

SKiiP 02NAC066V3



MiniSKiiP[®]0

3-phase bridge rectifier +
3-phase bridge inverter

SKiiP 02NAC066V3

Features

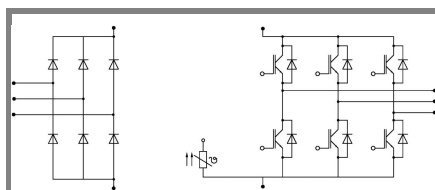
- Trench IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Typical Applications

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

Remarks

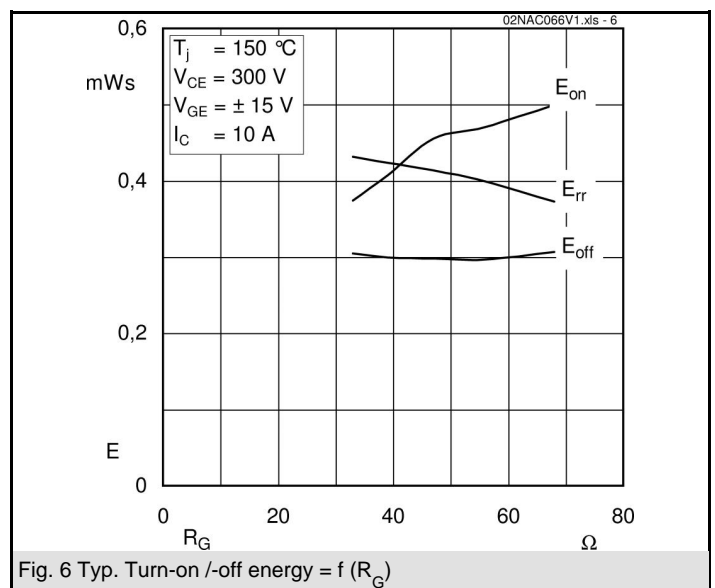
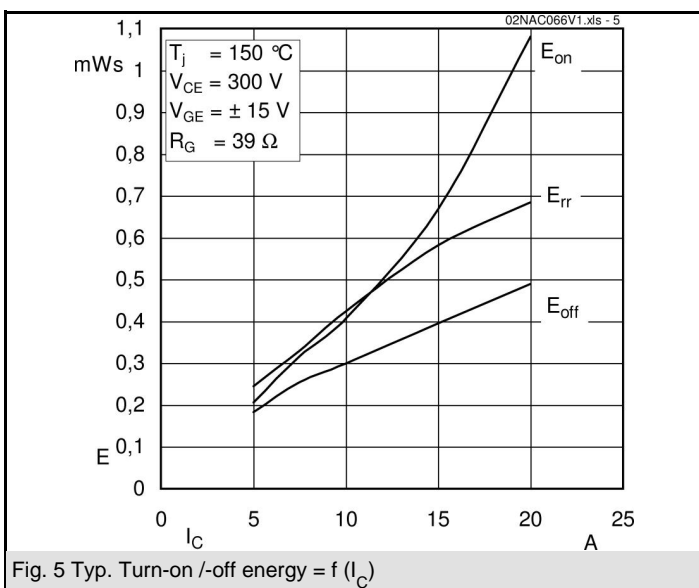
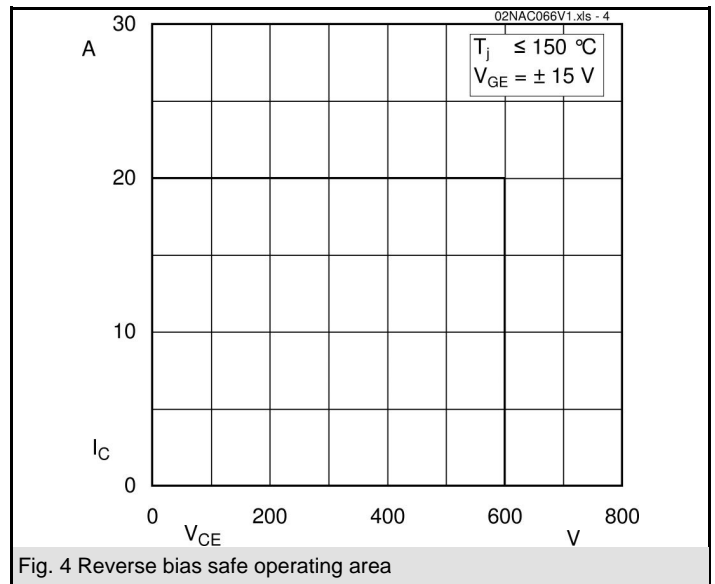
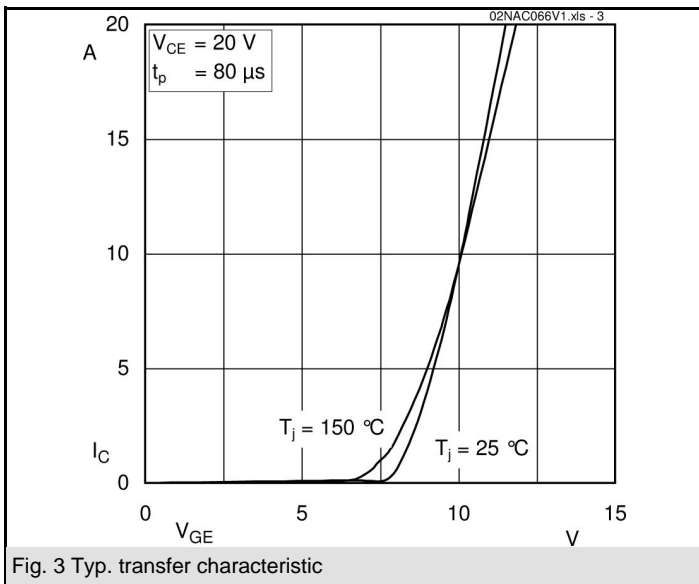
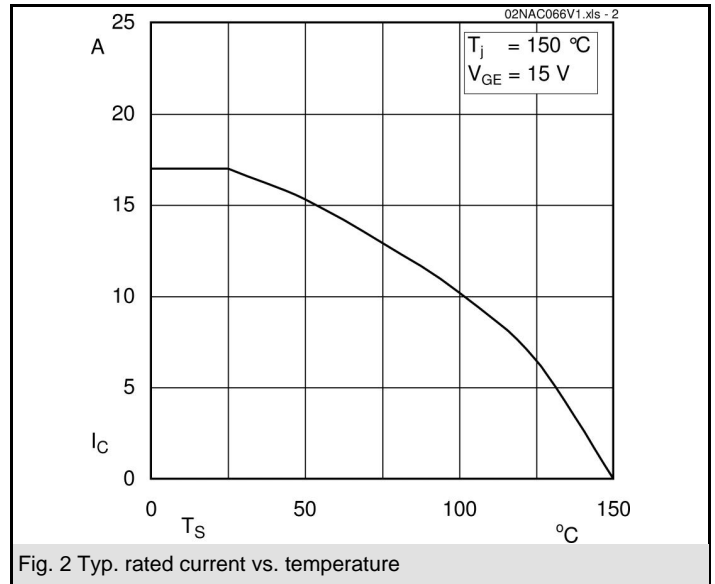
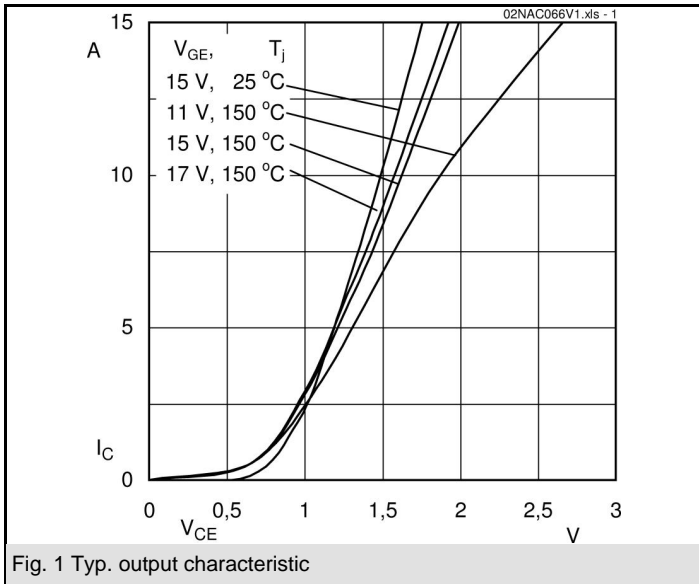
- Case temperature limited to $T_C = 125^\circ\text{C}$ max.
- Product reliability results are valid for $T_j = 150^\circ\text{C}$
- SC data: $t_p \leq 6 \mu\text{s}$; $V_{GE} \leq 15 \text{ V}$; $T_j = 150^\circ\text{C}$; $V_{CC} = 360 \text{ V}$
- V_{CEsat} , V_F = chip level values



NAC

| Absolute Maximum Ratings | | $T_S = 25^\circ\text{C}$, unless otherwise specified | |
|--------------------------|---|---|----------------------|
| Symbol | Conditions | Values | Units |
| IGBT - Inverter | | | |
| 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} | | ± 20 | V |
| Diode - Inverter | | | |
| 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 |
| Diode - Rectifier | | | |
| 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 | A^2s |
| 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 |
| IGBT - Inverter | | | | | |
| $V_{CE(sat)}$ | $I_{Cnom} = 10 \text{ A}$, $T_j = 25 (150)^\circ\text{C}$ | 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 |
| Diode - Inverter | | | | | |
| $V_F = V_{EC}$ | $I_F = 10 \text{ A}$, $T_j = 25 (150)^\circ\text{C}$ | | 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 | | μC |
| E_{rr} | $V_{GE} = 0 \text{ V}$, $T_j = 150^\circ\text{C}$ | | 0,5 | | mJ |
| | $di_F/dt = 810 \text{ A}/\mu\text{s}$ | | | | |
| Diode - Rectifier | | | | | |
| 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 |
| Temperature Sensor | | | | | |
| R_{ts} | 3 %, $T_r = 25 (100)^\circ\text{C}$ | | 1000(1670) | | Ω |
| Mechanical Data | | | | | |
| w | | | 21,5 | | g |
| M_s | Mounting torque | 2 | | 2,5 | Nm |



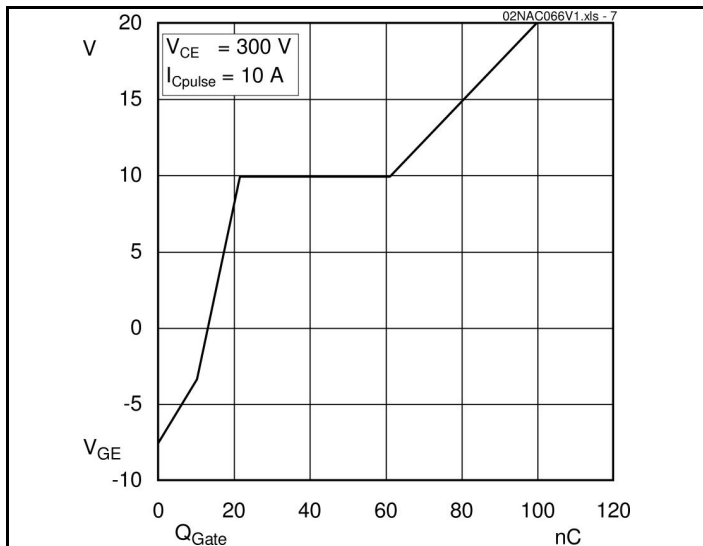


Fig. 7 Typ. gate charge characteristic

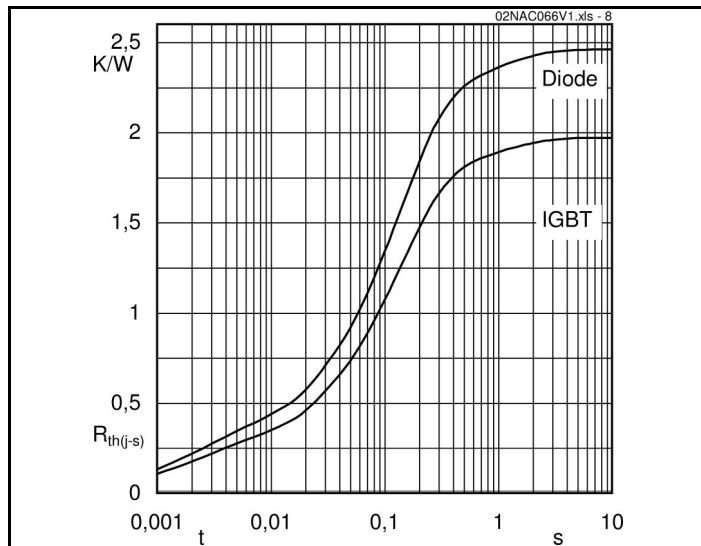


Fig. 8 Typ. thermal impedance

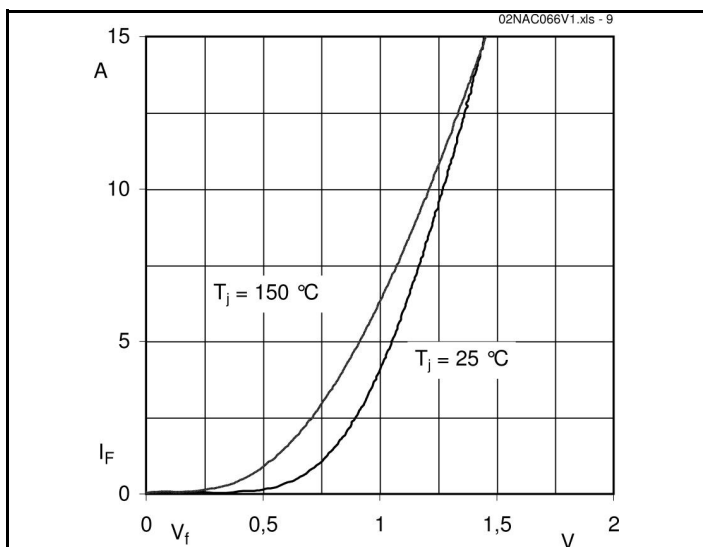


Fig. 9 Typ. freewheeling diode forward characteristic

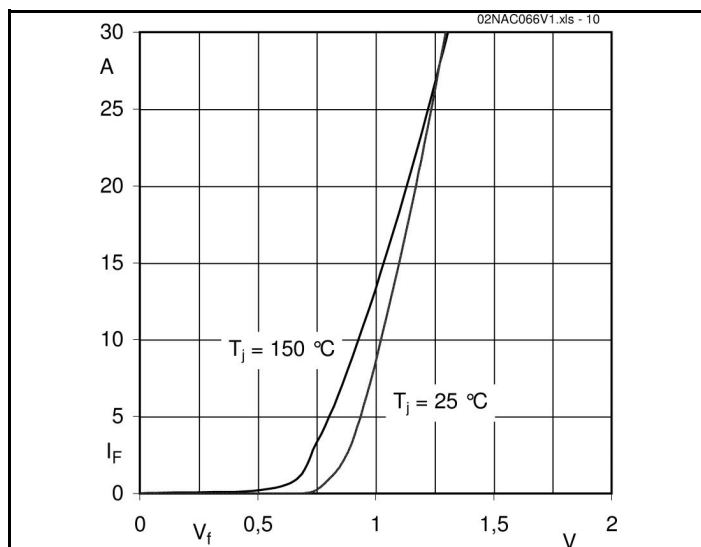
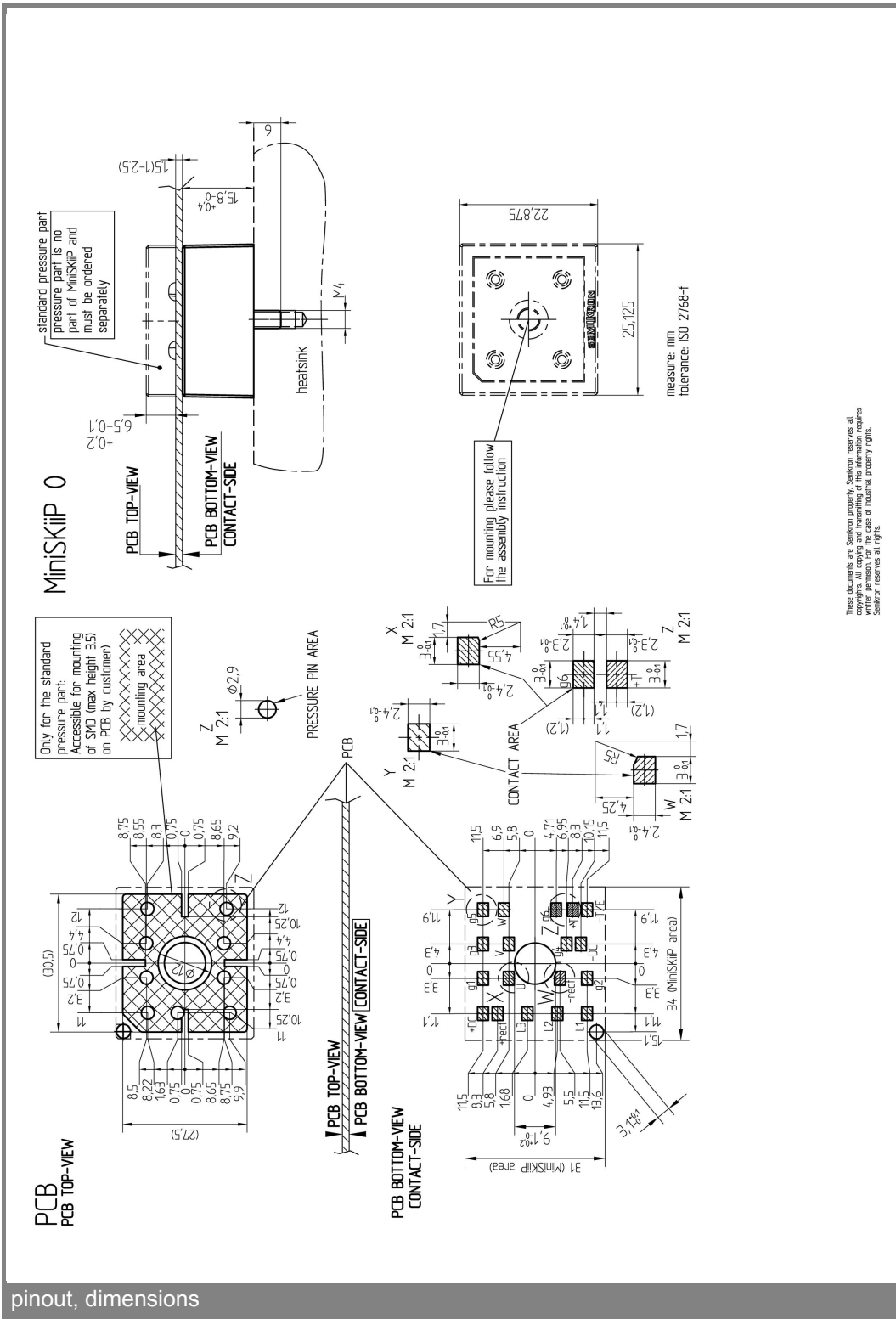
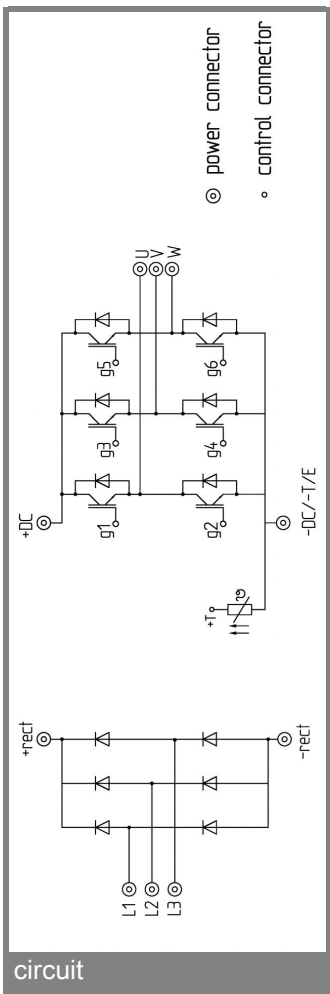


Fig. 10 Typ. input bridge forward characteristic



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