Circuit Documentation for ESP32-C3FN4 with TP4056 Battery Charger and CP2102 USB-UART converter

# Overview

This documentation outlines the design and functionality of a lithium-ion battery charging circuit using an ESP32-C3FN4 microcontroller and a TP4056 charging module. The circuit is designed to safely charge a battery while offering programmable control and monitoring capabilities.

# Components and Their Functions

**1. ESP32-C3FN4 Microcontroller**

- Function: Acts as the main controller, managing charging processes and interfacing with external systems.

**- Features:**

- 32-bit RISC-V architecture

- 2.4 GHz Wi-Fi and Bluetooth LE

- Integrated peripherals (UART, SPI, I2C, etc.)

**2. TP4056 Battery Charger Module**

- Function: Charges a single-cell lithium-ion battery with constant current/constant voltage (CC/CV) method.

**- Features:**

- Input Voltage: 4.5V to 5.5V

- Charging Current: Programmable via resistor

- Integrated protection features

**3. Battery Protection Circuit**

- Components: DW01A protection IC and FS8205 MOSFETs

- Function: Protects the battery from overcharge, over-discharge, and overcurrent.