

Data Sheet

SCALE High Voltage IGBT Driver 1SD418FI-FX800R33KF1

Plug-and-play ultra compact, high performance, single channel driver for two-level converters

Abstract

The SCALE HVI 1SD418FI-FX800R33KF1 is an ultra compact single-channel intelligent gate driver designed for EUPEC's high-voltage IGBTs type FD800R33KF1 and FZ800R33KF1. The driver features a fiber optic interface and a built-in DC/DC power supply.

For drivers adapted to other types of high-power and high-voltage IGBT modules refer to www.Igbt-Driver.com/HVI

Product Highlights

- ✓ Plug-and play solution
- ✓ Protects the IGBT from short-circuit failure
- ✓ Active Clamping of V_{ce} at turn-off
- ✓ Extremely reliable; long service life
- ✓ Gate current up to $\pm 18A$
- ✓ Electrical isolation 6000 V_{AC}
- ✓ Fiber-optic links
- ✓ Monitoring of supply voltage and fiber optics
- ✓ Switching frequency DC to max. 6kHz
- ✓ Duty cycle 0... 100%
- ✓ Build-in DC/DC power supply
- ✓ Shorten application's development time

Applications

- ✓ Two-level converters
- ✓ Medium-voltage converters
- ✓ Industrial drives
- ✓ Traction
- ✓ Railroad power supplies
- ✓ Wind-power converters
- ✓ Radiology and laser technology
- ✓ Research
- ✓ Almost all other conceivable

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Important: Please Refer to the Related Manuals!

This data sheet contains only product-specific data. For a detailed description, must-read application notes, and common data that apply to the whole series, please refer to "Description and Application Manual for 1SD418FI SCALE High Voltage IGBT Drivers".

Quality Standard

Manufacturing ISO9001 certified.

Mechanical and Electrical Interfaces

Dimensions: 183 x 38 (47) mm. Mounting Principle: Direct screw mount on IGBT.

Interface	Remarks	Part type #
Drive signal input	Fiber optic receiver (Notes 18, 20)	HFBR-2522
Status output	Fiber optic transmitter (Notes 18, 21)	HFBR-1522
Power supply connector	On board connector (Note 19)	77315-101-05

Power supply connector	Designator	Pin numbers
Ground	GND	1, 2, 4, 5
Supply Voltage	V_{DC}	3

Absolute Maximum Ratings

Parameter	Remarks	min	max	Unit
Supply voltage V_{DC}	VDC to GND (Note 1)	0	16	V
Gate peak current I_{out}	Note 8	-18	+18	A
Average supply current I_{DC}	Note 3		400	mA
Output power DC/DC converter	Notes 3, 13		4	W
Switching frequency	Note 13		6	kHz
Test voltage (50Hz/1min)	Primary to output (Note 17)		6000	$V_{AC}(eff)$
DC link voltage	Note 5		2200	V
Operating temperature	Note 13	-40	+85	°C
Storage temperature		-40	+90	°C

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Electrical Characteristics

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

Power supply	Remarks	min	typ	max	units
Nominal supply voltage V_{DC}	VDC to GND (Note 1)	14,5	15	15,5	V
Supply current I_{DC}	Without load (Note 2)		105		mA
Efficiency η	Internal DC/DC converter		85		%
Turn-on threshold V_{th}	Note 4		12.7		V
Hysteresis on-/off	Note 4		0.7		V
Coupling capacitance C_{io}	Primary to output		15		pF
Short-circuit protection	Remarks	min	typ	max	units
Vce-monitoring threshold	Between aux. terminals	50		60	V
Response time	Note 6		9	10	ms
Blocking time	Note 7		1		s
Timing characteristics	Remarks	min	typ	max	units
Turn-on delay $t_{pd(on)}$	Note 14		400		ns
Turn-off delay $t_{pd(off)}$	Note 14		550		ns
Output rise time $t_{r(out)}$	Note 9		100		ns
Output fall time $t_{f(out)}$	Note 9		100		ns
Delay time of status output	Note 16		450		ns
Acknowledge pulse width	At status output	0.7		1.8	ms
Gate Output	Remarks	min	typ	max	units
Turn-on gate resistor $R_{g(on)}$	Note 8		2.3		W
Turn-off gate resistor $R_{g(off)}$	Note 8		4.5		W
Aux. gate capacitor C_{ge}			220		nF
Electrical Isolation	Remarks	min	typ	max	units
Operating voltage (Note 10)	Continuous or repeated		3300		V
Test voltage (50Hz/1min)	Primary to output (Note 17)		6000		$V_{AC(eff)}$
Partial discharge extinction volt.	IEC1287 / <10pC	2600			$V_{AC(eff)}$
Creepage distance	Primary to output	20			mm

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Footnotes to the key data

- 1) Supply voltages higher than specified can lead to the destruction of the driver and protection circuits on the output side. The gate-emitter voltage tracks with the primary supply voltage. (Not regulated by the supply circuitry or by the gate drive unit.)
- 2) Static power consumption of the gate driver.
- 3) If the specified power consumption is exceeded at average, this indicates an overload of the DC/DC converter. The DC/DC converter is not protected against overload.
- 4) Under-voltage monitoring of power supply. For a voltage lower than that limit, the power modules are switched off. The voltage refers to the secondary supply voltage of the gate driver, which is approximately the same as the voltage between VDC and GND.
- 5) This limit is due to active clamping. Refer to "Description and Application Manual for 1SD418FI SCALE High Voltage IGBT Drivers".
- 6) Pulswidth of the direct output of the gate drive unit. (Not covering the delay of the gate resistors.)
- 7) Duration of blocking the command input (keeping the gate driver and the IGBT in off-state) after fault detection, i.e. short circuit detection or power supply undervoltage lock out.
- 8) The gate current is limited by on-board gate resistors.
- 9) Refers to the direct output of the gate drive unit. (Not covering the delay of the gate resistors.)
- 10) Maximum continuous or repeatedly-applied DC voltage or peak value of the repeatedly-applied AC voltage between the power supply inputs and all other terminals
- 13) Application-specific self-heating of gate drivers and IGBT modules, especially at high switching frequency, must be taken into account. Commonly, the switching frequency is limited due to 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. So, it is recommended to check the gate driver's ambient temperature within the system.
- 14) Including the delay of external fiber optic links. Measured from the transition of turn-on or turn-off command at the host controller side optical transmitter to direct output of the gate drive unit. (Not covering the delay of the gate resistors.)
- 16) Including the delay of external fiber optic links. Measured from the transition of turn-on or turn-off command at the host controller side optical transmitter to the transition of acknowledge signal at the host controller side optical receiver.
- 17) The 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 isolation layers due to the partial discharge. Consequently, this test is not performed at CONCEPT as a series test. In the case of repeated isolation 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.
- 18) The transceivers required at the host controller side are not delivered with the gate driver. It is recommended to use the same types as used in the gate driver. For product information refer to www.semiconductor.agilent.com
- 19) Customer-side connector is not delivered with the gate driver, but via FCI inc. Recommended crimp contact housing: order code 65039-032; recommended crimp contacts: 5 pcs, order code 48236-002. Refer to www.fciconnect.com
- 20) The recommended transmitter current at the host controller is 30-35mA, suitable for plastic optic fiber with a length of less than 2.5 meters. Higher current may increase jitter or delay at turn-off.
- 21) The transmitter current at the gate driver is 30-35mA.

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Exclusion Clause

CONCEPT 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 Ltd. apply.

Technical Support

CONCEPT offers you expert help for your questions and problems:

www.IGBT-Driver.com/support

E-Mail: Support@CT-Concept.com

Fax international +41 32 341 71 21

Quite Special: Customized SCALE HVI Drivers

If you need an IGBT driver that is not included in the delivery range, don't hesitate to contact CONCEPT or your CONCEPT sales partner.

CONCEPT engineers have more than 15 years experience in the development and manufacture of intelligent drivers for power MOSFETs and IGBTs and have already implemented a large number of customized solutions.

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Ordering Information

Related IGBT**CONCEPT Driver Type #**

EUPEC FD800R33KF1
EUPEC FZ800R33KF1

1SD418FI- FX800R33KF1
1SD418FI- FX800R33KF1

Information about Other Products

For drivers adapted to other high-voltage IGBT modules

Direct link: www.IGBT-Driver.com/HVI

Other drivers and evaluation boards

Please click: www.IGBT-Driver.com

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