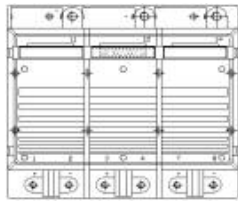


# SKiiP 292GD170-3DU



SKiiP<sup>®</sup> 2

## 6-pack - integrated intelligent Power System

### Power section

#### SKiiP 292GD170-3DU

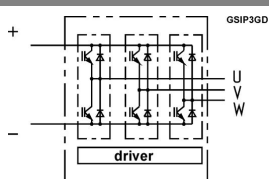
### Features

- SKiiP technology inside
- CAL diode technology
- Integrated current sensor
- Integrated temperature sensor
- Integrated heat sink
- IEC 60721-3-3 (humidity) class 3K3/IE32 (SKiiP<sup>®</sup> 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		$T_s = 25\text{ °C}$ unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$		1700	V
$V_{CC}^{1)}$	Operating DC link voltage	1200	V
$V_{GES}$		$\pm 20$	V
$I_C$	$T_s = 25\text{ (70) °C}$	250 (188)	A
<b>Inverse diode</b>			
$I_F = -I_C$	$T_s = 25\text{ (70) °C}$	250 (188)	A
$I_{FSM}$	$T_j = 150\text{ °C}$ , $t_p = 10\text{ ms}$ ; sin.	2160	A
$I^2t$ (Diode)	Diode, $T_j = 150\text{ °C}$ , 10 ms	23	kA <sup>2</sup> s
$T_j, (T_{stg})$		- 40 (- 25) ... + 150 (125)	°C
$V_{isol}$	AC, 1 min. (mainterminals to heat sink)	4000	V

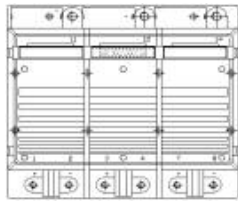
Characteristics		$T_s = 25\text{ °C}$ unless otherwise specified							
Symbol	Conditions	min.	typ.	max.	Units				
<b>IGBT</b>									
$V_{CESat}$	$I_C = 200\text{ A}$ , $T_j = 25\text{ (125) °C}$		3,3 (4,3)	3,9	V				
$V_{CEO}$	$T_j = 25\text{ (125) °C}$		1,7 (2)	2 (2,3)	V				
$r_{CE}$	$T_j = 25\text{ (125) °C}$		8,1 (11,7)	9,6 (13,2)	mΩ				
$I_{CES}$	$V_{GE} = 0\text{ V}$ , $V_{CE} = V_{CES}$ , $T_j = 25\text{ (125) °C}$		(15)	1	mA				
$E_{on} + E_{off}$	$I_C = 200\text{ A}$ , $V_{CC} = 900\text{ V}$ $T_j = 125\text{ °C}$ , $V_{CC} = 1200\text{ V}$			173	mJ				
				254	mJ				
$R_{CC' + EE'}$	terminal chip, $T_j = 125\text{ °C}$		0,5		mΩ				
$L_{CE}$	top, bottom		15		nH				
$C_{CHC}$	per phase, AC-side		0,8		nF				
<b>Inverse diode</b>									
$V_F = V_{EC}$	$I_F = 200\text{ A}$ , $T_j = 25\text{ (125) °C}$		2,3 (2,1)	2,9	V				
$V_{TO}$	$T_j = 25\text{ (125) °C}$		1,3 (1)	1,6 (1,3)	V				
$r_T$	$T_j = 25\text{ (125) °C}$		5 (5,6)	6,3 (7)	mΩ				
$E_{rr}$	$I_C = 200\text{ A}$ , $V_{CC} = 900\text{ V}$ $T_j = 125\text{ °C}$ , $V_{CC} = 1200\text{ V}$			21	mJ				
				25	mJ				
<b>Mechanical data</b>									
$M_{dc}$	DC terminals, SI Units	6		8	Nm				
$M_{ac}$	AC terminals, SI Units	13		15	Nm				
w	SKiiP <sup>®</sup> 2 System w/o heat sink		2,7		kg				
w	heat sink		6,6		kg				
<b>Thermal characteristics (P16 heat sink; 295 m<sup>3</sup>/h); " r " reference to temperature sensor</b>									
$R_{th(j-s)I}$	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 <sub>i</sub> (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 292GD170-3DU



SKiiP® 2

## 6-pack - integrated intelligent Power System

6-pack  
integrated gate driver

SKiiP 292GD170-3DU

### Gate driver features

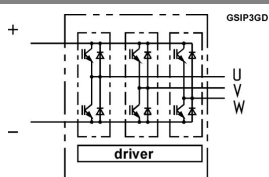
- CMOS compatible inputs
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- Short circuit protection
- Over current protection
- Over voltage protection (option)
- Power supply protected against under voltage
- Interlock of top/bottom switch
- Isolation by transformer
- IEC 60068-1 (climate) 25/85/56

Absolute Maximum Ratings		$T_a = 25\text{ °C}$ 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/ $\mu$ 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	20	kHz
$f_{out}$	output frequency for $I=I_C$ ; sin.	1	kHz
$T_{op}$ ( $T_{stg}$ )	operating / storage temperature	- 40 ... + 85	°C

Characteristics		$T_a = 25\text{ °C}$			
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
$I_{S1}$	$V_{S1} = 15\text{ V}$	$410+560 \cdot f_{max} + 3,6 \cdot (I_{AC}/A)$			mA
$I_{S2}$	$V_{S2} = 24\text{ V}$	$300+430 \cdot f_{max} + 2,6 \cdot (I_{AC}/A)$			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 $\Omega$
$t_{d(on)IO}$	input-output turn-on propagation time	1,5			$\mu$ s
$t_{d(off)IO}$	input-output turn-off propagation time	1,4			$\mu$ s
$t_{pERRRESET}$	error memory reset time	9			$\mu$ s
$t_{TD}$	top / bottom switch : interlock time	2,3			$\mu$ s
$I_{analogOUT}$	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
$V_{0l}$	logic low output voltage	0,6			V
$V_{0H}$	logic high output voltage	30			V
$I_{TRIPSC}$	over current trip level ( $I_{analog OUT} = 10\text{ V}$ )	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 ( $U_{analog OUT} = 9\text{ V}$ ); (option)	1200			V

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