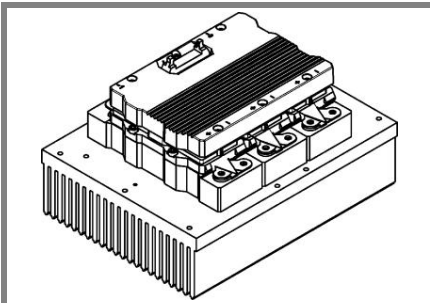


# SKiiP 613GD123-3DUL



SKiiP® 3

## 6-pack-integrated intelligent Power System

### Power section

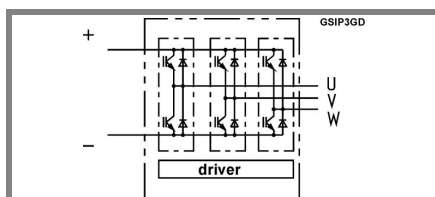
#### SKiiP 613GD123-3DUL

Data

### Power section features

- SKiiP technology inside
- Trench IGBTs
- CAL HD diode technology
- Integrated current sensor
- Integrated temperature sensor
- Integrated heat sink
- IEC 60721-3-3 (humidity) class 3K3/IE32 (SKiiP® 3 System)
- IEC 60068-1 (climate) 40/125/56
- UL recognized file no. E63532

1) with assembly of suitable MKP capacitor per terminal



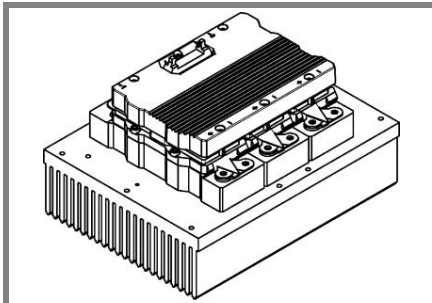
Case S33

Absolute Maximum Ratings		$T_s = 25^\circ\text{C}$ unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$	Operating DC link voltage	1200	V
$V_{CC}^{1)}$		900	V
$V_{GES}$		$\pm 20$	V
$I_C$	$T_s = 25 (70)^\circ\text{C}$	600 (450)	A
<b>Inverse diode</b>			
$I_F = -I_C$	$T_s = 25 (70)^\circ\text{C}$	470 (350)	A
$I_{FSM}$	$T_j = 150^\circ\text{C}$ , $t_p = 10\text{ ms}$ ; sin	3500	A
$I^2t$ (Diode)	Diode, $T_j = 150^\circ\text{C}$ , 10 ms	61	kA <sup>2</sup> s
$T_j$ , ( $T_{stg}$ )		- 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			
<b>IGBT</b>								
$V_{CEsat}$	$I_C = 300\text{ A}$ , $T_j = 25 (125)^\circ\text{C}$ ; measured at terminal		1,7 (1,9)	2,1	V			
$V_{CEO}$	$T_j = 25 (125)^\circ\text{C}$ ; at terminal		0,9 (0,8)	1,1 (1)	V			
$r_{CE}$	$T_j = 25 (125)^\circ\text{C}$ ; at terminal		2,6 (3,7)	3,3 (4,4)	m $\Omega$			
$I_{CES}$	$V_{GE} = 0\text{ V}$ , $V_{CE} = V_{CES}$ ; $T_j = 25 (125)^\circ\text{C}$		1,2 (36)		mA			
$E_{on} + E_{off}$	$I_C = 300\text{ A}$ , $V_{CC} = 600\text{ V}$		110		mJ			
	$T_j = 125^\circ\text{C}$ , $V_{CC} = 900\text{ V}$		195		mJ			
$R_{CC+EE}$	terminal chip, $T_j = 25^\circ\text{C}$		0,5		m $\Omega$			
$L_{CE}$	top, bottom		12		nH			
$C_{CHC}$	per phase, AC-side		1,7		nF			
<b>Inverse diode</b>								
$V_F = V_{EC}$	$I_F = 300\text{ A}$ , $T_j = 25 (125)^\circ\text{C}$ ; measured at terminal		1,5 (1,5)	1,8	V			
$V_{TO}$	$T_j = 25 (125)^\circ\text{C}$		0,9 (0,7)	1,1 (0,9)	V			
$r_T$	$T_j = 25 (125)^\circ\text{C}$		2 (2,7)	2,3 (3)	m $\Omega$			
$E_{rr}$	$I_C = 300\text{ A}$ , $V_{CC} = 600\text{ V}$		21		mJ			
	$T_j = 125^\circ\text{C}$ , $V_{CC} = 900\text{ V}$		28		mJ			
<b>Mechanical data</b>								
$M_{dc}$	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			
<b>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)</b>								
$R_{th(j-s)I}$	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 <sub>i</sub> (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 613GD123-3DUL



SKiiP® 3

## 6-pack-integrated intelligent Power System

6-pack  
integrated gate driver  
SKiiP 613GD123-3DUL

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 transformer
- IEC 60068-1 (climate) 40/85/56
- UL recognized file no. 242581

Absolute Maximum Ratings		$T_a = 25\text{ °C}$ unless otherwise specified	
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/ $\mu$ s
$V_{isolIO}$	input / output (AC, rms, 2 s)	3000	V
$V_{isolPD}$	partial discharge extinction voltage, rms, $Q_{PD} \leq 10\text{ pC}$ ;	1170	V
$V_{isol12}$	output 1 / output 2 (AC, rms, 2 s)	1500	V
$f_{sw}$	switching frequency	15	kHz
$f_{out}$	output frequency for $I_{peak(1)}=I_C$	15	kHz
$T_{op}$ ( $T_{stg}$ )	operating / storage temperature	- 40 ... + 85	°C

Characteristics		$(T_a = 25\text{ °C})$			
Symbol	Conditions	min.	typ.	max.	Units
$V_{S2}$	supply voltage non stabilized	13	24	30	V
$I_{S2}$	$V_{S2} = 24\text{ V}$	$365+37*f/\text{kHz}+0,00111*(I_{AC}/A)^2$			mA
$V_{iT+}$	input threshold voltage (High)			12,3	V
$V_{iT-}$	input threshold voltage (Low)	4,6			V
$R_{IN}$	input resistance		10		k $\Omega$
$C_{IN}$	input capacitance		1		nF
$t_{d(on)IO}$	input-output turn-on propagation time		1,3		$\mu$ s
$t_{d(off)IO}$	input-output turn-off propagation time		1,3		$\mu$ s
$t_{pERRRESET}$	error memory reset time		9		$\mu$ s
$t_{TD}$	top / bottom switch interlock time		3		$\mu$ 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 ( $I_{analog OUT} = 10\text{ V}$ )		750		A
$T_{tp}$	over temperature protection	110		120	°C
$U_{DCTRIP}$	$U_{DC}$ -protection ( $U_{analog OUT} = 9\text{ V}$ ); (option for GB types)		900		V

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