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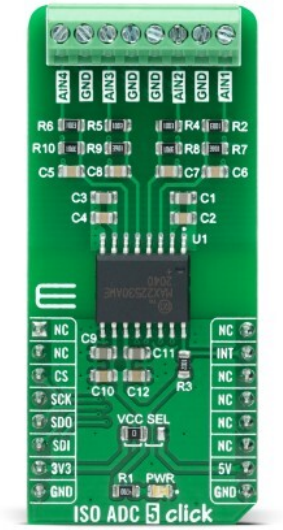
ISO ADC 5 Click



PID: MIKROE-4758

ISO ADC 5 Click is a compact add-on board that contains quad-channel isolated ADC with field supply. This board features the MAX22530, galvanically isolated, 4-channel, multiplexed, 12-bit, analog-to-digital converter (ADC), providing 5kVRMS isolation from Maxim Integrated. The ADC and all field-side circuits are powered by an integrated, isolated DC-DC converter that can verify field-side functionality even when there is no input signal or other field-side supply. The 12-bit ADC core has a sample rate of typically 20ksps per channel, where ADC data is available through the SPI interface. This Click board™ is ideal for high-density, multi-range, group-isolated, binary-input modules and provides a complete solution to any system requiring monitoring inputs without a separate isolated power supply.

ISO ADC 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?

ISO ADC 5 Click as its foundation uses the MAX22530, a 12-bit, 4-channel ADC with a 5kVRMS isolated SPI interface from Analog Devices. The ADC and all field-side circuits are powered by an integrated, isolated DC-DC converter that can verify field-side functionality even when there is no input signal or other field-side supply. It continually digitizes the input voltage on the field-side of an isolation barrier, and it transmits the data across the isolation barrier to the logic-side of the devices, where the magnitude of the input voltage is compared to programmable thresholds.

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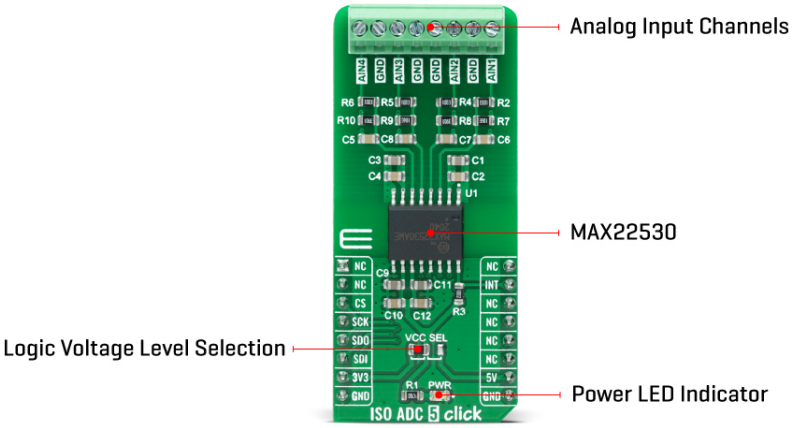

The MAX22530 ADC employs a 12-bit SAR architecture with a nominal sampling rate of 20ksps per channel and has an input voltage of up to 1.8V. Placed voltage dividers make the proper ADC input voltage on the input analog channels, which, based on the input in the range from 0 to 48V, gives the required input to the ADC in its range from 0 to 1.8V. After Power-Up, the ADC runs continually at the nominal sampling rate. The MAX22530 also features a precision internal voltage reference of 1.8V with a maximum error of ±2% over the entire operating temperature range.

The MAX22530 communicates with MCU using the standard SPI serial interface with a maximum frequency of 10MHz. Besides, it continuously monitors multiple possible fault conditions such as ADC functionality error, SPI framing error, CRC errors from SPI communications, and internal isolated data stream loss. This hardware alert feature is provided through the interrupt pin, routed on the CS pin of the mikroBUS™ socket, which asserts low when an enabled fault is detected.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to use the SPI 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	ADC
Applications	Can be used for high-density, multi-range, group-isolated, binary-input modules and provides a complete solution to any system requiring monitoring inputs without a separate isolated power supply
On-board modules	MAX22530 - 12-bit, 4-channel ADC with a 5kVRMS isolated SPI interface from Maxim Integrated
Key Features	Withstands 5kVRMS isolation for 60s, field-side self-powered with integrated DC-DC supply, 12-bit ADC with 20ksps per channel, flexible control and interface, and more

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Interface	SPI
Feature	No ClickID
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 ISO ADC 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	
	NC	2	RST	INT	15	**INT**	Interrupt
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
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

ISO ADC 5 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage VCC	3.3	-	5	V
Analog Channels Input Range	0	-	48	V
Maximum Withstanding-Isolation Voltage	-	-	5	KVrms
ADC Resolution	12	-	-	bits
Sample Rate	18	20	22	ksps
Operating Temperature Range	-40	+25	+125	°C

Software Support

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

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

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account.

Library Description

This library contains API for ISO ADC5 Click driver.

Key functions:

- isoadc5_cfg_setup - Config Object Initialization function.
- isoadc5_init - Initialization function.

Examples description

This example demonstrates the use of ISO ADC 5 click board.

The demo application is composed of two sections :

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

Other mikroE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.ISOADC5

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. The terminal available in all MikroElektronika compilers, or any other terminal application of your choice, can be used to read the message.

mikroSDK

This Click board™ is supported with mikroSDK - MikroElektronika 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

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ISO ADC 5 click 2D and 3D files

MAX22530 datasheet

ISO ADC 5 click schematic

ISO ADC 5 click example on Libstock