

SKiiP 232GDL120-4DU

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SKiiP® 2

7-pack - integrated intelligent Power System

Power section - 3 phase bridge

SKiiP 232GDL120-4DU

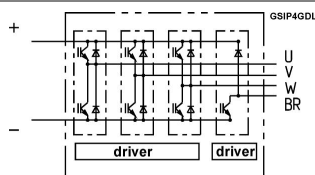
Power section features

- 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

Absolute Maximum Ratings		$T_s = 25^\circ\text{C}$ unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V_{CES}	Operating DC link voltage	1200	V
$V_{CC}^{1)}$		900	V
V_{GES}		± 20	V
I_C	$T_s = 25 (70)^\circ\text{C}$	200 (150)	A
Inverse diode			
$I_F = -I_C$	$T_s = 25 (70)^\circ\text{C}$	200 (150)	A
I_{FSM}	$T_j = 150^\circ\text{C}$, $t_p = 10\text{ ms}$; sin.	1440	A
I^2t (Diode)	Diode, $T_j = 150^\circ\text{C}$, 10 ms	10	kA^2s
$T_j, (T_{stg})$	AC, 1 min. (mainterminals to heat sink)	- 40 (- 25) ... + 150 (125)	$^\circ\text{C}$
V_{isol}		3000	V

Characteristics		$T_s = 25^\circ\text{C}$ unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
V_{CESat}	$I_C = 175\text{ A}$, $T_j = 25 (125)^\circ\text{C}$		2,6 (3,1)	3,1	V
V_{CEO}	$T_j = 25 (125)^\circ\text{C}$		1,2 (1,3)	1,5 (1,6)	V
r_{CE}	$T_j = 25 (125)^\circ\text{C}$		7,5 (10)	9 (11,5)	$\text{m}\Omega$
I_{CES}	$V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$, $T_j = 25 (125)^\circ\text{C}$		(10)	0,4	mA
$E_{on} + E_{off}$	$I_C = 175\text{ A}$, $V_{CC} = 600\text{ V}$ $T_j = 125^\circ\text{C}$, $V_{CC} = 900\text{ V}$			53 93	mJ
$R_{CC'} + EE'$	terminal chip, $T_j = 125^\circ\text{C}$		0,5		$\text{m}\Omega$
L_{CE}	top, bottom		15		nH
C_{CHC}	per phase, AC-side		1,4		nF
Inverse diode					
$V_F = V_{EC}$	$I_F = 150\text{ A}$, $T_j = 25 (125)^\circ\text{C}$		2,1 (1,9)	2,6	V
V_{TO}	$T_j = 25 (125)^\circ\text{C}$		1,3 (1)	1,4 (1,1)	V
r_T	$T_j = 25 (125)^\circ\text{C}$		5 (6)	6,8 (7,8)	$\text{m}\Omega$
E_{rr}	$I_C = 175\text{ A}$, $V_{CC} = 600\text{ V}$ $T_j = 125^\circ\text{C}$, $V_{CC} = 900\text{ V}$			6 8	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			0,129	K/W
$R_{th(j-s)D}$	per diode			0,375	K/W
$R_{th(s-a)}$	per module			0,036	K/W
Z_{th}	R_i (mK/W) (max. values)	$\tau_{th}(s)$			
	1 2 3 4	1	2	3	4
$Z_{th(j-r)I}$	14 99 15 0	1	0,13	0,001	1
$Z_{th(j-r)D}$	41 289 45 0	1	0,13	0,001	1
$Z_{th(r-a)}$	1,7 24 7,6 2,6	494	165	20	0,03

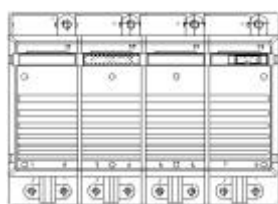


Case S 5

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integrated gate driver - 3 phase bridge

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Gate driver features

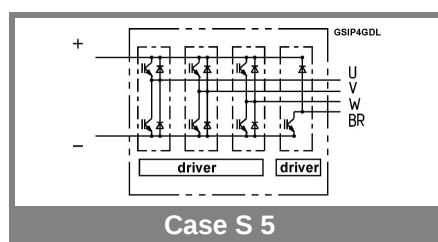
- CMOS compatible inputs
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- Short circuit protection
- Over current protection
- Over voltage protection (option)
- Power supply protected against under voltage
- Interlock of top/bottom switch
- Isolation by transformer
- IEC 60068-1 (climate) 40/85/56

Absolute Maximum Ratings		$T_a = 25^\circ\text{C}$ 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/ μs
V_{isolIO}	input / output (AC, r.m.s., 2s)	3000	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	$-40 \dots +85$	$^\circ\text{C}$

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+390*f/f _{max} +3,6*(I _{AC} /A)			mA
I _{S2}	V _{S2} = 24 V	300+280*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 (available when supplied with 24 V)	200			A
I _{Vs1outmax}	output current at pin 13/20/22/24/26			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 V)	250			A
I _{TRIPLG}	ground fault protection	58			A
T _{tp}	over temperature protection	110	120		°C
U _{DCTRIP}	trip level of U _{DC} -protection (U _{analog OUT} = 9 V); (option)	900			V

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