

# SKiM 270GD176D



SKiM<sup>®</sup> 5

## IGBT Modules

### SKiM 270GD176D

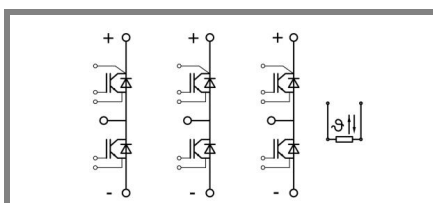
Preliminary Data

#### Features

- Homogenous Si
- Trench = Trenchgate Technology
- Low inductance case
- Isolated by Al<sub>2</sub>O<sub>3</sub> DCB (Direct Copper Bonded) ceramic plate
- Pressure contact technology for thermal contacts
- V<sub>CEsat</sub> with positive temperature coefficient
- High short circuit capability, self limiting to 6x I<sub>C</sub>
- Vf value is specified on chip level
- Integrated temperature sensor
- Spring contact system to attach driver PCB to the auxiliary terminals

#### Typical Applications\*

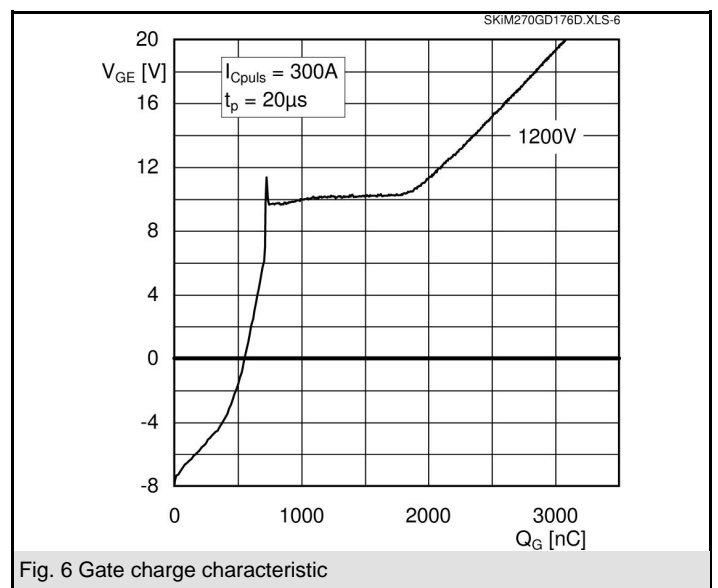
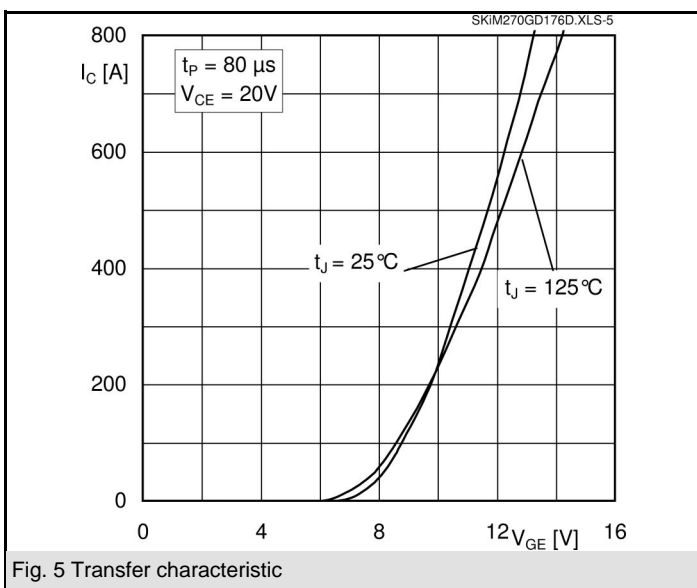
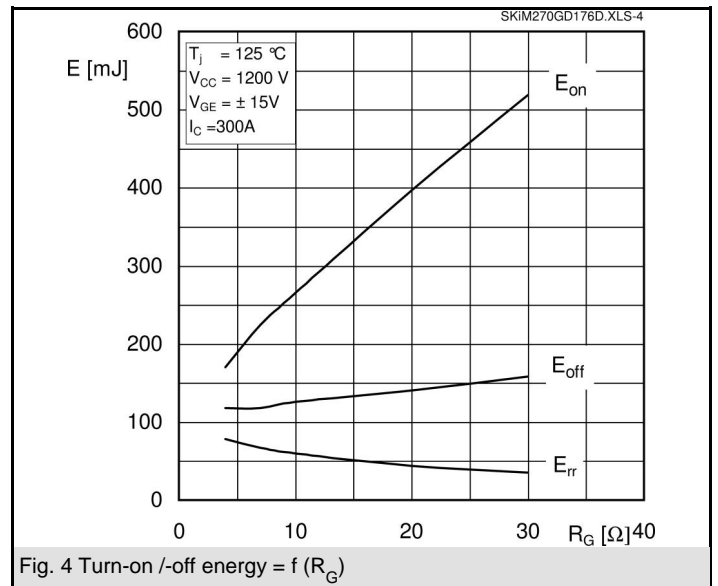
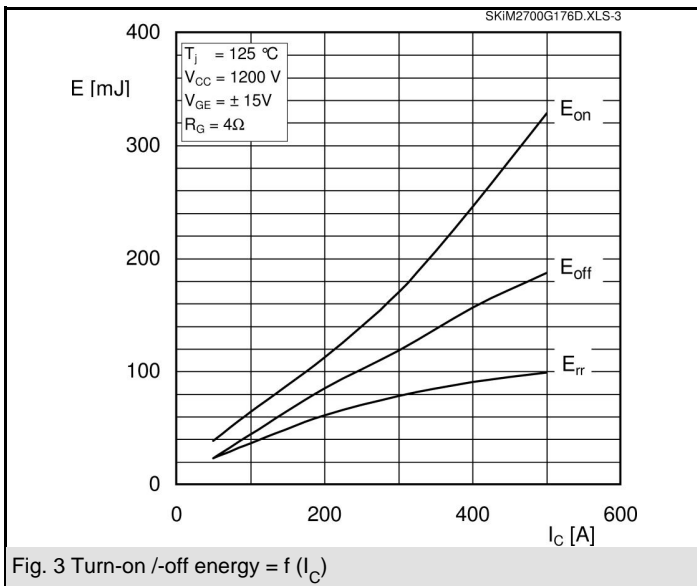
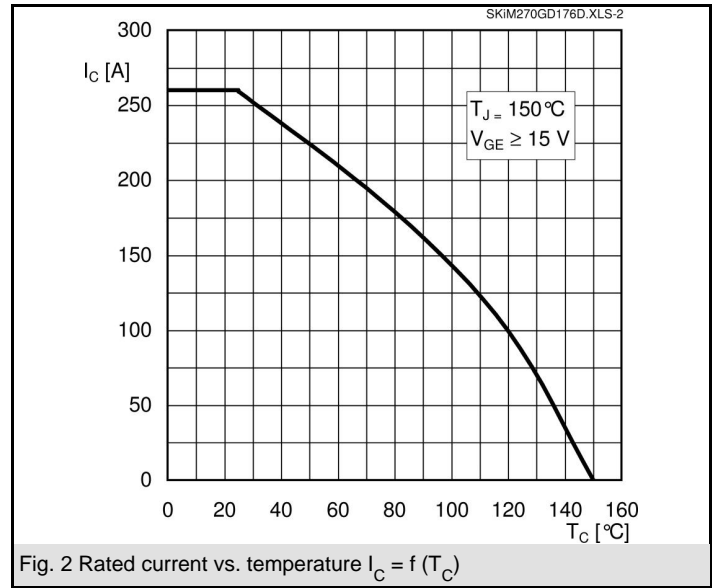
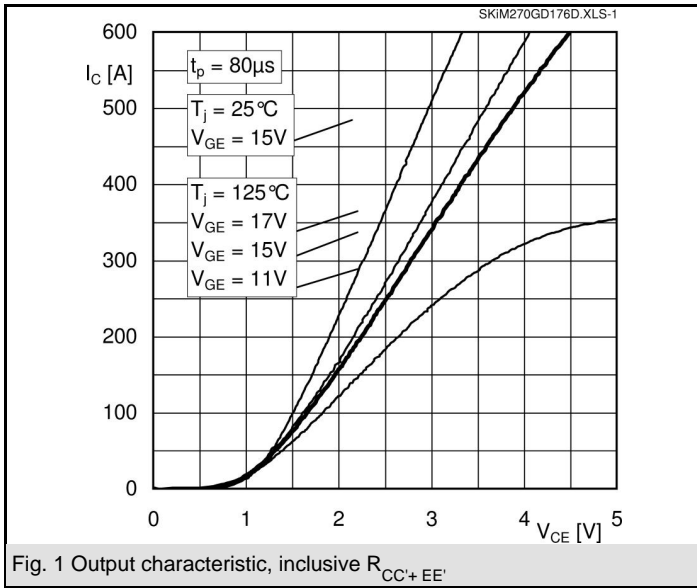
- AC inverter drives mains 575 - 750 V AC
- public transport (auxiliary syst.)

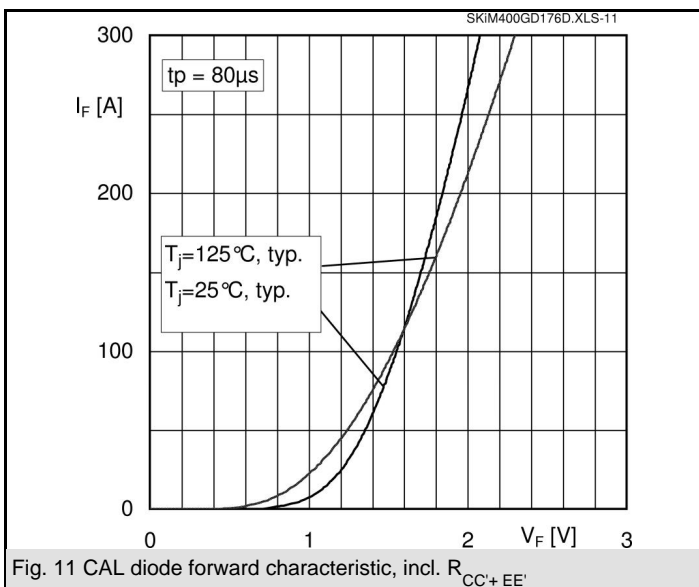
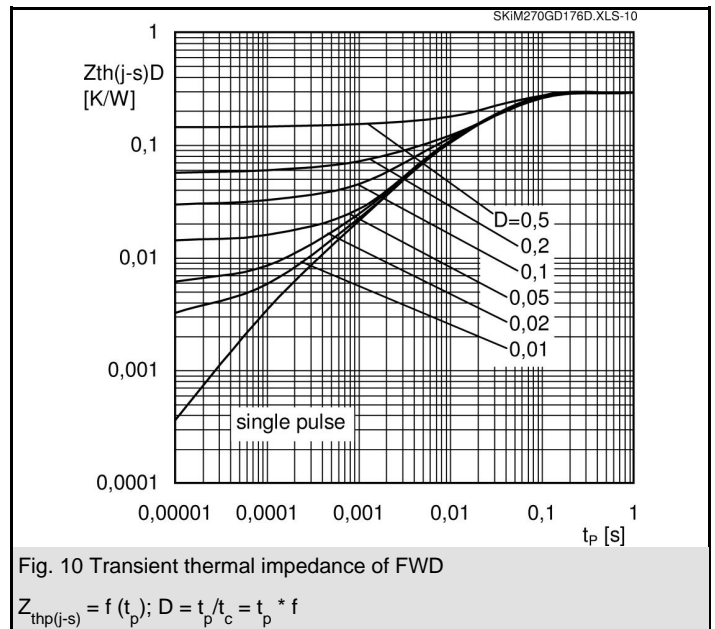
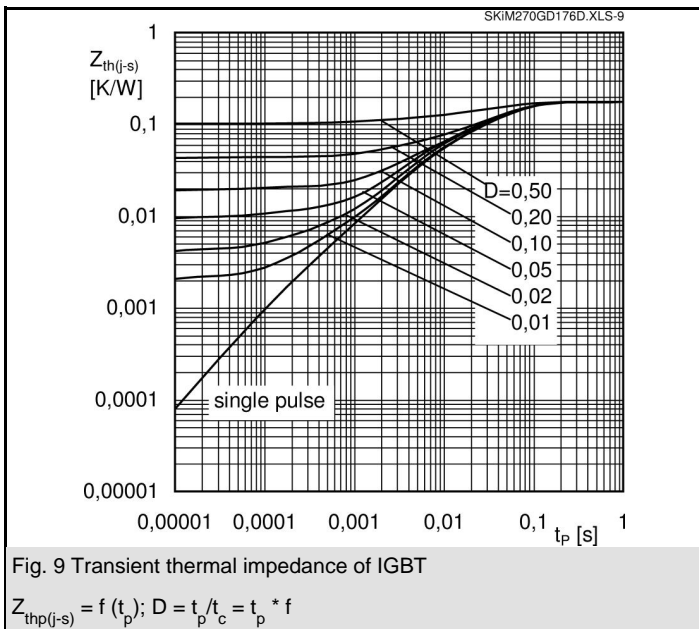
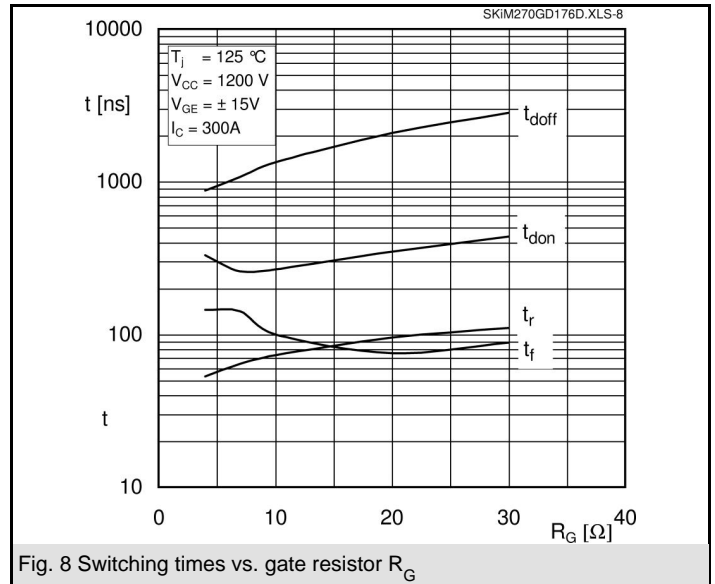
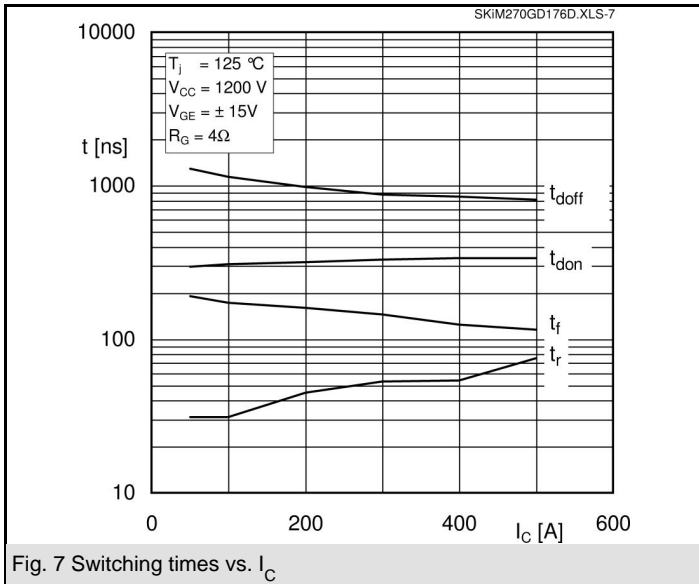


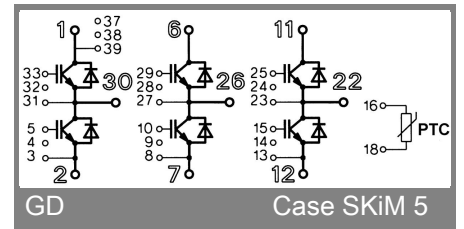
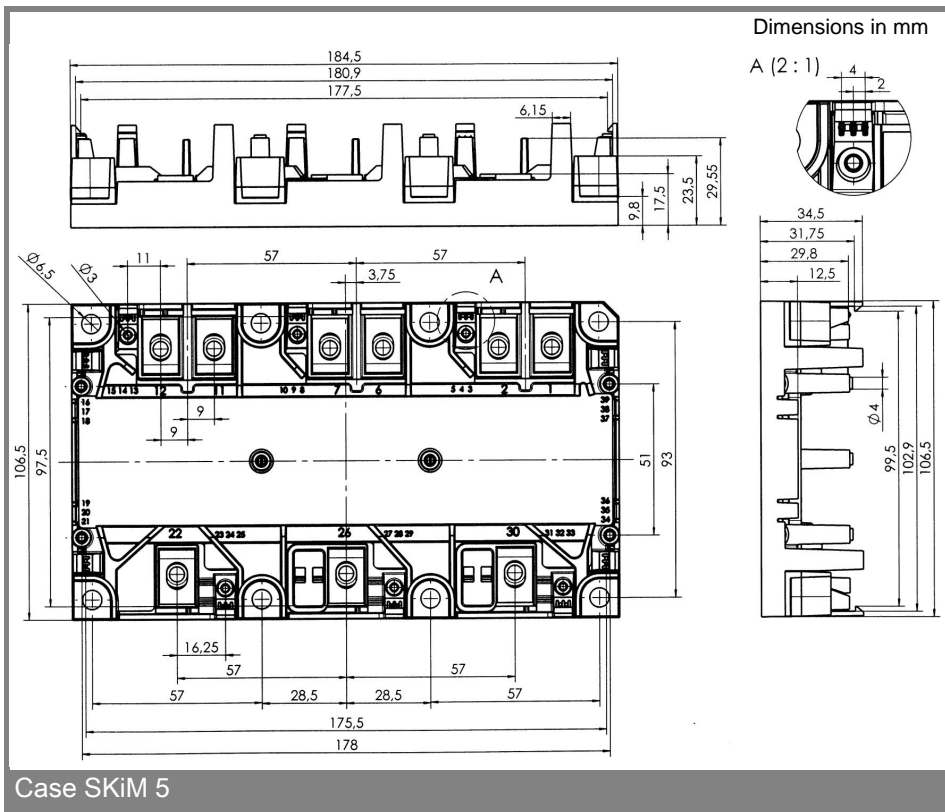
GD

| Absolute Maximum Ratings           |   | T <sub>c</sub> = 25 °C, unless otherwise specified |       |
|------------------------------------|---|--|-------|
| Symbol                             | Conditions  | Values   | Units |
| <b>IGBT</b>                        |   |  |       |
| V <sub>CES</sub>                   |   | 1700   | V     |
| I <sub>C</sub>                     | T <sub>s</sub> = 25 (70) °C                           | 260 (180)  | A     |
| I <sub>CRM</sub>                   | t <sub>p</sub> = 1 ms                                 | 600  | A     |
| V <sub>GES</sub>                   |   | ± 20   | V     |
| T <sub>j</sub> (T <sub>stg</sub> ) |   | - 40 ... 150 (125)                                 | °C    |
| T <sub>cop</sub>                   | max. case operating temperature                       | 125  | °C    |
| V <sub>isol</sub>                  | AC, 1 min.  | 3300   | V     |
| <b>Inverse diode</b>               |   |  |       |
| I <sub>F</sub>                     | T <sub>s</sub> = 25 (70) °C                           | 215 (155)  | A     |
| I <sub>FRM</sub>                   | t <sub>p</sub> = 1 ms                                 | 540  | A     |
| I <sub>FSM</sub>                   | t <sub>p</sub> = 10 ms; sin.; T <sub>j</sub> = 150 °C | 2200   | A     |

| Characteristics                     |   | T <sub>c</sub> = 25 °C, unless otherwise specified |           |            |       |
|-------------------------------------|---|--|-----------|------------|-------|
| Symbol                              | Conditions  | min.   | typ.      | max.       | Units |
| <b>IGBT</b>                         |   |  |           |            |       |
| V <sub>GE(th)</sub>                 | V <sub>GE</sub> = V <sub>CE</sub> ; I <sub>C</sub> = 12 mA                                    | 5,15   | 5,8       | 6,45       | V     |
| I <sub>CES</sub>                    | V <sub>GE</sub> = 0; V <sub>CE</sub> = V <sub>CES</sub> ; T <sub>j</sub> = 25 °C              |  | 0,1       | 0,3        | mA    |
| V <sub>CEO</sub>                    | T <sub>j</sub> = 25 (125) °C  |  | 1 (0,9)   | 1,2 (1,1)  | V     |
| r <sub>CE</sub>                     | T <sub>j</sub> = 25 (125) °C  |  | 3,3 (5)   | 4,2 (6)    | mΩ    |
| V <sub>CEsat</sub>                  | I <sub>Cnom</sub> = 300 A; V <sub>GE</sub> = 15 V; T <sub>j</sub> = 25 (125) °C on chip level |  | 2 (2,4)   | 2,45 (2,9) | V     |
| C <sub>ies</sub>                    | V <sub>GE</sub> = 0; V <sub>CE</sub> = 25 V; f = 1 MHz  |  | 21,3      |            | nF    |
| C <sub>oes</sub>                    | V <sub>GE</sub> = 0; V <sub>CE</sub> = 25 V; f = 1 MHz  |  | 1,1       |            | nF    |
| C <sub>res</sub>                    | V <sub>GE</sub> = 0; V <sub>CE</sub> = 25 V; f = 1 MHz  |  | 0,9       |            | nF    |
| L <sub>CE</sub>                     |   |  |           | 20         | nH    |
| R <sub>CC'+EE'</sub>                | resistance, terminal-chip T <sub>c</sub> = 25 (125) °C  |  | 0,9 (1,1) |            | mΩ    |
| t <sub>d(on)</sub>                  | V <sub>CC</sub> = 1200 V  |  |           |            | ns    |
| t <sub>r</sub>                      | I <sub>Cnom</sub> = 300 A   |  |           |            | ns    |
| t <sub>d(off)</sub>                 | R <sub>Gon</sub> = R <sub>Goff</sub> = 4 Ω  |  |           |            | ns    |
| t <sub>f</sub>                      | T <sub>j</sub> = 125 °C   |  |           |            | ns    |
| E <sub>on</sub> (E <sub>off</sub> ) | V <sub>GE</sub> ± 15 V  |  | 170 (120) |            | mJ    |
| E <sub>on</sub> (E <sub>off</sub> ) | with SKHI 65; T <sub>j</sub> = 125 °C<br>V <sub>CC</sub> = 1200 V; I <sub>C</sub> = 300 A     |  |           |            | mJ    |
| <b>Inverse diode</b>                |   |  |           |            |       |
| V <sub>F</sub> = V <sub>EC</sub>    | I <sub>Fnom</sub> = 225 A; V <sub>GE</sub> = 0 V; T <sub>j</sub> = 25 (125) °C                |  | 1,7 (1,8) | 1,9 (2)    | V     |
| V <sub>TO</sub>                     | T <sub>j</sub> = 25 (125) °C  |  | 1,2 (0,9) | 1,4 (1,1)  | V     |
| r <sub>T</sub>                      | T <sub>j</sub> = 25 (125) °C  |  | 2,2 (4)   | 2,2 (4)    | mΩ    |
| I <sub>RRM</sub>                    | I <sub>F</sub> = 225 A; T <sub>j</sub> = 125 °C   |  |           |            | A     |
| Q <sub>rr</sub>                     | V <sub>GE</sub> = 1200 V di/dt = A/μs   |  |           |            | μC    |
| E <sub>rr</sub>                     | R <sub>Gon</sub> = R <sub>Goff</sub> = 4 Ω  |  |           |            | mJ    |
| <b>Thermal characteristics</b>      |   |  |           |            |       |
| R <sub>th(j-s)</sub>                | per IGBT  |  |           | 0,175      | K/W   |
| R <sub>th(j-s)</sub>                | per FWD   |  |           | 0,29       | K/W   |
| <b>Temperature Sensor</b>           |   |  |           |            |       |
| R <sub>TS</sub>                     | T = 25 (100) °C   |  | 1 (1,67)  |            | kΩ    |
| tolerance                           | T = 25 (100) °C   |  | 3 (2)     |            | %     |
| <b>Mechanical data</b>              |   |  |           |            |       |
| M <sub>1</sub>                      | to heatsink (M5)  | 2  |           | 3          | Nm    |
| M <sub>2</sub>                      | for terminals (M6)  | 4  |           | 5          | Nm    |
| w                                   |   |  |           | 460        | g     |







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.