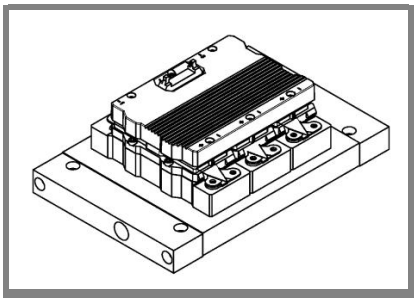
# SKiiP 1803GB172-3DW



SKiiP® 3

2-pack-integrated intelligent Power System

**Power section**

**SKiiP 1803GB172-3DW**

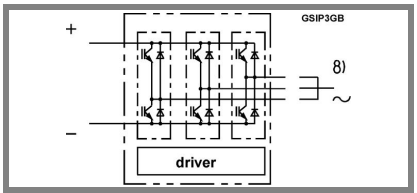
Data

## Power section features

- SKiiP technology inside
- Trench IGBTs
- CAL diode technology
- Integrated current sensor
- Integrated teperature 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 S33

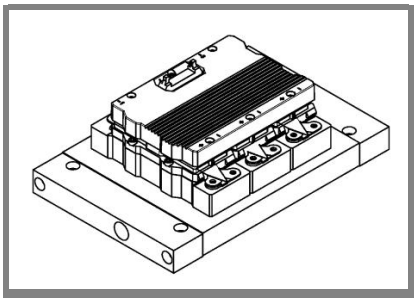
| Absolute Maximum Ratings | $T_s$ = 25°C unless otherwise specified | | |
|---|---|---|---|
| **Symbol** | **Conditions** | **Values** | **Units** |
| **IGBT** | | | |
| $V_{CES}$ | | 1700 | V |
| $V_{CC}$ 1) | Operating DC link voltage | 1200 | V |
| $V_{GES}$ | | ± 20 | V |
| $I_C$ | $T_s$ = 25 (70) °C | 1800 (1350) | A |
| **Inverse diode** | | | |
| $I_F$ = - $I_C$ | $T_s$ = 25 (70) °C | 1400 (1050) | A |
| $I_{FSM}$ | $T_j$ = 150 °C, $t_p$ = 10 ms; sin | 10200 | A |
| I²t (Diode) | Diode, $T_j$ = 150 °C, 10 ms | 520 | kA²s |
| $T_j$, ($T_{stg}$) | | - 40 ... + 150 (125) | °C |
| $V_{isol}$ | rms, AC, 1 min, main terminals to heat sink | 4000 | V |
| $I_{AC\text{-}terminal}$ | per AC terminal, rms, $T_s$ = 70 °C, $T_{terminal}$ <115 °C | 400 | A |

| Characteristics | $T_s$ = 25°C unless otherwise specified | | | | |
|---|---|---|---|---|---|
| **Symbol** | **Conditions** | **min.** | **typ.** | **max.** | **Units** |
| **IGBT** | | | | | |
| $V_{CEsat}$ | $I_C$ = 900 A, $T_j$ = 25 (125) °C; measured at terminal | | 1,9 (2,2) | 2,4 | V |
| $V_{CEO}$ | $T_j$ = 25 (125) °C; at terminal | | 1 (0,9) | 1,2 (1,1) | V |
| $r_{CE}$ | $T_j$ = 25 (125) °C; at terminal | | 1 (1,4) | 1,3 (1,7) | mΩ |
| $I_{CES}$ | $V_{GE}$ = 0 V, $V_{CE}$ = $V_{CES}$, $T_j$ = 25 (125) °C | | 3,6 (216) | | mA |
| $E_{on}$ + $E_{off}$ | $I_C$ = 900 A, $V_{CC}$ = 900 V | | 585 | | mJ |
| | $T_j$ = 125 °C, $V_{CC}$ = 1200 V | | 863 | | mJ |
| $R_{CC+EE'}$ | terminal chip, $T_j$ = 25 °C | | 0,17 | | mΩ |
| $L_{CE}$ | top, bottom | | 4 | | nH |
| $C_{CHC}$ | per phase, AC-side | | 3 | | nF |
| **Inverse diode** | | | | | |
| $V_F$ = $V_{EC}$ | $I_F$ = 900 A, $T_j$ = 25 (125) °C measured at terminal | | 2 (1,8) | 2,15 | V |
| $V_{TO}$ | $T_j$ = 25 (125) °C | | 1,1 (0,8) | 1,2 (0,9) | V |
| $r_T$ | $T_j$ = 25 (125) °C | | 1 (1,1) | 1,1 (1,2) | mΩ |
| $E_{rr}$ | $I_C$ = 900 A, $V_{CC}$ = 900 V | | 108 | | mJ |
| | $T_j$ = 125 °C, $V_{CC}$ = 1200 V | | 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 | | 5,2 | | 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)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $R_{th(j\text{-}s)I}$ | per IGBT | | | | | | 0,017 | K/W |
| $R_{th(j\text{-}s)D}$ | per diode | | | | | | 0,033 | K/W |
| $Z_{th}$ | $R_i$ (mK/W) (max. values) | | | | $tau_i$(s) | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| $Z_{th(j\text{-}r)I}$ | 1,4 | 6,8 | 7,8 | 0 | 69 | 0,35 | 0,02 | 1 |
| $Z_{th(j\text{-}r)D}$ | 2,6 | 4 | 17,7 | 17,7 | 50 | 5 | 0,25 | 0,04 |
| $Z_{th(r\text{-}a)}$ | 4,6 | 4,7 | 1,1 | 0,6 | 48 | 15 | 2,8 | 0,4 |

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.



SKiiP® 3

## 2-pack-integrated intelligent Power System

**2-pack**
**integrated gate driver**
**SKiiP 1803GB172-3DW**

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°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 | 9 | kHz |
| $f_{out}$ | output frequency for $I_{peak(1)}=I_C$ | 9 | kHz |
| $T_{op}$ ($T_{stg}$) | operating / storage temperature | - 40 ... + 85 | °C |

| Characteristics | | | | | ($T_a$ = 25°C) |
|---|---|---|---|---|---|
| **Symbol** | **Conditions** | **min.** | **typ.** | **max.** | **Units** |
| $V_{S2}$ | supply voltage non stabilized | 13 | 24 | 30 | V |
| $I_{S2}$ | $V_{S2}$ = 24 V | | 380+34*f/kHz+0,00015*$(I_{AC}/A)^2$ | | mA |
| $V_{iT+}$ | input threshold voltage (High) | | | 12,3 | V |
| $V_{iT-}$ | input threshold voltage (Low) | 4,6 | | | V |
| $R_{IN}$ | input resistance | | 10 | | kΩ |
| $C_{IN}$ | 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 | | 1500 | | A |
| $I_{s1out}$ | max. load current | | | 50 | mA |
| $I_{TRIPSC}$ | over current trip level ($I_{analog}$ OUT = 10 V) | | 1875 | | A |
| $T_{tp}$ | over temperature protection | 110 | | 120 | °C |
| $U_{DCTRIP}$ | $U_{DC}$-protection ( $U_{analog\ OUT}$ = 9 V); (option for GB types) | | not implemented | | V |

For electrical and thermal design support please use SEMISEL.
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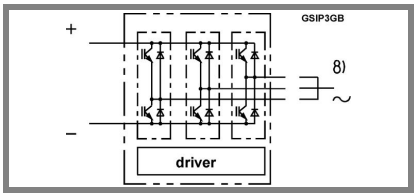


Case S33