

VE311 Electronic Circuits

Lab 03: Diodes plugged into another diodes, rectifiers

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Laboratory is focused on to understand a few of the things seen in class. Mainly, it is focused on to get the physics behind each device and how can we use them in our favor for future applications. In this practice, we are going to investigate how the rectification process is performed by a set of diodes for a half and full-wave.

1. The first analysis is performed to understand how a half-wave rectifier is working while a $10\sin(2\pi f)$ (peak-to-peak) is being applied according to Figure 1, $R = 10\text{ k}\Omega$ and $C = 0.02\mu\text{F}$ (or de closest value, if you wish).

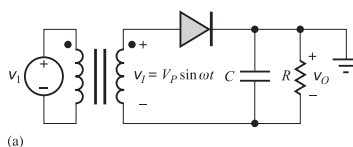


Figure 1: Half-wave rectifier circuit

In order to make it a bit interesting, you're going to sweep frequencies ranging from 30 Hz, up to 30 MHz in the step of 1 MHz and take evidence of what happened with the circuit. The source will be a function generator and the measurement will be taken through an oscilloscope plugged at the load resistor.

2. On this circuit configuration, please follow the same process as before and take evidence of the rectification in contrast with the initial full-wave signal.

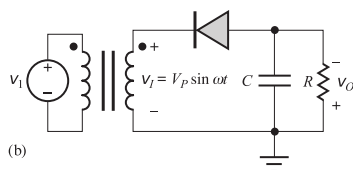


Figure 2: Half-wave rectifier circuit, negative-ish

3. For this toy, you're using four diodes plugged in the configuration that is featured in Figure 3. By considering similar values for R and C as before, analyze it according to the follow set of frequencies: 20, 60, 240, 3k, 20 k, 100 k, 10 M & 30 MHz.

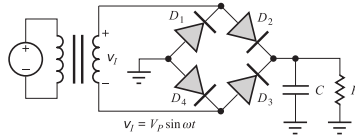


Figure 3: Full-wave rectifier

For each one of the experiments you need to obtain images from the oscilloscope, in which you show the key variations of the experiment. Support your images with appropriate explanation as well as numerical analysis and simulations by using SPICE. Each group must submit a report. Be aware of your safety and your team mates.