

SKiIP 232 GD 120 - 313 CTV

Absolute Maximum Ratings			
Symbol	Conditions ¹⁾	Values	Units
V_{isol} ⁴⁾	AC, 1min	3000	V
T_{op}, T_{stg}	Operating / stor. temperature	-25...+85	°C
IGBT and Inverse Diode			
V_{CES}		1200	V
V_{CC} ⁵⁾	Operating DC link voltage	900	V
I_C	IGBT	200	A
T_j ³⁾	IGBT + Diode	-40...+150	°C
I_F	Diode	200	A
I_{FM}	Diode, $t_p < 1$ ms	400	A
I_{FSM}	Diode, $T_j = 150$ °C, 10ms; sin	1440	A
I^2t (Diode)	Diode, $T_j = 150$ °C, 10ms	10	kAs ²
Driver			
V_{S1}	Stabilized Power Supply	18	V
V_{S2}	Non-stabilized Power Supply	30	V
f_{smax}	Switching frequency	20	kHz
dV/dt	Primary to secondary side	75	kV/ μ s

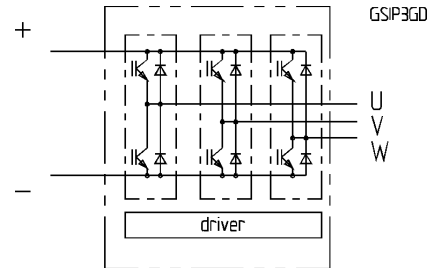
SKiPPACK[®]

SK integrated intelligent Power PACK 3-phase bridge SKiIP

232 GD 120 - 313 CTV ^{7,9)}

Preliminary Data

Case S3



Characteristics		min.	typ.	max.	Units
Symbol	Conditions ¹⁾				
IGBT ¹¹⁾					
$V_{(BR)CES}$	Driver without supply	$\geq V_{CES}$	-	-	V
I_{CES}	$V_{GE} = 0, T_j = 25$ °C $V_{CE} = V_{CES}, T_j = 125$ °C	-	-	0,4	mA
V_{TO}	$T_j = 125$ °C	-	-	1,38	V
r_T	$T_j = 125$ °C	-	-	10,5	m Ω
V_{Cesat}	$I_C = 175A, T_j = 125$ °C	-	-	3,2	V
V_{Cesat}	$I_C = 175A, T_j = 25$ °C	-	-	3,05	V
$E_{on} + E_{off}$	$V_{CC}=600/900V, I_C=200A$ $T_j = 125$ °C	-	-	60/98	mJ
C_{CHC}	per Phase, AC side	-	1,4	-	nF
L_{CE}	Top, Bottom	-	15	-	nH
Inverse Diode ²⁾					
$V_F = V_{EC}$	$I_F = 175A; T_j = 125$ °C	-	-	2,45	V
$V_F = V_{EC}$	$I_F = 175A; T_j = 25$ °C	-	-	2,55	V
$E_{on} + E_{off}$	$I_F = 200A; T_j = 125$ °C	-	-	8	mJ
V_{TO}	$T_j = 125$ °C	-	-	0,91	V
r_T	$T_j = 125$ °C	-	-	5,7	m Ω
Thermal Characteristics					
R_{thjs} ¹⁰⁾	per IGBT	-	-	0,129	K/W
R_{thjs} ¹⁰⁾	per Diode	-	-	0,375	K/W
R_{thsa} ^{6,10)}	P16 heatsink; see case S3	-	-	36	K/KW
Driver					
I_{S1}	Supply current 15V-supply	$340+360 \cdot f_s / f_{smax} + 3,5 \cdot I_{AC} / A$			mA
I_{S2}	Supply current 24V-supply	$250+250 \cdot f_s / f_{smax} + 2,6 \cdot I_{AC} / A$			mA
$t_{interlock-driver}$	Interlock-time	2,3			μ s
SKiPPACK protection					
I_{TRIPSC}	Short circuit protection	250			A
I_{TRIPLG}	Ground fault protection	58			A
T_{TRIP}	Over-temp. protection	115			°C
$U_{DCTRIIP}$ ⁹⁾	U_{DC} -protection	920			V
Mechanical Data					
M1	DC terminals, SI Units	4	-	6	Nm
M2	AC terminals, SI Units	8	-	10	Nm

Features

- Short circuit protection, due to evaluation of current sensor signals
- Isolated power supply
- Low thermal impedance
- Optimal thermal management with integrated heatsink
- Pressure contact technology with increased power cycling capability, compact design
- Low stray inductance
- High power, small losses
- Over-temperature protection

- ¹⁾ $T_{heatsink} = 25$ °C, unless otherwise specified
- ²⁾ CAL = Controlled Axial Lifetime Technology (soft and fast)
- ³⁾ without driver
- ⁴⁾ Driver input to DC link / AC output to DC link / AC output to heatsink
- ⁵⁾ with Semikron-DC link (low inductance)
- ⁶⁾ other heatsinks on request
- ⁷⁾ C - Integrated current sensors
T - Temperature protection
V - 15 V or 24 V power supply options available for driver:
U - DC link voltage sense
F – Fiber optic connector
- ⁹⁾ "s" referenced to temperature sensor
- ¹¹⁾ NPT-technology with homogenous current-distribution

PIN-array - 3-phase bridge driver SKiPPACK type „GD and GDL”

X1:

Pin	signal	remark
1	shield	connected to GND, when shielded cable is used
2	BOT HB 1 IN ⁴⁾	positive 15V CMOS logic; 10 kΩ impedance
3	ERROR HB 1 OUT ¹⁾	short circuit monitoring HB1 LOW = NO ERROR; open collector output; max. 30 V / 15 mA propagation delay 1 μs, min. pulsewidth error-memory-reset 8 μs
4	TOP HB 1 IN ⁴⁾	positive 15V CMOS logic; 10 kΩ impedance
5	BOT HB 2 IN ⁴⁾	positive 15V CMOS logic; 10 kΩ impedance
6	ERROR HB 2 OUT ¹⁾	short circuit monitoring HB2 LOW = NO ERROR; open collector output; max. 30 V / 15 mA propagation delay 1 μs, min. pulsewidth error-memory-reset 8 μs
7	TOP HB 2 IN ⁴⁾	positive 15V CMOS logic; 10 kΩ impedance
8	BOT HB 3 IN ⁴⁾	positive 15V CMOS logic; 10 kΩ impedance
9	ERROR HB 3 OUT ¹⁾	short circuit monitoring HB 3 LOW = NO ERROR; open collector output; max. 30 V / 15 mA propagation delay 1 μs, min. pulsewidth error-memory-reset 8 μs
10	TOP HB 3 ⁴⁾	positive 15V CMOS logic; 10 kΩ impedance
11	Overtemp. OUT ¹⁾	LOW = NO ERROR = $\vartheta_{DCB} < 115 \pm 5^\circ\text{C}$ open collector Output; max. 30 V / 15 mA „low“ output voltage < 0,6 V „high“ output voltage max. 30 V
12	reserved	
13	U _{DC} analog OUT	U _{DC} when using option „U” actual DC-link voltage, 9,0 V refer to U _{DCmax} max. output current 5 mA
14	+ 24 V _{DC} IN	24 V _{DC} (20 - 30 V)
15	+ 24 V _{DC} IN	don't supply with 24 V, when using + 15 V _{DC} supply voltage monitoring threshold 15,6 V
16	+ 15 V _{DC} IN	15 V _{DC} ± 4 % power supply
17	+ 15 V _{DC} IN	don't supply with 15 V, when using + 24 V _{DCIN} supply voltage monitoring threshold 13 V
18	GND	GND for power supply and
19	GND	GND for digital signals
20	Temp. analog OUT	
21	GND aux ²⁾	
22	I analog OUT HB 1	current actual value, 8,0 V refer to 100 % I _C overcurrent trip level 10 V ⇔ 125 %; I _C @ 25 °C current value > 0 ⇔ SKiP is source current value < 0 ⇔ SKiP is sink
23	GND aux ²⁾	
24	I analog OUT HB 2	current actual value, 8,0 V refer to 100 % I _C overcurrent trip level 10 V ⇔ 125 %; I _C @ 25 °C current value > 0 ⇔ SKiP is source current value < 0 ⇔ SKiP is sink
25	GND aux ²⁾	
26	I analog OUT HB 3	current actual value, 8,0 V refer to 100 % I _C overcurrent trip level 10 V ⇔ 125 %; I _C @ 25 °C current value > 0 ⇔ SKiP is source current value < 0 ⇔ SKiP is sink

X10: halfbridge 1 (HB1) OUT

Pin	Signal
1	
2	
8	Collector 1=TOP (HB1)
11	Gate 1=TOP (HB1)
12	Emitter 1=TOP (HB1)
13	Collector 2=BOT (HB1)
16	Gate 2=BOT (HB1)
17	Emitter 2=BOT (HB1)

X11: halfbridge 2 (HB2) OUT

Pin	Signal
1	Temp.-Sensor (HB2)1
2	Temp.-Sensor (HB2)2
8	Collector 1=TOP (HB2)
11	Gate 1=TOP (HB2)
12	Emitter 1=TOP (HB2)
13	Collector 2=BOT (HB2)
16	Gate 2=BOT (HB2)
17	Emitter 2=BOT (HB2)

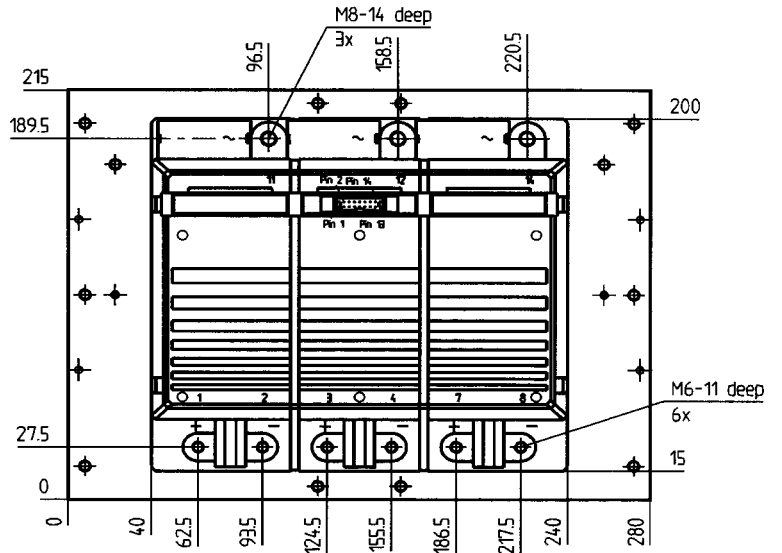
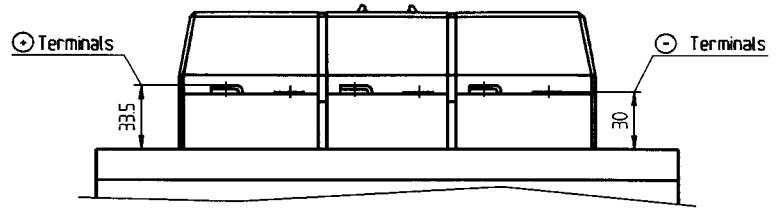
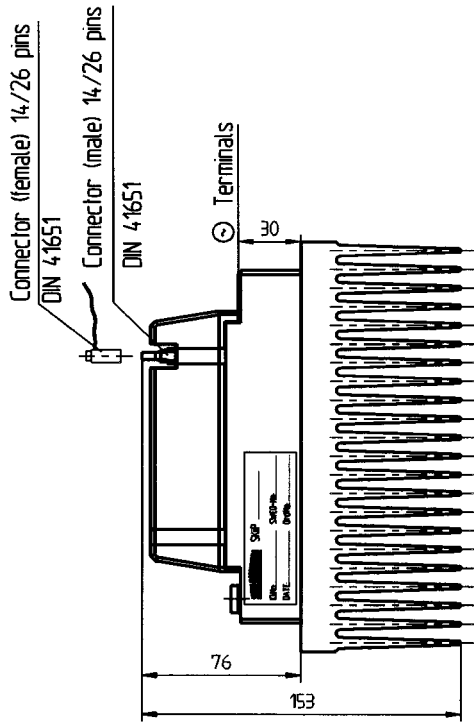
X12: halfbridge 3 (HB3) OUT

Pin	Signal
1	
2	
8	Collector 1=TOP (HB3)
11	Gate 1=TOP (HB3)
12	Emitter 1=TOP (HB3)
13	Collector 2=BOT (HB3)
16	Gate 2=BOT (HB3)
17	Emitter 2=BOT (HB3)

¹⁾ Open collector output, external pull up resistor necessary

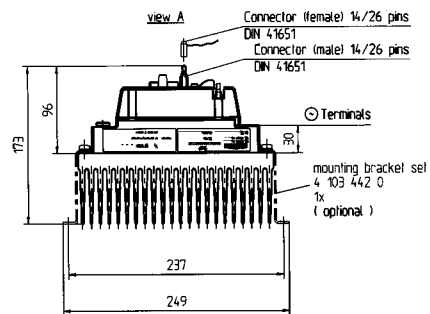
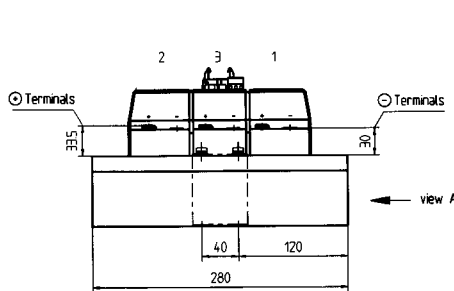
²⁾ GND aux = reference for analog output signals

⁴⁾ „high“ (min) 11,2 V
„low“ (max) 5,4 V



Weight without heatsink: 2,72 kg
P16: 6,6 kg

SKiiPPACK 3 - GB with F-option



F-Option

