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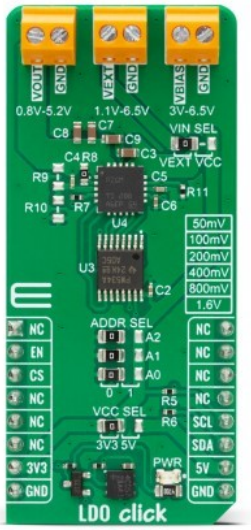
LDO Click



PID: MIKROE-5645

LDO Click is a compact add-on board designed to regulate the output voltage of a power supply to a lower level with a very low dropout voltage. This board features the TPS7A83A, a low-noise, low-dropout linear regulator (LDO) from Texas Instruments capable of sourcing 2A with only 200mV of maximum dropout. The TPS7A8300A has a pin-programmable output voltage from 0.8V-3.95V with a 50mV resolution, or it can be adjustable from 0.8V-5.2V using an external resistor divider. The combination of low noise, high PSRR, and high output current capability makes this Click board™ an excellent choice to power noise-sensitive components such as serializer and deserializer, ADCs, DACs, and RF components because the high performance of the TPS7A83A limits power-supply-generated phase noise and clock jitter.

How does it work?

LDO Click is based on the TPS7A83A, a high-current (2A), low-noise, high-accuracy, and low-dropout linear voltage regulator from Texas Instruments. The TPS7A83A has several features that make it useful in various applications, like high accuracy, high-PSR output, and fast transient response for voltage regulation part, as well as certain internal protections like thermal shutdown and foldback current limit. All these features make this Click board™ a robust solution for many challenging problems in generating a clean, accurate power supply.

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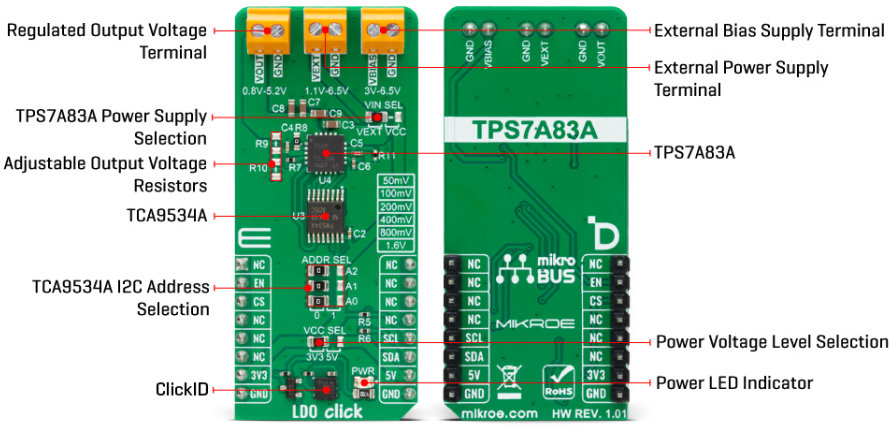

The TPS7A8300A can be easily enabled using the EN pin of the mikroBUS™ socket, offering a switch operation to turn ON/OFF the TPS7A8300A. It has a pin-programmable output voltage from 0.8V-3.95V with a 50mV resolution, or it can be adjustable from 0.8V-5.2V using an external resistor divider (R9 and R10). The pin-programmable output voltage is possible thanks to the TCA9534A, an I2C-configurable I/O expander also from Texas Instruments, which by setting the appropriate voltage setting pins on the TPS7A83A, which are connected to an internal feedback network, programs the regulated output voltage.

The TCA9534A expander also can choose the least significant bit (LSB) of its I2C slave address by positioning SMD jumpers labeled as ADDR SEL to an appropriate position marked as 0 and 1. The adjustable output voltage is achieved through voltage divider resistors whose corresponding values can be found in the datasheet table.

One of the power terminals on the board is the VBIAS terminal, which minimizes the internal charge-pump noise when the internal voltage is clamped, thereby reducing the overall output noise floor. This rail enables the use of low-input voltage, low-output (LILO) voltage conditions (VEXT=1.2V, VOUT =1V) to reduce the power dissipation of the TPS7A8300A. Using a VBIAS voltage improves DC and AC performance for VEXT≤2.2V.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to use the communication lines properly. Additionally, there is a possibility for the TPS7A83A power supply selection via jumper labeled as VIN SEL to supply the TPS7A83A from an external power supply terminal in the range from 1.1V to 6.5V or with selected mikroBUS™ power rail. However, the 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,Linear
Applications	Can be used to power noise-sensitive components such as serializer and deserializer, ADCs, DACs, and RF components
On-board modules	TPS7A83A - low-dropout linear regulator from Texas Instruments
Key Features	High accuracy, low output voltage noise, wide

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	input voltage range, pin-programmable and adjustable output voltage, excellent load transient response, bias supply to improve performance, and more
Interface	I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

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

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
Enable	**EN**	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-JP3	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1
JP4	VIN SEL	Right	TPS7A83A Power Supply Selection VEXT/VCC: Left position VEXT, Right position VCC
JP5	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
R9-R10	R9-R10	Unpopulated	Adjustable Output Voltage Resistors

LDO Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V

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External Power Supply VEXT	1.1	-	6.5	V
External Bias Supply	3	-	6.5	V
Output Voltage	0.8	-	5.2	V
Output Current	-	-	2	A

Software Support

We provide a library for the LDO 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 LDO Click driver.

Key functions

- ldo_enable_device This function enables the device by setting the EN pin to HIGH logic state.
- ldo_disable_device This function disables the device by setting the EN pin to LOW logic state.
- ldo_set_vout This function sets the voltage output.

Example Description

This example demonstrates the use of LDO click by changing the output voltage.

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.LDO

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, that needs to be downloaded from the LibStock and installed for the compiler you are using to ensure

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proper operation of mikroSDK compliant Click board™ demo applications.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click Boards™

ClickID

Downloads

LDO click example on Libstock

LDO click 2D and 3D files v101

TPS7A83A datasheet

LDO click schematic v101