# EENG 303L – Diode Characteristics And Some Applications (1)

1. Objectives

   To study the characteristic of several diodes, observing the temperature dependence of the I-V curve.

2. Instructions

   a)
   Use the curve tracer available in the lab. to obtain the diode forward current versus voltage for three different diodes over a wide current range (make sure to do not exceed the limitations of the diode).

   The diodes are the 1N4148, the 1N751A and an LED of your choice.

   For each diode, obtain one curve at room temperature and one curve at 50 °C.

   Record all six forward curves (no need to sketch the reverse curves) and determine the temperature coefficient $dV_D/dT \approx \Delta V_D/\Delta T$ at two different points. Compare your graphically determined results to the well known theoretical equation

   $$dV_D/dT \approx -2 \text{ mV/°C}$$

   b)
   For each diode, carefully measure the reverse breakdown voltage.
   Does the breakdown voltage increase, decrease, or remain constant when temperature increases? _____

Questions

Room Temperature = _____

Forward curves:
The vertical and horizontal settings of the curve tracer should be clearly marked on each curve. The numerical value of the temperature should also be clearly marked.

Forward Curves for 1N4148

Forward Curves for 1N751A

Forward Curves for LED (what LED did you use: _____)

What is the temperature coefficient of each diode? Shortly explain how it was computed using your graphs.

| Diode Type | Temperature coeff. [units] | $I_D$ [units] | $\Delta V_D$ [units] | $\Delta T$ [units] |
|---|---|---|---|---|
| 1N4148 | | | | |
| 1N4148 | | | | |
| 1N751A | | | | |
| 1N751A | | | | |
| LED | | | | |
| LED | | | | |

What is the breakdown voltage of each diode at room temperature?

| Diode Type | $V_{BR}$ [units] |
|---|---|
| 1N4148 | |
| 1N751A | |
| LED | |

Did any of the diodes blow up when the breakdown voltage was measured?

_____

Why or why not?

_____