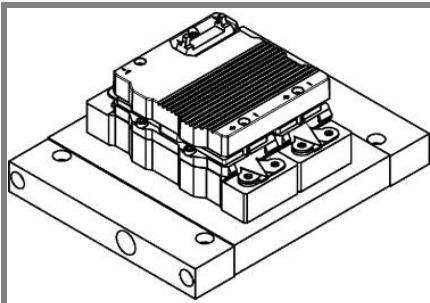


SKiiP 1203GB172-2DW



SKiiP® 3

2-pack-integrated intelligent Power System

Power section

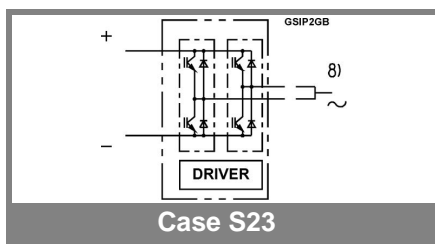
SKiiP 1203GB172-2DW

Preliminary Data

Features

- SKiiP technology inside
- Trench 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 (SEMIKRON type is recommended)
- 8) AC connection busbars must be connected by the user; copper busbars available on request

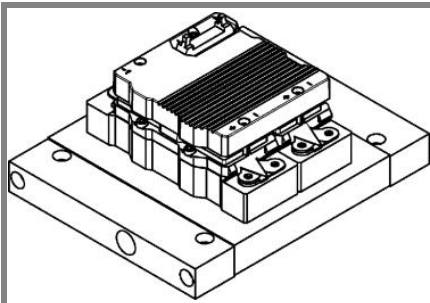


| Absolute Maximum Ratings | | $T_s = 25^\circ\text{C}$ unless otherwise specified | |
|--------------------------|--|---|-----------------------|
| Symbol | Conditions | Values | Units |
| IGBT | | | |
| V_{CES} | Operating DC link voltage | 1700 | V |
| $V_{CC}^{1)}$ | | 1200 | V |
| V_{GES} | | ± 20 | V |
| I_C | $T_s = 25 (70)^\circ\text{C}$ | 1200 (900) | A |
| Inverse diode | | | |
| $I_F = -I_C$ | $T_s = 25 (70)^\circ\text{C}$ | 900 (700) | A |
| I_{FSM} | $T_j = 150^\circ\text{C}$, $t_p = 10\text{ ms}$; sin. | 6900 | A |
| I^2t (Diode) | Diode, $T_j = 150^\circ\text{C}$, 10 ms | 238 | kA^2s |
| T_j ; (T_{stg}) | rms, AC, 1 min, main terminals to heat sink per AC terminal, rms, $T_s = 70^\circ\text{C}$, $T_{\text{terminal}} < 115^\circ\text{C}$ | - 40 ... + 150 (125) | $^\circ\text{C}$ |
| V_{isol} | | 4000 | V |
| $I_{\text{AC-terminal}}$ | | 400 | A |

| Characteristics | | $T_s = 25^\circ\text{C}$ unless otherwise specified | | | | | | |
|---|---|---|-----------|-----------|------------------|------|------|------|
| Symbol | Conditions | min. | typ. | max. | Units | | | |
| IGBT | | | | | | | | |
| V_{CEsat} | $I_C = 600\text{ A}$, $T_j = 25 (125)^\circ\text{C}$; measured at terminal | | 1,9 (2,2) | 2,4 | V | | | |
| V_{CEO} | $T_j = 25 (125)^\circ\text{C}$; at terminal | | 1 (0,9) | 1,2 (1,1) | V | | | |
| r_{CE} | $T_j = 25 (125)^\circ\text{C}$; at terminal | | 1,5 (2,1) | 1,9 (2,5) | $\text{m}\Omega$ | | | |
| I_{CES} | $V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$; $T_j = 25 (125)^\circ\text{C}$ | | 2,4 (144) | | mA | | | |
| $E_{on} + E_{off}$ | $I_C = 600\text{ A}$, $V_{CC} = 900\text{ V}$ | | 390 | | mJ | | | |
| | $T_j = 125^\circ\text{C}$, $V_{CC} = 1200\text{ V}$ | | 575 | | mJ | | | |
| R_{CC+EE} | terminal chip, $T_j = 25^\circ\text{C}$ | | 0,25 | | $\text{m}\Omega$ | | | |
| L_{CE} | top, bottom | | 6 | | nH | | | |
| C_{CHC} | per phase, AC-side | | 2 | | nF | | | |
| Inverse diode | | | | | | | | |
| $V_F = V_{EC}$ | $I_F = 600\text{ A}$, $T_j = 25 (125)^\circ\text{C}$; measured at terminal | | 2 (1,8) | 2,15 | V | | | |
| V_{TO} | $T_j = 25 (125)^\circ\text{C}$ | | 1,1 (0,8) | 1,2 (0,9) | V | | | |
| r_T | $T_j = 25 (125)^\circ\text{C}$ | | 1,5 (1,7) | 1,6 (1,8) | $\text{m}\Omega$ | | | |
| E_{rr} | $I_C = 600\text{ A}$, $V_{CC} = 900\text{ V}$ | | 72 | | mJ | | | |
| | $T_j = 125^\circ\text{C}$, $V_{CC} = 1200\text{ V}$ | | 86 | | mJ | | | |
| Mechanical data | | | | | | | | |
| 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 | | 1,7 | | kg | | | |
| w | heat sink | | 4,3 | | kg | | | |
| Thermal characteristics (NWK 40; 8l/min; 50%glyc.); "s" reference to heat sink; "r" reference to built-in temperature sensor (acc. IEC 60747-15) | | | | | | | | |
| $R_{th(j-s)I}$ | per IGBT | | | 0,026 | K/W | | | |
| $R_{th(j-s)D}$ | per diode | | | 0,05 | K/W | | | |
| Z_{th} | R_i (mK/W) (max. values) | $\tau_{th}(s)$ | | | | | | |
| | | 1 | 2 | 3 | 4 | | | |
| $Z_{th(j-r)I}$ | 2,8 | 11,6 | 13,6 | 0 | 69 | 0,35 | 0,02 | 1 |
| $Z_{th(j-r)D}$ | 4 | 6 | 26 | 26 | 50 | 5 | 0,25 | 0,04 |
| $Z_{th(r-a)}$ | 5,5 | 4,8 | 1,1 | 0,6 | 48 | 15 | 2,8 | 0,4 |

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SKiiP 1203GB172-2DW



SKiiP® 3

2-pack-integrated intelligent Power System

2-pack
integrated gate driver
SKiiP 1203GB172-2DW

Preliminary 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/ μs |
| V_{isolIO} | input / output (AC, rms, 2s) | 4000 | V |
| V_{isolPD} | partial discharge extinction voltage, rms, $Q_{PD} \leq 10$ pC; | 1500 | V |
| V_{isol12} | output 1 / output 2 (AC, rms, 2s) | 1500 | V |
| f_{sw} | switching frequency | 14 | kHz |
| f_{out} | output frequency for $I = I_C$; sin. | 1 | 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 | $320 + 23 \cdot f / \text{kHz} + 0,00022 \cdot (I_{AC} / \text{A})^2$ | | | 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 Ω |
| C_{IN} | input capacitance | | 1 | | nF |
| $t_{d(on)IO}$ | input-output turn-on propagation time | | 1,3 | | μs |
| $t_{d(off)IO}$ | input-output turn-off propagation time | | 1,3 | | μs |
| $t_{pERRRESET}$ | error memory reset time | | 9 | | μs |
| t_{TD} | top / bottom switch interlock time | | 3,3 | | μs |
| $I_{analogOUT}$ | max. 5mA; 8 V corresponds to 15 V supply voltage for external components | | 1000 | | A |
| I_{S1out} | max. load current | | | 50 | mA |
| I_{TRIPSC} | over current trip level ($I_{analog OUT} = 10$ V) | | 1250 | | A |
| T_{tp} | over temperature protection | 110 | | 120 | $^\circ\text{C}$ |
| U_{DCTRIP} | U_{DC} -protection ($U_{analog OUT} = 9$ V); (option for GB types) | | not implemented | | V |

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