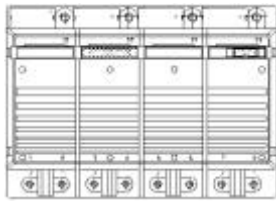


SKiiP 132GDL120-4DU



SKiiP[®] 2

7-pack - integrated intelligent Power System

Power section - 3 phase bridge

SKiiP 132GDL120-4DU

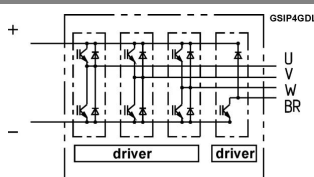
Features

- SKiiP technology inside
- CAL diode technology
- Integrated current sensor
- Integrated temperature sensor
- Integrated heat sink
- IEC 60721-3-3 (humidity) class 3K3/IE32 (SKiiP[®] 2 System)
- IEC 68T.1 (climate) 40/125/56 (SKiiP[®] 2 power section)
- UL recognized File no. E63532 (SKiiP[®] 2 power section)

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
IGBT			
V_{CES}	Operating DC link voltage	1200	V
$V_{CC}^{1)}$		900	V
V_{GES}		± 20	V
I_C	$T_s = 25\text{ (70) }^\circ\text{C}$	150 (112,5)	A
Inverse diode			
$I_F = -I_C$	$T_s = 25\text{ (70) }^\circ\text{C}$	150 (112,5)	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 ² s
T_j , (T_{stg})	AC, 1 min. (mainterminals to heat sink)	- 40 (- 25) ... + 15 0 (125)	$^\circ\text{C}$
V_{isol}		3000	V

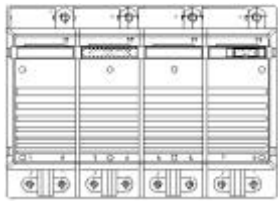
Characteristics		$T_s = 25\text{ }^\circ\text{C}$ unless otherwise specified							
Symbol	Conditions	min.	typ.	max.	Units				
IGBT									
V_{CESat}	$I_C = 125\text{ A}$, $T_j = 25\text{ (125) }^\circ\text{C}$	2,6 (3,1)	3,1		V				
V_{CEO}	$T_j = 25\text{ (125) }^\circ\text{C}$	1,2 (1,3)	1,5 (1,6)		V				
r_{CE}	$T_j = 25\text{ (125) }^\circ\text{C}$	10,5 (14)	12,6 (16,1)		m Ω				
I_{CES}	$V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$, $T_j = 25\text{ (125) }^\circ\text{C}$	(10)	0,4		mA				
$E_{on} + E_{off}$	$I_C = 125\text{ A}$, $V_{CC} = 600\text{ V}$ $T_j = 125\text{ }^\circ\text{C}$, $V_{CC} = 900\text{ V}$			38	mJ				
$R_{CC'} + EE'$	terminal chip, $T_j = 125\text{ }^\circ\text{C}$		0,5		m Ω				
L_{CE}	top, bottom		15		nH				
C_{CHC}	per phase, AC-side		1,4		nF				
Inverse diode									
$V_F = V_{EC}$	$I_F = 150\text{ A}$, $T_j = 25\text{ (125) }^\circ\text{C}$	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 Ω				
E_{rr}	$I_C = 125\text{ A}$, $V_{CC} = 600\text{ V}$ $T_j = 125\text{ }^\circ\text{C}$, $V_{CC} = 900\text{ V}$			6	mJ				
				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 m³/h); " r " reference to temperature sensor									
$R_{th(j-s)I}$	per IGBT			0,18	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 _i (s)							
	1 2 3 4	1	2	3	4				
$Z_{th(j-r)I}$		20	139	22	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 132GDL120-4DU



SKiiP[®] 2

7-pack - integrated intelligent Power System

7-pack
integrated gate driver - 3 phase
bridge
SKiiP 132GDL120-4DU

Gate driver features

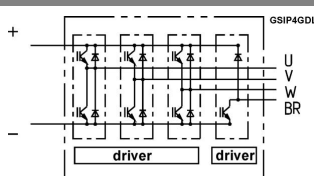
- CMOS compatible inputs
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- Short circuit protection
- Over current protection
- Over voltage protection (option)
- Power supply protected against under voltage
- Interlock of top/bottom switch
- Isolation by transformers
- Fibre optic interface (option for GB-types only)
- IEC 68T.1 (climate) 40/85/56 (SKiiP[®] 2 gate driver)

Absolute Maximum Ratings			
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 _{max}	switching frequency	20	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+280*f/f _{max} +3,6*(I _{AC} /A)			mA
I _{S2}	V _{S2} = 24 V	300+200*f/f _{max} +2,6*(I _{AC} /A)			mA
V _{iT+}	input threshold voltage (High)	11,2			V
V _{iT-}	input threshold voltage (Low)	5,4			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	150			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 V)	188			A
I _{TRIPLG}	ground fault protection	43			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

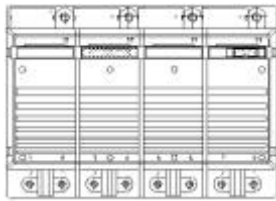
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Case S 5

SKiiP 132GDL120-4DU



SKiiP[®] 2

7-pack - integrated intelligent Power System

Power section - brake chopper

SKiiP 132GDL120-4DU

Features

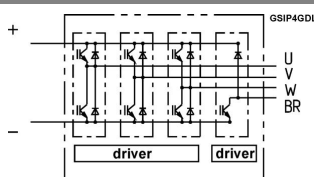
- SKiiP technology inside
- CAL diode technology
- Integrated current sensor
- Integrated temperature sensor
- Integrated heat sink
- IEC 60721-3-3 (humidity) class 3K3/IE32 (SKiiP[®] 2 System)
- IEC 68T.1 (climate) 40/125/56 (SKiiP[®] 2 power section)
- UL recognized File no. E63532 (SKiiP[®] 2 power section)

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
IGBT			
V_{CES}	Operating DC link voltage	1200	V
$V_{CC}^{1)}$		900	V
V_{GES}		± 20	V
I_C	$T_s = 25\text{ (70) °C}$	150 (112,5)	A
Inverse diode			
$I_F = -I_C$	$T_s = 25\text{ (70) °C}$	150 (112,5)	A
I_{FSM}	$T_j = 150\text{ °C}$, $t_p = 10\text{ ms}$; sin.	1440	A
I^2t (Diode)	Diode, $T_j = 150\text{ °C}$, 10 ms	10	kA ² s
T_j , (T_{stg})	AC, 1 min. (mainterminals to heat sink)	- 40 (- 25) ... + 150 (125)	°C
V_{isol}		3000	V

Characteristics		$T_s = 25\text{ °C}$ unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
V_{CESat}	$I_C = 125\text{ A}$, $T_j = 25\text{ (125) °C}$		2,6 (3,1)	3,1	V
V_{CEO}	$T_j = 25\text{ (125) °C}$		1,2 (1,3)	1,5 (1,6)	V
r_{CE}	$T_j = 25\text{ (125) °C}$		10,5 (14)	12,6 (16,1)	mΩ
I_{CES}	$V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$, $T_j = 25\text{ (125) °C}$		(10)	0,4	mA
$E_{on} + E_{off}$	$I_C = 125\text{ A}$, $V_{CC} = 600\text{ V}$ $T_j = 125\text{ °C}$, $V_{CC} = 900\text{ V}$			38	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		1,4		nF
Inverse diode					
$V_F = V_{EC}$	$I_F = 150\text{ A}$, $T_j = 25\text{ (125) °C}$		2,1 (1,9)	2,6	V
V_{TO}	$T_j = 25\text{ (125) °C}$		1,3 (1)	1,4 (1,1)	V
r_T	$T_j = 25\text{ (125) °C}$		5 (6)	6,8 (7,8)	mΩ
E_{rr}	$I_C = 125\text{ A}$, $V_{CC} = 600\text{ V}$ $T_j = 125\text{ °C}$, $V_{CC} = 900\text{ V}$			6	mJ
				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

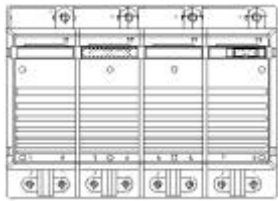
Thermal characteristics (P16 heat sink; 275 m ³ /h); " r " reference to temperature sensor									
$R_{th(j-s)I}$	per IGBT			0,18	K/W				
$R_{th(j-s)D}$	per diode			0,375	K/W				
$R_{th(s-a)}$	per module			0,036	K/W				
Z_{th}	R_i (mK/W) (max. values)	tau _i (s)							
		1	2	3	4				
$Z_{th(j-r)I}$		20	139	22	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 132GDL120-4DU



SKiiP® 2

7-pack - integrated intelligent Power System

7-pack
gate driver - brake chopper

SKiiP 132GDL120-4DU

Gate driver features

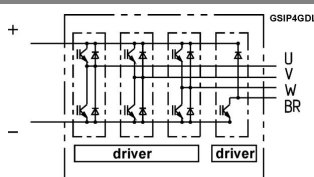
- CMOS compatible inputs
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- Short circuit protection
- Over current protection
- Over voltage protection (option)
- Power supply protected against under voltage
- Interlock of top/bottom switch
- Isolation by transformers
- Fibre optic interface (option for GB-types only)
- IEC 68T.1 (climate) 25/85/56 (SKiiP® 2 gate driver)

Absolute Maximum Ratings			
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/ μ 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_{max}	switching frequency	5	kHz
$T_{op} (T_{stg})$	operating / storage temperature	- 25 ... + 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}	$V_{S1} = 15 V$	$67 + 10 * f / f_{max} + 0,0 * (I_{AC} / A)$			mA
I_{S2}	$V_{S2} = 24 V$	$67 + 10 * f / f_{max} + 0,0 * (I_{AC} / A)$			mA
V_{iT+}	input threshold voltage (High)	11,2			V
V_{iT-}	input threshold voltage (Low)	5,4			V
R_{IN}	input resistance	10			k Ω
$t_{d(on)IO}$	input-output turn-on propagation time	20,2			μ s
$t_{d(off)IO}$	input-output turn-off propagation time	25,6			μ s
$t_{pERRRESET}$	error memory reset time	300000			μ s
t_{TD}	top / bottom switch : interlock time				μ s
$I_{analogOUT}$	8 V corresponds to max. current of 15 V supply voltage (available when supplied with 24 V)				A
$I_{Vs1outmax}$	output current at pin				mA
I_{A0max}	logic low output voltage	0,6			V
V_{0l}	logic high output voltage	30			V
V_{0H}	over current trip level (I _{analog OUT} = 10 V)	110			A
I_{TRIPSC}	ground fault protection	120			°C
I_{TRIPLG}	over temperature protection				V
T_{tp}	trip level of U _{DC} -protection (U _{analog OUT} = 9 V); (option)				

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Case S 5