

## 2-pack-integrated intelligent Power System

### Power section

#### SKiiP 1513GB172-3DL

##### Data

##### Power section 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

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

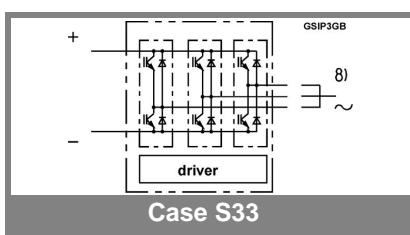
Absolute Maximum Ratings		$T_s = 25^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	Values		Units
<b>IGBT</b>				
$V_{CES}$		1700		V
$V_{CC}^1)$	Operating DC link voltage	1200		V
$V_{GES}$		$\pm 20$		V
$I_C$	$T_s = 25 (70)^\circ\text{C}$	1500 (1125)		A
<b>Inverse diode</b>				
$I_F = -I_C$	$T_s = 25 (70)^\circ\text{C}$	1250 (950)		A
$I_{FSM}$	$T_j = 150^\circ\text{C}$ , $t_p = 10\text{ ms}$ ; sin	10200		A
$I^2t$ (Diode)	Diode, $T_j = 150^\circ\text{C}$ , 10 ms	520		kA $^2$ s
$T_j$ , ( $T_{stg}$ )		- 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, $T_s = 70^\circ\text{C}$ , $T_{terminal} < 115^\circ\text{C}$	400		A

Characteristics		$T_s = 25^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	min.	typ.	max.
<b>IGBT</b>				
$V_{CEsat}$	$I_C = 900\text{ A}$ , $T_j = 25 (125)^\circ\text{C}$ ; 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 (1,4)	1,3 (1,7)	mΩ
$I_{CES}$	$V_{GE} = 0\text{ V}$ , $V_{CE} = V_{CES}$ , $T_j = 25 (125)^\circ\text{C}$	3,6 (216)		mA
$E_{on} + E_{off}$	$I_C = 900\text{ A}$ , $V_{CC} = 900\text{ V}$	585		mJ
	$T_j = 125^\circ\text{C}$ , $V_{CC} = 1200\text{ V}$	863		mJ
$R_{CC+EE}$	terminal chip, $T_j = 25^\circ\text{C}$	0,17		mΩ
$L_{CE}$	top, bottom	4		nH
$C_{CHC}$	per phase, AC-side	5,1		nF
<b>Inverse diode</b>				
$V_F = V_{EC}$	$I_F = 900\text{ A}$ , $T_j = 25 (125)^\circ\text{C}$ ; 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 (1,1)	1,1 (1,2)	mΩ
$E_{rr}$	$I_C = 900\text{ A}$ , $V_{CC} = 900\text{ V}$	108		mJ
	$T_j = 125^\circ\text{C}$ , $V_{CC} = 1200\text{ V}$	128		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	2,4		kg
w	heat sink	7,5		kg

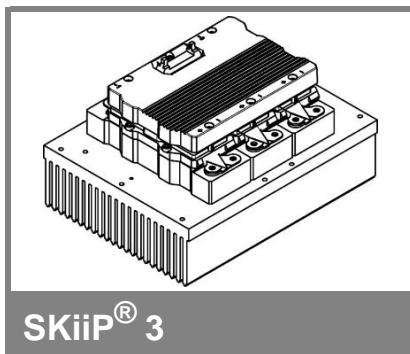
### Thermal characteristics (PX 16 heat sink with fan SKF16B-230-1); "s" reference to heat sink; "r" reference to built-in temperature sensor (acc.IEC 60747-15)

$R_{th(j-s)l}$	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
$Z_{th(j-r)l}$	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

\* 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



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## 2-pack-integrated intelligent Power System

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

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
$V_{i\text{isol}O}$	input / output (AC, rms, 2 s)	4000	V
$V_{i\text{isol}PD}$	partial discharge extinction voltage, rms, $Q_{PD} \leq 10 \text{ pC}$ ;	1500	V
$V_{i\text{isol}12}$	output 1 / output 2 (AC, rms, 2 s)	1500	V
$f_{sw}$	switching frequency	9	kHz
$f_{out}$	output frequency for $I_{\text{peak}(1)} = I_C$	9	kHz
$T_{op} (T_{stg})$	operating / storage temperature	- 40 ... + 85	°C

Characteristics ( $T_a = 25^\circ\text{C}$ )				
Symbol	Conditions	min.	typ.	max.
$V_{S2}$	supply voltage non stabilized	13	24	30
$I_{S2}$	$V_{S2} = 24 \text{ V}$	$380 + 34 \cdot f/\text{kHz} + 0,00015 \cdot (I_{AC}/\text{A})^2$		
$V_{i\text{T}+}$	input threshold voltage (High)	12,3		
$V_{i\text{T}-}$	input threshold voltage (Low)	4,6		
$R_{IN}$	input resistance	10		
$C_{IN}$	input capacitance	1		
$t_{d(on)IO}$	input-output turn-on propagation time	1,3		
$t_{d(off)IO}$	input-output turn-off propagation time	1,3		
$t_{\text{ERRRESET}}$	error memory reset time	9		
$t_{TD}$	top / bottom switch interlock time	3,3		
$I_{\text{analogOUT}}$	max. 5 mA; 8 V corresponds to 15 V supply voltage for external components	1500		
$I_{s1\text{out}}$	max. load current	50		
$I_{\text{TRIPSC}}$	over current trip level ( $I_{\text{analog OUT}} = 10 \text{ V}$ )	1875		
$T_{tp}$	over temperature protection	110	120	
$U_{DCT\text{TRIP}}$	$U_{DC\text{-protection}} (U_{\text{analog OUT}} = 9 \text{ V})$ ; (option for GB types)	not implemented		

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