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I2C Isolator 5 Click

PID: MIKROE-5725

I2C Isolator 5 Click is a compact add-on board that offers completely isolated bidirectional communication. This board features ISO1644, a hot-swappable bidirectional I2C isolator with enhanced EMC and GPIOs from Texas Instruments. The ISO1644 provides two bidirectional channels, supporting a completely isolated I2C interface that eliminates the need for splitting I2C signals into separate transmit and receive signals for use with standalone optocouplers. It supports data rates from DC up to 1.7MHz and has a hot swap circuitry to prevent data glitches. This Click board™ makes the perfect solution for transferring digital signals between circuits with different power domains at ambient temperatures.

How does it work?

I2C Isolator 5 Click is based on the ISO1644, a hot-swappable bidirectional I2C isolator with enhanced EMC and GPIOs from Texas Instruments. The ISO1644 bidirectionally buffers the two I2C signals across the isolation barrier while providing 5kVRMS of galvanic isolation. The isolation barrier consists of a double capacitive silicon dioxide and includes basic and reinforced insulation devices. In addition, the ISO1644 also integrates three unidirectional CMOS isolation channels with up to 50Mbps speed, which can be used for static GPIO signal isolation. It also integrates the logic required to support bidirectional channels.

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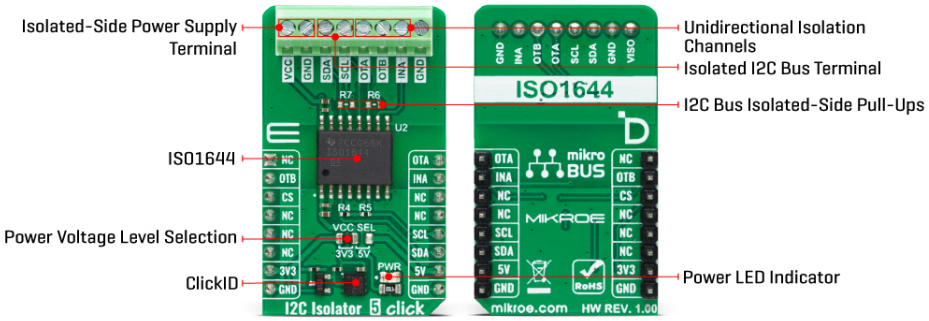

ISO1644 supports I2C 2-Wire bidirectional data transfer between a host device and several peripheral devices, where the host MCU controls the bus, specifically the serial clock (SCL) line. The data transfer can be made in standard, fast, fast-mode plus, and high-speed mode with speeds up to 3.4Mbps. As for three GPIO lines, the ISO1644 consists of two lines in one direction and one in the opposite direction. It could be used for any GPIO purpose.

This Click board™ poses a terminal with isolated SCL and SDA lines. Besides, the terminal consists of VCC and GND lines and OUTA, OUTB, and INA, labeling the direction of the lines. Those GPIO lines are connected to the mikroBUS™ socket, thus the host MCU, via OTA, OTB, and INA pins. You can pull up the isolated I2C lines via unpopulated R6 and R7 jumpers if that suit your needs.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. However, the Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used, as a reference, for further development.

Specifications

Type	I2C,Isolators
Applications	Can be used for transferring digital signals between circuits with different power domains at ambient temperatures
On-board modules	ISO1644 - a hot-swappable bidirectional I2C isolator with enhanced EMC and GPIOs from Texas Instruments
Key Features	Robust galvanic isolation of digital signals withstands 5kVRMS, low power consumption, supports four I2C speeds, three additional GPIO lines ideal for isolation and glitch-free operation, excellent reliability, long operational life, and more
Interface	GPIO,I2C
Feature	ClickID
Compatibility	mikroBUS™

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Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on I2C Isolator 5 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	**OTA**	Output A Channel
Output B Channel / ID SEL	**OTB**	2	RST	INT	15	**INT**	Input A Channel
Chip Select / ID COMM	**CS**	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	**SCL**	I2C Clock
	NC	6	MOSI	SDA	11	**SDA**	I2C Data
Power Supply	**3.3V**	7	3.3V	5V	10	**5V**	Power Supply
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Logic Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
R6	R6	Unpopulated	Isolated SCL Line Pull Up Resistor
R7	R7	Unpopulated	Isolated SDA Line Pull Up Resistor

I2C Isolator 5 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Maximum Withstand Isolation Voltage	-	-	5	kVRMS
Data Rate	-	-	1.7	Mbps

Software Support

We provide a library for the I2C Isolator 5 Click as well as a demo application (example), developed using MIKROE compilers. The demo can run on all the main MIKROE development boards.

Package can be downloaded/installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

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This library contains API for I2C Isolator 5 Click driver.

Key functions

- i2cisolator5_set_slave_address I2C Isolator 5 set I2C Slave address function.
- i2cisolator5_set_outa_state I2C Isolator 5 set output A state function.
- i2cisolator5_get_ina_state I2C Isolator 5 get input A state function.

Example Description

This library contains API for the I2C Isolator 5 click driver. This demo application shows an example of an I2C Isolator 5 click
wired to the VAV Press click for reading
differential pressure and temperature measurement.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.I2CIsolator5

Additional notes and informations

Depending on the development board you are using, you may need USB UART click, USB UART 2 Click or RS232 Click to connect to your PC, for development systems with no UART to USB interface available on the board. UART terminal is available in all MIKROE compilers.

mikroSDK

This Click board™ is supported with mikroSDK - MIKROE Software Development Kit, that needs to be downloaded from the LibStock and installed for the compiler you are using to ensure proper operation of mikroSDK compliant Click board™ demo applications.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

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Downloads

I2C Isolator 5 click example on Libstock

I2C Isolator 5 click 2D and 3D files v100

ISO1644 datasheet

I2C Isolator 5 click schematic v100