Regulator Prototype

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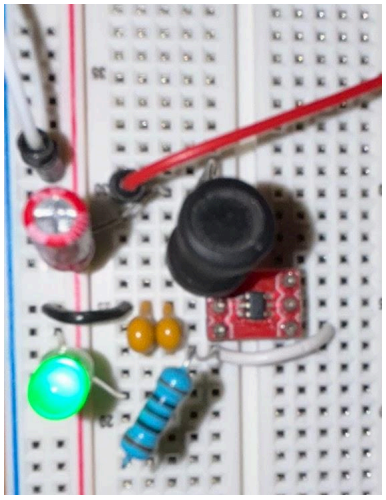
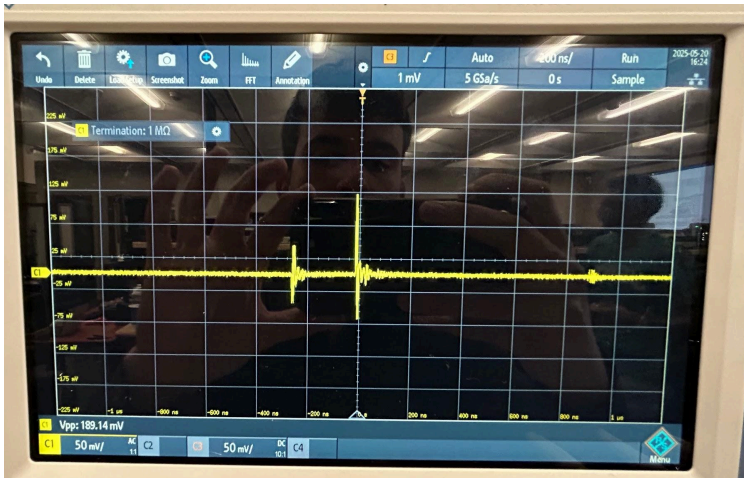
Procedure:

3.3 Volt
V_{IN} = 2.9 , $I_{IN\text{-}MAX}$ = 0.5
Circuit



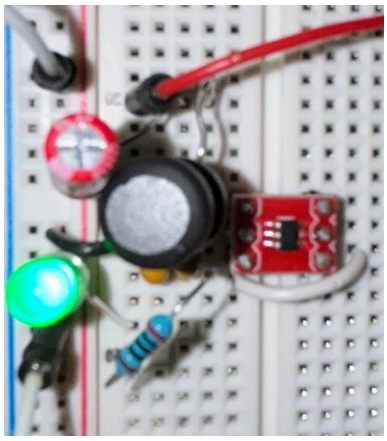
Measurement
Without Electronic Load
R_{LED} = 100.3 Ω
Vout = 3.309 V
V_F = 2.619 V
I_{LED} = 6.879 mA
With Electronic Load
V_{OUT} = 3.30 V → From DMM
V_{OUT} = 3.295 V → From Electronic Load
I_{OUT} = 30 mA
I_{TOTAL} = 30 mA + 6.879 mA = 36.879 mA
V_{IN} = 2.90 V
I_{IN} = 0.045 A
P_{IN} = 2.9 * 0.045 A = 0.1305 W
P_{OUT} = 3.30 * 36.879 mA = 0.0123 W
Eff = (P_{OUT} / P_{IN}) * 100 = 93%
V_{RPP} =189.14 mV



5.0 Volt

V_{IN} = 2.9 , $I_{IN\text{-}MAX}$ = 0.5

Circuit



Measurement

Without Electronic Load

R_{LED} = 199.7 Ω

Vout = 5.029 V

V_F = 2.77 V

I_{LED} = 11.296 mA

With Electronic Load

V_{OUT} = 5.0 V → From DMM

V_{OUT} = 4.998 V → From Electronic Load

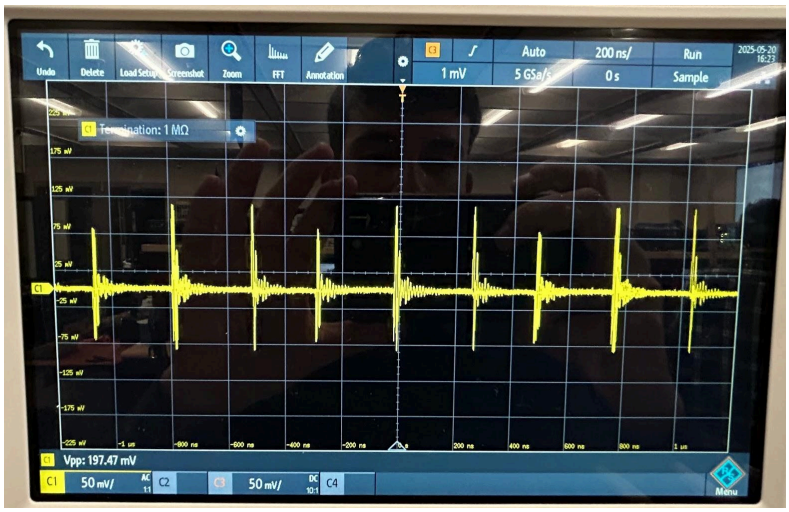
I_{OUT} = 23 mA

I_{TOTAL} = 11.296 mA + 23 mA = 34.296 mA

V_{IN} = 2.90 V

I_{IN} = 0.063 A

P_{IN} = 2.9 * 0.063 A = 0.1725 W
P_{OUT} = 5.0 * 34.296 mA = 0.172 W
Eff = (P_{OUT} / P_{IN}) * 100 = 94%
V_{RPP} =197.47 mV



7.0

The results in procedure 4 and 5 were as expected with the regulator based on the datasheets of the regulator chips as well as the data from the WEBENCH tool. All of the values also match components that were used in the circuit such as resistance values and the Turn on voltage for the DIODE.

What I learned - I learned a lot about using the chip, keeping in mind things such as wire length (because this can affect the functionality of the circuit), as well as using the oscillator tool to measure values that are as small as the ripple voltage of the output. I also learned how to use a thermal camera, showing that there is a range that is shown by the camera that has the values shown in the image as well as the ability to see a specific spot using the center crosshair.