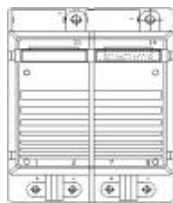


# SKiiP 232GH120-210CTV ...

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SKiiP® 2

4-pack - integrated intelligent Power System

Power section

SKiiP 232GH120-210CTV

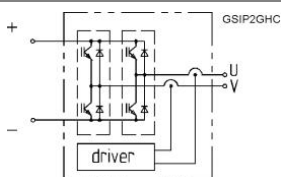
## Features

- 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 (SEMIKRON type is recommended)

Absolute Maximum Ratings		$T_s = 25^\circ\text{C}$ unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$	Operating DC link voltage	1200	V
$V_{CC}^{(1)}$		900	V
$V_{GES}$		$\pm 20$	V
$I_C$	$T_s = 25 (70)^\circ\text{C}$	200 (150)	A
<b>Inverse diode</b>			
$I_F = -I_C$	$T_s = 25 (70)^\circ\text{C}$	200 (150)	A
$I_{FSM}$	$T_j = 150^\circ\text{C}$ , $t_p = 10\text{ ms}$ ; sin.	1440	A
$I^2t$ (Diode)	Diode, $T_j = 150^\circ\text{C}$ , 10 ms	10	$\text{kA}^2\text{s}$
$T_j, (T_{stg})$	AC, 1 min. (mainterminals to heat sink)	- 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				
<b>IGBT</b>									
$V_{CESat}$	$I_C = 175\text{ A}$ , $T_j = 25 (125)^\circ\text{C}$	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)	9 (11,5)		$\text{m}\Omega$				
$I_{CES}$	$V_{GE} = 0\text{ V}$ , $V_{CE} = V_{CES}$ , $T_j = 25 (125)^\circ\text{C}$	10	0,4		$\text{mA}$				
$E_{on} + E_{off}$	$I_C = 175\text{ A}$ , $V_{CC} = 600\text{ V}$			53	$\text{mJ}$				
	$T_j = 125^\circ\text{C}$ , $V_{CC} = 900\text{ V}$			93	$\text{mJ}$				
$R_{CC'} + EE'$	terminal chip, $T_j = 125^\circ\text{C}$		0,5		$\text{m}\Omega$				
$L_{CE}$	top, bottom		15		nH				
$C_{CHC}$	per phase, AC-side		1,4		nF				
<b>Inverse diode</b>									
$V_F = V_{EC}$	$I_F = 150\text{ A}$ , $T_j = 25 (125)^\circ\text{C}$	2,1 (1,9)	2,6		V				
$V_{TO}$	$T_j = 25 (125)^\circ\text{C}$	1,3 (1)	1,4 (1,1)		V				
$r_T$	$T_j = 25 (125)^\circ\text{C}$	5 (6)	6,8 (7,8)		$\text{m}\Omega$				
$E_{rr}$	$I_C = 175\text{ A}$ , $V_{CC} = 600\text{ V}$			6	$\text{mJ}$				
	$T_j = 125^\circ\text{C}$ , $V_{CC} = 900\text{ V}$			8	$\text{mJ}$				
<b>Mechanical data</b>									
$M_{dc}$	DC terminals, SI Units	6		8	Nm				
$M_{ac}$	AC terminals, SI Units	13		15	Nm				
	SKiiP® 2 System w/o heat sink		1,9		kg				
w	heat sink		4,7		kg				
<b>Thermal characteristics (P16 heat sink; 310<math>\text{m}^3/\text{h}</math>); "r" reference to temperature sensor</b>									
$R_{th(j-s)I}$	per IGBT			0,129	K/W				
$R_{th(j-s)D}$	per diode			0,375	K/W				
$R_{th(s-a)}$	per module			0,044	K/W				
$Z_{th}$	$R_i$ (mK/W) (max. values)	$\tau_{th}(s)$							
		1	2	3	4				
$Z_{th(j-r)I}$		14	99	15	1	0,13	0,001		
$Z_{th(j-r)D}$		41	289	45	1	0,13	0,001		
$Z_{th(r-a)}$		14,2	19,3	6,8	3,7	262	50	5	0,02



Case S 2

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SKiiP<sup>®</sup> 2

4-pack - integrated intelligent Power System

4-pack integrated gate driver

SKiiP 232GH120-210CTV

### Gate driver features

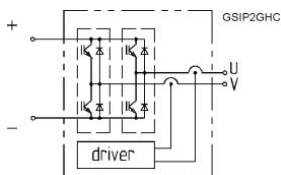
- CMOS compatible inputs
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage(option)
- Short circuit protection
- Over current protection
- Over voltage protection (option)
- Power supply protected against under voltage
- Interlock of top/bottom switch
- Isolation by transformers
- Fibre optic interface (option for GB-types only)
- IEC 68T.1 (climate) 25/85/56 (SKiiP<sup>®</sup> 2 gate driver)

Absolute Maximum Ratings			
Symbol	Conditions	Values	Units
V <sub>S1</sub>	stabilized 15 V power supply	18	V
V <sub>S2</sub>	unstabilized 24 V power supply	30	V
V <sub>iH</sub>	input signal voltage (high)	15 + 0,3	V
dv/dt	secondary to primary side	75	kV/μs
V <sub>isolIO</sub>	input / output (AC, r.m.s., 2s )	3000	Vac
V <sub>isol12</sub>	output 1 / output 2 (AC, r.m.s., 2s )	1500	Vac
f <sub>max</sub>	switching frequency	20	kHz
T <sub>op</sub> (T <sub>stg</sub> )	operating / storage temperature	- 25 ... + 85	°C

Characteristics				(T <sub>a</sub> = 25 °C)	
Symbol	Conditions	min.	typ.	max.	Units
V <sub>S1</sub>	supply voltage stabilized	14,4	15	15,6	V
V <sub>S2</sub>	supply voltage non stabilized	20	24	30	V
I <sub>S1</sub>	V <sub>S1</sub> = 15 V	230+230*f/f <sub>max</sub> +1,3*(I <sub>AC</sub> /A)			mA
I <sub>S2</sub>	V <sub>S2</sub> = 24 V	170+280*f/f <sub>max</sub> +1,0*(I <sub>AC</sub> /A)			mA
V <sub>iT+</sub>	input threshold voltage (High)	11,2			V
V <sub>iT-</sub>	input threshold voltage (Low)	5,4			V
R <sub>IN</sub>	input resistance	10			kΩ
t <sub>d(on)IO</sub>	input-output turn-on propagation time	1,2			μs
t <sub>d(off)IO</sub>	input-output turn-off propagation time	1,6			μs
t <sub>pERRRESET</sub>	error memory reset time	9			μs
t <sub>TD</sub>	top / bottom switch : interlock time	2,3			μs
I <sub>analogOUT</sub>	8 V corresponds to max. current of 15 V supply voltage	200			A
I <sub>Vs1outmax</sub>	(available when supplied with 24 V)	50			mA
I <sub>A0max</sub>	output current at pin 15/16/18/19	5			mA
V <sub>0l</sub>	logic low output voltage	0,6			V
V <sub>0H</sub>	logic high output voltage	30			V
I <sub>TRIPSC</sub>	over current trip level (I <sub>analog OUT</sub> = 10 V)	250			A
I <sub>TRIPLG</sub>	ground fault protection	58			A
T <sub>tp</sub>	over temperature protection	110	120		°C
U <sub>DCTRIP</sub>	trip level of U <sub>DC</sub> -protection ( U <sub>analog OUT</sub> = 9 V); (option)	900			V

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