Lab 4

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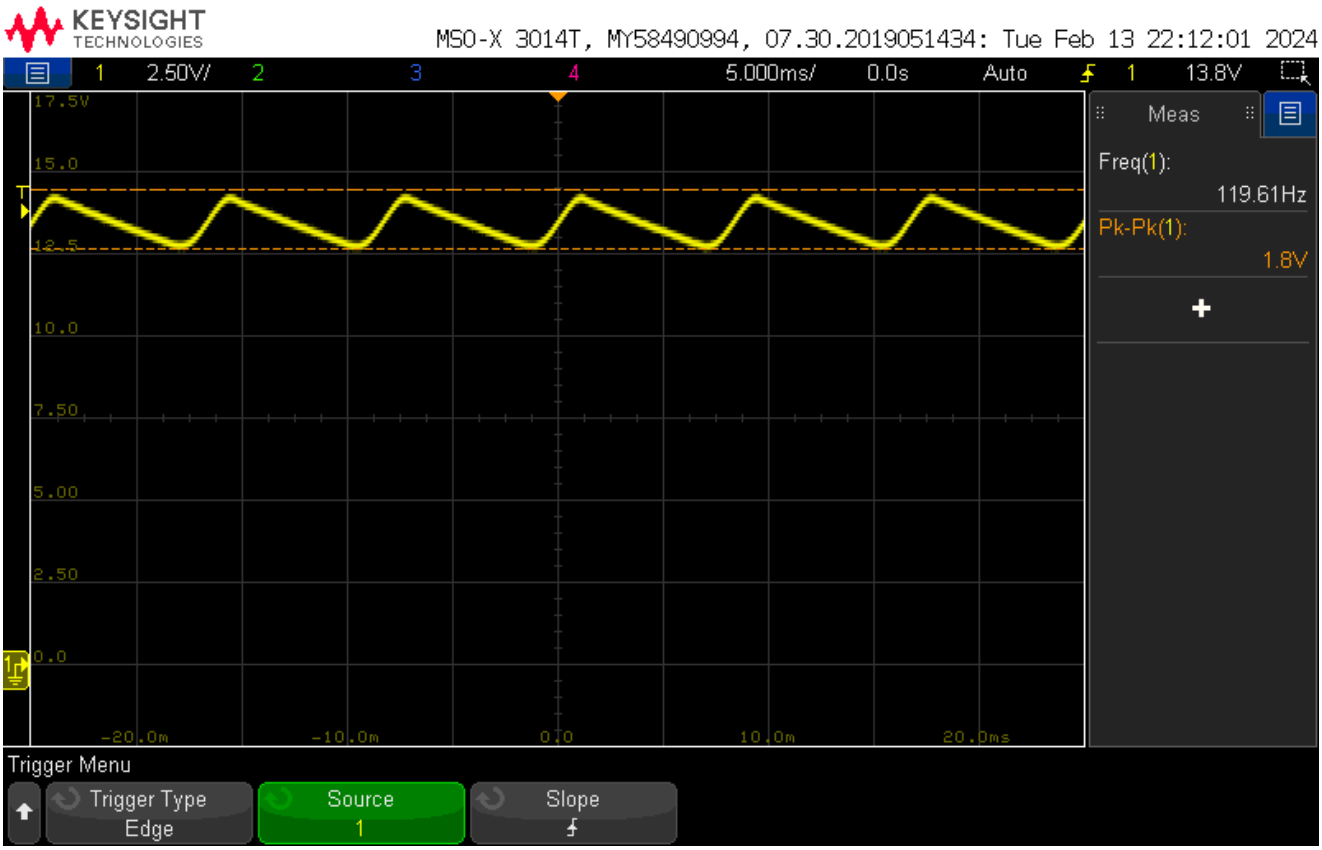
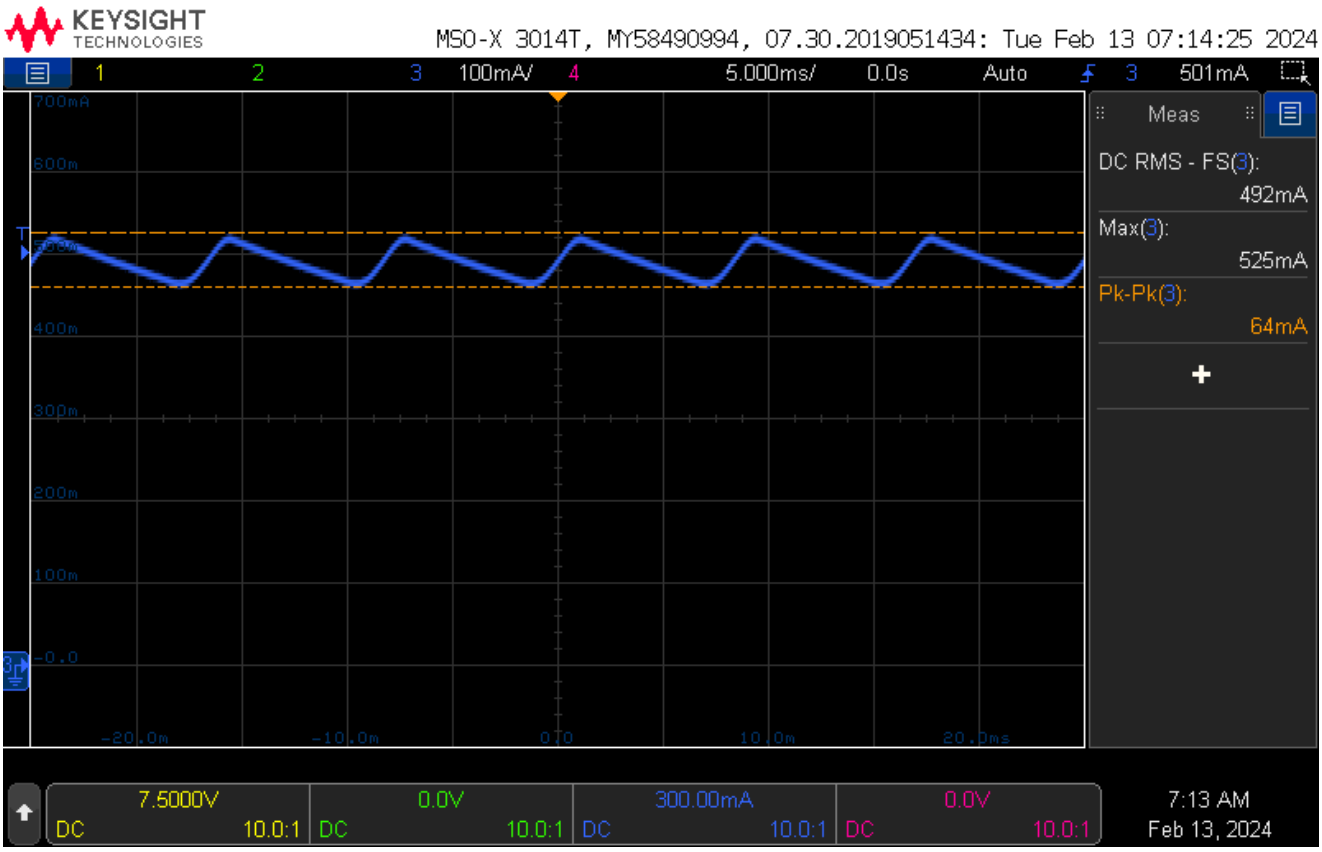
Part 1

Average DC Output Voltage (FL) 13.4VDC

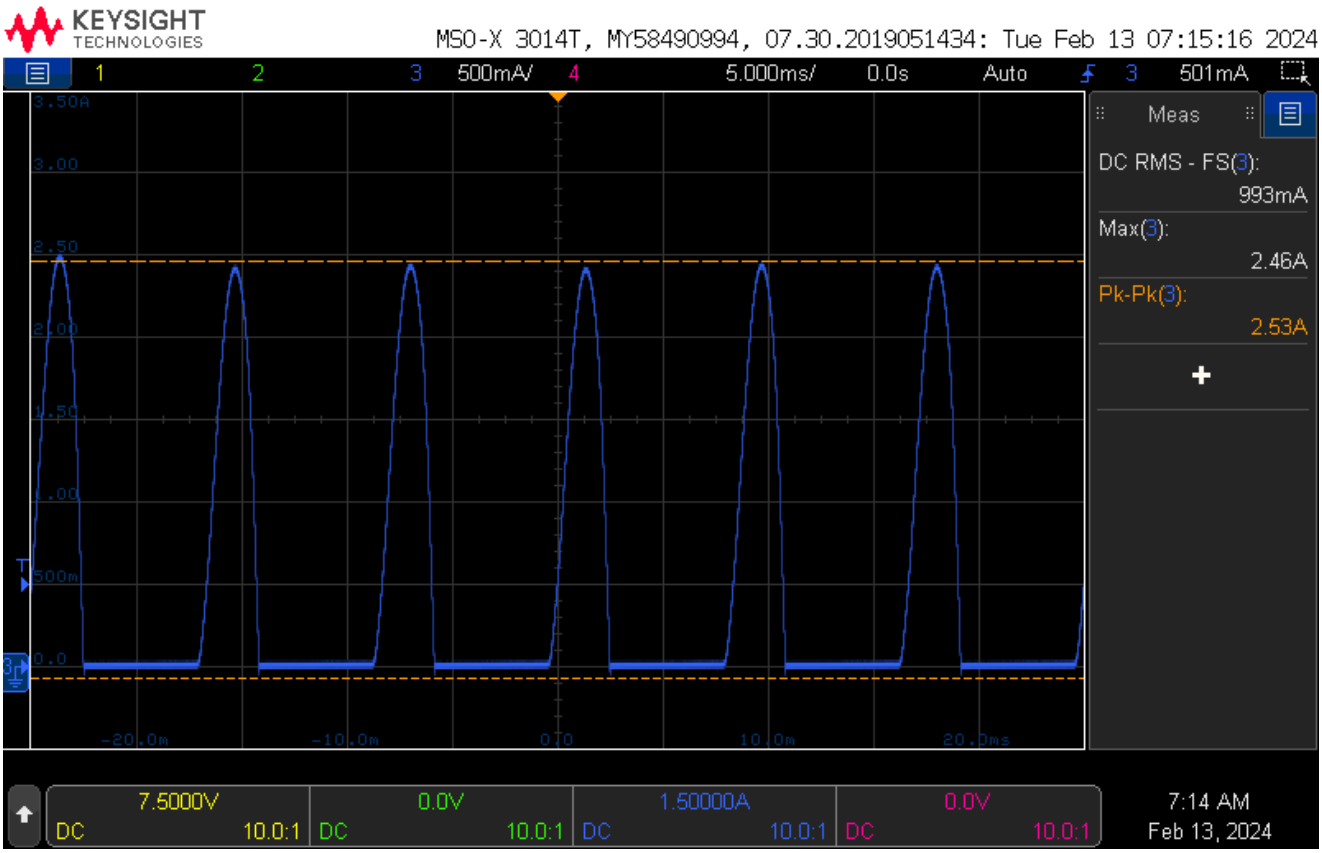
Average DC Output Current (FL) 0.489ADC



DC output Ripple Voltage (FL) 1.8Vpkpk



Filter capacitor peak and RMS current, point A RMS: 492mA pkpk: 64mA



Bridge rectifier output current, point B RMS: 993mA pkpk: 2.46A

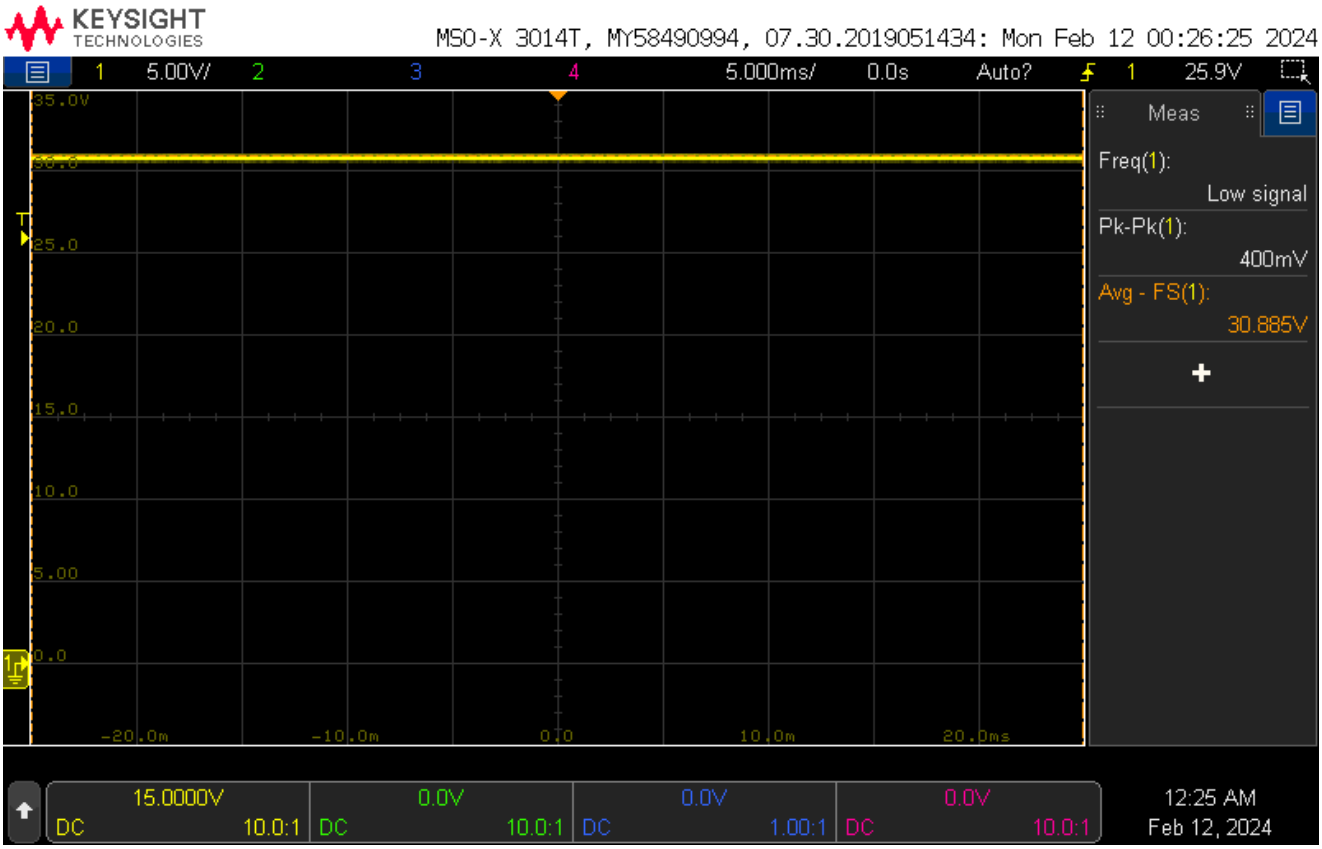
Explain the waveforms seen at points A and point B; what is the difference between them? The filter capacitor never fully discharges, and is always constantly dumping current into the load, thus the relatively consetant current through the filter capacitor. The lead from the diode to the capacitor only conducts

when the AC supply is above the capacitor voltage minus two diode drops. There is very little resistance from the source to the capacitor: just the ESR of the diodes, capacitor, wires, and series resistance of the source.

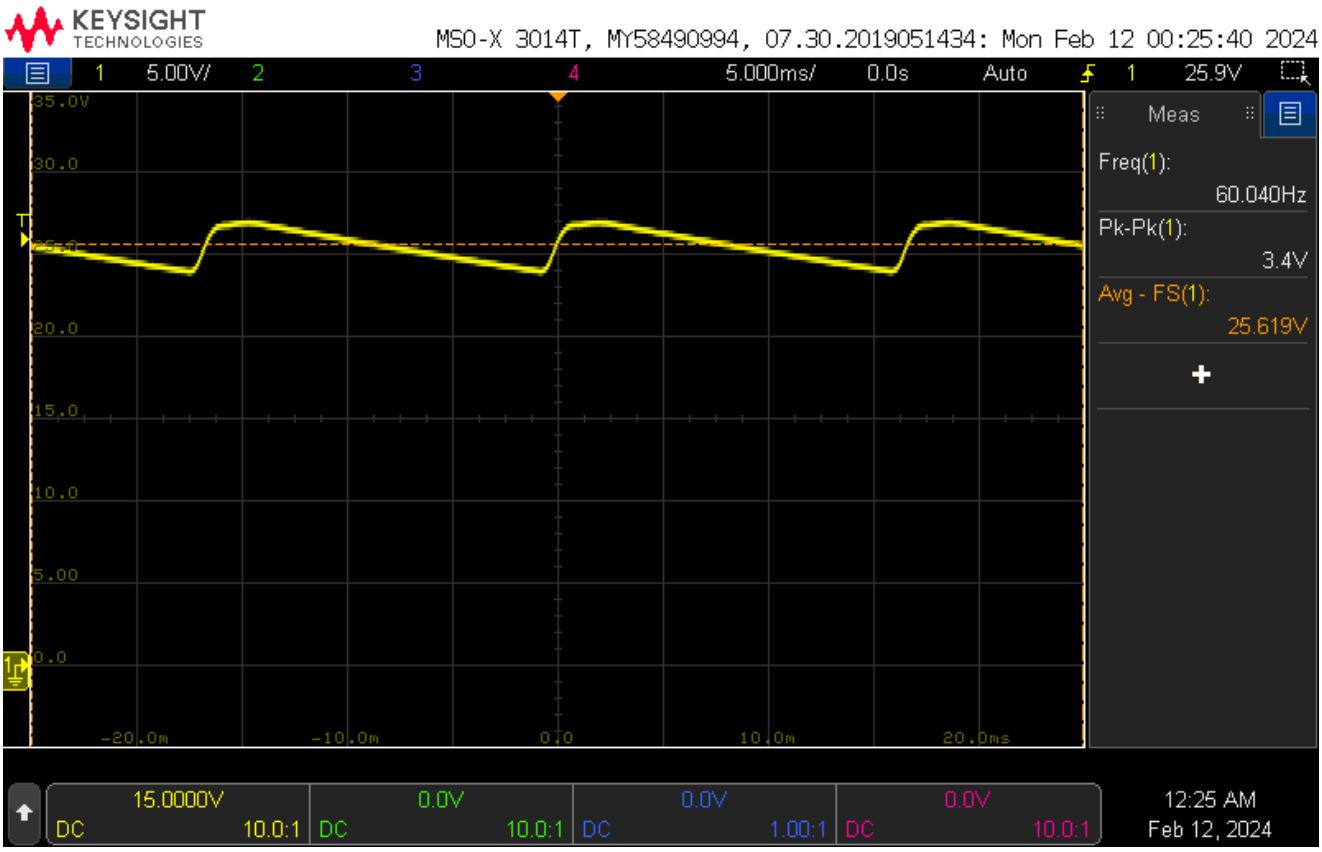
How do you define "output voltage"? What causes the drop in output voltage as the load increases? Output voltage can be defined as the voltage produced by a source at a given current value. That way, load regulation is accounted for. In more precise scenarios, multiple voltages at different currents can be provided. Output voltage drops as the load increases due to the internal series resistance of the source.

Part 2

Capacitor Selection We used the period of the half cycle to spec the time constant with a resistor that amounts to full load and a droop/ripple 2VDC



DC Output Voltage (NL) 30.885VDC



DC Output Ripple Voltage (FL) 25.6VDC with 3.4Vpkpk ripple