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DIGI Isolator Click

PID: MIKROE-5178

DIGI Isolator Click is a compact add-on board that provides electrical isolation and signal conditioning for the serial peripheral interface and a UART interface. This board features two DCL540C01s, high-speed, quad-channel digital isolators from Toshiba Semiconductor. Depending on the usage, this CMOS isolator can achieve data rates of up to 150Mbps, while withstanding up to 5kVrms voltage. DIGI Isolator Click is designed to isolate two additional IO pins besides SPI and UART interfaces. This Click board™ makes the perfect solution for developing industrial automation systems, motor control, inverters, switching power supplies, general SPI, and UART interfaces isolation where needed.

DIGI Isolator 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?

DIGI Isolator Click is based on two DCL540C01, high-speed, quad-channel digital isolators from Toshiba Semiconductor. Toshiba used the magnetic coupling structure and CMOS technology to achieve high reinforced isolation. The isolated lines are divided into two electrically connected groups. The first group comes in the form of 8 screw terminals, while the second forms a classic male 10-header row for easier jumper wire usage. Both groups of connectors have the same functions and are labeled the same. You can distinguish the power VDD2 and GND2 lines from the data lines: four SPI, UART TX/RX, and two digital IO lines. The isolator can work with supply voltages from 2.25 up to 5.5V.

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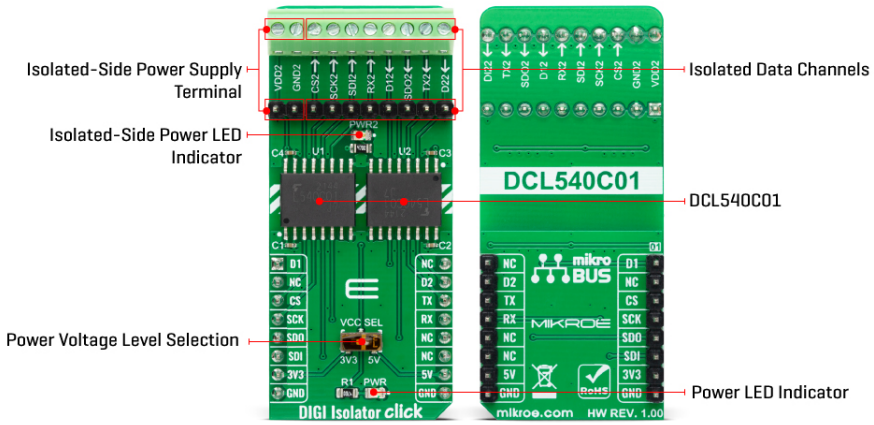

DIGI Isolator Click uses standard 4-Wire SPI serial interface lines, standard UART TX/RX interface lines, and two additional GP lines from the mikroBUS™ socket as an insulated extension, marked D2 and D1, respectively. The SPI and UART pins are labeled according to the standard interface markings. These eight lines go through the DCL540C01s to the terminals and headers, thus isolating the host MCU from the connected device.

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. This Click board™ is 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 developing industrial automation systems, motor control, inverters, switching power supplies, general SPI, and UART interface isolation where needed
On-board modules	DCL540C01 - quad-channel digital isolator from Toshiba Semiconductor
Key Features	Quad channel isolation withstanding up to 5kVrms of voltage, standard 4-Wire SPI serial interface isolation, standard 2-Wire UART interface isolation, additional two digital IO isolation, connection of isolated device over both the screw terminals and male headers
Interface	GPIO,SPI,UART
ClickID	No
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

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

Notes	Pin	mikroBUS™				Pin	Notes
General-Purpose I/O	**D1**	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	**D2**	General-Purpose I/O
SPI Chip Select	**CS**	3	CS	RX	14	**TX**	UART TX
SPI Clock	**SCK**	4	SCK	TX	13	**RX**	UART RX
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
LD2	PWR2	-	Isolated-Side Power LED Indicator
SW1	VCC SEL	Right	Power/Logic Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

DIGI Isolator 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 DIGI Isolator 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 DIGI Isolator Click driver.

Key functions

- digiisolator_spi_transfer DIGI Isolator SPI transfer function.
- digiisolator_uart_write DIGI Isolator UART data writing function.

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- digiisolator_get_d1_pin_voltage DIGI Isolator read D1 pin voltage level function.

Example Description

This example demonstrates the use of the DIGI Isolator Click board™ by reading and writing data by using SPI and UART serial interface and reading results of AD conversion.

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.DIGIIsolator

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

DCL540C01 datasheet

DIGI Isolator click 2D and 3D files

DIGI Isolator cick schematic

DIGI Isolator click example on Libstock

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