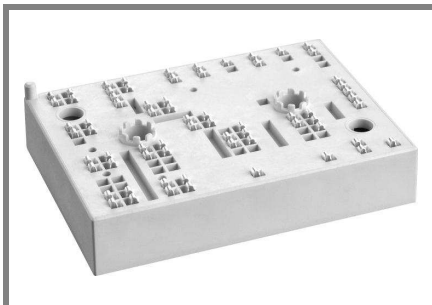


# SKiiP 39AHB16V1



MiniSKiiP<sup>®</sup> 3

3-phase bridge rectifier +  
brake chopper

SKiiP 39AHB16V1

## Features

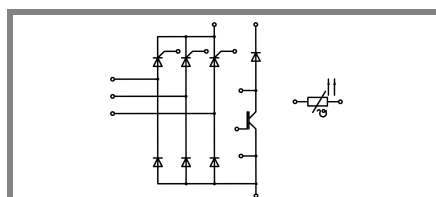
- Fast Trench IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

## Typical Applications\*

- Input bridge for inverter up to 45 kVA

## Remarks

- $V_{CEsat}$ ,  $V_F$  = chip level value

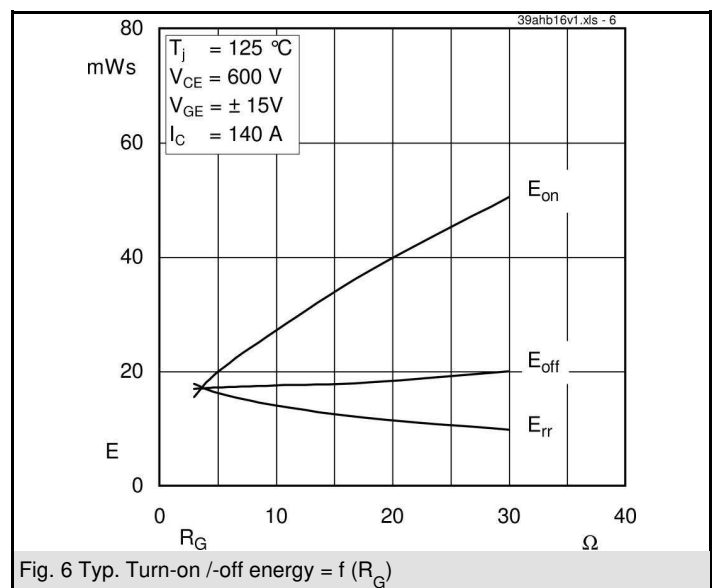
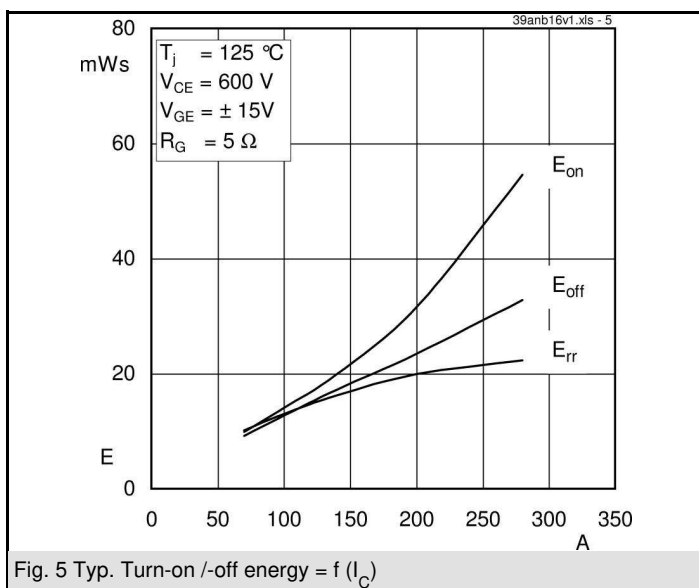
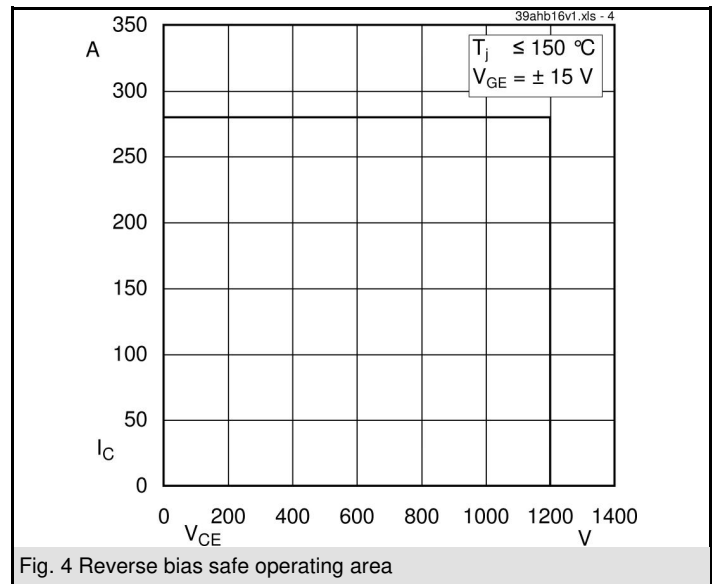
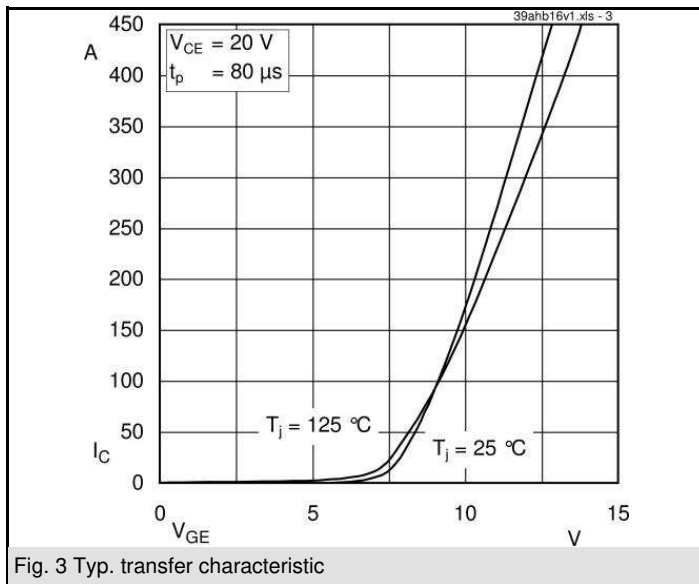
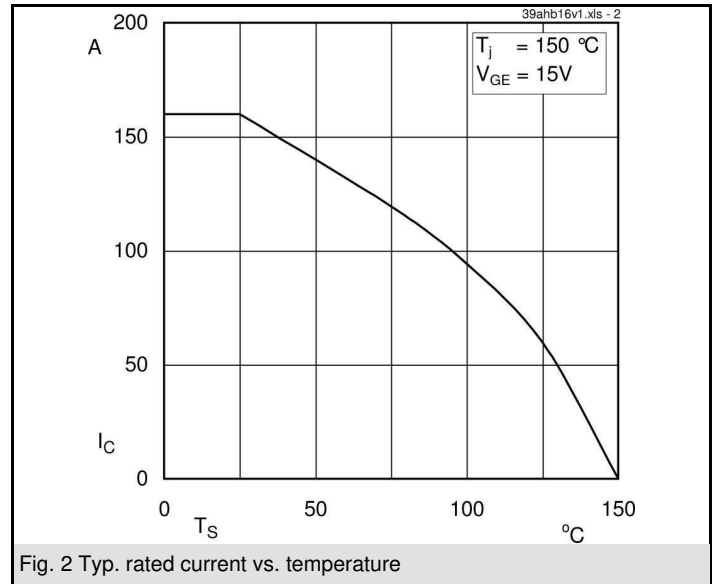
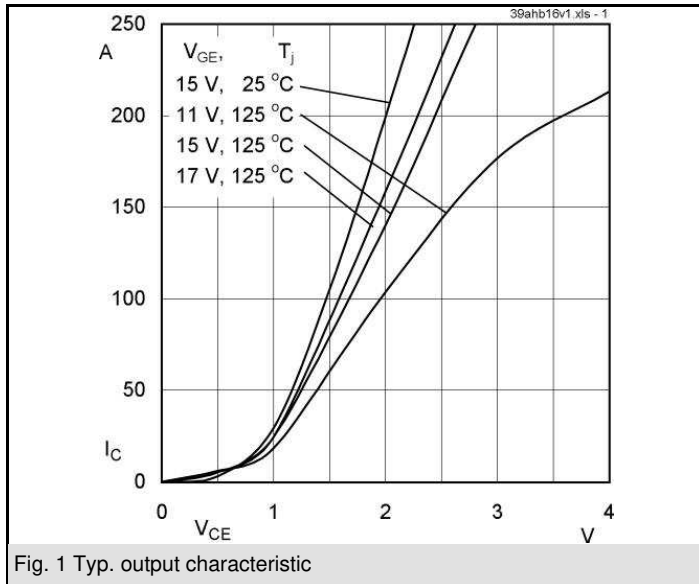


AHB

Absolute Maximum Ratings		$T_s = 25\text{ °C}$ , unless otherwise specified		
Symbol	Conditions	Values	Units	
<b>IGBT - Chopper</b>				
$V_{CES}$	$T_s = 25\text{ (70) °C}$ $t_p \leq 1\text{ ms}$	1200	V	
$I_C$		157 (118)	A	
$I_{CRM}$		280	A	
$V_{GES}$		$\pm 20$	V	
$T_j$		- 40 ... + 150	°C	
<b>Diode - Chopper</b>				
$I_F$	$T_s = 25\text{ (70) °C}$ $t_p \leq 1\text{ ms}$	167 (124)	A	
$I_{FRM}$		280	A	
$T_j$		- 40 ... + 150	°C	
<b>Diode / Thyristor - Rectifier</b>				
$V_{RRM}$	$T_s = 70$ $t_p = 10\text{ ms, sin } 180\text{ °, } T_j = 25\text{ °C}$ $t_p = 10\text{ ms, sin } 180\text{ °, } T_j = 25\text{ °C}$	1600	V	
$I_F / I_T$		121	A	
$I_{FSM} / I_{TSM}$		1250	A	
$i^2t$		7800	A <sup>2</sup> s	
$T_j$		Diode	- 40 ... + 150	°C
$T_j$		Thyristor	- 40 ... + 125	°C
$I_{RMS}$	per power terminal (20 A / spring)	160	A	
$T_{stg}$	$T_{op} \leq T_{stg}$	- 40 ... + 125	°C	
$V_{isol}$	AC, 1 min.	2500	V	

Characteristics		$T_s = 25\text{ °C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT - Chopper</b>					
$V_{CEsat}$	$I_{Cnom} = 140\text{ A, } T_j = 25\text{ (125) °C}$		1,7 (2)	2,1 (2,4)	V
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 6\text{ mA}$	5	5,8	6,5	V
$V_{CE(TO)}$	$T_j = 25\text{ (125) °C}$		1 (0,9)	1,2 (1,1)	V
$r_T$	$T_j = 25\text{ (125) °C}$		5 (7,9)	6,4 (9,3)	mΩ
$C_{ies}$	$V_{CE} = 25\text{ V, } V_{GE} = 0\text{ V, } f = 1\text{ MHz}$		11,2		nF
$C_{oes}$	$V_{CE} = 25\text{ V, } V_{GE} = 0\text{ V, } f = 1\text{ MHz}$		1,9		nF
$C_{res}$	$V_{CE} = 25\text{ V, } V_{GE} = 0\text{ V, } f = 1\text{ MHz}$		1,5		nF
$R_{th(j-s)}$	per IGBT		0,3		K/W
$t_{d(on)}$	under following conditions		80		ns
$t_r$	$V_{CC} = 600\text{ V, } V_{GE} = \pm 15\text{ V}$		40		ns
$t_{d(off)}$	$I_{Cnom} = 140\text{ A, } T_j = 125\text{ °C}$		500		ns
$t_f$	$R_{Gon} = R_{Goff} = 5\text{ Ω}$		100		ns
$E_{on}$	inductive load		19,9		mJ
$E_{off}$			17,3		mJ
<b>Diode - Chopper</b>					
$V_F = V_{EC}$	$I_{Fnom} = 140\text{ A, } T_j = 25\text{ (125) °C}$		1,5 (1,5)	1,7 (1,7)	V
$V_{(TO)}$	$T_j = 25\text{ (125) °C}$		1 (0,8)	1,1 (0,9)	V
$r_T$	$T_j = 25\text{ (125) °C}$		3,6 (5)	4,3 (5,7)	mΩ
$R_{th(j-s)}$	per diode		0,4		K/W
$I_{RRM}$	under following conditions		210		A
$Q_{rr}$	$I_{Fnom} = 140\text{ A, } V_R = 600\text{ V}$		38		μC
$E_{rr}$	$V_{GE} = 0\text{ V, } T_j = 125\text{ °C}$		16,2		mJ
	$di_F/dt = 4300\text{ A/μs}$				

Characteristics		$T_s = 25\text{ °C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>Diode - Rectifier</b>					
$V_F$	$I_{Fnom} = 90\text{ A}$ , $T_j = 25\text{ °C}$		1,2		V
$V_{T(TO)}$	$T_j = 150\text{ °C}$		0,8		V
$r_T$	$T_j = 150\text{ °C}$		4		mΩ
$R_{th(j-s)}$	per diode		0,5		K/W
<b>Thyristor - Rectifier</b>					
$V_T$	$I_{Fnom} = 200\text{ A}$ , $T_j = 25\text{ (125) °C}$			1,65 (1,6)	V
$V_{T(TO)}$	$T_j = 125\text{ °C}$			0,9	V
$r_T$	$T_j = 125\text{ °C}$			3,5	mΩ
$V_{GT}$	$T_j = 25\text{ °C}$			3	V
$I_{GT}$	$T_j = 25\text{ °C}$	150			mA
$I_H$	$T_j = 25\text{ °C}$		150		mA
$I_L$	$T_j = 25\text{ °C}$		300		mA
$dv/dt_{(cr)}$	$T_j = 125\text{ °C}$			1000	V/μs
$di/dt_{(cr)}$	$T_j = 125\text{ °C}$			100	A/μs
$R_{th(j-s)}$	per thyristor		0,5		K/W
<b>Temperature Sensor</b>					
$R_{ts}$	3 %, $T_r = 25\text{ (100) °C}$		1000(1670)		Ω
<b>Mechanical Data</b>					
w			95		g
$M_s$	Mounting torque	2		2,5	Nm



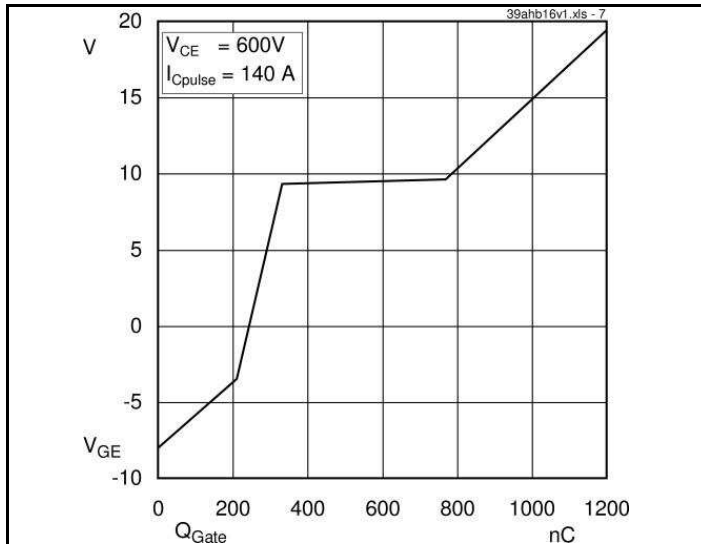


Fig. 7 Typ. gate charge characteristic

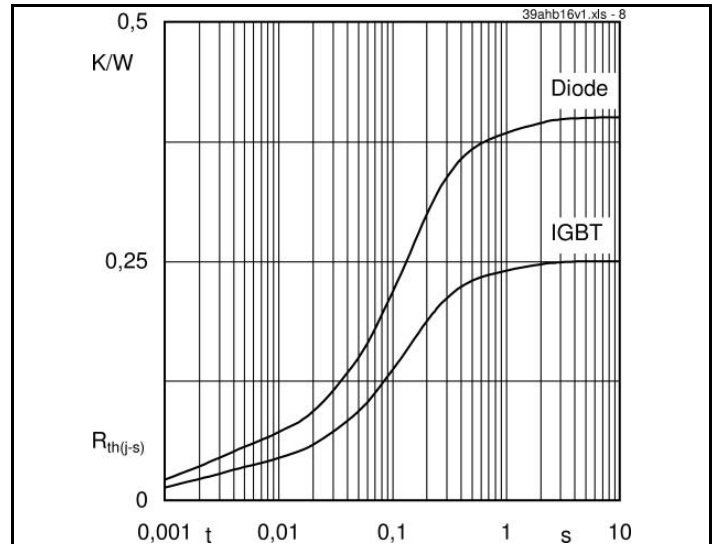


Fig. 8 Typ. thermal impedance

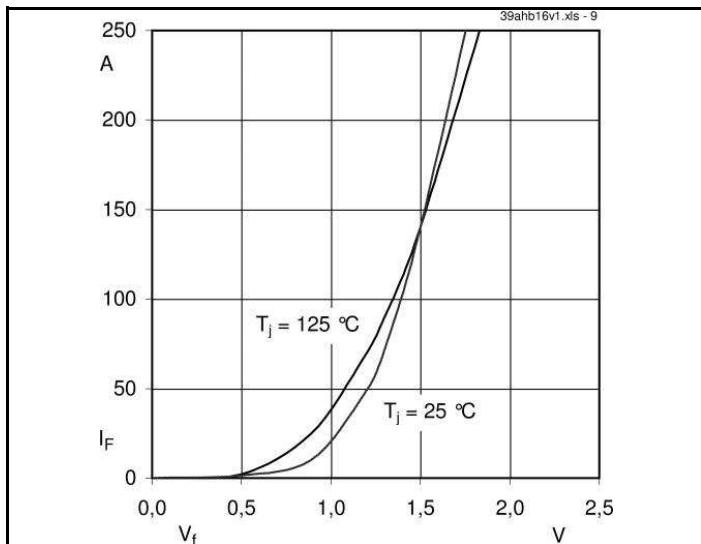


Fig. 9 Typ. freewheeling diode forward characteristic

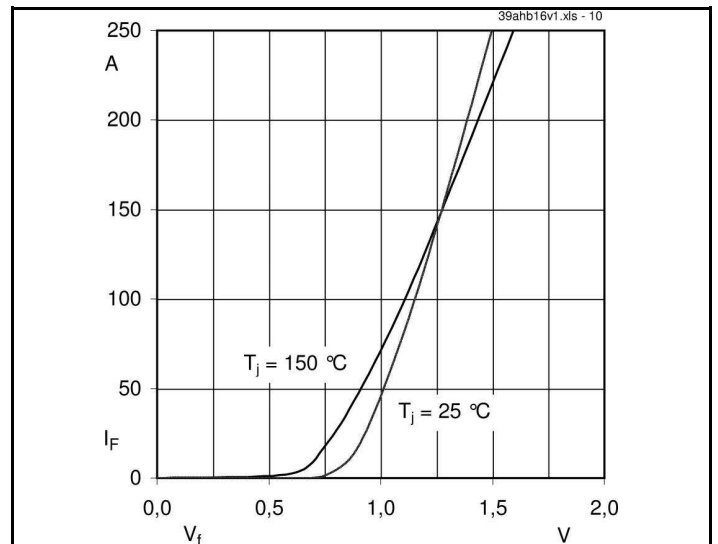


Fig. 10 Typ. input bridge forward characteristic

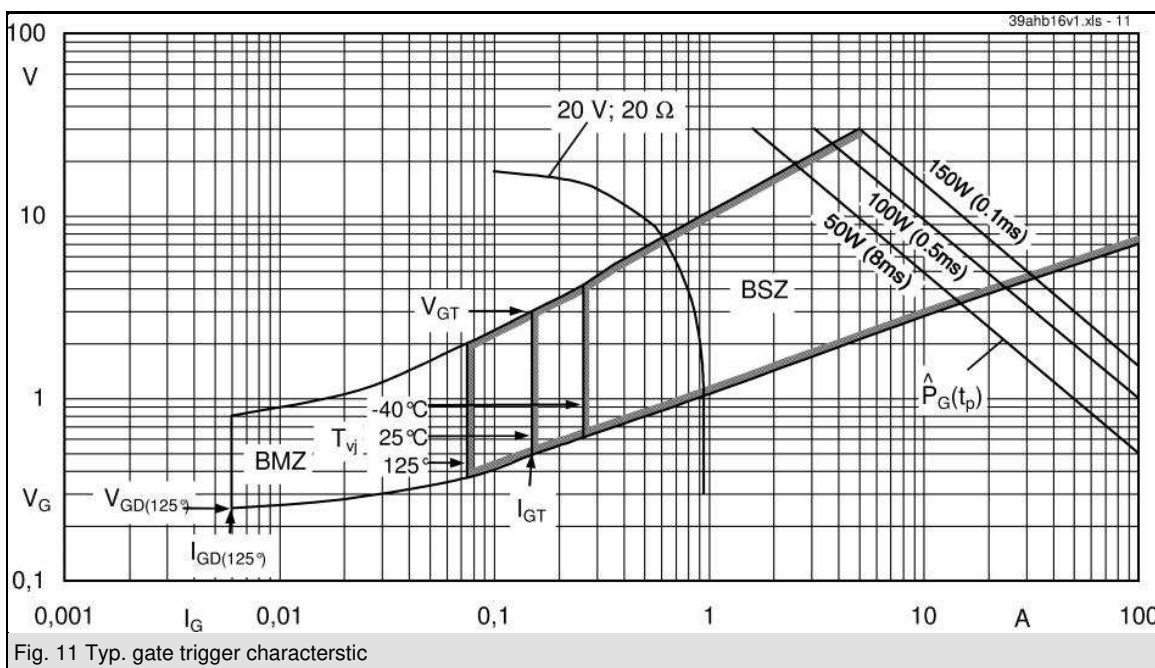
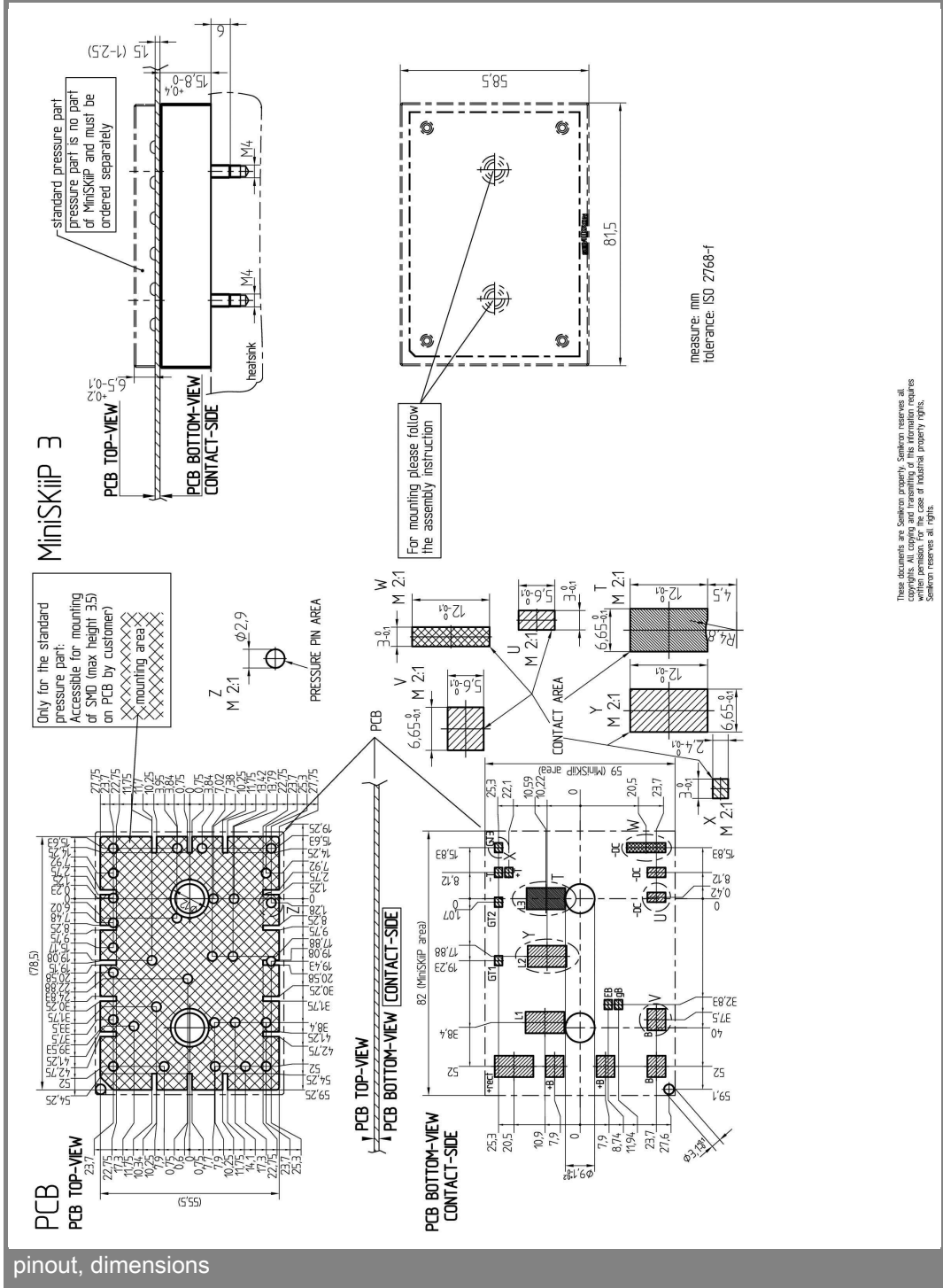
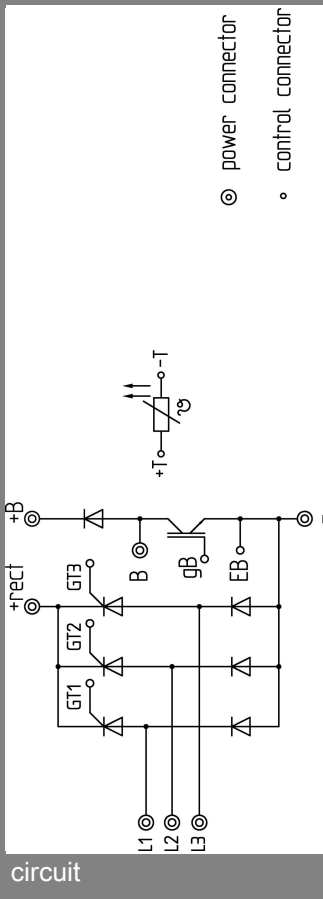


Fig. 11 Typ. gate trigger characteristic



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

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