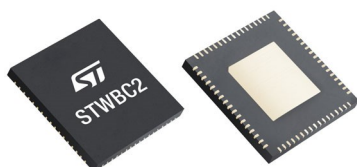


## Digital controller for wireless battery charger transmitters



### Features

- Digital controller for Qi certified wireless power transmitters
  - Compliant with WPC 1.3
  - Power Class 0 BPP (5 W) and EPP (15 W)
  - Proprietary extension from smartphone manufacturers
- SiP with uC and front end device:
  - ARM 32-bit Cortex™-M0+ CPU, frequency up to 64 MHz
  - 3x half-bridge drivers
  - Embedded 3.6 V / 5 V 500 mA DC-DC
  - 3.3 V 150 mA and 1.8 V 50 mA LDOs
  - 6 V to 9 V up to 100 mA voltage doubler
  - Qi FSK programmable modulator
  - Integrated current, voltage and phase demodulators
  - Integrated current and voltage sensors.
- Support for half- and full-bridge topologies with input DC-DC
  - Single and multi-coil topologies
  - Support for limited power sources such as 5 V 500 mA USB
- VIN operative range: 4.1 V to 24 V
- USB physical interfaces
  - USB power delivery
  - QC 3.0
- Communication interfaces
  - UART
  - SPI (up to 28 Mbit/s)
  - I2C (up to 1 Mbit/s)
  - Up to 8x GPIOs
- Peripherals
  - 40 MHz PLL
  - 17-step DLL
  - 1.47 ns resolution PWM generator
  - 8-channel 12-bit 0.5 us ADC
  - Low side differential current sensor
  - Q-Factor driver
- Memory
  - 128 Kbytes of Flash memory with ECC
  - 32 Kbytes of SRAM with HW parity check
- Clock management
  - 4 to 48 MHz crystal oscillator
- Development support: serial wire debug (SWD)
- Operating temperature: -40°C up to 125°C.
- Package: VFQFPN68L 8x8 mm pitch 0.4
- 96-bit unique ID

Product status link
<a href="#">STWBC2</a>
Product label


**Table 1. Ordering information**

Order code	Package	Packaging
STWBC2	VFQFPN68	Tube
STWBC2TR	VFQFPN68	Tape and reel

## Description

The **STWBC2** is a digital controller specifically dedicated to design Qi-certified Wireless Power TX applications. The STWBC2 is a SiP including an STM32™ microcontroller and an application-specific front-end die.

Specifically, the STM32™ microcontroller embedded into the STWBC2 is the STM32G071.

The STWBC2 is capable of driving the DC-DC stage and the half- or full-bridge inverter stage of a generic Qi wireless battery charging TX. It generates and controls the relevant PWM signals by means of a PWM machine capable of 1.47 ns resolution. In order to achieve that, the front-end die includes a 40 MHz PLL and a 17-step DLL.

The STWBC2 front end is capable of working from any DC voltage in the range of 4.1 V to 24 V and embeds:

- 3x half-bridge drivers capable of driving both the FB inverter or the DC-DC MOSFET
- 2x PWM outputs for external gate drivers
- 2x LED / speaker drivers
- 3.6 V / 5 V 500 mA monolithic buck DC-DC to supply the analog portion of the die
- 3.3 V 150 mA LDO to supply the STM32
- 1.8 V 50 mA LDO to supply the core
- 6 V to 9 V up to 100 mA voltage doubler to supply the gate drivers.
- Resonant tank current, voltage and phase sense circuitry and QFactor driver
- USB D+/D- external interface pins for USB BC 1.2 and QC 3.0

The Front End die also includes specific registers and an SPI interface with the STM32, in combination with an output mux for analog signals to the STM32 ADC, and GPIOs for digital signals to the STM32 core.

The STM32 microcontroller embeds an ARM Cortex™-M0+ CPU with up to 128 k Flash memory and up to 32 k of SRAM with parity check, with a clock frequency up to 64 MHz. It also embeds a 12-bit, 0.5 µs ADC and provides UART, I2C, SPI and GPIOs.

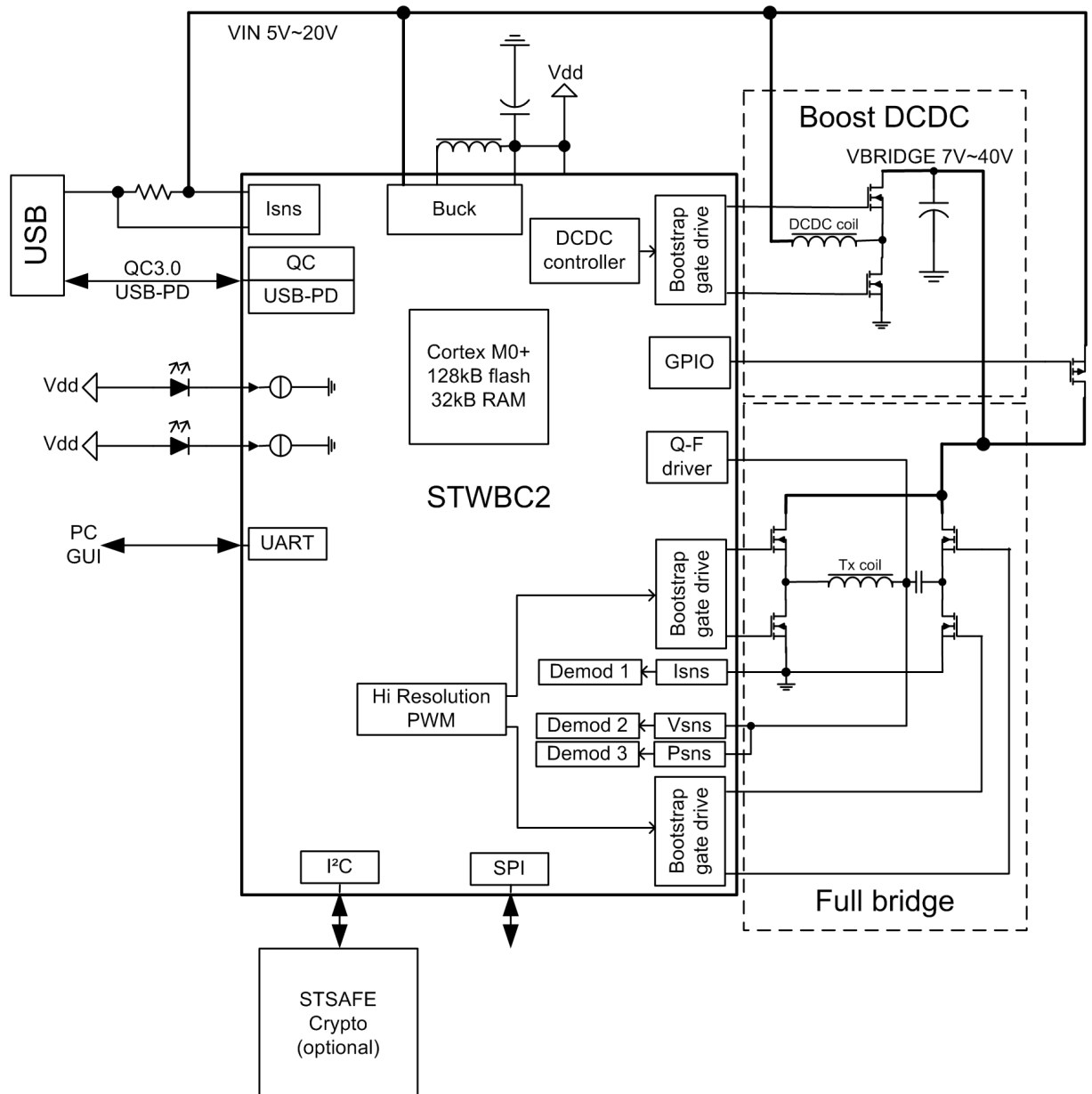
The STM32G071 embedded in STWBC2 also provides two 12-bit DACs and USB-PD controller.

## 1 Block diagrams

### 1.1 Typical application

#### 1.1.1 Qi single coil, variable frequency full-bridge, USB powered

**Figure 1. Qi single coil, variable frequency full-bridge, USB powered**



## Revision history

**Table 2. Document revision history**

Date	Version	Changes
30-Oct-2020	1	Initial release.

## Contents

<b>1</b>	<b>Block diagrams</b>	<b>3</b>
1.1	Typical application	3
1.1.1	Qi single coil, variable frequency full-bridge, USB powered	3
	<b>Revision history</b>	<b>4</b>
	<b>Contents</b>	<b>5</b>
	<b>List of tables</b>	<b>6</b>
	<b>List of figures</b>	<b>7</b>



## List of tables

Table 1.	Ordering information. . . . .	1
Table 2.	Document revision history . . . . .	4

## List of figures

Figure 1.	Qi single coil, variable frequency full-bridge, USB powered. . . . .	3
-----------	--	---

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, please refer to [www.st.com/trademarks](http://www.st.com/trademarks). All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2020 STMicroelectronics – All rights reserved