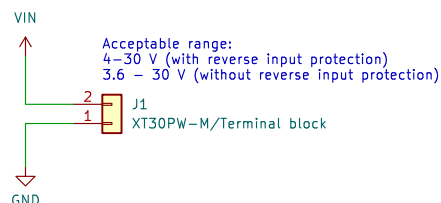
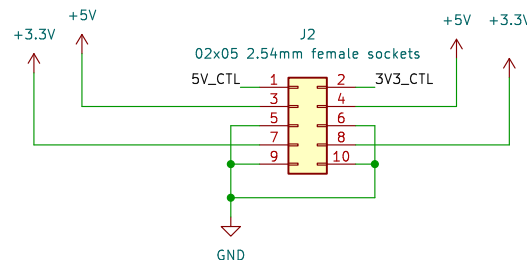


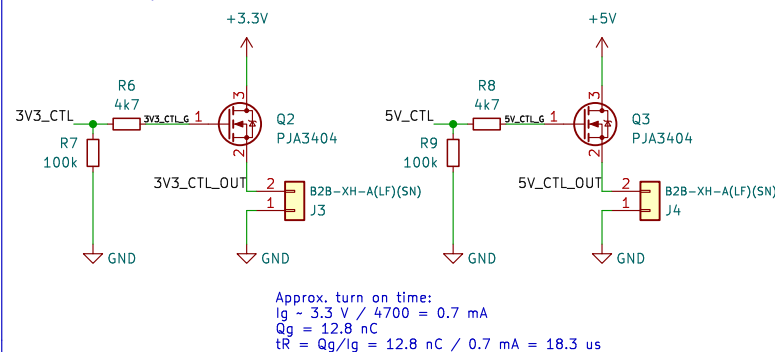
## 4–30 V input power connector



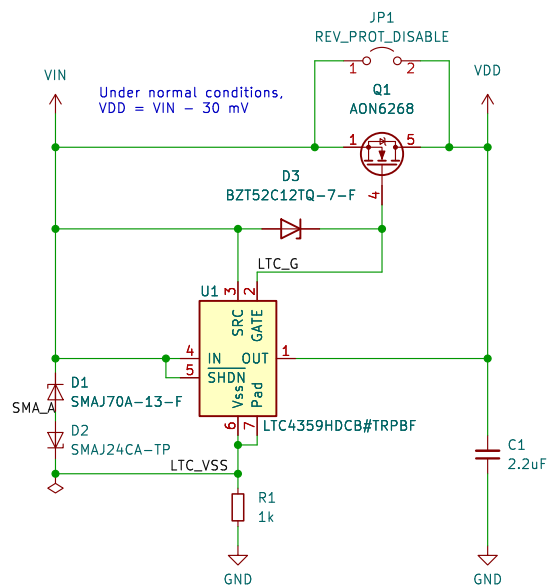
## MCU node (Orion) power connector



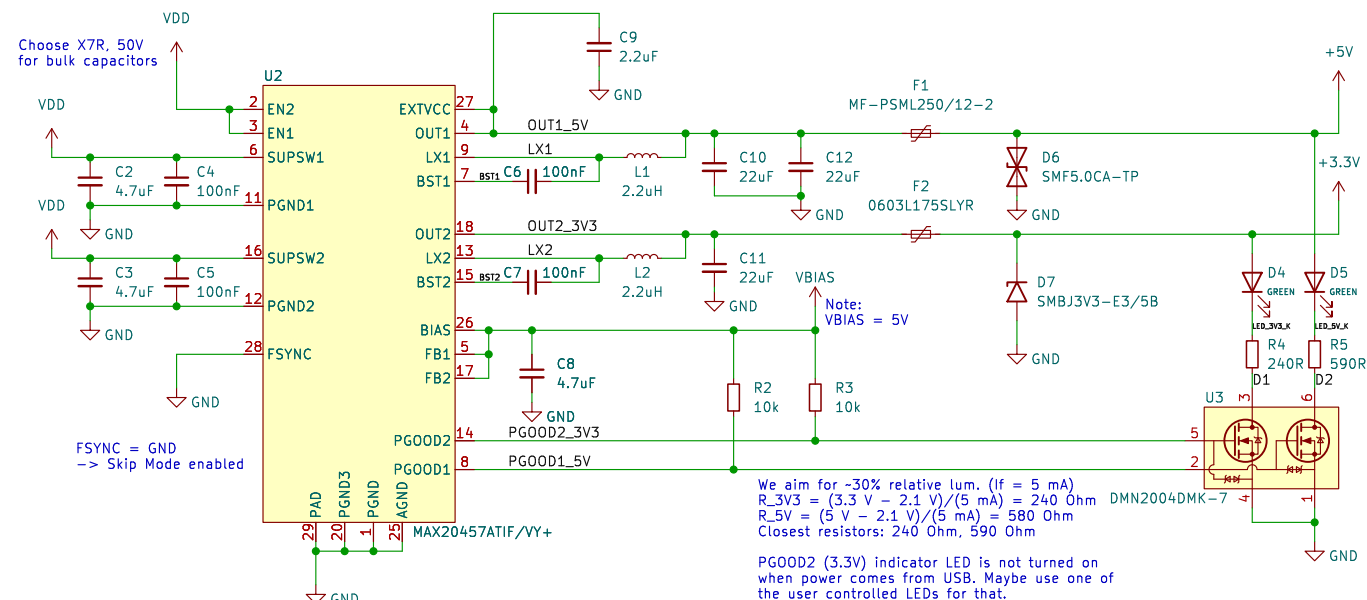
## External power control



## Reverse input protection (ideal diode)



## 3.3V / 5V Dual-channel switching regulator



## Mounting holes



## Power flags/Logo



Input capacitor  
 $I_{RMS} = I_{LOAD} / 2 = 6 \text{ A} / 2 = 3 \text{ A}$

Output capacitor:  
Max overshoot (VSOAR)  
 $L = 2.2 \text{ uH}$

BUCK 1:  
 $V_{OUT} = 5 \text{ V}$   
 $C_{OUT} = 22 \text{ uF} + 22 \text{ uF} = 44 \text{ uF}$   
 $I_{LOAD, max} = 3.5 \text{ A}$   
 $V_{SOAR} = I_{LOAD, max} \cdot 2 \cdot L / (2 \cdot C_{OUT} \cdot V_{OUT}) = 61.25 \text{ mV}$

BUCK 2:  
 $V_{OUT} = 3.3 \text{ V}$   
 $C_{OUT} = 22 \text{ uF}$   
 $I_{LOAD, max} = 2 \text{ A}$   
 $V_{SOAR} = I_{LOAD, max} \cdot 2 \cdot L / (2 \cdot C_{OUT} \cdot V_{OUT}) = 60.61 \text{ mV}$

Inductor selection:  
 $\eta = 90\%$  (efficiency)  
 $f_{sw} = 2.1 \text{ MHz}$   
 $V_{IN} = 29 \text{ V}$

BUCK 1  
 $I_{OUT} = 3.5 \text{ A}$   
 $V_{OUT} = 5 \text{ V}$   
 $D = V_{OUT} / (V_{IN, max} \cdot \eta) = 0.154$  (duty cycle)  
 $L_{MIN} = (V_{IN} - V_{OUT}) \cdot D / (f_{sw} \cdot I_{OUT} \cdot LIR) = 1.68 \text{ uH}$

BUCK 2  
 $I_{OUT} = 2 \text{ A}$   
 $V_{OUT} = 3.3 \text{ V}$   
 $D = V_{OUT} / (V_{IN, max} \cdot \eta) = 0.102$  (duty cycle)  
 $L_{MIN} = (V_{IN} - V_{OUT}) \cdot D / (f_{sw} \cdot I_{OUT} \cdot LIR) = 1.94 \text{ uH}$

We choose  $L = 2.2 \text{ uH}$

Nominal input: 4–30 V (5.1 V min for 5V output)  
Absolute maximum ratings: –40 V to 36 V  
Output (fused): 5V @ 2.5 A and 3.3 V @ 1.75 A  
Author: Vincent Nguyen

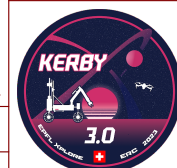


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Title: Meissa v2: 3.3V/5V Switching Regulator

Size: A4 Date: 2023–07–09  
KiCad E.D.A. kicad 7.0.1

Project Kerby



EPFL Xplore

Rev: 2  
Id: 1/1