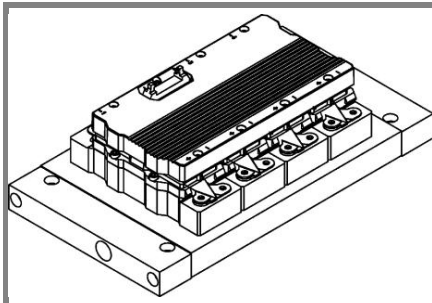


# SKiiP 2403GB122-4DW



SKiiP® 3

## 2-pack-integrated intelligent Power System

### Power section

#### SKiiP 2403GB122-4DW

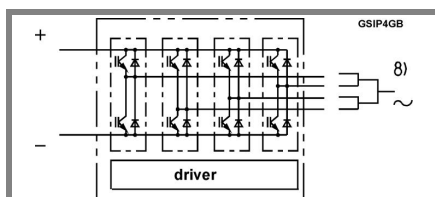
Data

### Power section features

- SKiiP technology inside
- SPT (Soft Punch Trough) IGBTs
- CAL diode technology
- Integrated current sensor
- Integrated temperature sensor
- Integrated heat sink
- IEC 60721-3-3 (humidity) class 3K3/IE32 (SKiiP® 3 System)
- IEC 60068-1 (climate) 40/125/56
- UL recognized File no. E63532

1) with assembly of suitable MKP capacitor per terminal

8) AC connection busbars must be connected by the user; copper busbars available on request



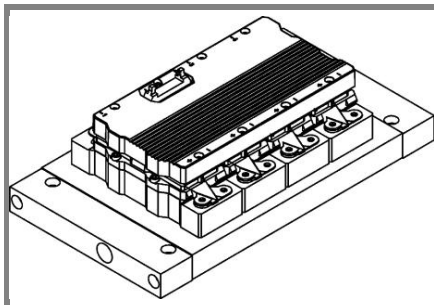
Case S43

| Absolute Maximum Ratings |   | $T_s = 25^\circ\text{C}$ unless otherwise specified |                       |
|--------------------------|---|---|-----------------------|
| Symbol                   | Conditions  | Values  | Units                 |
| <b>IGBT</b>              |   |   |                       |
| $V_{CES}$                | Operating DC link voltage                               | 1200  | V                     |
| $V_{CC}^{1)}$            |   | 900   | V                     |
| $V_{GES}$                |   | $\pm 20$  | V                     |
| $I_C$                    | $T_s = 25 (70)^\circ\text{C}$                           | 2400 (1800)   | A                     |
| <b>Inverse diode</b>     |   |   |                       |
| $I_F = -I_C$             | $T_s = 25 (70)^\circ\text{C}$                           | 1930 (1470)   | A                     |
| $I_{FSM}$                | $T_j = 150^\circ\text{C}$ , $t_p = 10 \text{ ms}$ ; sin | 13500   | A                     |
| $I^2t$ (Diode)           | Diode, $T_j = 150^\circ\text{C}$ , 10 ms                | 911   | $\text{kA}^2\text{s}$ |
| $T_j$ ; ( $T_{stg}$ )    |   | - 40 ... + 150 (125)                                | $^\circ\text{C}$      |
| $V_{isol}$               | rms, AC, 1 min, main terminals to heat sink             | 3000  | V                     |
| $I_{AC\text{-terminal}}$ | per AC terminal, rms, $T_s = 70^\circ\text{C}$ ,        | 400   | A                     |
|                          | $T_{terminal} < 115^\circ\text{C}$                      |   |                       |

| Characteristics   |   | $T_s = 25^\circ\text{C}$ unless otherwise specified |            |           |                  |      |      |      |
|---|---|---|------------|-----------|------------------|------|------|------|
| Symbol  | Conditions  | min.  | typ.       | max.      | Units            |      |      |      |
| <b>IGBT</b>   |   |   |            |           |                  |      |      |      |
| $V_{CEsat}$   | $I_C = 1200 \text{ A}$ , $T_j = 25 (125)^\circ\text{C}$ ;<br>measured at terminal |   | 2,3 (2,5)  | 2,6       | V                |      |      |      |
| $V_{CEO}$   | $T_j = 25 (125)^\circ\text{C}$ ; at terminal                                      |   | 1,1 (1)    | 1,3 (1,2) | V                |      |      |      |
| $r_{CE}$  | $T_j = 25 (125)^\circ\text{C}$ ; at terminal                                      |   | 1 (1,2)    | 1,1 (1,4) | $\text{m}\Omega$ |      |      |      |
| $I_{CES}$   | $V_{GE} = 0 \text{ V}$ , $V_{CE} = V_{CES}$ ;<br>$T_j = 25 (125)^\circ\text{C}$   |   | 4,8 (144)  |           | mA               |      |      |      |
| $E_{on} + E_{off}$  | $I_C = 1200 \text{ A}$ , $V_{CC} = 600 \text{ V}$                                 |   | 360        |           | mJ               |      |      |      |
|   | $T_j = 125^\circ\text{C}$ , $V_{CC} = 900 \text{ V}$                              |   | 635        |           | mJ               |      |      |      |
| $R_{CC+EE}$   | terminal chip, $T_j = 25^\circ\text{C}$   |   | 0,13       |           | $\text{m}\Omega$ |      |      |      |
| $L_{CE}$  | top, bottom   |   | 3          |           | nH               |      |      |      |
| $C_{CHC}$   | per phase, AC-side  |   | 4          |           | nF               |      |      |      |
| <b>Inverse diode</b>  |   |   |            |           |                  |      |      |      |
| $V_F = V_{EC}$  | $I_F = 1200 \text{ A}$ , $T_j = 25 (125)^\circ\text{C}$<br>measured at terminal   |   | 1,95 (1,7) | 2,1       | V                |      |      |      |
| $V_{TO}$  | $T_j = 25 (125)^\circ\text{C}$  |   | 1,1 (0,8)  | 1,2 (0,9) | V                |      |      |      |
| $r_T$   | $T_j = 25 (125)^\circ\text{C}$  |   | 0,7 (0,8)  | 0,8 (0,9) | $\text{m}\Omega$ |      |      |      |
| $E_{rr}$  | $I_C = 1200 \text{ A}$ , $V_{CC} = 600 \text{ V}$                                 |   | 96         |           | mJ               |      |      |      |
|   | $T_j = 125^\circ\text{C}$ , $V_{CC} = 900 \text{ V}$                              |   | 122        |           | mJ               |      |      |      |
| <b>Mechanical data</b>  |   |   |            |           |                  |      |      |      |
| $M_{dc}$  | DC terminals, SI Units  | 6   |            | 8         | Nm               |      |      |      |
| $M_{ac}$  | AC terminals, SI Units  | 13  |            | 15        | Nm               |      |      |      |
| w   | SKiiP® 3 System w/o heat sink   |   | 3,1        |           | kg               |      |      |      |
| w   | heat sink   |   | 97         |           | kg               |      |      |      |
| <b>Thermal characteristics (NWK40; 8l/min; 50%glycol); "s" reference to heat sink; "r" reference to built-in temperature sensor</b> |   |   |            |           |                  |      |      |      |
| $R_{th(j-s)I}$  | per IGBT  |   |            | 0,013     | K/W              |      |      |      |
| $R_{th(j-s)D}$  | per diode   |   |            | 0,025     | K/W              |      |      |      |
| $Z_{th}$  | $R_i$ (mK/W) (max. values)  | tau,(s)   |            |           |                  |      |      |      |
|   |   | 1   | 2          | 3         | 4                |      |      |      |
| $Z_{th(j-r)I}$  | 1,2   | 5   | 5,8        | 0         | 69               | 0,35 | 0,02 | 1    |
| $Z_{th(j-r)D}$  | 2   | 3   | 13,5       | 13,5      | 50               | 5    | 0,25 | 0,04 |
| $Z_{th(r-a)}$   | 2,7   | 4,6   | 1,1        | 0,6       | 48               | 15   | 2,8  | 0,4  |

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# SKiiP 2403GB122-4DW



SKiiP® 3

## 2-pack-integrated intelligent Power System

2-pack  
integrated gate driver  
SKiiP 2403GB122-4DW

Data

### Gate driver features

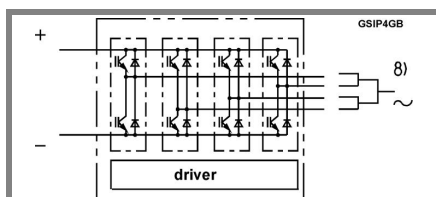
- CMOS compatible inputs
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- Short circuit protection
- Over current protection
- Over voltage protection (option)
- Power supply protected against under voltage
- Interlock of top/bottom switch
- Isolation by transformers
- Fibre optic interface (option for GB-types only)
- IEC 60068-1 (climate) 40/85/56
- UL recognized file no. 242581

| Absolute Maximum Ratings |   | $T_a = 25^\circ\text{C}$ unless otherwise specified |                   |
|--------------------------|---|---|-------------------|
| Symbol                   | Conditions  | Values  | Units             |
| $V_{S2}$                 | unstabilized 24 V power supply                                  | 30  | V                 |
| $V_i$                    | input signal voltage (high)                                     | 15 + 0,3  | V                 |
| $dv/dt$                  | secondary to primary side                                       | 75  | kV/ $\mu\text{s}$ |
| $V_{isolIO}$             | input / output (AC, rms, 2s)                                    | 3000  | V                 |
| $V_{isolPD}$             | partial discharge extinction voltage, rms, $Q_{PD} \leq 10$ pC; | 1170  | V                 |
| $V_{isol12}$             | output 1 / output 2 (AC, rms, 2s)                               | 1500  | V                 |
| $f_{sw}$                 | switching frequency   | 8   | kHz               |
| $f_{out}$                | output frequency for $I_{peak(1)} = I_C$                        | 8   | kHz               |
| $T_{op} (T_{stg})$       | operating / storage temperature                                 | - 40 ... + 85                                       | $^\circ\text{C}$  |

| Characteristics |  | $(T_a = 25^\circ\text{C})$                                   |                 |      |                  |
|-----------------|--|--|-----------------|------|------------------|
| Symbol          | Conditions   | min.   | typ.            | max. | Units            |
| $V_{S2}$        | supply voltage non stabilized  | 13   | 24              | 30   | V                |
| $I_{S2}$        | $V_{S2} = 24$ V  | $324 + 39 \cdot f / \text{kHz} + 0,00011 \cdot (I_{AC}/A)^2$ |                 |      | mA               |
| $V_{iT+}$       | input threshold voltage (High)   |  |                 | 12,3 | V                |
| $V_{iT-}$       | input threshold voltage (Low)  | 4,6  |                 |      | V                |
| $R_{IN}$        | input resistance   |  | 10              |      | k $\Omega$       |
| $C_{IN}$        | input capacitance  |  | 1               |      | nF               |
| $t_{d(on)IO}$   | input-output turn-on propagation time                                    |  | 1,3             |      | $\mu\text{s}$    |
| $t_{d(off)IO}$  | input-output turn-off propagation time                                   |  | 1,3             |      | $\mu\text{s}$    |
| $t_{pERRRESET}$ | error memory reset time  |  | 9               |      | $\mu\text{s}$    |
| $t_{TD}$        | top / bottom switch interlock time                                       |  | 3,3             |      | $\mu\text{s}$    |
| $I_{analogOUT}$ | max. 5mA; 8 V corresponds to 15 V supply voltage for external components |  | 2000            |      | A                |
| $I_{s1out}$     | max. load current  |  |                 | 50   | mA               |
| $I_{TRIPSC}$    | over current trip level ( $I_{analog OUT} = 10$ V)                       |  | 2500            |      | A                |
| $T_{tp}$        | over temperature protection  | 110  |                 | 120  | $^\circ\text{C}$ |
| $U_{DCTRIP}$    | $U_{DC}$ -protection ( $U_{analog OUT} = 9$ V);<br>(option for GB types) |  | not implemented |      | V                |

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Case S43