

High-Voltage Insulated DC/DC Power Supply ISO3116I

for gate drivers for 4.5kV and 6.5kV IGBTs

The ISO3116I is a single-channel insulated DC/DC converter suitable as a power supply for IGBT drivers up to 6.5kV. Its output power of 3W enables switching frequencies up to 5kHz for 6.5kV/600A IGBTs. The ISO3116I complements the 1SD210F2 and 1SD312F2 SCALE high-voltage IGBT drivers.

For drivers adapted to various types of high-power and high-voltage IGBT modules, refer to www.IGBT-Driver.com/go/plug-and-play



Fig. 1 Power Supply ISO3116I

| Product Highlights | Applications |
|--|--|
| <ul style="list-style-type: none"> ✓ Electrical insulation up to 18kV_{AC} ✓ Creepage distance 63mm ✓ Output power 3W ✓ No electrolytic capacitors ✓ Extremely reliable; long service life ✓ Shortens application development time ✓ Outstanding coupling capacitance 3pF | <ul style="list-style-type: none"> ✓ Medium-voltage converters ✓ Industrial drives ✓ Traction ✓ Railroad power supplies ✓ Wind-power converters ✓ Radiology and laser technology ✓ Research |

Data Sheet

Dimensions

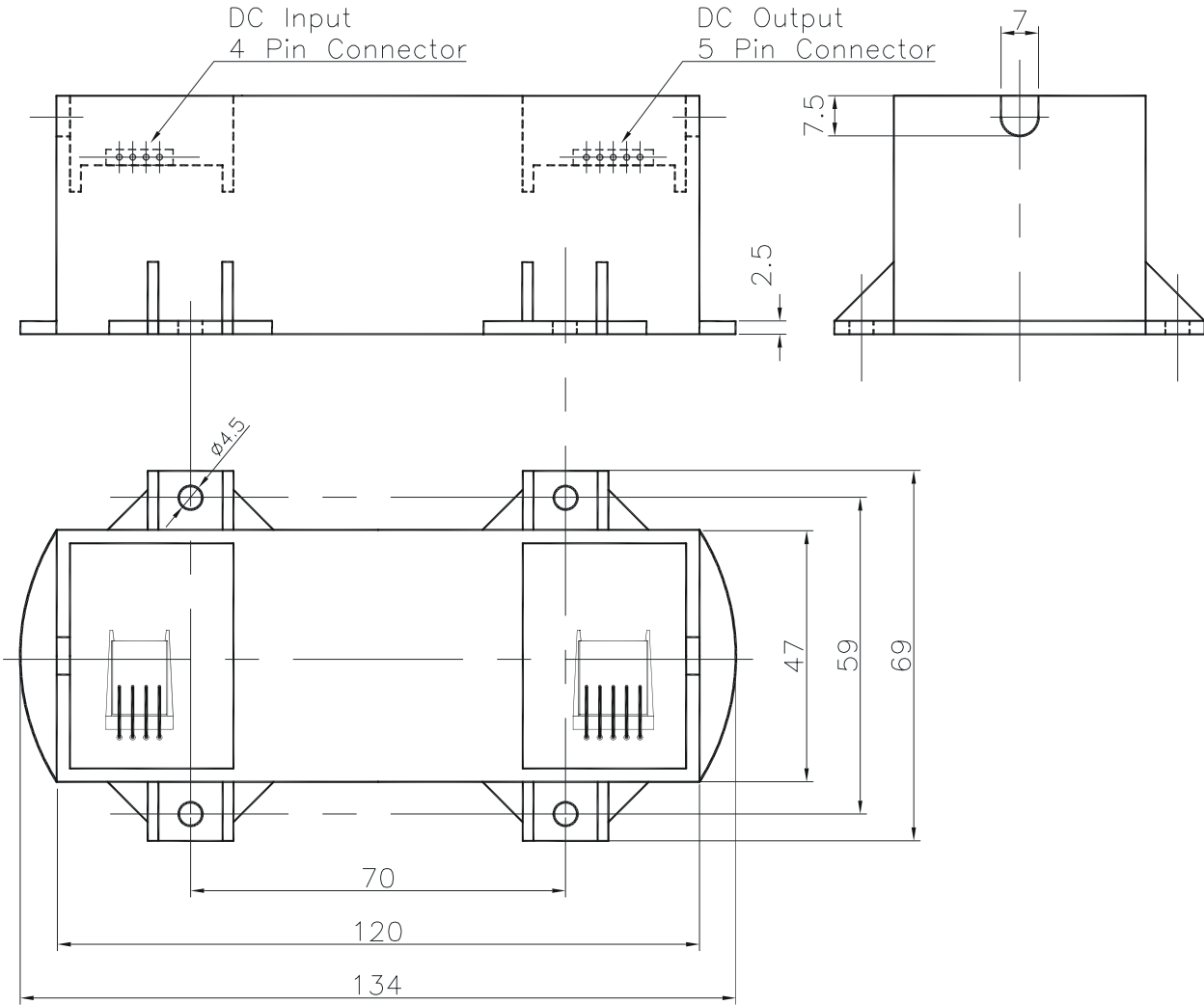


Fig. 2 Mechanical Drawing ISO3116I

Pin Designation

DC input (4-pin connector)

- 1 = GND-IN
- 2 = V_{IN} (+15V input, referred to GND-IN)
- 3 = V_{IN}
- 4 = GND-IN

DC output (5-pin connector)

- 1 = GND-OUT
- 2 = GND-OUT
- 3 = V_{OUT} (+16V output, referred to GND-OUT)
- 4 = GND-OUT
- 5 = GND-OUT

Notes: Pin 1 and designators IN and OUT are labeled on the PCB. The pin assignment allows the connectors to be flipped and daisy-chain cables to be used.

Manufacturer of the connectors

FCI (formerly Berg Electronics), Link: www.IGBT-Driver.com/go/fci

- DC-input female connector housing:
"FCI Basics" 4 pin; Part no. 65039-033
- DC-output female connector housing:
"FCI Basics" 5 pin; Part no. 65039-032
- Crimp contacts :
"Mini PV contact"; Part no. 48236-002
- Manual crimp tool:
HT 208

If you have problems finding a local supplier, CONCEPT will deliver all these parts. CONCEPT can also assemble cord sets according to the customer's specification.

Data Sheet

Absolute Maximum Ratings

| Parameter | Remarks | Min | Max | Units |
|-------------------------------------|------------------------------------|-----|------|-----------------------|
| Dielectric test voltage (50Hz/1min) | | | | |
| for ISO3116I-45 | | | 7.4 | kV _{AC(eff)} |
| for ISO3116I-65 | | | 10.2 | kV _{AC(eff)} |
| for ISO3116I-100 | | | 15.2 | kV _{AC(eff)} |
| for ISO3116I-120 | | | 18.0 | kV _{AC(eff)} |
| Input voltage | V _{IN} to GND-IN (Note 1) | 0 | 16 | V |
| Average output current | Note 3 | | 280 | mA |
| Output power | Notes 3,7 | | 4.5 | W |
| Operating temperature | Ambient (Note 7) | -40 | +85 | °C |
| Storage temperature | | -40 | +90 | °C |

Electrical Characteristics

All data refer to +25°C and an input voltage of 15V, unless otherwise specified.

| Input characteristics | Remarks | Min | Typ. | Max | Units |
|-----------------------|------------------------------------|------|------|------|-------|
| Nominal input voltage | V _{IN} to GND-IN (Note 1) | 14.0 | 15.0 | 15.5 | V |
| Input current | Without load (Note 9) | 30 | 45 | 120 | mA |
| Input current | Load 250mA (Note 6) | | 330 | 400 | mA |
| Turn-on threshold | Note 4 | | 11.5 | | V |
| Turn-off threshold | Note 4 | | 11.4 | | V |

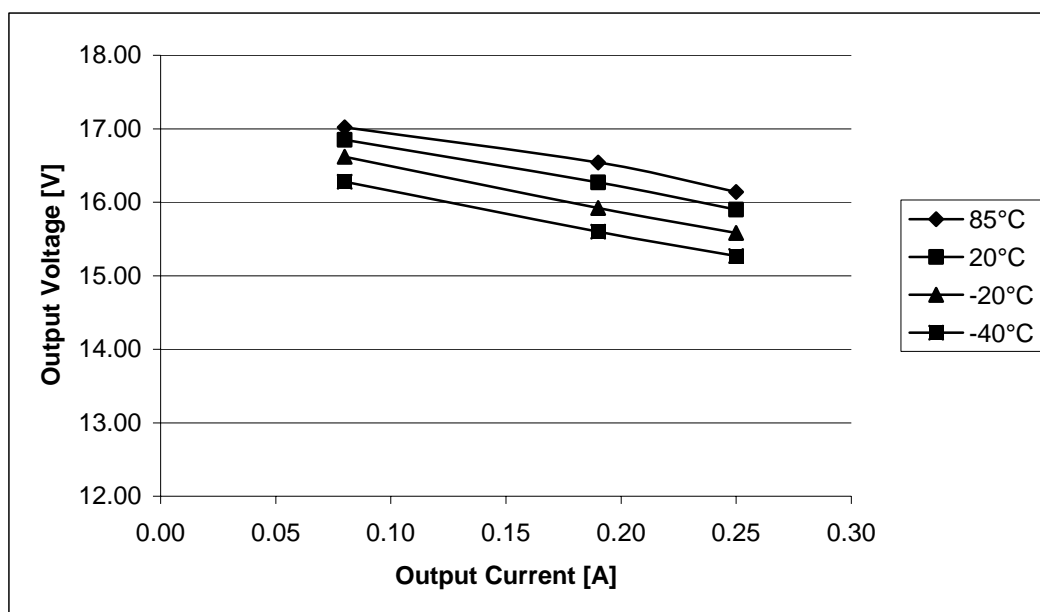
Overload protection

| | |
|-----------------|-----------|
| Not implemented | Notes 3,7 |
|-----------------|-----------|

| Output characteristics | Remarks | Min | Typ. | Max | Units |
|----------------------------|--|------|------|-----|-------|
| Output voltage | Load 160mA (Note 1) | 16.4 | | | V |
| Average output current | Note 3 | 190 | 250 | | mA |
| Output power | Notes 3,7 | 3 | 4 | | W |
| Static output resistance | Notes 1,3,8 | 5.5 | | | Ohm |
| Internal storage capacitor | At V _{OUT} | 23 | | | µF |
| External storage capacitor | At V _{OUT} , application-specific | | | 120 | µF |

| Electrical insulation | Remarks | Min | Typ. | Max | Units |
|-------------------------------------|--|-----|------|------|-----------------------|
| ISO3116I-45: | | | | | |
| Operating voltage | Note 5 | | | 4.5 | kV |
| Dielectric test voltage (50Hz/1min) | Note 10 | | | 7.4 | kV _{AC(eff)} |
| Partial discharge ext. voltage | IEC1287 / <10pC | 3.6 | | | kV _{AC(eff)} |
| ISO3116I-65: | | | | | |
| Operating voltage | Note 5 | | | 6.5 | kV |
| Dielectric test voltage (50Hz/1min) | Note 10 | | | 10.2 | kV _{AC(eff)} |
| Partial discharge ext. voltage | IEC1287 / <10pC | 5.1 | | | kV _{AC(eff)} |
| ISO3116I-100: | | | | | |
| Operating voltage | Note 5 | | | 10.0 | kV |
| Dielectric test voltage (50Hz/1min) | Note 10 | | | 15.2 | kV _{AC(eff)} |
| Partial discharge ext. voltage | IEC1287 / <10pC | 7.8 | | | kV _{AC(eff)} |
| ISO3116I-120: | | | | | |
| Operating voltage | Note 5 | | | 12.0 | kV |
| Dielectric test voltage (50Hz/1min) | Note 10 | | | 18.0 | kV _{AC(eff)} |
| Partial discharge ext. voltage | IEC1287 / <10pC | 9.4 | | | kV _{AC(eff)} |
| Creepage distance | Note 2 | 63 | | | mm |
| Coupling capacitance | Between V _{IN} and V _{OUT} | | 3 | | pF |

Output characteristics



Data Sheet

Footnotes to the key data

- 1) The output voltage is not regulated and tracks the input voltage. The typical output voltage is 16.4V for an input voltage of 15V and a load current of 160mA. Input voltages higher than those specified can lead to destruction of the DC/DC converter or the gate driver.
- 2) Distance between input and output or between input or output and the mounting plane.
- 3) Values are valid for the full operating temperature range. The output voltage decreases with increasing load current. The DC/DC converter is not protected against overload.
- 4) Under-voltage monitoring of the input voltage. For a voltage lower than this limit, the DC/DC converter is switched off.
- 5) Maximum continuous or repeatedly applied DC voltage or peak value of the repeatedly applied AC voltage between input and output or between input or output and the mounting plane.
- 6) Refers to the static case with a maximum load current (250mA). The input current increases with decreasing temperature. The maximum value refers to an operating temperature of -40°C.
- 7) Application-specific self-heating is approx. 5°C for a load current of 190mA (corresponds to 3W). Nevertheless, it is recommended to check the operating temperature within the system.
- 8) For an output current in the range of 80mA to 250mA. (For SCALE high-voltage IGBT drivers 1SD210F2 and 1SD312F2, the standby supply current is 80mA.)
- 9) Refers to the static case without load. The input current increases with decreasing temperature. The maximum value refers to an operating temperature of -40°C.
- 10) The dielectric test voltage may be applied only once during one minute. It should be noted that with this (strictly speaking obsolete) test method, some (minor) damage occurs to the insulation layers due to the partial discharge. Consequently, this test is not performed at CONCEPT as a series test. In the case of repeated insulation tests (e.g. module test, equipment test, system test), the subsequent tests should be performed with a lower test voltage: the test voltage is reduced by 10% for each additional test. The more modern if more elaborate partial-discharge measurement is better suited than such test methods as it is almost entirely non-destructive.

The Information Source

CONCEPT offers the widest selection of gate drivers for power MOSFETs and IGBTs for almost any application needs. The largest website on gate-drive circuitry anywhere contains all data sheets, application notes and manuals, technical information and support sections: www.IGBT-Driver.com

Customer-Specific Systems

CONCEPT develops and produces complete power equipment and systems according to the customer's specifications.

Consulting and Training

CONCEPT provides consulting and training services to customers on optimal procedures in power control, ideal circuit topologies as well as general do's and don'ts in the development of power electronics.

Technical Support

CONCEPT provides expert help with your questions and problems:

www.IGBT-Driver.com/go/support

Quality

The obligation to high quality is one of the central features laid down in the mission statement of CT-Concept Technology Ltd. The quality management system covers all stages of product development and production up to delivery. The drivers of the SCALE series are manufactured according to the ISO9001:2000 quality standard.

Disclaimer

This data sheet specifies devices but cannot promise to deliver any specific characteristics. No warranty or guarantee is given – either expressly or implicitly – regarding delivery, performance or suitability.

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Data Sheet

Ordering Information

The general terms and conditions of delivery of CT-Concept Technologie AG apply.

| IGBT voltage class | DC/DC converter type # |
|---------------------------|-------------------------------|
|---------------------------|-------------------------------|

| | |
|------------------|--------------|
| 4500V | ISO3116I-45 |
| 6500V | ISO3116I-65 |
| 6500V Multilevel | ISO3116I-100 |
| 6500V Multilevel | ISO3116I-120 |

Information about Other Products

For drivers adapted to high-voltage or high-power IGBT modules

Direct link: www.IGBT-Driver.com/go/plug-and-play

For other drivers and evaluation systems

Please click: www.IGBT-Driver.com

Manufacturer

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Power Integrations:

[ISO3116I-100](#) [ISO3116I-65](#) [ISO3116I-45](#) [ISO3116I-120](#)

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