

12V / 10A MPPT Solar Charge Controller with USB

Sheet: MCU

MCU

File: mcu.sch

Sheet: DCDC power stage

DC/DC

File: dcdc.sch

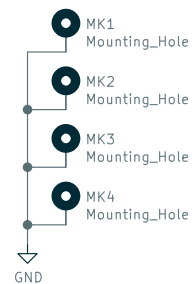
Sheet: Power Supply

Power
USB

File: power_supply.sch

Main Specifications

- 12V battery voltage
- 10A max. charge current
- 55V max. solar input
- 32bit ARM MCU (STM32L072)
- Expandable via Olimex Universal Extension Connector (UEXT) featuring I2C, Serial and SPI interface (e.g. used for display, WIFI communication, etc.)
- USB charging
- High-side load switching



MPPT 1210 HUS

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Author: Martin Jäger

Sheet: /
File: mppt-1210-hus.sch

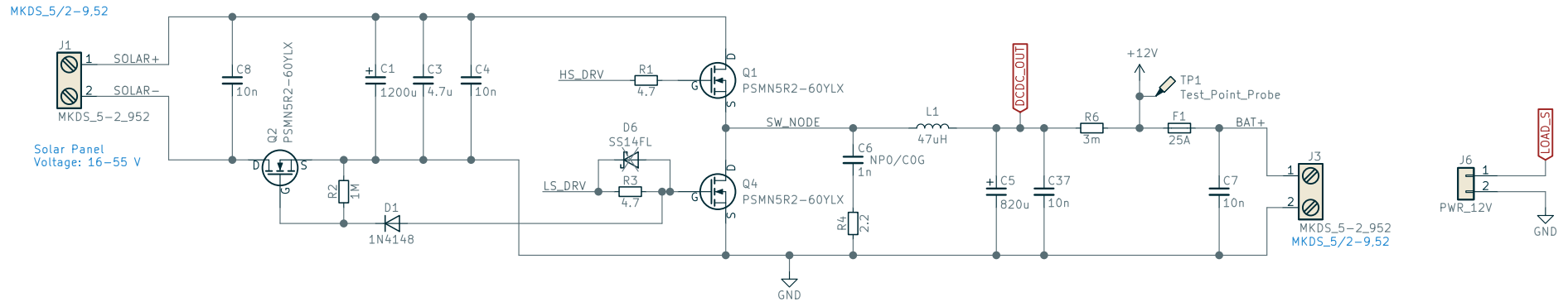
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Date: 2021-05-02

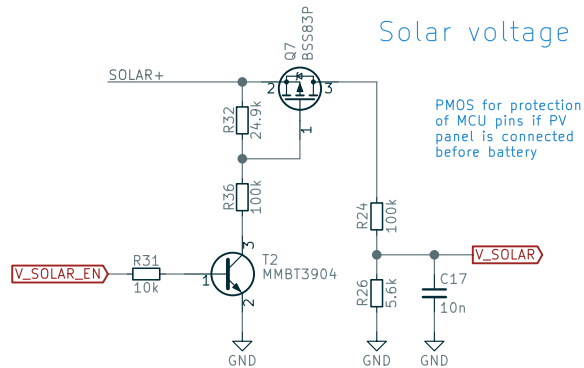


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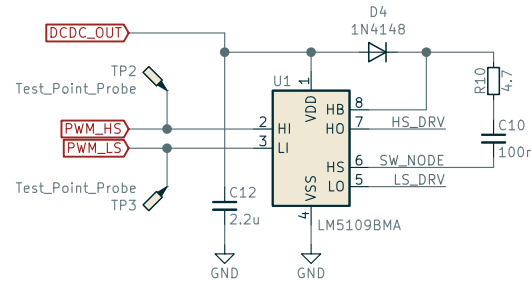
DC/DC power stage



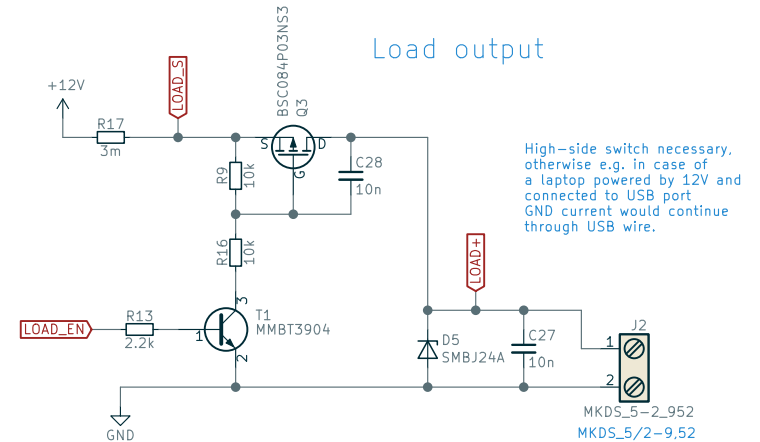
Solar voltage



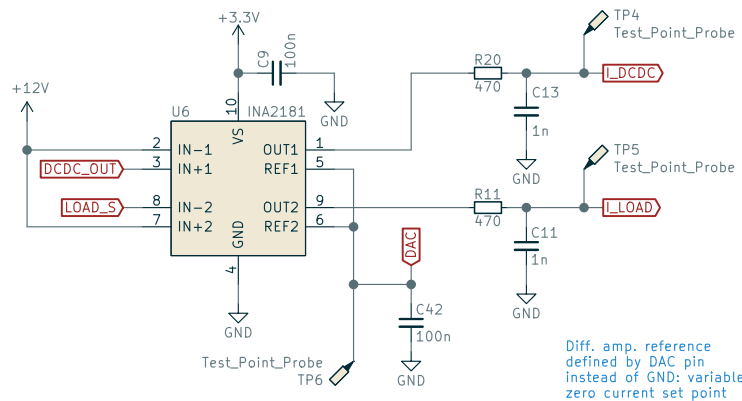
MOSFET driver



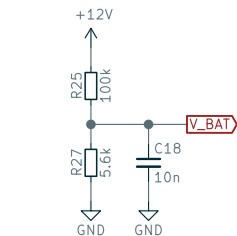
Load output



Current sense amplifier



Battery voltage



Same voltage divider for V_SOLAR and V_BAT to use COMP1 for MCU wake-up when Vsolar > Vbat

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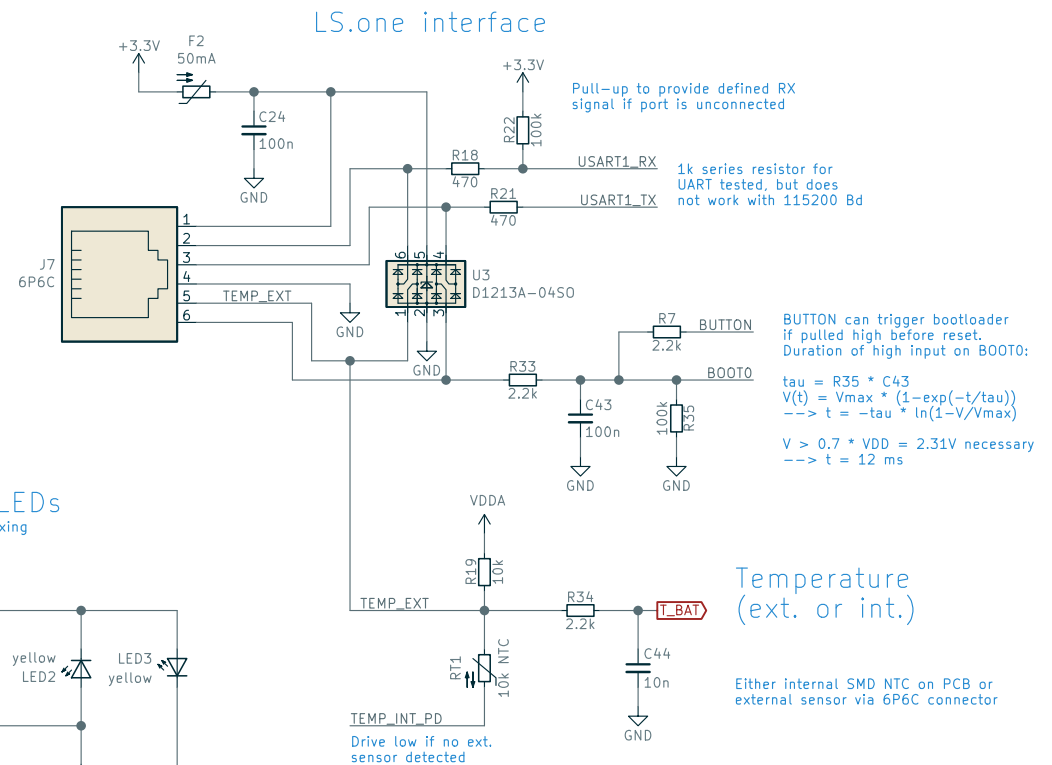
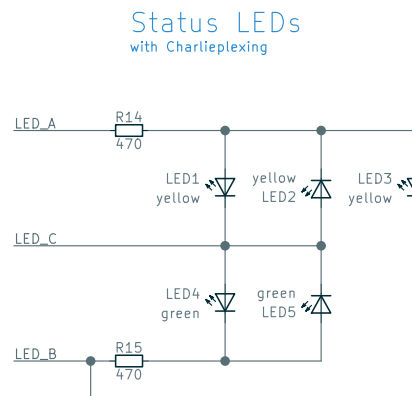
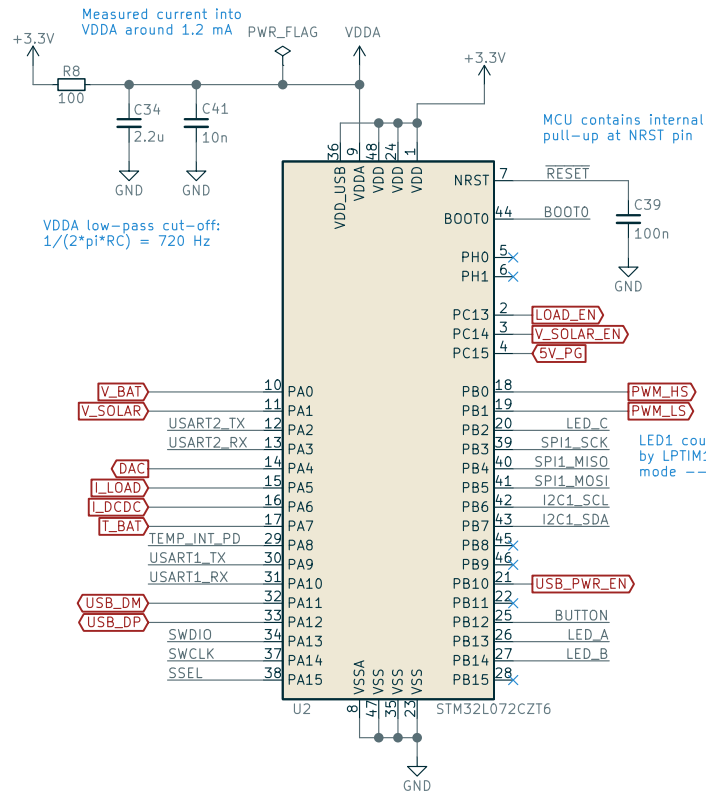
Author: Martin Jäger

Sheet: /DCDC power stage/
File: dcdc.sch

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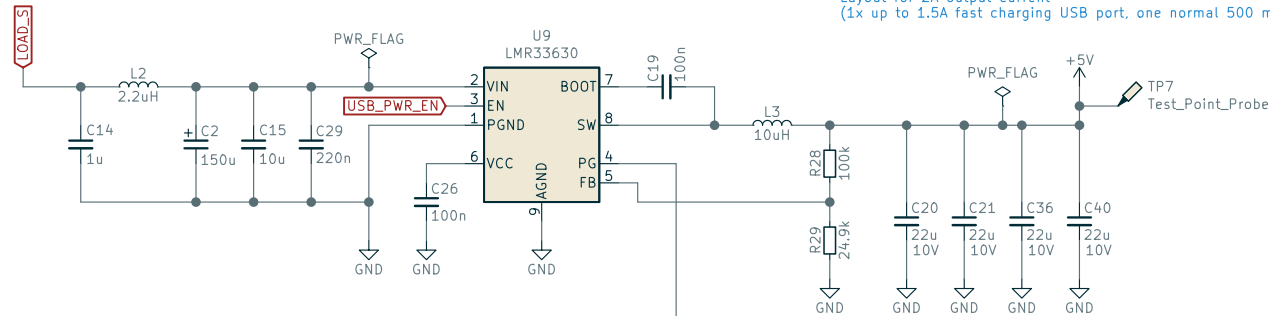


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Battery to 5V (SMPS)

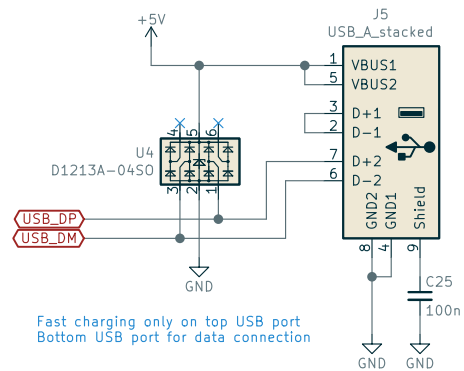
$$\text{Output voltage: } 0.925 \times (1 + 45.3/10) = 5.12 \text{ V}$$

Layout for 2A output current
(1x up to 1.5A fast charging USB port, one normal 500 mA port)



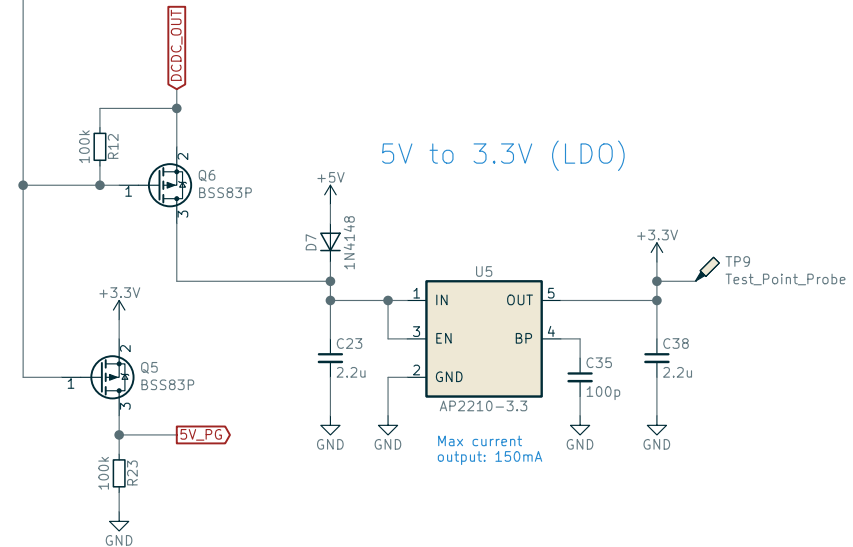
Fall-back power supply
from 12V rail if 5V is
not good enough

USB connector and power supply



Fast charging only on top USB port
Bottom USB port for data connection

5V to 3.3V (LDO)



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If not stated otherwise, all MLCC 50V X7R