VE311 Electronic Circuits

Lab 02: Diode

UM-SJTU JI

Shen Jiaqi
Zhang Xinwei
Dr. Mario Alberto García-Ramírez

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 the full behavior for the diode. Several configurations are going to be tested as well as why does it is key for nowadays technology.

1. According to the follow configuration shown in Figure 1, calculate which is the minimum voltage required to turn on the diode

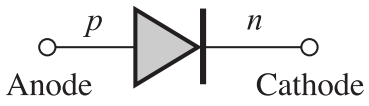

Figure 1: This is a diode

2. To corroborate if theory at some point will be close to reality, by using a signal generator and the configuration depicted in Figure 2, measure it by using an oscilloscope

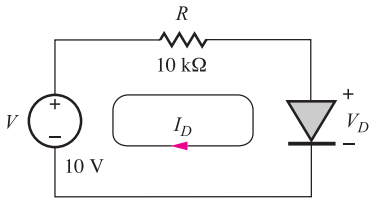

Figure 2: Diode circuit

3. Second analysis is to find the inverse breakdown voltage of the diode. In here, you are going to apply a voltage of 0.5 sin(60t) V and increase it to find the saturation point, if there is anyone (to clarify, voltage is peak-to-peak).

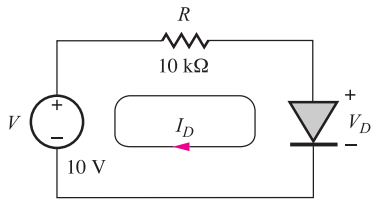

Figure 3: Inverse breakdown configuration

4. Third analysis is focused on to put two diodes back-to-back. In here, a voltage is sweep over the terminals according to the diagram. Measure the full behavior of them by sweeping peak-to-peak Asin(377t), where A= 1, 2, 5 and 10.

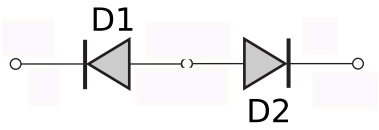

Figure 4: 2 diodes back-to-back

5. Fourth analysis, the same diodes, put them face-to-face and perform a similar analysis

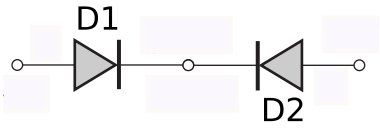

Figure 5: 2 diodes face-to-face

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 analyses and simulations by using SPICE. Each group must submit a report. Be aware of your safety and your team mates.