

## DAC 5 CLICK

PID: MIKROE-3712

Weight: 23 g

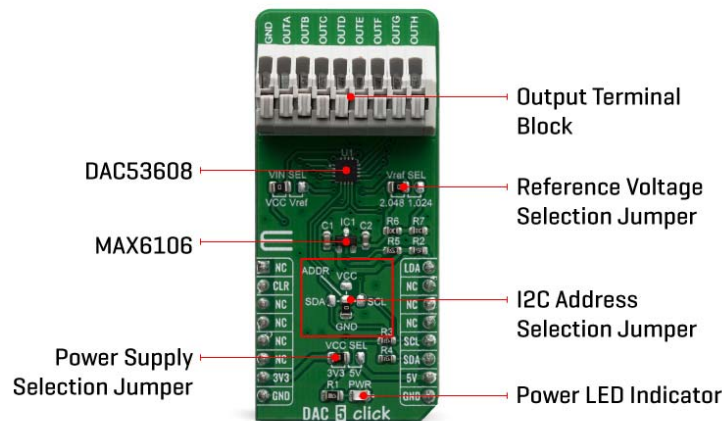
**DAC 5 Click** carries Texas Instruments DAC53608 IC, a low-power, eight-channel, 10-bit buffered Digital-to-Analog Converter. DAC53608 converts digital value to the corresponding voltage level using external voltage reference. For that purpose, DAC 5 click uses MAX6106, which is a low-dropout micropower voltage reference with 2,048V output voltage. With all those possibilities on board, DAC 5 click makes a perfect choice for an accurate and simple generation of analog signals for various purposes, such as programmable Power Supplies, Laser Drivers, Projectors, IP Network cameras, auto focus digital still camera lens, and more.

DAC 5 click board™ 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.

DAC 5 click is an advanced 10-bit eight-channel digital to analog converter (DAC). This device communicates with the main MCU through the I2C interface, supporting the standard mode (100 kbps), fast mode (400 kbps), and fast+ mode (1 Mbps). Also, there is a selectable voltage reference as well with onboard jumpers which makes this click more open for specific projects. I2C address can be selected with a cross-shaped jumper if such option is needed. DAC 5 click allows fine tuning to meet any specific project in mind.

## HOW DOES IT WORK?

DAC53608 from [Texas Instruments](#) is the main active component onboard on DAC 5 click. This is a low power, eight channel, 10-bit voltage output Digital-To-Analog Converter (DAC). It is specified monotonic by design across a wide power supply range from 1,8 V to 5,5 V. Using an external reference, the [DAC53608](#) provides a full-scale output voltage in the range from 0V to Vref, while consuming 0,1 mA quiescent current per channel. The DAC53608 also includes per channel, user programmable, power down registers facilitate the DAC output buffers to start in a power down to 10K state and remain in this state until a power up command is issued to these output buffers.



The DAC 5 click has a high precision voltage reference included onboard. For that purpose, MAX6106 is used, a 2.048V voltage reference IC, from [Maxim Integrated](#). This little SOT23 device is stable with capacitive loads, and no output capacitor is required. It has regulations for both sink and source and is very accurate. This gives DAC 5 click good flexibility for use in various applications.

Low quiescent current, wide power supply range, and per channel power down option makes DAC53608 ideal for low power, battery operated system. The device communicates through I2C interface. These devices support I2C standard mode (100 Kbps), fast mode (400 Kbps) and fast+ mode (1 Mbps). These devices also have a load DAC (LDAC) pin that allows simultaneous DAC updates. LDAC pin is tied with a mikroBUS™ PWM pin. The I2C lines (SCL and SDA) are routed to the dedicated mikroBUS™ pins.


The voltage level of the logic section can be selected via VCC SEL jumper, between 3.3V and 5V. This allows for both 3.3V and 5V capable MCUs to use the I2C communication lines properly. For I2C address selection, DAC 5 click has cross-shape jumper. There are four positions for I2C selection which can be selected with a SMD 0 ohms resistor. DAC 5 click has Vref SEL jumper for choosing between 2,048 V and 1,024 V, where 1,024 V is achieved using a voltage divider. Another jumper is for VrefIN and choosing between Vref (1,024 and 2,048) and VCC (3,3V and 5V). Voltage outputs from DAC 5 click can be connected through 9-terminal block where first is common GND and the last eight are VOUTA to VOUTH.

## SPECIFICATIONS

<b>Type</b>	DAC
<b>Applications</b>	Suitable for programmable power supplies, programable window comparator, VCOM biasing in display panel, laser driver in multifunction printers, auto focus digital still camera lens, ATM machines, currency counters, barcode readers, IP network cameras, projectors
<b>On-board modules</b>	DAC53608, a low power, eight channel, voltage output, 10-bit digital to analog converter (DAC) from Texas Instruments
<b>Key Features</b>	High precision MAX6106 voltage reference, low power consumption, high speed I2C interface
<b>Interface</b>	GPIO,I2C
<b>Click board size</b>	L (57.15 x 25.4 mm)
<b>Input Voltage</b>	3.3V,5V

## PINOUT DIAGRAM

This table shows how the pinout on DAC 5 click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
	NC	1	AN	PWM	16	LDA	Output update OUT
Asynchronous clear in	CLR	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
JP1	VCC SEL	Left	Power Supply Voltage Selection 3V3/5V, left position 3v3, right position 5v
JP2,JP3	ADDR	Left	4-position I2C address Selection toward host mcu: left - SDA; Right - SCL; Up - VCC; Down - GND
JP4	Vref SELL	Left	Reference voltage (Vref) selection 2.048V/1.024V, left position 2.048V, right position 1.024V
JP5	Vref IN	Left	Reference voltage input source selection (VrefIN) VCC/Vref, left position VCC, right position Vref
LD1	PWR	-	Power LED indicator

## SOFTWARE SUPPORT

We provide a library for the DAC 5 click on our [LibStock](#) page, as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

### Library Description

The library initializes and defines the I2C bus and drivers that offer a choice for writing data in register and reads data from register. The library includes function for sending data to output, configuration device, sets LDAC states, reading device info(DEVICE ID), software reset, clear and generic read and write functions.

Key functions:

- `uint8_t dac5_sendData(uint8_t dataReg, uint16_t dataBuff)` - Function for sending data to output
- `void dac5_config(uint16_t configData)` - Configuration function
- `uint8_t dac5_setLdacPin(uint8_t status)` - Function for setting LDAC pin status
- `void dac5_clear()` - Function for clearing data from output

## Examples description

The application is composed of three sections :

- System Initialization - Initializes I2C module
- Application Initialization - Initializes driver init, tests communication and configures device for measuring
- Application Task - Sends 4 different values to one output and prints expected measurement
- 

```
void applicationTask()
{
    uint16_t sender[4] = {0x0118, 0x0FF0, 0x0AAC, 0x0DD4};
    uint16_t expected[4] = {140, 2030, 1360, 1760};
    uint8_t endCount = 4;
    uint8_t i;

    for (i = 0; i < endCount; i++)
    {
        if (dac5_sendData(_DAC5_REG_DAC_A_DATA, sender[i]) == _DAC5_ERROR)
        {
            mikrobus_logWrite( "-ERROR SENDING DATA", _LOG_LINE);
            mikrobus_logWrite( " ", _LOG_LINE);
        }
        else
        {
            mikrobus_logWrite( "-SUCCESSFUL SENDING DATA", _LOG_LINE);
            mikrobus_logWrite( " ", _LOG_LINE);

            mikrobus_logWrite( "Sending : ", _LOG_TEXT);
            IntToStr(sender[i], demoText);
            mikrobus_logWrite( demoText, _LOG_LINE);

            mikrobus_logWrite( "Expected return around : ", _LOG_TEXT);
            IntToStr(expected[i], demoText);
            mikrobus_logWrite( demoText, _LOG_TEXT);
            mikrobus_logWrite( " mV ", _LOG_LINE);
        }
        Delay_ms ( 5000 );
    }
}
```

```

    dac5_clear();
    mikrobus_logWrite( "Clearing output... ", _LOG_LINE);
    mikrobus_logWrite( " ", _LOG_LINE);
    mikrobus_logWrite( " ", _LOG_LINE);
    Delay_ms ( 2000 );
}

mikrobus_logWrite( ".....", _LOG_LINE);
mikrobus_logWrite( " ", _LOG_LINE);
mikrobus_logWrite( " ", _LOG_LINE);

Delay_ms ( 1000 );
}

```

The full application code, and ready to use projects can be found on our [LibStock](#) page. Other mikroE Libraries used in the example:

- I2C
- Conversions

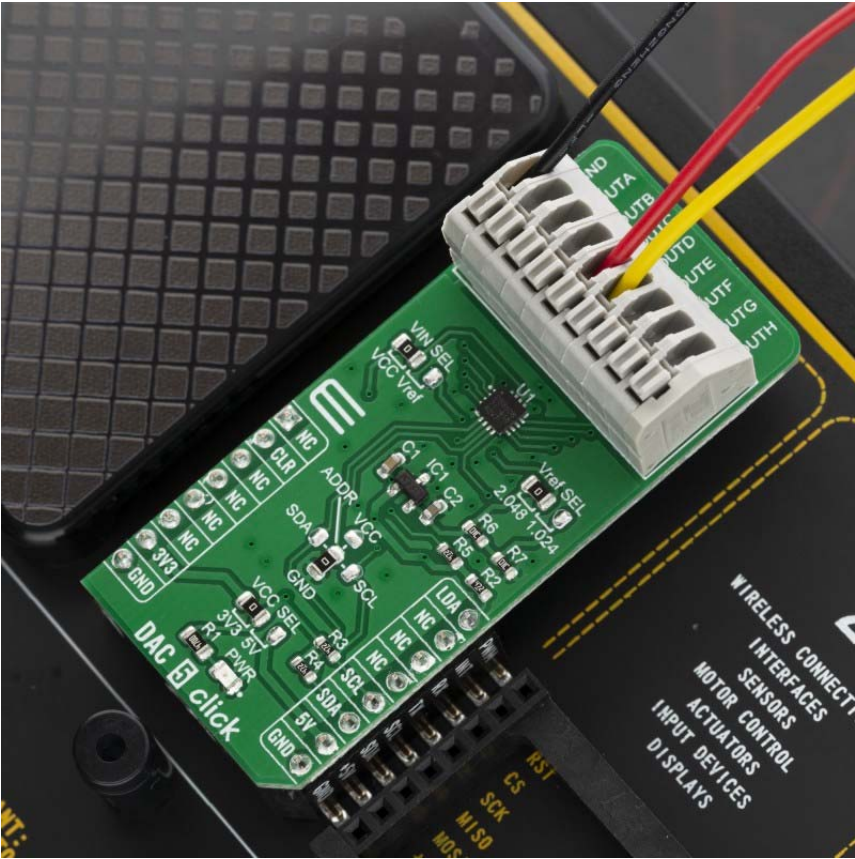
### **Additional notes and informations**

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](#).



<https://www.mikroe.com/dac-5-click/9-10-19>