SKiiP 402GD061-358CTV ...

SKiiP® 2

6-pack - integrated intelligent Power System

Power section

SKiiP 402GD061-358CTV

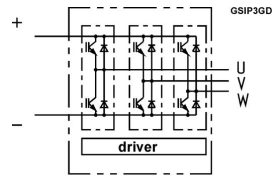
Features

- 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® 2 System)
- IEC 68T.1 (climate) 40/125/56 (SKiiP® 2 power section)

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

Absolute Maximum Ratings	T_s = 25 °C unless otherwise specified		
Symbol	**Conditions**	**Values**	**Units**
IGBT			
V_{CES}		600	V
V_{CC} 1)	Operating DC link voltage	400	V
V_{GES}		± 20	V
I_C	T_s = 25 (70) °C	400 (300)	A
Inverse diode			
I_F = - I_C	T_s = 25 (70) °C	400 (300)	A
I_{FSM}	T_j = 150 °C, t_p = 10 ms; sin.	4000	A
I²t (Diode)	Diode, T_j = 150 °C, 10 ms	80	kA²s
T_j, (T_{stg})		- 40 (- 25) ... + 150 (125)	°C
V_{isol}	AC, 1 min. (mainterminals to heat sink)	2500	V

Characteristics	T_s = 25 °C unless otherwise specified							
Symbol	**Conditions**				**min.**	**typ.**	**max.**	**Units**
IGBT								
V_{CEsat}	I_C = 400 A, T_j = 25 (125) °C					2,3 (2,6)	2,6	V
V_{CEO}	T_j = 25 (125) °C					0,8 (0,7)	1 (0,9)	V
r_{CE}	T_j = 25 (125) °C					3,8 (4,8)	4 (5)	mΩ
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}, T_j = 25 (125) °C					(20)	0,4	mA
E_{on} + E_{off}	I_C = 400 A, V_{CC} = 300 V						36	mJ
	T_j = 125 °C, V_{CC} = 400 V						53	mJ
$R_{CC'+EE'}$	terminal chip, T_j = 125 °C					0,5		mΩ
L_{CE}	top, bottom					15		nH
C_{CHC}	per phase, AC-side					0,8		nF
Inverse diode								
V_F = V_{EC}	I_F = 400 A, T_j = 25 (125) °C					1,5 (1,5)	1,8	V
V_{TO}	T_j = 25 (125) °C					0,8 (0,6)	1 (0,8)	V
r_T	T_j = 25 (125) °C					1,8 (2,2)	1,9 (2,3)	mΩ
E_{rr}	I_C = 400 A, V_{CC} = 300 V						13	mJ
	T_j = 125 °C, V_{CC} = 400 V						15	mJ
Mechanical data								
M_{dc}	DC terminals, SI Units				6		8	Nm
M_{ac}	AC terminals, SI Units				13		15	Nm
w	SKiiP® 2 System w/o heat sink					2,7		kg
w	heat sink					6,6		kg
Thermal characteristics (P16 heat sink; 295 m³/h); " $_r$ " reference to temperature sensor								
$R_{th(j-s)I}$	per IGBT						0,111	K/W
$R_{th(j-s)D}$	per diode						0,2	K/W
$R_{th(s-a)}$	per module						0,036	K/W
Z_{th}	R_i (mK/W) (max. values)						tau$_i$(s)	
	1	2	3	4	1	2	3	4
$Z_{th(j-r)I}$	12	86	13		1	0,13	0,001	
$Z_{th(j-r)D}$	22	154	24		1	0,13	0,001	
$Z_{th(r-a)}$	11,1	18,3	3,5	3,1	204	60	6	0,02



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SKiiP® 2

6-pack - integrated intelligent Power System

6-pack
integrated gate driver

SKiiP 402GD061-358CTV

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) 25/85/56 (SKiiP® 2 gate driver)

Absolute Maximum Ratings

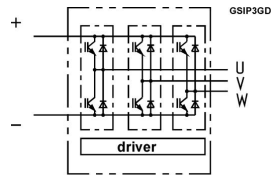
Symbol	Conditions	Values	Units
V_{S1}	stabilized 15 V power supply	18	V
V_{S2}	unstabilized 24 V power supply	30	V
V_{iH}	input signal voltage (high)	15 + 0,3	V
dv/dt	secondary to primary side	75	kV/µs
V_{isolIO}	input / output (AC, r.m.s., 2s)	2500	Vac
V_{isol12}	output 1 / output 2 (AC, r.m.s., 2s)	1500	Vac
f_{max}	switching frequency	20	kHz
T_{op} (T_{stg})	operating / storage temperature	- 25 ... + 85	°C

Characteristics (T_a = 25 °C)

Symbol	Conditions	min.	typ.	max.	Units
V_{S1}	supply voltage stabilized	14,4	15	15,6	V
V_{S2}	supply voltage non stabilized	20	24	30	V
I_{S1}	V_{S1} = 15 V		340+490*f/f_{max}+3,5*(I_{CA}/A)		mA
I_{S2}	V_{S2} = 24 V		250+360*f/f_{max}+2,6*(I_{AC}/A)		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
$t_{d(on)IO}$	input-output turn-on propagation time		1,1		µs
$t_{d(off)IO}$	input-output turn-off propagation time		1,4		µs
$t_{pERRRESET}$	error memory reset time	9			µs
t_{TD}	top / bottom switch : interlock time		2,3		µs
$I_{analogOUT}$	8 V corresponds to max. current of 15 V supply voltage		330		A
$I_{Vs1outmax}$	(available when supplied with 24 V)			50	mA
I_{A0max}	output current at pin 13/20/22/24/26			5	mA
V_{0l}	logic low output voltage			0,6	V
V_{0H}	logic high output voltage			30	V
I_{TRIPSC}	over current trip level ($I_{analog\ OUT}$ = 10 V)		413		A
I_{TRIPLG}	ground fault protection		96		A
T_{tp}	over temperature protection	110		120	°C
U_{DCTRIP}	trip level of U_{DC}-protection ($U_{analog\ OUT}$ = 9 V); (option)	400			V

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