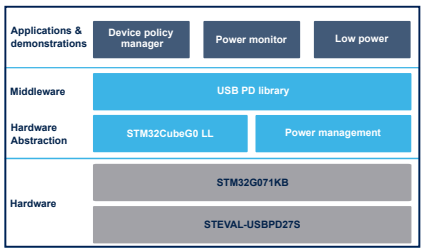
STSW-USBPD27SFW

Data brief

Software package for STEVAL-USBPD27S Compact 27W USB Type-C™ Power Delivery 3.1 adapter



Features

- Software package for the STEVAL-USBPD27S 27 W AC-DC certified USB-C and Power Delivery adapter with Programmable Power Supply (PPS) functionality (TID: 5445)
- USB-PD middleware stack based on STM32CubeG0 STM32Cube MCU Package for STM32G0 series running on the certified ARM® Cortex®-M0+ 32-bit STM32G071KBU6N microcontroller (TID: 5444)
- Proprietary IPs included: Synchronous Rectification, V_{BUS} Control Algorithm (for PPS Management) and Low Power Manager

Description

The STSW-USBPD27SFW software package contains the application source code designed to demonstrate the capabilities of the STEVAL-USBPD27S 27 W AC-DC USB-C and Power Delivery adapter with PPS functionality.

The application firmware is designed to run on the mainstream ARM® Cortex®-M0+ 32-bit STM32G071KB microcontroller integrated in the STEVAL-USBPD27S and embeds the USB-PD middleware stack coming from the STM32CubeG0 firmware package, making the solution compliant with the USB Type-C v.2.0 and Power Delivery v.3.1 specifications.

The STEVAL-USBPD27S running STSW-USBPD27SFW is certified by USB-IF as Power Brick (TID: 5445). STM32G071KBU6N is certified by USB-IF as PD Controller (TID: 5444).

The STSW-USBPD27SFW embeds three proprietary software IPs (as compiled libraries) that allow the STM32G071KB microcontroller to manage the synchronous rectification (SR) mechanism and to operate on the output voltage/current to cope with the Programmable Power Supply feature. Thus, the microcontroller acts as synchronous rectification manager and USB Power Delivery controller, maximizing the power conversion efficiency and reducing the system-level power consumption and the BOM components. These requirements, together with the microcontroller low power mode, allow a low standby power consumption in line with the energy efficiency regulation (CoC Tier 2 and DoE Level VI).

The application firmware enables the adapter to deliver two fixed PDOs (5 V at 5 A, 9 V at 3 A), properly managing the constant voltage (CV) mechanism, and two APDOs (5 V Prog at 5 A and 9 V Prog at 3 A), adjusting the output voltage with 20 mV steps in CV mode and the output current with 50 mA steps in constant current (CC) mode.

Product summary	
Compact 27W USB Type-C™ Power Delivery 3.1 with PPS adapter reference design	STEVAL-USBPD27S
Mainstream Arm Cortex-M0+ MCU with 128 Kbytes of Flash memory, 36 Kbytes RAM, 64 MHz CPU, including USB Type-C and Power Delivery Interface	STM32G071KB
STM32Cube MCU Package for STM32G0 series	STM32CUBEG0
Compact in-circuit debugger and programmer for STM32	STLINK-V3MINI
Software package for STEVAL-USBPD27S	STSW-USBPD27SFW
Application	Wired Connectivity

1 System requirements

STSW-USBPD27SFW runs on the STEVAL-USBPD27S board only.

For more details on all the components of the USB-PD libraries, refer to:

- UM2552: Managing USB power delivery systems with STM32 microcontrollers
- AN5225: USB Type-C™ Power Delivery using STM32xx Series MCUs and STM32xxx Series MPUs
- TA0357: Overview of USB Type-C and Power Delivery technologies

2 Ordering information

STSW-USBPD27SFW is available for free download at www.st.com.

3 License

STSW-USBPD27SFW is delivered under the Mix Ultimate Liberty+OSS+3rd-party V1 license. The software components provided within this package come with different license schemes as shown in Table 1. Software component license agreements. For more details, refer to the license agreement of each component.

Table 1. Software component license agreements

Software component	Owner	License
Cortex®-M CMSIS	Arm®	BSD 3-Clause
FreeRTOS™ Kernel	Copyright (C) 2017 Amazon.com, Inc. or its affiliates	MIT open source license
STM32WB HAL/LL APIs	STMicroelectronics International N.V.	BSD 3-Clause
STM32 USB-PD Library	STMicroelectronics International N.V.	Ultimate Liberty (SLA0044)
STSW-USBPD27SFW	STMicroelectronics International N.V.	Mix Ultimate Liberty (SLA0048)
STEVAL-USBPD27S BSP APIs	STMicroelectronics International N.V.	Ultimate Liberty (SLA0044)
STEVAL-USBPD27S PPS Library	STMicroelectronics International N.V.	Product Limited License Agreement (SLA0068)
STEVAL-USBPD27S Synchronous Rectification (SR) Library	STMicroelectronics International N.V.	Product Limited License Agreement (SLA0068)

Revision history

Table 2. **Document revision history**

Date	Version	Changes
27-Oct-2020	1	Initial release.
13-Sep-2021	2	Updated cover page features, description and product summary table.

Contents

List of tables