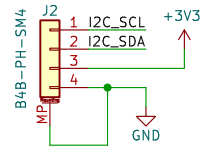


# Libre Solar BMS for 3–16 cells

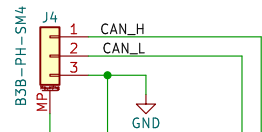
Based on TI bq76952 and ESP32-C3

Development funded by  
EnAccess Foundation.  
<https://enaccess.org>

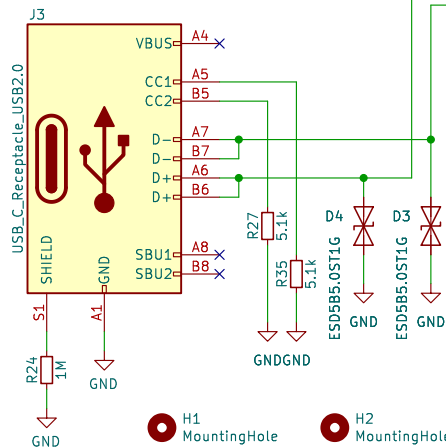
## Internal I2C



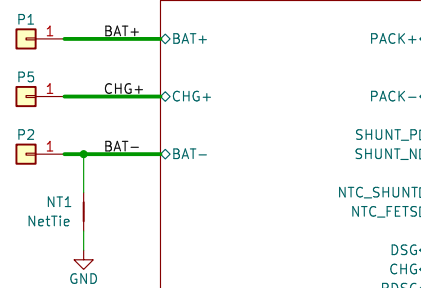
## CAN / RS-485



## USB

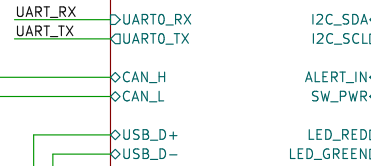


## Power Part



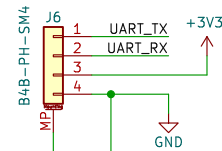
File: power-part.kicad\_sch

## ESP32-C3 MCU

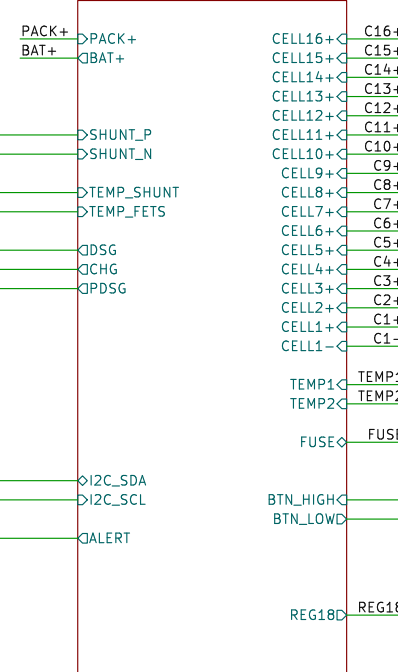


File: esp32-c3.kicad\_sch

## Serial

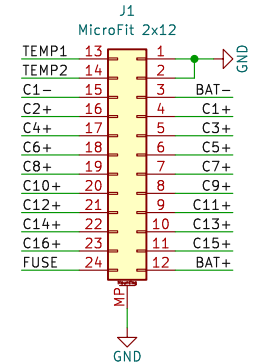


## BQ76952

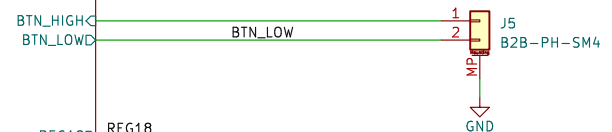


File: bq76952.kicad\_sch

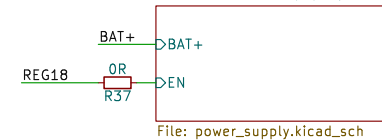
## Cell Connector



## On/Off button



## Power Supply



File: power\_supply.kicad\_sch

- H1 MountingHole
- H2 MountingHole
- H3 MountingHole
- H4 MountingHole
- H5 MountingHole
- H6 MountingHole



## Libre Solar BMS C1

Libre Solar Technologies GmbH  
Author: Martin Jäger

Website: <https://libre.solar>



Sheet:  
File: bms-c1.kicad\_sch

License: CERN-OHL-W

Size: A4 Date: 2023-11-03

KiCad E.D.A. kicad 7.0.7

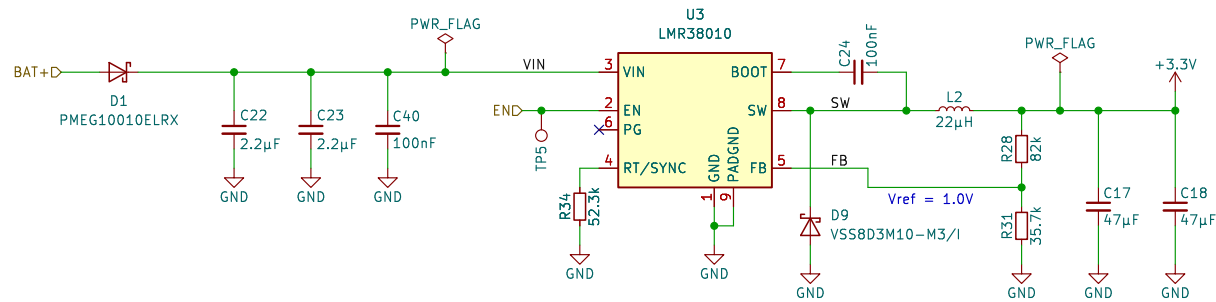
Rev: 0.4.0

Page: 1/5



## Battery to 3.3V (SMPS)

ESP32-C3 requires power supply with at least 500 mA



Layout for 500 kHz, 1A output

### Libre Solar BMS C1

Libre Solar Technologies GmbH  
Author: Martin Jäger

Website: <https://libre.solar>



Sheet: Power Supply  
File: power\_supply.kicad\_sch

License: CERN-OHL-W

Size: A4 Date: 2023-11-03

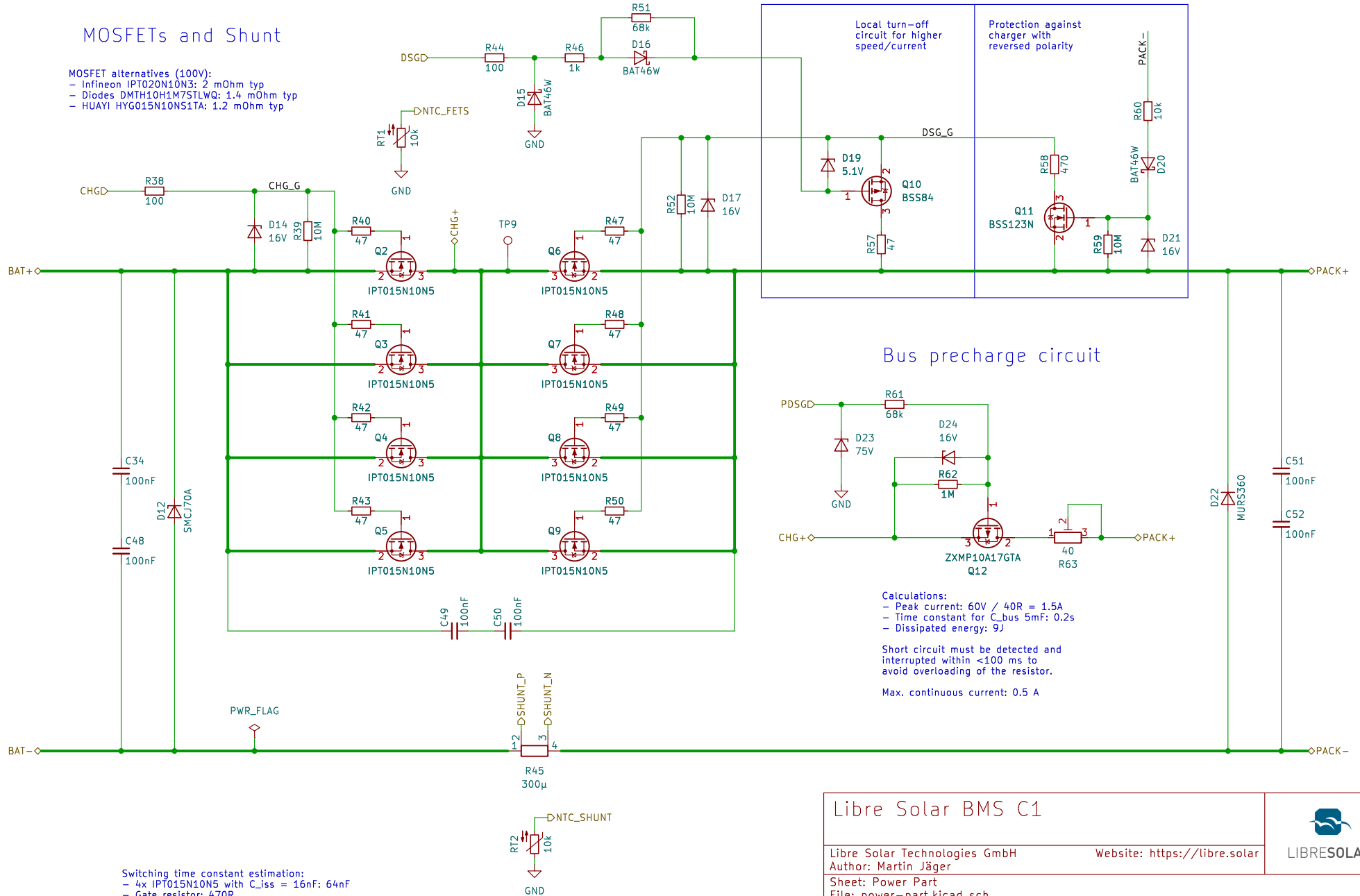
KiCad E.D.A. kicad 7.0.7

Rev: 0.4.0

Page: 4/5

## MOSFETs and Shunt

MOSFET alternatives (100V):  
 - Infineon IPT020N10N3: 2 mOhm typ  
 - Diodes DMTH10H1M75TLWQ: 1.4 mOhm typ  
 - HUAYI HYG015N10NS1TA: 1.2 mOhm typ



## Bus precharge circuit

Calculations:  
 - Peak current:  $60V / 40\Omega = 1.5A$   
 - Time constant for  $C_{bus} 5mF$ :  $0.2s$   
 - Dissipated energy:  $9J$

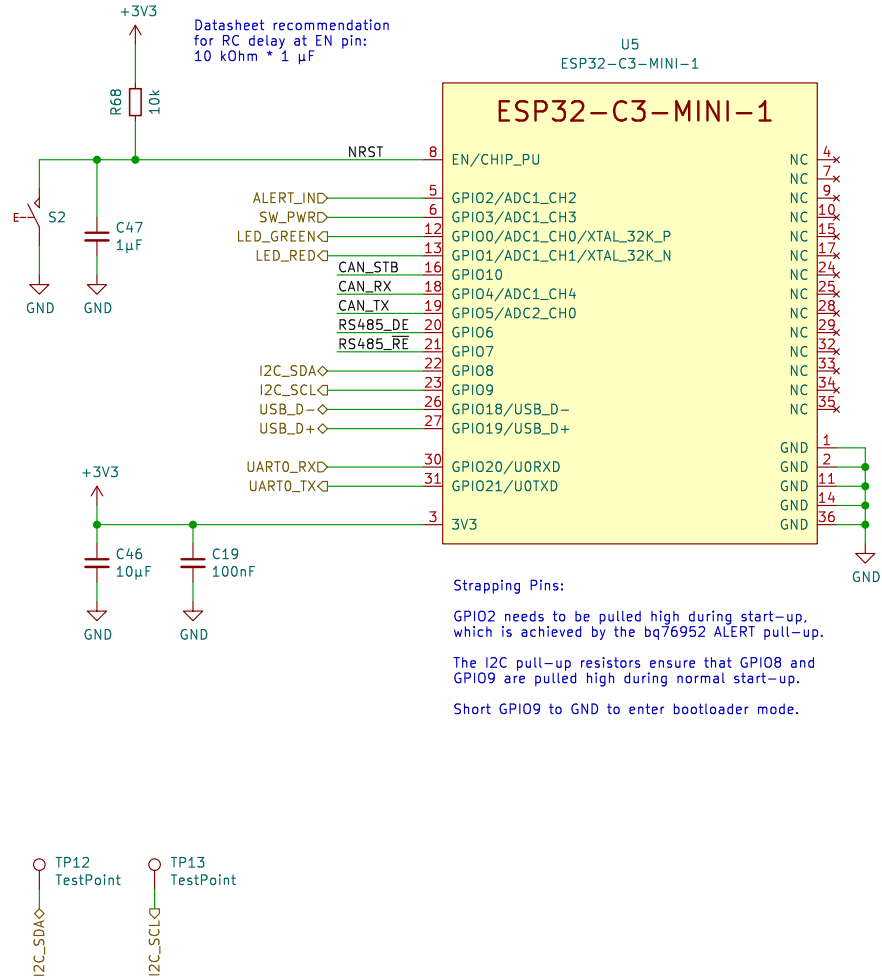
Short circuit must be detected and interrupted within  $<100ms$  to avoid overloading of the resistor.

Max. continuous current:  $0.5A$

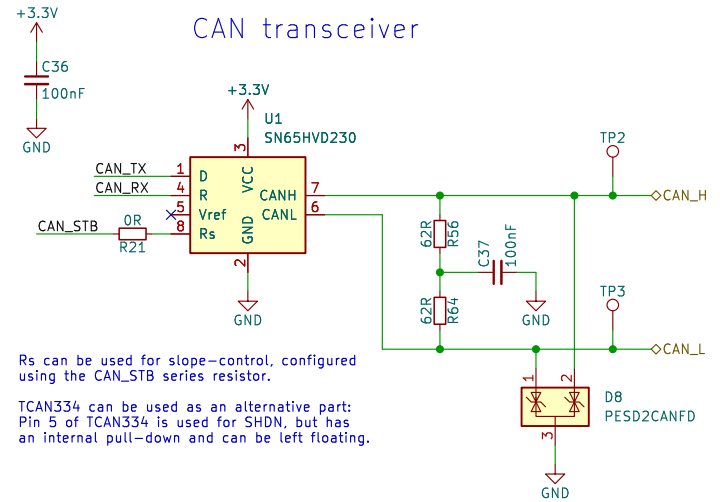
## Libre Solar BMS C1

Libre Solar Technologies GmbH		Website: <a href="https://libre.solar">https://libre.solar</a>		LIBRESOLAR
Author: Martin Jäger				
Sheet: Power Part				
File: power-part.kicad_sch				
License: CERN-OHL-W				
Size: A4		Date: 2023-11-03		Rev: 0.4.0
KiCad E.D.A. kicad 7.0.7				Page: 7/5

## ESP32-C3 module



CAN transceiver



PESD2CAN or NUP2105L  
also suitable, but  
FD versions are more  
common nowadays.

## RS-485 Transceiver

