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MIC24055 click

PID: MIKROE-2835

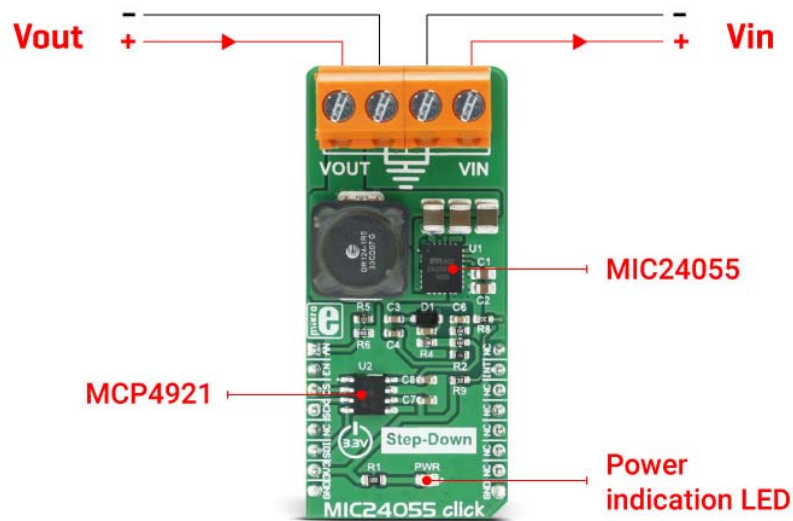
Weight: 35 g

MIC24055 click is the buck regulator that can deliver continuous output current up to 8A and can step down voltages from up to 19V which makes this click board easy to use with many power sources commonly available. The amount of current it can deliver and the steady, ripple-free regulated voltage, make this click board a perfect choice for powering up devices which require high current, regulated power supply, such as servers and workstations, routers, telecom equipment and every other electronic device with similar power demands.

MIC24055 click is equipped with the MIC24055, high-efficiency buck regulator from Microchip. This IC can work with the wide range of input voltages, from 4.5V up to 19V. The regulated voltage at the output can be set from 1V to 4.8V by the means of the feedback (FB) pin and the second chip on board - MCP4921, a single channel 12-bit DAC by Microchip, equipped with the SPI interface. By programming the output of this DAC through the SPI interface routed to the mikroBUS socket pins, it is possible to easily set up the output voltage of the buck regulator. MikroElektronika libraries make it possible to perform this task easily, as seen in the example application.

How does the MIC24055 click work?

The MIC24055 IC is used on this click board as the main buck regulating element. It is a synchronous buck regulator from Microchip, which works with the fixed switching frequency of 600kHz, featuring a unique adaptive on-time control architecture. This buck regulator accepts input voltages from 4.5V to 19V and outputs voltage from 1V to 4.8V. The buck regulator IC provides a full suite of safekeeping features to ensure the protection of the IC during fault conditions, such as the under-voltage lockout, internal soft-start to reduce inrush current, short-circuit protection and thermal shutdown. MIC24055 click is capable of delivering up to 8A of continuous output current on its output connector.



To set the desired output voltage, the MIC24055 relies on the feedback voltage of the FB pin. For that purpose, the FB pin of the MIC24055 is connected to the MCP4921 DAC converter VOUT pin. The MCP4921 DAC uses the SPI interface and it can be programmed to output a specific voltage level to the FB pin of the buck regulator. That way, the output voltage of the buck regulator can be adjusted to the desired level. The buck regulator output voltage is also fed back to the AN pin of the click board, through the voltage divider. This allows for checking the output voltage of the regulator, so the software can additionally adjust the level of the DAC output if needed. For the proper operation of the device, the input voltage needs to be greater than the set output voltage.

Besides the AN pin, the click board uses the SPI interface pins, EN pin - which is used to enable the buck regulator chip and the INT pin, which is routed to the PG pin of the MIC24055 buck regulator. This pin is an open drain output pin, used to signalize the Power Good condition, which occurs when the output voltage level (VOUT) reaches 92% of its steady state voltage level. This pin is supplied with the pull-up resistor, connected to the 3.3V rail.


The click board is also equipped with the two 18A connectors, for an easy and secure connection of the input and output lines.

Specifications

Type	Buck
Applications	The MIC24055 click can be used for powering up devices which require regulated power source with sufficient current, such as servers and work stations, routers, telecom equipment and every other electronic device with similar power demands.
On-board modules	Microchip's MIC24055 constant-frequency synchronous buck regulator. Microchip's MCP4921 single channel, 12-bit DAC with the SPI interface.
Key Features	Continuous output current up to 8A, wide input range from 4.5V to 19V, power good (PG) output, short circuit protection, under-voltage protection, fast transient response.
Interface	Analog,GPIO,SPI
Input Voltage	3.3V
Click board size	L (57.15 x 25.4 mm)

Pinout diagram

This table shows how the pinout on **MIC24055 click** corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Analog In	AN	1	AN	PWM	16	NC	
MIC24055 Enable	EN	2	RST	INT	15	INT	Power Good Out
DAC Chip Select	CS	3	CS	RX	14	NC	
SPI Clock	SCK	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
SPI SDI	MOSI	6	MOSI	SDA	11	NC	
Power Supply	+3.3V	7	3.3V	5V	10	NC	
Ground	GND	8	GND	GND	9	GND	Ground

MIC24055 click electrical specifications

Description	Min	Typ	Max	Unit
VIN	4.5		19	V
VOUT	1		4.8	V
Continuous output current			8	A

Onboard settings and indicators

Label	Name	Default	Description
PWR	Power LED	-	Power LED indicator
TB1	VIN	-	Connector for connecting external VIN
TB2	VOUT	-	Connector for connecting the load

Software support

We provide a library for MIC24055 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 contains functions for basic control of the onboard DAC.

Key functions:

`void mic24055_dacOutput (uint16_t valueDAC)` - Directly sets the DAC output voltage

`void mic24055_setVout (uint16_t voltage)` - Sets the output voltage

Examples Description

The application is composed of three sections :

- System Initialization - Initializes pin and peripherals
- Application Initialization - Initializes the click driver
- Application Task - Slowly alternates the click output between two values

```
mic24055_setVout (500);  
  mikrobus_logWrite("Setting Vout to 500mV",_LOG_LINE);  
  Delay_ms (3000);  
  mic24055_setVout (2300);  
  mikrobus_logWrite("Setting Vout to 2300mV",_LOG_LINE);  
  Delay_ms (3000);
```

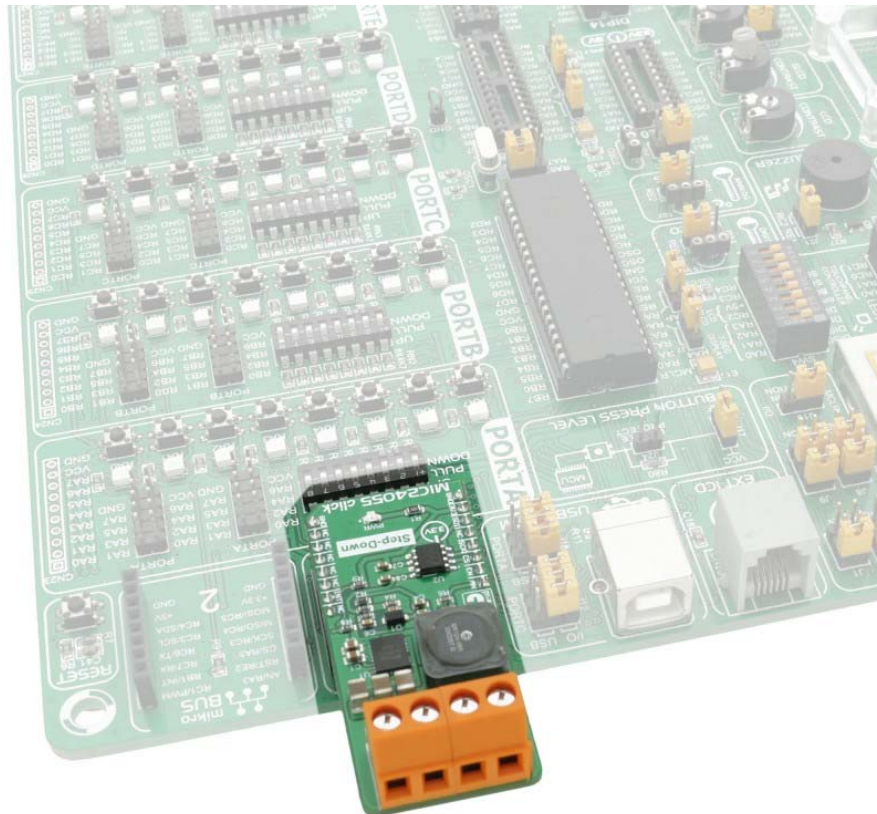
The full application code, and ready to use projects can be found on our LibStock page.

Other MikroElektronika libraries used in the example:

- UART

Additional notes and information

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.



<https://www.mikroe.com/mic24055-click> 12-20-17