

# SKiiP 342GDL120-4DU



SKiiP® 2

## 7-pack - integrated intelligent Power System

Power section - 3 phase bridge

SKiiP 342GDL120-4DU

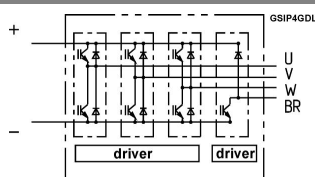
### Power section features

- SKiiP technology insid
- CAL diode technology
- Integrated current sensor
- Integrated temperature sensor
- Integrated heat sink
- IEC 60721-3-3 (humidity) class 3K3/IE32 (SKiiP® 2 System)
- IEC 60068-1 (climate) 40/125/56
- UL recognized file no. E63532

1) with assembly of suitable MKP capacitor per terminal

| Absolute Maximum Ratings |                                                     | $T_s = 25\text{ °C}$ 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                 |
| $I_C$                    | $T_s = 25\text{ (70) °C}$                           | 300 (225)                                       | A                 |
| <b>Inverse diode</b>     |                                                     |                                                 |                   |
| $I_F = -I_C$             | $T_s = 25\text{ (70) °C}$                           | 300 (225)                                       | A                 |
| $I_{FSM}$                | $T_j = 150\text{ °C}$ , $t_p = 10\text{ ms}$ ; sin. | 2160                                            | A                 |
| $I^2t$ (Diode)           | Diode, $T_j = 150\text{ °C}$ , 10 ms                | 23                                              | kA <sup>2</sup> s |
| $T_j, (T_{stg})$         | AC, 1 min. (mainterminals to heat sink)             | - 40 (- 25) ... + 150 (125)                     | °C                |
| $V_{isol}$               |                                                     | 3000                                            | V                 |

| Characteristics                                                                                       |                                                                                             | T <sub>s</sub> = 25 °C unless otherwise specified |                      |           |       |
|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------|----------------------|-----------|-------|
| Symbol                                                                                                | Conditions                                                                                  | min.                                              | typ.                 | max.      | Units |
| IGBT                                                                                                  |                                                                                             |                                                   |                      |           |       |
| V <sub>CEsat</sub>                                                                                    | I <sub>C</sub> = 250 A, T <sub>j</sub> = 25 (125) °C                                        |                                                   | 2,6 (3,1)            | 3,1       | V     |
| V <sub>CEO</sub>                                                                                      | T <sub>j</sub> = 25 (125) °C                                                                |                                                   | 1,2 (1,3)            | 1,5 (1,6) | V     |
| r <sub>CE</sub>                                                                                       | T <sub>j</sub> = 25 (125) °C                                                                |                                                   | 5,3 (7)              | 6,3 (8,1) | mΩ    |
| I <sub>CES</sub>                                                                                      | V <sub>GE</sub> = 0 V, V <sub>CE</sub> = V <sub>CES</sub> ,<br>T <sub>j</sub> = 25 (125) °C |                                                   | (15)                 | 0,4       | mA    |
| E <sub>on</sub> + E <sub>off</sub>                                                                    | I <sub>C</sub> = 250 A, V <sub>CC</sub> = 600 V                                             |                                                   |                      | 75        | mJ    |
|                                                                                                       | T <sub>j</sub> = 125 °C, V <sub>CC</sub> = 900 V                                            |                                                   |                      | 132       | mJ    |
| R <sub>CC' + EE'</sub>                                                                                | terminal chip, T <sub>j</sub> = 125 °C                                                      |                                                   | 0,5                  |           | mΩ    |
| L <sub>CE</sub>                                                                                       | top, bottom                                                                                 |                                                   | 15                   |           | nH    |
| C <sub>CHC</sub>                                                                                      | per phase, AC-side                                                                          |                                                   | 1,4                  |           | nF    |
| Inverse diode                                                                                         |                                                                                             |                                                   |                      |           |       |
| V <sub>F</sub> = V <sub>EC</sub>                                                                      | I <sub>F</sub> = 250 A, T <sub>j</sub> = 25 (125) °C                                        |                                                   | 2,1 (2)              | 2,6       | V     |
| V <sub>TO</sub>                                                                                       | T <sub>j</sub> = 25 (125) °C                                                                |                                                   | 1,3 (1)              | 1,4 (1,1) | V     |
| r <sub>T</sub>                                                                                        | T <sub>j</sub> = 25 (125) °C                                                                |                                                   | 3,3 (4)              | 4,5 (5,2) | mΩ    |
| E <sub>rr</sub>                                                                                       | I <sub>C</sub> = 250 A, V <sub>CC</sub> = 600 V                                             |                                                   |                      | 10        | mJ    |
|                                                                                                       | T <sub>j</sub> = 125 °C, V <sub>CC</sub> = 900 V                                            |                                                   |                      | 12        | mJ    |
| Mechanical data                                                                                       |                                                                                             |                                                   |                      |           |       |
| M <sub>dc</sub>                                                                                       | DC terminals, SI Units                                                                      | 6                                                 |                      | 8         | Nm    |
| M <sub>ac</sub>                                                                                       | AC terminals, SI Units                                                                      | 13                                                |                      | 15        | Nm    |
| w                                                                                                     | SKiiP® 2 System w/o heat sink                                                               |                                                   | 3,5                  |           | kg    |
| w                                                                                                     | heat sink                                                                                   |                                                   | 8,5                  |           | kg    |
| Thermal characteristics (P16 heat sink; 275 m <sup>3</sup> /h); " r " reference to temperature sensor |                                                                                             |                                                   |                      |           |       |
| R <sub>th(j-s)I</sub>                                                                                 | per IGBT                                                                                    |                                                   |                      | 0,09      | K/W   |
| R <sub>th(j-s)D</sub>                                                                                 | per diode                                                                                   |                                                   |                      | 0,25      | K/W   |
| R <sub>th(s-a)</sub>                                                                                  | per module                                                                                  |                                                   |                      | 0,036     | K/W   |
| Z <sub>th</sub>                                                                                       | R <sub>i</sub> (mK/W) (max. values)                                                         |                                                   | tau <sub>i</sub> (s) |           |       |
|                                                                                                       | 1                                                                                           | 2                                                 | 3                    | 4         |       |
| Z <sub>th(j-r)I</sub>                                                                                 | 10                                                                                          | 69                                                | 11                   | 0         | 1     |
| Z <sub>th(j-r)D</sub>                                                                                 | 28                                                                                          | 193                                               | 30                   | 0         | 1     |
| Z <sub>th(r-a)</sub>                                                                                  | 1,7                                                                                         | 24                                                | 7,6                  | 2,6       | 0,03  |



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\* 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 342GDL120-4DU



SKiiP® 2

## 7-pack - integrated intelligent Power System

### 7-pack

### integrated gate driver - 3 phase bridge

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### Gate driver features

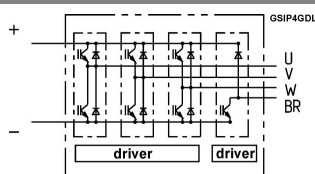
- CMOS compatible inputs
- Wide range power supply
- Integrated circuitry to sense phase current, heat sink temperature and DC-bus voltage (option)
- Short circuit protection
- Over current protection
- Over voltage protection (option)
- Power supply protected against under voltage
- Interlock of top/bottom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

| Absolute Maximum Ratings |                                       | $T_a = 25\text{ °C}$ unless otherwise specified |                    |
|--------------------------|---------------------------------------|-------------------------------------------------|--------------------|
| 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/ $\mu$ s        |
| $V_{isolIO}$             | input / output (AC, r.m.s., 2s )      | 3000                                            | Vac                |
| $V_{isol12}$             | output 1 / output 2 (AC, r.m.s., 2s ) | 1500                                            | Vac                |
| $f_{sw}$                 | switching frequency                   | 20                                              | kHz                |
| $f_{out}$                | output frequency for $I = I_C$ ; sin. | 1                                               | kHz                |
| $T_{op} (T_{stg})$       | operating / storage temperature       | $-40 \dots +85$                                 | $^{\circ}\text{C}$ |

| Characteristics        |                                                                                            | (T <sub>a</sub> = 25 °C)                             |      |      |       |
|------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------|------|------|-------|
| Symbol                 | Conditions                                                                                 | min.                                                 | typ. | max. | Units |
| V <sub>S1</sub>        | supply voltage stabilized                                                                  | 14,4                                                 | 15   | 15,6 | V     |
| V <sub>S2</sub>        | supply voltage non stabilized                                                              | 20                                                   | 24   | 30   | V     |
| I <sub>S1</sub>        | V <sub>S1</sub> = 15 V                                                                     | 410+550*f/f <sub>max</sub> +3,6*(I <sub>AC</sub> /A) |      |      | mA    |
| I <sub>S2</sub>        | V <sub>S2</sub> = 24 V                                                                     | 300+390*f/f <sub>max</sub> +2,6*(I <sub>AC</sub> /A) |      |      | mA    |
| V <sub>IT+</sub>       | input threshold voltage (High)                                                             | 12,3                                                 |      |      | V     |
| V <sub>IT-</sub>       | input threshold voltage (Low)                                                              | 4,6                                                  |      |      | V     |
| R <sub>IN</sub>        | input resistance                                                                           | 10                                                   |      |      | kΩ    |
| t <sub>d(on)IO</sub>   | input-output turn-on propagation time                                                      | 1,5                                                  |      |      | μs    |
| t <sub>d(off)IO</sub>  | input-output turn-off propagation time                                                     | 1,4                                                  |      |      | μs    |
| t <sub>pERRRESET</sub> | error memory reset time                                                                    | 9                                                    | μs   |      |       |
| t <sub>TD</sub>        | top / bottom switch : interlock time                                                       | 2,3                                                  |      |      | μs    |
| I <sub>analogOUT</sub> | 8 V corresponds to max. current of 15 V supply voltage (available when supplied with 24 V) | 300                                                  |      |      | A     |
| I <sub>Vs1outmax</sub> | output current at pin 13/20/22/24/26                                                       | 50                                                   |      |      | mA    |
| I <sub>A0max</sub>     | output current at pin 13/20/22/24/26                                                       | 5                                                    |      |      | mA    |
| V <sub>0l</sub>        | logic low output voltage                                                                   | 0,6                                                  |      |      | V     |
| V <sub>0H</sub>        | logic high output voltage                                                                  | 30                                                   |      |      | V     |
| I <sub>TRIPSC</sub>    | over current trip level (I <sub>analog OUT</sub> = 10 V)                                   | 375                                                  |      |      | A     |
| I <sub>TRIPLG</sub>    | ground fault protection                                                                    | 87                                                   |      |      | A     |
| T <sub>tp</sub>        | over temperature protection                                                                | 110                                                  | 120  |      | °C    |
| U <sub>DCTRIP</sub>    | trip level of U <sub>DC</sub> -protection ( U <sub>analog OUT</sub> = 9 V); (option)       | 900                                                  |      |      | V     |

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