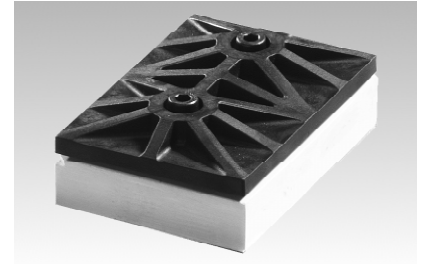


### SKiiP 30 NAB 12

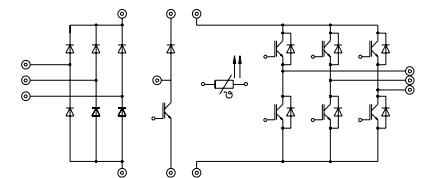
| Absolute Maximum Ratings           |  |                       |
|------------------------------------|--|-----------------------|
| Symbol                             | Conditions <sup>1)</sup>                                   | Units                 |
| Inverter                           | (Chopper see SKiiP 22 NAB 12)                              |                       |
| V <sub>CES</sub>                   |  | 1200 V                |
| V <sub>GES</sub>                   |  | ± 20 V                |
| I <sub>C</sub>                     | T <sub>heatsink</sub> = 25 / 80 °C                         | 33 / 22 A             |
| I <sub>CM</sub>                    | t <sub>p</sub> < 1 ms; T <sub>heatsink</sub> = 25 / 80 °C  | 66 / 44 A             |
| I <sub>F</sub> = -I <sub>C</sub>   | T <sub>heatsink</sub> = 25 / 80 °C                         | 38 / 26 A             |
| I <sub>FM</sub> = -I <sub>CM</sub> | t <sub>p</sub> < 1 ms; T <sub>heatsink</sub> = 25 / 80 °C  | 76 / 52 A             |
| Bridge Rectifier                   |  |                       |
| V <sub>RRM</sub>                   |  | 1500 V                |
| I <sub>D</sub>                     | T <sub>heatsink</sub> = 80 °C                              | 35 A                  |
| I <sub>FSM</sub>                   | t <sub>p</sub> = 10 ms; sin. 180 °, T <sub>j</sub> = 25 °C | 700 A                 |
| I <sup>2</sup> t                   | t <sub>p</sub> = 10 ms; sin. 180 °, T <sub>j</sub> = 25 °C | 2400 A <sup>2</sup> s |
| T <sub>j</sub>                     |  | - 40 ... + 150 °C     |
| T <sub>stg</sub>                   |  | - 40 ... + 125 °C     |
| V <sub>isol</sub>                  | AC, 1 min.   | 2500 V                |

### MiniSKiiP 3 SEMİKRON integrated intelligent Power SKiiP 30 NAB 12 3-phase bridge rectifier + braking chopper + 3-phase bridge inverter

Case M3



| Characteristics  |   |           | min. | typ.        | max.     | Units |     |
|--|---|-----------|------|-------------|----------|-------|-----|
| Symbol   | Conditions <sup>1)</sup>  |           |      |             |          |       |     |
| IGBT - Inverter  |   |           |      |             |          |       |     |
| V <sub>CESat</sub>   | I <sub>C</sub> = 25 A T <sub>j</sub> = 25 (125) °C<br>V <sub>CC</sub> = 600 V; V <sub>GE</sub> = ± 15 V<br>I <sub>C</sub> = 25 A; T <sub>j</sub> = 125 °C<br>R <sub>gon</sub> = R <sub>goff</sub> = 47 Ω<br>inductive load                        |           | -    | 2,5(3,1)    | 3,0(3,7) | V     |     |
| t <sub>d(on)</sub>   |   |           | -    | 75          | 150      | ns    |     |
| t <sub>r</sub>   |   |           | -    | 65          | 130      | ns    |     |
| t <sub>d(off)</sub>  |   |           | -    | 400         | 600      | ns    |     |
| t <sub>f</sub>   |   |           | -    | 50          | 100      | ns    |     |
| E <sub>on</sub> + E <sub>off</sub>   |   | -         | 6,2  | -           | -        | mJ    |     |
| C <sub>ies</sub>   | V <sub>CE</sub> = 25 V; V <sub>GE</sub> = 0 V, 1 MHz  | -         | 1,65 | -           | -        | nF    |     |
| R <sub>thjh</sub>  | per IGBT  | -         | -    | 1,0         | -        | K/W   |     |
| IGBT - Chopper *   |   |           |      |             |          |       |     |
| V <sub>CESat</sub>   | I <sub>C</sub> = 15 A T <sub>j</sub> = 25 (125) °C<br>V <sub>CC</sub> = 600 V; V <sub>GE</sub> = ± 15 V<br>I <sub>C</sub> = 15 A; T <sub>j</sub> = 125 °C<br>R <sub>gon</sub> = R <sub>goff</sub> = 82 Ω<br>inductive load                        |           | -    | 2,5(3,1)    | 3,0(3,7) | V     |     |
| t <sub>d(on)</sub>   |   |           | -    | 55          | 110      | ns    |     |
| t <sub>r</sub>   |   |           | -    | 45          | 90       | ns    |     |
| t <sub>d(off)</sub>  |   |           | -    | 400         | 600      | ns    |     |
| t <sub>f</sub>   |   |           | -    | 70          | 100      | ns    |     |
| E <sub>on</sub> + E <sub>off</sub>   |   | -         | 4,0  | -           | -        | mJ    |     |
| C <sub>ies</sub>   | V <sub>CE</sub> = 25 V; V <sub>GE</sub> = 0 V, 1 MHz  | -         | 1,0  | -           | -        | nF    |     |
| R <sub>thjh</sub>  | per IGBT  | -         | -    | 1,4         | -        | K/W   |     |
| Diode <sup>2)</sup> - Inverter (Diode <sup>2)</sup> - Chopper see SKiiP 22 NAB 12) |   |           |      |             |          |       |     |
| V <sub>F</sub> = V <sub>EC</sub>   | I <sub>F</sub> = 25 A T <sub>j</sub> = 25 (125) °C<br>T <sub>j</sub> = 125 °C<br>T <sub>j</sub> = 125 °C<br>I <sub>F</sub> = 25 A, V <sub>R</sub> = - 600 V<br>di <sub>F</sub> /dt = - 500 A/μs<br>V <sub>GE</sub> = 0 V, T <sub>j</sub> = 125 °C |           | -    | 2,0(1,8)    | 2,5(2,3) | V     |     |
| V <sub>TO</sub>  |   |           | -    | 1,0         | 1,2      | V     |     |
| r <sub>T</sub>   |   |           | -    | 32          | 44       | mΩ    |     |
| I <sub>RRM</sub>   |   |           | -    | 25          | -        | A     |     |
| Q <sub>rr</sub>  |   |           | -    | 4,5         | -        | μC    |     |
| E <sub>off</sub>   |   |           | -    | 1,0         | -        | mJ    |     |
| R <sub>thjh</sub>  |   | per diode | -    | -           | 1,2      | -     | K/W |
| Diode - Rectifier  |   |           |      |             |          |       |     |
| V <sub>F</sub>   | I <sub>F</sub> = 35 A, T <sub>j</sub> = 25 °C   |           | -    | 1,2         | -        | V     |     |
| R <sub>thjh</sub>  |   | per diode | -    | -           | 1,6      | -     | K/W |
| Temperature Sensor   |   |           |      |             |          |       |     |
| R <sub>TS</sub>  | T = 25 / 100 °C   |           |      | 1000 / 1670 |          | Ω     |     |
| Mechanical Data  |   |           |      |             |          |       |     |
| M <sub>1</sub>   | case to heatsink, SI Units  |           | 2    | -           | 2,5      | Nm    |     |
| Case   | mechanical outline see page B 16 - 9  |           |      | M3          |          |       |     |



UL recognized file no. E63532

- specification of temperature sensor see part A
- common characteristics B 16 - 4

#### Options

- also available with powerful chopper. For characteristics please refer to Inverter IGBT

- <sup>1)</sup> T<sub>heatsink</sub> = 25 °C, unless otherwise specified
- <sup>2)</sup> CAL = Controlled Axial Lifetime Technology (soft and fast recovery)

\* For diagrams of the Chopper IGBT please refer to SKiiP 22 NAB 12

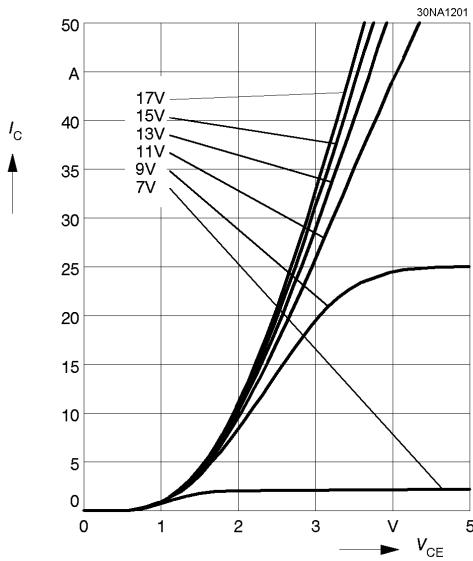


Fig. 1 Typ. output characteristic,  $t_p = 80 \mu s$ ;  $25 \text{ }^\circ\text{C}$

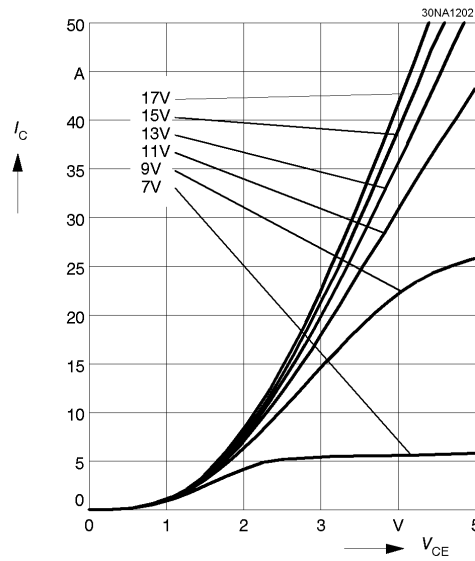


Fig. 2 Typ. output characteristic,  $t_p = 80 \mu s$ ;  $125 \text{ }^\circ\text{C}$

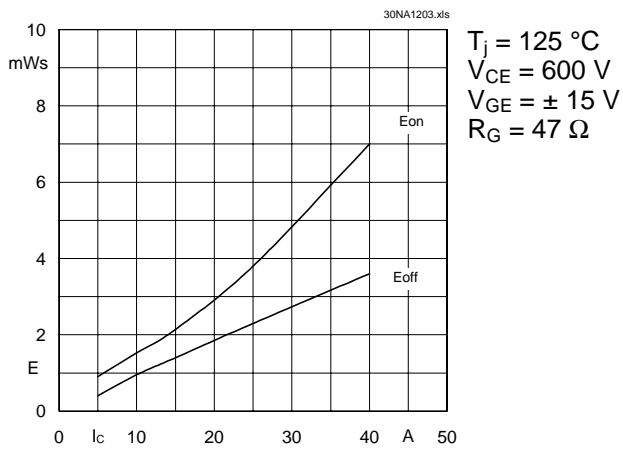


Fig. 3 Turn-on /-off energy =  $f(I_c)$

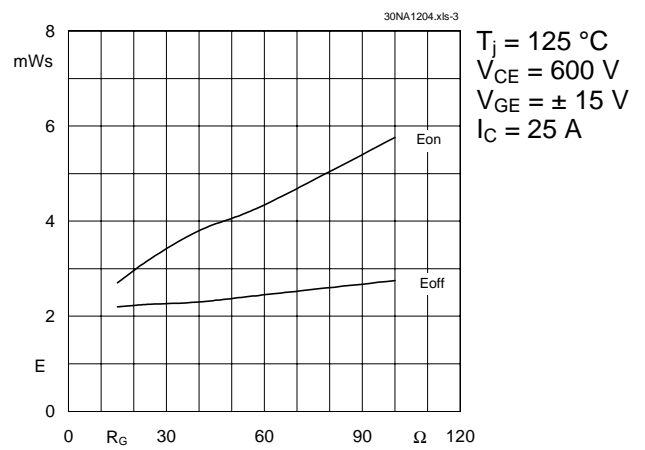


Fig. 4 Turn-on /-off energy =  $f(R_g)$

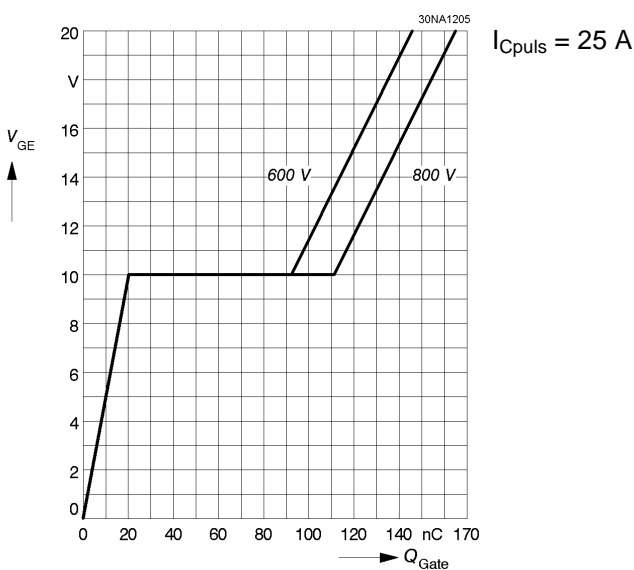


Fig. 5 Typ. gate charge characteristic

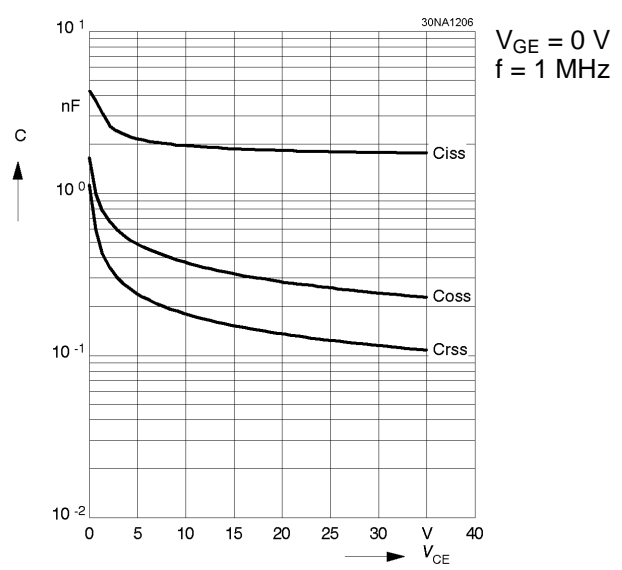


Fig. 6 Typ. capacitances vs.  $V_{CE}$

# MiniSKiiP 1200 V

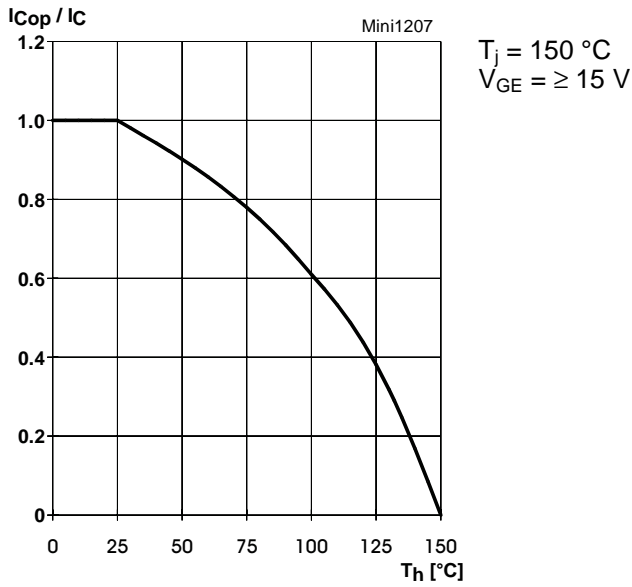


Fig. 7 Rated current of the IGBT  $I_{COp} / I_C = f(T_h)$

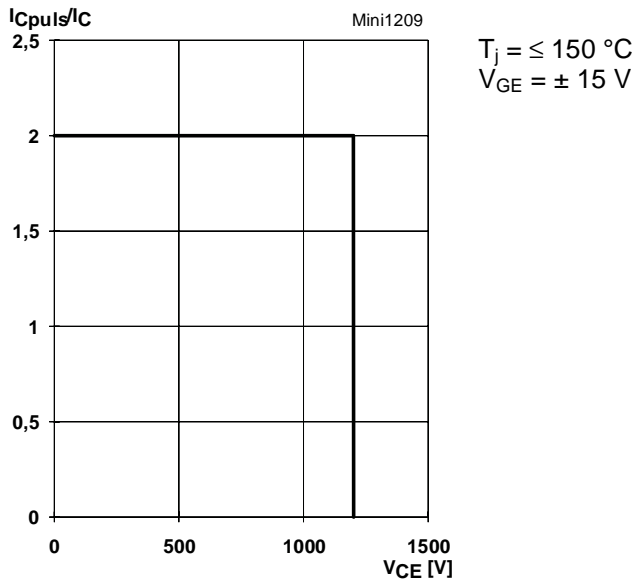


Fig. 9 Turn-off safe operating area (RBSOA) of the IGBT



Fig. 10 Safe operating area at short circuit of the IGBT

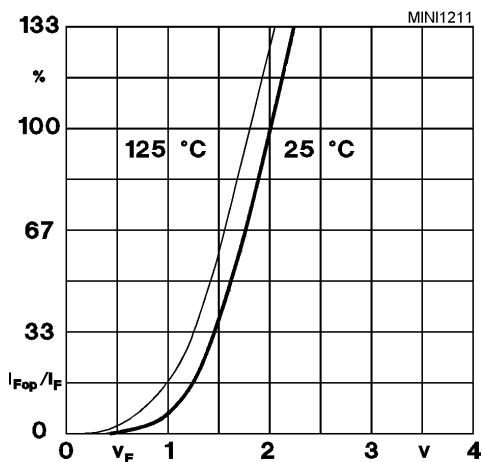


Fig. 11 Typ. freewheeling diode forward characteristic

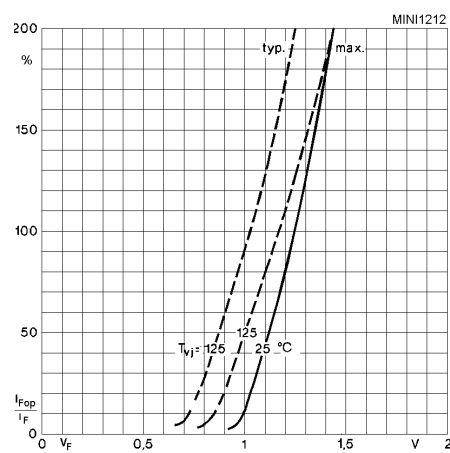


Fig. 12 Forward characteristic of the input bridge diode

### MiniSKiiP 3

SKiiP 30 NAB 06  
 SKiiP 31 NAB 06  
 SKiiP 32 NAB 06  
 SKiiP 30 NAB 12  
 SKiiP 31 NAB 12  
 SKiiP 32 NAB 12

Circuit  
 Case M3  
 Layout and connections for the  
 customer's printed circuit board

