SKiiP 192 GDL 170 - 475 CTV

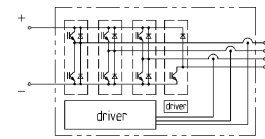
Absolute Maximum Ratings Symbol	Conditions [1]	Values	Units
IGBT & Inverse Diode			
V_{CES}		1700	V
V_{CC} [9]	Operating DC link voltage	1200	V
I_C	$T_{heatsink}$ = 25 °C	150	A
T_j [3]	IGBT & Diode	– 40 ... + 150	°C
V_{isol} [4]	AC, 1 min.	3500	V
I_F	$T_{heatsink}$ = 25 °C	150	A
I_{FM}	$T_{heatsink}$ = 25 °C; t_p < 1 ms	300	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 150 °C	1450	A
I^2t (Diode)	t_p = 10 ms; T_j = 150 °C	10,5	kA^2s

Characteristics Symbol	Conditions [1]	min.	typ.	max.	Units
$V_{(BR)CES}$	Driver without power supply	≥ V_{CES}	–	–	V
I_{CES}	V_{GE} = 0, T_j = 25 °C	–	0,4	–	mA
	V_{CE} = V_{CES}, T_j = 125 °C	–	15	–	mA
V_{CEsat}	I_C = 112 A, T_j = 25 (125) °C	–	3,2(4,4)	–	V
V_{CEsat}	I_C = 150 A, T_j = 25 (125) °C	–	3,8(5,3)	–	V
C_{CHC}	per SKiiPPACK AC side	–	0,8	–	nF
L_{CE}	Top (Bottom)	–	15	–	nH
$t_{d(on)}$	I_C = 150 A, T_j = 125 °C, V_{CC} = 1200 V, inductive load	–	200	–	ns
$t_{d(on)Driver}$		–	1,0	–	µs
t_r		–	300	–	ns
$t_{d(off)}$		–	2	–	µs
$t_{d(off)Driver}$		–	1,0	–	µs
t_f		–	120	–	ns
E_{on} + E_{off}	V_{CC} = 900 V / 1200 V	–	128/195	–	mJ
Inverse Diode [2] - inverter					
V_F = V_{EC}	I_F = 112 A, T_j = 25 (125) °C	–	2,1 (1,8)	–	V
	I_F = 150 A, T_j = 25 (125) °C	–	2,4(2,1)	–	V
E_{on} + E_{off}	I_F = 150 A; T_j = 125 °C	–	18	–	mJ
IGBT / Inverse Diode [2]					
V_{TO}	T_j = 125 °C	–	1,7 / 1,3	–	V
r_T	T_j = 125 °C	–	23 / 7,4	–	mΩ
Diode [2] - brake chopper (BC)					
V_F = V_{EC}	I_F = 112 A T_j = 25 (125) °C	–	2,1(1,8)	–	V
	I_F = 150 A T_j = 25 (125) °C	–	2,4(2,1)	–	V
V_{TO}	T_j = 125 °C	–	1,3	–	V
r_T	T_j = 125 °C	–	7,4	–	mΩ
Thermal Characteristics					
R_{thjh}	per IGBT	–	0,11	–	K/W
R_{thjh}	per diode inverter (BC)	–	0,40(0,40)	–	K/W
T_{tp} [12]	Over temperature protection	110	115	120	°C
R_{thha} [6]	P16/360 F; v_{air} = 279 m^3 / h	–	0,036	–	K/W
SKiiPPACK protection					
I_{TRIPSC}	Short circuit protection	184	187,5	191	A
I_{TRIPLG}	Ground fault protection	–	45	–	A
T_{TRIP}	Overtemperature protection	110	115	120	°C
U_{DCTRIP} [13]	U_{DC}-protection	1200	1225	1250	V
Mechanical Data					
Mdc	for DC terminals, SI Units	4	–	6	Nm
Mac	for AC terminals, SI Units	8	–	10	Nm

SKiiPPACK®
SK integrated intelligent Power PACK
3-phase bridge with brake chopper
SKiiP 192 GDL 170 + Driver 475 CTV [7,13)]

Preliminary Data

Case S5

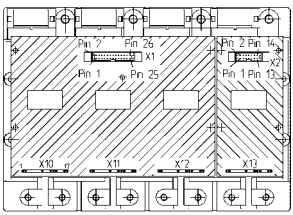


Features

- 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
- Overtemp. protection
- Short circuit protection, due to evalutation of current sensor signals
- Isolated power supply

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 or DC link/AC output to heatsink
6) other heatsink on request
7) C - integrated current sensors
T - Temperature protection
V - 15 V or 24 V power supply
9) with SK-DC link (low inductance)
12) thermal reference for R_{thjh}; R_{thha}
13) option available for driver
U - DC-link voltage sense

SKiiPPACK®
SK integrated intelligent Power PACK
3-phase bridge with brake chopper
SKiiP 192 GDL 170 + Driver 475 CTV [3,5)]
Preliminary Driver Data



Features
3-phase bridge
- CMOS compatible inputs
- Short circuit protection by evaluation of current sensor signals
- Drive interlock top/bottom
- Isolation by transformers
- Supply undervoltage protection
- Overtemperature protection
- U_{DC}-monitoring (option)

Features
brake chopper
- Short circuit protection by V_{CE} monitoring and soft switch off
- Self controlled switching
- Supply undervoltage protection
- Overtemperature protection

1) 24 V - power supply
2) Open collector output, external pull-up resistor necessary
3) C - integrated current sensors
T - Temperature protection
5) V - 15 V or 24 V power supply option available for driver
6) U - DC-link voltage sense
I_{AC} - AC-current per phase

SKiiP 192 GDL 170 - 475 CTV
Driver for 3-phase bridge and brake chopper

Absolute Maximum Ratings		3-phase bridge	brake chopper		
Symbol	**Conditions**	**Values**		**Units**	**remark**
V_{S1}	supply voltage primary	18		V	
V_{S2} [1)]	supply voltage primary	30		V	
I_{outmax}	output peak current max.	± 10	± 1,5	A	
I_{outAV}	output average current	± 50	± 90	mA	
f_{swmax}	switching frequency max.	20	5	kHz	
dv/dt	rate of rise and fall of voltage (secondary to primary side)	75	50	kV/µs	
$V_{isol\ IO}$	Isol. test volt. IN/OUT (RMS; 1 min)	3,5		kV~	
$V_{isol\ 12}$	Isol. test volt. OUT1-OUT2	1,7		kV=	
T_{op}, T_{stg}	operating / stor. temperature	– 25 ... + 85		℃	

Characteristics (Ta = 25 ℃)					
Symbol	**Conditions**	**Values**		**Units**	**remark**
V_{S1}	supply voltage primary	15,0 ± 4 %		V	
V_{S2} [1)]	supply voltage primary	24,0		V	+25%/-15%
V_{UVS}	supply undervolt. monitoring	13,5		V	
V_{UVS} [1)]	supply undervolt. monitoring	19,5	16	V	
I_{S01}	sup.current pr.side (standby)	340	67	mA	
I_{S02} [1)]	sup.current pr.side (standby)	250	67	mA	
I_{S1}	sup. current pr.side (max) at f_{swmax}	$720 + \frac{3 \cdot I_{AC}}{1000}$ [6)]	77	mA	
I_{S2} [1)]	sup. current pr.side (max) at f_{swmax}	$510 + \frac{3 \cdot I_{AC}}{1350}$ [6)]	77	mA	
V_{iT+}	input thresh. volt. (high) min	11,2		V	
V_{iT-}	input thresh. volt. (low) max.	5,4		V	
$V_{GE(on)}$	turn-on output gate voltage	15		V	
$V_{GE(off)}$	turn-off output gate voltage	– 7	0	V	
$t_{d(on)}$	propagation delay time on	1,0	< 20	µs	typ.
$t_{d(off)}$	propagation delay time off	1,0	< 25	µs	typ.
t_{TD}	dead time of interlock	2,2		µs	typ.
V_{CEstat}	VCE-thresh. st. monitoring	-	6,5	V	typ.
V_{OL} [2)]	logic low output voltage	< 0,6			15 mA sink
			< 0,6		2,5mA sink
V_{oH} [2)]	logic high output voltage	max. 30		V	
$V_{RESET\ L}$	Input voltage RESET Low		< 2	V	
$V_{RESET\ H}$	Input voltage RESET High		> 12	V	
V_{iL}	logic low input volt. Chop. ext. ON		< 5	V	> 5 mA
V_{iH}	logic high input volt.Chop. ext. ON		> 11,5	V	< 1 mA
$t_{pdon\text{-}error}$	propag. delay time-on error	1	< 60	µs	
$t_{p\ RESET}$	min. pulse width error memory RESET	8	300	µs ms	
T_{TRIP}	max. temperature	115 ± 5		℃	
I_{AOmax}	max. output current	± 5		mA	pin 13/20/ 22/24/26
$U_{ITRIPSC}$	overcurrent trip level	10	-	V	10 V= 125 % Ic
U_{DCTRIP}	overvoltage trip level	9	-	V	9V = 1200V; using opt."U"