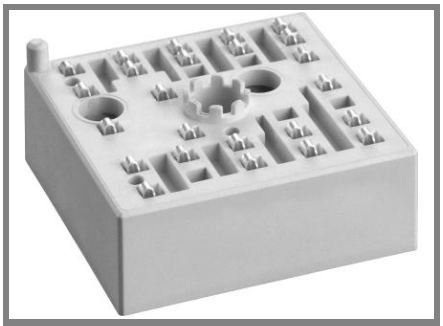
# SKiiP 11NAB066V1





**MiniSKiiP® 1**

3-phase bridge rectifier + brake chopper + 3-phase bridge inverter

**SKiiP 11NAB066V1**

## Features

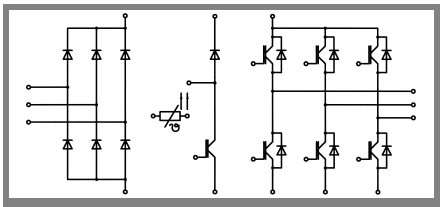
- Trench IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

## Typical Applications

- Inverter up to 3,5 kVA
- Typical motor power 1,5 kW

## Remarks

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



**NAB**

| **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 | 12 (11) | A |
| $I_C$ | $T_s$ = 25 (70) °C, $T_j$ = 175 °C | 12 (12) | A |
| $I_{CRM}$ | $t_p$ = 1 ms | 12 | A |
| $V_{GES}$ | | ± 20 | V |
| **Diode - Inverter, Chopper** | | | |
| $I_F$ | $T_s$ = 25 (70) °C, $T_j$ = 150 °C | 12 (12) | A |
| $I_F$ | $T_s$ = 25 (70) °C, $T_j$ = 175 °C | 12 (12) | A |
| $I_{FRM}$ | $t_p$ = 1 ms | 12 | A |
| **Diode - Rectifier** | | | |
| $V_{RRM}$ | | 800 | V |
| $I_F$ | $T_s$ = 70 °C | 35 | A |
| $I_{FSM}$ | $t_p$ = 10 ms, sin 180 °, $T_j$ = 25 °C | 220 | A |
| $i^2t$ | $t_p$ = 10 ms, sin 180 °, $T_j$ = 25 °C | 240 | $A^2s$ |
| $I_{tRMS}$ | per power terminal (20 A / spring) | 20 | A |
| $T_j$ | IGBT, Diode | -40...+175 | °C |
| $T_{stg}$ | | -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** | | | | | |
| $V_{CE(sat)}$ | $I_{Cnom}$ = 6 A, $T_j$ = 25 (150) °C | 1,1 | 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 (0,7) | 1,1 (1) | V |
| $r_{CE}$ | $T_j$ = 25 (150) °C | | 100 (167) | 134 (184) | mΩ |
| $C_{ies}$ | $V_{CE}$ = 25 V, $V_{GE}$ = 0 V, f = 1 MHz | | 0,45 | | nF |
| $C_{oes}$ | $V_{CE}$ = 25 V, $V_{GE}$ = 0 V, f = 1 MHz | | 0,1 | | nF |
| $C_{res}$ | $V_{CE}$ = 25 V, $V_{GE}$ = 0 V, f = 1 MHz | | 0,05 | | nF |
| $R_{CC'+EE'}$ | spring contact-chip $T_s$ = 25 (150 )°C | | | | mΩ |
| $R_{th(j-s)}$ | per IGBT | | 2,4 | | K/W |
| $t_{d(on)}$ | under following conditions | | 20 | | ns |
| $t_r$ | $V_{CC}$ = 300 V, $V_{GE}$ = -8V/+15V | | 25 | | ns |
| $t_{d(off)}$ | $I_{Cnom}$ = 6 A, $T_j$ = 150 °C | | 175 | | ns |
| $t_f$ | $R_{Gon} = R_{Goff}$ = 47 Ω | | 60 | | ns |
| $E_{on}$ ($E_{off}$) | inductive load | | 0,3 (0,2) | | mJ |
| **Diode - Inverter, Chopper** | | | | | |
| $V_F = V_{EC}$ | $I_F$ = 6 A, $T_j$ = 25 (150) °C | | 1,3 (1,3) | 1,6 (1,6) | V |
| $V_{(TO)}$ | $T_j$ = 25 (150) °C | | 0,9 (0,8) | 1 (0,9) | V |
| $r_T$ | $T_j$ = 25 (150) °C | | 67 (83) | 100 (117) | mΩ |
| $R_{th(j-s)}$ | per diode | | 3 | | K/W |
| $I_{RRM}$ | under following conditions | | 11,2 | | A |
| $Q_{rr}$ | $I_{Fnom}$ = 6 A, $V_R$ = 600 V | | 0,9 | | µC |
| $E_{rr}$ | $V_{GE}$ = 0 V, $T_j$ = 150°C | | 0,2 | | mJ |
| | $di_F/dt$ = 520 A/µs | | | | |
| **Diode - Rectifier** | | | | | |
| $V_F$ | $I_{Fnom}$ = 15 A, $T_j$ = 25 °C | | 1,1 | | V |
| $V_{(TO)}$ | $T_j$ = 150 °C | | 0,8 | | V |
| $r_T$ | $T_j$ = 150 °C | | 20 | | mΩ |
| $R_{th(j-s)}$ | per diode | | 1,5 | | 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 |

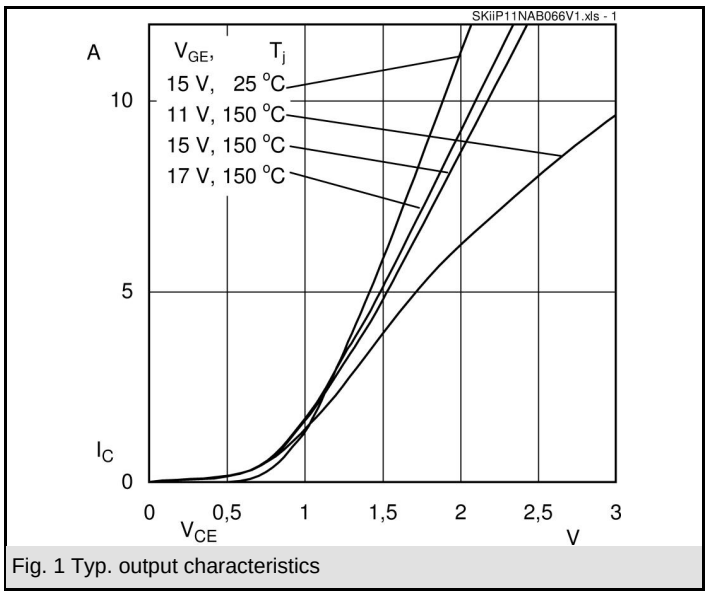



Fig. 1 Typ. output characteristics

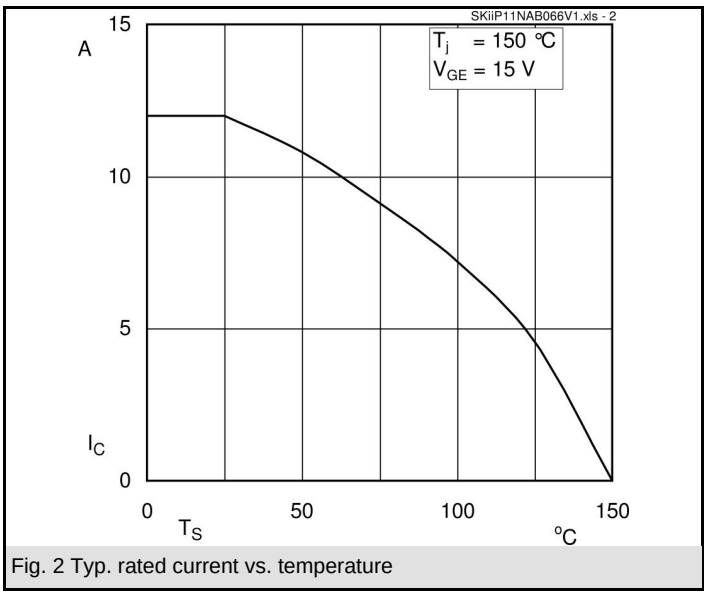



Fig. 2 Typ. rated current vs. temperature

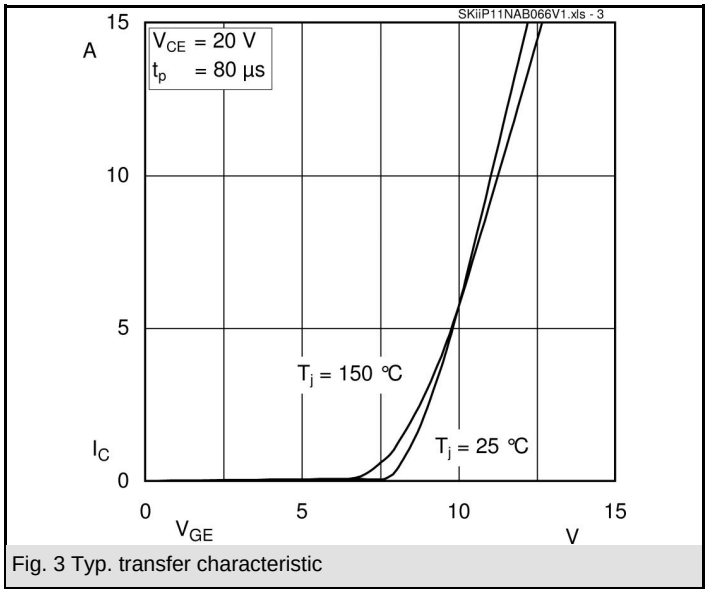



Fig. 3 Typ. transfer characteristic

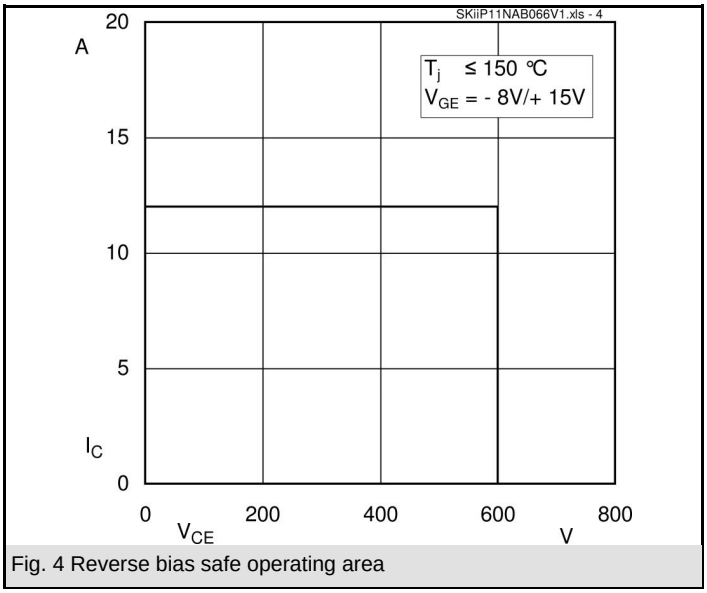



Fig. 4 Reverse bias safe operating area

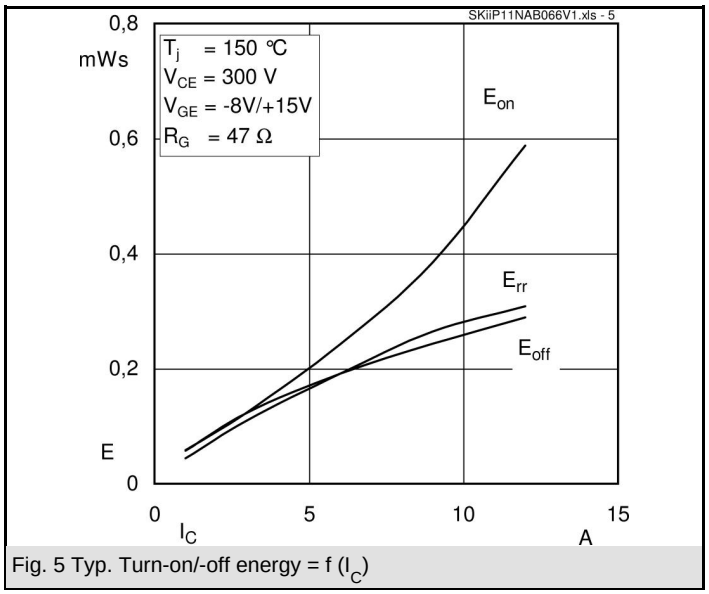



Fig. 5 Typ. Turn-on/-off energy = f ($I_C$)

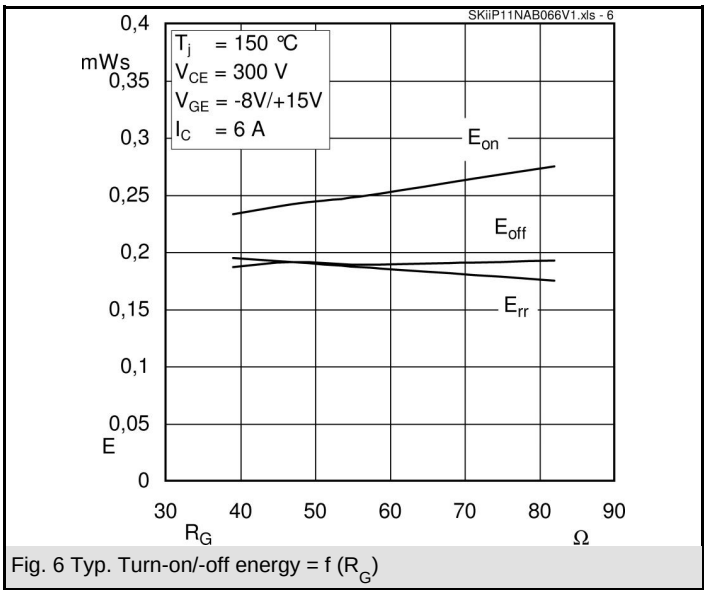



Fig. 6 Typ. Turn-on/-off energy = f ($R_G$)

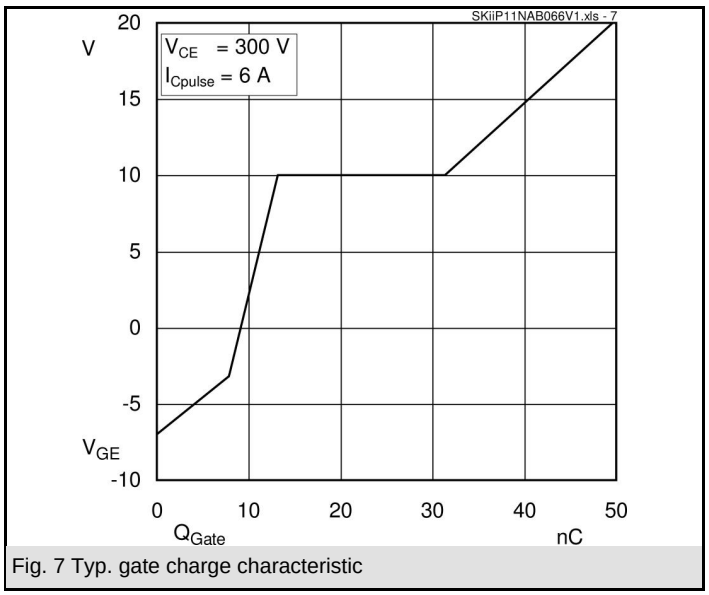



Fig. 7 Typ. gate charge characteristic

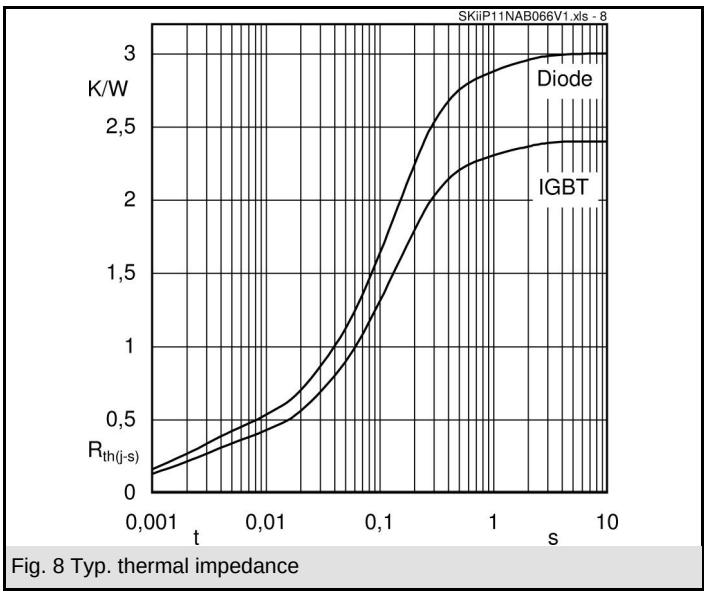



Fig. 8 Typ. thermal impedance

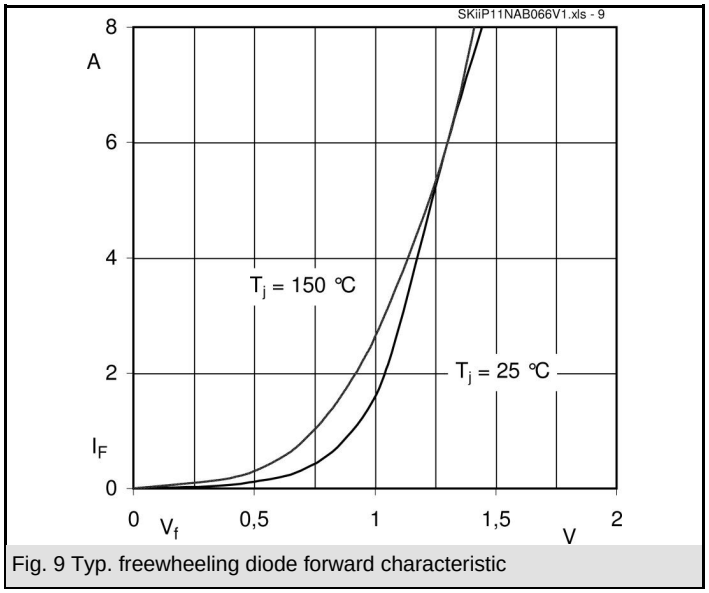



Fig. 9 Typ. freewheeling diode forward characteristic

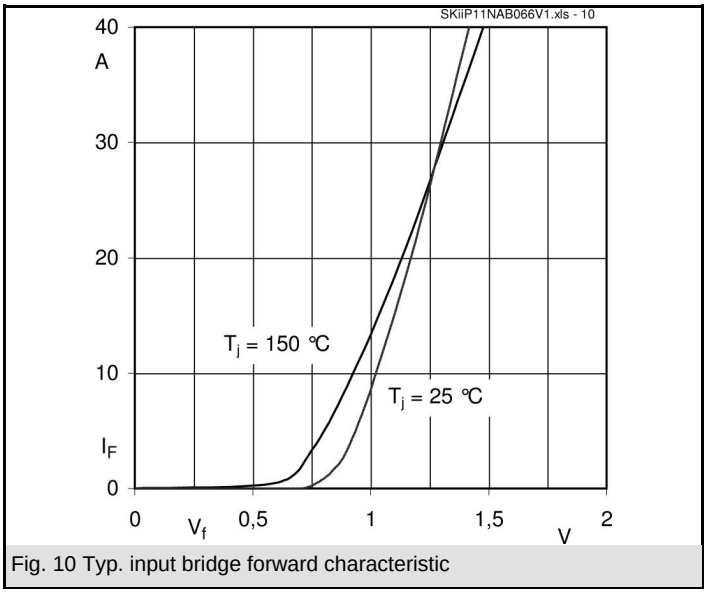
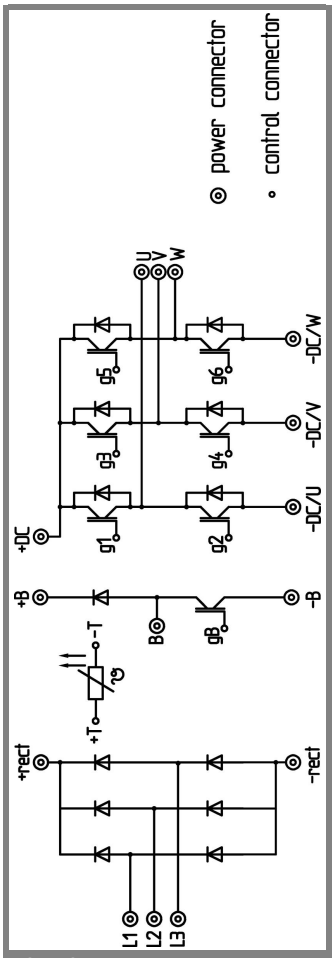
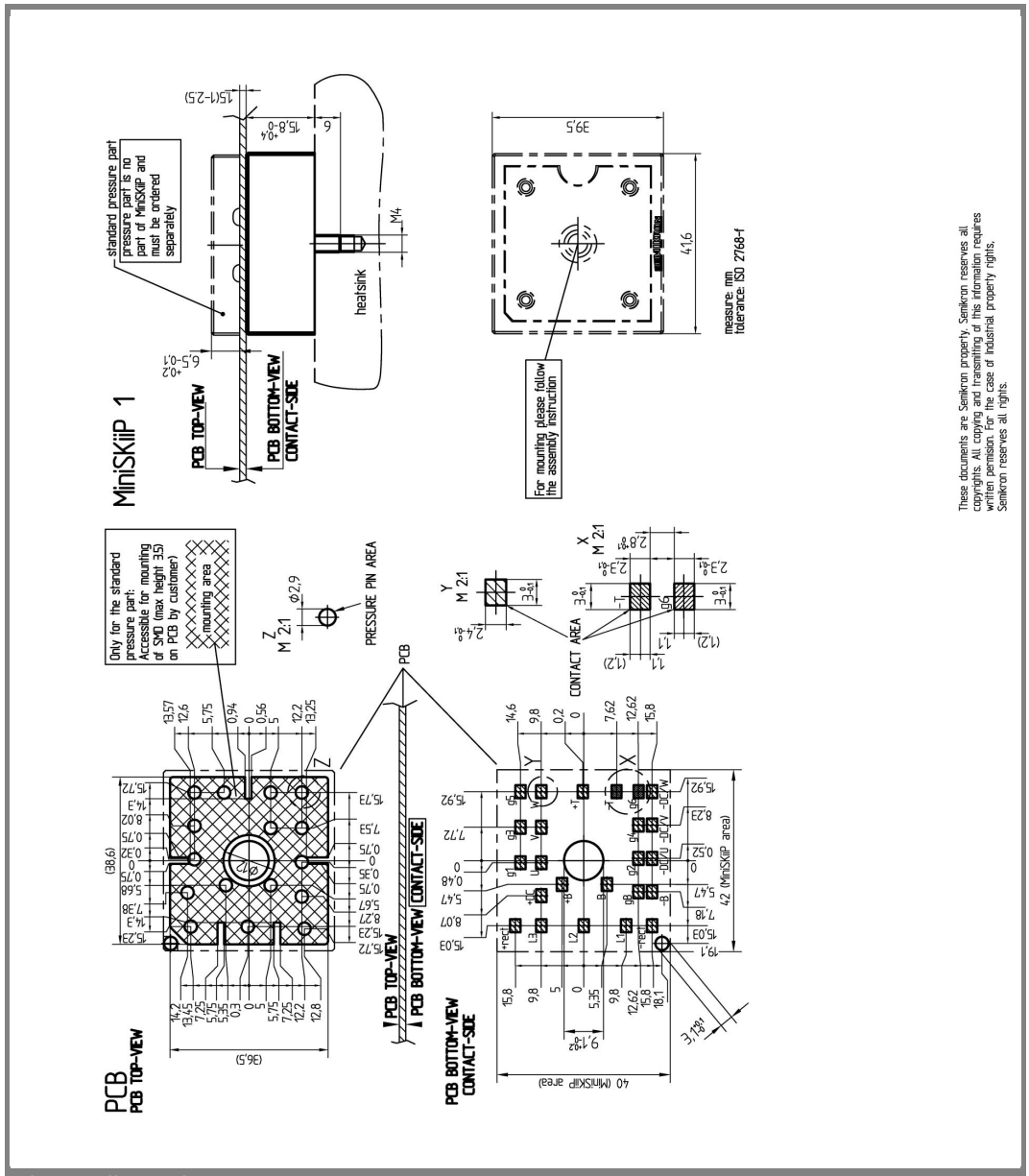



Fig. 10 Typ. input bridge forward characteristic




circuit




pinout, dimensions

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

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.