

## I. Power section

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
$V_{GES}$		$\pm 20$	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 (670)	A
$I_{FSM}$	$T_j = 150^\circ\text{C}$ , $t_p = 10\text{ms}$ ; sin	8640	A
$I^2t$ (Diode)	Diode, $T_j = 150^\circ\text{C}$ , 10ms	373	$\text{kA}^2\text{s}$
$T_j, (T_{stg})$	rms, AC, 1min per AC terminal, rms, $T_s = 70^\circ\text{C}$ , $T_{terminal} < 115^\circ\text{C}$	-40...+150 (125)	$^\circ\text{C}$
$V_{isol}$		4000	V
$I_{AC-terminal}$		400	A

Characteristics								
T <sub>s</sub> = 25°C unless otherwise specified								
Symbol	Conditions	min.	typ.	max.	Units			
IGBT								
V <sub>CEsat</sub>	I <sub>C</sub> = 600A, T <sub>j</sub> = 25 (125)°C; measured at terminal	–	1,9 (2,2)	2,4	V			
V <sub>CEO</sub>	T <sub>j</sub> = 25 (125) °C; at terminal	–	1,0 (0,9)	1,2 (1,1)	V			
r <sub>CE</sub>	T <sub>j</sub> = 25 (125) °C; at terminal	–	1,5 (2,1)	1,9 (2,5)	mΩ			
I <sub>CES</sub>	V <sub>GE</sub> =0, V <sub>CE</sub> =V <sub>CES</sub> , T <sub>j</sub> =25(125) °C	–	2,4 (144)	–	mA			
E <sub>on</sub> + E <sub>off</sub>	I <sub>C</sub> =600A, V <sub>CC</sub> =900V	–	484	–	mJ			
	T <sub>j</sub> =125°C V <sub>CC</sub> =1200V	–	714	–	mJ			
L <sub>CE</sub>	top, bottom	–	6	–	nH			
C <sub>CHC</sub>	per phase , AC side	–	2,0	–	nF			
R <sub>CC-EE</sub>	terminal-chip, T <sub>j</sub> =25 °C	–	0,25	–	mΩ			
Inverse diode								
V <sub>F</sub> = V <sub>EC</sub>	I <sub>F</sub> = 600A; T <sub>j</sub> = 25(125) °C measured at terminal	–	1,6 (1,5)	2,0	V			
V <sub>TO</sub>	T <sub>j</sub> = 25 (125) °C	–	1,1 (0,8)	1,3 (1,0)	V			
r <sub>T</sub>	T <sub>j</sub> = 25 (125) °C	–	0,8 (1,2)	1,2 (1,5)	mΩ			
E <sub>RR</sub>	I <sub>C</sub> =600A V <sub>CC</sub> =900V	–	86	–	mJ			
	T <sub>j</sub> =125°C V <sub>CC</sub> =1200V	–	102	–	mJ			
Mechanical data								
M <sub>dc</sub>	DC terminals, SI Units	6	–	8	Nm			
M <sub>ac</sub>	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 <sub>thjslIGBT</sub>	per IGBT	–	–	0,026	°C/W			
R <sub>thjsdiode</sub>	per diode	–	–	0,050	°C/W			
Z <sub>th</sub>	R <sub>i</sub> (mK/W) (max. values)				tau <sub>i</sub> (s)			
	1	2	3	4	1	2	3	4
IGBT <sub>jr</sub>	2,8	11,6	13,6	0,0	69,00	0,35	0,02	1,0
diode <sub>jr</sub>	4,0	6,0	26,0	26,0	50,0	5,0	0,25	0,04
heatsink <sub>ra</sub>	5,5	4,8	1,1	0,6	48	15	2,8	0,4

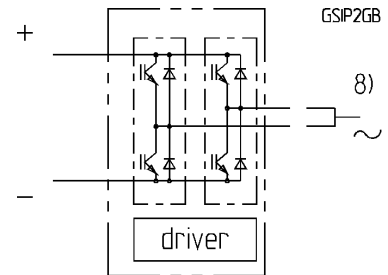
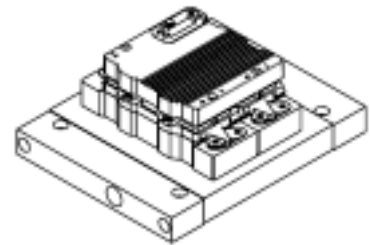
## SKiiP® 3

## SK integrated intelligent Power 2-pack

## SKiiP 1203GB173-2DW

Preliminary data

Case S23



## Features

- SKiiP technology inside
- Trench IGBTs
- CAL HD diode technology
- integrated current sensor
- integrated temperature sensor
- integrated heat sink
- IEC 60721-3-3 (humidity) class 3K3/IE32 (SKiiP® 3 System)
- IEC 68T.1 (climate) 40/125/56 (SKiiP® 3 power section)
- UL recognized File no. E63532 (SKiiP® 3 power section)

1) with assembly of suitable MKP capacitor per terminal (SEMİKRON type is recommended)

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

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## SKiiP 1203GB173-2DW

### SKiiP 3®

### SK integrated intelligent Power

## SKiiP 1203GB173-2DW

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 68T.1 (climate) 40/85/56 (SKiiP® 3 gate driver)

## II. Integrated gate driver

### Absolute maximum ratings

Symbol	Term	Value	Unit
V <sub>S2</sub>	unstabilized 24V power supply	30	V
V <sub>iH</sub>	input signal voltage (high)	15 + 0,3	V
dv/dt	secondary to primary side	75	kV/μs
V <sub>isollO</sub>	input / output (AC, rms, 2 s)	4000	V
V <sub>isolPD</sub>	partial discharge extinction voltage, rms, Q <sub>PD</sub> ≤ 10 pC;	1500	V
V <sub>isol12</sub>	output 1 / output 2 (AC, rms, 2s)	1500	V
f	switching frequency	13	kHz
T <sub>op</sub> (T <sub>stg</sub> )	operating / storage temperature	- 40 ... + 85	°C

### Electrical characteristics (T<sub>a</sub> = 25 °C)

Symbol	Term	Values			Units
		min	typ	max.	
V <sub>S2</sub>	supply voltage non stabilized	13	24	27	V
I <sub>S2</sub>	V <sub>S2</sub> = 24V	274 + 23*f / kHz + 0,00022 * (I <sub>AC</sub> /A) <sup>2</sup>			mA
V <sub>IT+</sub>	input threshold voltage (High)	11,2	–	–	V
V <sub>IT-</sub>	input threshold voltage (Low)	–	–	5,4	V
R <sub>in</sub>	input resistance	–	10	–	kΩ
C <sub>in</sub>	input capacitance	–	1	–	nF
t <sub>d(on)IO</sub>	input-output turn-on propagation time	–	1,1	–	μs
t <sub>d(off)IO</sub>	input-output turn-off propagation time	–	1,1	–	μs
t <sub>pERRRESET</sub>	error memory reset time	–	9	–	μs
t <sub>TD</sub>	top/bottom switch: interlock time	–	3,3	–	μs
I <sub>analogOUT</sub>	max. 5mA ; 8 V corresponds to 15 V supply voltage for external components; max load current	–	1000	–	A
I <sub>S1out</sub>		–	–	50	mA
I <sub>TRIPSC</sub>	over current trip level ( I <sub>analog OUT</sub> = 10V)	–	1250	–	A
T <sub>tp</sub>	over temperature protection	110	–	120	°C
U <sub>DCTrip</sub>	U <sub>DC</sub> -protection ( U <sub>analog OUT</sub> = 9V) (option for GB types)	not implemented	–	–	V

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