MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

SPI Isolator 8 Click

PID: MIKROE-5873

SPI Isolator 8 Click is a compact add-on board representing a digital isolator optimized for a serial peripheral interface. This board features the ISOW7743, a quad-channel digital isolator from Texas Instruments. This device has a maximum data rate of 100Mbps and transfers digital signals between circuits with different power domains featuring reinforced isolation for a withstand voltage rating of 5kVRMS for 60 seconds. This Click board™ makes the perfect solution for developing factory automation, motor control, grid infrastructure, medical equipment, test, measurement devices, and more.

SPI Isolator 8 Click is supported by a mikroSDK compliant library, which includes functions that simplify software development. This Click board™ comes as a fully tested product, ready to be used on a system equipped with the mikroBUS™ socket.

How does it work?

SPI Isolator 8 Click is based on the ISOW7743, a quad-channel digital isolator from Texas Instruments. The ISOW7743 is galvanically isolated and comes with an integrated high-efficiency DC-DC power converter with low emissions, which provides up to 550mW of isolated power. This way, the SPI Isolator 8 Click eliminates the need for a separate isolated power supply in space-constrained isolated designs. The integrated signal isolation channels employ an ON-OFF keying (OOK) modulation scheme to transmit data across a silicon-dioxide based isolation barrier. The transmitter sends a high-frequency carrier across the barrier to represent one state and sends no signal to represent the other state, while the receiver demodulates the signal after signal conditioning and produces the output through a buffer stage.

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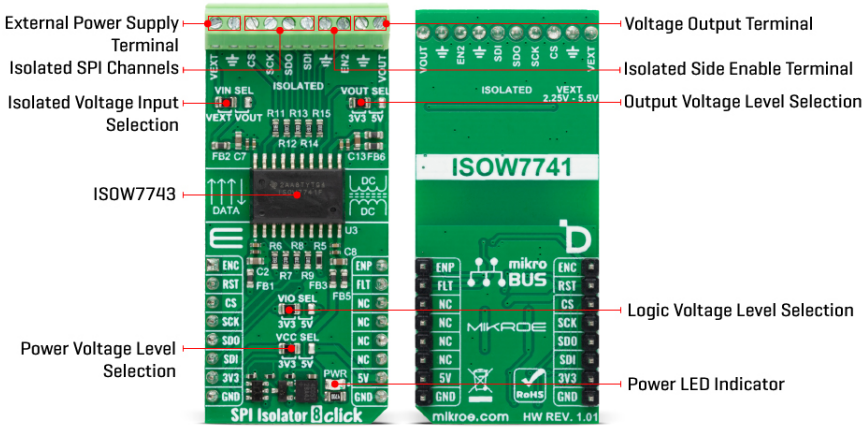

There are a few jumpers that allow you to use some of the isolator's features. The VIN SEL allows you to choose the supply voltage for isolation channels between the external and ISOW7743's converter output voltage. As external, you can use the voltages in a range of 2.25 – 5.5V. The VOUT SEL jumper allows you to choose the ISOW7743's converter output voltage level. You can connect the external SPI device over the screw terminal. Besides, you can also connect an external power supply over the VEXT screw terminal, and isolated SPI device enable logic over the EN2 terminal. Over the VOUT terminal, you can power the connected SPI device.

SPI Isolator 8 Click uses a standard 4-Wire SPI serial interface to establish communication between the host MCU and the connected SPI device that needs to be isolated. The isolator features a multifunctional power converter enable input pin, that also serves as a fault output pin. Obviously, you can not use both at the same time. Those functions are available on pins ENP and FLT of the mikroBUS™ socket. To enable the host MCU side of the SPI Isolator 8 Click, you can use the ENC pin with a HIGH logic state.

This Click board™ can operate with either 3.3V or 5V logic and power voltage levels selected via the VIO and VCC SEL jumpers. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this 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	Isolators,SPI
Applications	Can be used for the development of factory automation, motor control, grid infrastructure, medical equipment, test, and measurement devices, and more
On-board modules	ISOW7743 - quad-channel digital isolator from Texas Instruments
Key Features	Integrated DC-DC converter with low emissions, high-efficiency output power, and independent power supply for channel isolator and power converter, robust electromagnetic compatibility, enabling any of the isolator's sides, isolated side power source selection,

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	and more
Interface	SPI
ClickID	Yes
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on SPI Isolator 8 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
ISOW7741 Enable	NC	1	AN	PWM	16	**ENP**	DC-DC Converter Enable
Reset / ID SEL	NC	2	RST	INT	15	**FLT**	Fault Interrupt
SPI Chip Select / ID COMM	**CS**	3	CS	RX	14	NC	
SPI Clock	**SCK**	4	SCK	TX	13	NC	
SPI Data OUT	**SDO**	5	MISO	SCL	12	NC	
SPI Data IN	**SDI**	6	MOSI	SDA	11	NC	
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	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	VIO SEL	Left	Logic Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP3	VIN SEL	Left	Isolated Power Input Selection EXT/VOUT: Left position EXT, Right position VOUT
JP4	VOUT SEL	Left	Output Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

SPI Isolator 8 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Supply Voltage	2.25	-	5.5	V

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Data Rate	-	-	100	Mbps

Software Support

We provide a library for the SPI Isolator 8 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

This library contains API for SPI Isolator 8 Click driver.

Key functions

- spiisolator8_transfer SPI Isolator 8 data transfer function.
- spiisolator8_enc_enable SPI Isolator 8 enable side 1 function.
- spiisolator8_enp_enable SPI Isolator 8 enable side 2 function.

Example Description

This example demonstrates the use of SPI Isolator 8 Click board™ by reading the manufacturer ID and device ID of the connected Flash 11 Click board™.

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.SPIIsolator8

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. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the LibStock and installed for the compiler you are using.

For more information about mikroSDK, visit the official page.

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Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

SPI Isolator 8 click example on Libstock

SPI Isolator 8 click 2D and 3D files

ISOW7741 datasheet

SPI Isolator 8 click schematic

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