

SKiiP 513GD122-3DUL

I. Power section

Absolute maximum ratings		$T_s = 25^\circ\text{C}$ 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		$T_s = 25 (70)^\circ\text{C}$	500 (375)
Inverse diode			
$I_F = -I_C$	$T_s = 25 (70)^\circ\text{C}$	500 (375)	A
I_{FSM}	$T_j = 150^\circ\text{C}$, $t_p = 10\text{ms}$; sin	4320	A
I^2t (Diode)	Diode, $T_j = 150^\circ\text{C}$, 10ms	93	kA^2s
$T_j, (T_{stg})$		-40...+150 (125)	$^\circ\text{C}$
V_{isol}	rms, AC, 1min	3000	V
$I_{AC-terminal}$	per AC terminal, rms, $T_s = 70^\circ\text{C}$, $T_{terminal} < 115^\circ\text{C}$	400	A

Characteristics $T_s = 25^\circ\text{C}$ unless otherwise specified									
Symbol	Conditions	min.	typ.	max.	Units				
IGBT									
V_{CEsat}	$I_C = 300\text{A}$, $T_j = 25 (125)^\circ\text{C}$; measured at terminal	-	2,3 (2,5)	2,6	V				
V_{CEO}	$T_j = 25 (125)^\circ\text{C}$; at terminal	-	1,1 (1,0)	1,3 (1,2)	V				
r_{CE}	$T_j = 25 (125)^\circ\text{C}$; at terminal	-	3,8 (5,0)	4,5 (5,6)	$\text{m}\Omega$				
I_{CES}	$V_{GE}=0, V_{CE}=V_{CES}, T_j=25(125)^\circ\text{C}$	-	1,2 (36)	-	mA				
$E_{on} + E_{off}$	$I_C=300\text{A}$, $V_{CC}=600\text{V}$	-	90	-	mJ				
	$T_j=125^\circ\text{C}$, $V_{CC}=900\text{V}$	-	159	-	mJ				
L_{CE}	top, bottom	-	12	-	nH				
C_{CHC}	per phase, AC side	-	1,7	-	nF				
R_{CC-EE}	terminal-chip, $T_j=25^\circ\text{C}$	-	0,50	-	$\text{m}\Omega$				
Inverse diode									
$V_F = V_{EC}$	$I_F = 300\text{A}$; $T_j = 25(125)^\circ\text{C}$ measured at terminal	-	1,8 (1,5)	2,3	V				
V_{TO}	$T_j = 25 (125)^\circ\text{C}$	-	1,0 (0,7)	1,2 (0,9)	V				
r_T	$T_j = 25 (125)^\circ\text{C}$	-	2,6 (2,8)	3,5 (3,7)	$\text{m}\Omega$				
E_{RR}	$I_C=300\text{A}$, $V_{CC}=600\text{V}$	-	24	-	mJ				
	$T_j=125^\circ\text{C}$, $V_{CC}=900\text{V}$	-	31	-	mJ				
Mechanical data									
M_{dc}	DC terminals, SI Units	6	-	8	Nm				
M_{ac}	AC terminals, SI Units	13	-	15	Nm				
w	SKiiP [®] 3 System w/o heat sink	-	2,4	-	kg				
w	heat sink	-	7,5	-	kg				
Thermal characteristics (PX16 heat sink with fan SKF16B-230-1); "s" reference to heat sink; "r" reference to built-in temperature sensor (acc. IEC 60747-15)									
$R_{thjsIGBT}$	per IGBT	-	-	0,059	$^\circ\text{C/W}$				
$R_{thjsdiode}$	per diode	-	-	0,115	$^\circ\text{C/W}$				
Z_{th}	R_i (mK/W) (max. values)					τ_i (s)			
		1	2	3	4				
$IGBT_{jr}$		10,2	28,8	21,0	0,0	363,0	0,18	0,04	1,0
$diode_{jr}$		36,0	36,0	54,0	60,0	30,0	5,0	0,25	0,04
$heatsink_{ra}$		2,1	20,0	5,5	1,4	210	85	11,0	0,4

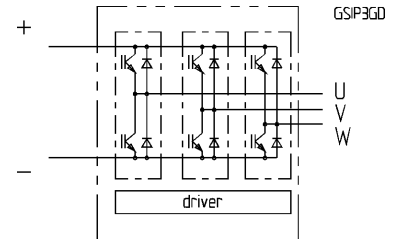
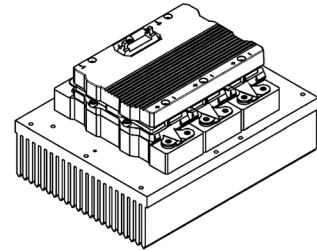
SKiiP[®] 3

SK integrated intelligent Power 6-pack

SKiiP 513GD122-3DUL

Preliminary data

Case S33



Features

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

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

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee, expressed or implied is made regarding delivery, performance or suitability.

SKiiP 513GD122-3DUL

SKiiP 3®

SK integrated intelligent Power

SKiiP 513GD122-3DUL

Preliminary data

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® 3 gate driver)

II. Integrated gate driver

Absolute maximum ratings

Symbol	Term	Value	Unit
V _{S2}	unstabilized 24V power supply	35	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, rms, 2 s)	3000	V
V _{isolPD}	partial discharge extinction voltage, rms, Q _{PD} ≤ 10 pC;	1170	V
V _{isol12}	output 1 / output 2 (AC, rms, 2s)	1500	V
f	switching frequency	15	kHz
T _{op} (T _{stg})	operating / storage temperature	- 40 ... + 85	°C

Electrical characteristics (T_a = 25 °C)

Symbol	Term	Values			Units
		min	typ	max.	
V _{S2}	supply voltage non stabilized	13	24	30	V
I _{S2}	V _{S2} = 24V	365 + 30*f / kHz + 0,00111 * (I _{AC} /A) ²			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
C _{in}	input capacitance	–	1	–	nF
t _{d(on)IO}	input-output turn-on propagation time	–	1,1	–	μs
t _{d(off)IO}	input-output turn-off propagation time	–	1,1	–	μs
t _{pERRRESET}	error memory reset time	–	9	–	μs
t _{TD}	top/bottom switch: interlock time	–	3,3	–	μs
I _{analogOUT}	max. 5mA ; 8 V corresponds to 15 V supply voltage for external components; max load current	–	500	–	A
I _{S1out}		–	–	50	mA
I _{TRIPSC}	over current trip level (I _{analog OUT} = 10V)	–	625	–	A
T _{tp}	over temperature protection	110	–	120	°C
U _{DCTRIP}	U _{DC} -protection (U _{analog OUT} = 9V) (option for GB types)	900	–	–	V

For electrical and thermal design support please use SEMISEL. Access to SEMISEL is via SEMIKRON website <http://www.semikron.com>.

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.