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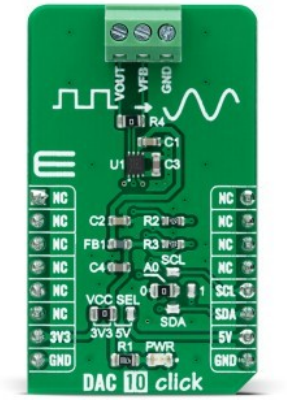
DAC 10 Click



PID: MIKROE-4732

DAC 10 Click is a compact add-on board that contains a fully-featured, highly accurate digital-to-analog converter. This board features the DAC53401, a 10-bit voltage-output smart digital-to-analog converter from Texas Instruments. This device consumes extremely low power and has a nonvolatile memory (NVM), an internal reference, and an I2C serial interface with a configurable slave address. It operates with either an internal reference or the power supply as a reference and provides full-scale output from 1.8V to 5.5V. This Click board™ represents an excellent choice for applications such as LED and general-purpose bias point generation, power supply control, programmable reference, and more.

DAC 10 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?

DAC 10 Click as its foundation uses the DAC53401, a 10-bit voltage-output smart digital-to-analog converter from Texas Instruments. This device consumes extremely low power and has a nonvolatile memory (NVM), an internal reference, and an I2C serial interface. It also has a power-on-reset circuit that makes sure all the registers start with default or user-programmed settings using NVM. It operates with either an internal reference or the power supply as a reference and provides full-scale output from 0V to 5.5V.

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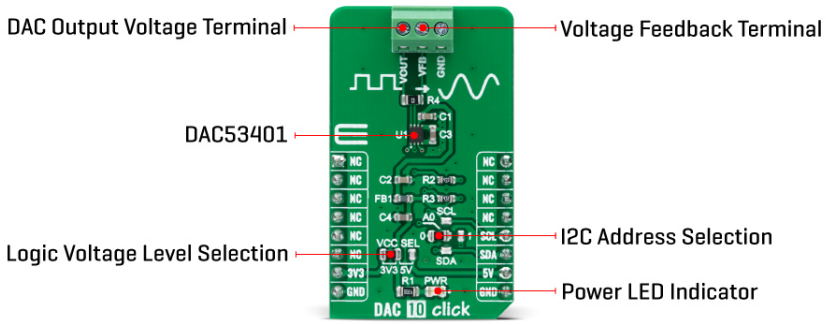

The DAC53401 includes digital slew rate control and supports basic signal generation such as square, ramp, and sawtooth waveforms. It also can generate pulse-width modulation (PWM) output with the combination of the triangular or sawtooth waveform and the VFB terminal. The DAC53401 is also called a smart DAC device because of its advanced integrated features. The force-sense output, PWM output, and NVM capabilities of this smart DAC enable system performance and control without using the software. These features allow DAC53401 to go beyond a conventional DAC's limitations that depend on a processor to function.

DAC 10 Click communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings, supporting Standard Mode operation with a clock frequency up to 100kHz, Fast Mode up to 400kHz, and Fast Mode Plus up to 1MHz. Besides, it also allows the choice of the three least significant bits of its I2C slave address by positioning the SMD jumper labeled as ADDR SEL to an appropriate position marked as 0, 1, SCL, and SDA, providing the user with a choice of 4 I2C Slave addresses.

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 I2C 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	DAC
Applications	Can be used for applications such as LED and general-purpose bias point generation, power supply control, programmable reference, and more
On-board modules	DAC53401 - 10-bit voltage-output smart digital-to-analog converter from Texas Instruments
Key Features	Low power consumption, voltage-output smart DAC, user-programmable nonvolatile memory, I2C compatible interface, programmable waveform generation, PWM output using triangular waveform and VFB terminal, and more

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Interface	I2C
ClickID	No
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on DAC 10 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	NC	
	NC	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	**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
JP2-JP3	ADDR SEL	Left	I2C Address Selection 0/1/SCL/SDA: Left position 0, Right position 1, Upper position SCL, Lower position SDA

DAC 10 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Output Voltage Range	0	-	5.5	V
Resolution	-	10	-	bits
Operating Temperature Range	-40	+25	+125	°C

Software Support

We provide a library for the DAC 10 Click as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

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

Library Description

This library contains API for DAC 10 Click driver.

Key functions:

- dac10_cfg_setup - Config Object Initialization function.
- dac10_init - Initialization function.

Examples description

This example demonstrates the use of DAC 10 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.DAC10

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™

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Downloads

DAC53401 datasheet

DAC 10 click 2D and 3D files

DAC 10 click schematic

DAC 10 click example on Libstock