SKiiP 292GD170-3DU

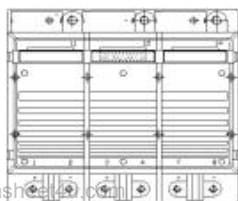## SKiiP® 2

6-pack - integrated intelligent Power System

**Power section**

SKiiP 292GD170-3DU

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)

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	250 (188)	A
Inverse diode			
$I_F = - I_C$	T_s = 25 (70) °C	250 (188)	A
I_{FSM}	T_j = 150 °C, t_p = 10 ms; sin.	2160	A
I^2t (Diode)	Diode, T_j = 150 °C, 10 ms	23	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 = 200 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		8,1 (11,7)	9,6 (13,2)	mΩ
I_{CES}	V_{GE} = 0 V, $V_{CE} = V_{CES}$, T_j = 25 (125) °C		(15)	1	mA
$E_{on} + E_{off}$	I_C = 200 A, V_{CC} = 900 V			173	mJ
	T_j = 125 °C, V_{CC} = 1200 V			254	mJ
$R_{CC' + EE'}$	terminal chip, T_j = 125 °C		0,5		mΩ
L_{CE}	top, bottom		15		nH
C_{CHC}	per phase, AC-side		0,8		nF
Inverse diode					
$V_F = V_{EC}$	I_F = 200 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		5 (5,6)	6,3 (7)	mΩ
E_{rr}	I_C = 200 A, V_{CC} = 900 V			21	mJ
	T_j = 125 °C, V_{CC} = 1200 V			25	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		2,7		kg
w	heat sink		6,6		kg

Thermal characteristics (P16 heat sink; 295 m³/h); " $_r$ " reference to temperature sensor

$R_{th(j-s)I}$	per IGBT						0,08	K/W
$R_{th(j-s)D}$	per diode						0,267	K/W
$R_{th(s-a)}$	per module						0,036	K/W
Z_{th}	R_i (mK/W) (max. values)				tau_i(s)			
	1	2	3	4	1	2	3	4
$Z_{th(j-r)I}$	9	62	10	0	1	0,13	0,001	1
$Z_{th(j-r)D}$	29	205	32	0	1	0,13	0,001	1
$Z_{th(r-a)}$	11,1	18,3	3,5	3,1	204	60	6	0,02
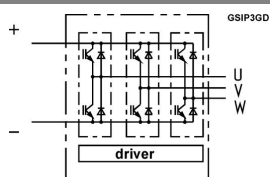
Case S 3

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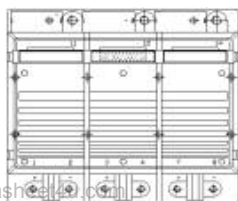
SKiiP® 2

6-pack - integrated
intelligent Power System

6-pack
integrated gate driver
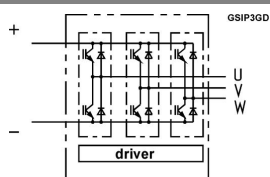
SKiiP 292GD170-3DU

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 transformer
- IEC 60068-1 (climate) 25/85/56

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	20	kHz
f_{out}	output frequency for I=I_C ;sin.	1	kHz
T_{op} (T_{stg})	operating / storage temperature	- 40 ... + 85	°C

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	410+560*f/f_{max}+3,6*(I_{AC}/A)			mA
I_{S2}	V_{S2} = 24 V	300+430*f/f_{max}+2,6*(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		2,3		µs
$I_{analogOUT}$	8 V corresponds to max. current of 15 V supply voltage		250		A
$I_{Vs1outmax}$	(available when supplied with 24 V)			50	mA
I_{A0max}	output current at pin 13/20/22/24/26			5	mA
V_{0I}	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)		313		A
I_{TRIPLG}	ground fault protection		72		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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