

MiniSKiiP® 3

3-phase bridge rectifier +  
brake chopper + 3-phase  
bridge inverter  
SKiiP 36NAB126V10

## Features

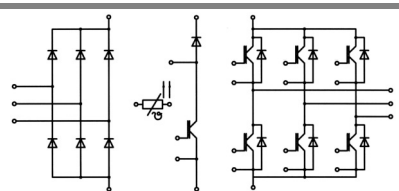
- Fast Trench IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

## Typical Applications\*

- Inverter up to 36 kVA
- Typical motor power 18,5 kW

## Remarks

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



NAB

| Absolute Maximum Ratings  |                                    | T <sub>s</sub> = 25 °C, unless otherwise specified |                  |
|---------------------------|------------------------------------|----------------------------------------------------|------------------|
| Symbol                    | Conditions                         | Values                                             | Units            |
| IGBT - Inverter, Chopper  |                                    |                                                    |                  |
| V <sub>CES</sub>          | T <sub>s</sub> = 25 (70) °C        | 1200                                               | V                |
| I <sub>C</sub>            |                                    | 88 (66)                                            | A                |
| I <sub>CRM</sub>          |                                    | 140                                                | A                |
| V <sub>GES</sub>          |                                    | ± 20                                               | V                |
| T <sub>j</sub>            |                                    | - 40 ... + 150                                     | °C               |
| Diode - Inverter, Chopper |                                    |                                                    |                  |
| I <sub>F</sub>            | T <sub>s</sub> = 25 (70) °C        | 91 (68)                                            | A                |
| I <sub>FRM</sub>          |                                    | 140                                                | A                |
| T <sub>j</sub>            |                                    | - 40 ... + 150                                     | °C               |
| Diode - Rectifier         |                                    |                                                    |                  |
| V <sub>RRM</sub>          | T <sub>s</sub> = 70 °C             | 1600                                               | V                |
| I <sub>F</sub>            |                                    | 67                                                 | A                |
| I <sub>FSM</sub>          |                                    | 850                                                | A                |
| i <sup>2</sup> t          |                                    | 3600                                               | A <sup>2</sup> s |
| T <sub>j</sub>            |                                    | - 40 ... + 150                                     | °C               |
| Module                    |                                    |                                                    |                  |
| I <sub>tRMS</sub>         | per power terminal (20 A / spring) | 80                                                 | A                |
| T <sub>stg</sub>          |                                    | - 40 ... + 125                                     | °C               |
| V <sub>isol</sub>         | AC, 1 min.                         | 2500                                               | V                |

| Characteristics                  |                                                                                                                                                                                                     | T <sub>s</sub> = 25 °C, unless otherwise specified |            |           |       |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------------|-----------|-------|
| Symbol                           | Conditions                                                                                                                                                                                          | min.                                               | typ.       | max.      | Units |
| IGBT - Inverter, Chopper         |                                                                                                                                                                                                     |                                                    |            |           |       |
| V <sub>CEsat</sub>               | I <sub>Cnom</sub> = 70 A, T <sub>j</sub> = 25 (125) °C                                                                                                                                              | 5                                                  | 1,7 (2)    | 2,1 (2,4) | V     |
| V <sub>GE(th)</sub>              | V <sub>GE</sub> = V <sub>CE</sub> ; I <sub>C</sub> = 3 mA                                                                                                                                           |                                                    | 5,8        | 6,5       | V     |
| V <sub>CE(TO)</sub>              | T <sub>j</sub> = 25 (125) °C                                                                                                                                                                        |                                                    | 1 (0,9)    | 1,2 (1,1) | V     |
| r <sub>T</sub>                   | T <sub>j</sub> = 25 (125) °C                                                                                                                                                                        |                                                    | 10 (16)    | 13 (19)   | mΩ    |
| C <sub>ies</sub>                 | V <sub>CE</sub> = 25 V, V <sub>GE</sub> = 0 V, f = 1 MHz                                                                                                                                            |                                                    | 4,8        |           | nF    |
| C <sub>oes</sub>                 | V <sub>CE</sub> = 25 V, V <sub>GE</sub> = 0 V, f = 1 MHz                                                                                                                                            |                                                    | 1          |           | nF    |
| C <sub>res</sub>                 | V <sub>CE</sub> = 25 V, V <sub>GE</sub> = 0 V, f = 1 MHz                                                                                                                                            |                                                    | 0,6        |           | nF    |
| R <sub>th(j-s)</sub>             | per IGBT                                                                                                                                                                                            |                                                    | 0,5        |           | K/W   |
| t <sub>d(on)</sub>               | under following conditions<br>V <sub>CC</sub> = 600 V, V <sub>GE</sub> = ± 15 V<br>I <sub>Cnom</sub> = 70 A, T <sub>j</sub> = 125°C<br>R <sub>Gon</sub> = R <sub>Goff</sub> = 9 Ω<br>inductive load |                                                    | 80         |           | ns    |
| t <sub>r</sub>                   |                                                                                                                                                                                                     |                                                    | 25         |           | ns    |
| t <sub>d(off)</sub>              |                                                                                                                                                                                                     |                                                    | 390        |           | ns    |
| t <sub>f</sub>                   |                                                                                                                                                                                                     |                                                    | 90         |           | ns    |
| E <sub>on</sub>                  |                                                                                                                                                                                                     |                                                    | 9          |           | mJ    |
| E <sub>off</sub>                 |                                                                                                                                                                                                     |                                                    | 7,7        |           | mJ    |
| Diode - Inverter, Chopper        |                                                                                                                                                                                                     |                                                    |            |           |       |
| V <sub>F</sub> = V <sub>EC</sub> | I <sub>Fnom</sub> = 70 A, T <sub>j</sub> = 25 (125) °C                                                                                                                                              |                                                    | 1,5 (1,5)  | 1,7 (1,7) | V     |
| V <sub>(TO)</sub>                | T <sub>j</sub> = 25 (125) °C                                                                                                                                                                        |                                                    | 1 (0,8)    | 1,1 (0,9) | V     |
| r <sub>T</sub>                   | T <sub>j</sub> = 25 (125) °C                                                                                                                                                                        |                                                    | 7,1 (10)   | 8,6 (11)  | mΩ    |
| R <sub>th(j-s)</sub>             | per diode                                                                                                                                                                                           |                                                    | 0,7        |           | K/W   |
| I <sub>RRM</sub>                 | under following conditions<br>I <sub>Fnom</sub> = 70 A, V <sub>R</sub> = 600 V<br>V <sub>GE</sub> = 0 V, T <sub>j</sub> = 125 °C<br>di <sub>F</sub> /dt = 2000 A/μs                                 |                                                    | 77         |           | A     |
| Q <sub>rr</sub>                  |                                                                                                                                                                                                     |                                                    | 18         |           | μC    |
| E <sub>rr</sub>                  |                                                                                                                                                                                                     |                                                    | 7,5        |           | mJ    |
|                                  |                                                                                                                                                                                                     |                                                    |            |           |       |
| Diode - Rectifier                |                                                                                                                                                                                                     |                                                    |            |           |       |
| V <sub>F</sub>                   | I <sub>Fnom</sub> = 40 A, T <sub>j</sub> = 25 °C                                                                                                                                                    |                                                    | 1,1        |           | V     |
| V <sub>(TO)</sub>                | T <sub>j</sub> = 125 °C                                                                                                                                                                             |                                                    | 0,8        |           | V     |
| r <sub>T</sub>                   | T <sub>j</sub> = 125 °C                                                                                                                                                                             |                                                    | 9          |           | mΩ    |
| R <sub>th(j-s)</sub>             | per diode                                                                                                                                                                                           |                                                    | 0,85       |           | K/W   |
| Temperature Sensor               |                                                                                                                                                                                                     |                                                    |            |           |       |
| R <sub>ts</sub>                  | 3 %, T <sub>r</sub> = 25 (100) °C                                                                                                                                                                   |                                                    | 1000(1670) |           | Ω     |
| Mechanical Data                  |                                                                                                                                                                                                     |                                                    |            |           |       |
| w                                |                                                                                                                                                                                                     |                                                    | 95         |           | g     |
| M <sub>s</sub>                   | Mounting torque                                                                                                                                                                                     | 2                                                  |            | 2,5       | Nm    |

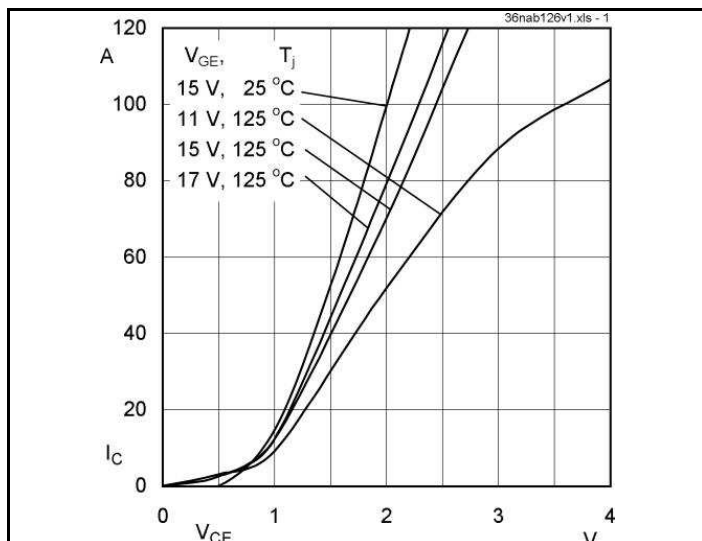


Fig. 1 Typ. output characteristic

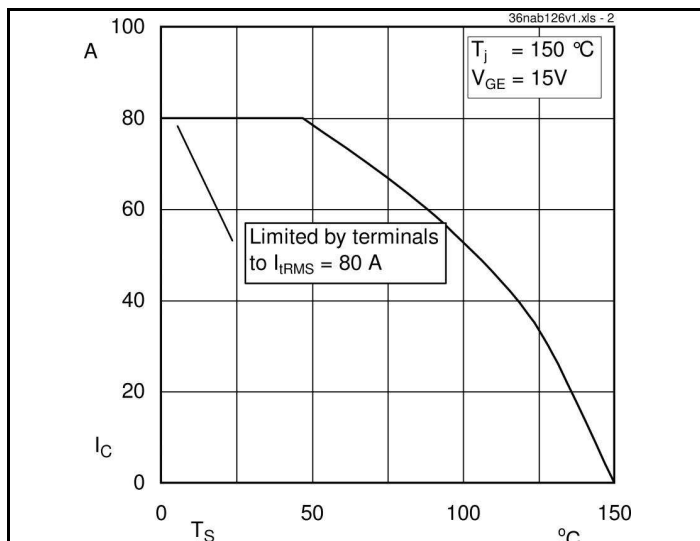


Fig. 2 Typ. rated current vs. temperature

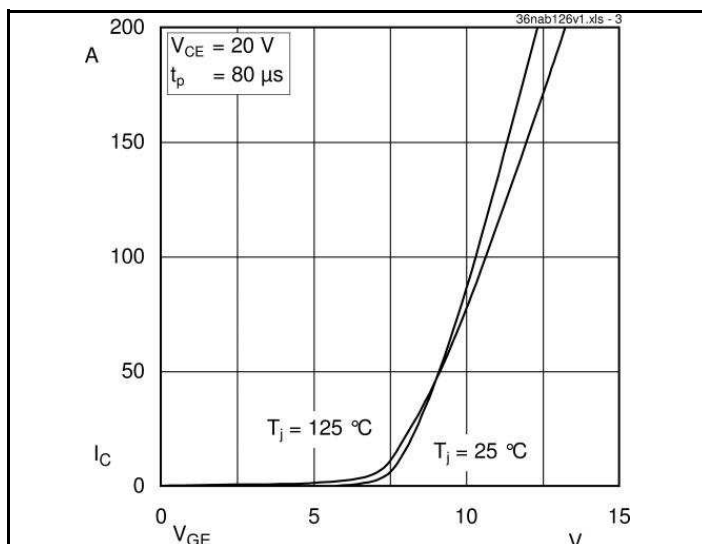


Fig. 3 Typ. transfer characteristic

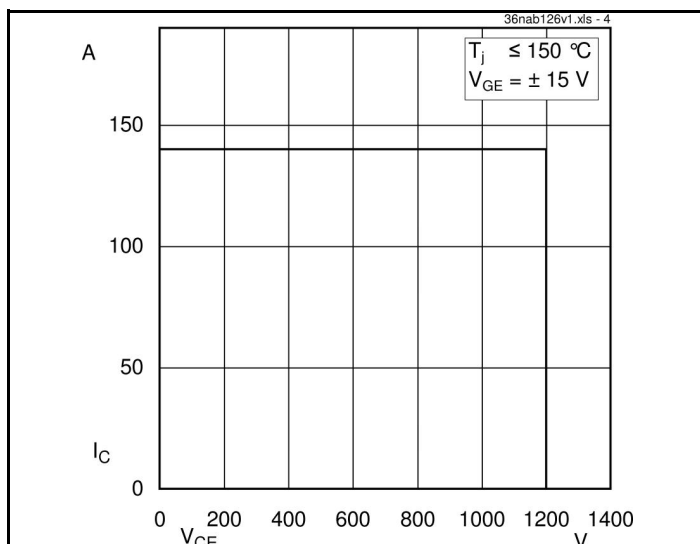


Fig. 4 Reverse bias safe operating area

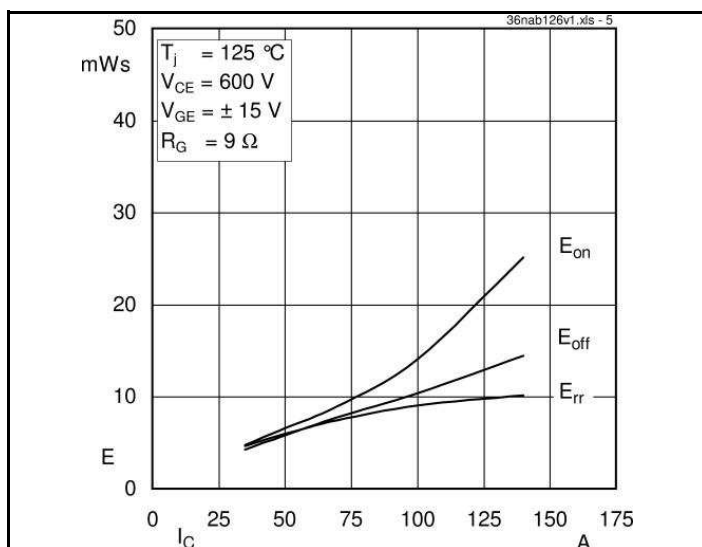


Fig. 5 Typ. Turn-on /-off energy =  $f(I_C)$

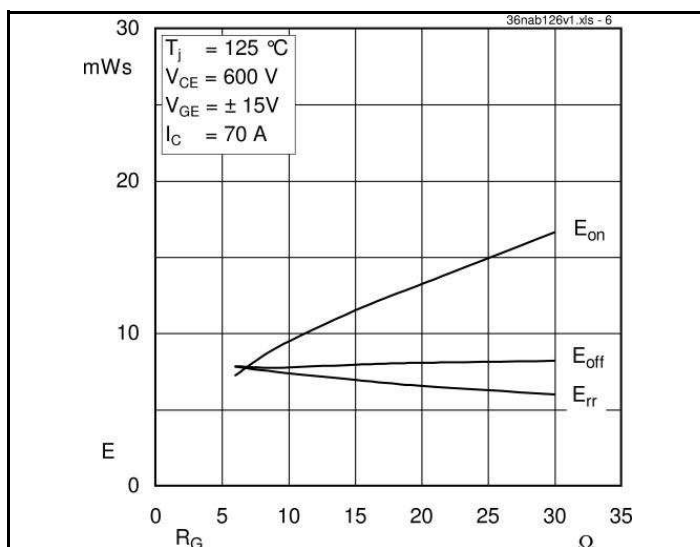
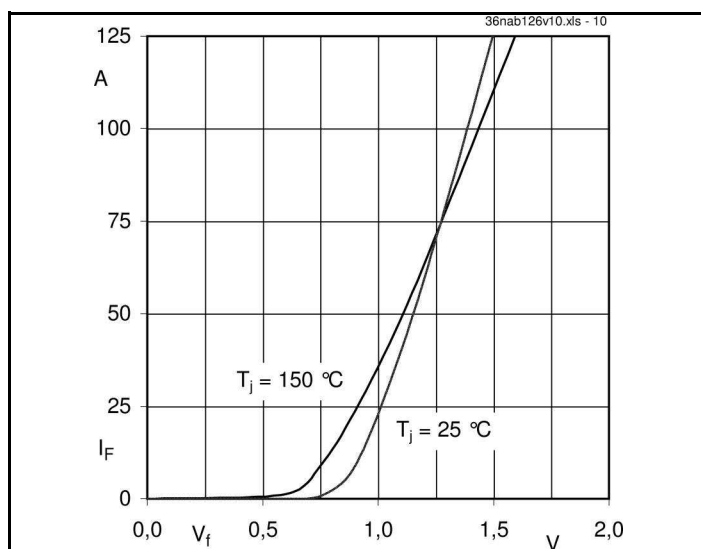
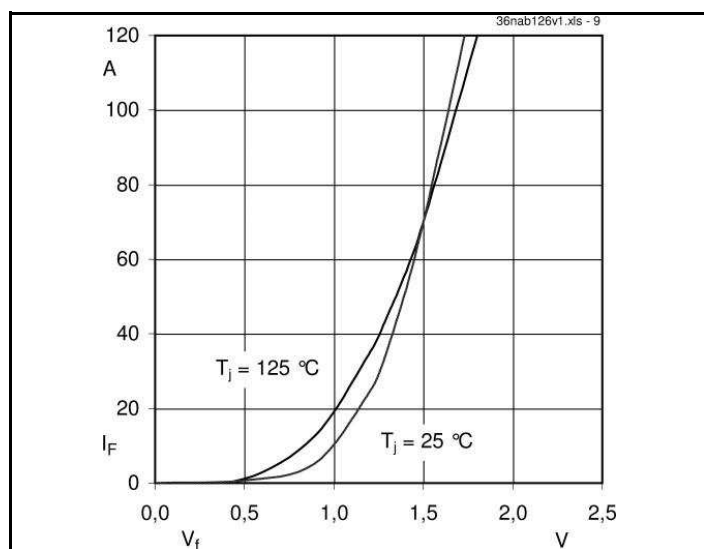
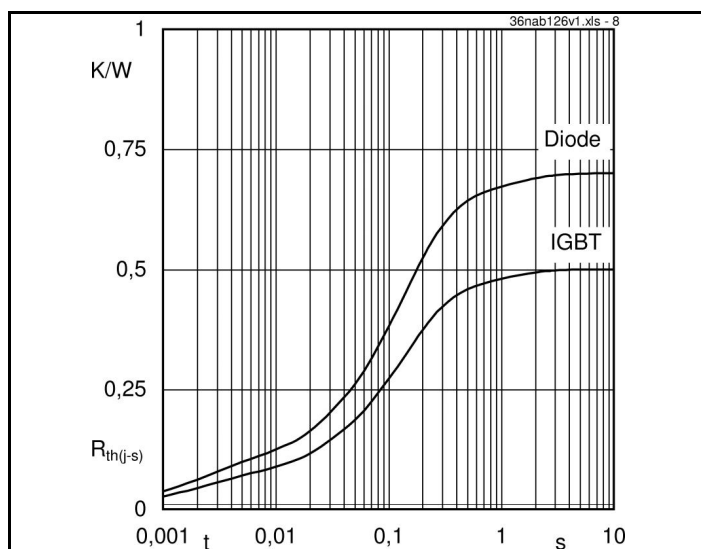
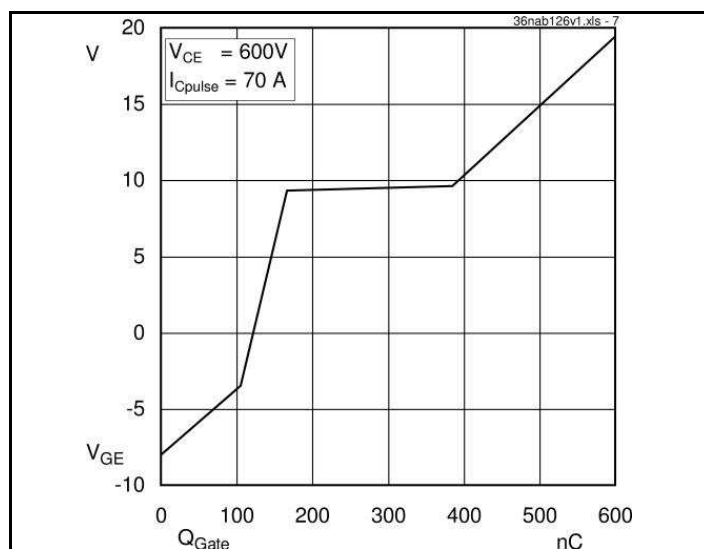
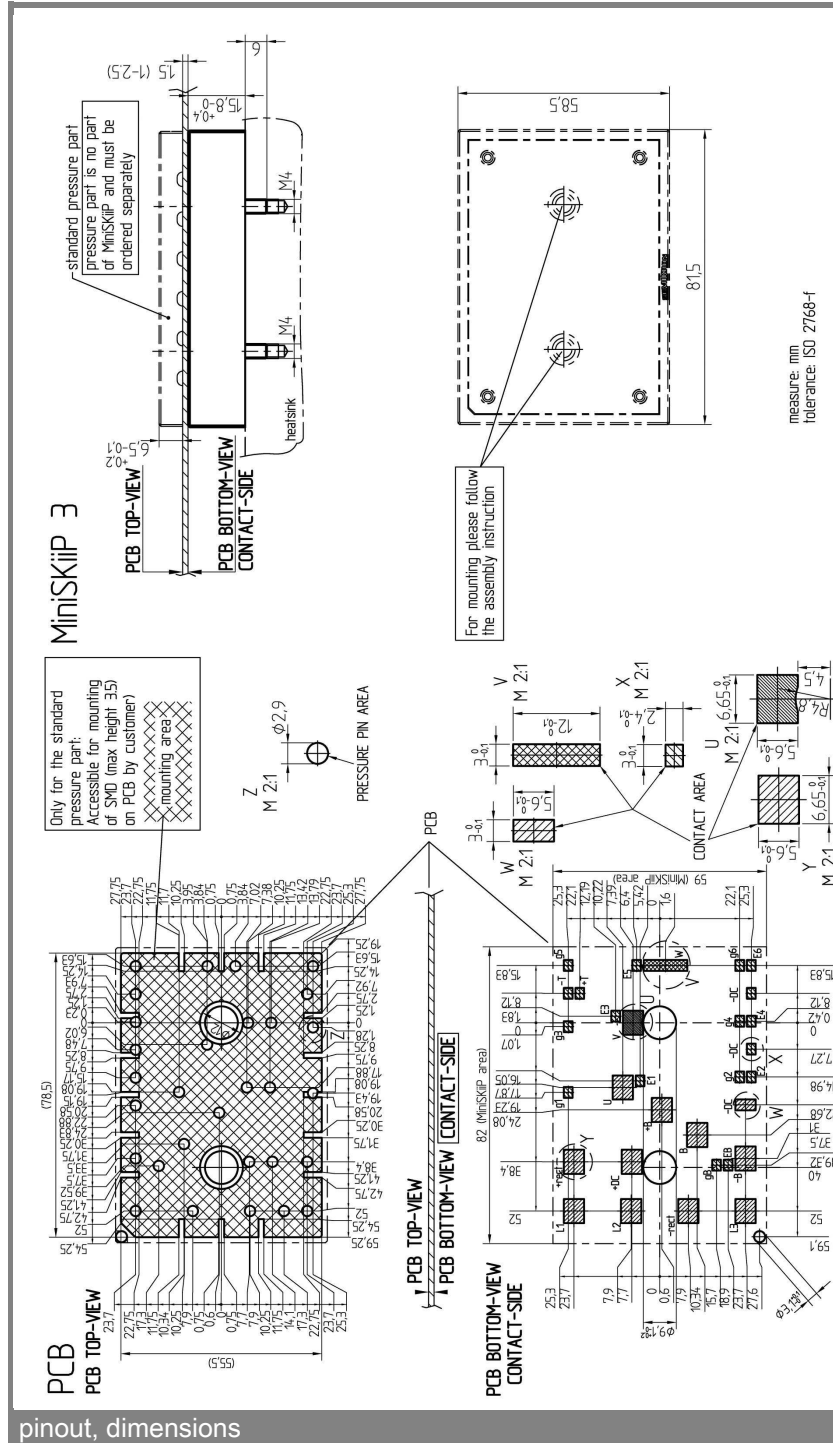
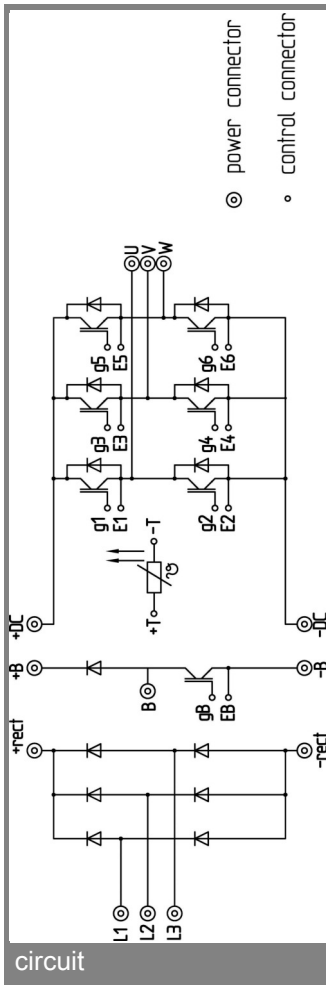


Fig. 6 Typ. Turn-on /-off energy =  $f(R_G)$





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

\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.