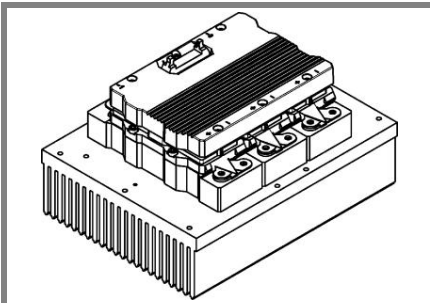


SKiiP 613GD061-3DUL



SKiiP® 3

6-pack-integrated intelligent power system

Power section

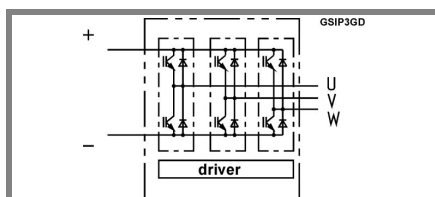
SKiiP 613GD061-3DUL

Preliminary Data

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. E 63 532 (SKiiP® 3 power section)

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



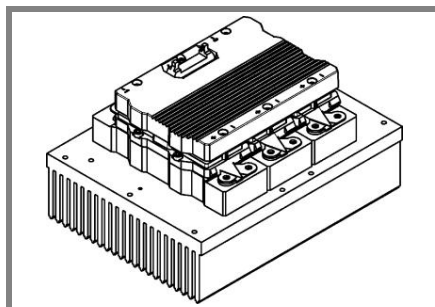
Case S33

Absolute Maximum Ratings		$T_s = 25\text{ }^\circ\text{C}$, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V_{CES}	Operating DC link voltage	600	V
$V_{CC}^{1)}$		400	V
V_{GES}		± 20	V
I_C	$T_s = 25\text{ (70) }^\circ\text{C}$	600 (450)	A
Inverse diode			
$I_F = -I_C$	$T_s = 25\text{ (70) }^\circ\text{C}$	560 (420)	A
I_{FSM}	$T_j = 150\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$; sin	6000	A
I^2t (Diode)	Diode, $T_j = 150\text{ }^\circ\text{C}$, 10 ms	180	kA ² s
T_j ; (T_{stg})	rms, AC, 1 min	- 40 ... + 150 (125)	$^\circ\text{C}$
V_{isol}		2500	V
$I_{AC-terminal}$		per AC terminal, rms, $T_s = 70\text{ }^\circ\text{C}$,	400
	$T_{terminal} < 115\text{ }^\circ\text{C}$		

Characteristics		$T_s = 25\text{ }^\circ\text{C}$, unless otherwise specified						
Symbol	Conditions	min.	typ.	max.	Units			
IGBT								
V_{CEsat}	$I_C = 300\text{ A}$, $T_j = 25\text{ (125) }^\circ\text{C}$; measured at terminal		1,5 (1,6)	1,8	V			
V_{CEO}	$T_j = 25\text{ (125) }^\circ\text{C}$; at terminal		0,8 (0,7)	1 (0,9)	V			
r_{CE}	$T_j = 25\text{ (125) }^\circ\text{C}$; at terminal		2,4 (3,1)	2,7 (3,4)	m Ω			
I_{CES}	$V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$; $T_j = 25\text{ (125) }^\circ\text{C}$		1,2 (36)		mA			
$E_{on} + E_{off}$	$I_C = 300\text{ A}$, $V_{CC} = 300\text{ V}$		27		mJ			
	$T_j = 125\text{ }^\circ\text{C}$, $V_{CC} = 400\text{ V}$		39		mJ			
R_{CC+EE}	terminal chip, $T_j = 25\text{ }^\circ\text{C}$		0,5		m Ω			
L_{CE}	top, bottom		12		nH			
C_{CHC}	per phase, AC-side		1,7		nF			
Inverse diode								
$V_F = V_{EC}$	$I_F = 300\text{ A}$, $T_j = 25\text{ (125) }^\circ\text{C}$; measured at terminal		1,3 (1,2)	1,5	V			
V_{TO}	$T_j = 25\text{ (125) }^\circ\text{C}$		0,8 (0,6)	1 (0,8)	V			
r_T	$T_j = 25\text{ (125) }^\circ\text{C}$		1,5 (1,9)	1,7 (2)	m Ω			
E_{rr}	$I_C = 300\text{ A}$, $V_{CC} = 300\text{ V}$		5		mJ			
	$T_j = 125\text{ }^\circ\text{C}$, $V_{CC} = 400\text{ V}$		6		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)								
$R_{th(j-s)I}$	per IGBT			0,059	K/W			
$R_{th(j-s)D}$	per diode			0,115	K/W			
Z_{th}	R_i (mK/W) (max. values)	tau _i (s)						
		1	2	3	4			
$Z_{th(j-r)I}$	10,2	28,8	21	0	363	0,18	0,04	1
$Z_{th(j-r)D}$	36	36	54	60	30	5	0,25	0,04
$Z_{th(r-a)}$	2,1	20	5,5	1,4	210	85	11	0,4

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SKiiP 613GD061-3DUL



SKiiP® 3

6-pack-integrated intelligent power system

6-pack integrated gate driver SKiiP 613GD061-3DUL

Preliminary Data

Gate driver features

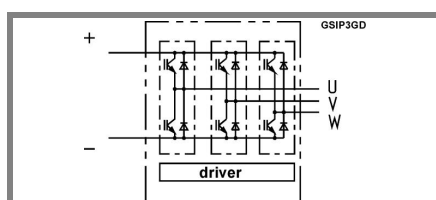
- CMOS compatible inputs
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- Short circuit protection
- Over current protection
- Over voltage protection (option)
- Power supply protected against under voltage
- Interlock of top/bottom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

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 s)	2500	V
V_{isolPD}	partial discharge extinction voltage, rms, $Q_{PD} \leq 10$ pC;	960	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 ($T_a = 25$ °C)					
Symbol	Conditions	min.	typ.	max.	Units
V_{S2}	supply voltage non stabilized	13	24	27	V
I_{S2}	$V_{S2} = 24$ V	$375+30*f/kHz+0,00111*(I_{AC}/A)^2$			mA
V_{IT+}	input threshold voltage (High)	11,2			V
V_{IT-}	input threshold voltage (Low)	5,4			V
R_{IN}	input resistance	10			k Ω
C_{IN}	input capacitance	1			nF
$t_{d(on)IO}$	input-output turn-on propagation time	1,1			μ s
$t_{d(off)IO}$	input-output turn-off propagation time	1,1			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. 5 mA; 8 V corresponds to 15 V supply voltage for external components	600			A
I_{s1out}	max. load current	50			mA
I_{TRIPSC}	over current trip level ($I_{analog OUT} = 10$ V)	750			A
T_{tp}	over temperature protection	110		120	°C
U_{DCTRIP}	U_{DC} -protection ($U_{analog OUT} = 9$ V); (option for GB type)	400			V

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Case S33