

EEE210: Electronic Circuits and Devices

Lab #4: Simple Power Supply

Experimental Work: All oscilloscope readings are done with DC coupling of the channels unless otherwise noted.

1. Build the circuit of figure 1. Adjust the variable resistor to $R_L = 10 \text{ k}\Omega$.
2. Measure $v_2(t)$, $v_o(t)$ on the oscilloscope with $R_L = 0 \Omega$. Using the cursors, measure the minimum and maximum values of $v_2(t)$. You may now close the oscilloscope window as it will no longer be required.
3. While varying R_L from $10 \text{ k}\Omega$ to 0 , measure:
 - measure the average of $v_o(t)$ as indicated by the DC voltmeter,
 - measure the average of $I_{680}(t)$ as indicated by the DC ammeter,
 - calculate the average of $I_{R_L}(t)$ using the average of $v_o(t)$ and the value of R_L .

You may also observe that the current in the 680Ω resistor remains constant as long as the Zener diode is in reverse conduction (this is the maximum available current in normal operation of the power supply); R_L takes the current that it needs and the *balance* is shunted through the Zener.

Suggestion: Record the values in a spreadsheet.

Report:

1. Sketch a graph of the average of $v_o(t)$ versus the average of $I_{R_L}(t)$ and estimate from the graph the *nominal value* (smallest value) of the load resistor for this simple power supply.
2. Compare the nominal value of the load resistor to what is predicted by the theory (i.e. in course notes).

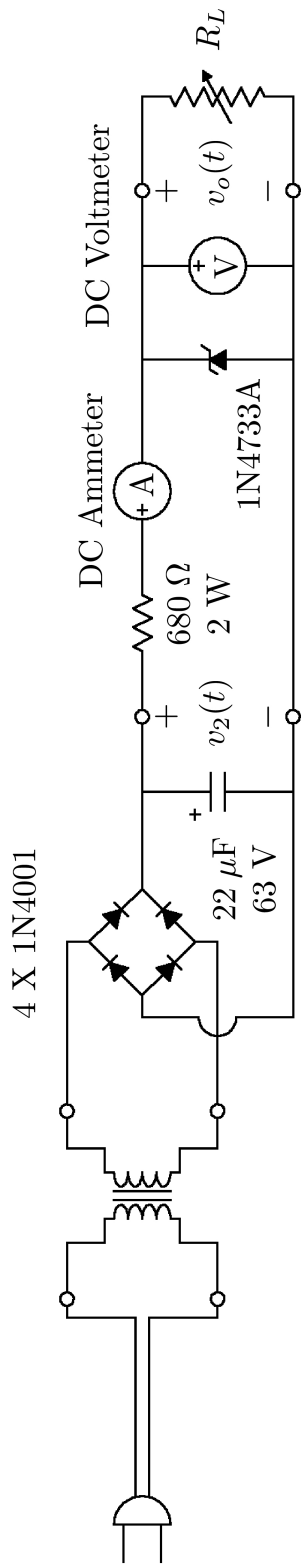


Figure 1: