

## SKiiP 3-phase bridge

Absolute Maximum Ratings		Values	Units
Symbol	Conditions <sup>1)</sup>		
V <sub>isol</sub> <sup>4)</sup>	AC, 1min	2500	V
T <sub>op</sub> , T <sub>stg</sub>	Operating / stor. temperature	-25...+85	°C
IGBT and Inverse Diode			
V <sub>CES</sub>		600	V
V <sub>CC</sub> <sup>5)</sup>	Operating DC link voltage	400	V
I <sub>C</sub>	IGBT	300	A
T <sub>j</sub> <sup>3)</sup>	IGBT + Diode	-40...+150	°C
I <sub>F</sub>	Diode	300	A
I <sub>FM</sub>	Diode, t <sub>p</sub> < 1 ms	600	A
I <sub>FSM</sub>	Diode, T <sub>j</sub> = 150 °C, 10ms; sin	3000	A
I <sup>2</sup> t (Diode)	Diode, T <sub>j</sub> = 150 °C, 10ms	45	kAs <sup>2</sup>
Driver			
V <sub>S1</sub>	Stabilized Power Supply	18	V
V <sub>S2</sub>	Non-stabilized Power Supply	30	V
f <sub>smax</sub>	Switching frequency	20	kHz
dV/dt	Primary to secondary side	75	kV/μs

Characteristics		min.	typ.	max.	Units
Symbol	Conditions <sup>1)</sup>				
IGBT <sup>11)</sup>					
V <sub>(BR)CES</sub>	Driver without supply	≥V <sub>CES</sub>	–	–	V
I <sub>CES</sub>	V <sub>GE</sub> = 0, T <sub>j</sub> = 25 °C	–	–	0,4	mA
	V <sub>CE</sub> = V <sub>CES</sub> T <sub>j</sub> = 125 °C	–	4,5	–	mA
V <sub>TO</sub>	T <sub>j</sub> = 125 °C	–	–	0,94	V
r <sub>T</sub>	T <sub>j</sub> = 125 °C	–	–	6,4	mΩ
V <sub>Cesat</sub>	I <sub>C</sub> = 300A, T <sub>j</sub> = 125 °C	–	–	2,9	V
V <sub>Cesat</sub>	I <sub>C</sub> = 300A, T <sub>j</sub> = 25 °C	–	–	2,65	V
E <sub>on</sub> + E <sub>off</sub>	V <sub>CC</sub> =300/400V, I <sub>C</sub> =300A T <sub>j</sub> = 125 °C	–	–	27/38	mJ
C <sub>CHC</sub>	per SKiiP, AC side	–	0,8	–	nF
L <sub>CE</sub>	Top, Bottom	–	15	–	nH
Inverse Diode <sup>2)</sup>					
V <sub>F</sub> = V <sub>EC</sub>	I <sub>F</sub> = 300A; T <sub>j</sub> = 125 °C	–	–	1,72	V
V <sub>F</sub> = V <sub>EC</sub>	I <sub>F</sub> = 300A T <sub>j</sub> = 25 °C	–	–	1,75	V
E <sub>on</sub> + E <sub>off</sub>	I <sub>F</sub> = 300A; T <sub>j</sub> = 125 °C	–	–	9	mJ
V <sub>TO</sub>	T <sub>j</sub> = 125 °C	–	–	0,78	V
r <sub>T</sub>	T <sub>j</sub> = 125 °C	–	–	3,3	mΩ
Thermal Characteristics					
R <sub>thjs</sub> <sup>10)</sup>	per IGBT	–	–	0,150	K/W
R <sub>thjs</sub> <sup>10)</sup>	per Diode	–	–	0,250	K/W
R <sub>thsa</sub> <sup>6,10)</sup>	P16 heatsink; see case S5	–	–	36	K/KW
Driver					
I <sub>S1</sub>	Supply current 15V-supply	340+360*f <sub>s</sub> /f <sub>smax</sub> +3,5*I <sub>AC</sub> /A			mA
I <sub>S2</sub>	Supply current 24V-supply	250+240*f <sub>s</sub> /f <sub>smax</sub> +2,6*I <sub>AC</sub> /A			mA
t <sub>interlock-driver</sub>	Interlock-time	2,3			μs
SKiiPPACK protection					
I <sub>TRIPSC</sub>	Short circuit protection	375			A
I <sub>TRIPLG</sub>	Ground fault protection	87			A
T <sub>TRIP</sub>	Over-temp. protection	115			°C
U <sub>DCTRIP</sub> <sup>9)</sup>	U <sub>DC</sub> -protection	410			V
Mechanical Data					
M1	DC terminals, SI Units	4	–	6	Nm
M2	AC terminals, SI Units	8	–	10	Nm

## SKiiPPACK®

### SK integrated intelligent Power PACK

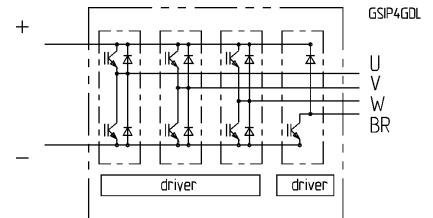
### 3-phase bridge with brake chopper

### SKiiP

### 302 GDL 061 - 458 CTV <sup>7,9)</sup>

### Preliminary Data

### Case S5



### Features

- Short circuit protection, due to evaluation of current sensor signals
- Isolated power supply
- Low thermal impedance
- Optimal thermal management with integrated heatsink
- Pressure contact technology with increased power cycling capability, compact design
- Low stray inductance
- High power, small losses
- Over-temperature protection

- 1) T<sub>heatsink</sub> = 25 °C, unless otherwise specified
- 2) CAL = Controlled Axial Lifetime Technology (soft and fast) without driver
- 3) Driver input to DC link / AC output to DC link / AC output to heatsink
- 4) with Semikron-DC link (low inductance)
- 5) other heatsinks on request
- 6) C - Integrated current sensors
- 7) T - Temperature protection
- 8) V - 15 V or 24 V power supply
- 9) options available for driver:
  - U - DC link voltage sense
  - F – Fiber optic connector
- 10) "s" referenced to temperature sensor
- 11) NPT-technology with homogeneous current-distribution

## SKiiP Brake-chopper

Absolute Maximum Ratings		Values	Units
Symbol	Conditions <sup>1)</sup>		
V <sub>isol</sub> <sup>4)</sup>	AC, 1min	2500	V
T <sub>op</sub> , T <sub>stg</sub>	Operating / stor. temperature	-25...+85	°C
IGBT and Inverse Diode			
V <sub>CES</sub>		600	V
V <sub>CC</sub> <sup>5)</sup>	Operating DC link voltage	400	V
I <sub>C</sub>	IGBT	300	A
T <sub>j</sub> <sup>3)</sup>	IGBT + Diode	-40...+150	°C
I <sub>F</sub>	Diode	300	A
I <sub>FM</sub>	Diode, t <sub>p</sub> < 1 ms	600	A
I <sub>FSM</sub>	Diode, T <sub>j</sub> = 150 °C, 10ms; sin	4000	A
I <sup>2</sup> t (Diode)	Diode, T <sub>j</sub> = 150 °C, 10ms	80	kAs <sup>2</sup>
Driver			
V <sub>S1</sub>	Stabilized Power Supply	18	V
V <sub>S2</sub>	Non-stabilized Power Supply	30	V
f <sub>smax</sub>	Switching frequency	5	kHz
dV/dt	Primary to secondary side	50	kV/μs

Characteristics		min.	typ.	max.	Units
Symbol	Conditions <sup>1)</sup>				
IGBT <sup>11)</sup>					
V <sub>(BR)CES</sub>	Driver without supply	≥V <sub>CES</sub>	–	–	V
I <sub>CES</sub>	V <sub>GE</sub> = 0, T <sub>j</sub> = 25 °C	–	–	0,4	mA
	V <sub>CE</sub> = V <sub>CES</sub> T <sub>j</sub> = 125 °C	–	6	–	mA
V <sub>TO</sub>	T <sub>j</sub> = 125 °C	–	–	0,94	V
r <sub>T</sub>	T <sub>j</sub> = 125 °C	–	–	4,2	mΩ
V <sub>Cesat</sub>	I <sub>C</sub> = 300A, T <sub>j</sub> = 125 °C	–	–	2,2	V
V <sub>Cesat</sub>	I <sub>C</sub> = 300A, T <sub>j</sub> = 25 °C	–	–	2,60	V
E <sub>on</sub> + E <sub>off</sub>	V <sub>CC</sub> =300/400V, I <sub>C</sub> =300A T <sub>j</sub> = 125 °C	–	–	27/38	mJ
C <sub>CHC</sub>	per SKiiP, AC side	–	0,8	–	nF
L <sub>CE</sub>	Top, Bottom	–	15	–	nH
Inverse Diode <sup>2)</sup>					
V <sub>F</sub> = V <sub>EC</sub>	I <sub>F</sub> = 300A; T <sub>j</sub> = 125 °C	–	–	1,68	V
V <sub>F</sub> = V <sub>EC</sub>	I <sub>F</sub> = 300A T <sub>j</sub> = 25 °C	–	–	1,75	V
E <sub>on</sub> + E <sub>off</sub>	I <sub>F</sub> = 300A; T <sub>j</sub> = 125 °C	–	–	9	mJ
V <sub>TO</sub>	T <sub>j</sub> = 125 °C	–	–	0,78	V
r <sub>T</sub>	T <sub>j</sub> = 125 °C	–	–	2,5	mΩ
Thermal Characteristics					
R <sub>thjs</sub> <sup>10)</sup>	per IGBT	–	–	0,100	K/W
R <sub>thjs</sub> <sup>10)</sup>	per Diode	–	–	0,188	K/W
R <sub>thsa</sub> <sup>6,10)</sup>	P16 heatsink; see case S5	–	–	36	K/KW
Driver					
I <sub>S1</sub>	Supply current 15V-supply	67+10*f <sub>s</sub> /f <sub>smax</sub> +0*I <sub>AC</sub> /A			mA
I <sub>S2</sub>	Supply current 24V-supply	67+10*f <sub>s</sub> /f <sub>smax</sub> +0*I <sub>AC</sub> /A			mA
t <sub>interlock-driver</sub>	Interlock-time	-			μs
SKiiPPACK protection					
I <sub>TRIPSC</sub>	Short circuit protection	Vcesat-protection			A
I <sub>TRIPLG</sub>	Ground fault protection	-			A
T <sub>TRIP</sub>	Over-temp. protection	115			°C
U <sub>DCTRIP</sub> <sup>9)</sup>	U <sub>DC</sub> -protection	410			V
Mechanical Data					
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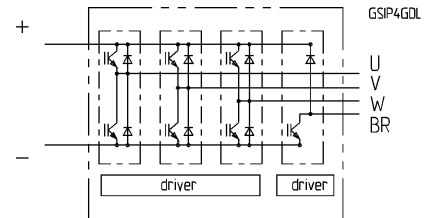
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