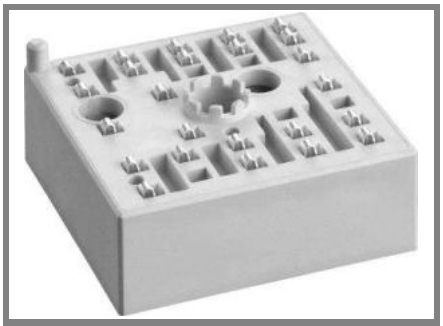


MiniSKiiP®1

1-phase half-controlled bridge rectifier + brake chopper + 3-phase bridge inverter

SKiiP 11HEB066V1

Features

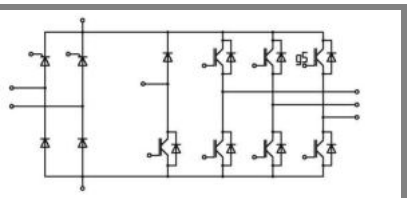
- Trench IGBTs
- Robust and soft freewheeling diode in CAL technology
- Highly reliable spring contacts for electrical connection
- UL recognised file no. E63532

Remarks

- Case temperature limited to T_C = 125°C
- Product reliability results are valid for Tj = 150°C
- SC data: $t_p \leq 6$ s; V_{GE} = 15 V; T_j = 150°C; V_{CC}= 360 V
- V_{CEsat}, V_F, V_T= chip level value

Absolute Maximum Ratings		T_S = 25°C, unless otherwise specified	
Symbol	**Conditions**	**Values**	**Units**
IGBT -Inverter, Chopper			
V_{CES}		600	V
I_C	T_s = 25 (70) °C, T_j = 150 °C	25 (17)	A
I_C	T_s = 25 (70) °C, T_j = 175 °C	27 (21)	A
I_{CRM}	t_p = 1 ms	30	A
V_{GES}		±20	V
T_j		-40...+175	°C
Diode - Inverter, Chopper			
I_F	T_s = 25 (70) °C, T_j = 150 °C	24 (16)	A
I_F	T_s = 25 (70) °C, T_j = 175 °C	28 (21)	A
I_{FRM}	t_p = 1 ms	30	A
T_j		-40...+175	°C
Diode / Thyristor - Rectifier			
V_{RRM}		800	V
I_F / I_T	T_s = 70	46 / 45	A
I_{FSM} / I_{TSM}	t_p = 10 ms, sin 180 °, T_j = 25 °C	370 / 340	A
i^2t	t_p = 10 ms, sin 180 °, T_j = 25 °C	575	A^2s
T_j	Diode	-40...+150	°C
T_j	Thyristor	-40...+125	°C
I_{tRMS}	per power terminal (20 A / spring)	20	A
T_{stg}	$T_{op} \leq T_{stg}$	-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		1,45 (1,65)	1,85 (2,05)	V
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 1 mA		5,8		V
$V_{CE(TO)}$	T_j = 25 (150) °C		0,9 (0,85)	1 (0,9)	V
r_T	T_j = 25 (150) °C		40 (56,7)	60 (80)	mΩ
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		0,86		nF
C_{oes}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		0,18		nF
C_{res}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		0,12		nF
$R_{CC'+EE'}$	spring contact-chip T_s = 25 (150)°C				mΩ
$R_{th(j-s)}$	per IGBT		1,8		K/W
$t_{d(on)}$	under following conditions		20		ns
t_r	V_{CC} = 300 V, V_{GE} = ± 15V		30		ns
$t_{d(off)}$	I_{Cnom} = 15 A, T_j = 150 °C		155		ns
t_f	R_{Gon} = R_{Goff} = 22 Ω		45		ns
E_{on} (E_{off})	inductive load		0,6 (0,5)		mJ
Diode - Inverter, Chopper					
V_F = V_{EC}	I_{Fnom} = 15 A, T_j = 25 (150) °C		1,4 (1,4)	1,7 (1,7)	V
$V_{(TO)}$	T_j = 25 (150) °C		1 (0,9)	1,1 (1)	V
r_T	T_j = 25 (150) °C		27 (34)	40 (47)	mΩ
$R_{th(j-s)}$	per diode		2,46		K/W
I_{RRM}	under following conditions		20		A
Q_{rr}	I_{Fnom} = 15 A, V_R = 300 V		2		C
E_{rr}	V_{GE} = 0 V, T_j = 150 °C		0,5		mJ
	di_F/dt = 930 A/ s				



HEB

Characteristics		T_S = 25°C, unless otherwise specified			
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Units**
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
Thyristor - Rectifier					
V_T	I_{Fnom} = 25 A, T_j = 25 (125) °C			(1,6)	V
$V_{T(TO)}$	T_j = 125 °C			1,1	V
r_T	T_j = 125 °C			20	mΩ
V_{GT}	T_j = 25 °C			2	V
I_{GT}	T_j = 25 °C			100	mA
I_H	T_j = 25 °C		80	150	mA
I_L	T_j = 25 °C		150	300	mA
$dv/dt_{(cr)}$	T_j = 125 °C	500			V/ s
$di/dt_{(cr)}$	T_j = 125 °C			100	A/ s
$R_{th(j-s)}$	per thyristor		1,25		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

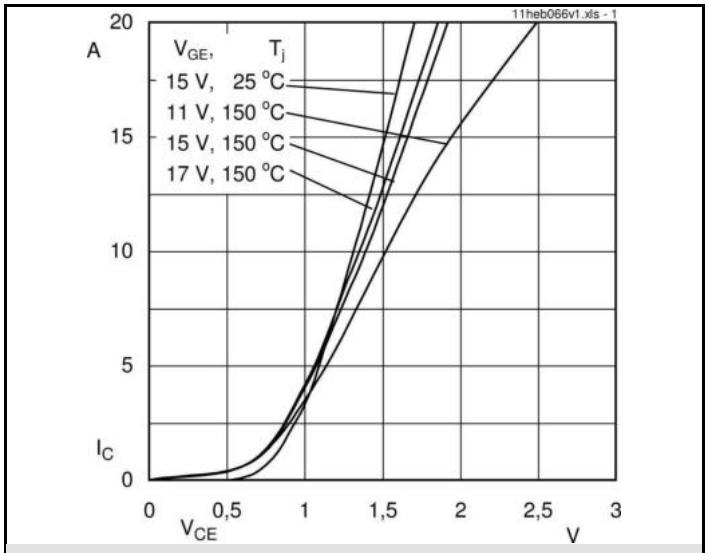


Fig. 1 Typ. output characteristics

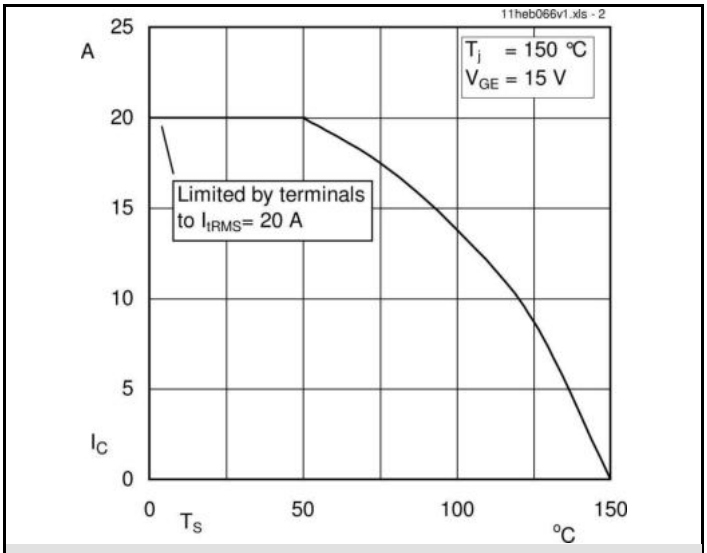


Fig. 2 Typ. rated current vs. temperature

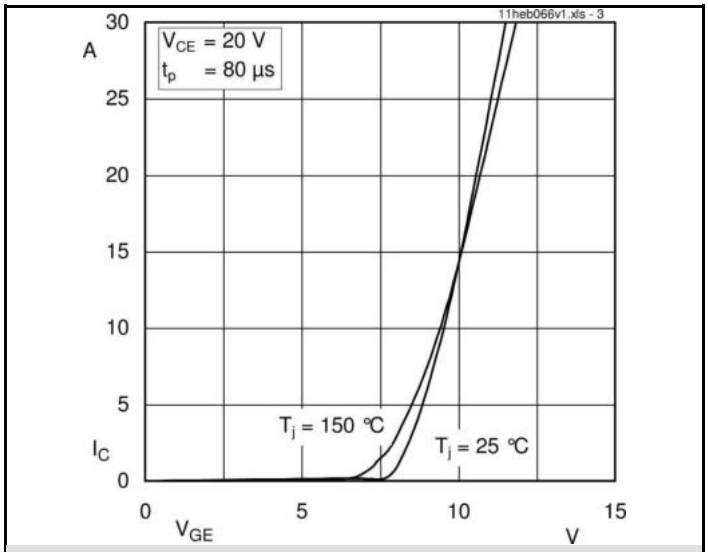


Fig. 3 Typ. transfer characteristic

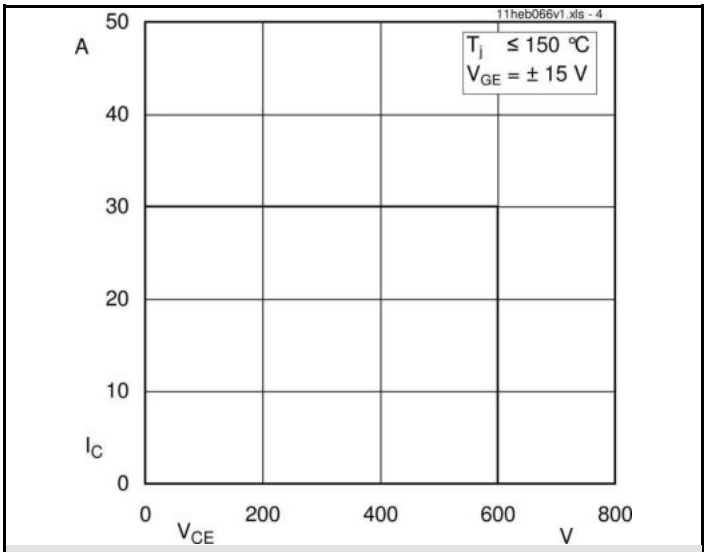


Fig. 4 Reverse bias safe operating area

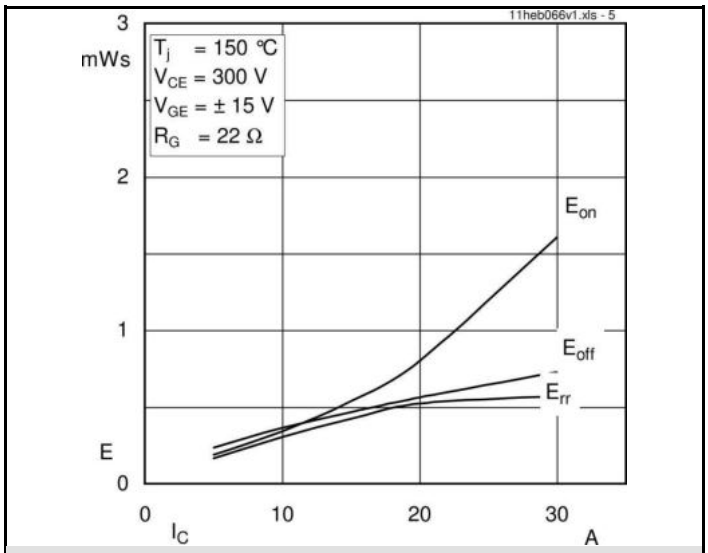


Fig. 5 Typ. Turn-on/-off energy = f (I_C)

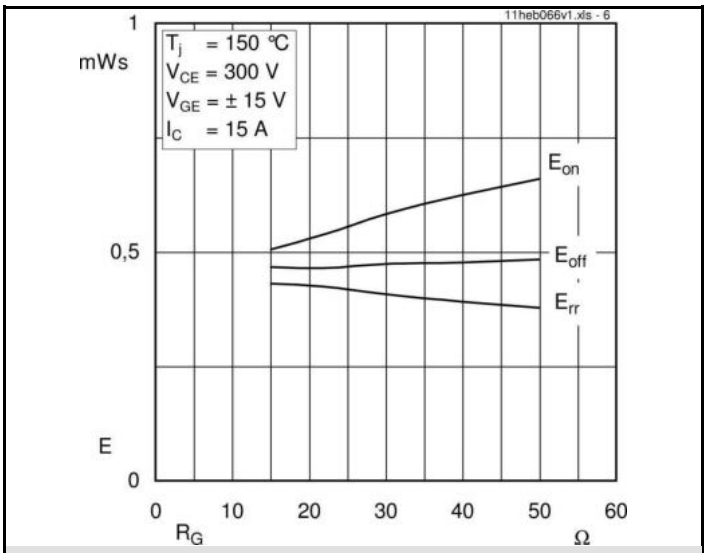


Fig. 6 Typ. Turn-on/-off energy = f (R_G)

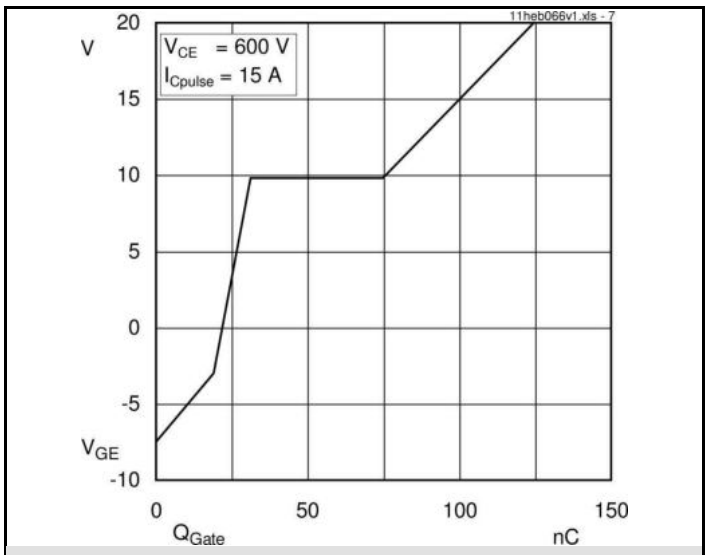


Fig. 7 Typ. gate charge characteristic

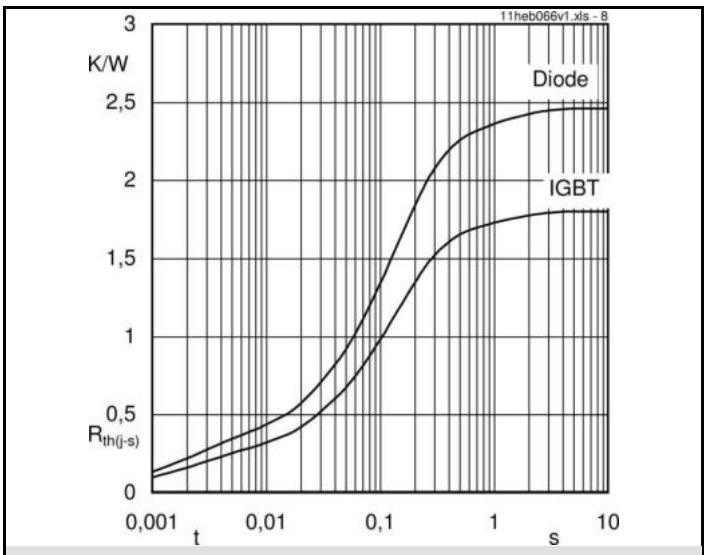


Fig. 8 Typ. thermal impedance

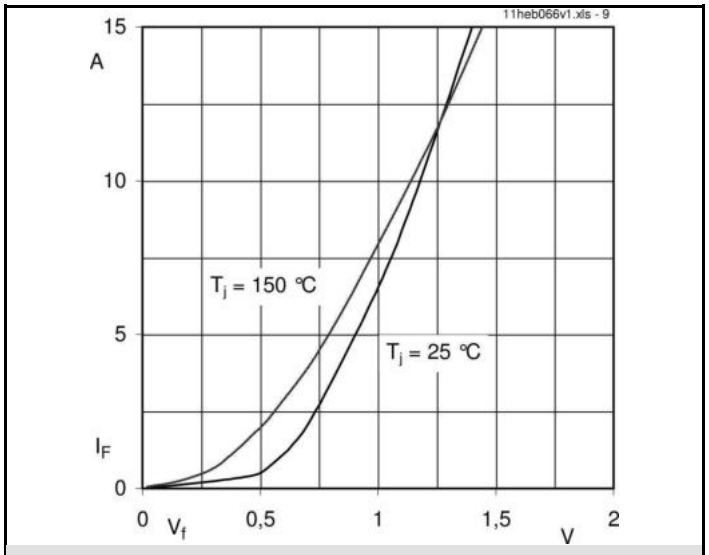


Fig. 9 Typ. freewheeling diode forward characteristic

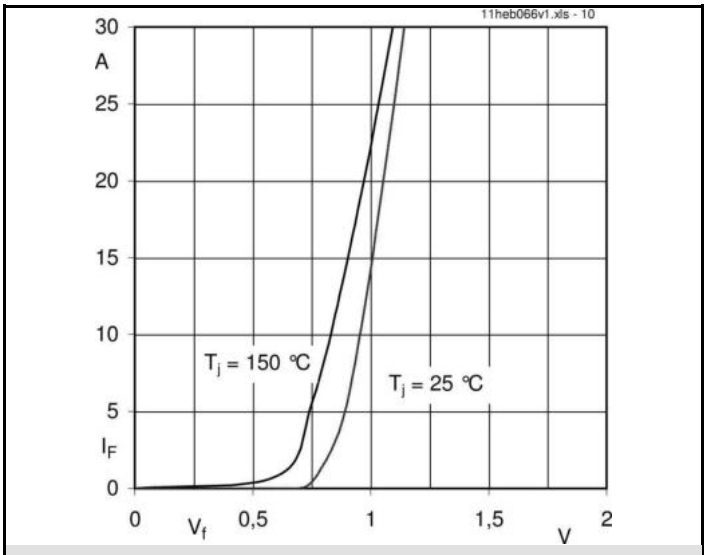


Fig. 10 Typ. input bridge forward characteristic (rect. diode)

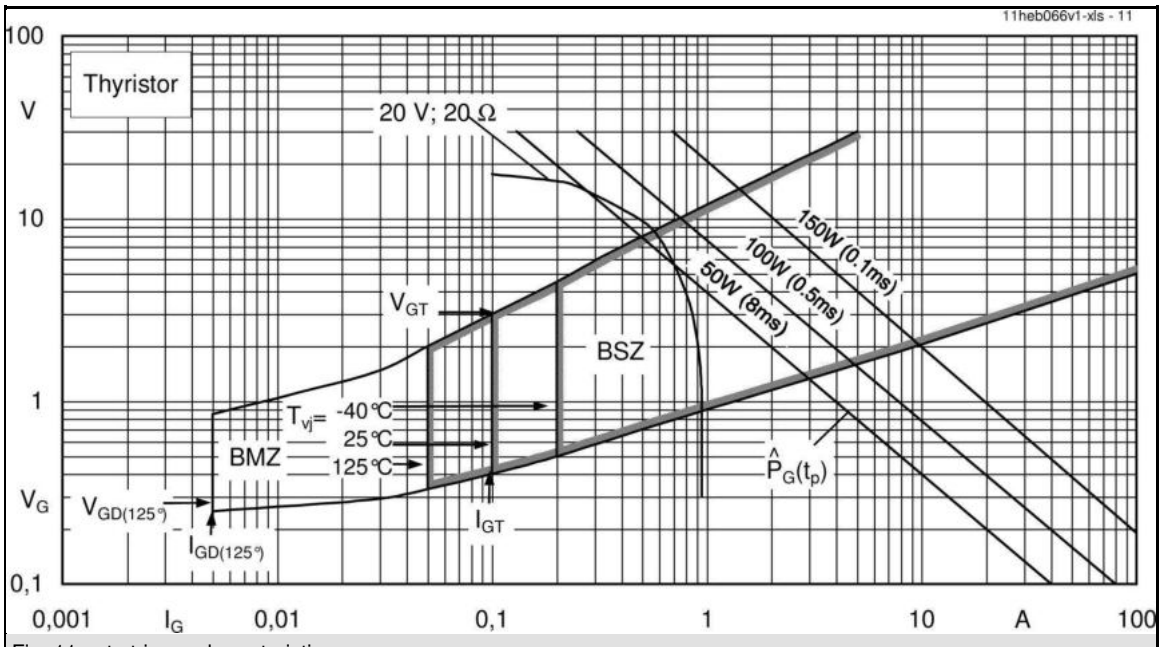
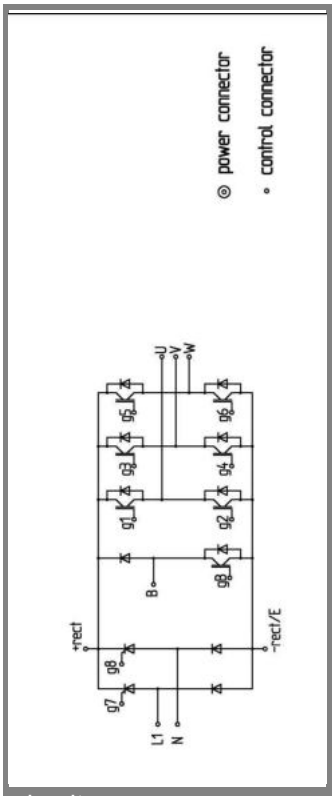
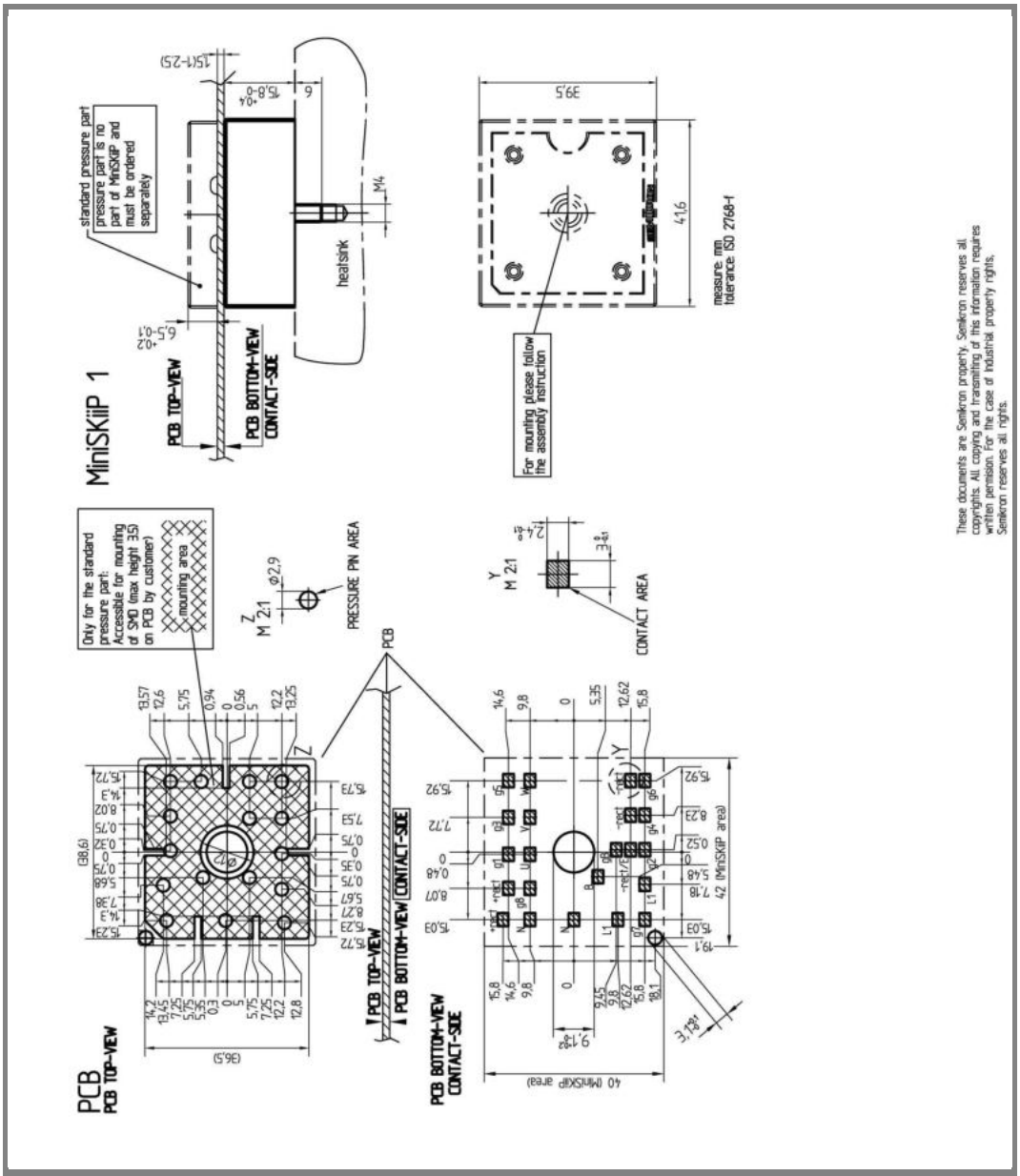


Fig. 11 gate trigger characteristics



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.

