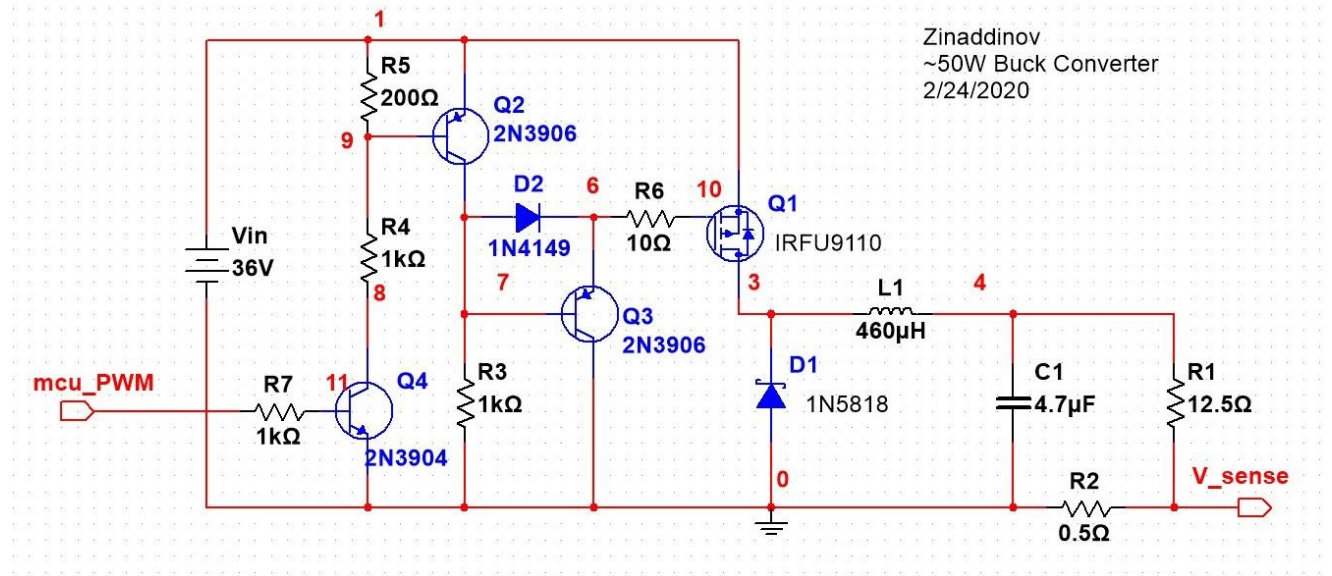


# A Simple 50W Buck Converter

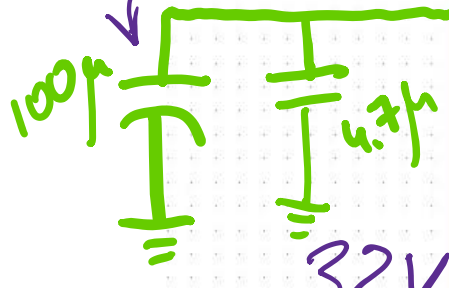
2



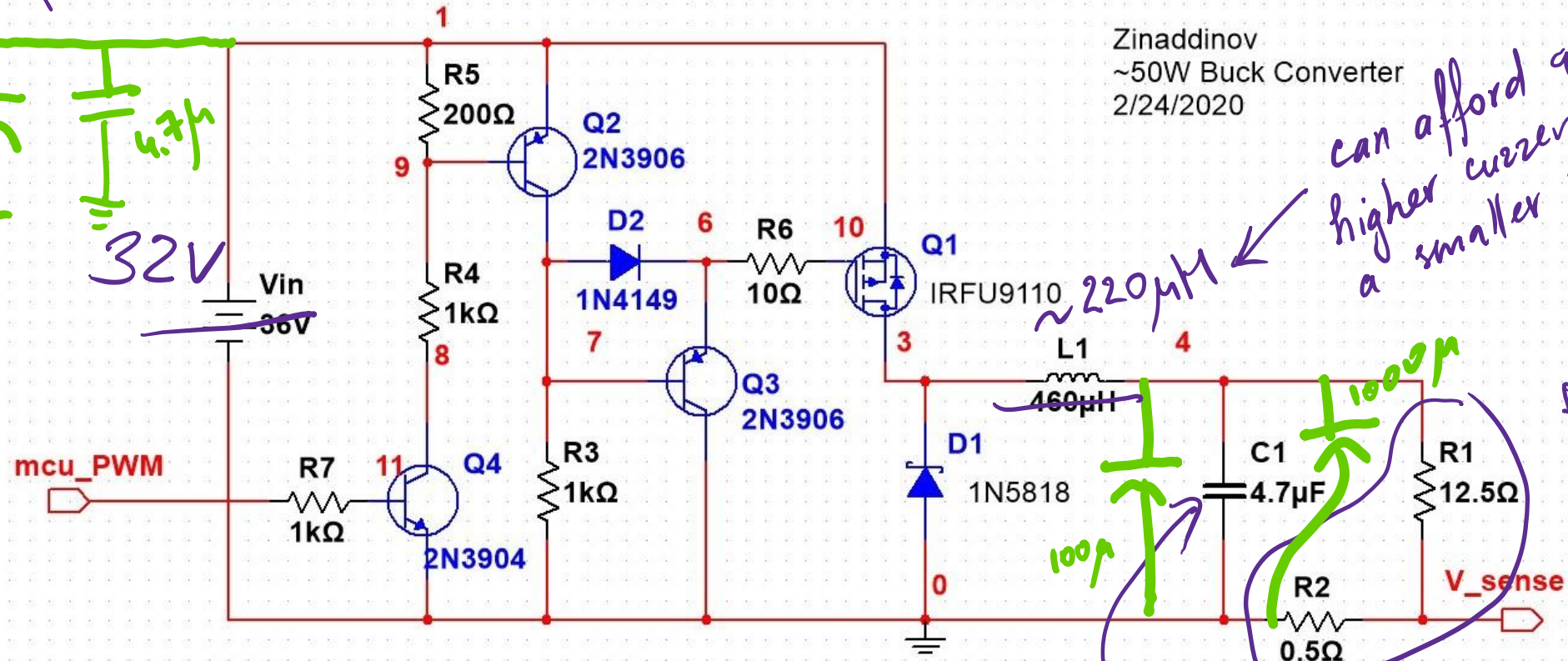
36V-26V (2A) \*these values are motivated by component availability

Both 36V and 26V are unusual numbers. I selected those because of their “convenience” in the context of a rapid development. I thought my power supply outputs 36V max (apparently it is 32V). I thus changed the  $V_{out(max)}$  to 25V to be able to deliver around 50w to  $R_{load(min)}$  of 13 ohm. Load resistor is constructed from what I had lying around.

a charge bucket to alleviate some stress from my power supply

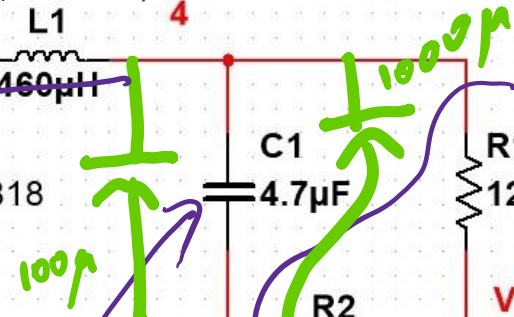


Zinaddinov  
~50W Buck Converter  
2/24/2020



can afford a higher current ripple for a smaller inductor

$\sim 220\mu H$



$R_{load(min)} = 23\Omega$

ceramic small ESR NOT ENOUGH!

this is no longer a sense res, but just a part of the load... I don't need to sense curr I'd rather sense  $V_o$



Initial layout

not connected

gate drive

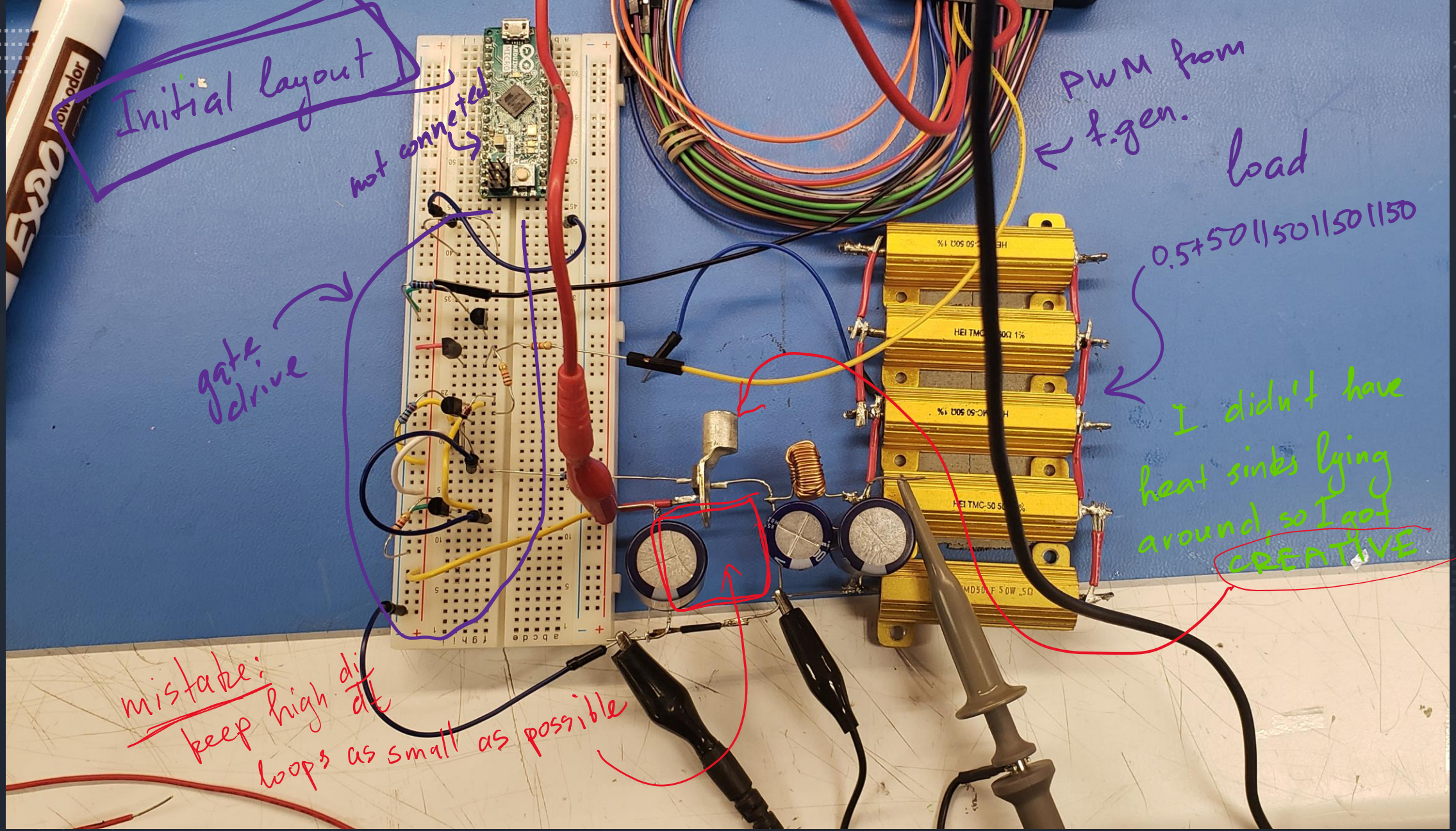
PWM from  
f.gen.

load

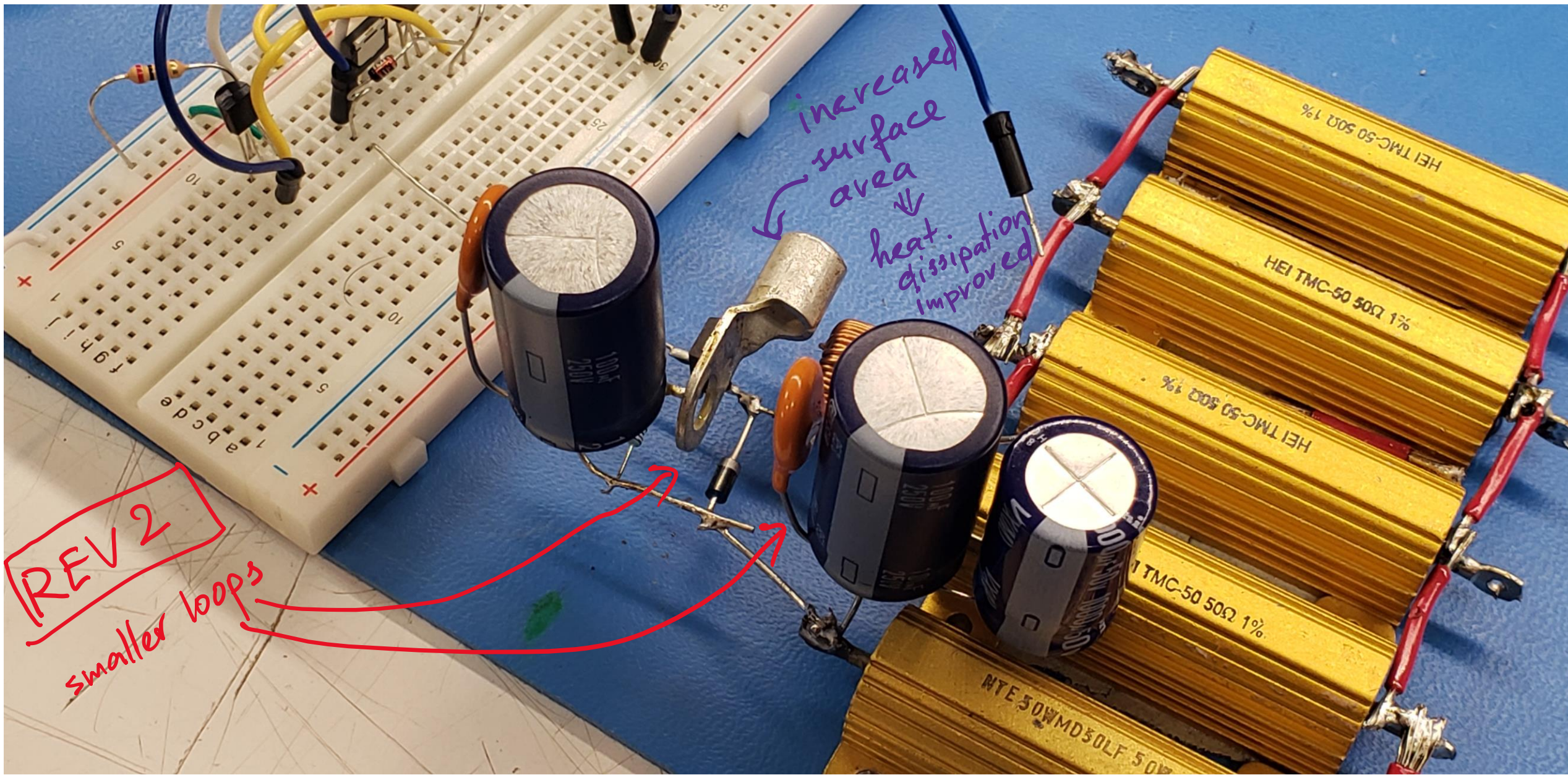
0.5+50||50||50||50

I didn't have  
heat sinks lying  
around, so I got  
CREATIVE

mistake:  
keep high  $di/dt$   
loops as small as possible







increased surface area  
↓  
heat dissipation improved

REV 2  
smaller loops



**Characteristics:**

**$P_{in} = 32V * 1.465A = 46.88W$**

**$P_{out} = 23.8V^2 * 13R = 43.57W$**

**Eff ~93%, but drops with time**

**Noise: so large that it is  
embarrassing haha**

There is a ringing noise at the output which can be addressed using a snubber circuit across a diode. TI has a great application regarding this issue, but I didn't have time to implement it:

<https://www.ti.com/lit/an/slyt465/slyt465.pdf>

As usual, a VIDEO demo and more details are on my website:

<https://masa8q.com/a-simple-50w-almost-buck-converter>