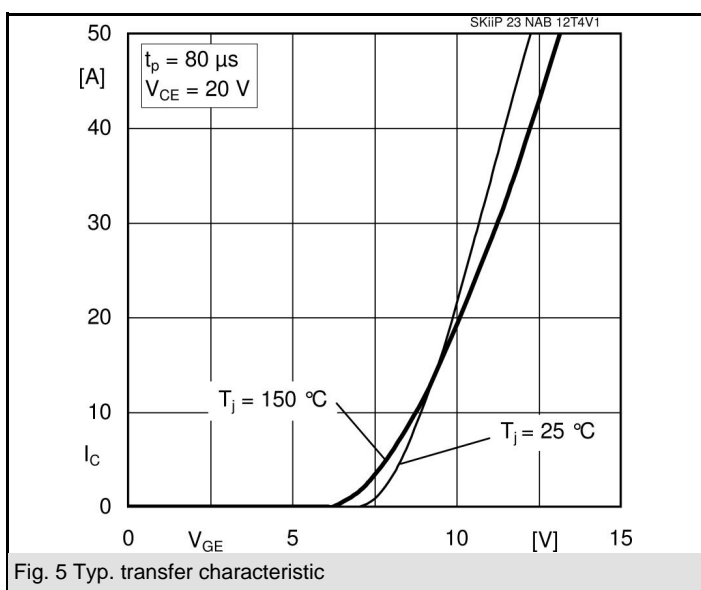
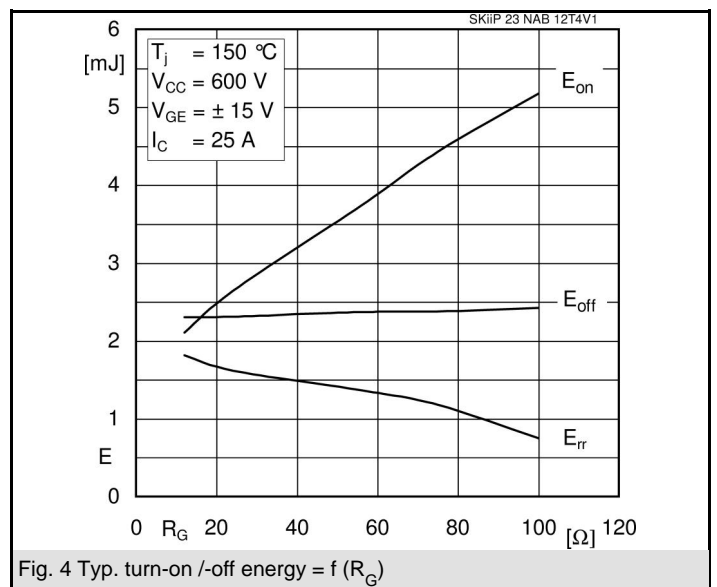
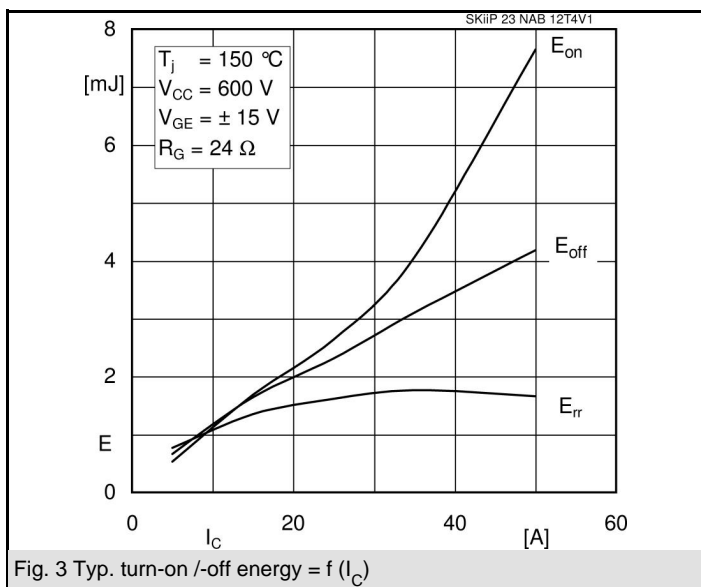
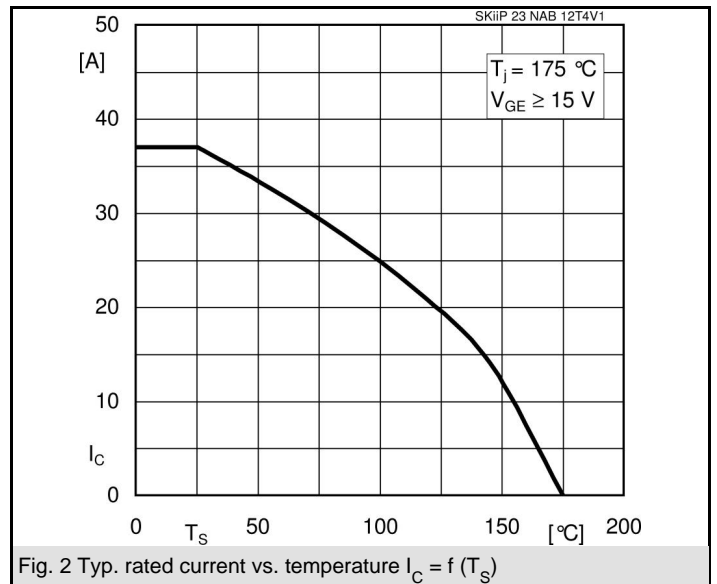
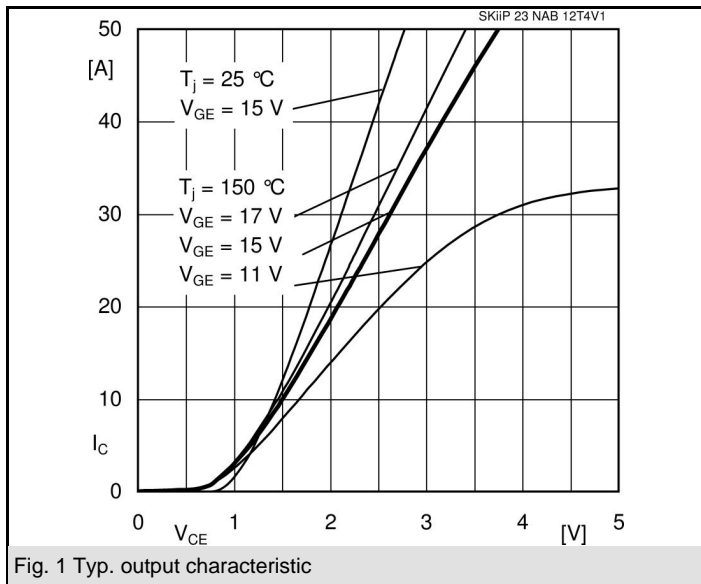
- V_{CEsat} , $V_F =$ chip level value
- Case temp. limited to $T_C = 125^\circ\text{C}$ max. (for baseplateless modules $T_C = T_S$)
- product rel. results valid for $T_{j \leq 150}$ (recomm. $T_{op} = -40 \dots +150^\circ\text{C}$)



NAB

Absolute Maximum Ratings		$T_S = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT - Inverter, Chopper				
V_{CES}	$T_S = 25 (70)^\circ\text{C}$	1200	V	
I_C		37 (30)	A	
I_{CRM}		75	A	
V_{GES}		± 20	V	
T_j		- 40 ... + 175	$^\circ\text{C}$	
Diode - Inverter, Chopper				
I_F	$T_S = 25 (70)^\circ\text{C}$	30 (26)	A	
I_{FRM}		75	A	
T_j		- 40 ... + 175	$^\circ\text{C}$	
Diode - Rectifier				
V_{RRM}	$T_S = 70^\circ\text{C}$	1600	V	
I_F		46	A	
I_{FSM}		$t_p = 10 \text{ ms, sin } 180^\circ, T_j = 25^\circ\text{C}$	370	A
i^2t		$t_p = 10 \text{ ms, sin } 180^\circ, T_j = 25^\circ\text{C}$	680	A^2s
T_j		- 40 ... + 150	$^\circ\text{C}$	
Module				
I_{RMS}	per power terminal (20 A / spring)	40	A	
T_{stg}		- 40 ... + 125	$^\circ\text{C}$	
V_{isol}	AC, 1 min.	2500	V	

Characteristics		$T_S = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT - Inverter, Chopper					
V_{CEsat}	$I_{Cnom} = 25 \text{ A}, T_j = 25 (150)^\circ\text{C}$		1,85 (2,25)	2,05 (2,45)	V
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 1 \text{ mA}$	5	5,8	6,5	V
$V_{CE(TO)}$	$T_j = 25 (150)^\circ\text{C}$		0,8 (0,7)	0,9 (0,8)	V
r_T	$T_j = 25 (150)^\circ\text{C}$		42 (62)	46 (66)	m Ω
C_{ies}	$V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 1 \text{ MHz}$		1,4		nF
C_{oes}	$V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 1 \text{ MHz}$		0,12		nF
C_{res}	$V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 1 \text{ MHz}$		0,085		nF
$R_{th(j-s)}$	per IGBT		1,2		K/W
$t_{d(on)}$	under following conditions		28		ns
t_r	$V_{CC} = 600 \text{ V}, V_{GE} = \pm 15 \text{ V}$		40		ns
$t_{d(off)}$	$I_{Cnom} = 25 \text{ A}, T_j = 150^\circ\text{C}$		295		ns
t_f	$R_{Gon} = R_{Goff} = 24 \Omega$		68		ns
E_{on}	inductive load		2,65		mJ
E_{off}			2,3		mJ
Diode - Inverter, Chopper					
$V_F = V_{EC}$	$I_{Fnom} = 25 \text{ A}, T_j = 25 (150)^\circ\text{C}$		2,4 (2,45)	2,75 (2,8)	V
$V_{(TO)}$	$T_j = 25 (150)^\circ\text{C}$		1,3 (0,9)	1,5 (1,1)	V
r_T	$T_j = 25 (150)^\circ\text{C}$		44 (62)	50 (68)	m Ω
$R_{th(j-s)}$	per diode		1,52		K/W
I_{RRM}	under following conditions		23,6		A
Q_{rr}	$I_{Fnom} = 25 \text{ A}, V_R = 600 \text{ V}$		3,7		μC
E_{rr}	$V_{GE} = 0 \text{ V}, T_j = 150^\circ\text{C}$		1,6		mJ
	$di_F/dt = 850 \text{ A}/\mu\text{s}$				
Diode - Rectifier					
V_F	$I_{Fnom} = 25 \text{ A}, T_j = 25^\circ\text{C}$		1,1		V
$V_{(TO)}$	$T_j = 150^\circ\text{C}$		0,8		V
r_T	$T_j = 150^\circ\text{C}$		13		m Ω
$R_{th(j-s)}$	per diode		1,25		K/W
Temperature Sensor					
R_{ts}	3 %, $T_r = 25 (100)^\circ\text{C}$		1000(1670)		Ω
Mechanical Data					
w			65		g
M_s	Mounting torque	2		2,5	Nm



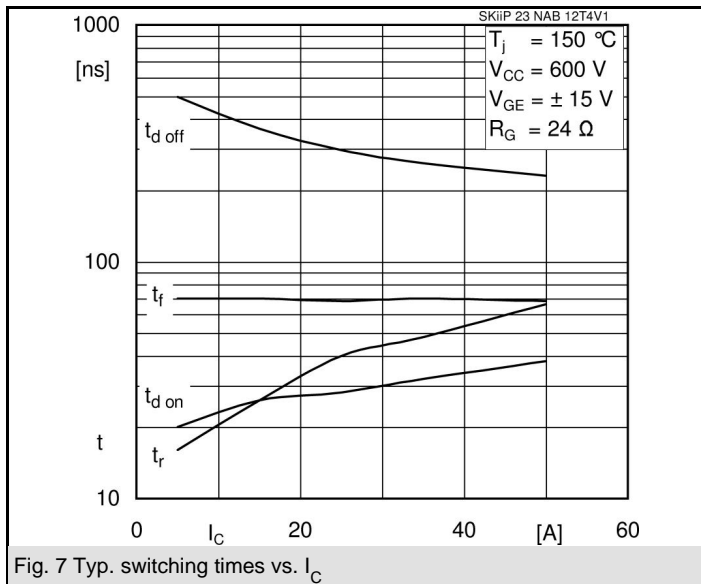


Fig. 7 Typ. switching times vs. I_C

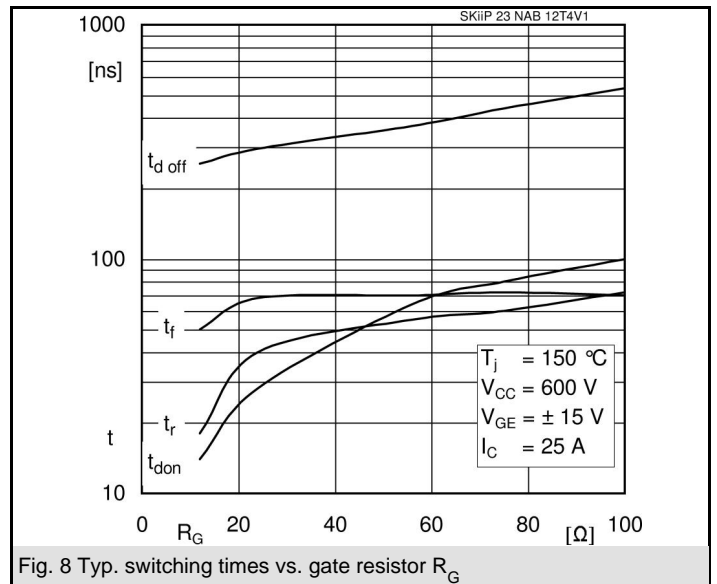


Fig. 8 Typ. switching times vs. gate resistor R_G

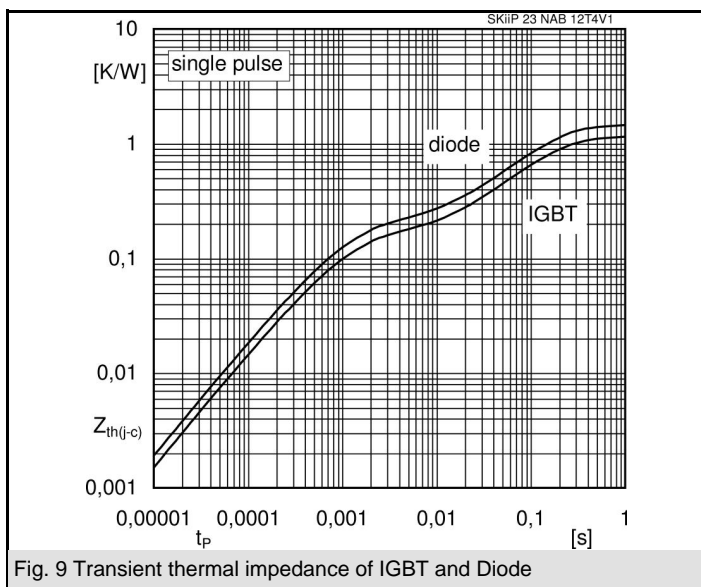


Fig. 9 Transient thermal impedance of IGBT and Diode

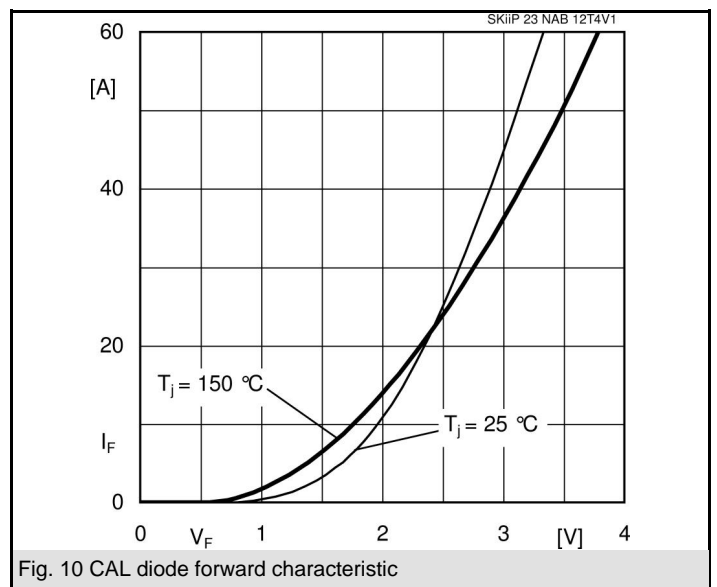


Fig. 10 CAL diode forward characteristic

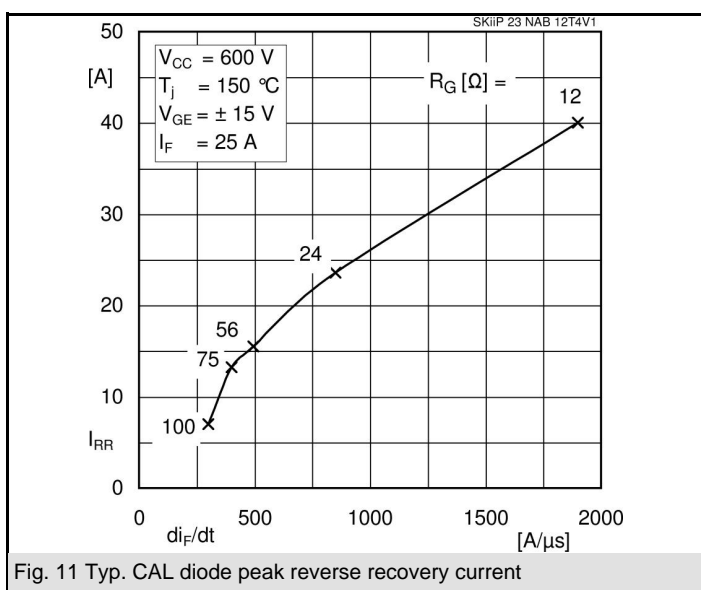


Fig. 11 Typ. CAL diode peak reverse recovery current

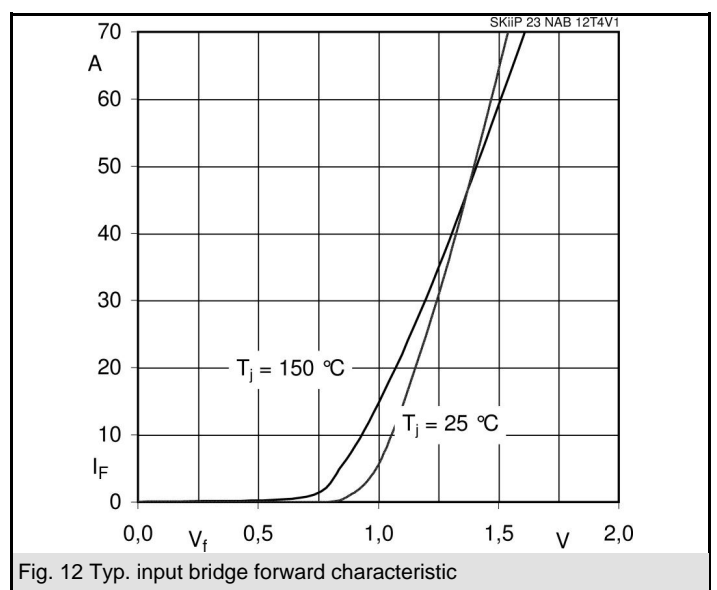
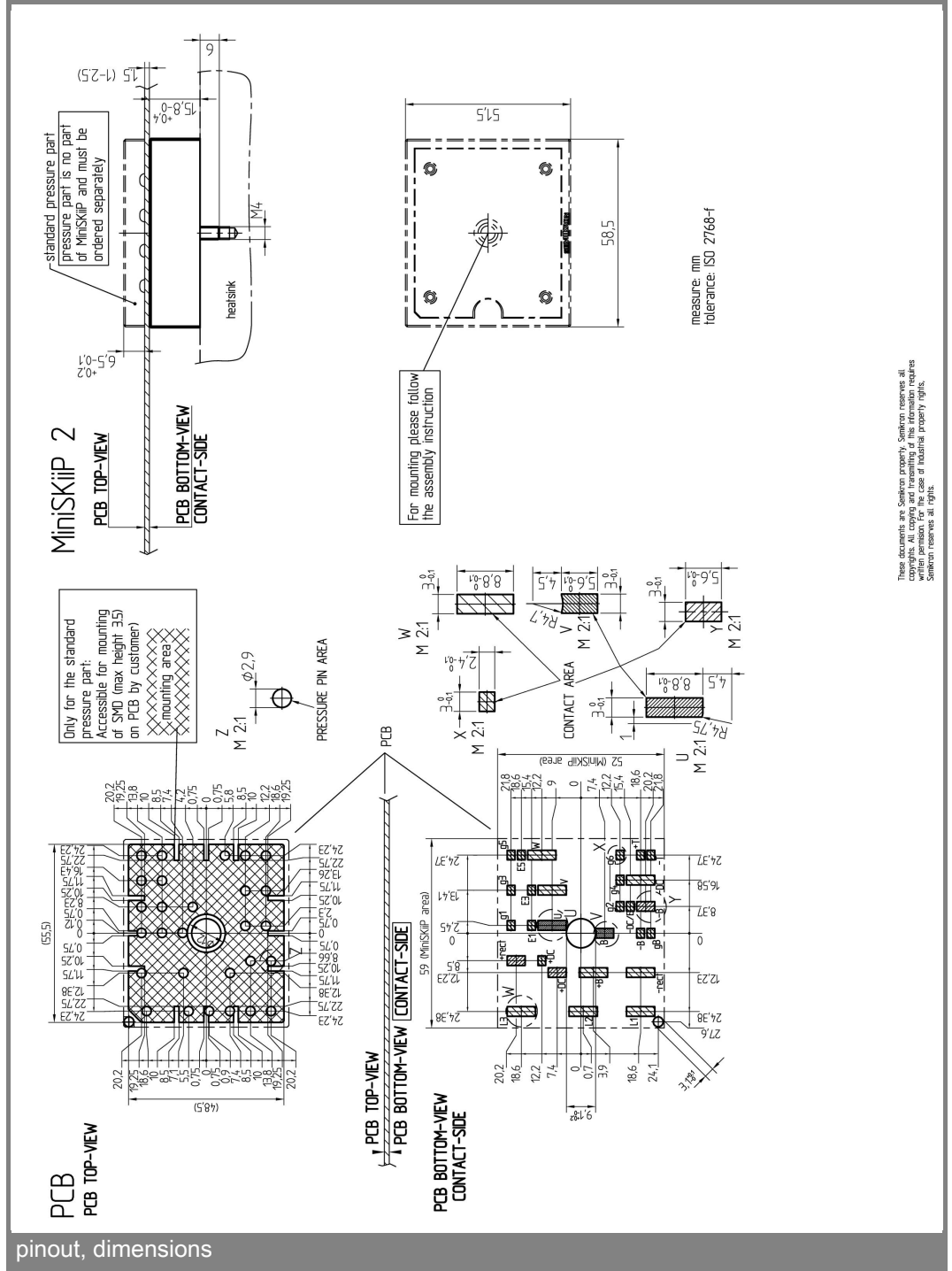
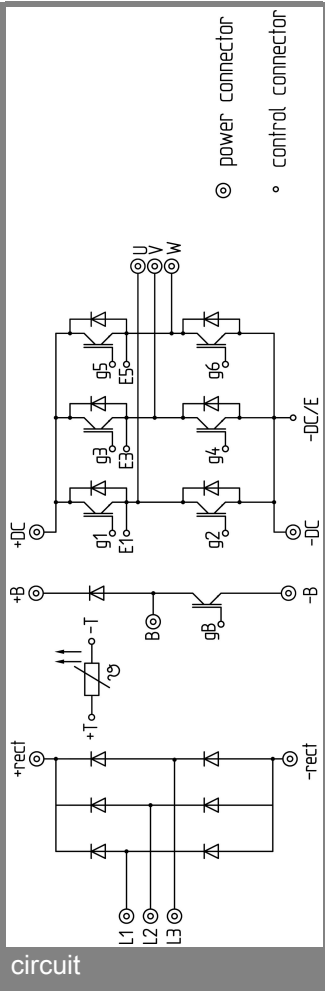


Fig. 12 Typ. input bridge forward characteristic



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

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