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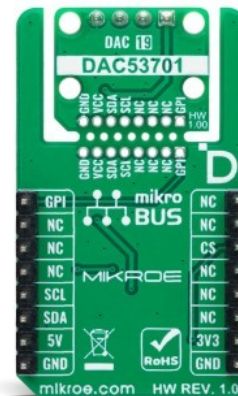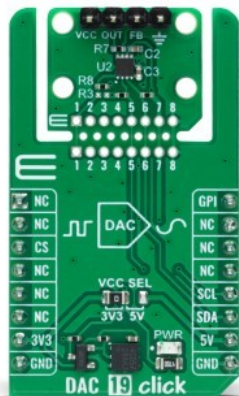www.mikroe.com

DAC 19 Click

PID: MIKROE-6406

DAC 19 Click is a compact add-on board designed for high-performance voltage-output applications. This board features the DAC53701-Q1, a 10-bit automotive-grade DAC from Texas Instruments, offering smart functionality through force-sense output, GPI function trigger, PWM output, and integrated nonvolatile memory (NVM). The board supports an internal or power supply reference, provides a full-scale output range, and communicates efficiently with microcontrollers using an I2C interface with up to 1MHz clock speed. Additional unpopulated pins enable a force-sense option for use as a programmable comparator and current sink, enhancing control flexibility. Ideal for automotive applications, DAC 19 Click is suited for tail and brake light control, fade-in/fade-out effects, and interior lighting adjustments, where precise voltage control is essential.

How does it work?

DAC 19 Click is based on the DAC53701-Q1, a 10-bit automotive-grade voltage-output digital-to-analog converter (DAC) from Texas Instruments, tailored for high-performance applications. This advanced DAC offers a range of smart features, making it ideal for control applications that demand enhanced performance without heavy reliance on software. Equipped with a force-sense output, a general-purpose input (GPI) function trigger, PWM output capability, and nonvolatile memory (NVM), the DAC53701-Q1 supports dynamic system performance and control functionality.
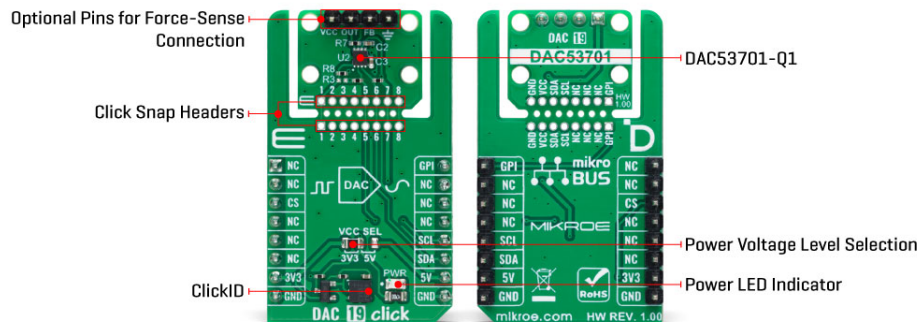
This DAC can operate either with an internal reference or by using the power supply as a reference source, providing flexibility for different voltage needs. It supports a full-scale output range and integrates seamlessly with PMBus-compatible I2C communication, allowing it to interface efficiently with microcontrollers or other digital systems. The DAC53701-Q1's low power consumption also suits it, particularly for automotive applications, such as tail and brake light control, fade-in/fade-out effects for license plate lighting, and PWM-based control for interior lighting adjustments.

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 sensor area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the DAC53701-Q1 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.

As mentioned, the DAC 19 Click uses a standard 2-wire I2C interface to communicate with the host MCU, supporting Standard mode with up to 1MHz of frequency clock. It also provides a general-purpose input (GPI) pin on the mikroBUS™ socket, which can be configured to trigger various functions thoroughly explained in the attached datasheet. The board features additional header pins connected to the DAC output, designed to provide a versatile force-sense capability. This feature allows the DAC to function as a programmable comparator and current sink, enabling precise control and flexibility in applications that require adaptable voltage monitoring and current control. These pins allow users to customize and expand the DAC's functionality according to specific needs.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this 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.

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

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to this feature.

Specifications

Type	DAC
Applications	Ideal for automotive applications, for tail and brake light control, fade-in/fade-out effects, and interior lighting adjustments
On-board modules	DAC53701-Q1 - 10-bit automotive-grade voltage-output digital-to-analog converter (DAC) from Texas Instruments
Key Features	AEC-Q100 qualified for automotive, high resolution, general-purpose input (GPI) based function trigger, I2C interface, Click Snap feature, option for force-sense connection, and more
Interface	I2C
Feature	Click Snap,ClickID
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 19 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS				Pin	Notes
	NC	1	AN	PWM	16	**GPI**	General-Purpose Input Trigger
	NC	2	RST	INT	15	NC	
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	**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	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

DAC 19 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Output Voltage	-	-	5	V
Update Rate	-	-	25	kSPS

Software Support

We provide a library for the DAC 19 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 DAC 19 Click driver.

Key functions

- dac19_set_voltage This function sets the output voltage depending on the vref value defined by the VCC SEL on-board jumper. VREF and Voltage values can be either in Volts or Milivolts.

- dac19_set_value This function sets the DAC DATA register to a desired value.

- dac19_set_voltage_int_vref This function sets the output voltage with the internal reference enabled.

Example Description

This example demonstrates the use of DAC 19 Click by changing the output voltage level.

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.DAC19

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

DAC 19 click example on Libstock

DAC53701-Q1 datasheet

DAC 19 click 2D and 3D files v100

DAC 19 click schematic v100