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SPI Isolator 5 Click





PID: MIKROE-5179

SPI Isolator 5 Click is a compact add-on board with a digital isolator optimized for a serial peripheral interface. This board features the DCL541A01, a high-speed quad-channel digital isolator from Toshiba Semiconductor. Outstanding performance characteristics of the DCL541A01 are achieved by Toshiba CMOS technology and the magnetic coupling structure. In addition, they comply with UL 1577 safety-related certification, have a withstand voltage rating of 5kVrms, and operate with the external supply voltage ranging from 2.25V to 5.5V, providing compatibility with lower voltage systems enabling voltage translation functionality across the isolation barrier. This Click board™ is suitable for general SPI-bus isolation, industrial automation systems, motor control, inverter, and many other applications.

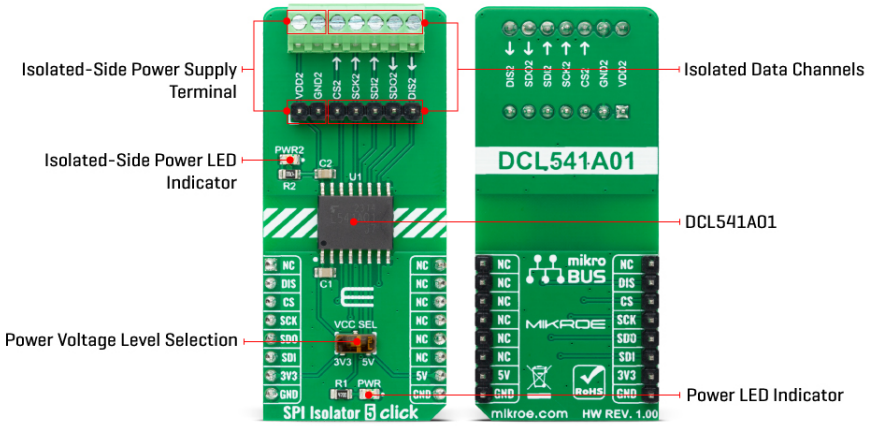
SPI Isolator 5 Click is supported by a mikroSDK compliant library, which includes functions that simplify software development. This Click board™ comes as a fully tested product, ready to be used on a system equipped with the mikroBUS™ socket.

How does it work?

SPI Isolator 5 Click is based on the DCL541A01, a high-speed quad-channel digital isolator from Toshiba Semiconductor. The DCL541A01 stands out with its exceptional performance capabilities, made possible by leveraging Toshiba's advanced CMOS technology and a magnetic coupling structure. Not only does it meet the stringent safety standards of UL 1577 certification, but it also boasts an impressive withstand voltage rating of 5kVrms. Furthermore, its operating range spans from 2.25V to 5.5V, enabling seamless integration with lower voltage systems and facilitating voltage translation functionality across isolation barriers. With its versatility, this Click board™ is well-suited for various applications, including industrial automation systems, motor control, inverters, and more.

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ISO 27001: 2013 certification of informational security management system.
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SPI Isolator 5 Click communicates with an MCU using the SPI serial interface with a maximum data rate of 150Mbps. The isolated lines are divided into two groups with the same lines. The first group comes in the form of 5 screw terminals, while the second forms a classic male 5-header row for easier jumper wire usage. Both groups of connectors have the same functions. You can distinguish the power VDD2 and GND2 lines from the data lines, which are CS2, SCK2, SDI2, SDO2, and DIS2. The DIS and DIS2 pins have the same function: to disable the lines from the side of the isolator on which they are located. By setting the DIS pin to a high logic level, the input signals are disabled, and by setting it to a low logic level, they are enabled. The isolator can work with external supply voltages from 2.25V up to 5.5V, and the existence of an external power supply is easily visible using the PWR2 LED indicator.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL switch. 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	Isolators,SPI
Applications	Can be used for general SPI-bus isolation, industrial automation systems, motor control, inverter, and more
On-board modules	DCL541A01 - quad-channel digital isolator from Toshiba Semiconductor
Key Features	High speed, data rate up to 150Mbps, wide supply range, UL1577 safety-related certification, high withstanding voltage, and more
Interface	SPI
ClickID	No
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V,External

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Pinout diagram

This table shows how the pinout on SPI 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	NC	
Signal Disable	**DIS**	2	RST	INT	15	NC	
SPI Chip Select	**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
LD1	PWR	-	Isolated-Side Power LED Indicator
JP1	VCC SEL	Left	Power/Logic Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

SPI Isolator 5 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Isolated-Side Supply Voltage VDD2	2.25	-	5.5	V
Maximum Withstand Isolation Voltage	-	5	-	kVrms
Data Rate	-	-	150	Mbps

Software Support

We provide a library for the SPI 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

This library contains API for SPI Isolator 5 Click driver.

Key functions

- spiisolator5_write SPI Isolator 5 data writing function.
- spiisolator5_read SPI Isolator 5 data reading function.

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- spiisolator5_transfer SPI Isolator 5 transfer function.

Example Description

This example demonstrates the use of SPI Isolator 5 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.SPIIsolator5

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.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

Downloads

SPI Isolator 5 click example on Libstock

SPI Isolator 5 click schematic

SPI Isolator 5 click 2D and 3D files

DCL541A01 datasheet

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