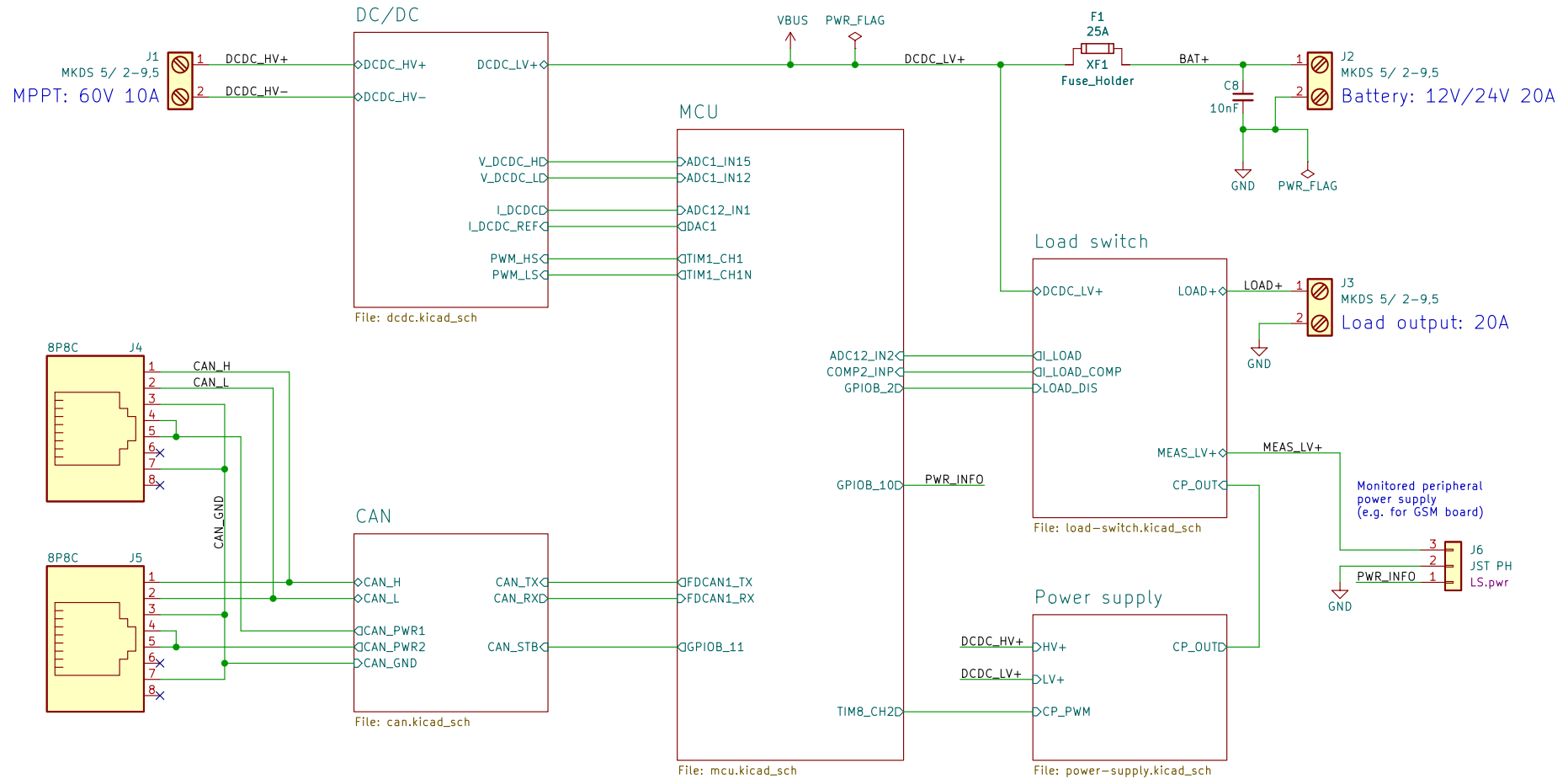


# MPPT charge controller with HS load switch and CAN



MPPT 2420 HC

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Author: Martin Jäger

Sheet: /  
File: mppt-2420-hc.kicad\_sch

Size: A4 Date: 2021-01-06

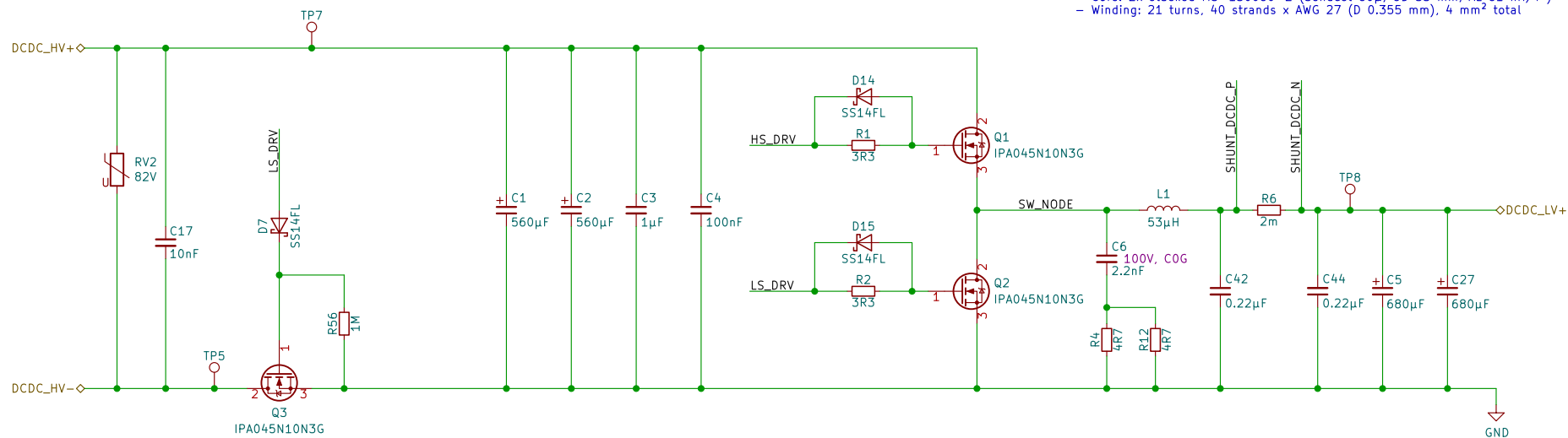
KiCad E.D.A. kicad 6.0.10-86aedd382b-118-ubuntu20.04.1



Rev: 0.2.3

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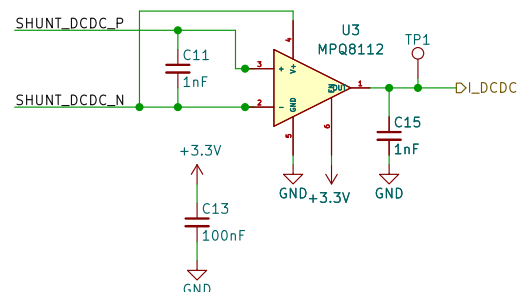
## DC/DC power stage



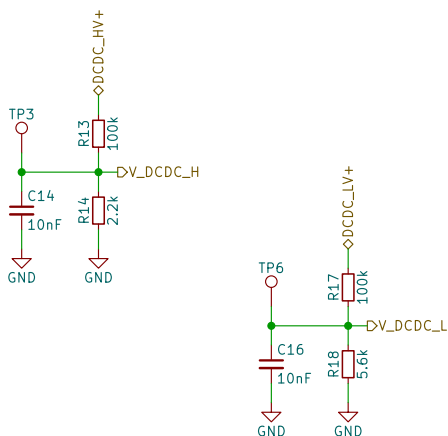
Main inductor L1 layout:  
 - Core: 2x stacked MS-130060-2 (Sendust 60μ, OD 33 mm, AL 61 nH/T<sup>2</sup>)  
 - Winding: 21 turns, 40 strands x AWG 27 (D 0.355 mm), 4 mm<sup>2</sup> total

Reverse polarity protection and  
PV reverse current blocking

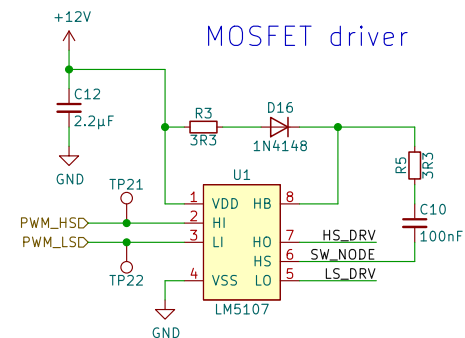
## Inductor current measurement



## Voltage measurement



## MOSFET driver



## MPPT 2420 HC

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Author: Martin Jäger

Sheet: /DC/DC/  
 File: dcdc.kicad\_sch

Size: A4

Date: 2021-05-03

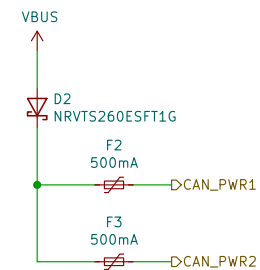
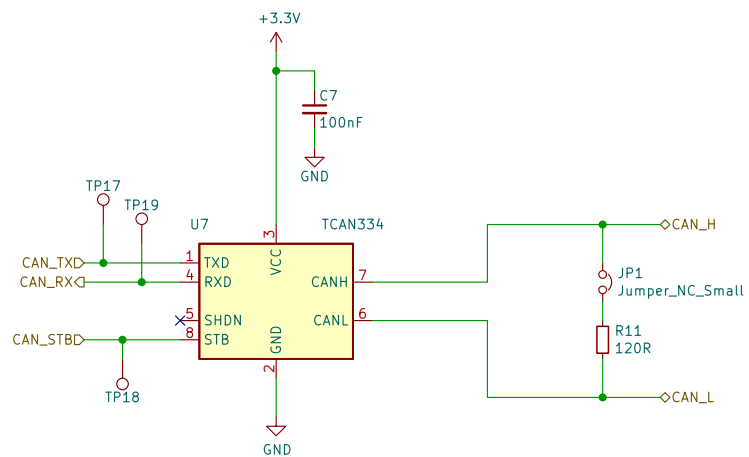
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If not stated otherwise, all MLCC 50V X7R



CAN bus power supply  
 - 10V-32V  
 - 600 mA (like PoE)

Diodes necessary to prevent  
 separate GND loops.

Polyfuse to prevent  
 over-current in daisy-chained  
 bus with multiple sources and  
 sinks.

## MPPT 2420 HC

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Author: Martin Jäger

Sheet: /CAN/  
 File: can.kicad\_sch

Size: A4

Date: 2021-01-06

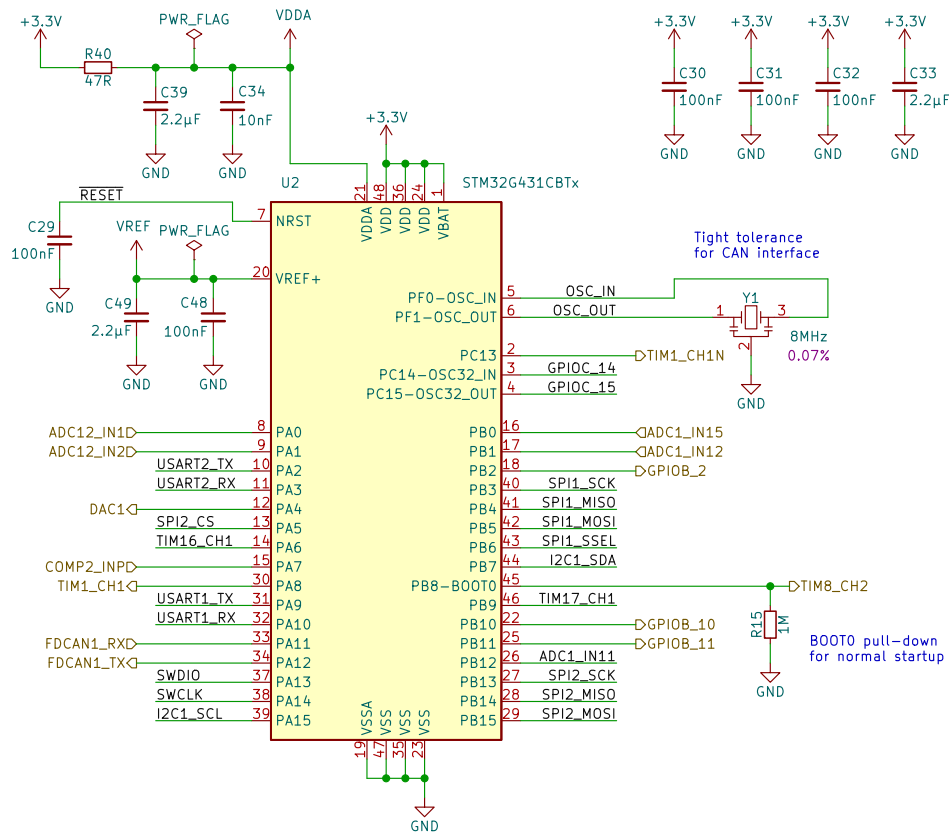
KiCad E.D.A. kicad 6.0.10-86aedd382b-118-ubuntu20.04.1



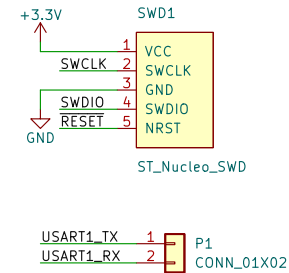
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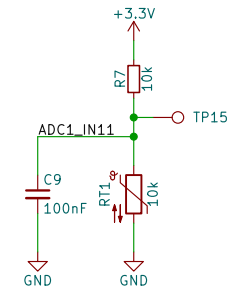
## MCU STM32G431



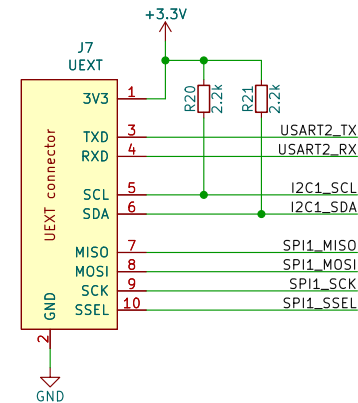
## STM Nucleo SWD and USART



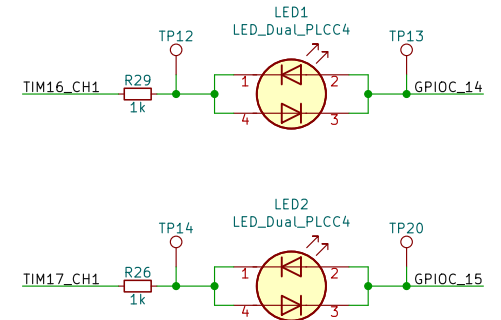
## Internal temperature



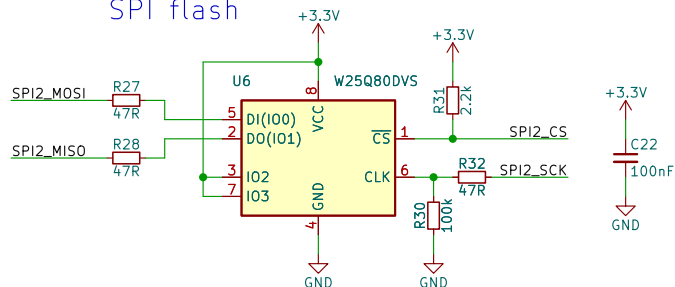
## UEXT



## Status LEDs



## SPI flash



If not stated otherwise, all MLCC 50V X7R

## MPPT 2420 HC

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Author: Martin Jäger

Sheet: /MCU/  
File: mcu.kicad\_sch

Size: A4

Date: 2021-03-17

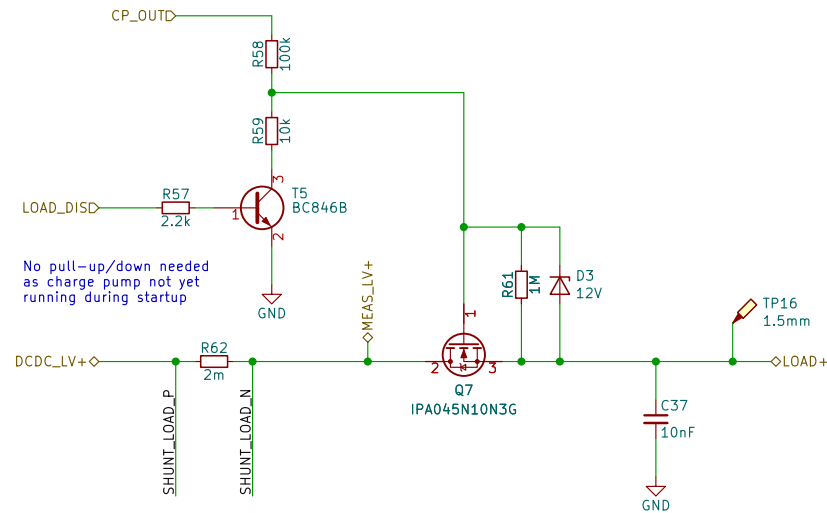
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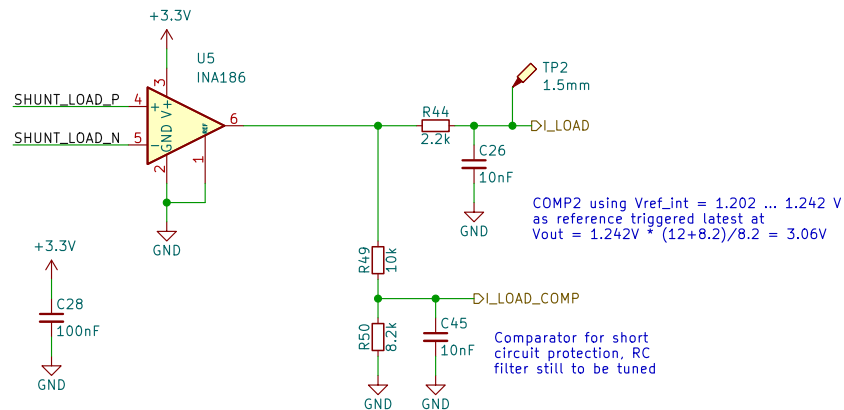
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## High-side load switch



## Load current monitoring



## MPPT 2420 HC

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Author: Martin Jäger

Sheet: /Load switch/  
File: load-switch.kicad\_sch

Size: A4

Date: 2021-01-06



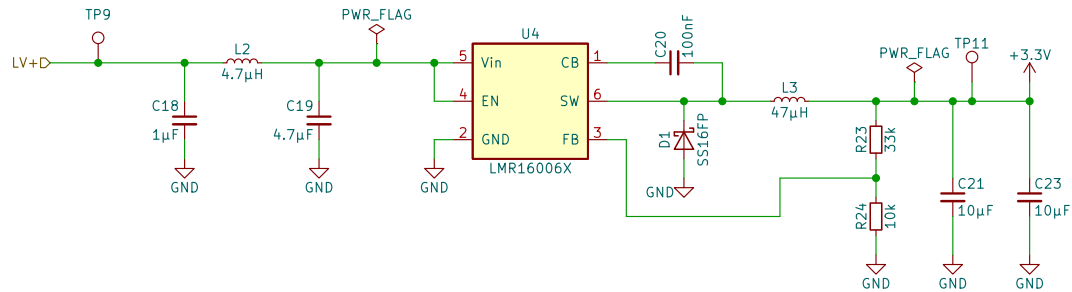
KiCad E.D.A. kicad 6.0.10-86aedd382b-118-ubuntu20.04.1

Rev: 0.2.3

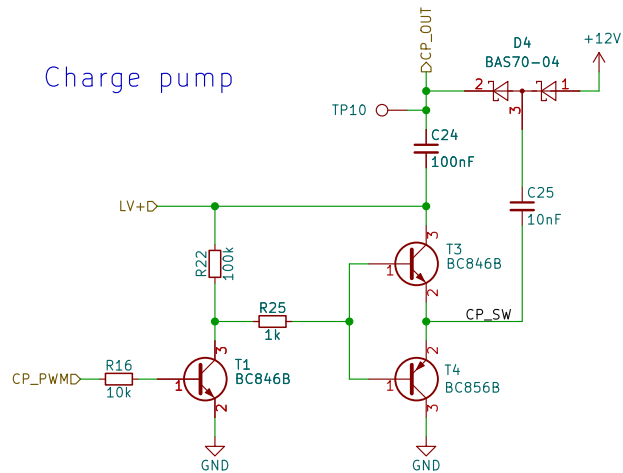
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If not stated otherwise,  
all MLCC 50V X7R

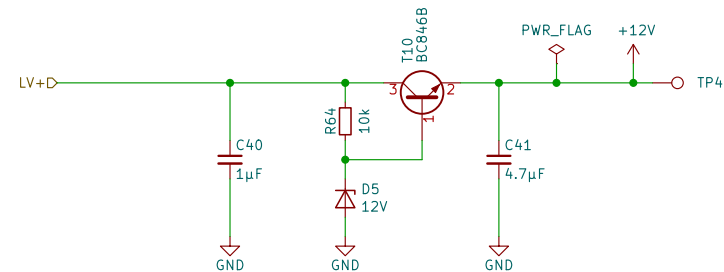
# LV side to 3.3V (SMPS)



## Charge pump



## 12V MOSFET driver supply voltage (emitter follower)



If not stated otherwise, all MLCC 50V X7R

## MPPT 2420 HC

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Author: Martin Jäger

Sheet: /Power supply/  
File: power-supply.kicad\_sch

Size: A4

Date: 2021-01-06

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