

SKiP 232GDL120-410CTV

I. Power section 3 phase bridge

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		$T_s = 25 (70)^\circ\text{C}$	200 (150)
Inverse diode			
$I_F = -I_C$	$T_s = 25 (70)^\circ\text{C}$	200 (150)	A
I_{FSM}	$T_j = 150^\circ\text{C}$, $t_p = 10\text{ms}$; sin	1440	A
I^2t (Diode)	Diode, $T_j = 150^\circ\text{C}$, 10ms	10	kA^2s
$T_j, (T_{stg})$	AC, 1min.	-40 (-25) ... +150 (125)	$^\circ\text{C}$
V_{isol}		3000	V

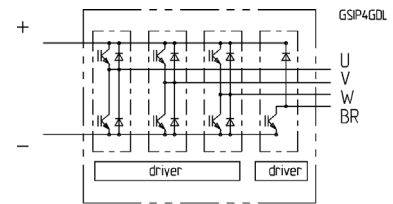
Characteristics		$T_s = 25^\circ\text{C}$ unless otherwise specified							
Symbol	Conditions	min.	typ.	max.	Units				
IGBT									
V_{CEsat}	$I_C = 175\text{A}$, $T_j = 25 (125)^\circ\text{C}$	-	2,6 (3,1)	3,1	V				
V_{CEO}	$T_j = 25 (125)^\circ\text{C}$	-	1,2 (1,3)	1,5 (1,6)	V				
r_{CE}	$T_j = 25 (125)^\circ\text{C}$	-	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	SKiP [®] 2 System w/o heat sink	-	3,5	-	kg				
w	heat sink	-	8,5	-	kg				
Thermal characteristics (P16 heat sink; 275 m^3/h); "r" reference to temperature sensor									
$R_{thjrIGBT}$	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.)	$\tau_{i(s)}$							
		1	2	3	4				
$IGBT_{jr}$		14	99	15	-	1	2	3	4
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

SKiP[®] 2

SK integrated intelligent Power 7-pack

SKiP 232GDL120-410CTV

Case S5



Features

- SKiP 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 (SKiP[®] 2 System)
- IEC 68T.1 (climate) 40/125/56 (SKiP[®] 2 power section)

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

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SKiiP 232GDL120-410CTV

SKiiP 2®

SK integrated intelligent Power

SKiiP 232GDL120-410CTV

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 _{isolIO}	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

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)

Electrical characteristics (T _a = 25 °C)				Values				
Symbol	Term				min	typ	max.	Units
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 _{A0max}	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 _{ip}	over temperature protection				110	–	120	°C
U _{DCTRIP}	trip level of U _{DC} -protection (U _{analog OUT} = 9V); (option)				900	–	–	V

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