

EV Charger Design Overview

Highlights:

Custom Boost Converter:

- Boosts voltage from 12V-24V with Texas Instruments switching IC
- Layout minimized the area of the switching loop to limit parasitic inductance
- Maximized copper area for cooling and improved stability

EVSE Charger Logic:

- Designed the board to conform to the SAE J1772 charging standard
- Uses pilot and proximity control signals to communicate with charging controller and determine current limit and charging state

High Voltage Safety:

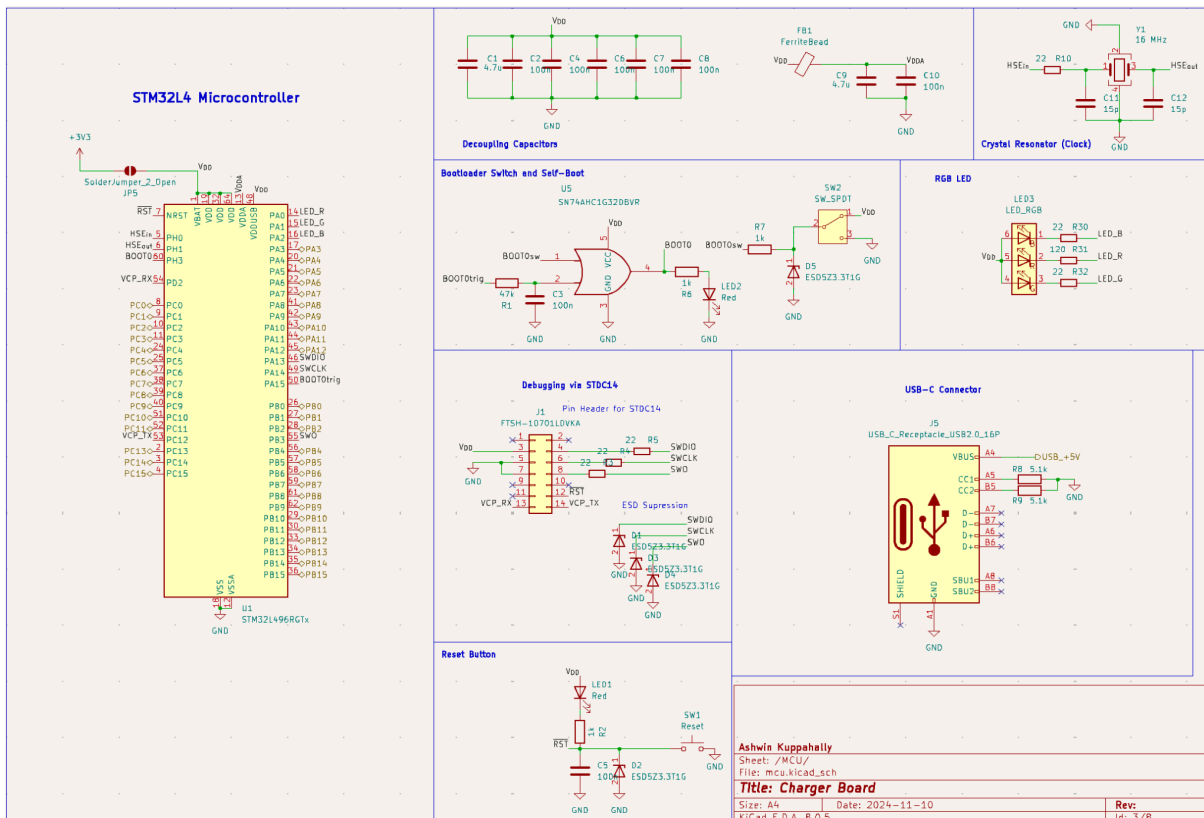
- Designed shutdown loop in-line with vehicle fault signals to integrate with battery safety systems
- Designed high-current traces with sufficient width to ensure an acceptable temperature differential

Design:

- Designed charger faceplate and case in Solidworks and sourced parts like the e-stop button, status lights, and display
- Mounted Elcon DC-DC converter to maximize airflow and cooling

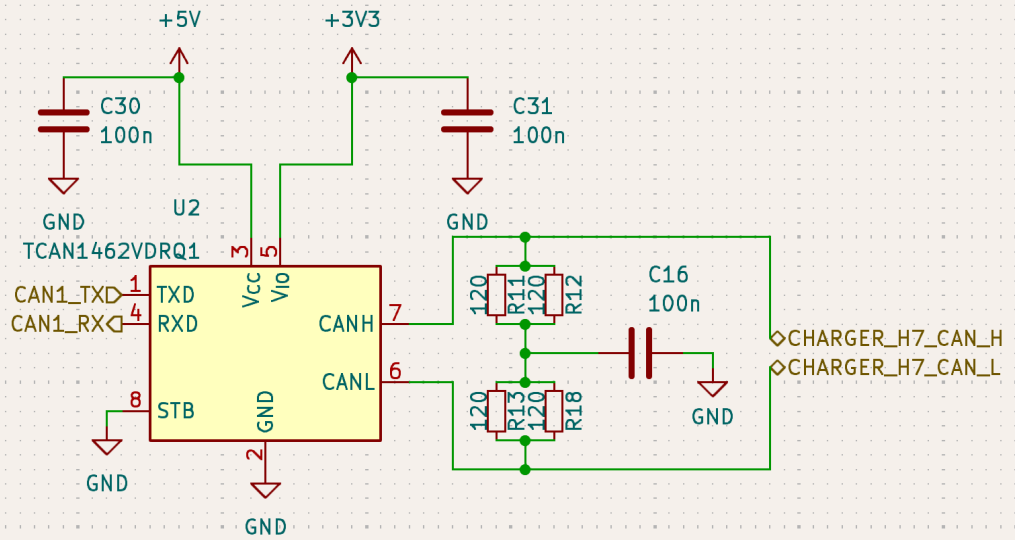
Schematic Overview

STM32 Microcontroller:



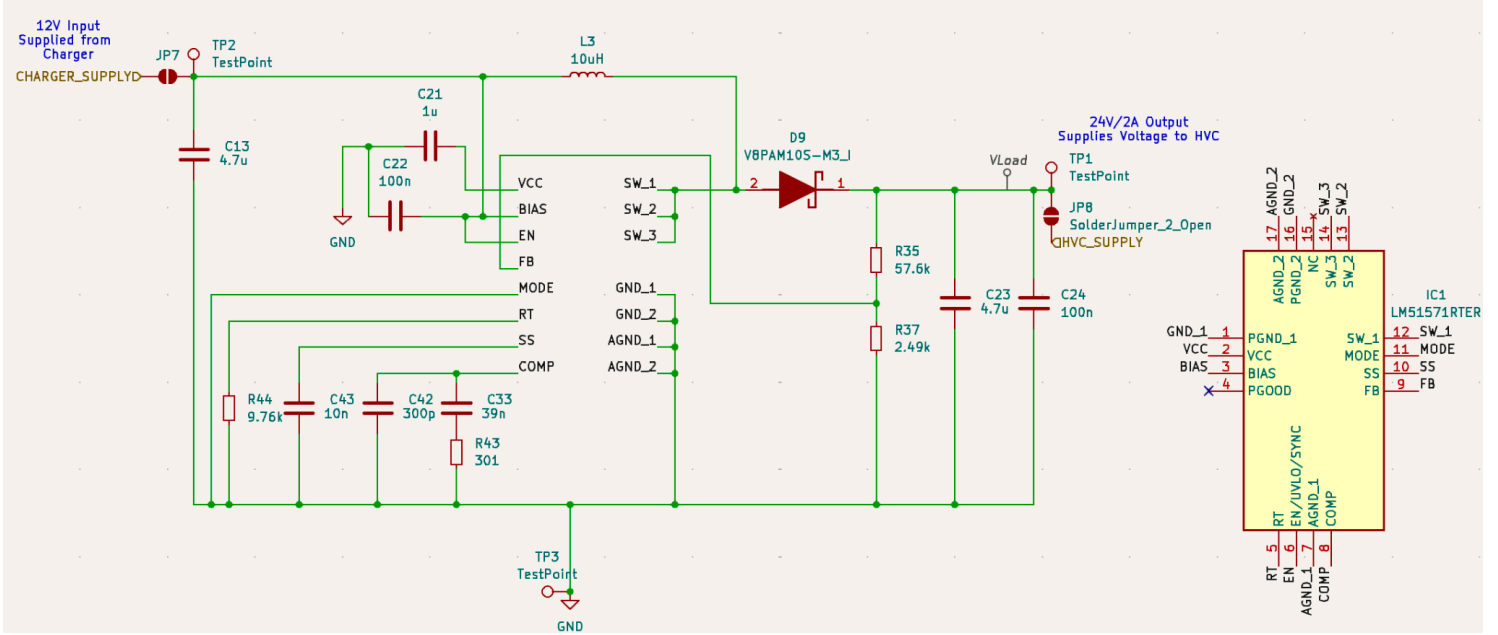
Texas Instruments CAN Transceiver:

Charger CAN Transceiver



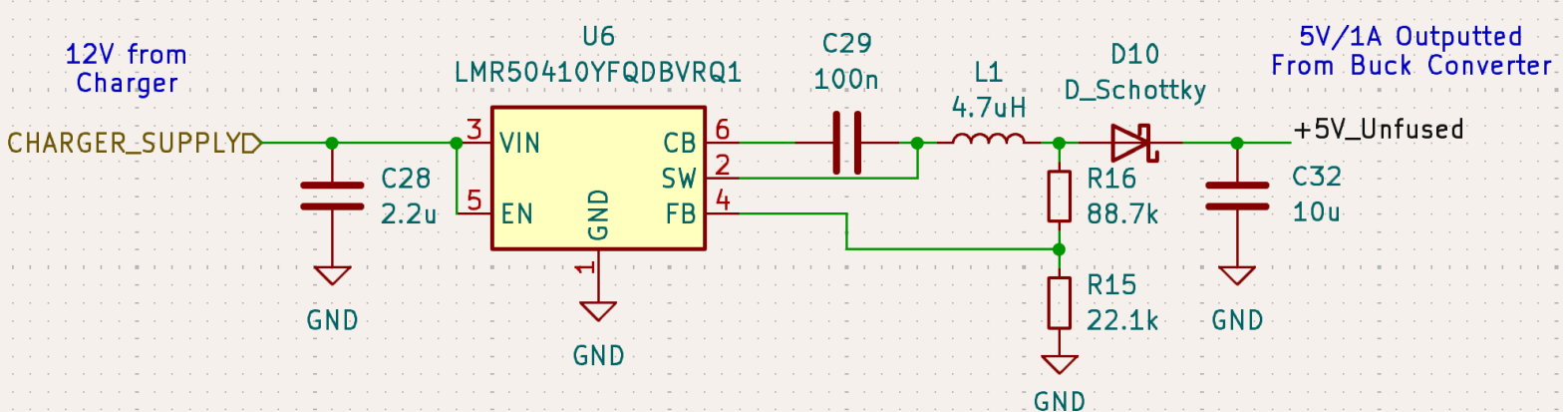
12V - 24V @2A Boost Converter:

12V - 24V @2A Boost Converter

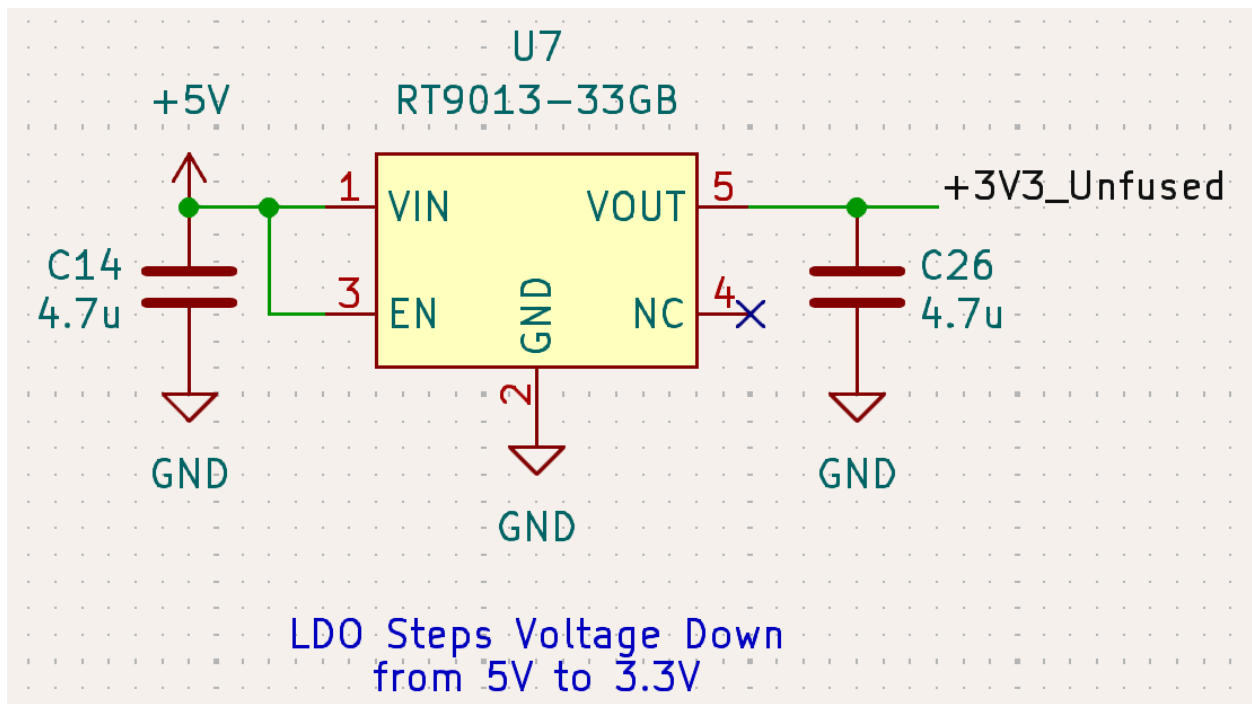


12V - 3.3V Buck Converter:

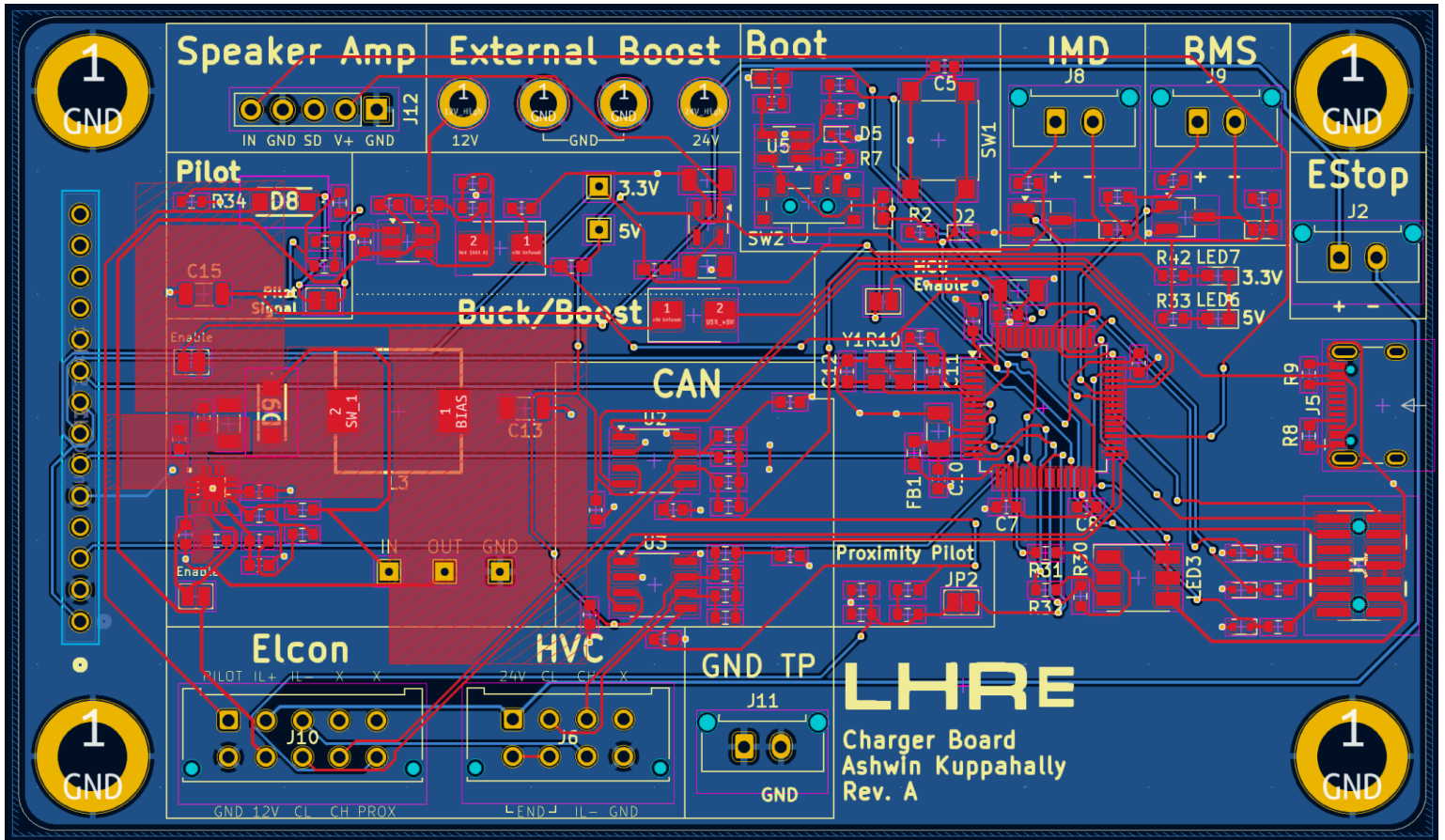
12V - 3.3V Buck Converter

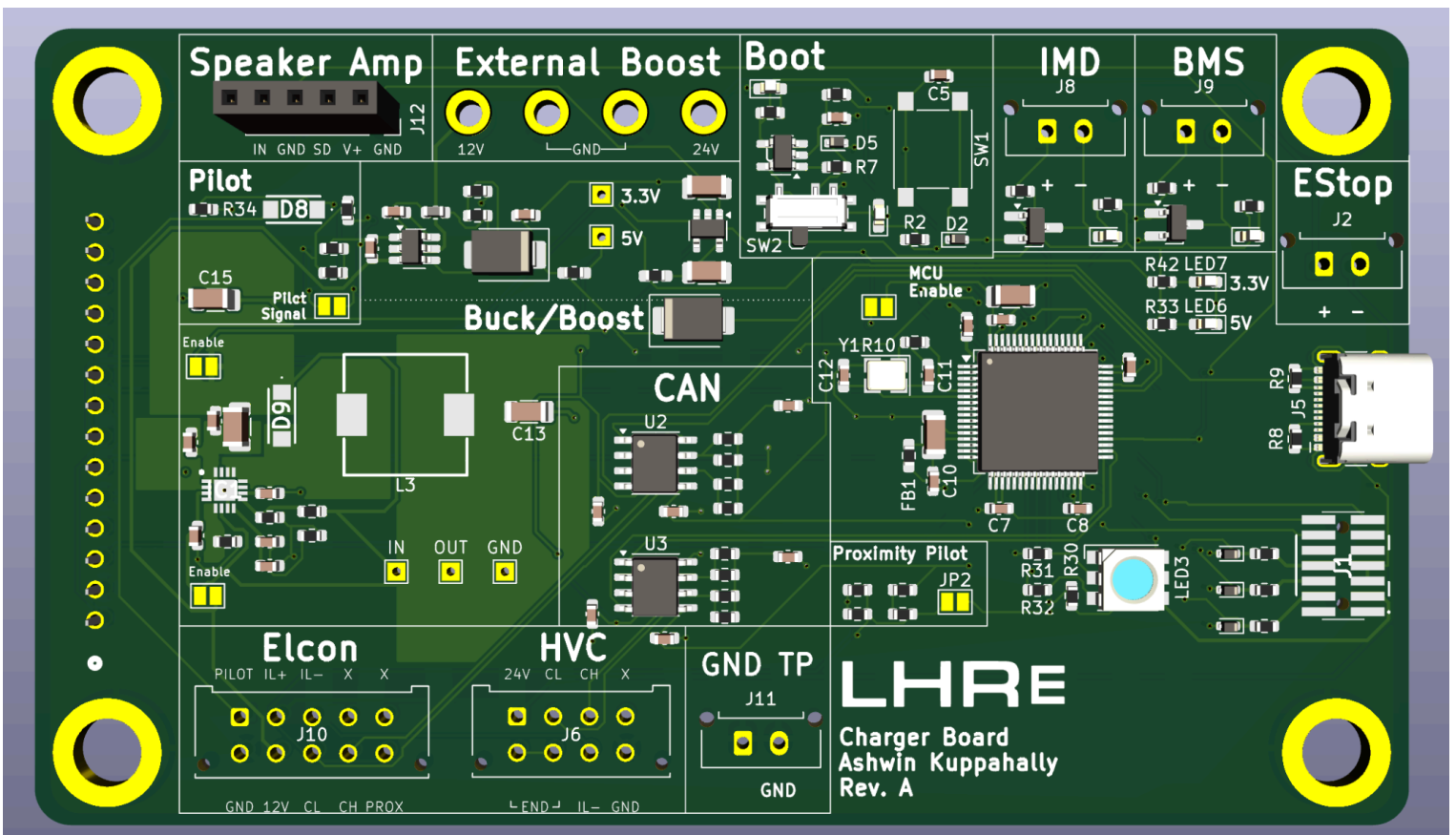


LDO 5V to 3.3V Voltage Step Down:

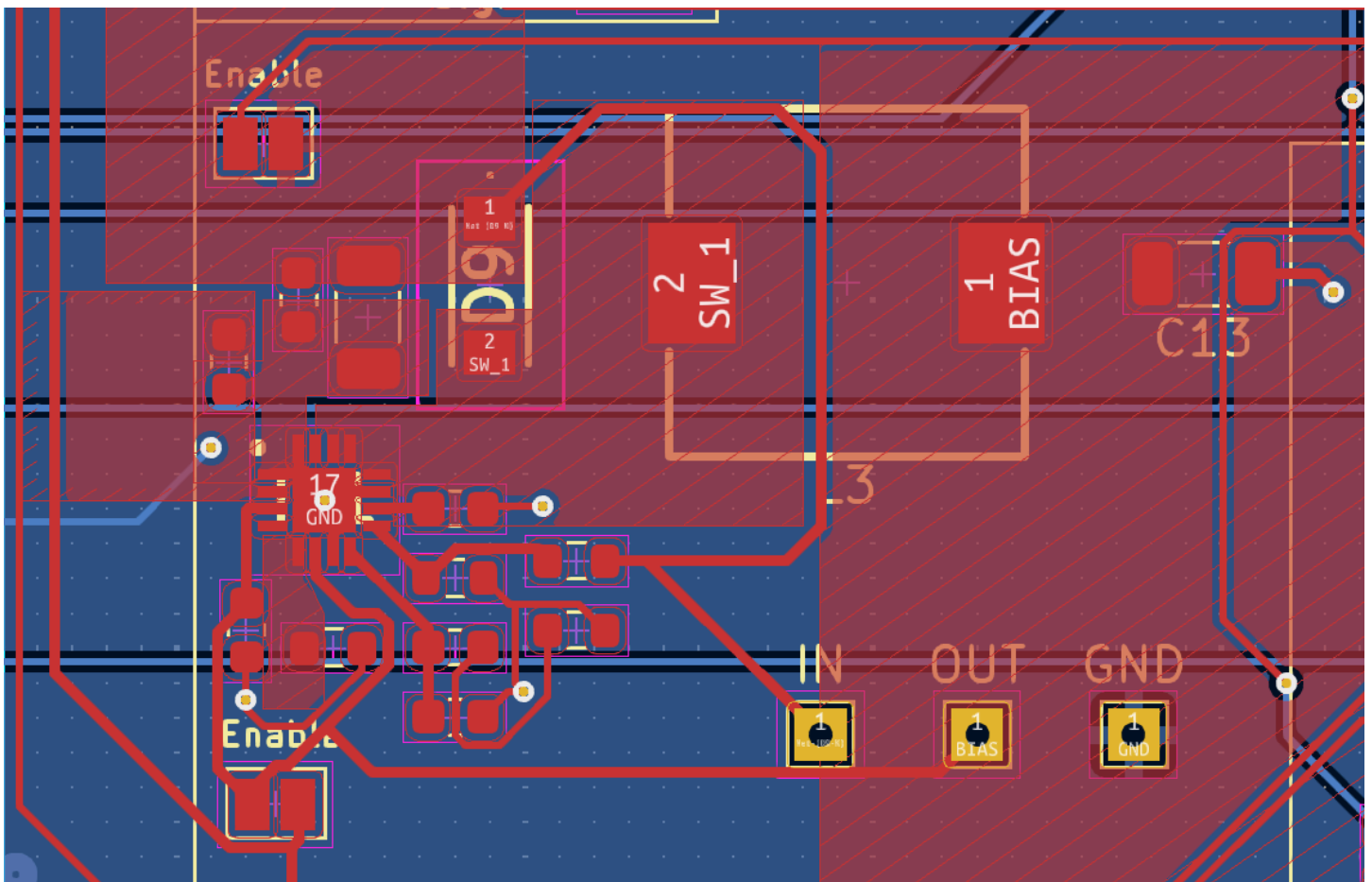


Layout Overview





12V - 24V Boost Converter:



Design Overview

