

I. Power section 3 phase bridge

Absolute maximum ratings		T _s = 25°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		200 (150)	A
T _s = 25 (70) °C			
Inverse diode			
I _F = -I _C	T _s = 25 (70) °C	200 (150)	A
I _{FSM}	T _j = 150 °C, t _p = 10ms; sin	1440	A
I ² t (Diode)	Diode, T _j = 150 °C, 10ms	10	kA ² s
T _j , (T _{stg})	AC, 1min.	-40 (-25) ...+150 (125)	°C
V _{isol}		3000	V

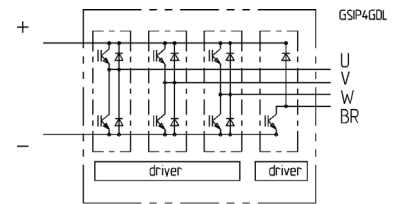
Characteristics $T_s = 25^\circ\text{C}$ unless otherwise specified					
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
V_{CESat}	$I_C = 175\text{A}$, $T_j = 25 (125)^\circ\text{C}$	–	2,6 (3,1)	3,1	V
V_{CEO}	$T_j = 25 (125)^\circ\text{C}$	–	1,2 (1,3)	1,5 (1,6)	V
r_{CE}	$T_j = 25 (125)^\circ\text{C}$	–	7,5 (10,0)	9,0 (11,5)	$\text{m}\Omega$
I_{CES}	$V_{GE}=0, V_{CE}=V_{CES}, T_j=25(125)^\circ\text{C}$	–	(10)	0,4	mA
$E_{on} + E_{off}$	$I_C=175\text{A}$, $V_{CC}=600\text{V}$	–	–	53	mJ
	$T_j=125^\circ\text{C}$, $V_{CC}=900\text{V}$	–	–	93	mJ
R_{CC-EE}	terminal chip, $T_j = 125^\circ\text{C}$	–	0,50	–	$\text{m}\Omega$
L_{CE}	top, bottom	–	15,0	–	nH
C_{CHC}	per phase, AC-side	–	1,4	–	nF
Inverse diode					
$V_F = V_{EC}$	$I_F = 150\text{A}$; $T_j = 25(125)^\circ\text{C}$	–	2,1 (1,9)	2,6	V
V_{TO}	$T_j = 25 (125)^\circ\text{C}$	–	1,3 (1,0)	1,4 (1,1)	V
r_T	$T_j = 25 (125)^\circ\text{C}$	–	5,0 (6,0)	6,8 (7,8)	$\text{m}\Omega$
E_{RR}	$I_C=175\text{A}$, $V_{CC}=600\text{V}$	–	–	6	mJ
	$T_j=125^\circ\text{C}$, $V_{CC}=900\text{V}$	–	–	8	mJ
Mechanical data					
M_{dc}	DC terminals, SI Units	6	–	8	Nm
M_{ac}	AC terminals, SI Units	13	–	15	Nm
w	SKiiP [®] 2 System w/o heat sink	–	3,5	–	kg
w	heat sink	–	8,5	–	kg
Thermal characteristics (P16 heat sink; $275 \text{ m}^3/\text{h}$); " r " reference to temperature sensor					
$R_{thjrlGBT}$	per IGBT	–	–	0,129	K/W
$R_{thjrdiode}$	per diode	–	–	0,375	K/W
R_{thra}	per module	–	–	0,036	K/W
Z_{th}	R_i (mK/W) (max.)	$\tau_{ui}(\text{s})$			
	1 2 3 4	1	2	3	4
IGBT _{jr}	14 99 15 –	1	0,13	0,001	–
diode _{jr}	41 289 45 –	1	0,13	0,001	–
heatsink _{ra}	1,7 24,0 7,6 2,6	494	165	20	0,03

SKiiP[®] 2

SK integrated intelligent Power 7-pack

SKiiP 232GDL120-410CTV

Case S5



Features

- SKiiP technology inside
- low loss IGBTs
- CAL diode technology
- integrated current sensor
- integrated temperature sensor
- integrated heat sink
- IEC 60721-3-3 (humidity) class 3K3/IE32 (SKiiP[®] 2 System)
- IEC 68T.1 (climate) 40/125/56 (SKiiP[®] 2 power section)

1) with assembly of suitable MKP capacitor per terminal (SEMİKRON type is recommended)

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SKiiP 232GDL120-410CTV

SKiiP 2®

SK integrated intelligent Power

SKiiP 232GDL120-410CTV

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) 25/85/56 (SKiiP® 2 gate driver)

II. Integrated gate driver 3 phase bridge

Absolute maximum ratings

Symbol	Term	Value	Unit
V _{S1}	stabilized 15V power supply	18	V
V _{S2}	unstabilized 24V power supply	30	V
V _{iH}	input signal voltage (high)	15 + 0,3	V
dv/dt	secondary to primary side	75	kV/μs
V _{isollO}	input / output (AC)	3000	Vac
V _{isol12}	output 1 / output 2 (AC)	1500	Vac
f _{max}	switching frequency	20	kHz
T _{op} (T _{stg})	operating / storage temperature	- 25 ... + 85	°C

Electrical characteristics (T_a = 25 °C)

Symbol	Term	Values			Units
		min	typ	max.	
V _{S1}	supply voltage stabilized	14,4	15	15,6	V
V _{S2}	supply voltage non stabilized	20	24	30	V
I _{S1}	V _{S1} = 15V	340 + 360*f / f _{max} + 3,5* (I _{AC} /A)			mA
I _{S2}	V _{S2} = 24V	250 + 250*f / f _{max} + 2,6 * (I _{AC} /A)			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
t _{d(on)IO}	turn-on propagation time (system)	–	1,2	–	μs
t _{d(off)IO}	turn-off propagation time (system)	–	1,6	–	μs
t _{pERRRESET}	error memory reset time	9	–	–	μs
t _{TD}	top/bottom switch: interlock time	–	2,3	–	μs
I _{analogOUT}	8 V corresponds to	–	200	–	A
I _{Vs1outmax}	max. current of 15 V supply voltage (available when supplied with 24V)	–	–	50	mA
I _{AOmax}	output current at pin 13/20/22/24/26	–	–	5	mA
V _{ol}	logic low output voltage	–	–	0,6	V
V _{oH}	logic high output voltage	–	–	30	V
I _{TRIPSC}	over current trip level (I _{analog OUT} = 10V)	–	250	–	A
I _{TRIPLG}	ground fault protection	–	58	–	A
T _{tp}	over temperature protection	110	–	120	°C
U _{DCTRIIP}	trip level of U _{DC} -protection (U _{analog OUT} = 9V); (option)	900	–	–	V

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