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Step Down 9 Click

PID: MIKROE-5844

Step Down 9 Click is a compact add-on board that converts higher voltages into a lower voltage level. This board features the MAX20406, an automotive fully integrated synchronous silent switcher buck converter from Analog Devices. It is designed to deliver up to 6A with wide input voltages ranging from 3V up to 36V. The output voltages are programmable in a range of 0.8V to 10V and are available over the VOUT terminal. This Click board™ makes the perfect solution for developing automotive infotainment systems, ADAS and other safety-critical components, industrial equipment, high-voltage DC-DC converters, and more.

How does it work?

Step Down 9 Click is based on the MAX20406, an automotive fully integrated synchronous silent switcher buck converter from Analog Devices. It is a low EMI emission buck converter with integrated high-side and low-side switches and can operate in dropout by running at a 99% duty cycle. The Step Down 9 Click uses a TPL0501 digital potentiometer in a resistor divider configuration for an external output voltage adjustment. The TPL0501 is a single-channel digital potentiometer with an SPI interface from Texas Instruments. It has a 256-position resolution and 100KΩ of end-to-end resistance.

Mikroe produces entire development toolchains for all major microcontroller architectures.
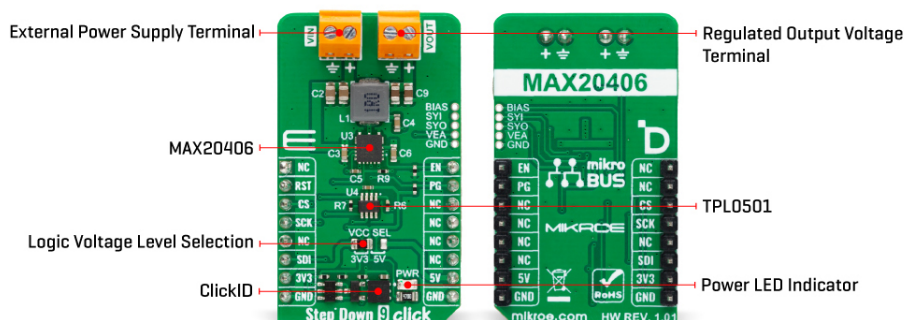Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.

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As mentioned, the Step Down 9 Click uses the TPL0501 and its 3-Wire SPI serial interface to communicate with the host MCE, supporting clock frequency of up to 25MHz. The voltage quality can be monitored by observing the PGOOD signal over the PG pin of the mikroBUS™ socket. The enable EN pin is an input for circuit activation, active with a HIGH logic state.

This Click board™ is also equipped with a 5-pin header that lets you use additional features of the MAX20406. The converter can use dual-phase operation for high-current applications, which is intended for forced-PWM mode only. If in forced-PWM mode, the SYO pin will be 180 degrees out of phase with the controller clock. If in Skip mode, then no clock will be present on the SYO pin. To set the skip mode, connect the SYI pin to the GND; otherwise, the forced-PWM mode will be selected if you connect the SYI to BIAS. VEA is an internal voltage loop error-amplifier output needed for dual-phase operation.

The MAX20406 can be configured as a controller or a target. While SYO is connected to the BIAS and the converter is enabled, there will be a procedure to detect if it is a controller or a target. In controller configuration, you can use a VEA pin to connect to a VEA of a target to ensure balanced current sharing between two phases. For more info, check the MAX20406's datasheet.

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.

Specifications

Type	Buck
Applications	Can be used for developing automotive infotainment systems, ADAS and other safety-critical components, industrial equipment, high-voltage DC-DC converters, and more
On-board modules	MAX20406 - an automotive fully integrated synchronous silent switcher buck converter from Analog Devices
Key Features	Wide input range, wide programmable adjusted output range, multiple functions for a

	small package, fixed soft start, high precision, dual-phase capability, superior EMI performance, spread-spectrum frequency modulation, and more
Interface	SPI
Feature	ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V,External

Pinout diagram

This table shows how the pinout on Step Down 9 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	**EN**	Converter Enable
Reset / ID SEL	**RST**	2	RST	INT	15	**PG**	Power Good Indicator
SPI Select / ID COMM	**CS**	3	CS	RX	14	NC	
SPI Clock	**SCK**	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
SPI Data IN	**SDI**	6	MOSI	SDA	11	NC	
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

Step Down 9 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Power Supply Voltage VIN	3	-	36	V
Programmable Output Voltage VOUT	0.8	-	10	V
Continuous RMS Current	-	-	6	A

Software Support

We provide a library for the Step Down 9 Click as well as a demo application (example), developed using MIKROE compilers. The demo can run on all the main MIKROE development boards.

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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 Step Down 9 Click driver.

Key functions

- stepdown9_set_en_pin Step Down 9 set EN pin state function.
- stepdown9_set_wiper_pos Step Down 9 set wiper position.
- stepdown9_set_output Step Down 9 set output voltage.

Example Description

This library contains API for the Step Down 9 Click driver. This driver provides the functions to set the output voltage treshold.

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.StepDown9

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

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