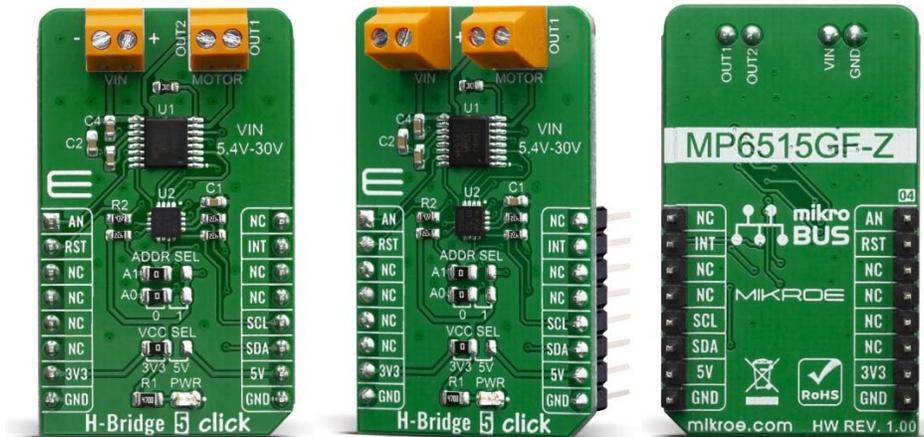


# MIKROE



## H-BRIDGE 5 CLICK

PID: MIKROE-3854

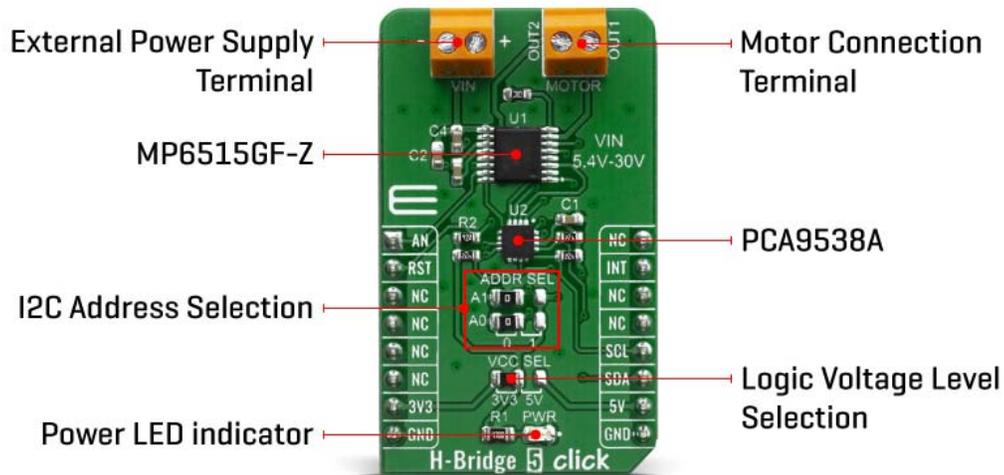
Weight: 20 g

The **H-Bridge 5 Click** is designed for control DC motors and inductive loads. This Click board™ contains the MP6515GF-Z, a H-bridge motor driver from MPS, It features an Full H-Bridge driver with Internal safety features include over-current protection, input over-voltage protection, under voltage lockout (UVLO), and thermal shutdown. This click also contains the PCA9538A, a low-voltage 8-bit General Purpose Input/Output (GPIO) expander. The H-Bridge 5 click can be used for Solenoid Drivers and DC Brush Motor Drive.

The H-Bridge 5 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?

The H-Bridge 5 click's most important and relevant feature is the MP6515GF-Z, a H-bridge motor driver from Monolithic Power Systems (MPS). This Click board™ is operates from a supply voltage of up to 30V and delivers motor current up to 1.5A. Its main applications include Solenoid Drivers and DC Brush Motor Drive.



Its internal safety features include over-current protection, input over-voltage protection, undervoltage lockout (UVLO), and thermal shutdown. The MP6515GF-Z integrates four N-channel power MOSFETs with 2.8A peak current capability. It is designed to drive DC brush motors, solenoids, or other loads.

When it comes to current sensing, the current flowing in the two low-side MOSFETs is sensed with an internal current sensing circuit. A voltage that is proportional to the output current is sourced on VISEN. Current is sensed when one of the low-side MOSFETs is turned on, including during slow decay (brake) mode. The load current applied to VISEN should be kept below 2mA, with no more than 500pF of capacitance.

The H-Bridge 5 click also contains the PCA9538A, a low-voltage 8-bit General Purpose Input/Output (GPIO) expander with interrupt and reset for I2C-bus/SMBus applications. This feature is designed by NXP. NXP I/O expanders provide a simple solution when additional I/Os are needed while keeping interconnections to a minimum. Expanders provide communication between MP6515GF-Z and MCU, MCU control expander with I2C communication, and set output logic level for I/O pins.

The PCA9538A is an I2C-bus slave device. Data is exchanged between the master and PCA9538A through write and read commands using I2C-bus. The two communication lines are a serial data line (SDA) and a serial clock line (SCL). Both lines must be connected to a positive supply via a pull-up resistor when connected to the output stages of a device. Data transfer may be initiated only when the bus is not busy. Given all the capabilities the features that are contained in the H-Bridge 5 click have, this Click board™ is best used for Solenoid Drivers and DC Brush Motor Drive.

The H-Bridge 5 click comes with a mikroC, mikroBASIC, and mikroPASCAL compilers compatible library, which contains functions for easy and simple operating of this Click board™. The provided example application demonstrates their usage and can be used as a reference for custom projects.

## SPECIFICATIONS

<b>Type</b>	Brushed
<b>Applications</b>	Solenoid Drivers and DC Brush Motor Drive
<b>On-board modules</b>	MP6515GF-Z, a H-bridge motor driver from MPS
<b>Key Features</b>	Simple and versatile logic Interfaces, 3.3V and 5V Compatible Logic Supply, Internal Full H-Bridge Driver, Fault Indication Output
<b>Interface</b>	Analog, I2C
<b>Click board size</b>	M (42.9 x 25.4 mm)
<b>Input Voltage</b>	3.3V or 5V

## PINOUT DIAGRAM

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

Notes	Pin					Pin	Notes
		1	AN	PWM	16		
Analog voltage output	<b>AN</b>	1	AN	PWM	16	NC	
Reset	<b>RST</b>	2	RST	INT	15	<b>INT</b>	Interrupt pin
	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
TB1	VIN	-	Terminal udes for connecting external input voltage
TB2	MOTOR	-	Terminal used for connection motor
JP1	VCC SEL	Left	Logic voltage level selection
JP2	ADR0	Left	Select I2C address bit
JP3	ADR1	Left	Select I2C address bit

## H-BRIDGE 5 CLICK ELECTRICAL SPECIFICATIONS

Description	Min	Typ	Max	Unit
Receive input voltage range	5.4	-	30	V
Receive input current range	-	-	1.5	A

# SOFTWARE SUPPORT

We provide a library for the H-Bridge5 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 covers all the necessary functions that enables the usage of the H-Bridge 5 Click board. It initializes and defines the I2c driver and drivers that allow full control of the device to the user. User can use the device to control forward and reverse motion, apply different kinds of brake functions and synchronization fast decay functions, enable and disable device, or to put it to sleep. For better control over the device generic read and write functions are made available to the user as well as "set port" and ADC functions.

Key functions:

- void hbridge5\_forward() - Function is used to put motor into forward motion.
- void hbridge5\_reverse() - Function is used to put motor into reverse motion.
- void hbridge5\_brake\_low() - Function is used to brake motor to a halt.

## Examples description

The application is composed of three sections :

- System Initialization - Initializes I2C module, LOG and GPIO structures, sets RST pin as output and INT and AN pins as input.
- Application Initialization - Initializes I2C driver, configures all ports as output and writes an initial log.
- Application Task - (code snippet) This example demonstrates the use of H-Bridge 5 Click board, by running dc motor forward, then stopping and then running it in reverse and stopping again.

```
void application_task ( )
{
    hbridge5_forward( );
    Delay_ms( 3000 );

    hbridge5_brake_low( );
    Delay_ms( 1000 );

    hbridge5_reverse( );
    Delay_ms( 3000 );

    hbridge5_brake_low( );
```

```
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
- UART
- ADC
- 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.