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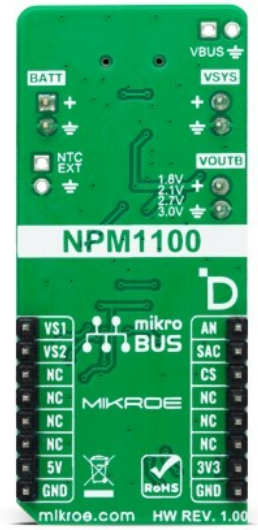
Charger 19 Click



PID: MIKROE-5899

Charger 19 Click is a compact add-on board that contains a battery charger. This board features the nPM1100, an integrated power management IC from Nordic Semiconductor. It has a highly efficient DC/DC buck regulator with automatic selection between hysteretic and PWM modes. The nPM1100 has automatic USB port detection and features discharge current limitation, battery thermal protection, automatic trickle, constant current, and constant voltage charging. This Click board™ makes the perfect solution for developing Li-Ion/Polymer battery chargers for portable devices and accessories, power tools, and more.

Charger 19 Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the mikroBUS™ standard. It comes with the mikroSDK open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this Click board™ apart is the groundbreaking ClickID feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

How does it work?

Charger 19 Click is based on the nPM1100, an integrated power management IC from Nordic Semiconductor. It supports charging batteries at up to 400mA. The charging current can be selected over the CHARGE SEL jumper (100, 200, 400mA). The low quiescent current extends battery life for shipping and storage in Ship mode or in operation with auto-controlled hysteretic buck mode for high efficiency down to 1µA loads. The Ship mode isolates the battery, can be activated by the host MCU, and deactivated over the onboard SHIP MODE RST key button or by connecting the Charger 19 Click to a VBUS power supply. The VBUS can be supplied with power over the USB C connector or the VBUS header with a voltage of 4.1 up to 5.5V.

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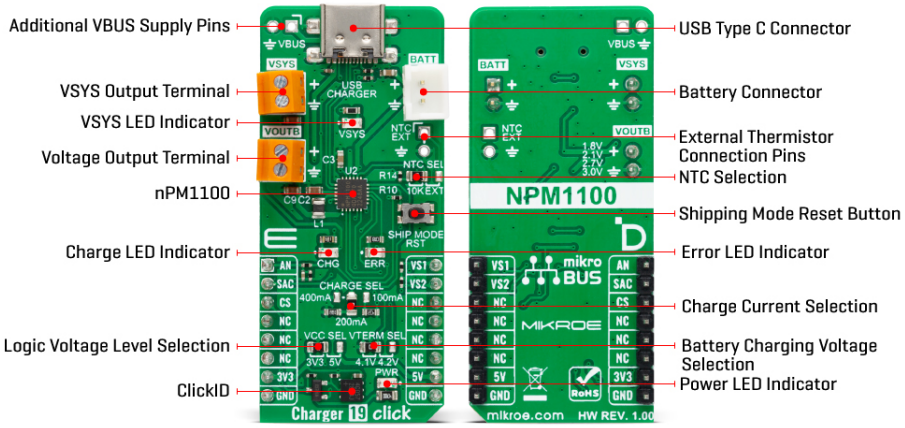

The battery can be connected to the BATT connector with properly labeled polarity. It can also deliver up to 150mA of current to power external components with regulated voltage over the VOUTB terminal. The output voltage can be set in a range of 1.8 – 3.0V by the host MCU, according to the table in the datasheet. There is also a system voltage output terminal VSYS, which is automatically enabled after a power-on reset and indicated by the VSYS LED. In addition, there are CHG and ERR LEDs, which indicate the device's charging status.

The nPM1100 implements a thermal regulation based on battery temperature. There is an NTC SEL jumper to choose between the onboard 10K resistor or an external NTC thermistor, which can be connected over the NTC EXT connector. Finally, the termination voltage can be set over the VTERM SEL jumper between 4.1V and 4.2V (4.1V set by default).

Charger 19 Click uses a general purpose IO pins to communicate with the host MCU. The mentioned shipping mode can be activated over the SAC pin. You can always monitor the battery charging level over the analog AN pin and voltage divider. The buck regulator output voltage can be set over the VS1 and VS2 pins, but only when no connected device exists. You can connect the device to VOUTB after you set the output voltage.

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	Battery charger
Applications	Can be used for developing Li-Ion/Polymer battery chargers for portable devices and accessories, power tools, and more
On-board modules	nPM1100 - integrated power management IC from Nordic Semiconductor
Key Features	Linear-mode Li-Ion/Li-Poly charger, selectable charging current, high efficiency, auto USB detection, battery thermal protection, step-down buck regulator, pin-selectable output voltage, and more

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Interface	Analog,GPIO
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 Charger 19 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Analog Output	**AN**	1	AN	PWM	16	**VS1**	Output Voltage Selection
Shipping Mode	**SAC**	2	RST	INT	15	**VS2**	Output Voltage Selection
ID COMM	**CS**	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
	NC	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
LD2	CHG	-	Charging LED Indicator
LD3	ERR	-	Error LED Indicator
LD4	VSYS	-	VSYS LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	VTERM SEL	Left	Battery Charging Termination Voltage Selection 4.1/4.2: Left position 4.1, Right position 4.2
JP3	CHARGE SEL	Lower	Charge Current Selection 400mA/200mA/100mA : Left position 400mA, Lower Position 200mA, Right position 100mA
JP4	NTC SEL	Left	NTC Selection 10K/EXT: Left Position

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			10K, Right Position EXT
T1	SHIP MODE RST	-	Shipping Mode Hold Button

Charger 19 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	4.1	5	6.7	V
Battery Charging Voltage	4.1	-	4.2	V
Charging Current	100	-	400	mA
System Output Voltage	1.8	-	3	V

Software Support

We provide a library for the Charger 19 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 Charger 19 Click driver.

Key functions

- charger19_set_vout Charger 19 set output voltage function.
- charger19_set_ship_mode Charger 19 set Ship mode function.
- charger19_get_vbat Charger 19 get battery voltage function.

Example Description

This example demonstrates the use of Charger 19 Click board™ by enabling the device and then reading and displaying the battery 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.Charger19

Additional notes and informations

Depending on the development board you are using, you may need USB UART click, USB UART

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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

Click Boards™

ClickID

Downloads

Charger 19 click example on Libstock

Charger 19 click 2D and 3D files

nPM1100 datasheet

Charger 19 click schematic

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