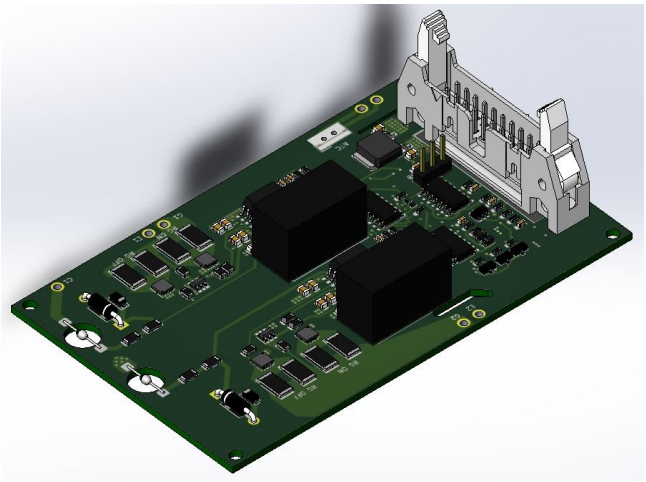


DI215-17-E-1 two-channel plug and play IGBT driver designed for IGBT-modules with a housing height of 17 mm and voltage up to 1700 V.

Typical application

- Converters for solar and wind energy
- Uninterruptible Power Supply (UPS)
- Electric transport
- Frequency converter
- Active rectifiers

Features

- Two chanel IGBT driver
- Drives IGBTs up to V_{CE} = 1700V
- Plug-and-Play solution
- Gate peak current I_{OUT} ±15 A
- Gate output voltage V_{OUT} +15/-9 V
- Selectable level of +15 V or +5 V control input signals
- Interlock protection in “half-bridge” mode
- Isolation testing voltage 4 kV AC
- Frequency PWM up to 15 kHz
- IGBT short-circuit protection with soft switch-off
- Power-supply monitoring (UVLO)
- Compact design 100x62x30.5 mm

Maximum rated values

Definition	Symbol	Conditions	Value	Unit
Supply voltage V_{CC}	V_{SUP}		15.5	V
Logic input voltage	$V_{IN\_A/B}$		15.5	V
Gate peak current	I_{OUT}		±15	A
Frequency PWM	f_{SW}	Gate charge Q_G = 5600 uC	15	kHz
Isolation voltage	V_{ISOL}	First to second side, 2 sec	4000	V rms
Output power	P_{OUT}	For 1 chanel	2	W
dV/dt	dV/dt	Rate of change of input to output voltage	50	kV/µs
DC-link voltage	V_{DC}		1100	V
Collector-Emitter voltage	V_{CE}		1700	V
Operating temperature	T_{OP}		-40..+85	°C
Storage temperature	T_{STOR}		-40..+85	°C

Characteristics

Definition	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Supply voltage V_{CC}	V_{SUP}		14.5	15	15.5	V
UVLO threshold	V_{UVLO}	Switch-off threshold 13.7 V Switch-on threshold 14.3 V	13.7		14.3	V
Supply current I_{CC}	$I_{s(idle)}$	Without load		80		mA
Average supply current	$I_{s(max)}$	f_{SW}= 15 kHz Q_G= 5600 µC		390		mA
Turn-on threshold	$V_{(on)}$	Amplitude of control signals 15 V	8.2			V
Turn-off threshold	$V_{(off)}$				6.4	V
Input resistance switching channels	$R_{IN(sw)}$			3		kΩ
Control channel input capacity	$C_{IN(sw)}$			100		pF
Turn-on delay	$t_{d(on)}$			250		ns
Turn-off delay	$t_{d(off)}$			250		ns
Dead time	t_{IDT}	Half-bridge mode		3.2		us
Input resistance F out A/B channels	$R_{IN\_F(A/B),}$			4.7		kΩ

Turn-on output voltage	$V_{G(on)}$			15		V
Turn-off output voltage	$V_{G(off)}$			-9		V
V_{CE} monitoring threshold	$V_{CE(ref)}$			8.2		V
Response time	$t_{bl(VCE)}$			8		us
Turn-on gate resistor	$R_{G(on)}$			1		Ω
Turn-off gate resistor	$R_{G(off)}$			1		Ω
Creepage distance primary to secondary side	$l_{clear(PS)}$			7.7		mm
Creepage distance secondary to secondary side	$l_{clear(SS)}$			5.8		mm
Weight	W			34.2		g

Operating mode of «F out»

The driver is in a working state if the output of the contact «F out» is logical 1 (+15). If the contact output contains F out logic 0 (0 V), the driver is in an error state for one or more of the following reasons:

1. Channel A is in error.
2. Channel B is in error.
3. Driver supply voltage below minimum (+13.7 V)

Operating mode of «F out A / B»

Output of channel A / B has logic “1” (+15 V) in normal state. If the output of the contact F out A / F out B has logic 0 (0 V), the driver is in an error state for one or more of the following reasons:

1. Reduced voltage of the secondary side of the channel A / B
2. The DESAT circuit has triggered (collector-emitter voltage is more than + 8V or is open circuit.)

Selects the level of the Signal A / B control input signals

To select the amplitude of the input control signals Signal A and Signal B, you must set jumper JP1 to 15 V or 5 V.

Operating mode of UVLO

If the V_{CC} supply voltage drops below +13.7 V, the driver will go into an error state and block the control. To exit the error state, the V_{CC} supply voltage must be raised to +14.5 V.

Mod select

Pin “Mod select” is used to select the operating mode of the driver. If “Mod select” is not connected, the “direct mode” is selected. This mode allows to control channels independently. The simultaneous inclusion of channels A and B are allowed.

If the “Mod select” is pulled to GND “Half-bridge” mode is selected — that is, the simultaneous switch-on of channel A and channel B are not allowed. A delay (dead time t_{IDT}) of 3.2 µs appears between channel state switching.

TB control lock operation mode

TB pin is a programmable pin and determines the blocking time of control inputs after an error occurs. When connecting the driver, you must connect this output to the GND driver. If the input is pulled to GND without a resistor, the delay will be minimal (300 µs *). To program the delay time, you must connect this pin through an external R_{TB} resistor. The resistance value for the required time can be calculated by the following formula:

$$TB = 300 + \left(\frac{R_{TB}}{5}\right)$$

TB - blocking delay time in microseconds.

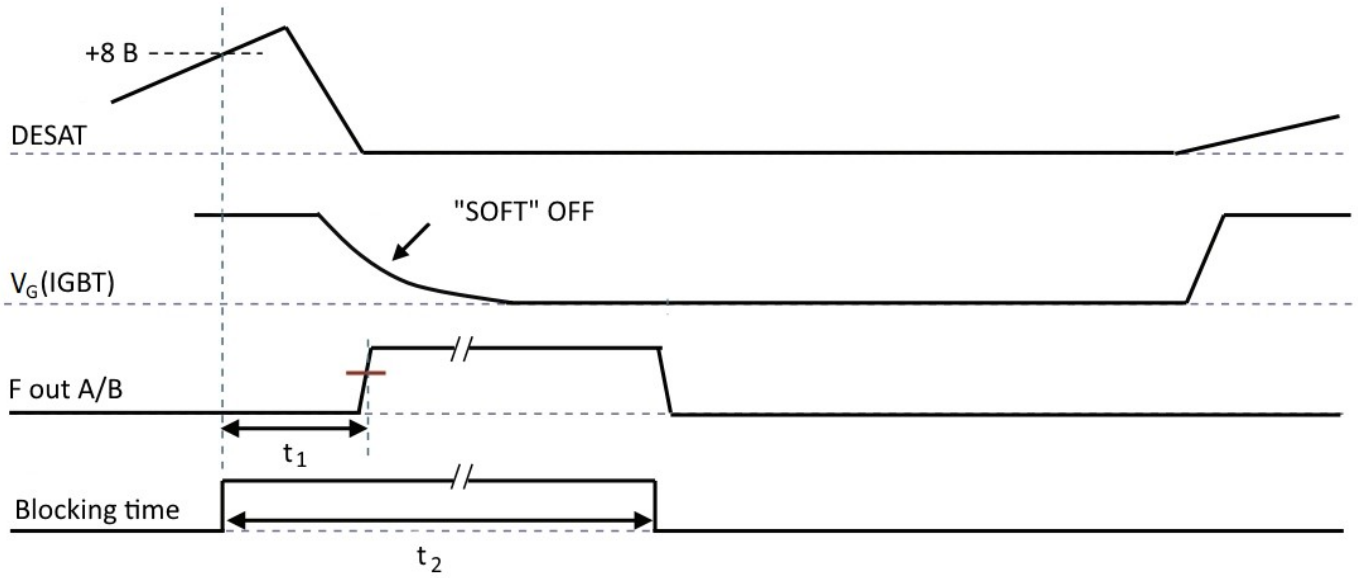
R_{TB} - resistance of the R_{TB} resistor in ohms.

If the output is not connected to the ground through a resistor or directly, the driver will not exit the error state after its elimination.

* - 300 µs in the event of an error due to a reduced supply voltage, in the event of a transition to an error state due to DESAT control triggering, the minimum blocking time will be 750 µs.

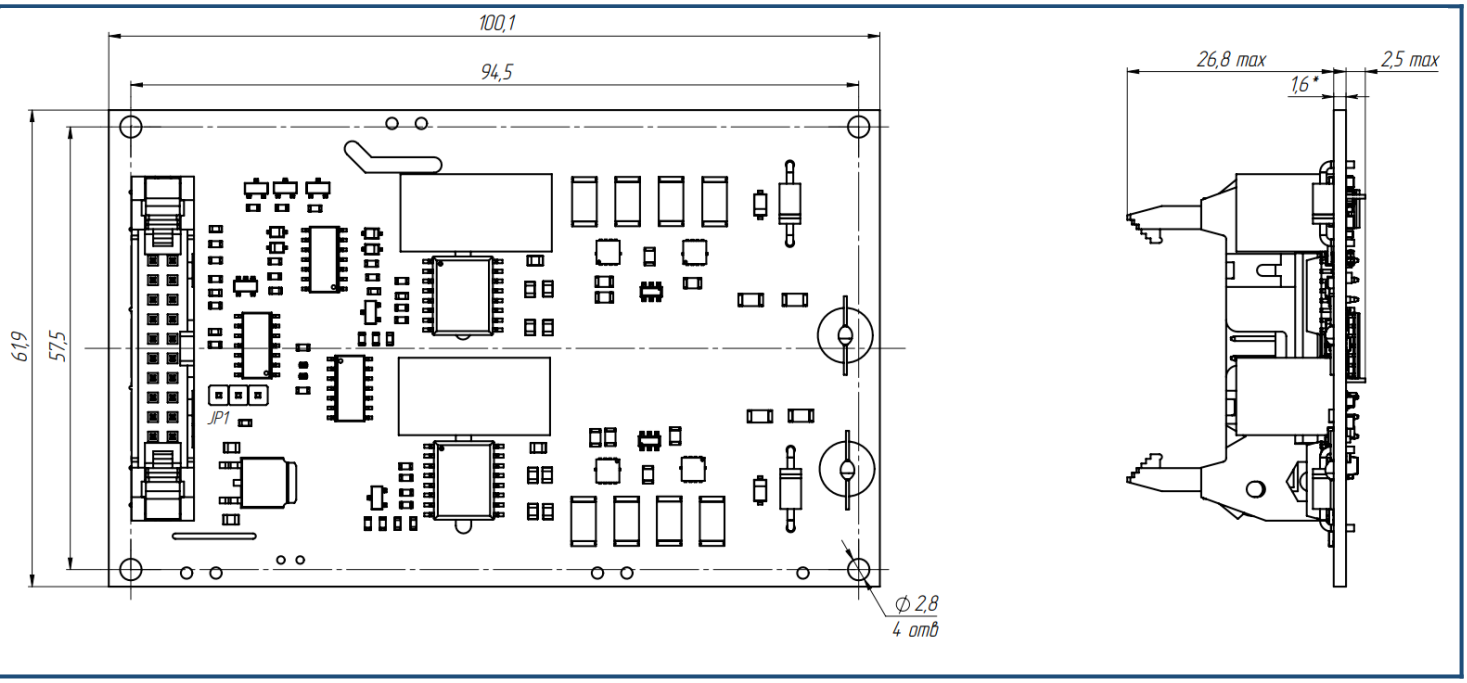
DESAT circuit mode

The DESAT circuit is a protective driver circuit that protects the IGBT module from high-amplitude currents. A circuit with a delay of 8 µs after the start of switching on the IGBT starts monitoring the voltage drop of the IGBT transistor between the collector-emitter terminals. If the voltage drop exceeds the value + 8V, the driver will turn off the IGBT module with a delay of 350 ns using the “soft” shutdown function with next blocking the input control signals. The outputs of the Fout A / B driver and F out will be put into an error state.

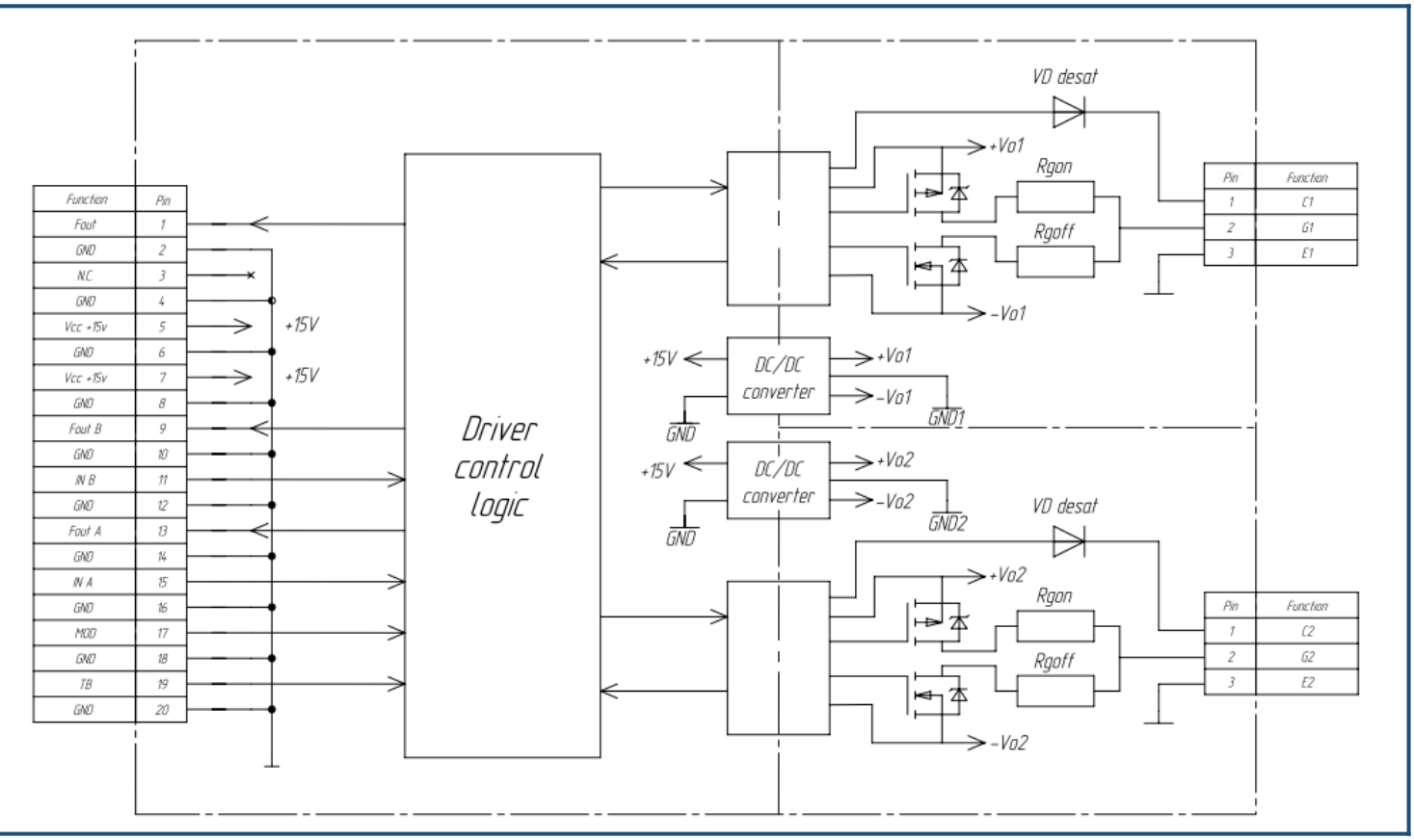


t1 – error enable delay time 500 ns
t2 – channel control lock time 1 ms

Overall dimensions



Functional diagram



Pin Designation (IDCC 20MS)

№ pin	Function	№ pin	Function
1	F out	2	GND
3	Not connected	4	GND
5	Vcc +15 B	6	GND
7	Vcc +15 B	8	GND
9	F out B	10	GND
11	IN B	12	GND
13	F out A	14	GND
15	IN A	16	GND
17	Mod select	18	GND
19	TB	20	GND

Part numbering guide

DI	2	15	-	17	-	E	-	1	
DI									IGBT driver
	2								Number of Output Channels
		15							Maximum pulse output current
				17					IGBT module class
						E			Electrical interface
								1	Version for IGBT modules type MIDA with control contacts for solder connection