CMPE226 Electronics Lab Report
Experiment # 5 Semiconductor Diode

Std. No Name

1. _____ _____
2. _____ _____
3. _____ _____

Group _____
Date _____

Objectives:

1) *Ability to recognize diodes in various physical forms.*
2) *Ability to determine the diode polarity and to understand the need for correct connection.*
3) *To obtain knowledge of the forward voltage/current characteristics and conduction voltage for germanium and silicon types.*

Introduction

A Semiconductor Junction Diode (or just Diode) is made from a piece of P-type and a piece of N-type semiconductor joined together. See figure 1.

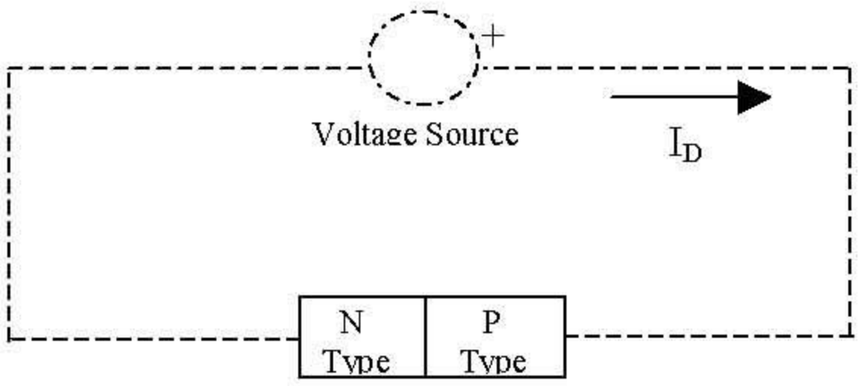


Figure 1
Function Diode

If a voltage (potential difference) is applied across the two terminals, the Diode will conduct electricity. The amount of current that flows depends upon the size and polarity of the applied voltage.
The Diode is represented in

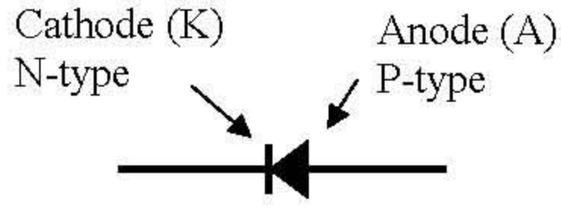


Figure 2
Function Diode

Experimental Procedure: Determining Diode Polarity

1) Construct the circuit as shown in Figure 3. Note that the resistor limits the current to a safe value.

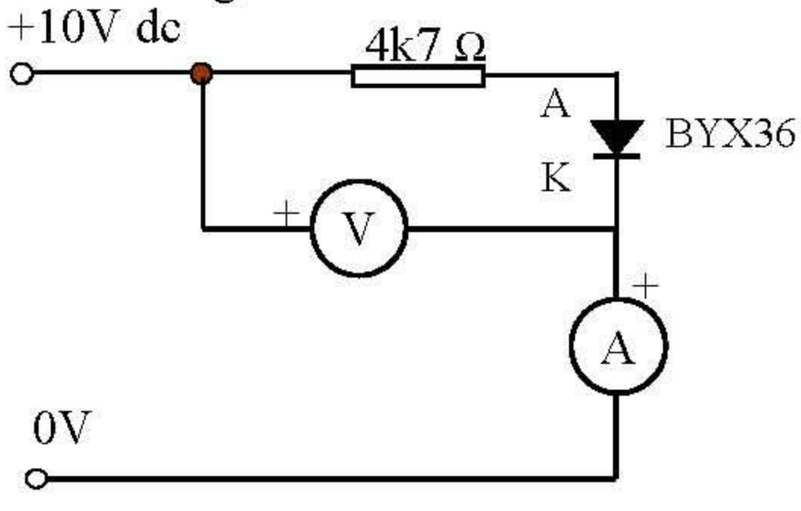


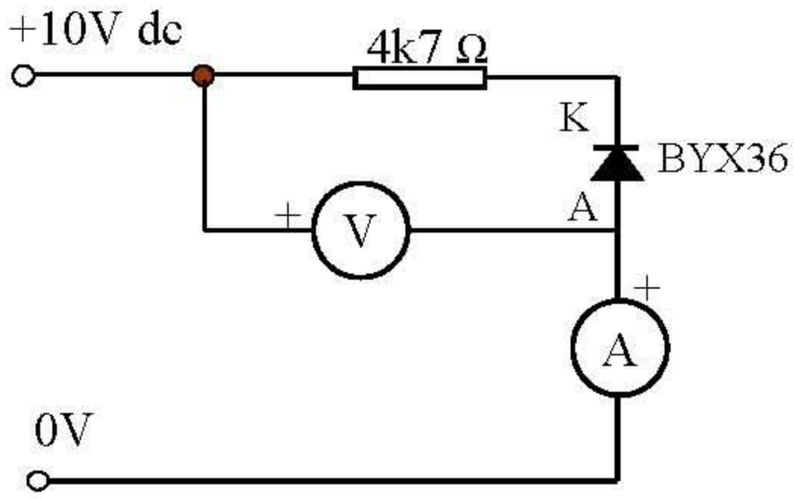
Figure 3 Diode test Circuit

2) Switch on the power supply, Set the power supply control to give 10V on the meter

3) Copy the results to following table and record the current measurement in the first row of the table.

4) Now switch off the power supply and reverse the BYX36 diode as shown below.

Figure 4



5) Switch on the power supply and readjust the voltage to 10V. Read the new value of current and record it in the second row of your table

Circuit	Current (mA)
Figure 3	
Figure 4	

6) Study your results and answer the following questions.

Q1) Which side of a diode should be connected to the positive voltage supply to make it conduct current?

Q2) When the diode was connected the opposite way round was the current?

a) slightly smaller b)much smaller c) too small to measure

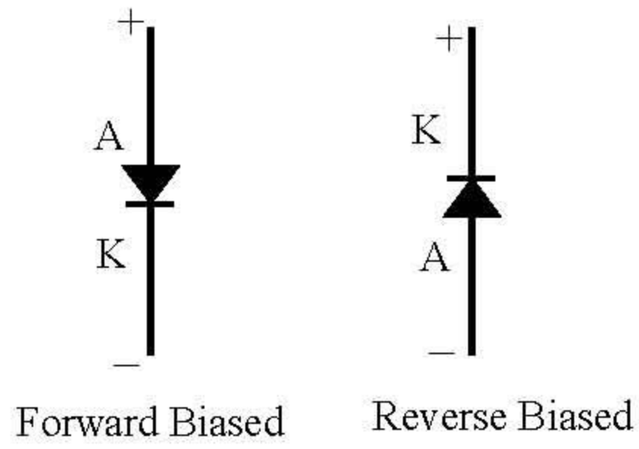
When a diode is connected so as to conduct it is **Forward Biased**

When a diode is connected so as NOT to conduct, it is **Reverse Biased**

Figure 5, shows the two methods of connecting diodes

Figure5

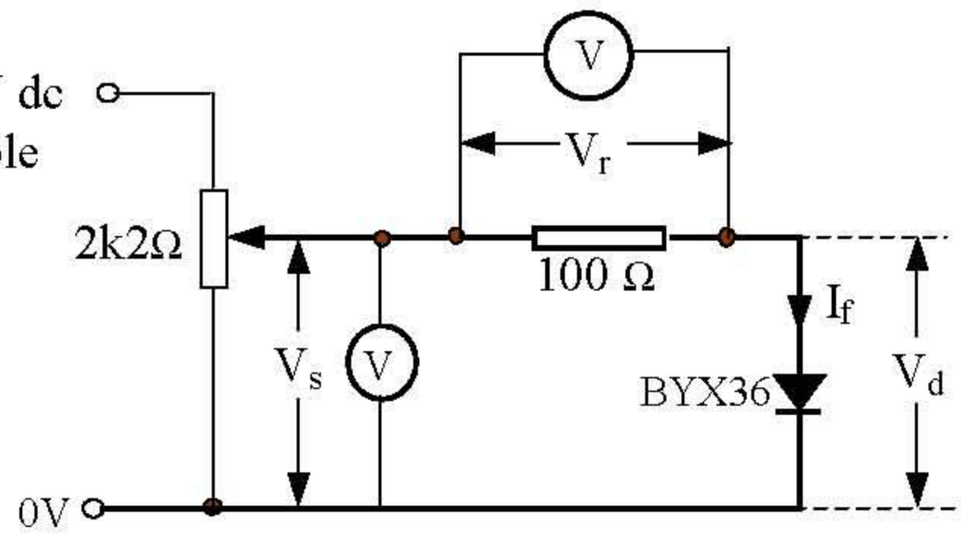
Diode Bias



The Characteristics of Forward Biased Diodes

As shown on Figure 6 the 2.2kΩ potentiometer will provide fine control over the applied voltage.

Figure 6



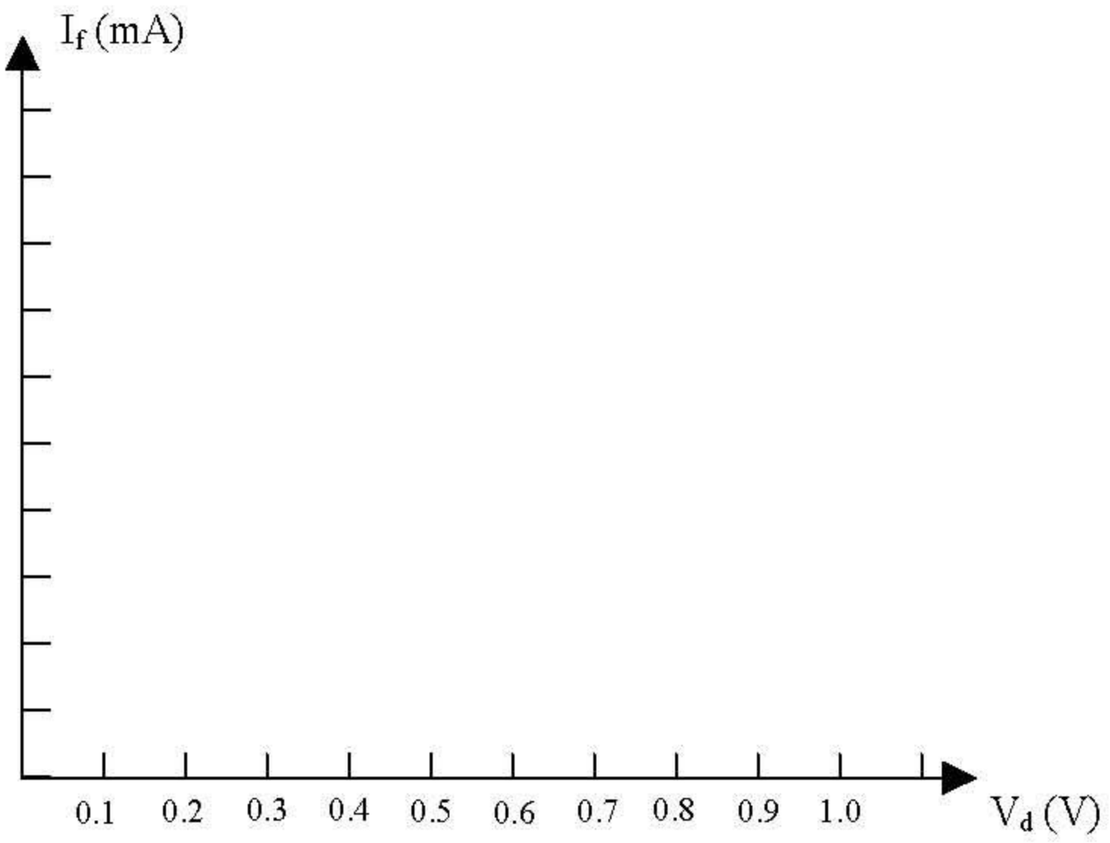
NOTE: $V_d=V_s-V_r$ and $V_r=I_f\times100$

$$\therefore I_f = \frac{V_r}{100}A = \frac{V_r}{100}\times1000mA = 10V_r mA$$

Copy the results table as shown in table as follows

- Turn the potentiometer to zero; fully clockwise
- Switch on the power supply and adjust it to supply 20V
- Adjust the potentiometer to give a voltage of 1V on the voltmeter showing Vs.
- Now use the power supply variable control to set Vs to:0, 0.1V, 0.2V, 0.3V,etc, up to 1.0V.
- Record Vr for each setting and enter it in your table.
- Now, with the power supply variable control set to supply 20V, use the potentiometer to set Vs to: 1.5V, 2.0V, 2.5V and 3.0V.
- Again enter the values of Vr in your table
- Calculate V_d and I_f as shown above and enter these also in the table draw it.

Vs (V)	Vr (V)	Vd=Vs-Vr	If=10Vr
(V)	(V)	(V)	(mA)
0.0			
0.1			
0.2			
0.3			
0.4			
0.5			
0.6			
0.7			
0.8			
0.9			
1.0			
1.5			
2.0			
2.5			
3.0			



CONCLUSIONS (USE BACK SIDE OF PAGE)