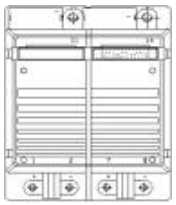
SKiiP 592GB170-2D



SKiiP® 2

2-pack - integrated intelligent Power System

Power section

SKiiP 592GB170-2D

Features

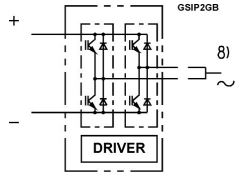
- SKiiP technology inside
- CAL diode technology
- Integrated current sensor
- Integrated temperature sensor
- Integrated heat sink
- IEC 60721-3-3 (humidity) class 3K3/IE32 (SKiiP® 2 System)
- IEC 60068-1 (climate) 40/125/56
- UL recognized file no. E63532

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

8) AC connection busbars must be connected by 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		1,9		kg
w	heat sink		4,7		kg
Thermal characteristics (P16 heat sink; 310 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			0,043	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	
$Z_{th(r-a)}$	13,9 18,9 6,6 3,6			262 50 5 0,02	



Case S 2

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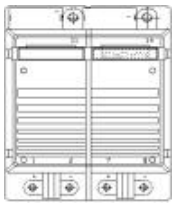
SKiiP 592GB170-2D



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

2-pack - integrated intelligent Power System

2-pack
integrated gate driver

SKiiP 592GB170-2D

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 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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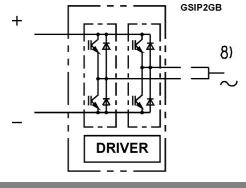

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