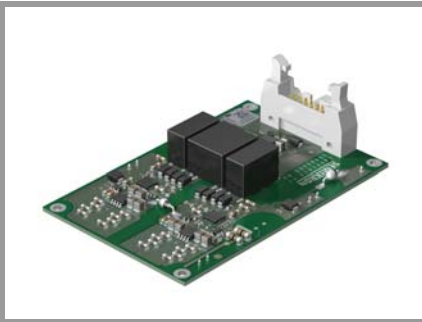


SKYPER 12 press-fit 600A 1700V



SKYPER®

Plug & Play Driver Board for SEMiX603GB17E4p

Order Number
L5066605 – Driver
27895400 – Module

SKYPER 12 press-fit 600A 1700V

Features*

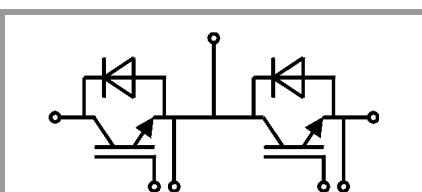
- Dynamic short circuit detection with SoftOff
- Undervoltage lockout on primary side and secondary side
- Internal power supply
- ROHS, UL recognized

Typical Applications

- Solar inverters
- Power supplies
- Motor drives

Remarks

- All data refer to $T_{op} = +25^{\circ}\text{C}$ and $V_S = V_{S(typ)}$ unless otherwise specified
- Environmental conditions please see technical explanation

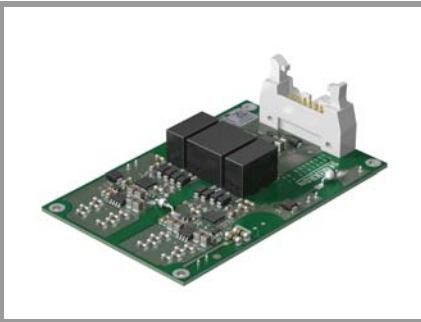


Two channel driver

| Absolute Maximum Ratings | | | |
|--------------------------|--|--------------------|--------------------|
| Symbol | Conditions | Values | Unit |
| V_S | Supply voltage primary side | 15.7 | V |
| V_{IH} | Input signal voltage (HIGH) | $V_S + 0.4$ | V |
| V_{IL} | Input signal voltage (LOW) | $\text{GND} - 0.4$ | V |
| f_{max} | Maximum switching frequency ¹⁾ | 10 | kHz |
| V_{CE} | Collector emitter voltage ²⁾ | 1700 | V |
| V_{DC} | DC-Link voltage ³⁾ | 1200 | V |
| dv/dt | Rate of rise and fall of voltage secondary to primary side | 50 | kV/ μs |
| V_{isol} | Insulation test voltage ⁴⁾ | 4000 | V |
| T_{op} | Operating temperature | -40 ... 85 | $^{\circ}\text{C}$ |
| T_{stg} | Storage temperature | -40 ... 85 | $^{\circ}\text{C}$ |

| Characteristics | | | | | |
|------------------|---|------|------------|------|---------------|
| Symbol | Conditions | min. | typ. | max. | Unit |
| V_S | Supply voltage primary side | 14.4 | 15 | 15.6 | V |
| $V_{UVLO(prim)}$ | Undervoltage lockout primary side | 12.2 | | 13.9 | V |
| $V_{UVLO(secP)}$ | Undervoltage lockout secondary side, positive voltage | 9.4 | | | V |
| $V_{UVLO(secN)}$ | Undervoltage lockout secondary side, negative voltage | -5.8 | | -4.1 | V |
| $I_{S(idle)}$ | Supply current primary side (no load) | | 120 | | mA |
| $I_{S(max)}$ | Supply current primary side (full load) | | | 450 | mA |
| V_I | Input signal voltage on/off | | $V_S/0$ | | V |
| $R_{IN(sw)}$ | Input resistance (switching signals) | | 33 | | k Ω |
| $C_{IN(sw)}$ | Input capacitance (switching signals) | | 1 | | nF |
| $V_{G(on)}$ | Turn-on output voltage | | 15 | | V |
| $V_{G(off)}$ | Turn-off output voltage | | -11.3 | | V |
| $t_{d(on)}$ | Turn-on propagation delay time | | 1 | | μs |
| $t_{d(off)}$ | Turn-off propagation delay time | | 1 | | μs |
| $R_{IN(err)}$ | Input resistance (error input) | | 150 | | k Ω |
| $C_{IN(err)}$ | Input capacitance (error input) | | 10 | | nF |
| $t_{d(err)}$ | Error propagation delay time ⁵⁾ | | 0.6 | | μs |
| $t_{d(err,ext)}$ | External error propagation delay time ⁶⁾ | | 0.6 | | μs |
| t_{IDT} | Interlock dead time ⁷⁾ | | 2 | | μs |
| t_{jitter} | Signal transfer time deviation ⁸⁾ | | ± 12.5 | | ns |
| t_{SPS} | Short pulse suppression | | 0.395 | | μs |
| t_{POR} | Power-on reset time | | 0.15 | | s |
| t_{reset} | Error reset time ⁹⁾ | 0.03 | | | ms |
| $V_{CE(ref)}$ | Reference voltage for V_{CE} -monitoring ¹⁰⁾ | | 8.2 | | V |
| $t_{bl(VCE)}$ | Blanking time V_{CE} -monitoring ¹¹⁾ | | 5.4 | | μs |
| R_{OTLO} | Over temperature lockout ¹²⁾ | | 243 | | Ω |
| $R_{G(on)}$ | Populated gate resistor for turn-on | | 2.27 | | Ω |
| $R_{G(off)}$ | Populated gate resistor for turn-off | | 0.5 | | Ω |
| $l_{clear(PS)}$ | Shortest distance in air, primary side to secondary side | 12.2 | | | mm |
| $l_{clear(SS)}$ | Shortest distance in air, secondary sides | 6.1 | | | mm |
| $l_{clear(TS)}$ | Shortest distance in air, temperature sensor pads to secondary side | 3.1 | | | mm |
| $l_{clear(TP)}$ | Shortest distance in air, temperature sensor pads to primary side | 12.2 | | | mm |

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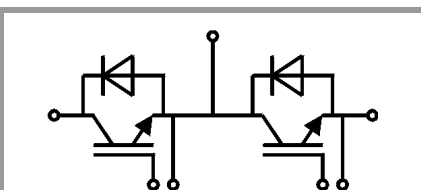
Typical Applications

- Solar inverters
- Power supplies
- Motor drives

Remarks

- All data refer to $T_{op} = +25^{\circ}\text{C}$ and $V_S = V_{S(typ)}$ unless otherwise specified
- Environmental conditions please see technical explanation

| Characteristics | | | | | |
|-----------------|---|------|------|------|-------------------|
| Symbol | Conditions | min. | typ. | max. | Unit |
| $I_{creep(PS)}$ | Shortest distance along the surface, primary side to secondary side (CTI \geq 175) | 12.2 | | | mm |
| $I_{creep(SS)}$ | Shortest distance along the surface, secondary sides (CTI \geq 175) | 6.1 | | | mm |
| $I_{creep(TS)}$ | Shortest distance along the surface, temperature sensor pads to secondary side (CTI \geq 175) | 6.1 | | | mm |
| $I_{creep(TP)}$ | Shortest distance along the surface, temperature sensor pads to primary side (CTI \geq 175) | 12.2 | | | mm |
| V_{PDPS} | Partial discharge extinction voltage, primary side to secondary side ¹³⁾ | 2107 | | | V |
| V_{PDTP} | Partial discharge extinction voltage, temperature sensor pads to primary side ¹³⁾ | 2107 | | | V |
| w | Weight | | 45 | | g |
| MTBF | Mean Time Between Failure ¹⁴⁾ | | 7.5 | | 10 ⁶ h |



Two channel driver

Footnotes

| Footnote | Description |
|----------|--|
| 1) | The rated maximum switching frequency is valid for an operating temperature up to 75°C. For operating temperatures above 75°C the limits are specified according to the graph 'Maximum Switching Frequency'. |
| 2) | Voltage class of semiconductor. |
| 3) | The DC-Link voltage is limited due to the specified safe operation area boundaries. |
| 4) | Test Conditions: ACrms, 2s, input to output |
| 5) | Time between the driver detects an error at the secondary side until the primary side reports an error at the interface. |
| 6) | Time between the driver receives an external error signal at the primary side until the driver turns off its outputs at the secondary side. |
| 7) | The interlock dead time prevents the two outputs from being activated simultaneously. The dead time generation starts with each turn-off command at the driver's primary side. |
| 8) | The jitter is defined as the maximum deviation of the switching signal propagation delay time at constant environmental conditions. |
| 9) | Minimum time of the driver in error state. |
| 10) | The driver detects a desaturation event, when one of its outputs is in on-state and the applied voltage at the corresponding V_{CE} -monitoring input exceeds the reference voltage for V_{CE} -monitoring. |
| 11) | Time elapsed when the driver starts the power semiconductor's turn-on process after the V_{CE} -monitoring input has fallen below the reference voltage for V_{CE} -monitoring. |
| 12) | The driver sets both outputs to $V_{G(off)}$, if the ohmic resistance of the applied temperature sensor is less than R_{OTLO} . For proper function of the temperature lockout a NTC temperature sensor has to be used. The temperature sensor of the SEMIKRON's SEMiX 3 press-fit modules has an ohmic resistance of R_{OTLO} at 130°C, typically. |
| 13) | The partial discharge extinction voltage in this data sheet is defined as peak voltage. |
| 14) | Conditions: $T_{op} = 40^{\circ}\text{C}$; full load |

Signal Connector

| PIN | Signal | Function | Specifications |
|--------|----------|---|--|
| X10:01 | reserved | | To be connected to ground |
| X10:02 | BOT_IN | Switching signal input (BOT) | 15V logic; 33k Ω /1nF (pull-down) LOW = BOT switch off HIGH = BOT switch on |
| X10:03 | nERR_OUT | Error output | Open collector output; max. 18V/15mA (external pull-up resistor needed) LOW = Error HIGH = No error |
| X10:04 | TOP_IN | Switching signal input (TOP) | 15V logic; 33k Ω /1nF (pull-down) LOW = TOP switch off HIGH = TOP switch on |
| X10:05 | nERR_IN | Error input | 15V logic inverted; 150k Ω /10nF (pull-up) LOW = External error HIGH = No external error |
| X10:06 | reserved | | To be connected to ground |
| X10:07 | reserved | | To be connected to ground |
| X10:08 | PWR_VS | Driver power supply | Stabilized +15V \pm 4% |
| X10:09 | PWR_VS | Driver power supply | Stabilized +15V \pm 4% |
| X10:10 | PWR_GND | Ground potential for power supply and digital inputs | To be connected to ground |
| X10:11 | PWR_GND | Ground potential for power supply and digital inputs | To be connected to ground |
| X10:12 | reserved | | To be connected to ground |
| X10:13 | reserved | | To be connected to ground |
| X10:14 | reserved | | To be connected to ground |

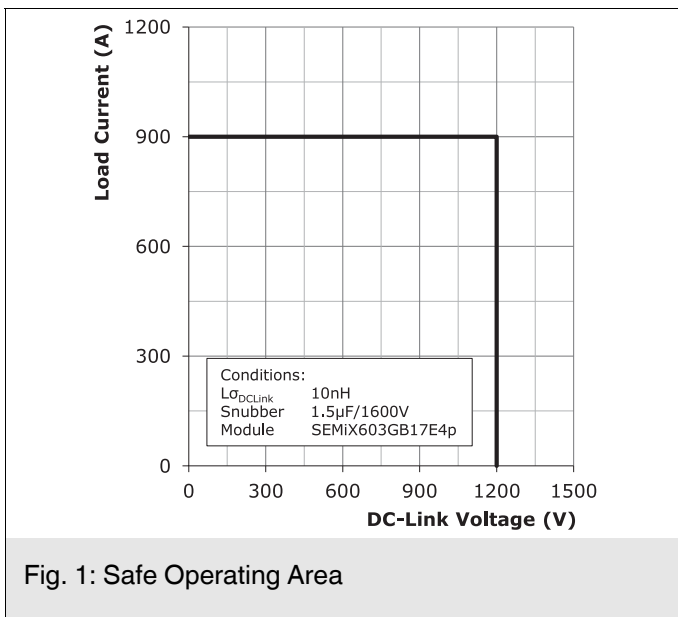


Fig. 1: Safe Operating Area

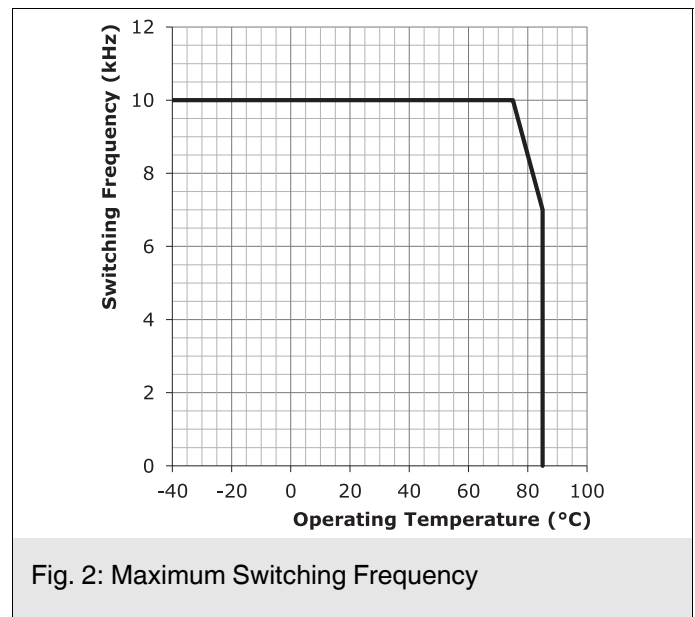


Fig. 2: Maximum Switching Frequency

This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

*IMPORTANT INFORMATION AND WARNINGS

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