

SKiiP® 3

2-pack-integrated intelligent Power System

Power section

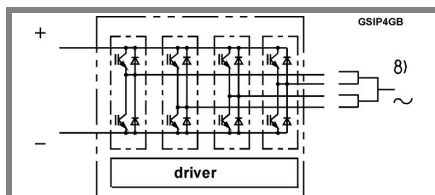
SKiiP 2013GB122-4DL

Preliminary Data

Features

- SKiiP technology inside
- SPT (Soft Punch Trough) 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 (SEMIKRON type is recommended)
- 8) AC connection busbars must be connected by the user; copper busbars available on request

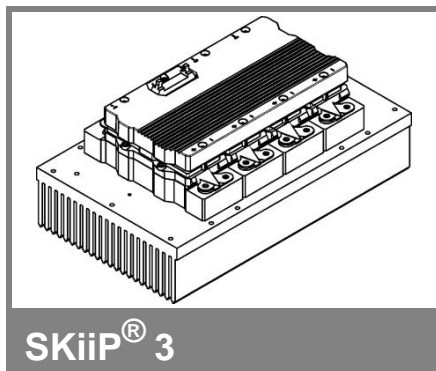


Case S43

Absolute Maximum Ratings		$T_s = 25^\circ\text{C}$ unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V_{CES}	Operating DC link voltage	1200	V
$V_{CC}^{1)}$		900	V
V_{GES}		± 20	V
I_C	$T_s = 25 (70)^\circ\text{C}$	2000 (1500)	A
Inverse diode			
$I_F = -I_C$	$T_s = 25 (70)^\circ\text{C}$	1760 (1340)	A
I_{FSM}	$T_j = 150^\circ\text{C}$, $t_p = 10\text{ ms}$; sin.	13500	A
I^2t (Diode)	Diode, $T_j = 150^\circ\text{C}$, 10 ms	911	kA^2s
$T_j, (T_{stg})$	rms, AC, 1 min, main terminals to heat sink per AC terminal, rms, $T_s = 70^\circ\text{C}$, $T_{terminal} < 115^\circ\text{C}$	- 40 ... + 150 (125)	$^\circ\text{C}$
V_{isol}		3000	V
$I_{AC-terminal}$		400	A

Characteristics		$T_s = 25^\circ\text{C}$ unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
V_{CEsat}	$I_C = 1200\text{ A}$, $T_j = 25 (125)^\circ\text{C}$; measured at terminal		2,3 (2,5)	2,6	V
V_{CEO}	$T_j = 25 (125)^\circ\text{C}$; at terminal		1,1 (1)	1,3 (1,2)	V
r_{CE}	$T_j = 25 (125)^\circ\text{C}$; at terminal		1 (1,2)	1,1 (1,4)	$\text{m}\Omega$
I_{CES}	$V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$, $T_j = 25 (125)^\circ\text{C}$		4,8 (144)		mA
$E_{on} + E_{off}$	$I_C = 1200\text{ A}$, $V_{CC} = 600\text{ V}$ $T_j = 125^\circ\text{C}$, $V_{CC} = 900\text{ V}$		360		mJ
			635		mJ
$R_{CC+EE'}$	terminal chip, $T_j = 25^\circ\text{C}$		0,13		$\text{m}\Omega$
L_{CE}	top, bottom		3		nH
C_{CHC}	per phase, AC-side		6,8		nF
Inverse diode					
$V_F = V_{EC}$	$I_F = 1200\text{ A}$, $T_j = 25 (125)^\circ\text{C}$ measured at terminal		1,95 (1,7)	2,1	V
V_{TO}	$T_j = 25 (125)^\circ\text{C}$		1,1 (0,8)	1,2 (0,9)	V
r_T	$T_j = 25 (125)^\circ\text{C}$		0,7 (0,8)	0,8 (0,9)	$\text{m}\Omega$
E_{rr}	$I_C = 1200\text{ A}$, $V_{CC} = 600\text{ V}$		96		mJ
	$T_j = 125^\circ\text{C}$, $V_{CC} = 900\text{ V}$		122		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		3,1		kg
w	heat sink		9,7		kg
Thermal characteristics (PX 16 heat sink with fan SKF 16B-230-1); "s" reference to heat sink; "r" reference to built-in temperature sensor					
$R_{th(j-s)I}$	per IGBT			0,015	K/W
$R_{th(j-s)D}$	per diode			0,029	K/W
Z_{th}	R_i (mK/W) (max. values)	$\tau_{th}(s)$			
	1 2 3 4	1	2	3	4
$Z_{th(j-r)I}$	5,6 6 6,4 0	363	0,18	0,04	1
$Z_{th(j-r)D}$	10 8,4 14,8 14,8	50	5	0,25	0,04
$Z_{th(r-a)}$	3,1 17,3 3,7 0,9	230	78	13	0,4

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2-pack-integrated intelligent Power System

2-pack

integrated gate driver SKiiP 2013GB122-4DL

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 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_{isolIO}	input / output (AC, rms, 2s)	3000	V
V_{isolPD}	partial discharge extinction voltage, rms, $Q_{PD} \leq 10 \text{ pC}$;	1170	V
V_{isol12}	output 1 / output 2 (AC, rms, 2s)	1500	V
f_{sw}	switching frequency	8	kHz
f_{out}	output frequency for $I = I_C$; sin.	1	kHz
$T_{op} (T_{stg})$	operating / storage temperature	- 40 ... + 85	$^\circ\text{C}$

Characteristics		$(T_a = 25^\circ\text{C})$			
Symbol	Conditions	min.	typ.	max.	Units
V_{S2}	supply voltage non stabilized	13	24	30	V
I_{S2}	$V_{S2} = 24 \text{ V}$	$324 + 39 \cdot f / \text{kHz} + 0,00011 \cdot (I_{AC} / \text{A})^2$			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 Ω
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		2000		A
I_{s1out}	max. load current			50	mA
I_{TRIPSC}	over current trip level ($I_{analogOUT} = 10 \text{ V}$)		2500		A
T_{tp}	over temperature protection	110		120	$^\circ\text{C}$
U_{DCTRIP}	U_{DC} -protection ($U_{analogOUT} = 9 \text{ V}$); (option for GB types)		not implemented		V

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