

n-mosfet (name : IRLB113)  
 1-gate  
 2-drain  
 3-source  
 4-drain(backplate)

absolute maximum ratings  
 Vds : 30 (V)  
 Vgs : 20 (V)  
 Id : 74 (A)

R(1) param  
 Qt : 50 (nC)  
 t : 5000 (nsec)  
 $i = Q_t / t = 0.01 \text{ (A)}$   
 $R = V / i = 12 / 0.01 = 1.2 \text{ (kOhm)}$

R(2) param  
 $R = R(1) * 10 = 1.2 * 10 = 12 \text{ (kOhm)}$

R(3) param  
 LED Voltage drop : 2 (V)  
 LED current : 0.01 (A)  
 $R = V / I = (12 - 2) / 0.01 = 1 \text{ (kOhm)}$

R(4) and R(5) param  
 divider resistor for voltage sensor  
 output max voltage = 3 (V)  
 → divider ratio = 9 : 1  
 $\Rightarrow R(4) = 91 \text{ (kOhm)}, R(5) = 10 \text{ (kOhm)}$

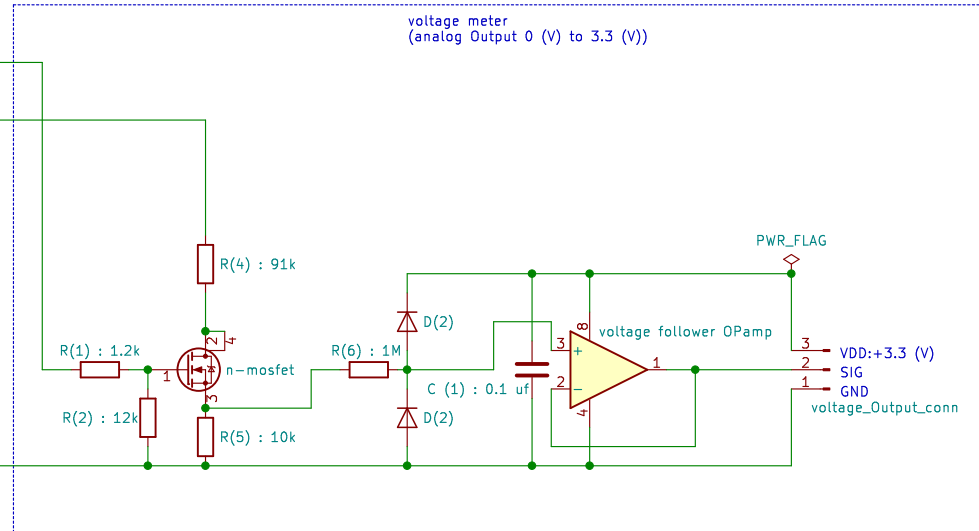
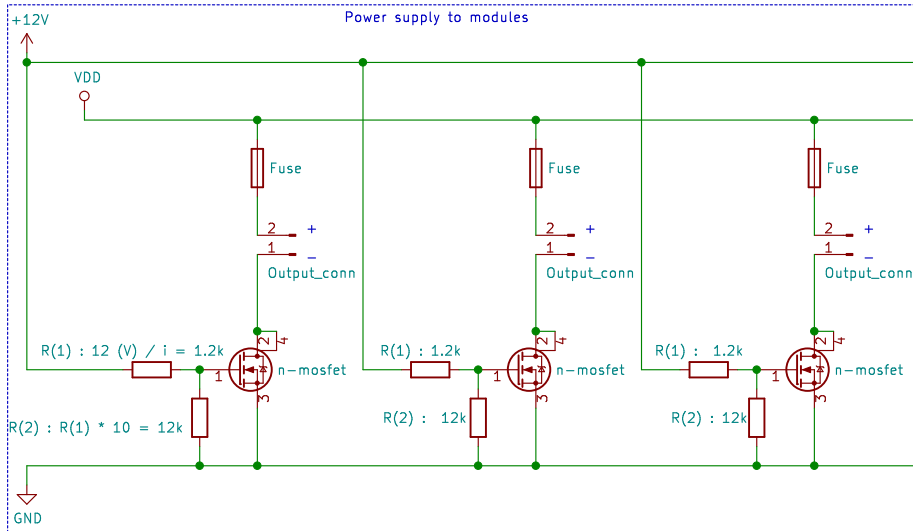
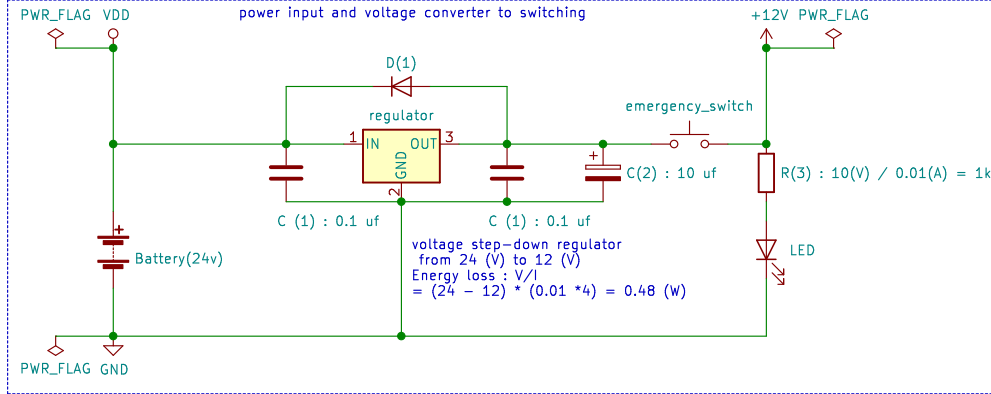
R(6) param  
 Current limiting resistor  
 need high impedance.  
 $\Rightarrow R(6) = 1 \text{ (MOhm)}$

C(1)  
 For high-frequency noise suppression  
 Basically, use a 0.1 uF capacitor

C(2)  
 For voltage stabilization

D(1)  
 Protection Diode  
 To release reverse voltage  
 caused by noise (ex: switch)

D(2)  
 Clamp diode  
 for Overvoltage protection



2021-07-02 tanaka designed  
 2021-07-07 tanaka updated

Please test before make PCB, and read reference, data sheet, and "readme.txt".

Sheet: /  
 File: switching\_board.sch

**Title: switching\_board**

Size: A4 Date: 2021-07-02

KiCad E.D.A. kicad (5.1.4)-1

Rev:

Id: 1/1