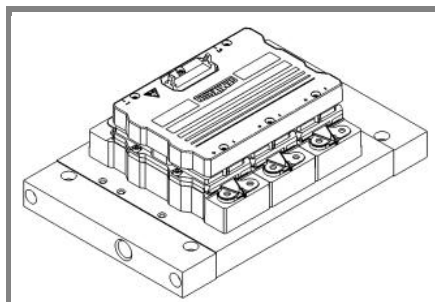


# SKiiP 603GD172-3DUW V3



SKiiP® 3

## 6-pack-integrated intelligent Power System

### Power section

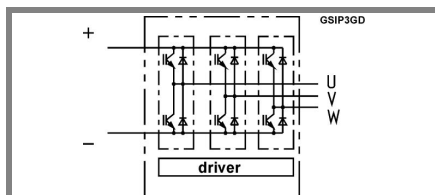
#### SKiiP 603GD172-3DUW V3

Target Data

### Power section features

- SKiiP technology inside
- Trench 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 60068 -1 (climate) 40/125/56
- UL recognized file no. E63532

1) with assembly of suitable MKP capacitor per terminal



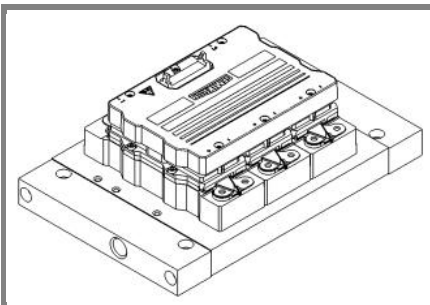
Case S33

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	1700	V
$V_{CC}^{1)}$		1200	V
$V_{GES}$		$\pm 20$	V
$I_C$	$T_s = 25 (70)^\circ\text{C}$	570 (440)	A
<b>Inverse diode</b>			
$I_F = -I_C$	$T_s = 25 (70)^\circ\text{C}$	450 (340)	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	$\text{kA}^2\text{s}$
$T_j$ , ( $T_{stg}$ )	rms, AC, 1 min, main terminals to heat sink per AC terminal, rms, $T_s = 70^\circ\text{C}$ , $T_{terminal} < 115^\circ\text{C}$	- 40 ... + 150 (125)	$^\circ\text{C}$
$V_{isol}$		4000	V
$I_{AC-terminal}$		400	A

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		1,9 (2,2)	2,4	V			
$V_{CEO}$	$T_j = 25 (125)^\circ\text{C}$ ; at terminal		1 (0,9)	1,2 (1,1)	V			
$r_{CE}$	$T_j = 25 (125)^\circ\text{C}$ ; at terminal		3 (4,1)	3,9 (5)	$\text{m}\Omega$			
$I_{CES}$	$V_{GE} = 0\text{ V}$ , $V_{CE} = V_{CES}$ ; $T_j = 25 (125)^\circ\text{C}$		1,2 (72)		mA			
$E_{on} + E_{off}$	$I_C = 300\text{ A}$ , $V_{CC} = 900\text{ V}$		195		mJ			
	$T_j = 125^\circ\text{C}$ , $V_{CC} = 1200\text{ V}$		288		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			
<b>Inverse diode</b>								
$V_F = V_{EC}$	$I_F = 300\text{ A}$ , $T_j = 25 (125)^\circ\text{C}$ ; measured at terminal		1,9 (1,7)	2,4	V			
$V_{TO}$	$T_j = 25 (125)^\circ\text{C}$		1,1 (0,8)	1,4 (1,1)	V			
$r_T$	$T_j = 25 (125)^\circ\text{C}$		2,6 (2,9)	3,4 (3,7)	$\text{m}\Omega$			
$E_{rr}$	$I_C = 300\text{ A}$ , $V_{CC} = 900\text{ V}$		36		mJ			
	$T_j = 125^\circ\text{C}$ , $V_{CC} = 1200\text{ V}$		43		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 (NWK40; 8l/min; 50%glyc.); "s" reference to heat sink; "r" reference to built-in temperature sensor</b>								
$R_{th(j-s)I}$	per IGBT			0,051	K/W			
$R_{th(j-s)D}$	per diode			0,1	K/W			
$Z_{th}$	$R_i$ (mK/W) (max. values)	tau <sub>i</sub> (s)						
		1	2	3	4			
$Z_{th(j-r)I}$	4,2	20,4	23,4	0	69	0,35	0,02	1
$Z_{th(j-r)D}$	7,8	12	53,1	53,1	50	5	0,25	0,04
$Z_{th(r-a)}$	4,6	4,7	1,1	0,6	48	15	2,8	0,35

\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.

# SKiiP 603GD172-3DUW V3



SKiiP® 3

## 6-pack-integrated intelligent Power System

**6-pack  
integrated gate driver  
SKiiP 603GD172-3DUW V3**

Target Data

### Gate driver features

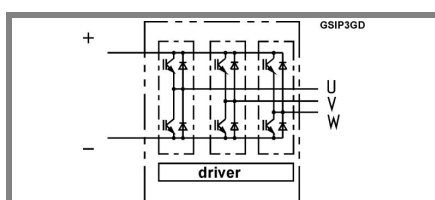
- CMOS compatible inputs
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- Short circuit protection
- Over current protection
- Over voltage protection (option)
- Power supply protected against under voltage
- Interlock of top/bottom switch
- Isolation by transformer
- IEC 60068-1 (climate) 40/85/56

Absolute Maximum Ratings		$T_a = 25^\circ\text{C}$ 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/ $\mu\text{s}$
$V_{isolIO}$	input / output (AC, rms, 2s)	4000	V
$V_{isolPD}$	partial discharge extinction voltage, rms, $Q_{PD} \leq 10$ pC;	1500	V
$V_{isol12}$	output 1 / output 2 (AC, rms, 2s)	1500	V
$f_{sw}$	switching frequency	14	kHz
$f_{out}$	output frequency for $I_{peak(1)} = I_C$	14	kHz
$T_{op} (T_{stg})$	operating / storage temperature	- 40 ... + 85	$^\circ\text{C}$

Characteristics		$(T_a = 25^\circ\text{C})$			
Symbol	Conditions	min.	typ.	max.	Units
$V_{S2}$	supply voltage non stabilized	13	24	30	V
$I_{S2}$	$V_{S2} = 13\text{V} - 30\text{V}$	$417 + 42 * f / \text{kHz} + 0,00014 * (I_{AC} / \text{A})^2$			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		1,4		$\mu\text{s}$
$t_{d(off)IO}$	input-output turn-off propagation time		1,4		$\mu\text{s}$
$t_{pERRRESET}$	error memory reset time		12,2		$\mu\text{s}$
$t_{TD}$	top / bottom switch interlock time		3		$\mu\text{s}$
$I_{analogOUT}$	max. 5mA; 8 V corresponds to 15 V supply voltage for external components		500		A
$I_{s1out}$	max. load current			50	mA
$I_{TRIPSC}$	over current trip level ( $I_{analog OUT} = 10$ V)		625		A
$T_{tp}$	over temperature protection	110		120	$^\circ\text{C}$
$U_{DCTRIP}$	$U_{DC}$ -protection ( $U_{analog OUT} = 9$ V); ( )		1200		V

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

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Case S33