

Introduce and define all concepts

Diode - a component that only allows electrical flow in one direction

Source- <https://www.britannica.com/technology/diode>

Rectifier circuit - A circuit that converts AC power into DC power

Source -

<https://www.utmel.com/blog/categories/diodes/all-you-need-to-know-about-rectifier-circuit>

Op-amp circuit - AN integrated circuit that amplifies the difference in voltage between two inputs.

Source -

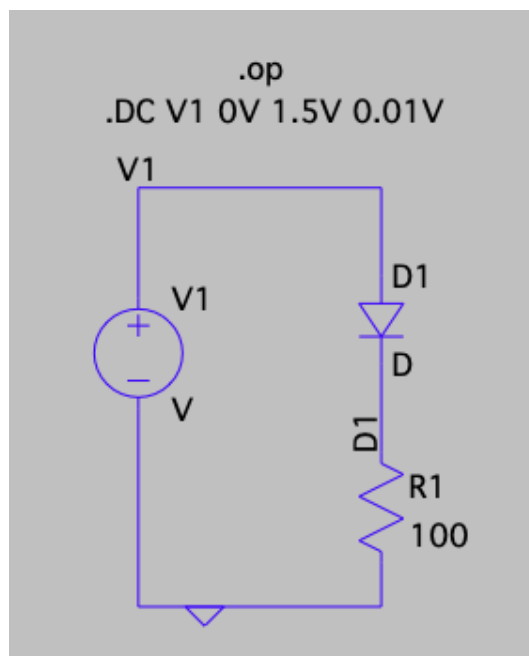
[https://toshiba.semicon-storage.com/us/semiconductor/knowledge/faq/linear_opamp/what-is-an-operational-amplifier.html#:~:text=An%20operational%20amplifier%20\(](https://toshiba.semicon-storage.com/us/semiconductor/knowledge/faq/linear_opamp/what-is-an-operational-amplifier.html#:~:text=An%20operational%20amplifier%20()

Motivation

The purpose of this lab is to become more familiar with diode based circuits through LTspice circuit simulation. With its ability to plot voltage/current signals, it can help us understand the diodes on/off characteristics. Experimenting with a few different circuits, the intention is to pay close attention to how the diode functions in a circuit.

1) Diode turn on voltage

Circuit



Plot of Diode Voltage $V(d1)$ and diode current $-I(v1)$

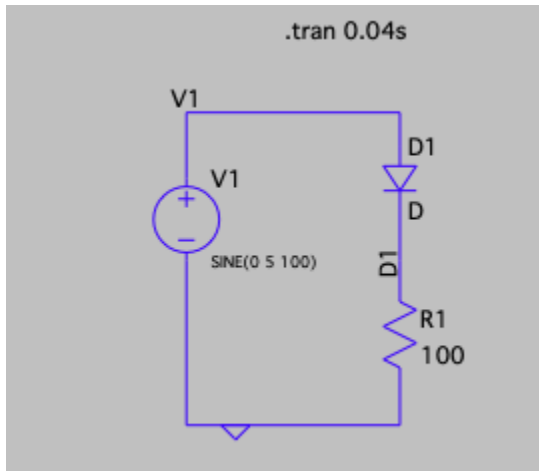


What is the turn-on voltage for this diode?

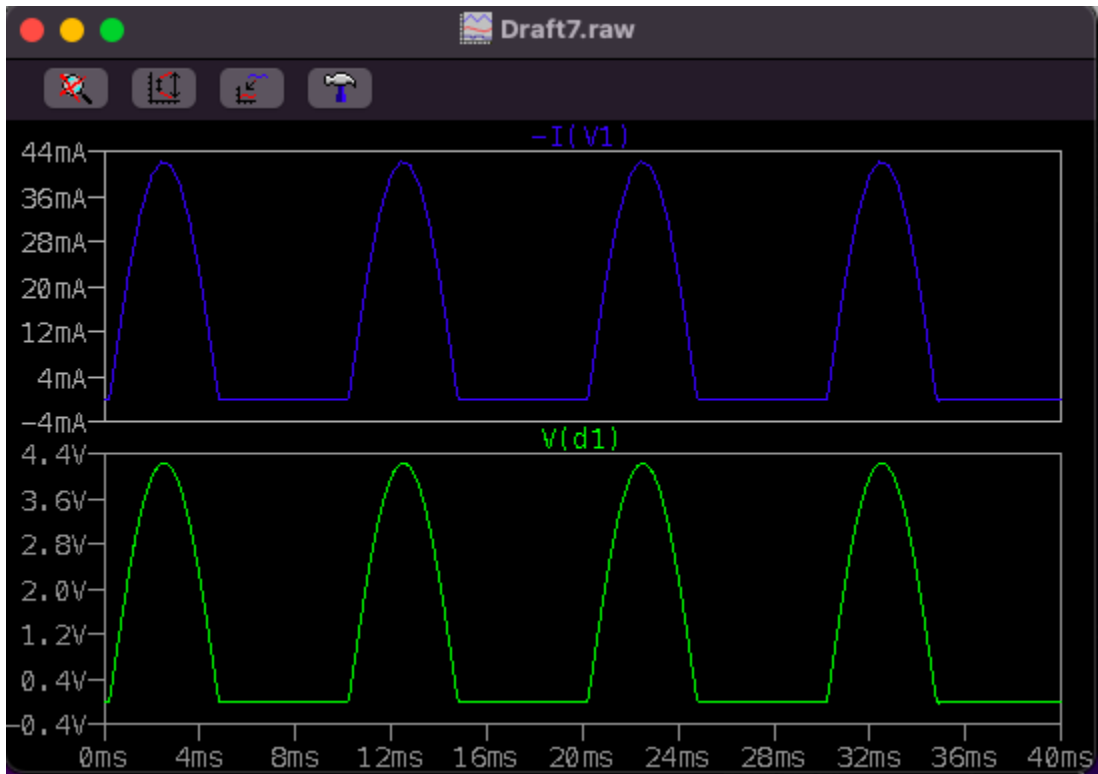
The turn on voltage for this diode is about 0.62V. From the plot, the curves start a little after the 0.6V label.

2) Half wave rectifier

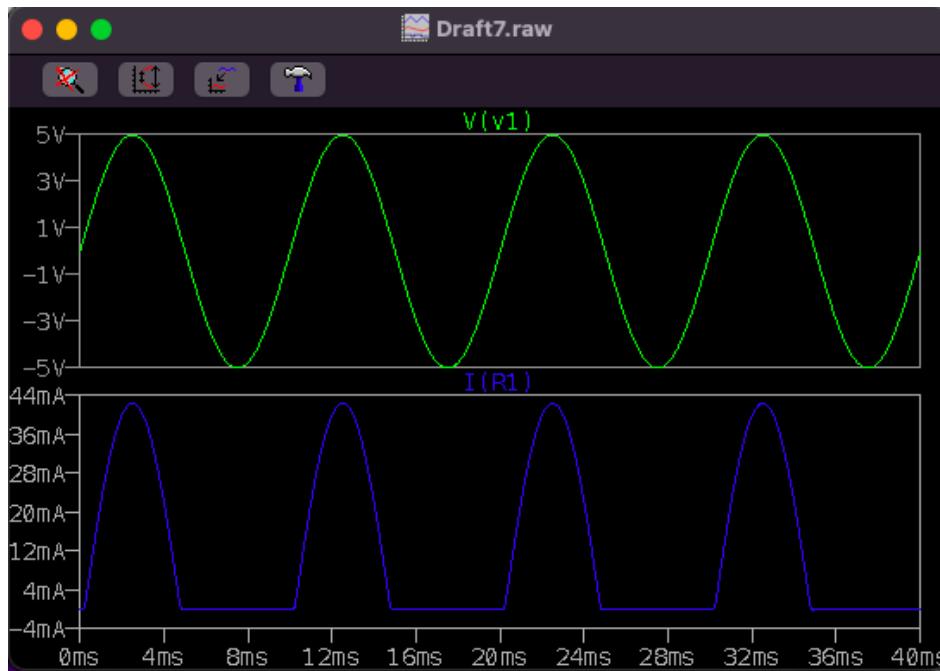
circuit schematic



- Simulation plot with diode voltage and diode current



- Simulation plot with V1 voltage and resistor voltage

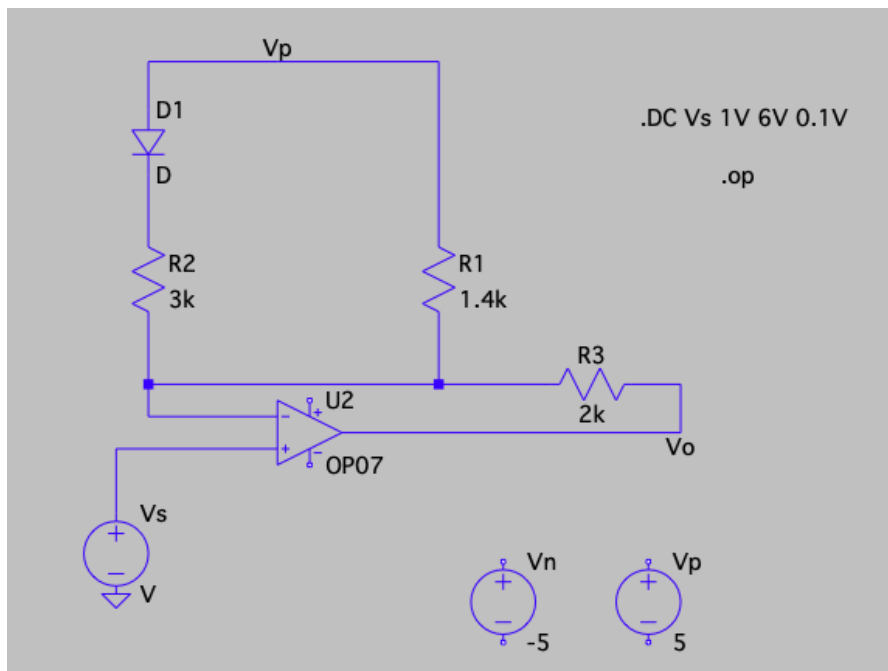


- Diode turn-on voltage – shown by indicating on voltage/current plot OR .meas statement

In this first chart, the diode voltage and current both have off periods at 0mA/mV. This means the turn on voltage is 0mV.

3) Diode + Op-Amp

- Your circuit schematic



- Simulation plot with diode voltage, diode current, and V_s voltage

