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Data Sheet 2SD316EI-17

Dual-Channel Plug-and-play SCALE IGBT Driver for 1700V EconoDual Modules

A compact, plug-and-play, high-performance half-bridge driver

Abstract

The 2SD316EI-17 is a dual-channel driver based on CONCEPT's proprietary SCALE chipset, a proven technology for the reliable driving and safe operation of IGBTs.

The driver (with the corresponding basic board) is matched to 1700V EconoDual IGBT modules. Its plug-and-play capability makes it ready to operate immediately after mounting. The user needs invest no effort in designing or adjusting it to a specific application.

Product Highlights

- ✓ Plug-and-play solution
- ✓ IGBT short-circuit and overcurrent protection
- ✓ Active clamping of Vce at turn-off
- ✓ Suitable for 1700V IGBTs
- ✓ No electrolytic capacitors
- ✓ Gate current up to -6 A/+16 A
- ✓ 20-pin flat cable interface
- ✓ Monitoring of power supply voltage
- ✓ Duty cycle 0... 100%
- ✓ Extremely reliable; long service life
- ✓ Shortens application development time

Applications

- ✓ Three-phase inverters
- ✓ Motor drives
- ✓ UPS
- ✓ Power-factor correctors
- ✓ Wind-power converters
- ✓ Welding
- ✓ SMPS
- ✓ and many others

Data Sheet

Important: Please refer to the relevant manuals!

This data sheet contains only product-specific data. A detailed description, must-read application notes and general data applicable to this driver family are found in: "Description and Application Manual, Dual-Channel Driver 2SD316EI for the EconoDual Modules ".

Information specific to the relevant basic board can be found in the corresponding data sheet.

Dimensions

Dimensions: 62 x 100 mm.
Height including basic board: 21 mm (30 mm with connector X1 and flat cable).

Mounting principle: Mount onto EconoDual IGBT module with spacer bolts.

Absolute Maximum Ratings

Parameter	Remarks	Min	Max	Units
Supply voltage V_{DC}	VDC to GND (Note 1)	0	16	V
Supply voltage V_{DD}	VDD to GND	0	16	V
Logic input voltage	To GND	0	V_{DD}	V
Gate peak current I_{out}	Note 7	-6	+16	A
Average supply current I_{DC}	Notes 2,3		480	mA
Output power per gate	Note 3		3	W
Switching frequency	Notes 3,5		100	kHz
Operating temperature	Note 3	-40	+85	°C
Storage temperature		-40	+90	°C

All data refer to +25°C and V_{DC} = 15 V unless otherwise specified

Electrical Characteristics

Power supply	Remarks	Min	Typ.	Max	Units
Nominal supply voltage V_{DC}	To GND (Note 1)		15		V_{dc}
Supply current I_{DC}	Without load		72		mA
Max. supply current I_{DC}	Notes 2,3			480	mA
Output power DC/DC converter	Both channels (Note 3)			6	W
Efficiency η	Internal DC/DC converter		85		%
Nominal supply voltage V_{DD}	To GND		15		V_{dc}
Supply current I_{DD}	Without load		17		mA
Supply current I_{DD}	At 25 kHz switching frequency		19		mA

Power supply monitoring	Test conditions	Min	Typ.	Max	Units
Turn-on threshold V_{th}	Note 4		10.6		V_{dc}
Hysteresis on/off	Note 4		0.6		V_{dc}

Logic inputs	Test conditions	Min	Typ.	Max	Units
Input voltage	All inputs	0		V_{DD}	V_{dc}

Timing characteristics	Test conditions	Min	Typ.	Max	Units
Delay time input to output	Turn-on $t_{pd(on)}$		360		ns
	Turn-off $t_{pd(off)}$		410		ns
Blocking time	After failure (Note 8)		1		s
Dead time	Half-bridge mode		1.5		µs

Outputs	Test conditions	Min	Typ.	Max	Units
Output current I_G	Gx to Ex (Note 7)	-6		+16	A
Output rise time $t_{r(out)}$	Gx to Ex (Note 6)		100/160		ns
Output fall time $t_{f(out)}$	Gx to Ex (Note 6)		80/130		ns
Output current SOx		1.5			mA
Output voltage rating SOx	SOx to GND			V_{DD}	V

Vce monitoring	Test conditions	Min	Typ.	Max	Units
Inputs Cx	To Ex	0		12	V_{dc}

Data Sheet

Electrical insulation	Test conditions	Min	Typ.	Max	Units
Test voltage	50 Hz/1 min (Note 11)			4000	$V_{AC(eff)}$
Partial discharge extinction volt.	IEC270 (Note 10)		>1700		$V_{AC(pk)}$
Creep path input-output			20		mm
Creep path output-output			20		mm
Maximum dV/dt at dV =1000 V	Note 9	100			kV/µs

All data refer to +25°C and V_{DC} = 15 V unless otherwise specified

Footnotes to the key data

1) The basic boards have a zener diode on each channel for over-voltage protection. When the feed voltage exceeds 16 V, this protection may be exposed to thermal overload.
2) If the specified power consumption is exceeded, this indicates an overload of the DC/DC converter. It should be noted that these DC/DC converters are not protected against overload.
3) Application-specific self-heating of gate drivers and IGBT modules, especially at high switching frequency, must be taken into account. As a rule, the switching frequency is limited due to the switching losses of the IGBT modules. Because CONCEPT cannot predict how the drivers will be incorporated in the user's application, no binding recommended value for self-heating and thus for the maximum useable output power can be made. Users are therefore recommended to check the gate driver's ambient temperature within the system.
4) Under-voltage monitoring of the supply voltage to the gate driver. If the voltage drops below this limit, the power modules are switched off.
5) The driver can operate at switching frequencies up to 100 kHz. However, the switching frequency is usually limited by the available power of the built-in DC/DC converter. The applicable power depends upon the particular EconoDual IGBT module. See the data sheet of the relevant basic board.
6) First value: At a load of 39 nF in series with 5.6 Ohms. Second value: At a load of 250 nF in series with 1.8 Ohms. The delay refers to the direct output of the gate drive unit (excluding the delay of the gate resistors).
7) The gate current is limited by the gate resistors located on the basic board.
8) The typical blocking time after an error is 1 second. Versions with other blocking times may also be supplied if required.
9) This specification guarantees that the drive information will be transferred reliably even at a high DC-link voltage and with ultra-fast switching operations.
10) The partial discharge is not measured for the standard types. Tested and selected types with guaranteed partial-discharge immunity can be supplied for applications with maximum requirements and higher operating voltages (such as railroad applications).
11) The test voltage of 4000 $V_{ac(rms)}$/50 Hz 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 400 V for each additional test. The more modern if more elaborate partial-discharge measurement is preferable to such test methods as it is almost entirely non-destructive.

Important Notice

The data contained in this product data sheet is intended exclusively for technically trained staff. Handling all high-voltage equipment involves risk to life. Strict compliance with the respective safety regulations is mandatory!

Any handling of electronic devices is subject to the general specifications for protecting electrostatic-sensitive devices according to international standard IEC 747-1, Chapter IX or European standard EN 100015 (i.e. the workplace, tools, etc. must comply with these standards). Otherwise, this product may be damaged.

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.

CT-Concept Technology AG reserves the right to make modifications to its technical data and product specifications at any time without prior notice. The general terms and conditions of delivery of CT-Concept Technology AG apply.

Technical Support

CONCEPT provides expert help for your questions and problems:

Internet: 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 AG. The quality management system covers all stages of product development and production up to delivery. The drivers of the SCALE series are manufactured to the ISO 9001 standard.

Data Sheet

Ordering Information

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

Related IGBT	CONCEPT Driver Type #
1700V EconoDual IGBTs	2SD316EI-17

Connection	CONCEPT Modular Cable Type #
2SD316EI-17 to DB01-xxx (all types)	MIC01A (2 items per driver)

Related IGBT	CONCEPT Basic Board Type #

See current list on www.IGBT-Driver.com/go/EconoDual

Information about Other Products

For drivers adapted to other 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

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