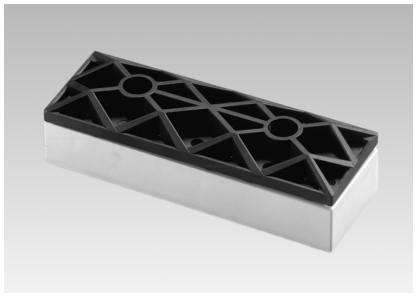
SKiiP 82 AHB 15

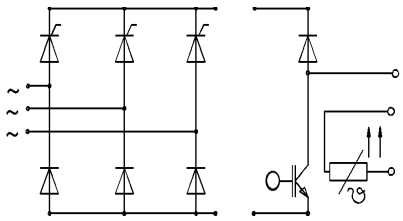
Absolute Maximum Ratings			
Symbol	**Conditions** [1]	**Values**	**Units**
Bridge Rectifier			
V_{RRM}		1500	V
I_D	$T_{heatsink}$ = 80 °C	75	A
I_{FSM}/I_{TSM}	t_p = 10 ms; sin. 180 °C, T_j = 25 °C	1000	A
I^2t	t_p = 10 ms; sin. 180 °C, T_j = 25 °C	5000	A^2s
IGBT Chopper			
V_{CES}		1200	V
V_{GES}		± 20	V
I_C	$T_{heatsink}$ = 25 / 80 °C	65 / 45	A
I_{CM}	t_p < 1 ms; $T_{heatsink}$ = 25 / 80 °C	130 / 90	A
Freewheeling Diode [2]			
V_{RRM}		1200	V
I_F	$T_{heatsink}$ = 25 / 80 °C	38 / 26	A
I_{FM}	t_p < 1 ms; $T_{heatsink}$ = 25 / 80 °C	76 / 52	A
T_j	Diode & IGBT	– 40 ... + 150	°C
T_j	Thyristor	– 40 ... + 125	°C
T_{stg}		– 40 ... + 125	°C
V_{isol}	AC, 1 min.	2500	V

Characteristics					
Symbol	**Conditions** [1]	**min.**	**typ.**	**max.**	**Units**
Diode - Rectifier					
V_F	I_F = 75 A T_j = 125 °C	–	1,15	–	V
V_{TO}	T_j = 125 °C	–	0,8	–	V
r_T	T_j = 125 °C	–	4,5	–	mΩ
R_{thjh}	per diode	–	–	1,0	K/W
Thyristor - Rectifier					
V_T	I_F = 120 A T_j = 25 °C	–	–	1,8	V
V_T (TO)	T_j = 125 °C	–	–	1,1	V
r_T	T_j = 125 °C	–	–	5	mΩ
R_{thjh}	per thyristor	–	–	0,9	K/W
I_{GD}	T_j = 125 °C	5	–	–	mA
V_{GT}	T_j = 25 °C	–	–	3	V
I_{GT}	T_j = 25 °C	–	–	150	mA
I_H	T_j = 25 °C	–	250	–	mA
I_L	T_j = 25 °C	–	600	–	mA
dv/dt_{CR}	T_j = 125 °C	500	–	–	V/µs
di/dt_{CR}	T_j = 125 °C	–	–	125	A/µs
IGBT - Chopper					
V_{CEsat}	I_C = 50 A T_j = 25 (125) °C	–	2,5(3,1)	3,0(3,7)	V
$t_{d(on)}$	V_{CC} = 600 V; V_{GE} = ± 15 V	–	44	100	ns
t_r	I_C = 50 A; T_j = 125 °C	–	56	100	ns
$t_{d(off)}$	R_{gon} = R_{goff} = 22 Ω	–	380	500	ns
t_f	inductive load	–	70	100	ns
$E_{on} + E_{off}$		–	13	–	mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V, 1 MHz	–	3,3	–	nF
R_{thjh}	per IGBT	–	–	0,5	K/W

MiniSKiiP 8
SEMIKRON integrated intelligent Power
SKiiP 82 AHB 15
half controlled 3-phase bridge rectifier + IGBT braking chopper

Case M8a





UL recognized file no. E63532

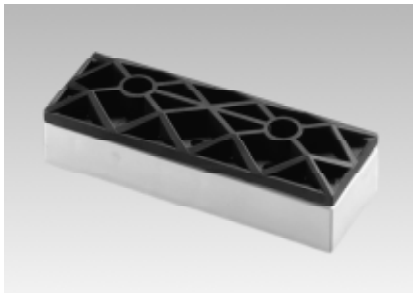
- specification of temperature sensor see part A
- common characteristics see page B 16 – 4

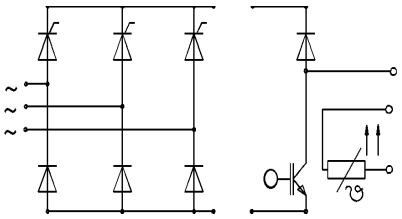
Options
- also available with uncontrolled rectifier (called 82 ANB 15)
- also available with powerful chopper, for characteristics please refer to SKiiP 82 AC 12
- also available with full controlled rectifier (called 82 ATB 15)

[1] $T_{heatsink}$ = 25 °C, unless otherwise specified
[2] CAL = Controlled Axial Lifetime Technology (soft and fast recovery)

MiniSKiiP 8
SEMIKRON integrated intelligent Power
SKiiP 82 AHB 15
half controlled
3-phase bridge rectifier +
IGBT braking chopper

Case M8a





SKiiP 82 AHB 15

Characteristics					
Symbol	**Conditions** [1]	**min.**	**typ.**	**max.**	**Units**
Diode [2] - Freewheeling					
$V_F = V_{EC}$	I_F = 25 A T_j = 25 (125) °C	–	2,0(1,8)	2,5(2,3)	V
V_{TO}	T_j = 125 °C	–	1,0	1,2	V
r_T	T_j = 125 °C	–	32	44	mΩ
I_{RRM}	I_F = 25 A; V_R = – 600 V	–	25	–	A
Q_{rr}	di_F/dt = – 500 A/µs	–	4,5	–	µC
E_{off}	V_{GE} = 0 V, T_j = 125 °C	–	1,0	–	mJ
R_{thjh}	per diode	–	–	1,2	K/W
Temperature Sensor					
R_{TS}	T = 25 / 100 °C		1000 / 1670		Ω
Mechanical Data					
M_1	case to heatsink, SI Units	2,5	–	3,5	Nm
Case	mechanical outline see pages B 16 –13 and B 16 – 14		M8a		

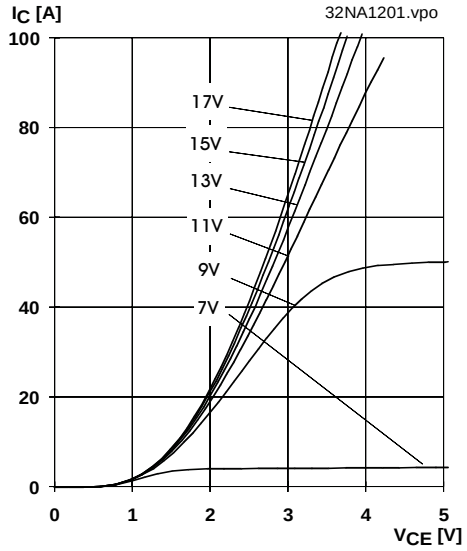


Fig. 1 Typ. output characteristic, t_p = 80 µs; 25 °C

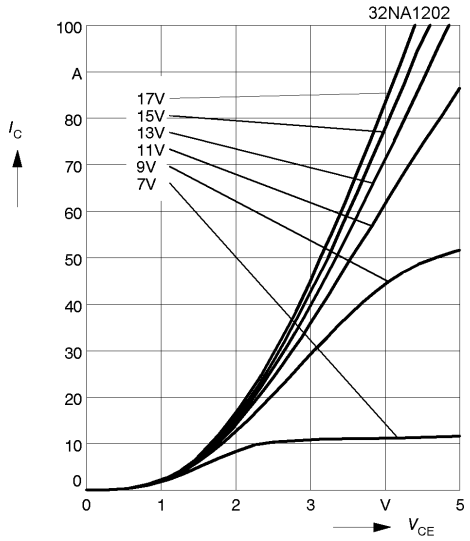
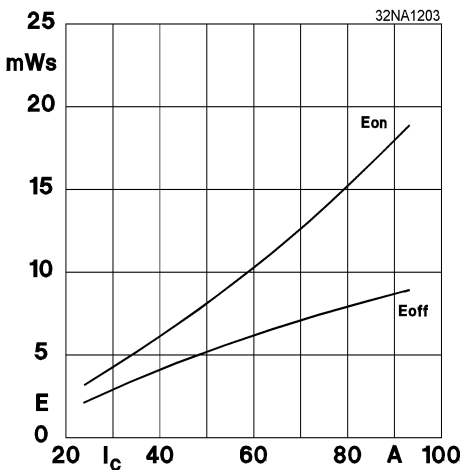
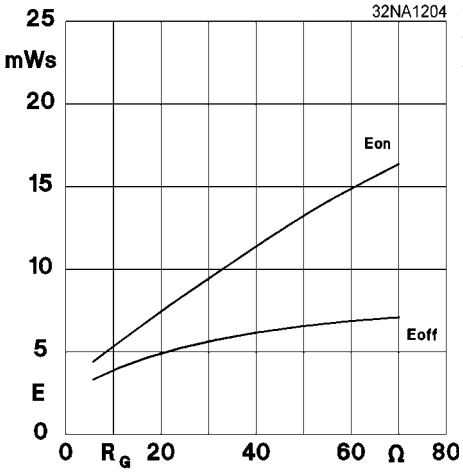


Fig. 2 Typ. output characteristic, t_p = 80 µs; 125 °C



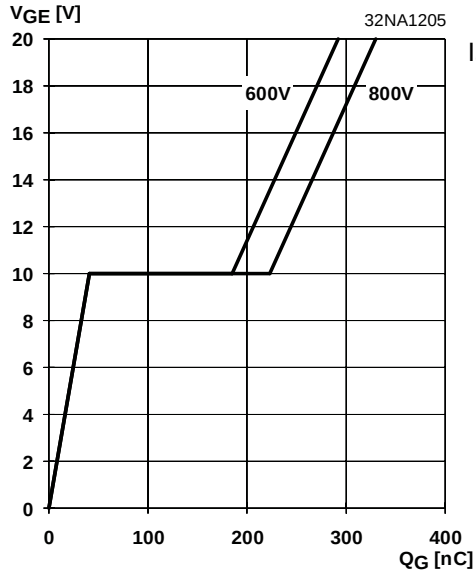
T_j = 125 °C
V_{CE} = 600 V
V_{GE} = ± 15 V
R_G = 22 Ω

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



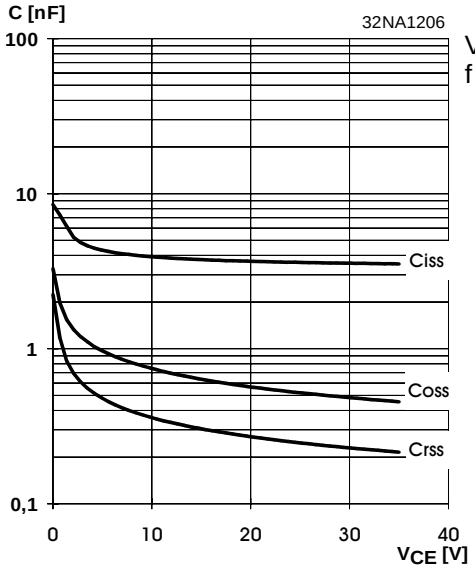
T_j = 125 °C
V_{CE} = 600 V
V_{GE} = ± 15 V
I_C = 50 A

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



I_{Cpuls} = 50 A

Fig. 5 Typ. gate charge characteristic



V_{GE} = 0 V
f = 1 MHz

Fig. 6 Typ. capacitances vs. V_{CE}

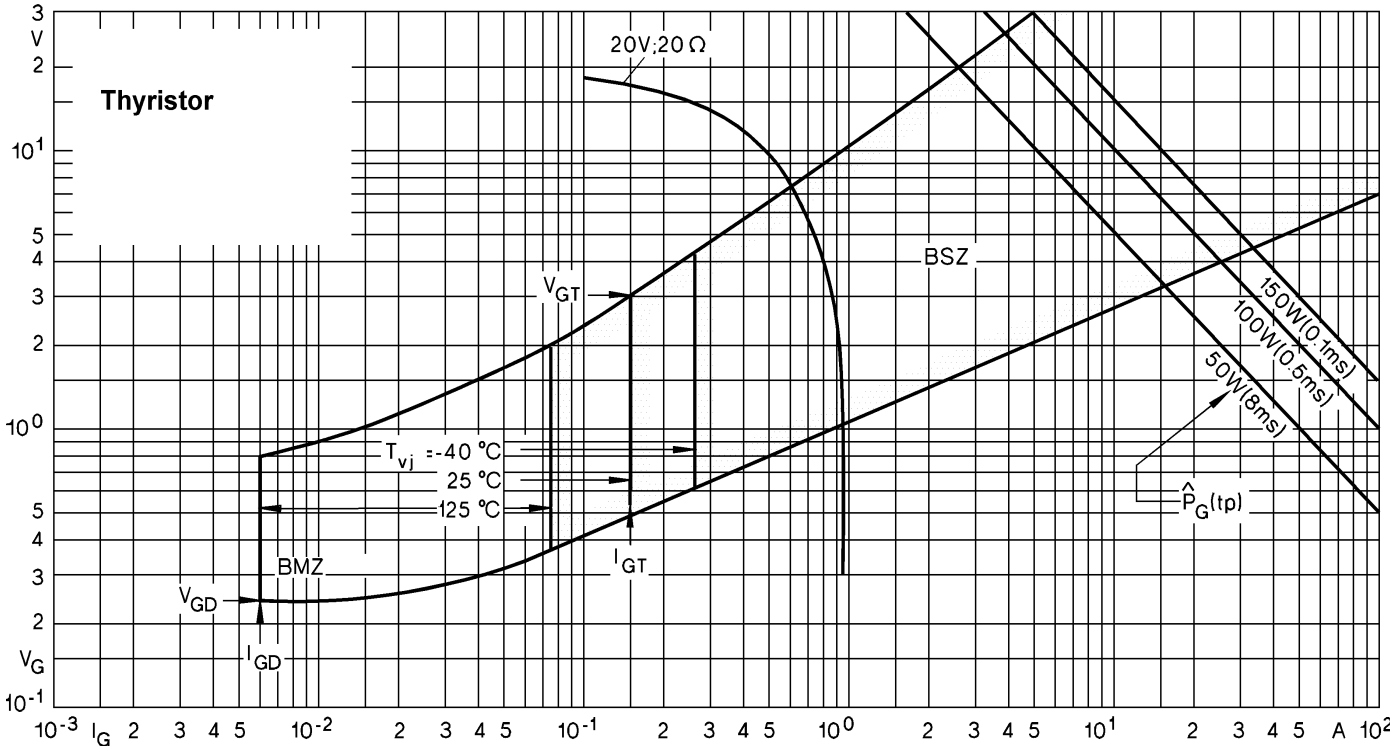
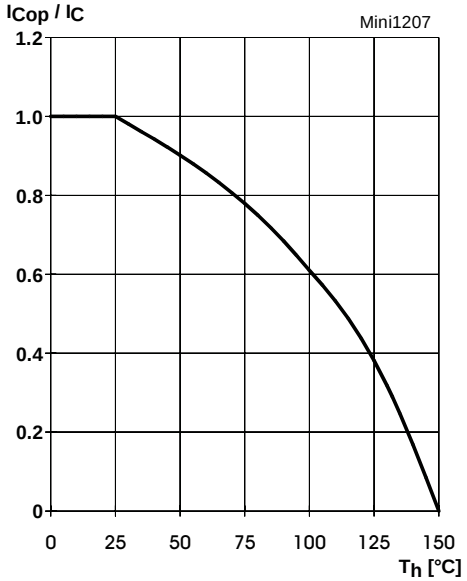
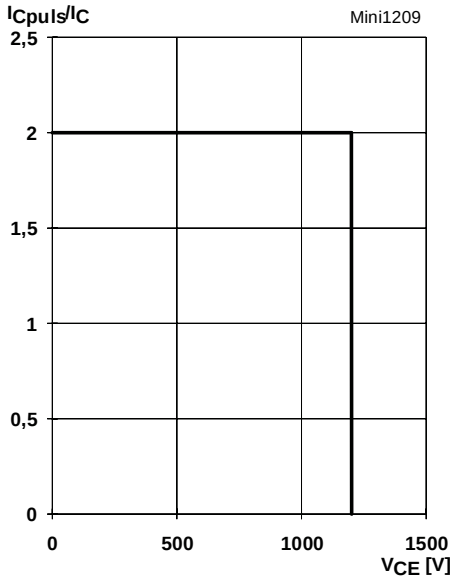


Fig. 7 Gate trigger characteristics



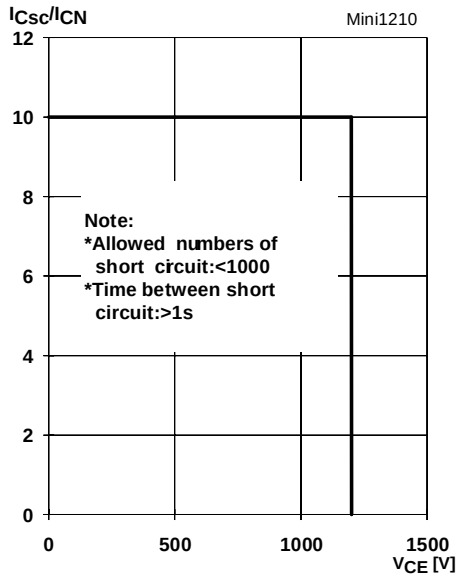
T_j = 150 °C
V_{GE} = ≥ 15 V

Fig. 7 Rated current of the IGBT $I_{Cop} / I_C = f(T_h)$



T_j = ≤ 150 °C
V_{GE} = ± 15 V

Fig. 9 Turn-off safe operating area (RBSOA) of the IGBT



T_j = ≤ 150 °C
V_{GE} = ± 15 V
t_{sc} = ≤ 10 µs
L_{ext} < 25 nH

Fig. 10 Safe operating area at short circuit of the IGBT

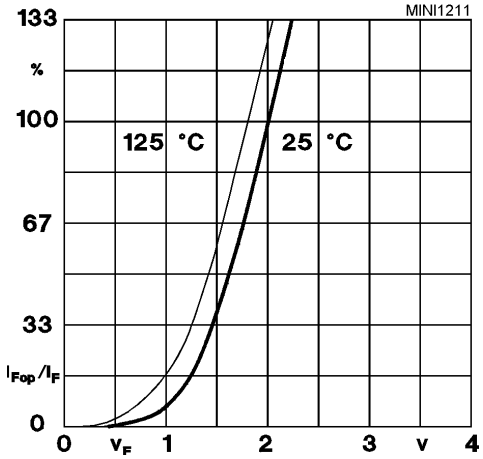


Fig. 11 Typ. freewheeling diode forward characteristic

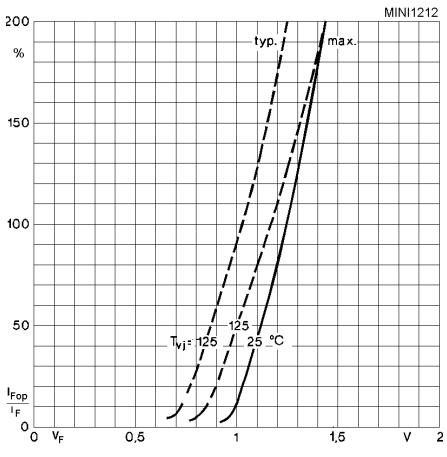
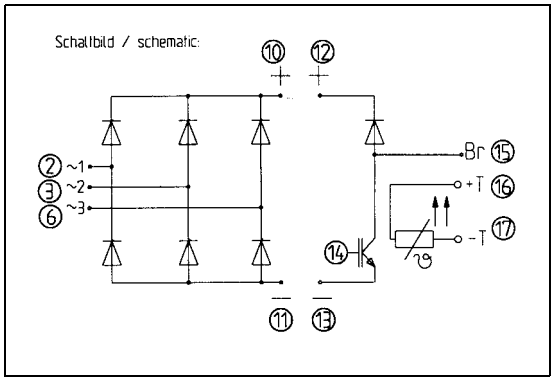


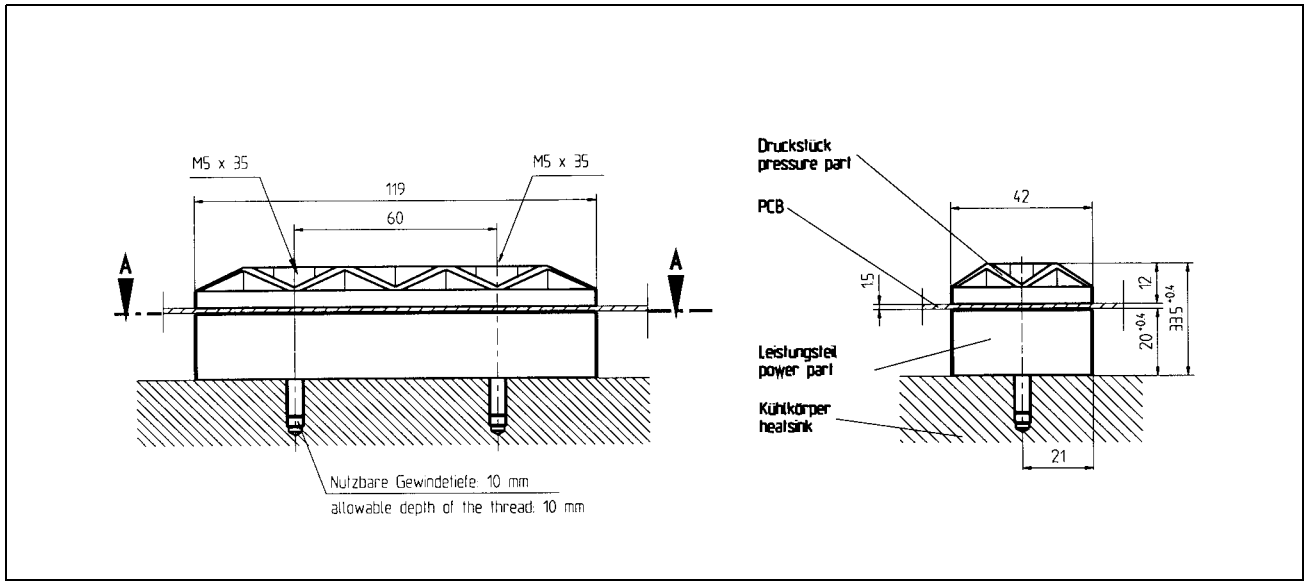
Fig. 12 Forward characteristic of the input bridge diode

MiniSKiiP 8

Input bridge part

SKiiP 82 ANB 08	Circuit ANB
SKiiP 83 ANB 08	Case M8a
SKiiP 81 ANB 15	
SKiiP 82 ANB 15	
SKiiP 83 ANB 15	
SKiiP 83 AHB 15	
SKiiP 83 ATB 15	





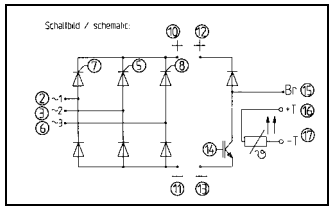
MiniSKiiP 8

Input bridge part

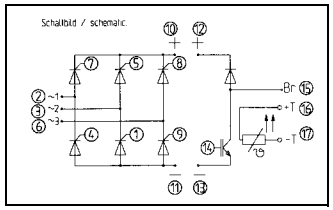
SKiiP 82 ANB 08
SKiiP 83 ANB 08
SKiiP 81 ANB 15
SKiiP 82 ANB 15
SKiiP 83 ANB 15
SKiiP 83 AHB 15
SKiiP 83 ATB 15

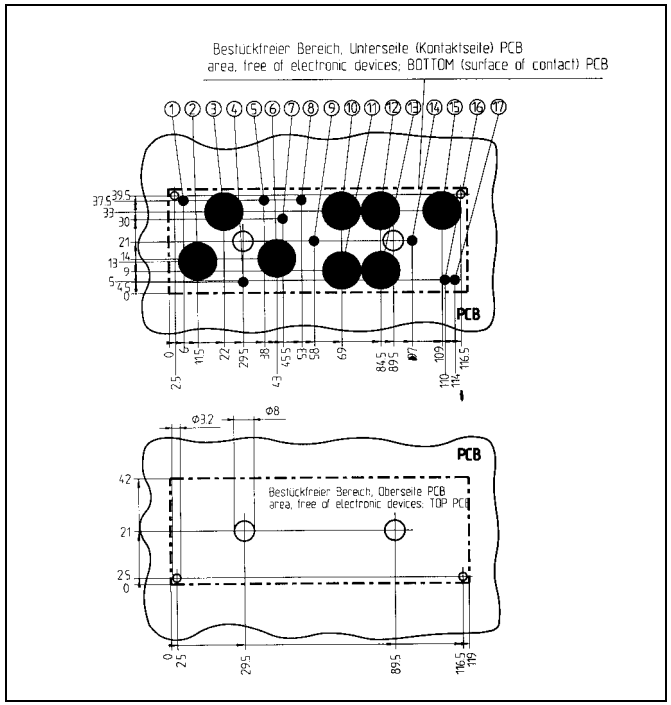
Case M8a
Layout and connections for the customer's printed circuit board

Circuit AHB



Circuit ATB





Pin	Connection					
	Diode bridge ANB		Halfcontrolled AHB		Thyristor bridge ATB	
1		reserved		reserved		G2 Bot
2	~ 1		~ 1		~ 1	
3	~ 2		~ 2		~ 2	
4		reserved		reserved		G1 Bot
5		reserved		G2 Top		G2 Top
6	~ 3		~ 3		~ 3	
7		reserved		G1 Top		G1 Top
8		reserved		G3 Top		G3 Top
9		reserved		reserved		G3 Bot
10	+		+		+	
11	–		–		–	
12	+		+		+	
13	–		–		–	
14		Gate Br		Gate Br		Gate Br
15	Br		Br		Br	
16		T +		T +		T +
17		T –		T –		T –