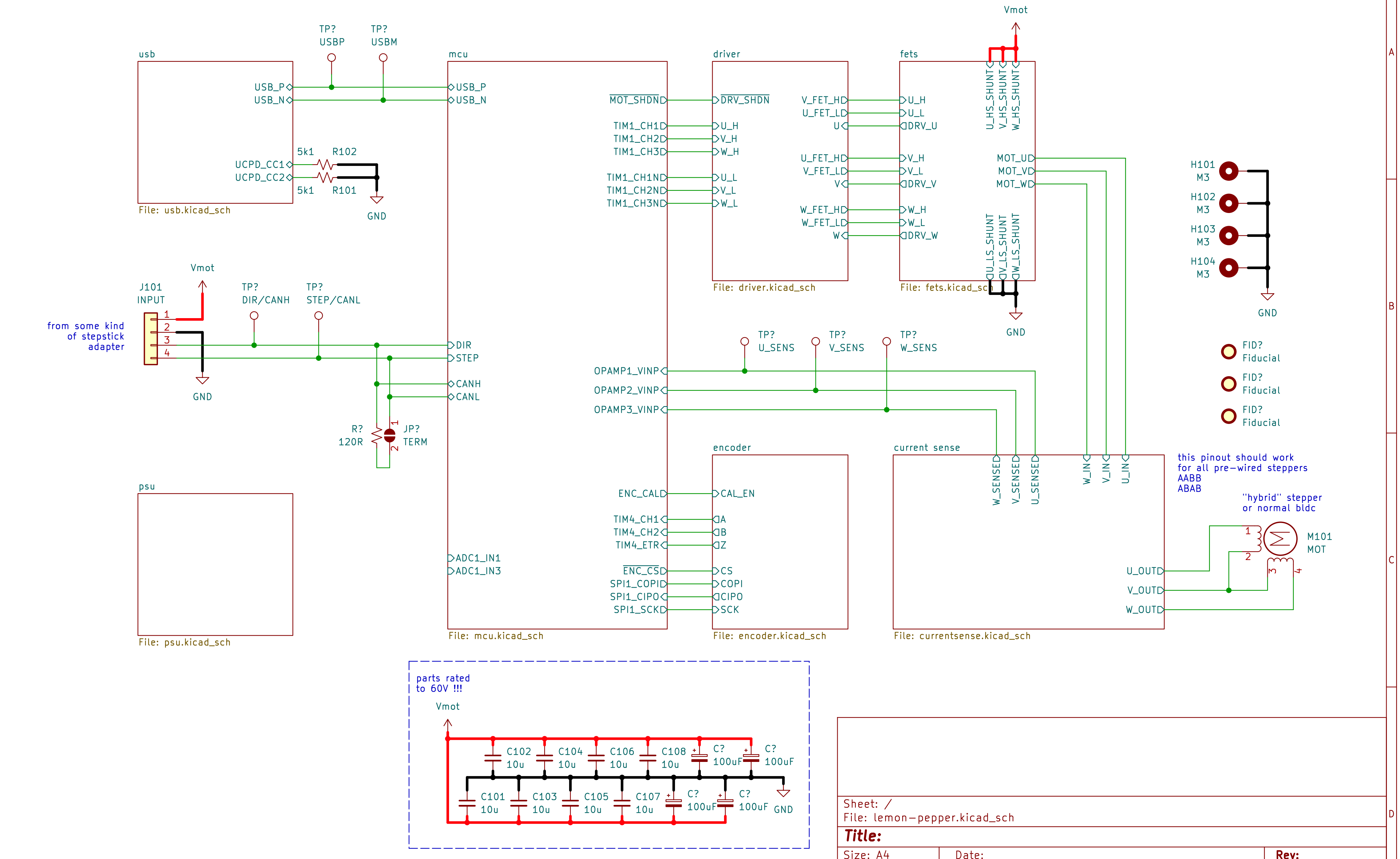

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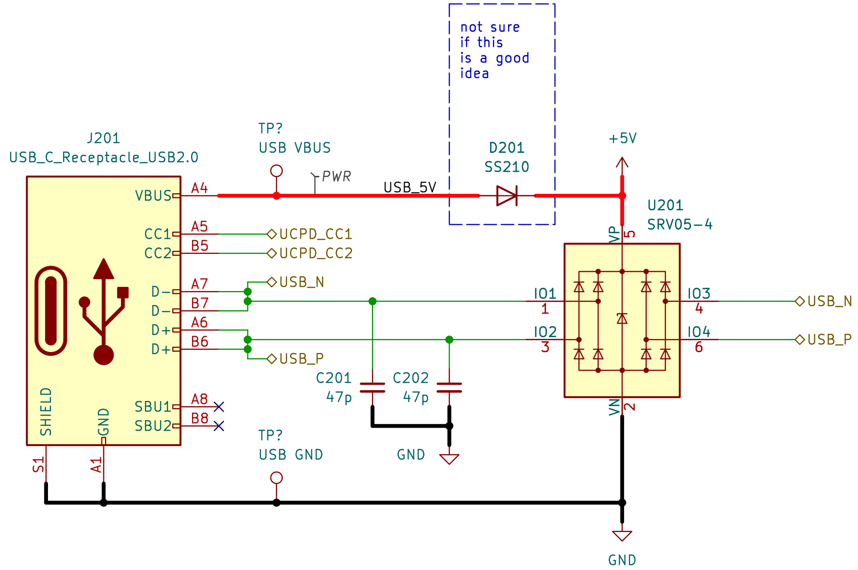
Title:

Size: A4 | Date: | **Rev:**

KiCad E.D.A. kicad 7.0.8 | Id: 1/8



matei repair lab

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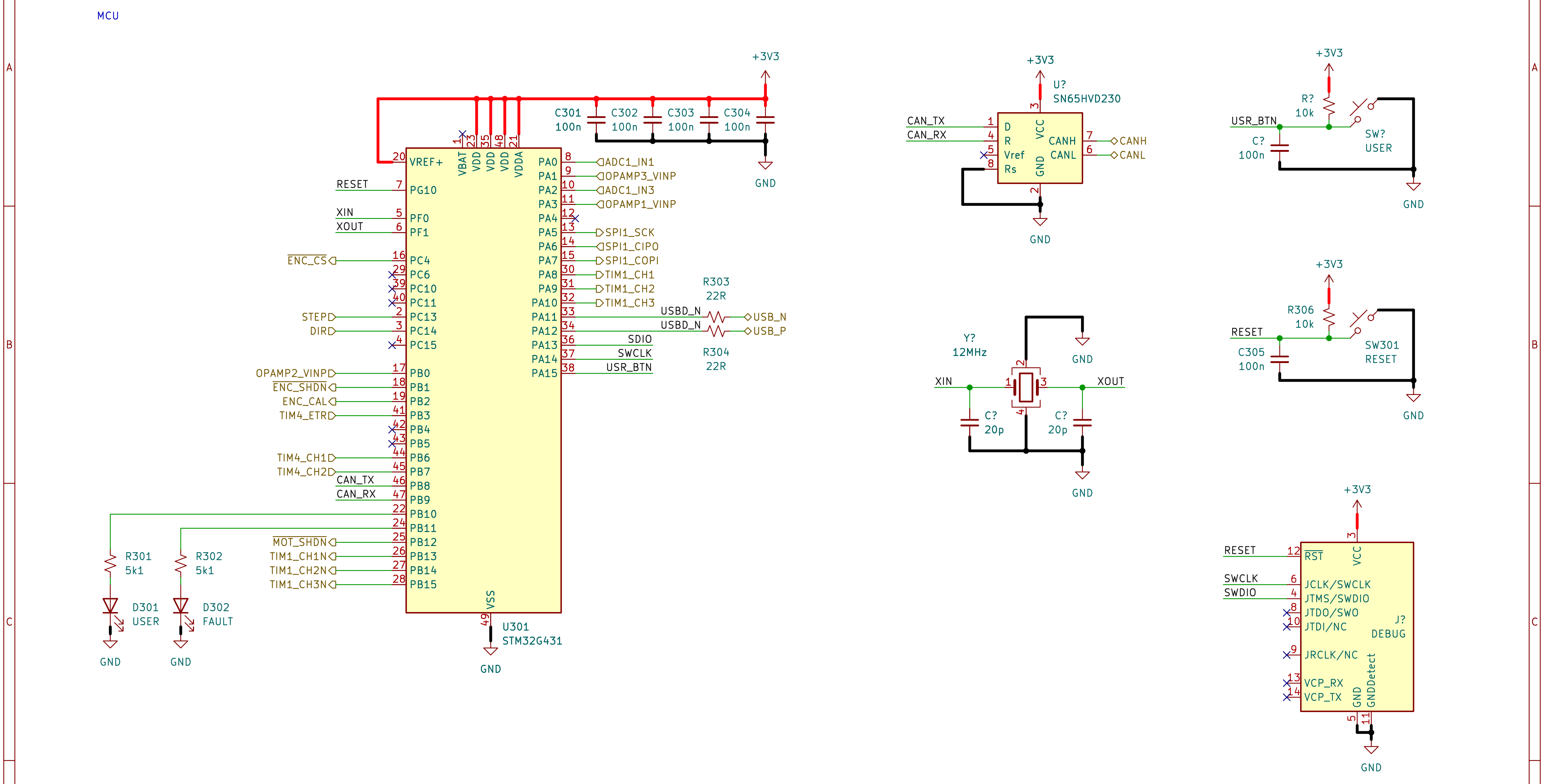
Size: A4	Date: 2023-06-17	**Rev: 1.0**
KiCad E.D.A. kicad 7.0.8		Id: 2/8



matei repair lab	
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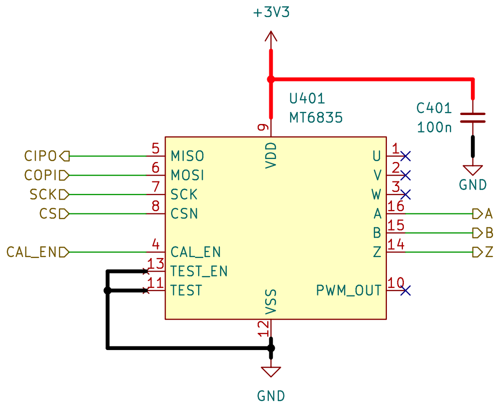
Size: A4 Date: 2023-06-17	**Rev: 1.0**
KiCad E.D.A. kicad 7.0.8	Id: 3/8



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Sheet: /encoder/
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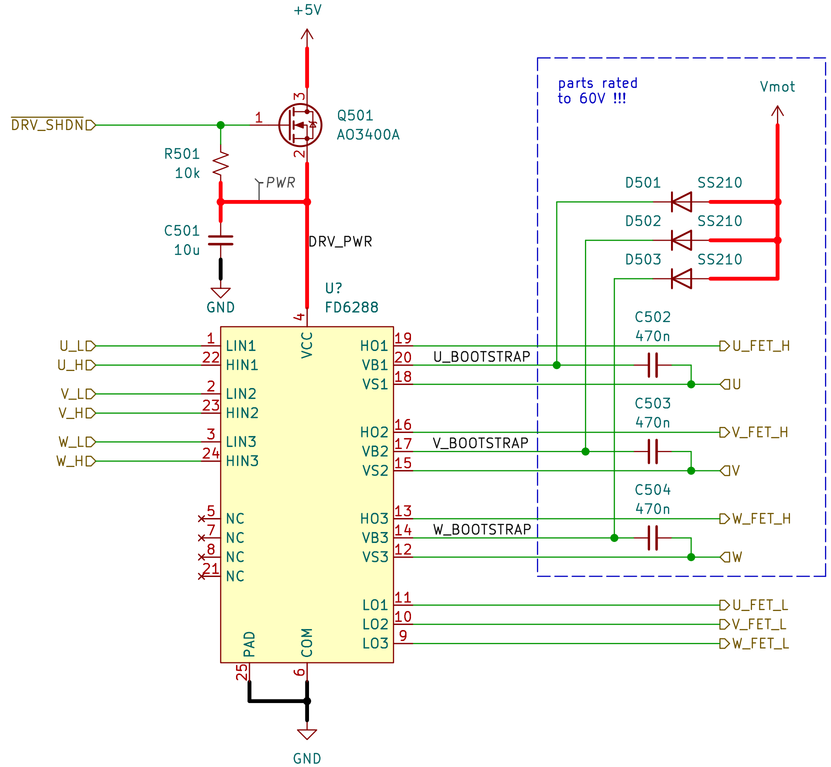
Title: MAGNETIC ENCODER 14 BIT

Size: A4	Date: 2023-06-17	**Rev: 1.0**
KiCad E.D.A. kicad 7.0.8		Id: 4/8



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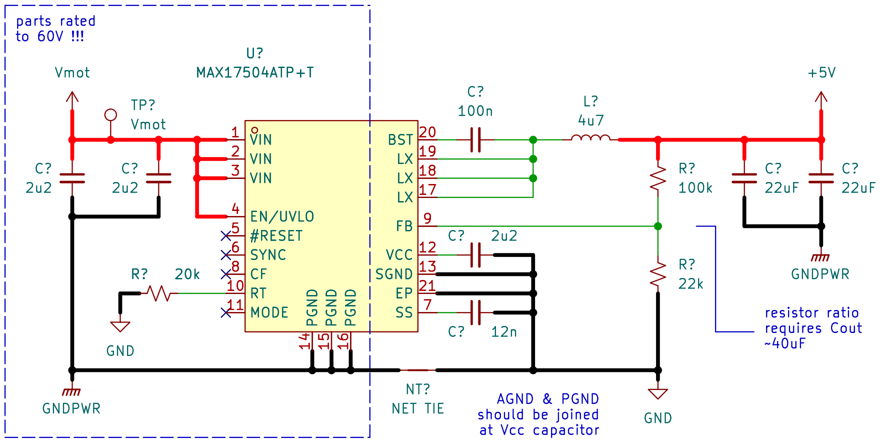
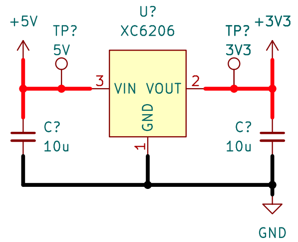
Title:

Size: A4 | Date: | **Rev:**

KiCad E.D.A. kicad 7.0.8 | Id: 5/8





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Sheet: /psu/

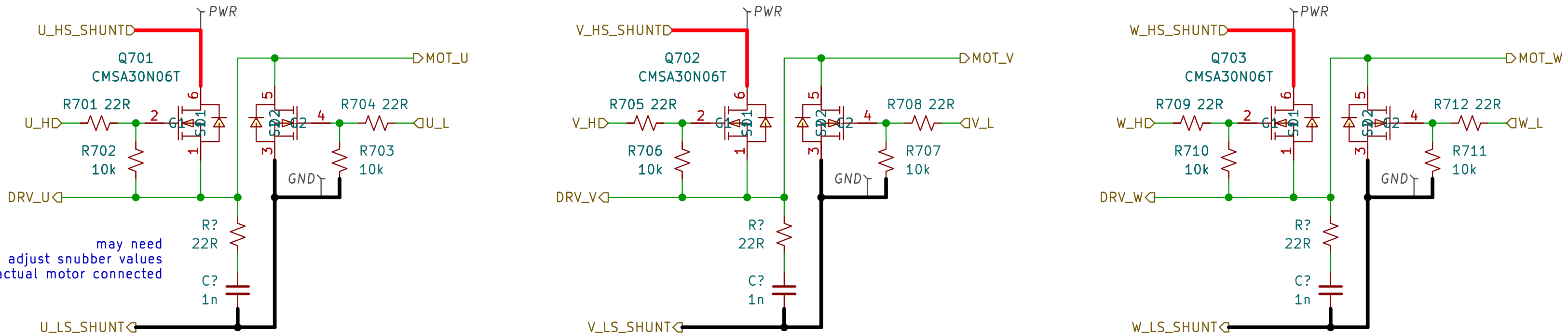
File: psu.kicad_sch

Title: POWER SUPPLY & FILTERING

Size: A4	Date: 2023-06-17	**Rev: 1.0**
KiCad E.D.A. kicad 7.0.8		Id: 6/8

parts rated
to 60V !!!

may need
adjust snubber values
with actual motor connected

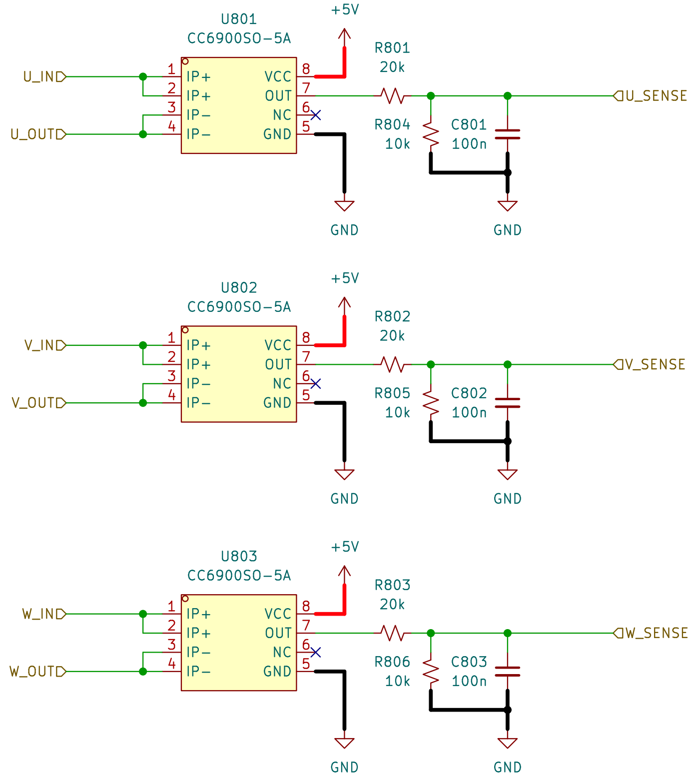


Seven steps to calculate R-C Snubber (with Example)		
Steps	**Description**	**Example**
Step 1	Measure the oscillation frequency (f_o) of the V_{DS} ringing with no RC snubber. See Figure 3.	$f_0 = \frac{1}{82ns} = 12.2\ MHz$
Step 2	Add a capacitor (C_1) in parallel with the rectifier or FET and measure the shifted oscillation frequency (f_1). Select a C_1 value that is several times larger than the rectifier's stated typical capacitance at full-reverse voltage in the datasheet. In this example, the rectifier's capacitance is 22pF, so I chose a 100pF value for C_1. A frequency shift of at least 50% is reasonable. See Figure 4.	$C_1 = 100pF$ $f_1 = \frac{1}{90ns} = 11.1MHz$
Step 3	Calculate the frequency shift ratio: $m = \frac{f_0}{f_1}$	$m = \frac{12.2\ MHz}{11.1\ MHz} = 1.1$
Step 4	Calculate the circuit's parasitic capacitance: $C_0 = \frac{C_1}{(m^2-1)}$	$C_0 = \frac{100pF}{(1.1^2-1)} = 0.48nF$
Step 5	Calculate the circuit's parasitic inductance: $L = \frac{(m^2-1)}{(2\pi f_0)^2 C_1}$	$L = \frac{(1.1^2-1)}{(2\pi * 12.2MHz)^2(100pF)} = 0.36\mu H$
Step 6	Calculate the starting snubber capacitor value: $C_{snub} = 3C_0$	$C_{snub} = 3(0.48nF) = 1440pF$
Step 7	Calculate the starter snubber resistor value: $R_{snub} = \sqrt{\frac{L}{C_0}}$	$R_{snub} = \sqrt{\frac{0.36\mu H}{0.48nF}} = 27\Omega$

Sheet: /fets/
File: fets.kicad_sch

Title:

Size: A4 | Date: | **Rev:**
KiCad E.D.A. kicad 7.0.8 | Id: 7/8



5A model
410mV/A sensitivity

expected current +-1A (2A peak)
820mV range -> 3.3V
need gain of ~4 at G431 OP-AMP input
for full resolution

due to "hybrid" phase connection, it may be possible
to have 8x gain on the independent phases, and
just this 4x gain on the center tap.

Sheet: /current sense/
File: currentsense.kicad_sch

Title:

Size: A4 | Date: | **Rev:**

KiCad E.D.A. kicad 7.0.8 | Id: 8/8