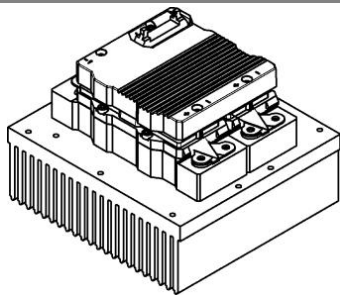


SKiiP 1013GB172-2DL



SKiiP® 3

2-pack-integrated intelligent Power System

Power Section

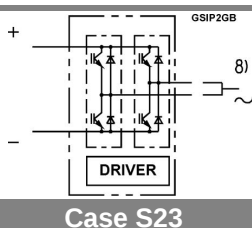
SKiiP 1013GB172-2DL

Preliminary Data

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 (SEMIKRON type is recommended)
- 8) AC connection busbars must be connected by the user; copper busbars available on request



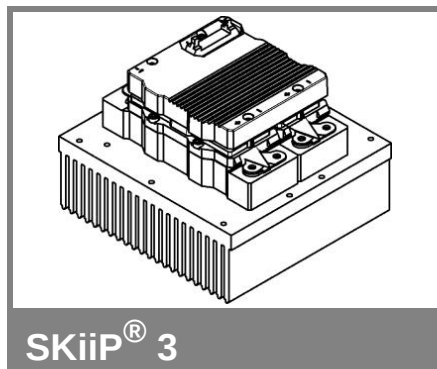
Case S23

Absolute Maximum Ratings		T _s = 25 °C unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V _{CES}	Operating DC link voltage	1700	V
V _{CC} ¹⁾		1200	V
V _{GES}		± 20	V
I _C	T _s = 25 (70) °C	1000 (750)	A
Inverse diode			
I _F = - I _C	T _s = 25 (70) °C	830 (630)	A
I _{FSM}	T _j = 150 °C, t _p = 10 ms; sin	6900	A
I²t (Diode)	Diode, T _j = 150 °C, 10 ms	238	kA²s
T _j , (T _{stg})	rms, AC, 1 min, main terminals to heat sink per AC terminal, rms, T _s = 70 °C, T _{terminal} ≤ 115 °C	- 40 ... + 150 (125)	°C
V _{isol}		4000	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}	$I_C = 600\text{ A}$, $T_j = 25 (125)^\circ\text{C}$; 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		1,5 (2,1)	1,9 (2,5)	m Ω
I_{CES}	$V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$, $T_j = 25 (125)^\circ\text{C}$		2,4 (144)		mA
$E_{on} + E_{off}$	$I_C = 600\text{ A}$, $V_{CC} = 900\text{ V}$		390		mJ
	$T_j = 125^\circ\text{C}$, $V_{CC} = 1200\text{ V}$		575		mJ
$R_{CC+EE'}$	terminal chip, $T_j = 25^\circ\text{C}$		0,25		m Ω
L_{CE}	top, bottom		6		nH
C_{CHC}	per phase, AC-side		3,4		nF
Inverse diode					
$V_F = V_{EC}$	$I_F = 600\text{ A}$, $T_j = 25 (125)^\circ\text{C}$; 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	$T_j = 25 (125)^\circ\text{C}$		1,5 (1,7)	1,6 (1,8)	m Ω
E_{rr}	$I_C = 600\text{ A}$, $V_{CC} = 900\text{ V}$		72		mJ
	$T_j = 125^\circ\text{C}$, $V_{CC} = 1200\text{ V}$		86		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 (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)					
$R_{th(j-s)I}$	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)			$\tau_{th}(s)$	
	1 2 3 4	1	2	3	4
$Z_{th(j-r)I}$	9,8 16,4 3,8 0	0,37	0,06	0,01	1
$Z_{th(j-r)D}$	10 24 24 36	50	5	0,25	0,04
$Z_{th(r-a)}$	4,3 20,3 7,1 2,3	160	53	9	0,4

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SKiiP 1013GB172-2DL



2-pack-integrated intelligent Power System

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

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 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/ μ 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 $I=I_C$; sin.	1	kHz
$T_{op} (T_{stg})$	operating / storage temperature	$- 40 \dots + 85$	°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}	$V_{S2} = 24\text{ V}$	$320 + 23 \cdot f / \text{kHz} + 0,00022 \cdot (I_{AC} / A)^2$			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 Ω
C_{IN}	input capacitance		1		nF
$t_{d(on)IO}$	input-output turn-on propagation time		1,3		μ s
$t_{d(off)IO}$	input-output turn-off propagation time		1,3		μ s
$t_{pERRRESET}$	error memory reset time		9		μ s
t_{TD}	top / bottom switch interlock time		3,3		μ 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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