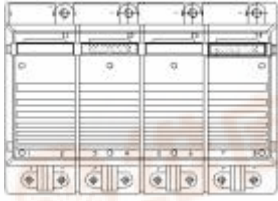


SKiIP 592GH170-4D



SKiIP® 2

4-pack - integrated intelligent Power System

Power section

SKiIP 592GH170-4D

Features

- SKiIP technology inside
- CAL diode technology
- Integrated current sensor
- Integrated temperature 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

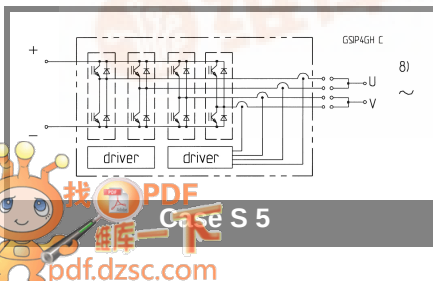
- with assembly of suitable MKP capacitor per terminal (SEMIKRON type is recommended)
- AC connection busbars must be connected by the user; copper busbars available on request

Absolute Maximum Ratings		$T_s = 25^\circ\text{C}$ unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V_{CES}	Operating DC link voltage	1700	V
$V_{CC}^{1)}$		1200	V
V_{GES}		± 20	V
I_C	$T_s = 25 (70)^\circ\text{C}$	500 (375)	A
Inverse diode			
$I_F = -I_C$	$T_s = 25 (70)^\circ\text{C}$	500 (375)	A
I_{FSM}	$T_j = 150^\circ\text{C}$, $t_p = 10\text{ ms}$; sin.	4320	A
I^2t (Diode)	Diode, $T_j = 150^\circ\text{C}$, 10 ms	93	kA^2s
$T_j, (T_{stg})$	AC, 1 min. (mainterminals to heat sink)	- 40 (-25) ... + 150 (125)	$^\circ\text{C}$
V_{isol}		4000	V

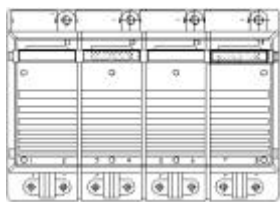
Characteristics		$T_s = 25^\circ\text{C}$ unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
V_{CEsat}	$I_C = 400\text{ A}$, $T_j = 25 (125)^\circ\text{C}$		3,3 (4,3)	3,9	V
V_{CEO}	$T_j = 25 (125)^\circ\text{C}$		1,7 (2)	2 (2,3)	V
r_{CE}	$T_j = 25 (125)^\circ\text{C}$		4 (5,9)	4,8 (6,6)	$\text{m}\Omega$
I_{CES}	$V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$, $T_j = 25 (125)^\circ\text{C}$		(30)	2	mA
$E_{on} + E_{off}$	$I_C = 400\text{ A}$, $V_{CC} = 900\text{ V}$ $T_j = 125^\circ\text{C}$, $V_{CC} = 1200\text{ V}$			345 509	mJ
$R_{CC'} + EE'$	terminal chip, $T_j = 125^\circ\text{C}$		0,25		$\text{m}\Omega$
L_{CE}	top, bottom		7,5		nH
C_{CHC}	per phase, AC-side		1,6		nF
Inverse diode					
$V_F = V_{EC}$	$I_F = 400\text{ A}$, $T_j = 25 (125)^\circ\text{C}$		2,3 (2,1)	2,9	V
V_{TO}	$T_j = 25 (125)^\circ\text{C}$		1,3 (1)	1,6 (1,3)	V
r_T	$T_j = 25 (125)^\circ\text{C}$		2,5 (2,8)	3,2 (3,5)	$\text{m}\Omega$
E_{rr}	$I_C = 400\text{ A}$, $V_{CC} = 900\text{ V}$ $T_j = 125^\circ\text{C}$, $V_{CC} = 1200\text{ V}$			42 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 m^3/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)	τ_{a_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

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SKiiP 592GH170-4D



SKiiP® 2

4-pack - integrated intelligent Power System

4-pack integrated gate driver

SKiiP 592GH170-4D

Gate driver features

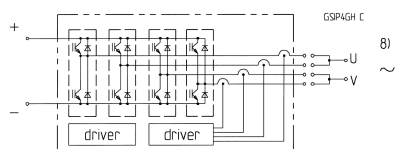
- Two separate and independent "GB"-type driver
- CMOS compatible input
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- U-option is integrated on left driver, (DC terminals at bottom; refer to case drawing)
- Short circuit protection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

Absolute Maximum Ratings		$T_a = 25\text{ }^\circ\text{C}$, 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/ μ s
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	$^\circ\text{C}$

Characteristics		$(T_a = 25\text{ }^\circ\text{C})$			
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}	$V_{S1} = 15\text{ V}$	$210+440*f_{f_{max}}+1,2*(I_{AC}/A)$			mA
I_{S2}	$V_{S2} = 24\text{ V}$	$160+310*f_{f_{max}}+0,85*(I_{AC}/A)$			mA
V_{iT+}	input threshold voltage (High)	12,3			V
V_{iT-}	input threshold voltage (Low)	4,6			V
R_{IN}	input resistance	10			k Ω
$t_{d(on)IO}$	input-output turn-on propagation time	1,5			μ s
$t_{d(off)IO}$	input-output turn-off propagation time	1,4			μ s
$t_{pERRRESET}$	error memory reset time	9			μ s
t_{TD}	top / bottom switch : interlock time	3,3			μ s
$I_{analogOUT}$	8 V corresponds to max. current of 15 V supply voltage (available when supplied with 24 V)	500			A
$I_{Vs1outmax}$	output current at pin 12/14	50			mA
I_{AOmax}	logic low output voltage	5			mA
V_{OI}	logic low output voltage	0,6			V
V_{OH}	logic high output voltage	30			V
I_{TRIPSC}	over current trip level ($I_{analog OUT} = 10\text{ V}$)	625			A
I_{TRIPLG}	ground fault protection	110			A
T_{tp}	over temperature protection	120			$^\circ\text{C}$
$U_{DCTRIIP}$	trip level of U_{DC} -protection ($U_{analog OUT} = 9\text{ V}$); (option)	1200			V

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Case S 5