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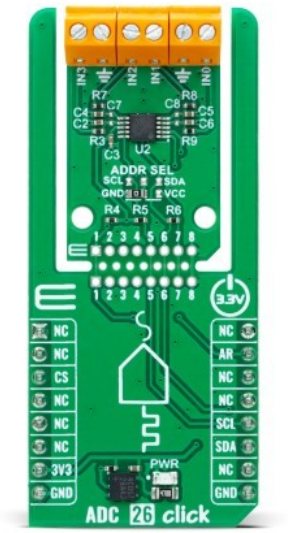
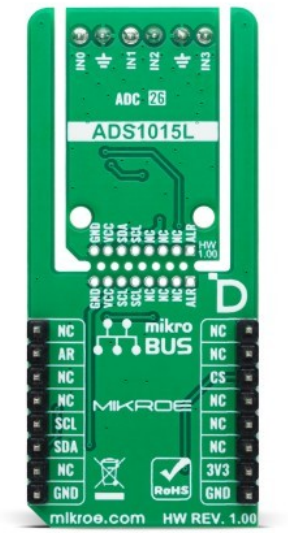
ADC 26 Click





PID: MIKROE-6416

ADC 26 Click is a compact add-on board for precise analog-to-digital signal conversion. This board features the ADS1015L, a low-power 12-bit ADC with an I2C-compatible interface from Texas Instruments. The ADS1015L features a ΔΣ ADC core with an internal voltage reference, programmable gain amplifier (PGA), and digital comparator, capable of measuring differential signals with a flexible input range from ±0.256V to ±6.144V at up to 3300 samples per second (SPS). It supports single-shot and continuous-conversion modes, offering both energy efficiency and real-time performance. The innovative Click Snap design allows for the detachment of the main IC area for versatile implementation. Ideal for system monitoring, ADC 26 Click excels in applications such as supply voltage tracking, current sensing, temperature measurements, wearables, and personal electronics.

How does it work?

ADC 26 Click is based on the ADS1015L, a low-power 12-bit analog-to-digital converter (ADC) with an I2C-compatible interface from Texas Instruments. It integrates several key components: a ΔΣ ADC core, an internal voltage reference, a clock oscillator, a programmable gain amplifier (PGA), and a programmable digital comparator. This combination enables the ADC to deliver conversions at data rates of up to 3300 samples per second (SPS), making it suitable for applications requiring both high speed and low noise.

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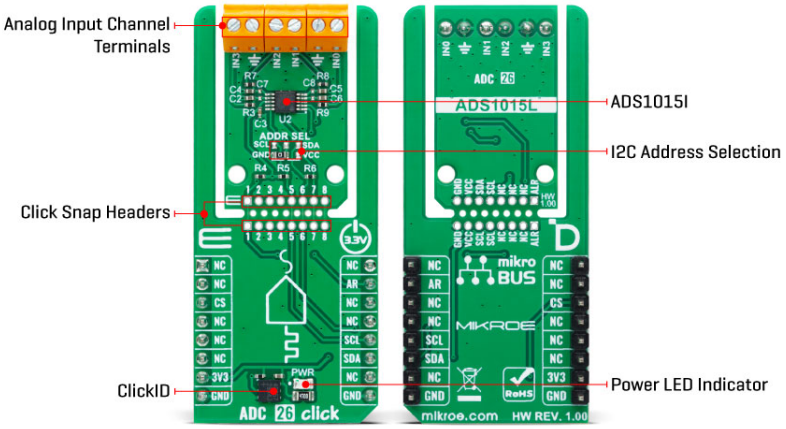

The ADC core of the ADS1015L measures differential signals brought to its analog input channels (IN0-IN3), offering a flexible full-scale input voltage range from ±0.256V to ±6.144V. This broad range enables the ADS1015L to handle both large and small signals with high precision, making it ideal for general system monitoring tasks such as supply voltage tracking, current sensing, and temperature measurements. These features also cater to applications in wearables and personal electronics.

The IC's architecture comprises a differential switched-capacitor ΔΣ modulator followed by a digital filter, ensuring excellent attenuation of common-mode signals and high immunity to noise. The input signal is compared against the internal voltage reference, while the modulator generates a high-speed bitstream. This stream is processed by the digital filter, which produces a digital output code proportional to the measured voltage.

The ADS1015L supports two operational modes designed to optimize power consumption and performance based on application requirements. In single-shot mode, the ADC executes a single measurement upon request, stores the result in an internal register, and then enters a power-down state, making it particularly effective for systems that require periodic measurements or experience extended idle periods between conversions. In continuous-conversion mode, the ADC seamlessly initiates a new measurement as soon as the previous one is completed, maintaining a conversion rate consistent with the configured data rate. This mode is well-suited for real-time monitoring applications, as the data register consistently contains the most recent measurement.

This Click board™ is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main IC area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the ADS1015I can operate autonomously by accessing its signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

ADC 26 Click uses an I2C interface with clock speeds of up to 400kHz, ensuring fast and efficient communication with the host MCU. The I2C address can be easily configured via onboard ADDR SEL jumpers positioned in the Snap part of the board, allowing multiple devices to coexist on the same bus. Additionally, the board features an alert interrupt (AR) pin triggered whenever conversion data exceeds the limit set in the appropriate upper/lower threshold register, or it can be used as a conversion-ready pin.

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This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. It also comes equipped with a library containing functions and example code that can be used as a reference for further development.

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, introducing a new level of flexibility and ease of use. This feature allows for easy detachment of the main sensor area by simply snapping the PCB along designated lines, enabling various implementation possibilities. For detailed information about Click Snap, please visit the official page dedicated to this feature.

Specifications

Type	ADC
Applications	Ideal for system monitoring such as supply voltage tracking, current sensing, temperature measurements, wearables, and personal electronics
On-board modules	ADS1015L - delta-sigma (ΔΣ) 12-bit I2C-compatible analog□to-digital converter from Texas Instruments
Key Features	High resolution, up to 3300SPS data rate, flexible full-scale input range, conversion modes for optimized performance, I2C interface, alert interrupt, Click Snap, and more
Interface	I2C
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on ADC 26 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	**AR**	Comparator Output / Conversion Ready
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	NC	

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Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1-JP2	ADDR SEL	Lower Left	I2C Address Selection GND/SCL/SDA/VCC: Lower Left Position GND, Upper Left Position SCL, Upper Right Position SDA, Lower Right Position VCC

ADC 26 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Full-Scale Input Voltage Range	±0.256	-	±6.144	V
Resolution	12	-	-	bits
Data Rate	-	-	3300	SPS

Software Support

We provide a library for the ADC 26 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 ADC 26 Click driver.

Key functions

- adc26_start_conversion This function starts a single-shot conversion for the selected MUX channel and gain level (full-scale range).
- adc26_get_alert_pin This function returns the ALERT (data ready) pin logic state.
- adc26_read_voltage This function reads the RAW ADC measurement and converts it to a voltage level.

Example Description

This example demonstrates the use of ADC 26 Click by reading and displaying the voltage levels from IN0-IN1 differential and IN2-IN3 single-ended analog input channels.

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

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account.

Other MIKROE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.ADC26

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™

ClickID

Downloads

ADC 26 click example on Libstock

ADC 26 click 2D and 3D files v100

ADS1015L datasheet

ADC 26 click schematic v100

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