



MiniSKiiP®1

3-phase bridge rectifier +  
brake chopper + 3-phase  
bridge inverter  
SKiiP 13NAB066V1

## Features

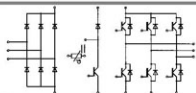
- Trench IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

## Typical Applications\*

- Inverter up to 5,6 kVA
- Typical motor power 3,0 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 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                |
| $I_C$                            | $T_s = 25 (70)^\circ\text{C}$ , $T_J = 150^\circ\text{C}$           | 24 (17)   | A                |
| $I_C$                            | $T_s = 25 (70)^\circ\text{C}$ , $T_J = 175^\circ\text{C}$           | 27 (20)   | A                |
| $I_{CRM}$                        | $t_p = 1 \text{ ms}$  | 30  | A                |
| $V_{GES}$                        |   | $\pm 20$  | V                |
| <b>Diode - Inverter, Chopper</b> |   |   |                  |
| $I_F$                            | $T_s = 25 (70)^\circ\text{C}$ , $T_J = 150^\circ\text{C}$           | 24 (16)   | A                |
| $I_F$                            | $T_s = 25 (70)^\circ\text{C}$ , $T_J = 175^\circ\text{C}$           | 28 (21)   | A                |
| $I_{FRM}$                        | $t_p = 1 \text{ ms}$  | 30  | A                |
| <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                |
| $i_{T1}$                         | $t_p = 10 \text{ ms}$ , $\sin 180^\circ$ , $T_J = 25^\circ\text{C}$ | 240   | A's              |
| $I_{RMS}$                        | per power terminal (20 A / spring)                                  | 20  | A                |
| $T_J$                            | IGBT, Diode   | -40...+175  | $^\circ\text{C}$ |
| $T_{stg}$                        |   | -40...+125  | $^\circ\text{C}$ |
| $V_{Rct}$                        | 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>  |  |   |             |      |               |
| $V_{CE(sat)}$                    | $I_{Cnom} = 15 \text{ A}$ , $T_J = 25 (150)^\circ\text{C}$             | 1,45 (1,65)   | 1,85 (2,05) |      | V             |
| $V_{GE(th)}$                     | $V_{CE} = V_{CE}$ , $I_C = 1 \text{ mA}$                               | 5,8   |             |      | V             |
| $V_{CE(TO)}$                     | $T_J = 25 (150)^\circ\text{C}$   | 0,9 (0,7)   | 1,1 (1)     |      | V             |
| $r_{CE}$                         | $T_J = 25 (150)^\circ\text{C}$   | 37 (63)   | 50 (70)     |      | m $\Omega$    |
| $C_{iss}$                        | $V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$ | 0,86  |             |      | nF            |
| $C_{oss}$                        | $V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$ | 0,18  |             |      | nF            |
| $C_{res}$                        | $V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$ | 0,12  |             |      | nF            |
| $R_{CC+EE}$                      | spring contact-chip $T_s = 25 (150)^\circ\text{C}$                     |   |             |      | m $\Omega$    |
| $R_{\theta(j-a)}$                | per IGBT   | 1,8   |             |      | K/W           |
| $t_{i(on)}$                      | under following conditions   | 20  |             |      | ns            |
| $t_r$                            | $V_{CC} = 300 \text{ V}$ , $V_{GE} = \pm 15 \text{ V}$                 | 30  |             |      | ns            |
| $t_{i(off)}$                     | $I_{Cnom} = 15 \text{ A}$ , $T_J = 150^\circ\text{C}$                  | 155   |             |      | ns            |
| $t_f$                            | $R_{con} = R_{Coff} = 22 \Omega$                                       | 45  |             |      | ns            |
| $E_{on} (E_{off})$               | inductive load   | 0,6 (0,5)   |             |      | mJ            |
| <b>Diode - Inverter, Chopper</b> |  |   |             |      |               |
| $V_F = V_{EC}$                   | $I_F = 15 \text{ A}$ , $T_J = 25 (150)^\circ\text{C}$                  | 1,4 (1,4)   | 1,7 (1,7)   |      | V             |
| $V_{(TO)}$                       | $T_J = 25 (150)^\circ\text{C}$   | 0,9 (0,8)   | 1 (0,9)     |      | V             |
| $r_T$                            | $T_J = 25 (150)^\circ\text{C}$   | 33 (40)   | 47 (53)     |      | m $\Omega$    |
| $R_{\theta(j-a)}$                | per diode  | 2,5   |             |      | K/W           |
| $I_{RRM}$                        | under following conditions   | 19,8  |             |      | A             |
| $O_{rr}$                         | $I_{Fnom} = 15 \text{ A}$ , $V_R = 300 \text{ V}$                      | 1,9   |             |      | $\mu\text{C}$ |
| $E_{rr}$                         | $V_{GE} = 0 \text{ V}$ , $T_J = 150^\circ\text{C}$                     | 0,5   |             |      | mJ            |
|                                  | $di_F/dt = 930 \text{ A}/\mu\text{s}$                                  |   |             |      |               |
| <b>Diode - Rectifier</b>         |  |   |             |      |               |
| $V_F$                            | $I_{Fnom} = 15 \text{ A}$ , $T_J = 25^\circ\text{C}$                   | 1,1   |             |      | V             |
| $V_{(TO)}$                       | $T_J = 150^\circ\text{C}$  | 0,8   |             |      | V             |
| $r_T$                            | $T_J = 150^\circ\text{C}$  | 20  |             |      | m $\Omega$    |
| $R_{\theta(j-a)}$                | per diode  | 1,5   |             |      | K/W           |
| <b>Temperature Sensor</b>        |  |   |             |      |               |
| $R_{ts}$                         | 3 %, $T_s = 25 (100)^\circ\text{C}$                                    | 1000(1670)  |             |      | $\Omega$      |
| <b>Mechanical Data</b>           |  |   |             |      |               |
| w                                |  | 35  |             |      | g             |
| $M_b$                            | Mounting torque  | 2   | 2,5         |      | Nm            |

