SEMIKRON

SKiiP 3-phase bridge

Absolute Maximum Ratings

Symbol	Conditions [1]	Values	Units
V_{isol} [4]	AC, 1min	2500	V
T_{op}, T_{stg}	Operating / stor. temperature	-25...+85	°C
IGBT and Inverse Diode			
V_{CES}		600	V
V_{CC} [5]	Operating DC link voltage	400	V
I_C	IGBT	200	A
T_j [3]	IGBT + Diode	-40...+150	°C
I_F	Diode	200	A
I_{FM}	Diode, t_p < 1 ms	400	A
I_{FSM}	Diode, T_j = 150 °C, 10ms; sin	2000	A
I^2t (Diode)	Diode, T_j = 150 °C, 10ms	20	kAs^2
Driver			
V_{S1}	Stabilized Power Supply	18	V
V_{S2}	Non-stabilized Power Supply	30	V
f_{smax}	Switching frequency	20	kHz
dV/dt	Primary to secondary side	75	kV/µs

Characteristics

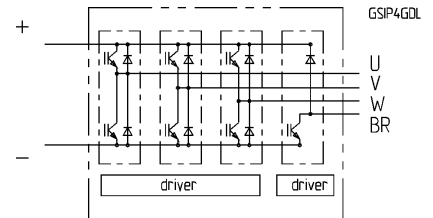| Symbol	Conditions [1]	min.	typ.	max.	Units
IGBT [11]					
$V_{(BR)CES}$	Driver without supply	$\geq V_{CES}$	–	–	V
I_{CES}	V_{GE} = 0, T_j = 25 °C	–	–	0,4	mA
	V_{CE} = V_{CES} T_j = 125 °C	–	3	–	mA
V_{TO}	T_j = 125 °C	–	–	0,94	V
r_T	T_j = 125 °C	–	–	9,6	mΩ
V_{Cesat}	I_C = 200A, T_j = 125 °C	–	–	2,9	V
V_{Cesat}	I_C = 200A, T_j = 25 °C	–	–	2,65	V
E_{on} + E_{off}	V_{CC}=300/400V,I_C=200A T_j = 125 °C	–	–	18/25	mJ
C_{CHC}	per SkiiP, AC side	–	0,8	–	nF
L_{CE}	Top, Bottom	–	15	–	nH
Inverse Diode [2]					
$V_F = V_{EC}$	I_F= 200A; T_j = 125 °C	–	–	1,72	V
$V_F = V_{EC}$	I_F= 200A T_j = 25 °C	–	–	1,75	V
E_{on} + E_{off}	I_F= 200A; T_j = 125 °C	–	–	6	mJ
V_{TO}	T_j = 125 °C	–	–	0,78	V
r_T	T_j = 125 °C	–	–	5,0	mΩ
Thermal Characteristics					
R_{thjs} [10]	per IGBT	–	–	0,225	K/W
R_{thjs} [10]	per Diode	–	–	0,375	K/W
R_{thsa} [6,10]	P16 heatsink; see case S5	–	–	36	K/KW
Driver					
I_{S1}	Supply current 15V-supply	340+240*f_s/f_{smax}+3,5*I_{AC}/A			mA
I_{S2}	Supply current 24V-supply	250+170*f_s/f_{smax}+2,6*I_{AC}/A			mA
$t_{interlock-driver}$	Interlock-time	2,3			µs
SKiiPPACK protection					
I_{TRIPSC}	Short circuit protection	250			A
I_{TRIPLG}	Ground fault protection	58			A
T_{TRIP}	Over-temp. protection	115			°C
U_{DCTRIP} [9]	U_{DC}-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 202 GDL 061 - 457 CTV [7,9]

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] $T_{heatsink}$ = 25 °C, unless otherwise specified
[2] CAL = Controlled Axial Lifetime Technology (soft and fast)
[3] without driver
[4] Driver input to DC link / AC output to DC link / AC output to heatsink
[5] with Semikron-DC link (low inductance)
[6] other heatsinks on request
[7] C - Integrated current sensors
    T - Temperature protection
    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 homogenous current-distribution

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SKiiP Brake-chopper

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I_{FSM}	Diode, T_j = 150 °C, 10ms; sin	3000	A
I^2t (Diode)	Diode, T_j = 150 °C, 10ms	45	kAs^2
Driver			
V_{S1}	Stabilized Power Supply	18	V
V_{S2}	Non-stabilized Power Supply	30	V
f_{smax}	Switching frequency	5	kHz
dV/dt	Primary to secondary side	50	kV/µs

Characteristics

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V_{Cesat}	I_C = 200A, T_j = 125 °C	–	–	2,2	V
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E_{on} + E_{off}	I_F= 200A; T_j = 125 °C	–	–	6	mJ
V_{TO}	T_j = 125 °C	–	–	0,78	V
r_T	T_j = 125 °C	–	–	3,3	mΩ
Thermal Characteristics					
R_{thjs} [10]	per IGBT	–	–	0,150	K/W
R_{thjs} [10]	per Diode	–	–	0,250	K/W
R_{thsa} [6,10]	P16 heatsink; see case S5	–	–	36	K/KW
Driver					
I_{S1}	Supply current 15V-supply	67+10*f_s /f_{smax}+0*I_{AC}/A			mA
I_{S2}	Supply current 24V-supply	67+10*f_s /f_{smax}+0*I_{AC}/A			mA
$t_{interlock-driver}$	Interlock-time	-			µs
SKiiPPACK protection					
I_{TRIPSC}	Short circuit protection	Vcesat-protection			A
I_{TRIPLG}	Ground fault protection	-			A
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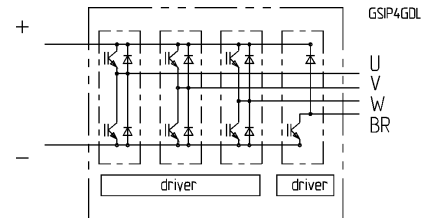### SK integrated intelligent Power PACK 3-phase bridge with brake chopper SKiiP 202 GDL 061 - 457 CTV [7,9]

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