



MiniSKiiP® 0

1-phase bridge rectifier +  
brake chopper + 3-phase  
bridge inverter  
**SKiiP 03NEC066V3**

## Features

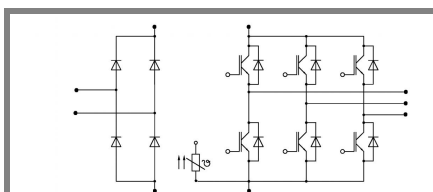
- Trench IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

## Typical Applications\*

- Inverter up to 5,6 kVA
- Typical motor power 3,0 kW

## Remarks

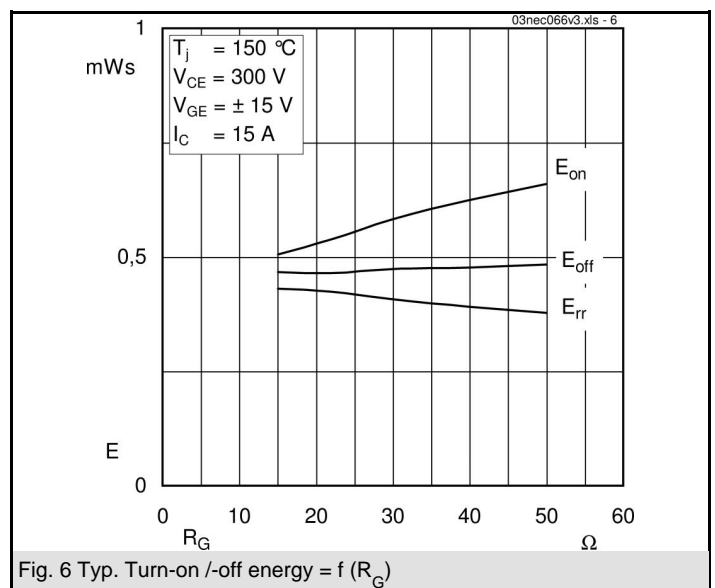
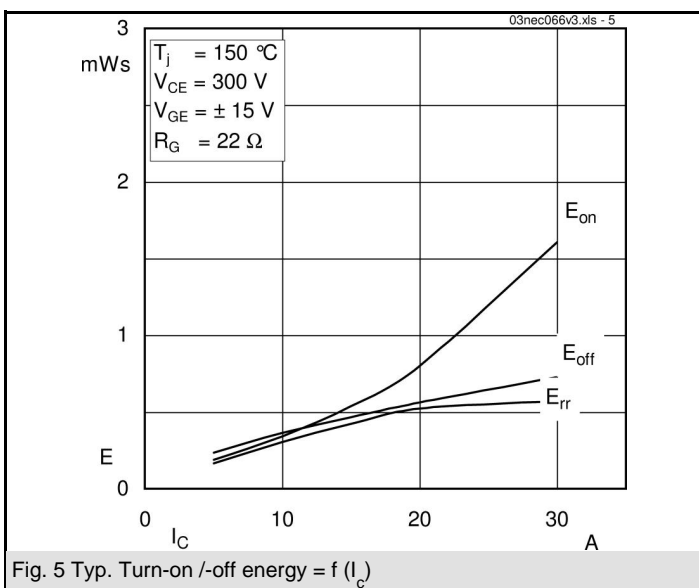
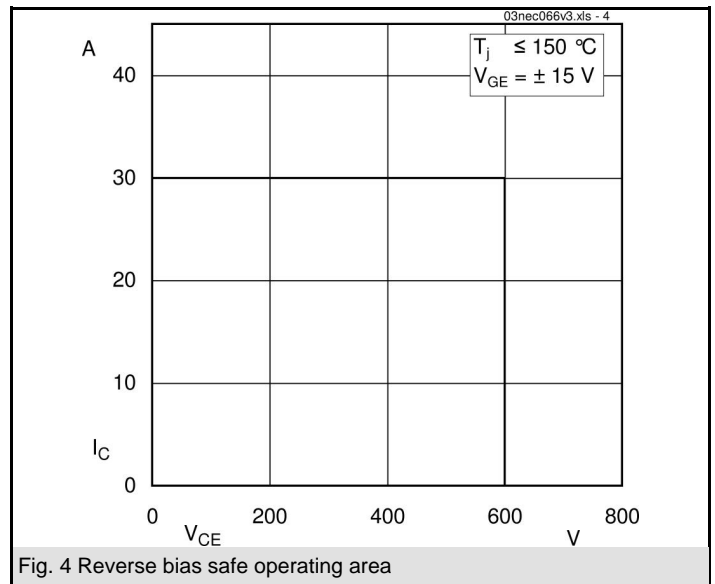
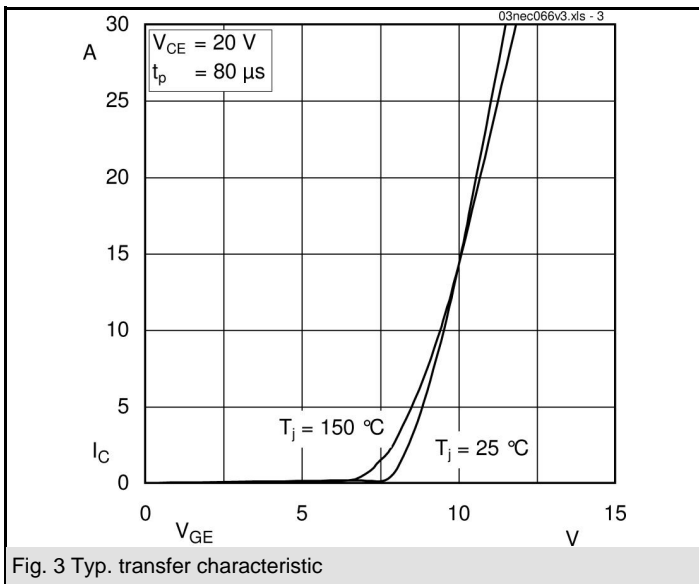
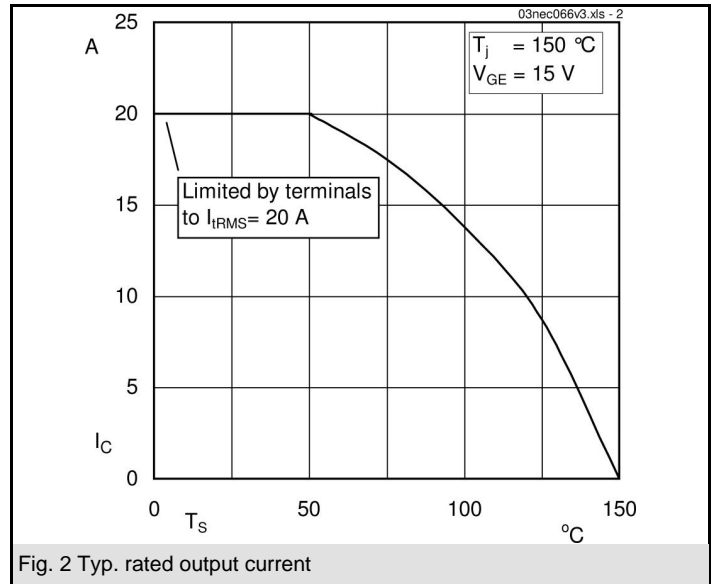
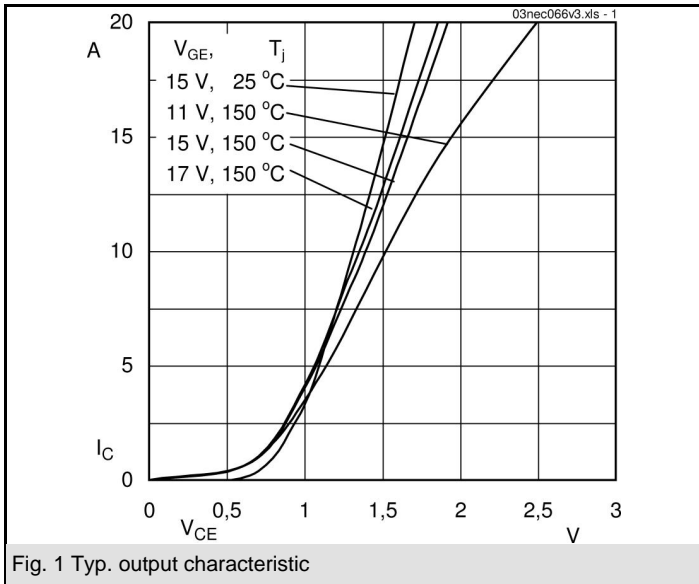
- Case temperature limited to  $T_C = 125^\circ\text{C}$  max.
- Product reliability results are valid for  $T_j = 150^\circ\text{C}$
- SC data:  $t_p \leq 6 \mu\text{s}$ ;  $V_{GE} \leq 15 \text{ V}$ ;  $T_j = 150^\circ\text{C}$ ;  $V_{CC} = 360 \text{ V}$
- $V_{CEsat}$ ,  $V_F =$  chip level value



NEC

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
$I_C$	$T_s = 25 (70)^\circ\text{C}$ , $T_j = 150^\circ\text{C}$	25 (17)	A
$I_C$	$T_s = 25 (70)^\circ\text{C}$ , $T_j = 175^\circ\text{C}$	27 (21)	A
$I_{CRM}$	$t_p = 1 \text{ ms}$	30	A
$V_{GES}$		$\pm 20$	V
<b>Diode - Inverter, Chopper</b>			
$I_F$	$T_s = 25 (70)^\circ\text{C}$ , $T_j = 150^\circ\text{C}$	24 (16)	A
$I_F$	$T_s = 25 (70)^\circ\text{C}$ , $T_j = 175^\circ\text{C}$	28 (21)	A
$I_{FRM}$	$t_p = 1 \text{ ms}$	30	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...+175	$^\circ\text{C}$
$T_{stg}$		-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
<b>IGBT - Inverter, Chopper</b>					
$V_{CE(sat)}$	$I_{Cnom} = 15 \text{ A}$ , $T_j = 25 (150)^\circ\text{C}$	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 (0,85)	1 (0,9)		V
$r_{CE}$	$T_j = 25 (150)^\circ\text{C}$	40 (57)	60 (80)		$\text{m}\Omega$
$C_{ies}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$	0,86			nF
$C_{oes}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$	0,18			nF
$C_{res}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$	0,12			nF
$R_{CC+EE'}$	spring contact-chip $T_s = 25 (150)^\circ\text{C}$				$\text{m}\Omega$
$R_{th(j-s)}$	per IGBT	1,8			K/W
$t_{d(on)}$	under following conditions	20			ns
$t_r$	$V_{CC} = 300 \text{ V}$ , $V_{GE} = \pm 15 \text{ V}$	30			ns
$t_{d(off)}$	$I_{Cnom} = 15 \text{ A}$ , $T_j = 150^\circ\text{C}$	155			ns
$t_f$	$R_{Gon} = R_{Goff} = 22 \Omega$	45			ns
$E_{on} (E_{off})$	inductive load	0,6 (0,5)			mJ
<b>Diode - Inverter, Chopper</b>					
$V_F = V_{EC}$	$I_F = 15 \text{ A}$ , $T_j = 25 (150)^\circ\text{C}$	1,4 (1,4)	1,7 (1,7)		V
$V_{(TO)}$	$T_j = 25 (150)^\circ\text{C}$	1 (0,9)	1,1 (1)		V
$r_T$	$T_j = 25 (150)^\circ\text{C}$	27 (34)	40 (47)		$\text{m}\Omega$
$R_{th(j-s)}$	per diode	2,5			K/W
$I_{RRM}$	under following conditions	19,8			A
$Q_{rr}$	$I_{Fnom} = 15 \text{ A}$ , $V_R = 300 \text{ V}$	1,9			$\mu\text{C}$
$E_{rr}$	$V_{GE} = 0 \text{ V}$ , $T_j = 150^\circ\text{C}$	0,5			mJ
	$di_F/dt = 930 \text{ A}/\mu\text{s}$				
<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		21,5			g
$M_s$	Mounting torque	2	2,5		Nm



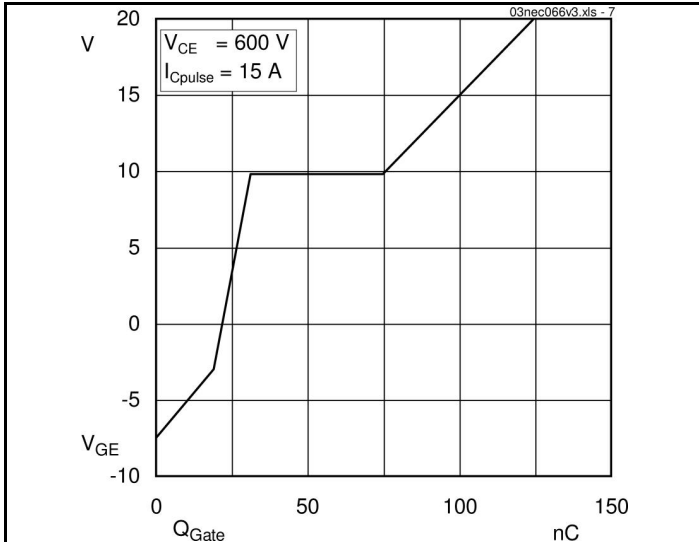


Fig. 7 Typ. gate charge characteristic

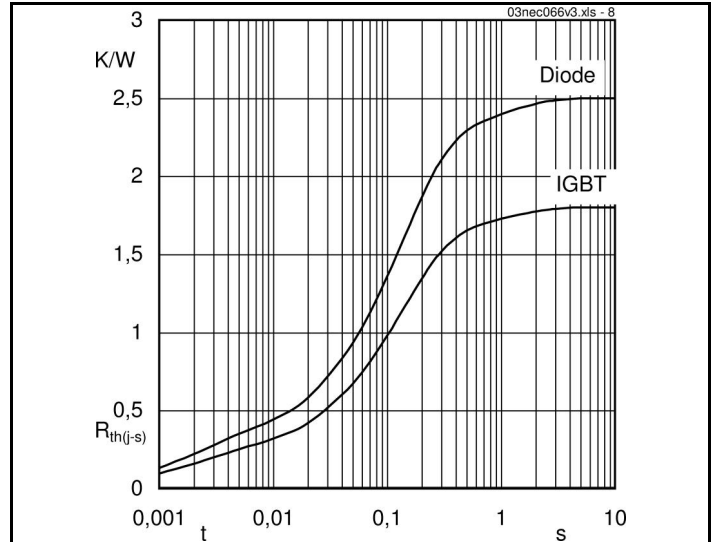


Fig. 8 Typ. thermal impedance

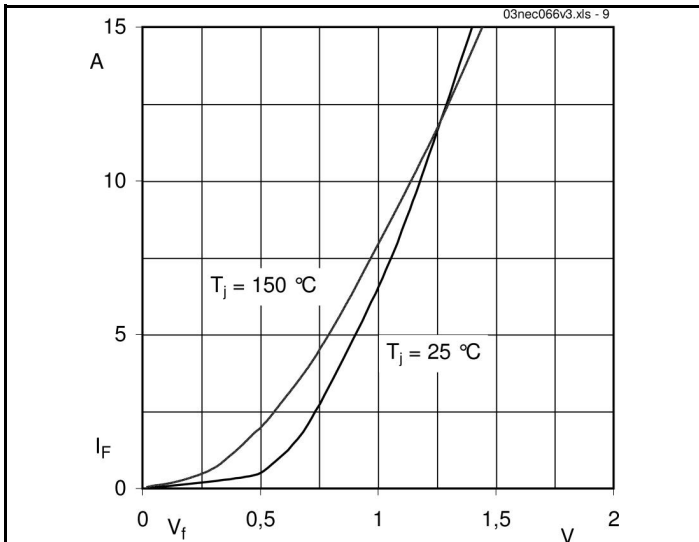


Fig. 9 Typ. freewheeling diode forward characteristic

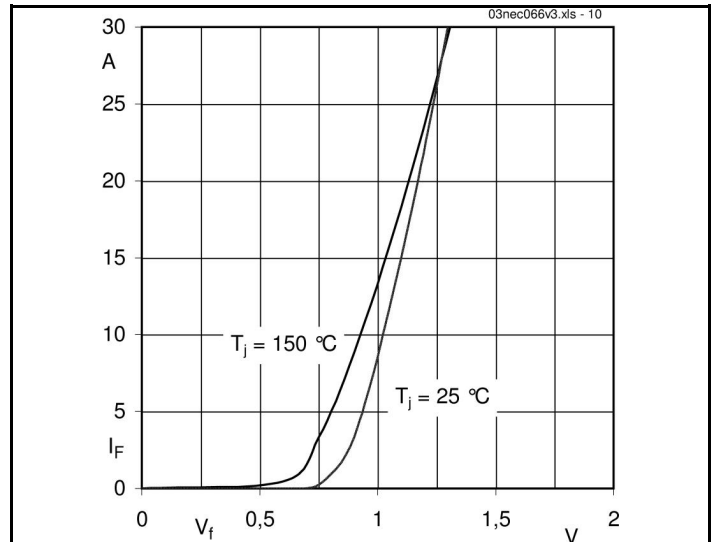
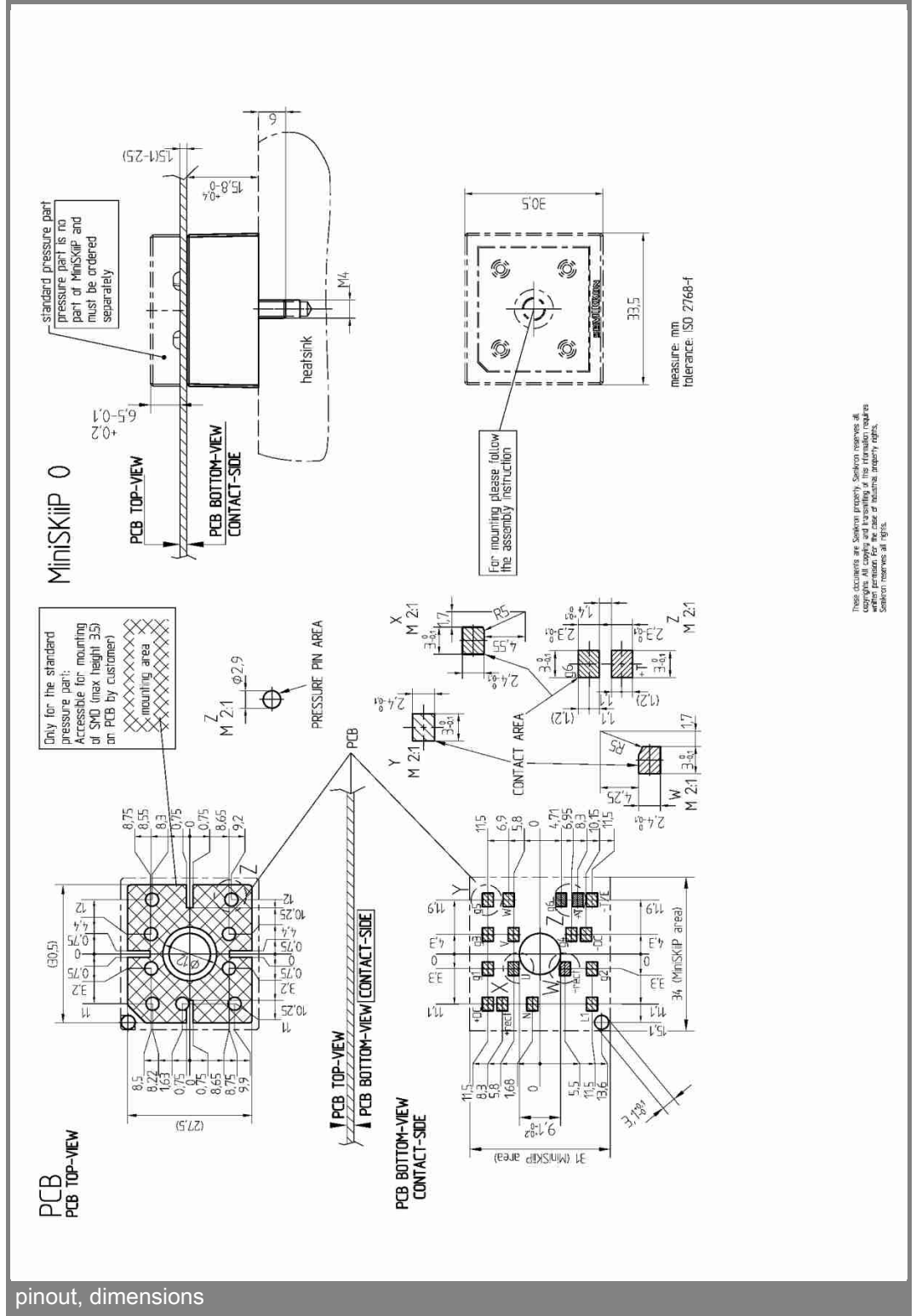
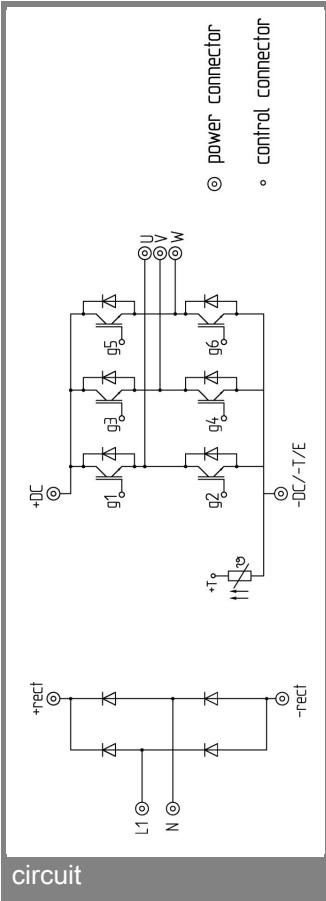


Fig. 10 Typ. input bridge forward characteristic



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

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