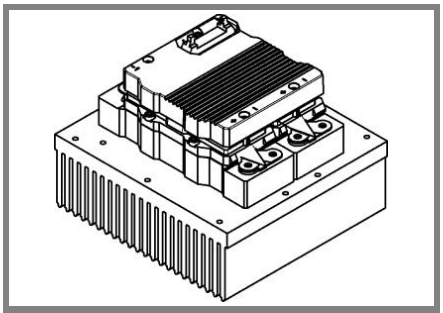
SKiiP 1213GB123-2DL



SKiiP® 3

2-pack-integrated intelligent Power System

Power section

SKiiP 1213GB123-2DL

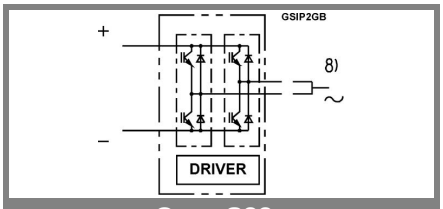
Preliminary Data

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 (SEMIKRON type is recommended)

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



Case S23

Absolute Maximum Ratings	T_s = 25°C unless otherwise specified		
Symbol	**Conditions**	**Values**	**Units**
IGBT			
V_{CES}		1200	V
V_{CC} 1)	Operating DC link voltage	900	V
V_{GES}		± 20	V
I_C	T_s = 25 (70) °C	1200 (900)	A
Inverse diode			
I_F = - I_C	T_s = 25 (70) °C	930 (700)	A
I_{FSM}	T_j = 150 °C, t_p = 10 ms; sin.	8640	A
I²t (Diode)	Diode, T_j = 150 °C, 10 ms	373	kA²s
T_j, (T_{stg})		- 40 ... + 150 (125)	°C
V_{isol}	rms, AC, 1 min, main terminals to heat sink	3000	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 = 600 A, T_j = 25 (125) °C; measured at terminal		1,7 (1,9)	2,1	V
V_{CEO}	T_j = 25 (125) °C; at terminal		0,9 (0,8)	1,1 (1)	V
r_{CE}	T_j = 25 (125) °C; at terminal		1,3 (1,8)	1,7 (2,2)	mΩ
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}, T_j = 25 (125) °C		2,4 (72)		mA
E_{on} + E_{off}	I_C = 600 A, V_{CC} = 600 V		221		mJ
	T_j = 125 °C, V_{CC} = 900 V		390		mJ
$R_{CC+EE'}$	terminal chip, T_j = 25 °C		0,25		mΩ
L_{CE}	top, bottom		6		nH
C_{CHC}	per phase, AC-side		3,4		nF
Inverse diode					
V_F = V_{EC}	I_F = 600 A, T_j = 25 (125) °C measured at terminal		1,5 (1,5)	1,8	V
V_{TO}	T_j = 25 (125) °C		0,9 (0,7)	1,1 (0,9)	V
r_T	T_j = 25 (125) °C		1 (1,3)	1,1 (1,5)	mΩ
E_{rr}	I_C = 600 A, V_{CC} = 600 V		42		mJ
	T_j = 125 °C, V_{CC} = 900 V		56		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		1,7		kg
w	heat sink		5,4		kg

Thermal characteristics (PX16 heat sink with fan SKF16B-230-1); "s" reference to heat sink; "r" reference to built-in temperature sensor (acc. IEC 60747-15)

$R_{th(j\text{-}s)I}$	per IGBT						0,03	K/W
$R_{th(j\text{-}s)D}$	per diode						0,058	K/W
Z_{th}	R_i (mK/W) (max. values)				tau_i(s)			
	1	2	3	4	1	2	3	4
$Z_{th(j\text{-}r)I}$	9,8	16,4	3,8	0	0,37	0,06	0,01	1
$Z_{th(j\text{-}r)D}$	10	24	24	36	50	5	0,25	0,04
$Z_{th(r\text{-}a)}$	4,3	20,3	7,1	2,3	160	53	9	0,4

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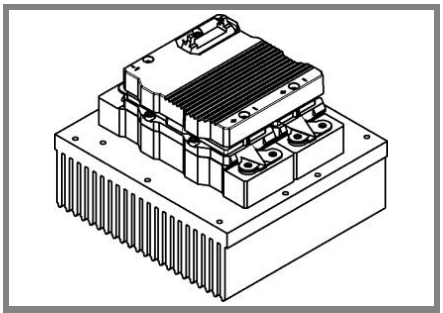
SKiiP 1213GB123-2DL



SKiiP® 3

2-pack-integrated intelligent Power System

2-pack
integrated gate driver
SKiiP 1213GB123-2DL

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)

Absolute Maximum Ratings

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)	3000	V
V_{isolPD}	partial discharge extinction voltage, rms, $Q_{PD} \leq 10$ pC;	1170	V
V_{isol12}	output 1 / output 2 (AC, rms, 2s)	1500	V
f	switching frequency	15	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		274+25*f/kHz+0,00022*(I_{AC}/A)^2		mA
V_{iT+}	input threshold voltage (High)	11,2			V
V_{iT-}	input threshold voltage (Low)			5,4	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		1000		A
I_{s1out}	max. load current			50	mA
I_{TRIPSC}	over current trip level (I_{analog} OUT = 10 V)		1250		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

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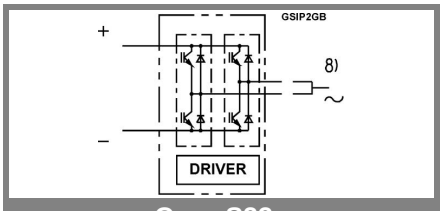

Case S23

