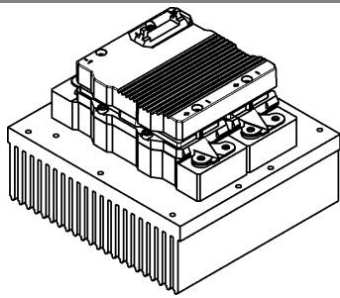


# SKiiP 1013GB172-2DL



SKiiP® 3

## 2-pack-integrated intelligent Power System

### Power Section

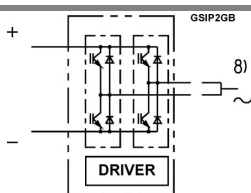
#### SKiiP 1013GB172-2DL

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



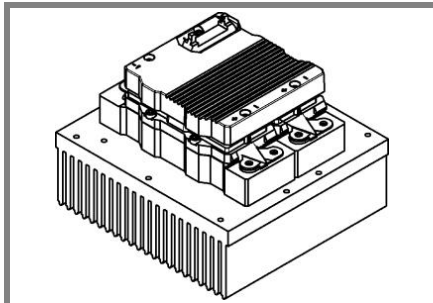
Case S23

Absolute Maximum Ratings		$T_s = 25\text{ °C}$ unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$	Operating DC link voltage	1700	V
$V_{CC}^{1)}$		1200	V
$V_{GES}$		$\pm 20$	V
$I_C$	$T_s = 25\text{ (70) °C}$	1000 (750)	A
<b>Inverse diode</b>			
$I_F = -I_C$	$T_s = 25\text{ (70) °C}$	830 (630)	A
$I_{FSM}$	$T_j = 150\text{ °C}$ , $t_p = 10\text{ ms}$ ; sin	6900	A
$I^2t$ (Diode)	Diode, $T_j = 150\text{ °C}$ , 10 ms	238	kA <sup>2</sup> s
$T_j$ , ( $T_{stg}$ )		- 40 ... + 150 (125)	°C
$V_{isol}$	rms, AC, 1 min, main terminals to heat sink	4000	V
$I_{AC-terminal}$	per AC terminal, rms, $T_s = 70\text{ °C}$ ,	400	A
	$T_{terminal} \leq 115\text{ °C}$		

Characteristics		$T_s = 25\text{ °C}$ unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{CEsat}$	$I_C = 600\text{ A}$ , $T_j = 25\text{ (125) °C}$ ; 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		1,5 (2,1)	1,9 (2,5)	mΩ
$I_{CES}$	$V_{GE} = 0\text{ V}$ , $V_{CE} = V_{CES}$ ; $T_j = 25\text{ (125) °C}$		2,4 (144)		mA
$E_{on} + E_{off}$	$I_C = 600\text{ A}$ , $V_{CC} = 900\text{ V}$		390		mJ
	$T_j = 125\text{ °C}$ , $V_{CC} = 1200\text{ V}$		575		mJ
$R_{CC+EE}$	terminal chip, $T_j = 25\text{ °C}$		0,25		mΩ
$L_{CE}$	top, bottom		6		nH
$C_{CHC}$	per phase, AC-side		3,4		nF
<b>Inverse diode</b>					
$V_F = V_{EC}$	$I_F = 600\text{ A}$ , $T_j = 25\text{ (125) °C}$ ; 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
$r_T$	$T_j = 25\text{ (125) °C}$		1,5 (1,7)	1,6 (1,8)	mΩ
$E_{rr}$	$I_C = 600\text{ A}$ , $V_{CC} = 900\text{ V}$		72		mJ
	$T_j = 125\text{ °C}$ , $V_{CC} = 1200\text{ V}$		86		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		1,7		kg
w	heat sink		5,4		kg
<b>Thermal characteristics (PX 16 heat sink with fan SKF 16B-230-1); "s" reference to heat sink; "r" reference to built-in temperature sensor (acc. IEC 60747-15)</b>					
$R_{th(j-s)I}$	per IGBT			0,03	K/W
$R_{th(j-s)D}$	per diode			0,058	K/W
$Z_{th}$	$R_i$ (mK/W) (max. values)	tau <sub>i</sub> (s)			
		1	2	3	4
$Z_{th(j-r)I}$		9,8	16,4	3,8	0
$Z_{th(j-r)D}$		10	24	24	36
$Z_{th(r-a)}$		4,3	20,3	7,1	2,3
				160	53
					9
					0,4

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# SKiiP 1013GB172-2DL



SKiiP® 3

## 2-pack-integrated intelligent Power System

2-pack  
integrated gate driver  
SKiiP 1013GB172-2DL

Data

### Gate driver features

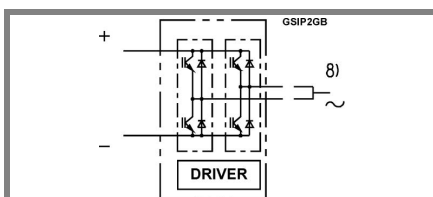
- CMOS compatible inputs
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- Short circuit protection
- Over current protection
- Over voltage protection (option)
- Power supply protection against under voltage
- Interlock of top/bottom 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		$T_a = 25\text{ °C}$ 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/ $\mu$ s
$V_{isolIO}$	input / output (AC, rms, )	4000	V
$V_{isolPD}$	partial discharge extinction voltage, rms, $Q_{PD}$ pC;	1500	V
$V_{isol12}$	output 1 / output 2 (AC, rms, )	1500	V
$f_{sw}$	switching frequency	14	kHz
$f_{out}$	output frequency for $I_{peak(1)}=I_C$	14	kHz
$T_{op}$ ( $T_{stg}$ )	operating / storage temperature	- 40 ... + 85	°C

Characteristics		$T_a = 25\text{ °C}$ unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
$V_{S2}$	supply voltage non stabilized	13	24	30	V
$I_{S2}$	$V_{S2} = 24\text{ V}$	$320+23*f/kHz+0,00022*(I_{AC}/A)^2$			mA
$V_{IT+}$	input threshold voltage (High)			12,3	V
$V_{IT-}$	input threshold voltage (Low)	4,6			V
$R_{IN}$	input resistance		10		k $\Omega$
$C_{IN}$	input capacitance		1		nF
$t_{d(on)IO}$	input-output turn-on propagation time		1,3		$\mu$ s
$t_{d(off)IO}$	input-output turn-off propagation time		1,3		$\mu$ s
$t_{pERRRESET}$	error memory reset time		9		$\mu$ s
$t_{TD}$	top / bottom switch interlock time		3,3		$\mu$ s
$I_{analogOUT}$	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 ( $I_{analog OUT} = 10\text{ V}$ )		1250		A
$T_{tp}$	over temperature protection	110		120	°C
$U_{DCTRIP}$	$U_{DC}$ -protection ( $U_{analog OUT} = 9\text{ V}$ ); (option for GB types)		not implemented		V

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Case S23