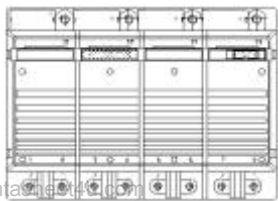


# SKiiP 232GDL120-4DU



SKiiP<sup>®</sup> 2

7-pack - integrated intelligent Power System

Power section - 3 phase bridge

SKiiP 232GDL120-4DU

## Features

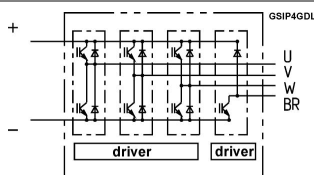
- SKiiP technology inside
- CAL diode technology
- Integrated current sensor
- Integrated temperature sensor
- Integrated heat sink
- IEC 60721-3-3 (humidity) class 3K3/IE32 (SKiiP<sup>®</sup> 2 System)
- IEC 60068-1 (climate) 40/125/56
- UL recognized file no. E63532

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

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

Characteristics		$T_s = 25\text{ }^\circ\text{C}$ unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{CESat}$	$I_C = 175\text{ A}$ , $T_j = 25\text{ (125) }^\circ\text{C}$		2,6 (3,1)	3,1	V
$V_{CEO}$	$T_j = 25\text{ (125) }^\circ\text{C}$		1,2 (1,3)	1,5 (1,6)	V
$r_{CE}$	$T_j = 25\text{ (125) }^\circ\text{C}$		7,5 (10)	9 (11,5)	m $\Omega$
$I_{CES}$	$V_{GE} = 0\text{ V}$ , $V_{CE} = V_{CES}$ , $T_j = 25\text{ (125) }^\circ\text{C}$		(10)	0,4	mA
$E_{on} + E_{off}$	$I_C = 175\text{ A}$ , $V_{CC} = 600\text{ V}$ $T_j = 125\text{ }^\circ\text{C}$ , $V_{CC} = 900\text{ V}$			53	mJ
					93
$R_{CC'} + EE'$	terminal chip, $T_j = 125\text{ }^\circ\text{C}$		0,5		m $\Omega$
$L_{CE}$	top, bottom		15		nH
$C_{CHC}$	per phase, AC-side		1,4		nF
<b>Inverse diode</b>					
$V_F = V_{EC}$	$I_F = 150\text{ A}$ , $T_j = 25\text{ (125) }^\circ\text{C}$		2,1 (1,9)	2,6	V
$V_{TO}$	$T_j = 25\text{ (125) }^\circ\text{C}$		1,3 (1)	1,4 (1,1)	V
$r_T$	$T_j = 25\text{ (125) }^\circ\text{C}$		5 (6)	6,8 (7,8)	m $\Omega$
$E_{rr}$	$I_C = 175\text{ A}$ , $V_{CC} = 600\text{ V}$ $T_j = 125\text{ }^\circ\text{C}$ , $V_{CC} = 900\text{ V}$			6	mJ
					8
<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		3,5		kg
w	heat sink		8,5		kg

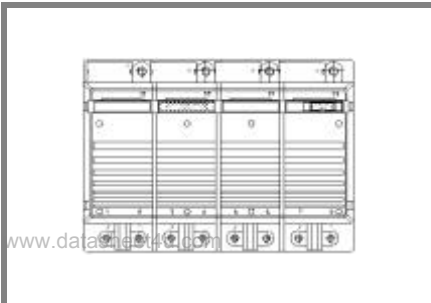
Thermal characteristics (P16 heat sink; 275 m <sup>3</sup> /h); " r " reference to temperature sensor									
$R_{th(j-s)I}$	per IGBT			0,129	K/W				
$R_{th(j-s)D}$	per diode			0,375	K/W				
$R_{th(s-a)}$	per module			0,036	K/W				
$Z_{th}$	$R_i$ (mK/W) (max. values)	tau,(s)							
		1	2	3	4				
$Z_{th(j-r)I}$		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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# SKiiP 232GDL120-4DU



SKiiP<sup>®</sup> 2

## 7-pack - integrated intelligent Power System

### 7-pack

integrated gate driver - 3 phase bridge  
SKiiP 232GDL120-4DU

### 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		$T_a = 25\text{ }^\circ\text{C}$ 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/ $\mu$ s
$V_{isolIO}$	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 ... + 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
$I_{S1}$	$V_{S1} = 15\text{ V}$	$410+390*f/f_{max}+3,6*(I_{AC}/A)$			mA
$I_{S2}$	$V_{S2} = 24\text{ V}$	$300+280*f/f_{max}+2,6*(I_{AC}/A)$			mA
$V_{iT+}$	input threshold voltage (High)	12,3			V
$V_{iT-}$	input threshold voltage (Low)	4,6			V
$R_{IN}$	input resistance	10			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	200			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 ( $I_{analog OUT} = 10\text{ V}$ )	250			A
$I_{TRIPLG}$	ground fault protection	58			A
$T_{tp}$	over temperature protection	110	120		$^\circ\text{C}$
$U_{DCTRIP}$	trip level of $U_{DC}$ -protection ( $U_{analog OUT} = 9\text{ V}$ ); (option)	900			V

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