ELEC-313
Lab 2: Diode Characterization

September 23, 2013

Date Performed: September 18, 2013
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1 Objective

The objective is to observe the basic operation of a diode. In addition, the Schlockley equation (Eq 1) is used to find the diode's reverse saturation current (I_S) and thermal voltage (V_T) using measured values in the lab.

2 Equipment

Diode: 1N4002
Resistors: 330 Ω, 470 Ω, 680 Ω
Resistive decade box: HeathKit IN-3117
Power supply: HP E3631A
Multimeter: Fluke 8010A

3 Schematics

3.1 Circuits Tested

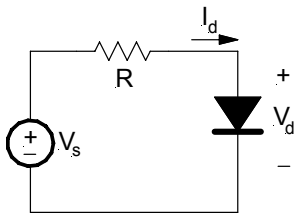

Figure 1: Circuit used for Part A and Part B.

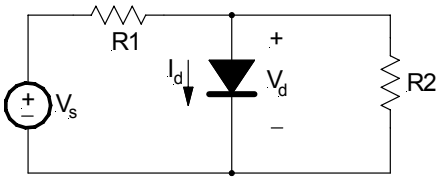

Figure 2: Circuit used for Part C.

4 Procedure

4.1 Part A

The circuit in Figure 1 with $R = 470\,\Omega$ and the power supply as V_S.

4.2 Part B

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4.3 Part C

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5 Results

5.1 Part A

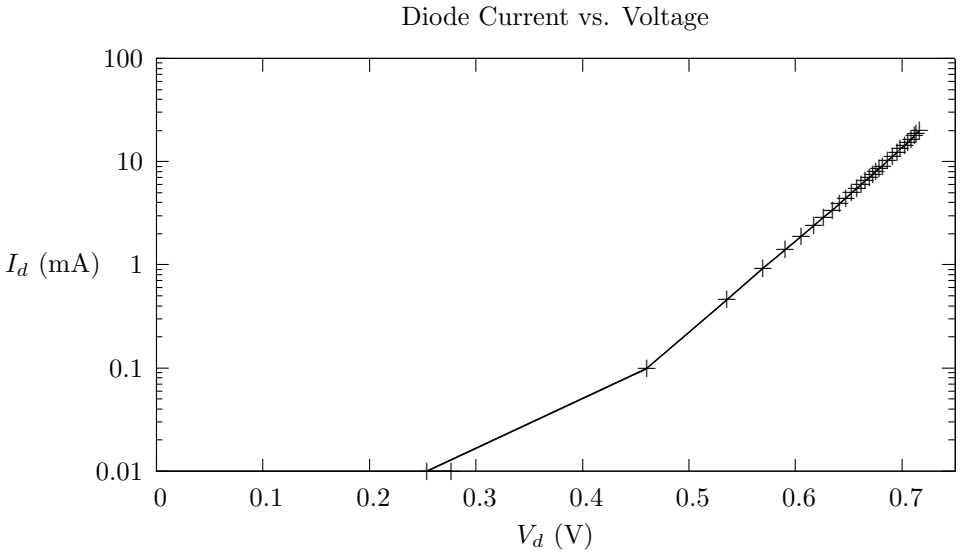

Figure 3: Diode characteristics measured in Part A.

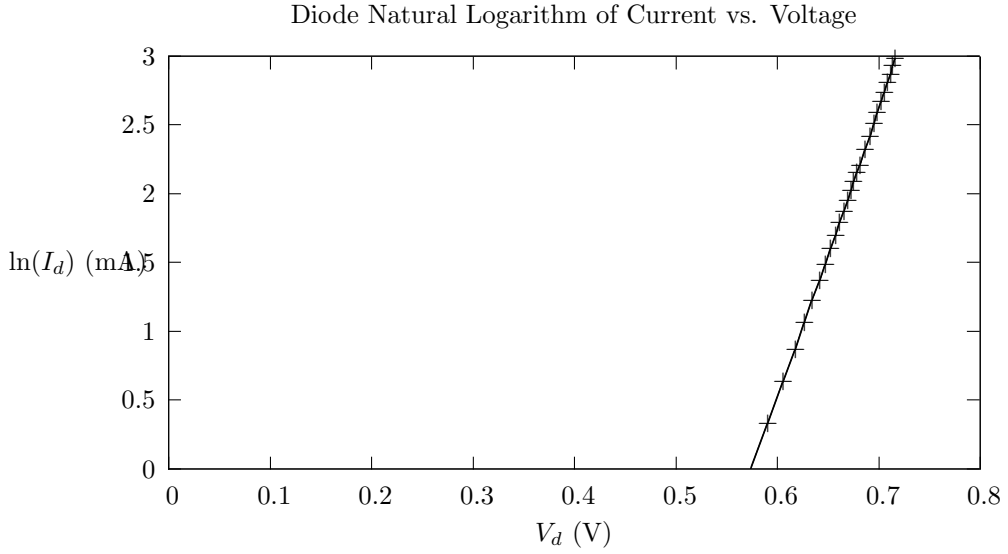

Figure 4: $\ln(I_d)$ vs. V_d.

5.2 Part B

R (Ω)	V_d (V)	I_d (mA)
200	0.751	46.00
500	0.713	18.60
1k	0.682	9.30
2k	0.650	4.70
5k	0.605	1.85
10k	0.571	0.94
20k	0.538	0.47
50k	0.494	0.19
100k	0.464	0.10

Table 1: Diode characteristics measured in Part B.

V_d (V)	I_d (mA)	V_{OC} (V)
0.712	27.2	6.70

Table 2: Diode characteristics measured in Part C.

5.3 Part C

6 Conclusion

7 Equations

$$I_D = I_S \left(e^{\frac{V_D}{V_T}} - 1 \right) \tag{1}$$