STWBC2-HP

Data brief

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)
  - Power Tx design topologies MP-A2 and MP-A22
  - Proprietary ST Super Charge extension for high power charging
- 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 DC-DC
  - 3.3 V and 1.8 V LDOs
  - 6 V to 9 V 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
- Communication interfaces
  - UART
  - SPI (up to 28 Mbit/s)
  - I2C (up to 1 Mbit/s)
  - Up to 8x GPIOs
- Peripherals
  - 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
- 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
STWBC2-HP

Product label
SUSTAINABLE TECHNOLOGY

Table 1. Ordering information

Order code	Package	Packaging
STWBC2-HP	VFQFPN68	Tape & Reel

Description

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

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

The STWBC2-HP 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-HP 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 monolithic buck DC-DC to supply the analog portion of the die
- 3.3 V LDO to supply the STM32
- 1.8 V LDO to supply the core
- 6 V to 9 V voltage doubler to supply the gate drivers
- Resonant tank current, voltage and phase sense circuitry and Q-factor driver
- USB D+/D- external interface pins for USB PD

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

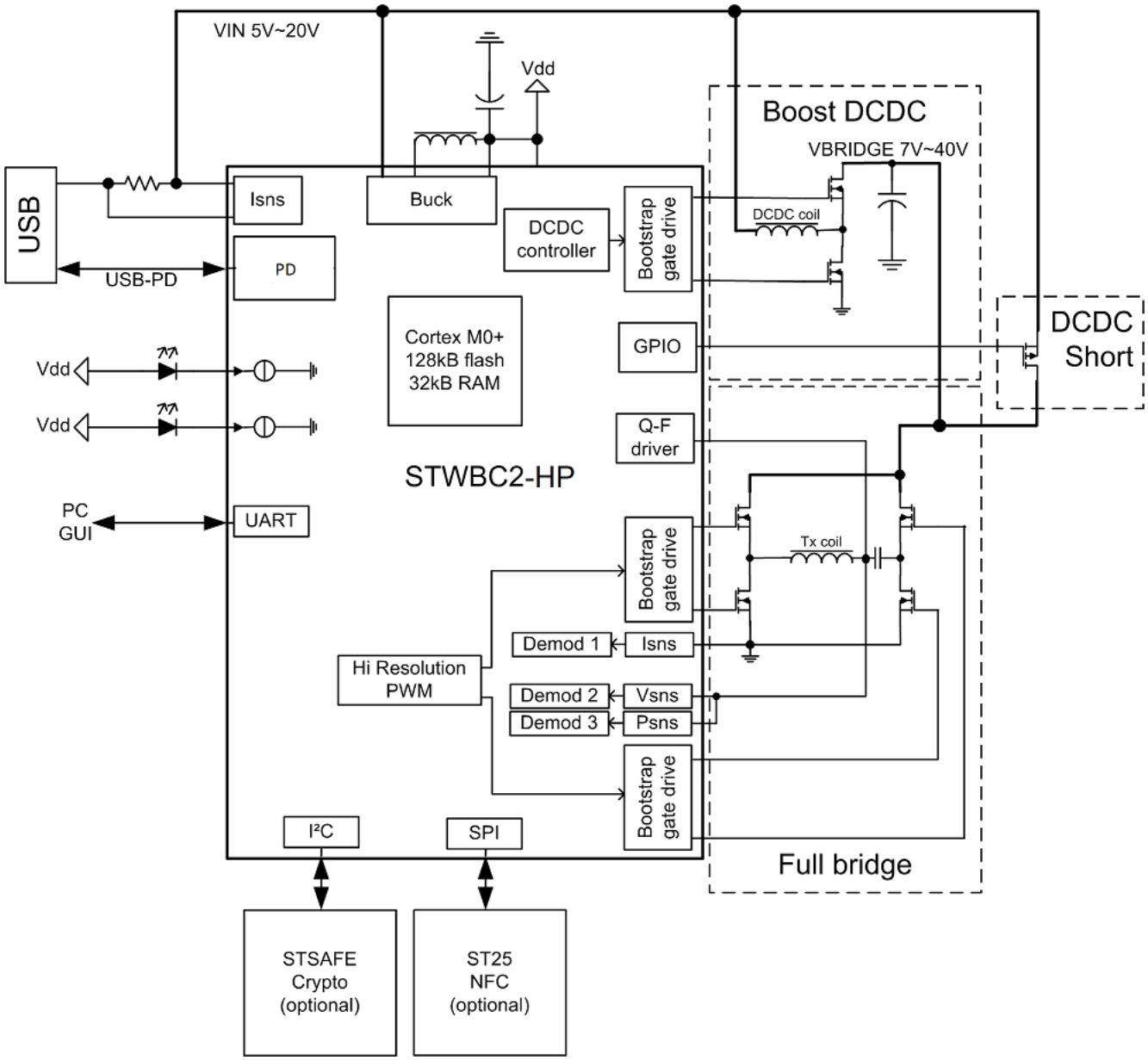
The STM32G071 embedded in STWBC2-HP also provides two 12-bit DACs and USB-PD controller.

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
14-Sep-2021	1	Initial release.