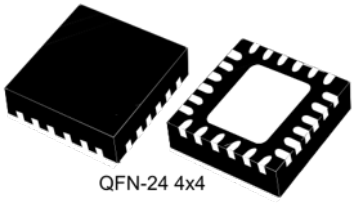
STUSB4500L

Datasheet

Standalone USB Type-C™ sink port controller

WLCSP-25 2.6x2.6



QFN-24 4x4

Features

- Auto-run Type-C™ sink controller
- Dead battery mode support
- Integrated V_{BUS} switch gate drivers (PMOS)
- Integrated V_{BUS} voltage monitoring
- Short-to-VBUS protections on CC pins
- High voltage capability on V_{BUS} pins
- V_{BUS} powered:
  - Zero consumption on local battery or application
  - V_{DD} = [4.1 V; 22 V]
- Temperature range: -40 °C up to 105 °C
- ESD: 3 kV HBM - 1.5 kV CDM
- Certified:
  - USB Type-C™ rev 1.4
  - Power sinking device (TID #1455)

Applications

- Printers, camcorders, cameras
- IoT, drones, accessories and battery powered devices
- Computer accessories (keyboards, mouse)
- Toys, gaming, POS, scanner, LED lighting
- Healthcare, e-cigarettes, handheld devices
- USB accessories
- 5 V DC barrel, USB STD-B and micro-B replacement
- Any 5 V Type-C sink device

Product status link
STUSB4500L

Product summary	
Order code	STUSB4500LQTR
	STUSB4500LBJR
Description	Standalone USB Type-C controller (auto-run mode)
Package	QFN-24 EP (4x4)
	WLCSP-25 (2.6x2.6x0.5)
Marking	4500L

Description

The STUSB4500L is a USB Type-C controller that addresses sink devices.

This device supports dead battery mode and is suited for sink devices powered from dead battery state. It is able to operate without any external software support for quick application power-on and immediate charging process start. At type-C connection, the STUSB4500L seeks CC pin for SOURCE termination and monitors V_{BUS} voltage in order to protect the application from an incorrect SOURCE operation. When V_{BUS} is within the appropriate range, the STUSB4500L powers the application by closing the input switch. The available current advertised by the SOURCE is reported to the application in order to align the sinking current. Port status can be optionally monitored by the software through I²C interface.

Thanks to its 20 V technology, it implements high voltage features to protect the CC pins against short-circuits to V_{BUS}.

1 Functional description

The STUSB4500L is a USB Type-C™ IC controller addressing 5 V sink applications. It supports dead battery mode to allow a system to be powered from a V_{BUS} power source directly.

The STUSB4500L major role is to:

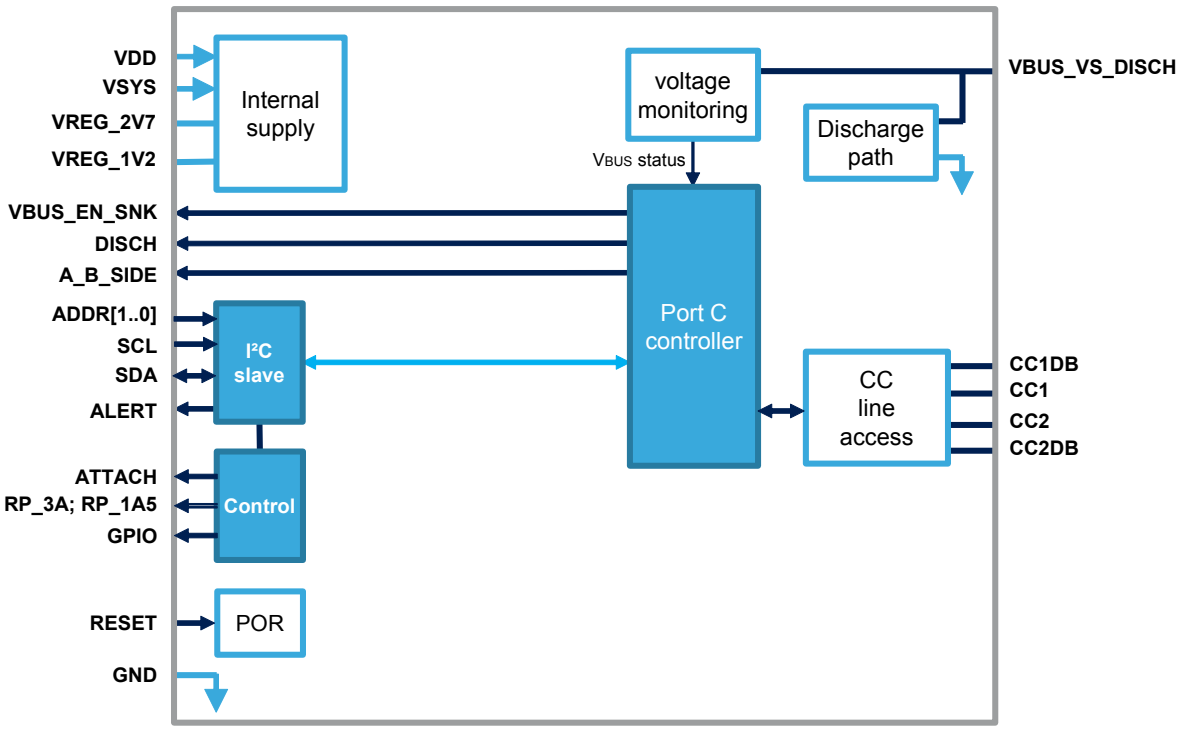
1. Detect the connection between two USB Type-C ports (attach detection)
2. Establish a valid source-to-sink connection
3. Identify the attached device: source or debug accessory
4. Resolve cable orientation and twist connections to establish USB 3 data routing (MUX control) if any
5. Configure the incoming V_{BUS} power path
6. Monitor the V_{BUS} power path
7. Report the available power advertised by the source
8. Handle the high voltage protections

The STUSB4500L also provides:

- Dead battery mode
- Internal and/or external V_{BUS} discharge paths
- Debug accessory mode detection
- Customization of the device configuration through NVM to support specific applications

1.1 Block overview

Figure 1. Functional block diagram



2 Inputs/outputs

2.1 Pinout

Figure 2. **QFN-24 pin connections (top view)**

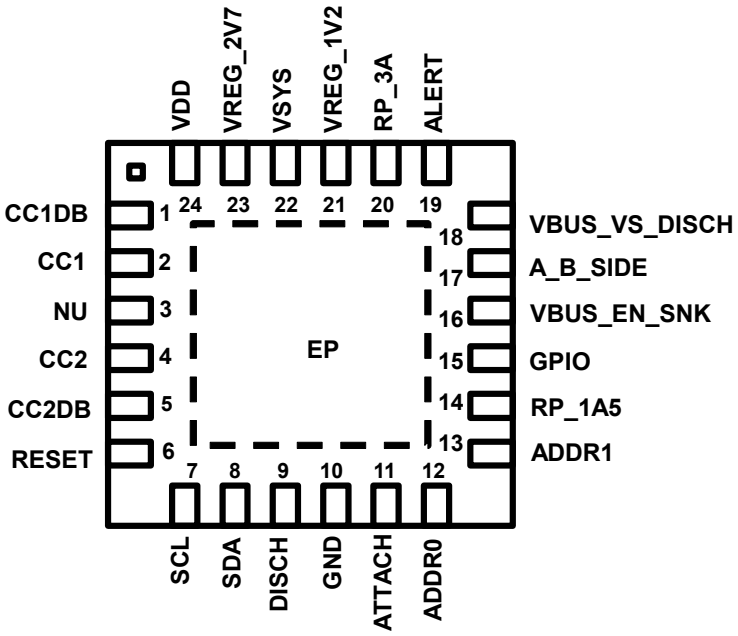


Figure 3. **WLCSP-25 pin connections (top view)**