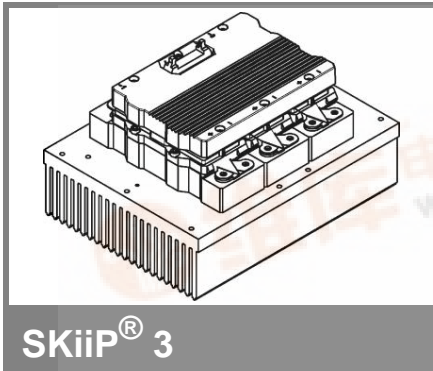


SKiIP 313GD122-3DUL



6-pack-integrated intelligent Power System

Power Section

SKiIP 313GD122-3DUL

Preliminary Data

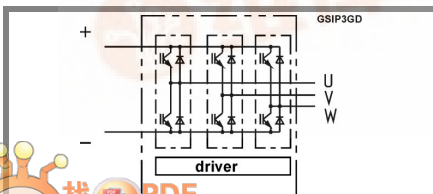
Features

- SKiIP technology inside
- SPT (Soft Punch Through) 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)

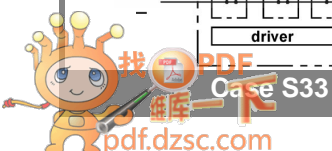
1) with assembly of suitable MKP capacitor per terminal (SEMIKRON type is recommended)

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	$T_s = 25 (70)^\circ\text{C}$	300 (225)	A
Inverse diode			
$I_F = -I_C$	$T_s = 25 (70)^\circ\text{C}$	230 (180)	A
I_{FSM}	$T_j = 150^\circ\text{C}$, $t_p = 10\text{ ms}$; sin	2880	A
I^2t (Diode)	Diode, $T_j = 150^\circ\text{C}$, 10 ms	23	kA^2s
T_j ; (T_{stg})		- 40 ... + 150 (125)	$^\circ\text{C}$
V_{isol}	rms, AC, 1 min, main terminals to heat sink	3000	V
$I_{AC-terminal}$	per AC terminal, rms, $T_s = 70^\circ\text{C}$,	400	A
	$T_{terminal} < 115^\circ\text{C}$		

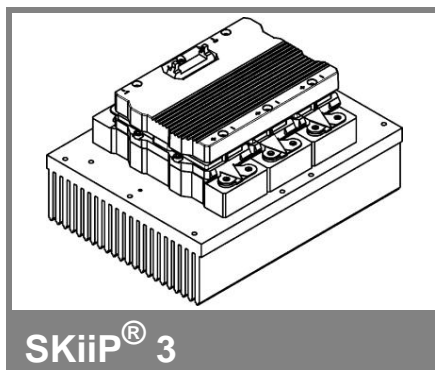
Characteristics		$T_s = 25^\circ\text{C}$ unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
V_{CEsat}	$I_C = 193\text{ A}$, $T_j = 25 (125)^\circ\text{C}$; measured at terminal		2,3 (2,5)	2,6	V
V_{CEO}	$T_j = 25 (125)^\circ\text{C}$; at terminal		1,1 (1)	1,3 (1,2)	V
r_{CE}	$T_j = 25 (125)^\circ\text{C}$; at terminal		6 (7,8)	7 (8,8)	$\text{m}\Omega$
I_{CES}	$V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$, $T_j = 25 (125)^\circ\text{C}$		0,6 (18)		mA
$E_{on} + E_{off}$	$I_C = 193\text{ A}$, $V_{CC} = 600\text{ V}$		58		mJ
	$T_j = 125^\circ\text{C}$, $V_{CC} = 900\text{ V}$		102		mJ
R_{CC+EE}	terminal chip, $T_j = 25^\circ\text{C}$		0,5		$\text{m}\Omega$
L_{CE}	top, bottom		12		nH
C_{CHC}	per phase, AC-side		1,7		nF
Inverse diode					
$V_F = V_{EC}$	$I_F = 193\text{ A}$, $T_j = 25 (125)^\circ\text{C}$ measured at terminal		2 (1,8)	2,3	V
V_{TO}	$T_j = 25 (125)^\circ\text{C}$		1 (0,7)	1,2 (0,9)	V
r_T	$T_j = 25 (125)^\circ\text{C}$		5,3 (5,6)	7 (7,4)	$\text{m}\Omega$
E_{rr}	$I_C = 193\text{ A}$, $V_{CC} = 600\text{ V}$		15		mJ
	$T_j = 125^\circ\text{C}$, $V_{CC} = 900\text{ V}$		20		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 SKF 16B-230-1); "s" reference to heat sink; "r" reference to built-in temperature sensor (acc. IEC 60747-15)					
$R_{th(j-s)I}$	per IGBT			0,092	K/W
$R_{th(j-s)D}$	per diode			0,23	K/W
Z_{th}	R_i (mK/W) (max. values)		tau _i (s)		
		1	2	3	4
$Z_{th(j-r)I}$					
$Z_{th(j-r)D}$					
$Z_{th(r-a)}$		2,1	20	5,5	1,4
		210	85	11	0,4



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SKiiP 313GD122-3DUL



SKiiP® 3

6-pack-integrated intelligent Power System

6-pack integrated gate driver SKiiP 313GD122-3DUL

Preliminary Data

Gate driver features

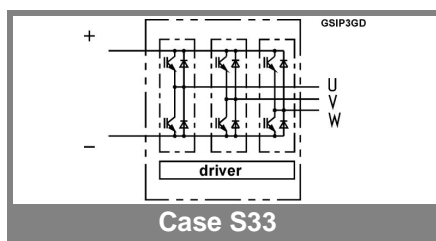
- CMOS compatible inputs
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- Short circuit protection
- Over current protection
- Over voltage protection (option)
- Power supply protection against under voltage
- Interlock of top/bottom switch
- Isolation by transformers
- Fibre optic interface (option for GB-types only)
- IEC 68T.1 (climate) 40/85/56 (SKiiP® 3 gate driver)

Absolute Maximum Ratings			
Symbol	Conditions	Values	Units
V_{S2}	unstabilized 24 V power supply	30	V
V_i	input signal voltage (high)	15 + 0,3	V
dv/dt	secondary to primary side	75	kV/ μ s
V_{isolIO}	input / output (AC, rms, 2)	3000	V
V_{isolPD}	partial discharge extinction voltage, rms, $Q_{PD} \leq 10$ pC;	1170	V
V_{isol12}	output 1 / output 2 (AC, rms, 2 s)	1500	V
f	switching frequency	20	kHz
T_{op} (T_{stg})	operating / storage temperature	- 40 ... + 85	°C

Characteristics				$(T_a = 25^\circ\text{C})$		
Symbol	Conditions	min.	typ.	max.	Units	
V_{S2}	supply voltage non stabilized	13	24	30	V	
I_{S2}	$V_{S2} = 24$ V	$365 + 20 \cdot f / \text{kHz} + 0,00111 \cdot (I_{AC} / A)^2$			mA	
V_{IT+}	input threshold voltage (High)	11,2			V	
V_{IT-}	input threshold voltage (Low)	5,4			V	
R_{IN}	input resistance	10			k Ω	
C_{IN}	input capacitance	1			nF	
$t_{d(on)IO}$	input-output turn-on propagation time	1,3			μ s	
$t_{d(off)IO}$	input-output turn-off propagation time	1,3			μ s	
$t_{pERRRESET}$	error memory reset time	9			μ s	
t_{TD}	top / bottom switch interlock time	3,3			μ s	
$I_{analogOUT}$	max. 5mA; 8 V corresponds to 15 V supply voltage for external components	300			A	
I_{s1out}	max. load current	50			mA	
I_{TRIPSC}	over current trip level ($I_{analog OUT} = 10$ V)	375			A	
T_{tp}	over temperature protection	110	120		°C	
U_{DCTRIP}	U_{DC} -protection ($U_{analog OUT} = 9$ V); (option for GB types)	900			V	

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Case S33