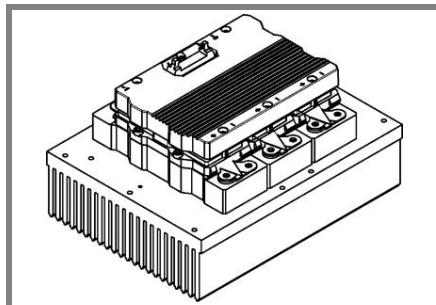


SKiiP 1513GB172-3DL



SKiiP® 3

2-pack-integrated intelligent Power System

Power section

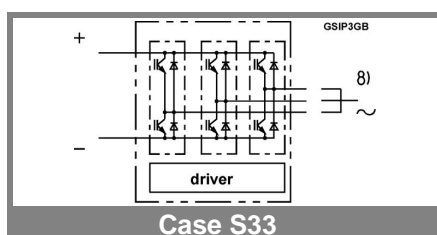
SKiiP 1513GB172-3DL

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



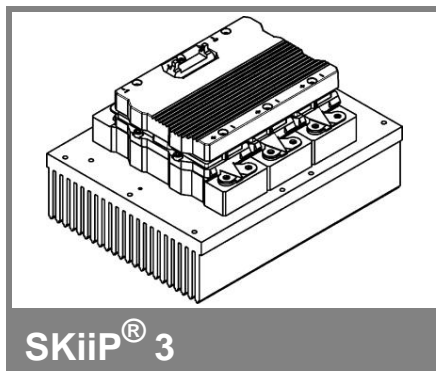
Case S33

| Absolute Maximum Ratings | | $T_s = 25\text{ °C}$, 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 | $T_s = 25\text{ (70) °C}$ | 1500 (1125) | A |
| Inverse diode | | | |
| $I_F = -I_C$ | $T_s = 25\text{ (70) °C}$ | 1250 (950) | A |
| I_{FSM} | $T_j = 150\text{ °C}$, $t_p = 10\text{ ms}$; sin | 10200 | A |
| I^2t (Diode) | Diode, $T_j = 150\text{ °C}$, 10 ms | 520 | kA²s |
| $T_j, (T_{stg})$ | rms, AC, 1 min, main terminals to heat sink per AC terminal, rms, $T_s = 70\text{ °C}$, $T_{terminal} < 115\text{ °C}$ | - 40 ... + 150 (125) | °C |
| V_{isol} | | 4000 | V |
| $I_{AC-terminal}$ | | 400 | A |

| Characteristics | | $T_s = 25\text{ °C}$, unless otherwise specified | | | |
|---|--|---|-----------|----------------|-------|
| Symbol | Conditions | min. | typ. | max. | Units |
| IGBT | | | | | |
| V_{CEsat} | $I_C = 900\text{ A}$, $T_j = 25\text{ (125) °C}$; measured at terminal | | 1,9 (2,2) | 2,4 | V |
| V_{CEO} | $T_j = 25\text{ (125) °C}$; at terminal | | 1 (0,9) | 1,2 (1,1) | V |
| r_{CE} | $T_j = 25\text{ (125) °C}$; at terminal | | 1 (1,4) | 1,3 (1,7) | mΩ |
| I_{CES} | $V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$, $T_j = 25\text{ (125) °C}$ | | 3,6 (216) | | mA |
| $E_{on} + E_{off}$ | $I_C = 900\text{ A}$, $V_{CC} = 900\text{ V}$ $T_j = 125\text{ °C}$, $V_{CC} = 1200\text{ V}$ | | 585 | | mJ |
| | | | 863 | | mJ |
| $R_{CC+EE'}$ | terminal chip, $T_j = 25\text{ °C}$ | | 0,17 | | mΩ |
| L_{CE} | top, bottom | | 4 | | nH |
| C_{CHC} | per phase, AC-side | | 5,1 | | nF |
| Inverse diode | | | | | |
| $V_F = V_{EC}$ | $I_F = 900\text{ A}$, $T_j = 25\text{ (125) °C}$ measured at terminal | | 2 (1,8) | 2,15 | V |
| V_{TO} | $T_j = 25\text{ (125) °C}$ | | 1,1 (0,8) | 1,2 (0,9) | V |
| r_T | $T_j = 25\text{ (125) °C}$ | | 1 (1,1) | 1,1 (1,2) | mΩ |
| E_{rr} | $I_C = 900\text{ A}$, $V_{CC} = 900\text{ V}$ $T_j = 125\text{ °C}$, $V_{CC} = 1200\text{ V}$ | | 108 | | mJ |
| | | | 128 | | 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 | | 2,4 | | kg |
| w | heat sink | | 7,5 | | kg |
| Thermal characteristics (PX 16 heat sink with fan SKF16B-230-1); "s" reference to heat sink; "r" reference to built-in temperature sensor (acc.IEC 60747-15) | | | | | |
| $R_{th(j-s)I}$ | per IGBT | | | 0,02 | K/W |
| $R_{th(j-s)D}$ | per diode | | | 0,038 | K/W |
| Z_{th} | R_i (mK/W) (max. values) | | | $\tau_{th}(s)$ | |
| | 1 2 3 4 | 1 | 2 | 3 | 4 |
| $Z_{th(j-r)I}$ | 3,4 9,6 7 0 | 363 | 0,18 | 0,04 | 1 |
| $Z_{th(j-r)D}$ | 12 12 18 20 | 30 | 5 | 0,25 | 0,04 |
| $Z_{th(r-a)}$ | 2,1 20 5,5 1,4 | 210 | 85 | 11 | 0,4 |

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SKiiP 1513GB172-3DL



2-pack-integrated intelligent Power System

2-pack integrated gate driver SKiiP 1513GB172-3DL

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, 2 s) | 4000 | V |
| V_{isolPD} | partial discharge extinction voltage, rms, $Q_{PD} \leq 10 \text{ pC}$; | 1500 | V |
| V_{isol12} | output 1 / output 2 (AC, rms, 2 s) | 1500 | V |
| f_{sw} | switching frequency | 9 | 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} | $V_{S2} = 24 \text{ V}$ | $380 + 34 \cdot f / \text{kHz} + 0,00015 \cdot (I_{AC} / \text{A})^2$ | | | 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. 5 mA; 8 V corresponds to 15 V supply voltage for external components | | 1500 | | A |
| I_{s1out} | max. load current | | | 50 | mA |
| I_{TRIPSC} | over current trip level ($I_{analogOUT} = 10 \text{ V}$) | | 1875 | | A |
| T_{tp} | over temperature protection | 110 | | 120 | $^\circ\text{C}$ |
| U_{DCTRIP} | U_{DC} -protection ($U_{analogOUT} = 9 \text{ V}$); (option for GB types) | | not implemented | | V |

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