

Experiment 1

Diode I-V Characteristics and Bang-gap

Read the lab handout given and the supporting document first before performing the pre-lab simulation exercises.

The aim of this simulation exercise is to do the following-

1. Write NGSPICE netlist to implement the diode circuit shown in Figure 1. This is used to obtain the I-V characteristics of a diode (or LED).
2. Plot I_d vs V_d for regular diode and each LED by varying the supply from 0-5V (using DC sweep). Note down their cut-in voltages.
3. Plot $\ln(I_d)$ vs V_d using the same DC sweep and notice the trend. This plot will be used to calculate the ideality factors.

The model files required for the exercise are uploaded along with this document.

The I-V characteristics of all 4 LEDs and regular diode must be present in the same plot (this will be useful in comparison).

You are required to submit the NGSPICE netlist, 2 plots and the cut-in voltage values for all 5 diodes.

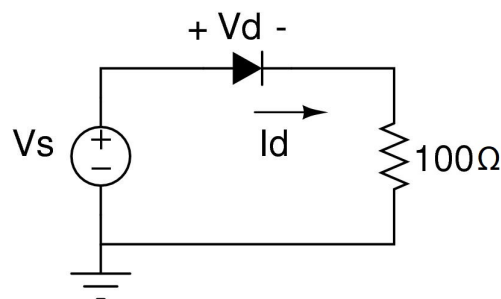


Figure 1: Diode I-V circuit