

# SKiiP 12NAB065V1



MiniSKiiP® 1

3-phase bridge rectifier +  
brake chopper + 3-phase  
bridge inverter  
SKiiP 12NAB065V1

## Features

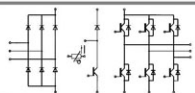
- Ultrafast NPT IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

## Typical Applications\*

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

## Remarks

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



NAB

| Absolute Maximum Ratings         |   | $T_s = 25^\circ\text{C}$ , unless otherwise specified |                      |
|----------------------------------|---|---|----------------------|
| Symbol                           | Conditions  | Values  | Units                |
| <b>IGBT - Inverter, Chopper</b>  |   |   |                      |
| $V_{CES}$                        |   | 600   | V                    |
| $I_C$                            | $T_s = 25 (70)^\circ\text{C}$                                 | 20 (15)   | A                    |
| $I_{CRM}$                        |   | 20  | A                    |
| $V_{GES}$                        |   | $\pm 20$  | V                    |
| $T_J$                            |   | -40 ... +150  | $^\circ\text{C}$     |
| <b>Diode - Inverter, Chopper</b> |   |   |                      |
| $I_F$                            | $T_s = 25 (70)^\circ\text{C}$                                 | 20 (16)   | A                    |
| $I_{FRM}$                        |   | 20  | A                    |
| $T_J$                            |   | -40 ... +150  | $^\circ\text{C}$     |
| <b>Diode - Rectifier</b>         |   |   |                      |
| $V_{RRM}$                        |   | 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   | $\text{A}^2\text{s}$ |
| $T_J$                            |   | -40 ... +150  | $^\circ\text{C}$     |
| <b>Module</b>                    |   |   |                      |
| $I_{RMS}$                        | per power terminal (20 A / spring)                            | 20  | A                    |
| $T_{stg}$                        |   | -40 ... +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         |
| <b>IGBT - Inverter, Chopper</b>  |  |   |            |           |               |
| $V_{CEsat}$                      | $I_{Cnom} = 10 \text{ A}, T_J = 25 (125)^\circ\text{C}$          |   | 2 (2,2)    | 2,5 (2,7) | V             |
| $V_{GE(TH)}$                     | $V_{GE} = V_{CE}, I_C = 0,5 \text{ mA}$                          | 3   | 4          | 5         | V             |
| $V_{CE(TD)}$                     | $T_J = 25 (125)^\circ\text{C}$                                   |   | 1,2 (1,1)  | 1,3 (1,2) | V             |
| $r_T$                            | $T_J = 25 (125)^\circ\text{C}$                                   |   | 80 (110)   | 120 (150) | m $\Omega$    |
| $C_{iss}$                        | $V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 1 \text{ MHz}$ |   | 0,62       |           | nF            |
| $C_{oss}$                        | $V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 1 \text{ MHz}$ |   | 0,12       |           | nF            |
| $C_{res}$                        | $V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 1 \text{ MHz}$ |   | 0,06       |           | nF            |
| $R_{\theta(j-c)}$                | per IGBT   |   | 1,5        |           | K/W           |
| $t_{i(on)}$                      | under following conditions                                       |   | 20         |           | ns            |
| $t_r$                            | $V_{CC} = 300 \text{ V}, V_{GE} = \pm 15 \text{ V}$              |   | 25         |           | ns            |
| $t_{i(off)}$                     | $I_{Cnom} = 10 \text{ A}, T_J = 125^\circ\text{C}$               |   | 230        |           | ns            |
| $t_f$                            | $R_{con} = R_{coff} = 60 \Omega$                                 |   | 15         |           | ns            |
| $E_{on}$                         | inductive load   |   | 0,3        |           | mJ            |
| $E_{off}$                        |  |   | 0,3        |           | mJ            |
| <b>Diode - Inverter, Chopper</b> |  |   |            |           |               |
| $V_F = V_{EC}$                   | $I_{Fnom} = 10 \text{ A}, T_J = 25 (125)^\circ\text{C}$          |   | 1,4 (1,4)  | 1,7 (1,7) | V             |
| $V_{(TD)}$                       | $T_J = 25 (125)^\circ\text{C}$                                   |   | 1 (0,9)    | 1,1 (1)   | V             |
| $r_T$                            | $T_J = 25 (125)^\circ\text{C}$                                   |   | 45 (50)    | 60 (70)   | m $\Omega$    |
| $R_{\theta(j-c)}$                | per diode  |   | 2,5        |           | K/W           |
| $I_{FRM}$                        | under following conditions                                       |   | 20         |           | A             |
| $C_{rr}$                         | $I_{Fnom} = 10 \text{ A}, V_{RR} = 300 \text{ V}$                |   | 1          |           | $\mu\text{C}$ |
| $E_{rr}$                         | $V_{GE} = 0 \text{ V}, T_J = 125^\circ\text{C}$                  |   | 0,2        |           | mJ            |
|                                  | $di_F/dt = 1200 \text{ A}/\mu\text{s}$                           |   |            |           |               |
| <b>Diode - Rectifier</b>         |  |   |            |           |               |
| $V_F$                            | $I_{Fnom} = 15 \text{ A}, T_J = 25^\circ\text{C}$                |   | 1,1        |           | V             |
| $V_{(TD)}$                       | $T_J = 150^\circ\text{C}$  |   | 0,8        |           | V             |
| $r_T$                            | $T_J = 150^\circ\text{C}$  |   | 20         |           | m $\Omega$    |
| $R_{\theta(j-c)}$                | per diode  |   | 1,5        |           | K/W           |
| <b>Temperature Sensor</b>        |  |   |            |           |               |
| $R_{ts}$                         | $\pm 3\%, T_r = 25 (100)^\circ\text{C}$                          |   | 1000(1670) |           | $\Omega$      |
| <b>Mechanical Data</b>           |  |   |            |           |               |
| w                                |  |   | 35         |           | g             |
| $M_b$                            | Mounting torque  | 2   |            | 2,5       | Nm            |

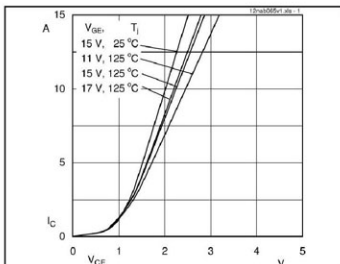


Fig. 1 Typ. output characteristic

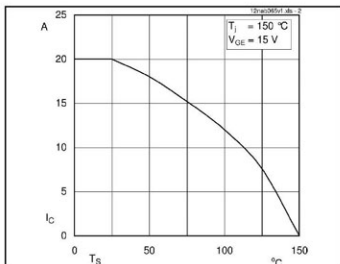


Fig. 2 Typ. rated current vs. temperature

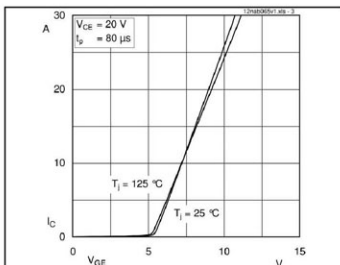


Fig. 3 Typ. transfer characteristic

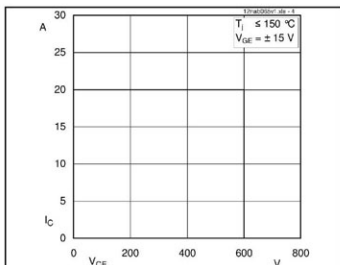


Fig. 4 Reverse bias safe operating area

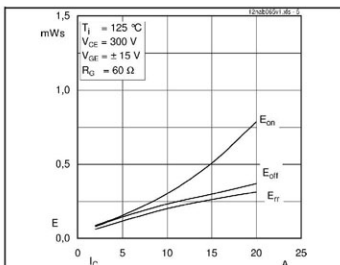


Fig. 5 Typ. Turn-on / off energy =  $f(I_C)$

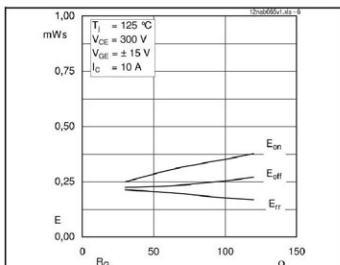


Fig. 6 Typ. Turn-on / off energy =  $f(R_G)$

