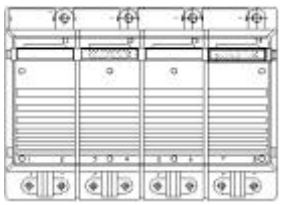
SKiiP 592GH170-4D



SKiiP® 2

4-pack - integrated intelligent Power System

Power section

SKiiP 592GH170-4D

Features

- SKiiP technology inside
- CAL diode technology
- Integrated current sensor
- Integrated teperature sensor
- Integrated heat sink
- IEC 60721-3-3 (humidity) class 3K3/IE32 (SKiiP® 2 System)
- IEC 60068-1 (climate) 40/125/56
- UL recognized file no. E63532

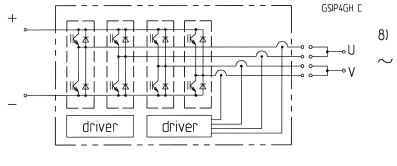
1) with assembly of suitable MKP capacitor per terminal (SEMIKRON type is recommended)

8) AC connection busbars must be connected by the user; copper busbars available on request

Absolute Maximum Ratings		T_s = 25 °C unless otherwise specified	
Symbol	**Conditions**	**Values**	**Units**
IGBT			
V_{CES}		1700	V
V_{CC} 1)	Operating DC link voltage	1200	V
V_{GES}		± 20	V
I_C	T_s = 25 (70) °C	500 (375)	A
Inverse diode			
I_F = - I_C	T_s = 25 (70) °C	500 (375)	A
I_{FSM}	T_j = 150 °C, t_p = 10 ms; sin.	4320	A
I²t (Diode)	Diode, T_j = 150 °C, 10 ms	93	kA²s
T_j, (T_{stg})		- 40 (-25) ... + 150 (125)	°C
V_{isol}	AC, 1 min. (mainterminals to heat sink)	4000	V

Characteristics		T_s = 25 °C unless otherwise specified			
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Units**
IGBT					
V_{CEsat}	I_C = 400 A, T_j = 25 (125) °C		3,3 (4,3)	3,9	V
V_{CEO}	T_j = 25 (125) °C		1,7 (2)	2 (2,3)	V
r_{CE}	T_j = 25 (125) °C		4 (5,9)	4,8 (6,6)	mΩ
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}, T_j = 25 (125) °C		(30)	2	mA
E_{on} + E_{off}	I_C = 400 A, V_{CC} = 900 V			345	mJ
	T_j = 125 °C, V_{CC} = 1200 V			509	mJ
$R_{CC'+EE'}$	terminal chip, T_j = 125 °C		0,25		mΩ
L_{CE}	top, bottom		7,5		nH
C_{CHC}	per phase, AC-side		1,6		nF
Inverse diode					
V_F = V_{EC}	I_F = 400 A, T_j = 25 (125) °C		2,3 (2,1)	2,9	V
V_{TO}	T_j = 25 (125) °C		1,3 (1)	1,6 (1,3)	V
r_T	T_j = 25 (125) °C		2,5 (2,8)	3,2 (3,5)	mΩ
E_{rr}	I_C = 400 A, V_{CC} = 900 V			42	mJ
	T_j = 125 °C, V_{CC} = 1200 V			50	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 m³/h); " $_r$ " reference to temperature sensor					
$R_{th(j-s)I}$	per IGBT			0,04	K/W
$R_{th(j-s)D}$	per diode			0,133	K/W
$R_{th(s-a)}$	per module			0,033	K/W

Z_{th}	R_i (mK/W) (max. values)				tau$_i$(s)			
	1	2	3	4	1	2	3	4
$Z_{th(j-r)I}$	4	31	5	0	1	0,13	0,001	1
$Z_{th(j-r)D}$	15	103	16	0	1	0,13	0,001	1
$Z_{th(r-a)}$	1,6	22	7	2,4	494	165	20	0,03



Case S 5

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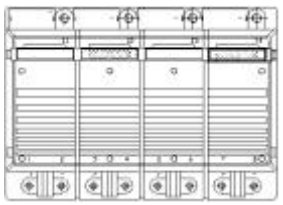
SKiiP 592GH170-4D



SKiiP® 2

Absolute Maximum Ratings		T_a = 25 °C, unless otherwise specified	
Symbol	**Conditions**	**Values**	**Units**
V_{S1}	stabilized 15 V power supply	18	V
V_{S2}	unstabilized 24 V 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, r.m.s., 2s)	4000	Vac
V_{isol12}	output 1 / output 2 (AC, r.m.s., 2s)	1500	Vac
f_{sw}	switching frequency	10	kHz
f_{out}	output frequency for I=I_C ;sin.	1	kHz
T_{op} (T_{stg})	operating / storage temperature	- 40 ... + 85	°C

4-pack - integrated intelligent Power System

4-pack
integrated gate driver

SKiiP 592GH170-4D

Gate driver features

- Two separate and independent "GB"-type driver
- CMOS compatible input
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- U-option is integrated on left driver, (DC terminals at bottom; refer to case drawing)
- 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)
- IEC 60068-1 (climate) 25/85/56

Characteristics					(T_a = 25 °C)
Symbol	**Conditions**	**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} = 15 V		210+440*f/f_{max}+1,2*(I_{AC}/A)		mA
I_{S2}	V_{S2} = 24 V		160+310*f/f_{max}+0,85*(I_{AC}/A)		mA
V_{iT+}	input threshold voltage (High)			12,3	V
V_{iT-}	input threshold voltage (Low)	4,6			V
R_{IN}	input resistance		10		kΩ
$t_{d(on)IO}$	input-output turn-on propagation time			1,5	µs
$t_{d(off)IO}$	input-output turn-off propagation time			1,4	µs
$t_{pERRRESET}$	error memory reset time	9			µs
t_{TD}	top / bottom switch : interlock time		3,3		µs
$I_{analogOUT}$	8 V corresponds to max. current of 15 V supply voltage		500		A
$I_{Vs1outmax}$	(available when supplied with 24 V)			50	mA
I_{A0max}	output current at pin 12/14			5	mA
V_{0l}	logic low output voltage			0,6	V
V_{0H}	logic high output voltage			30	V
I_{TRIPSC}	over current trip level ($I_{analog\ OUT}$ = 10 V)		625		A
I_{TRIPLG}	ground fault protection				A
T_{tp}	over temperature protection	110		120	°C
U_{DCTRIP}	trip level of U_{DC}-protection ($U_{analog\ OUT}$ = 9 V); (option)	1200			V

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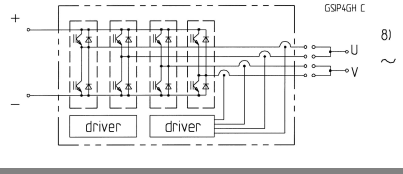

Case S 5

