

# SKiiP 12NAB066V1



MiniSKiiP® 1

3-phase bridge rectifier +  
brake chopper + 3-phase  
bridge inverter  
**SKiiP 12NAB066V1**

## Features

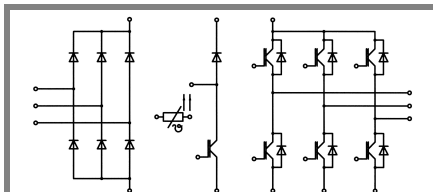
- Trench IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

## Typical Applications\*

- Inverter up to 5 kVA
- Typical motor power 2,2 kW

## Remarks

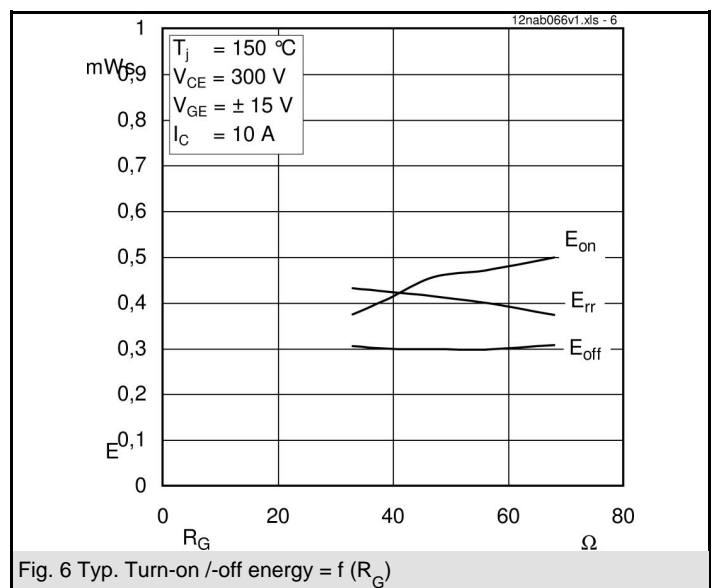
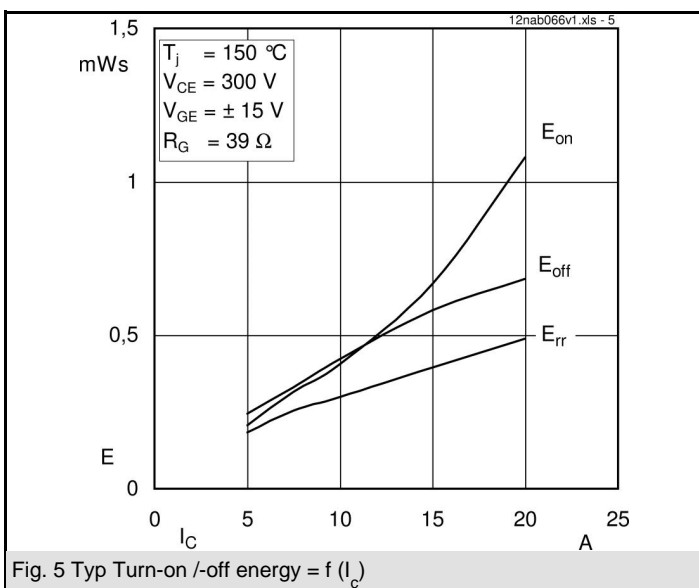
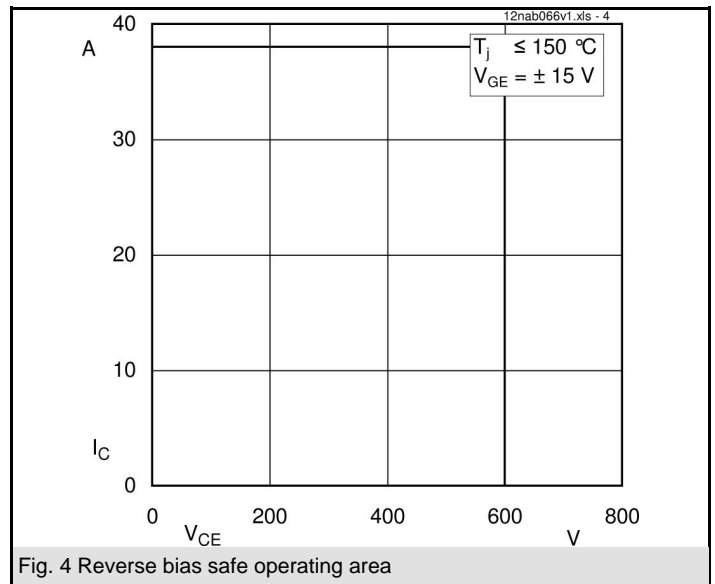
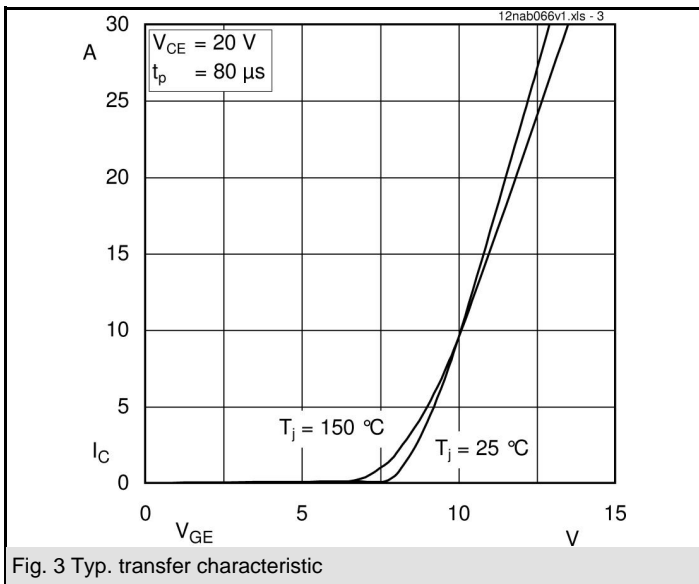
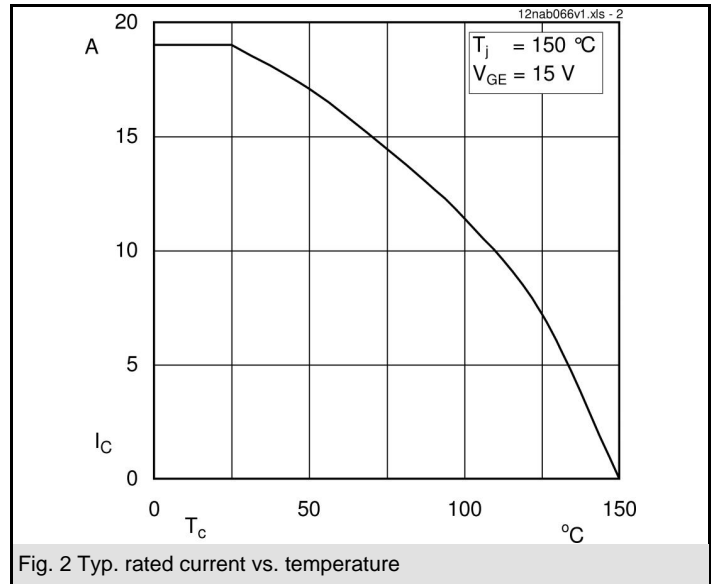
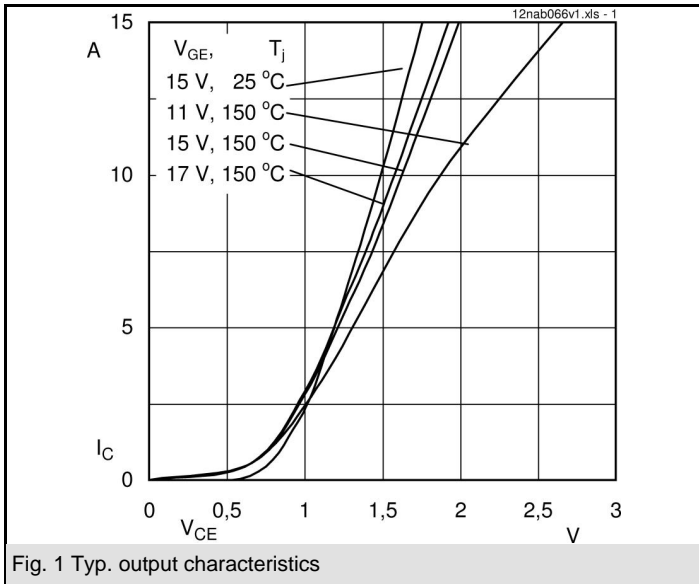
- Case temperature limited to  $T_C = 125^\circ\text{C}$  max.
- Product reliability results are valid for  $T_j = 150^\circ\text{C}$
- SC data:  $t_p \leq 6 \mu\text{s}$ ;  $V_{GE} \leq 15 \text{ V}$ ;  $T_j = 150^\circ\text{C}$ ;  $V_{CC} = 360 \text{ V}$
- $V_{CEsat}$ ,  $V_F =$  chip level values



NAB

Absolute Maximum Ratings		$T_S = 25^\circ\text{C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT - Inverter, Chopper</b>			
$V_{CES}$		600	V
$I_C$	$T_S = 25 (70)^\circ\text{C}$ , $T_j = 150^\circ\text{C}$	19 (14)	A
$I_C$	$T_S = 25 (70)^\circ\text{C}$ , $T_j = 175^\circ\text{C}$	20 (16)	A
$I_{CRM}$	$t_p = 1 \text{ ms}$	20	A
$V_{GES}$		$\pm 20$	V
<b>Diode - Inverter, Chopper</b>			
$I_F$	$T_S = 25 (70)^\circ\text{C}$ , $T_j = 150^\circ\text{C}$	20 (15)	A
$I_F$	$T_S = 25 (70)^\circ\text{C}$ , $T_j = 175^\circ\text{C}$	20 (18)	A
$I_{FRM}$	$t_p = 1 \text{ ms}$	20	A
<b>Diode - Rectifier</b>			
$V_{RRM}$		800	V
$I_F$	$T_S = 70^\circ\text{C}$	35	A
$I_{FSM}$	$t_p = 10 \text{ ms}$ , $\sin 180^\circ$ , $T_j = 25^\circ\text{C}$	220	A
$i^2t$	$t_p = 10 \text{ ms}$ , $\sin 180^\circ$ , $T_j = 25^\circ\text{C}$	240	$\text{A}^2\text{s}$
$I_{tRMS}$	per power terminal (20 A / spring)	20	A
$T_j$	IGBT, Diode	$-40 \dots +175$	$^\circ\text{C}$
$T_{stg}$		$-40 \dots +125$	$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	2500	V

Characteristics		$T_S = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT - Inverter, Chopper</b>					
$V_{CE(sat)}$	$I_{Cnom} = 10 \text{ A}$ , $T_j = 25 (150)^\circ\text{C}$	1,1	1,45 (1,65)	1,85 (2,05)	V
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_C = 1 \text{ mA}$		5,8		V
$V_{CE(TO)}$	$T_j = 25 (150)^\circ\text{C}$		0,9 (0,7)	1,1 (1)	V
$r_{CE}$	$T_j = 25 (150)^\circ\text{C}$		60 (100)	80 (110)	$\text{m}\Omega$
$C_{ies}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		0,58		nF
$C_{oes}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		0,12		nF
$C_{res}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		0,04		nF
$R_{CC+EE'}$	spring contact-chip $T_S = 25 (150)^\circ\text{C}$				$\text{m}\Omega$
$R_{th(j-s)}$	per IGBT		2		K/W
$t_{d(on)}$	under following conditions		25		ns
$t_r$	$V_{CC} = 300 \text{ V}$ , $V_{GE} = \pm 15 \text{ V}$		25		ns
$t_{d(off)}$	$I_{Cnom} = 10 \text{ A}$ , $T_j = 150^\circ\text{C}$		190		ns
$t_f$	$R_{Gon} = R_{Goff} = 39 \Omega$		40		ns
$E_{on} (E_{off})$	inductive load		0,5 (0,3)		mJ
<b>Diode - Inverter, Chopper</b>					
$V_F = V_{EC}$	$I_F = 10 \text{ A}$ , $T_j = 25 (150)^\circ\text{C}$		1,3 (1,3)	1,6 (1,6)	V
$V_{(TO)}$	$T_j = 25 (150)^\circ\text{C}$		0,9 (0,8)	1 (0,9)	V
$r_T$	$T_j = 25 (150)^\circ\text{C}$		40 (50)	60 (70)	$\text{m}\Omega$
$R_{th(j-s)}$	per diode		2,5		K/W
$I_{RRM}$	under following conditions		15,8		A
$Q_{rr}$	$I_{Fnom} = 10 \text{ A}$ , $V_R = 300 \text{ V}$		1,5		$\mu\text{C}$
$E_{rr}$	$V_{GE} = 0 \text{ V}$ , $T_j = 150^\circ\text{C}$		0,5		mJ
	$di_F/dt = 810 \text{ A}/\mu\text{s}$				
<b>Diode - Rectifier</b>					
$V_F$	$I_{Fnom} = 15 \text{ A}$ , $T_j = 25^\circ\text{C}$		1,1		V
$V_{(TO)}$	$T_j = 150^\circ\text{C}$		0,8		V
$r_T$	$T_j = 150^\circ\text{C}$		20		$\text{m}\Omega$
$R_{th(j-s)}$	per diode		1,5		K/W
<b>Temperature Sensor</b>					
$R_{ts}$	3 %, $T_r = 25 (100)^\circ\text{C}$		1000(1670)		$\Omega$
<b>Mechanical Data</b>					
w			35		g
$M_s$	Mounting torque	2		2,5	Nm



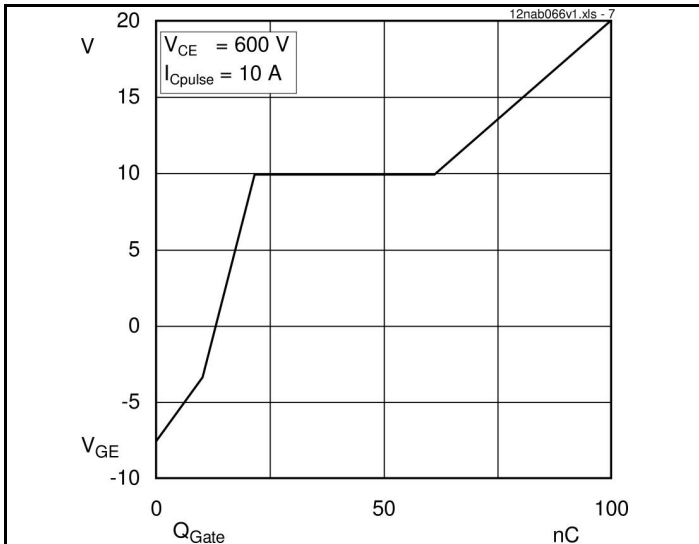


Fig. 7 Typ. gate charge characteristic

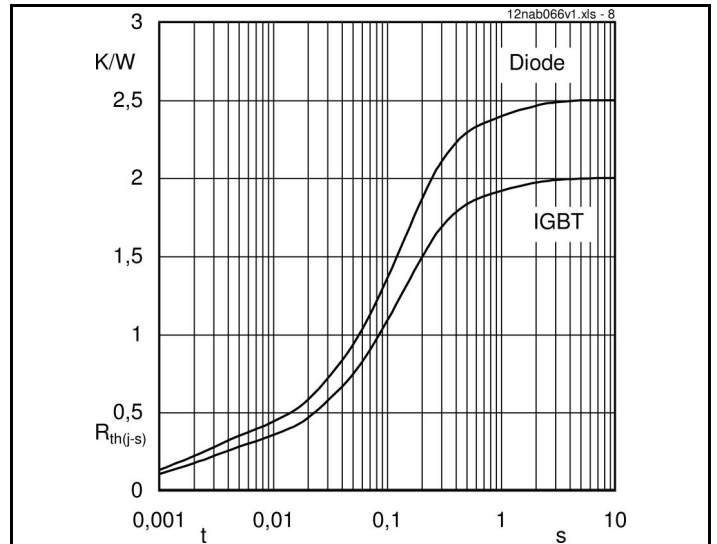


Fig. 8 Typ. thermal impedance

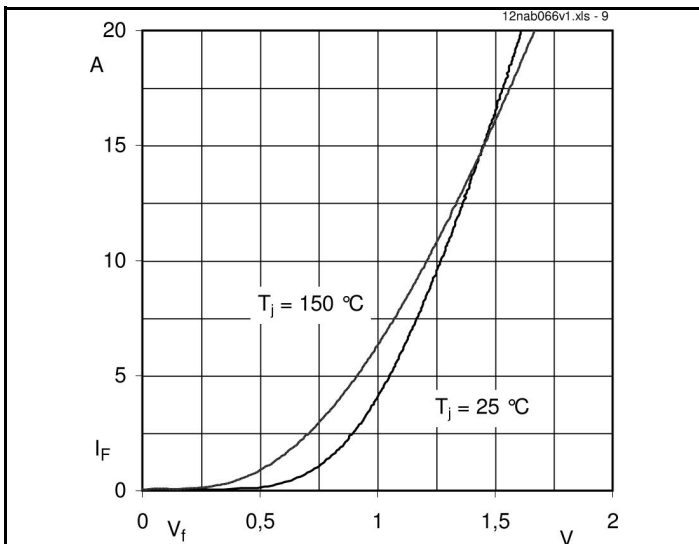


Fig. 9 Typ. freewheeling diode forward characteristic

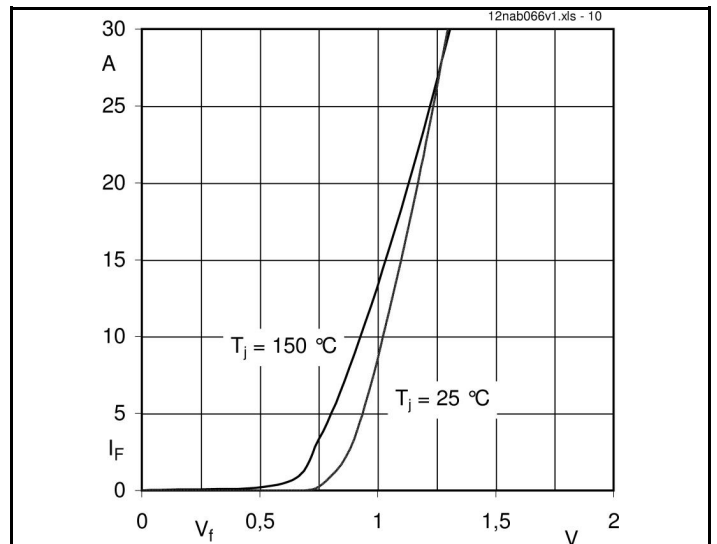
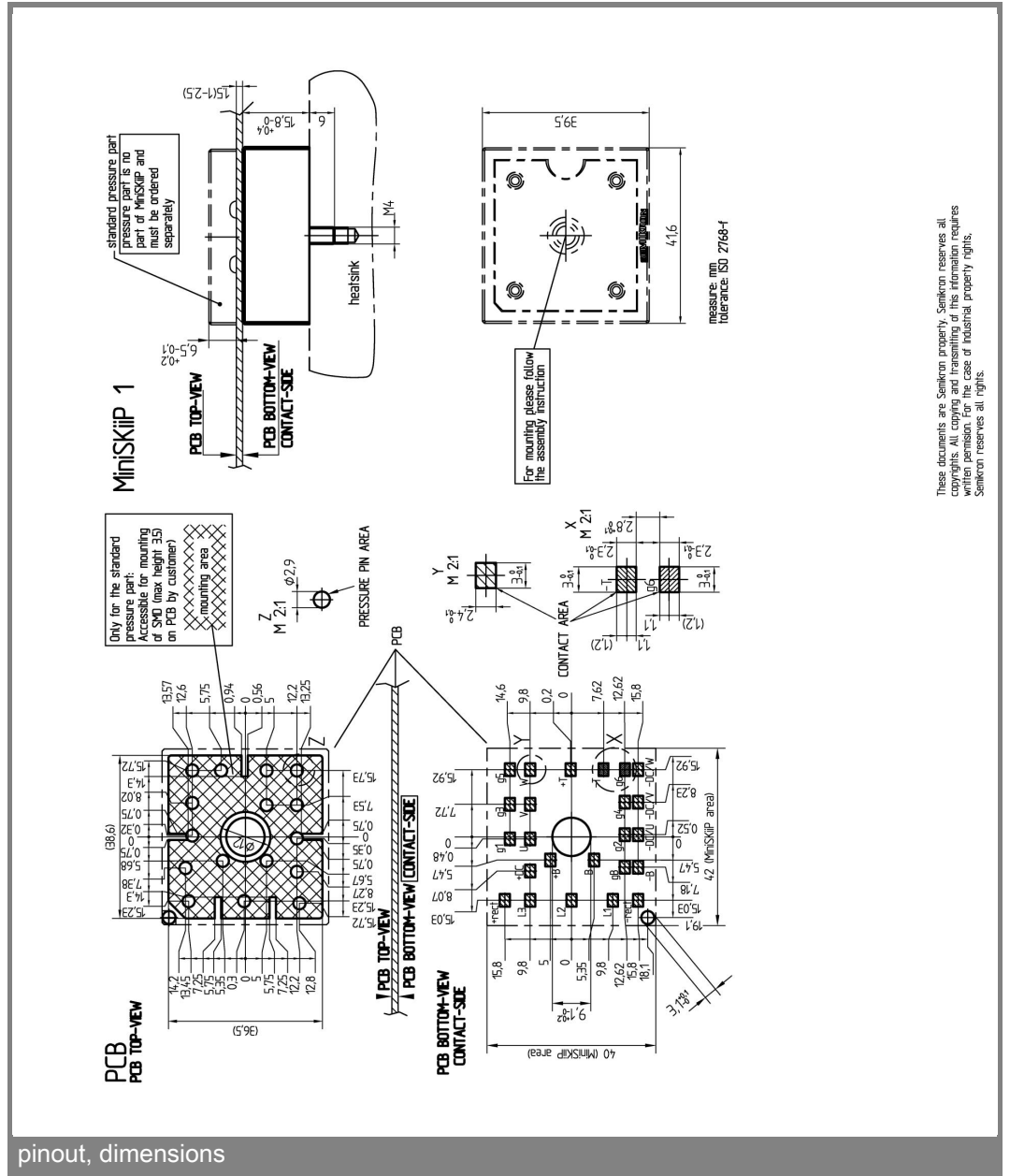
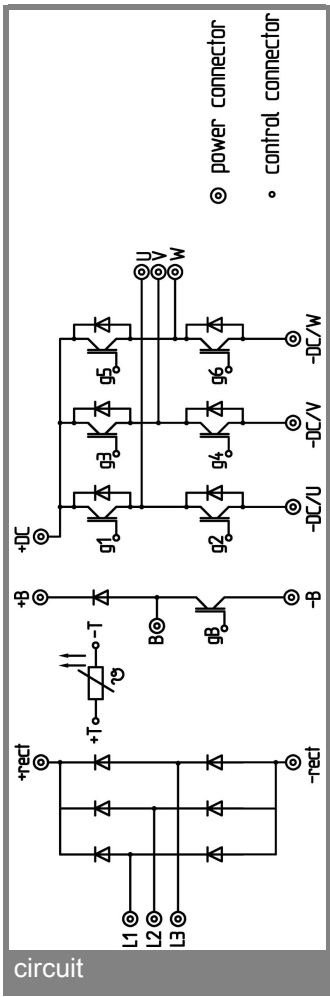


Fig. 10 Typ. input bridge forward characteristic



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