

PREMIER UNIVERSITY CHITTAGONG

Department of Computer Science & Engineering



Course Code

: EEE 212

Course Title

: Electronics I Laboratory

Experiment No.

: 02

Name of Experiment

: V-I characteristics of a semi-conductor diode.

Date of Performance

: 18-09-2018

Date of Submission

: 25-09-2018

Submitted By:-

| REMARKS |
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| Department | : CSE |
| Batch | : 33th |
| Semester | : 2 nd |
| Section | : C2A1 |

⇒ Object :-

① Find out the V-I characteristics of a semiconductor diode under forward and reverse biased condition.

② To study the characteristics of the forward and reverse biased junction diodes.

③ To study and verify the functionality of PN junction diode in forward bias and point-contact diode in reverse bias.

⇒ Equipments :-

| No. | Equipment Name | Quantity | Rating |
|-----|-----------------|----------|-------------|
| 1. | DC Power Supply | 1 | (0-30)V |
| 2. | Resistor | 1 | 1K Ω |
| 3. | Diode | 1 | |
| 4. | Ammeter | 1 | (0-50)mA |
| 5. | Multimeter | 2 | |
| 6. | Conductors | 2 | |

⇒ Introduction :-

(i) Semiconductor diode - A diode made of semiconductor components, usually silicon. The cathode which is negatively charged and has an excess of electrons, is placed adjacent to the anode, which has an inherently positive charge, carrying an excess of holes. At this junction a depletion region forms, with neither holes nor electrons. A positive voltage at the anode makes the depletion region large, preventing current flow.

(ii) Forward bias - when voltage is applied across a diode in such a way that the diode allows current, the diode is said to be forward biased.

(iii) Reverse bias - when voltage is applied across a diode in such a way that the diode prohibits current, the diode is said to be reverse bias biased.

⇒ Theory :-

The general form of the current-voltage c/eq of a diode is shown in figure (1). A current flow in the forward direction is very large compared with that in the reverse direction and such a device is very useful as a rectifier. The diode is in the forward direction when an external battery is connected with positive terminal to the (p) region and negative terminal to the region (n). The reverse current through the diode varies greatly with temperature and with the semiconductor material used.

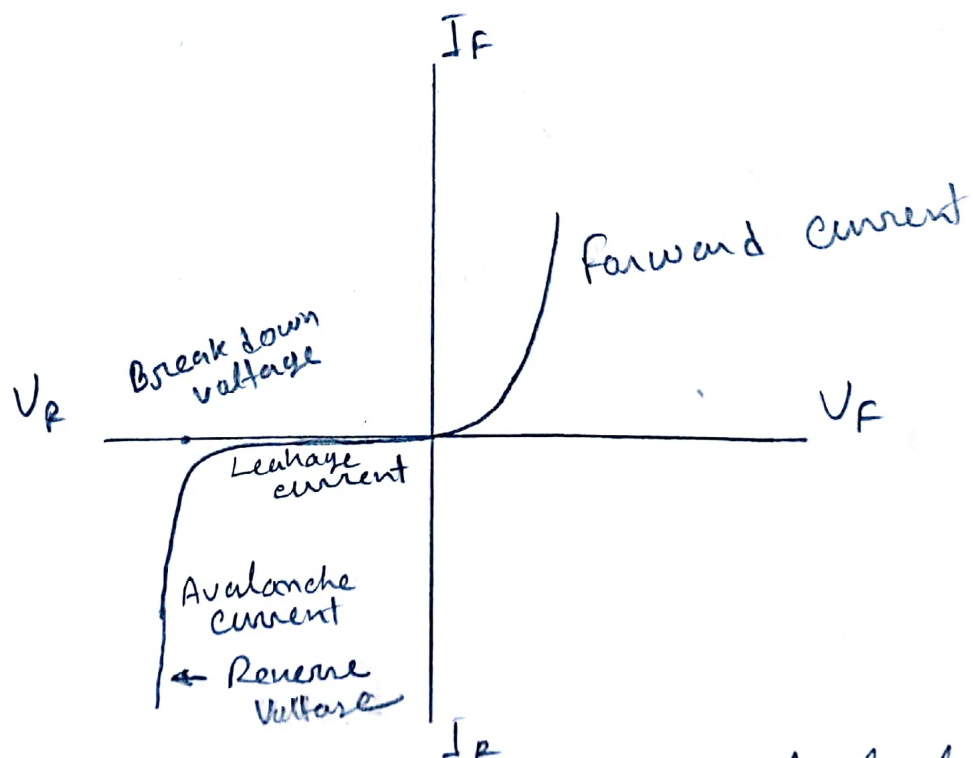


Figure - (1) V-I c/eq of a real diode.

⇒ Circuit Diagram :-

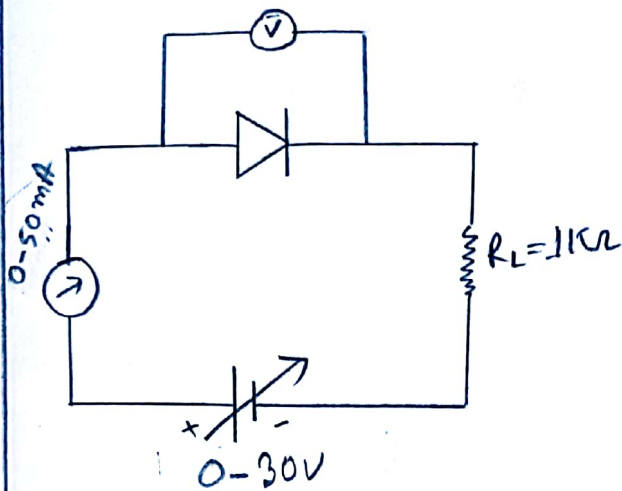


Fig: 1 Forward bias

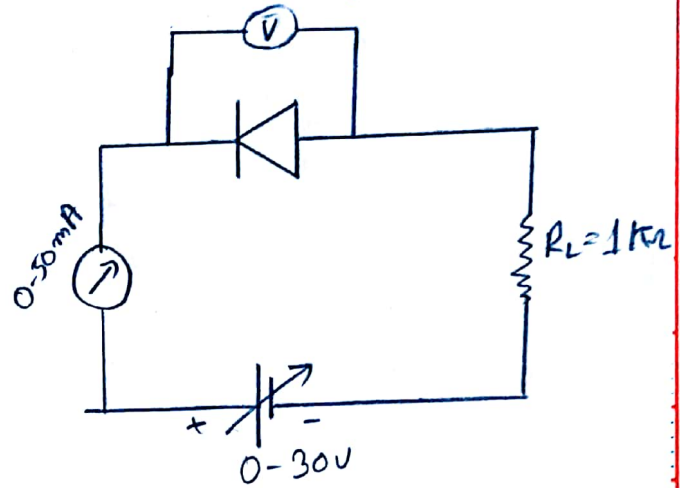


Fig: 2 Reverse bias

⇒ Procedure :-

1. Connections are made as Fig 1. using
2. Increase the variable DC voltage from ~~20~~ 0 voltage up to 20 voltage and recorded the result.
3. Tabulated my results in a table.
4. Then connections are changed to as Fig 2.
5. Increase the variable DC voltage from 0 voltage up to 20 voltage and recorded the results.
6. Tabulated my results in a table.

7.

⇒ Data table :-

Forward biased condition

| No. | Supply voltage (V) | V_d (V) | I_d (mA) |
|-----|--------------------|-----------|------------|
| 1. | 0 | 0 | 0 |
| 2. | 0.52 | 0.44 | 0 |
| 3. | 1.006 | 0.532 | 0.1 |
| 4. | 1.5 | 0.567 | 0.5 |
| 5. | 2.1 | 0.591 | 1.1 |

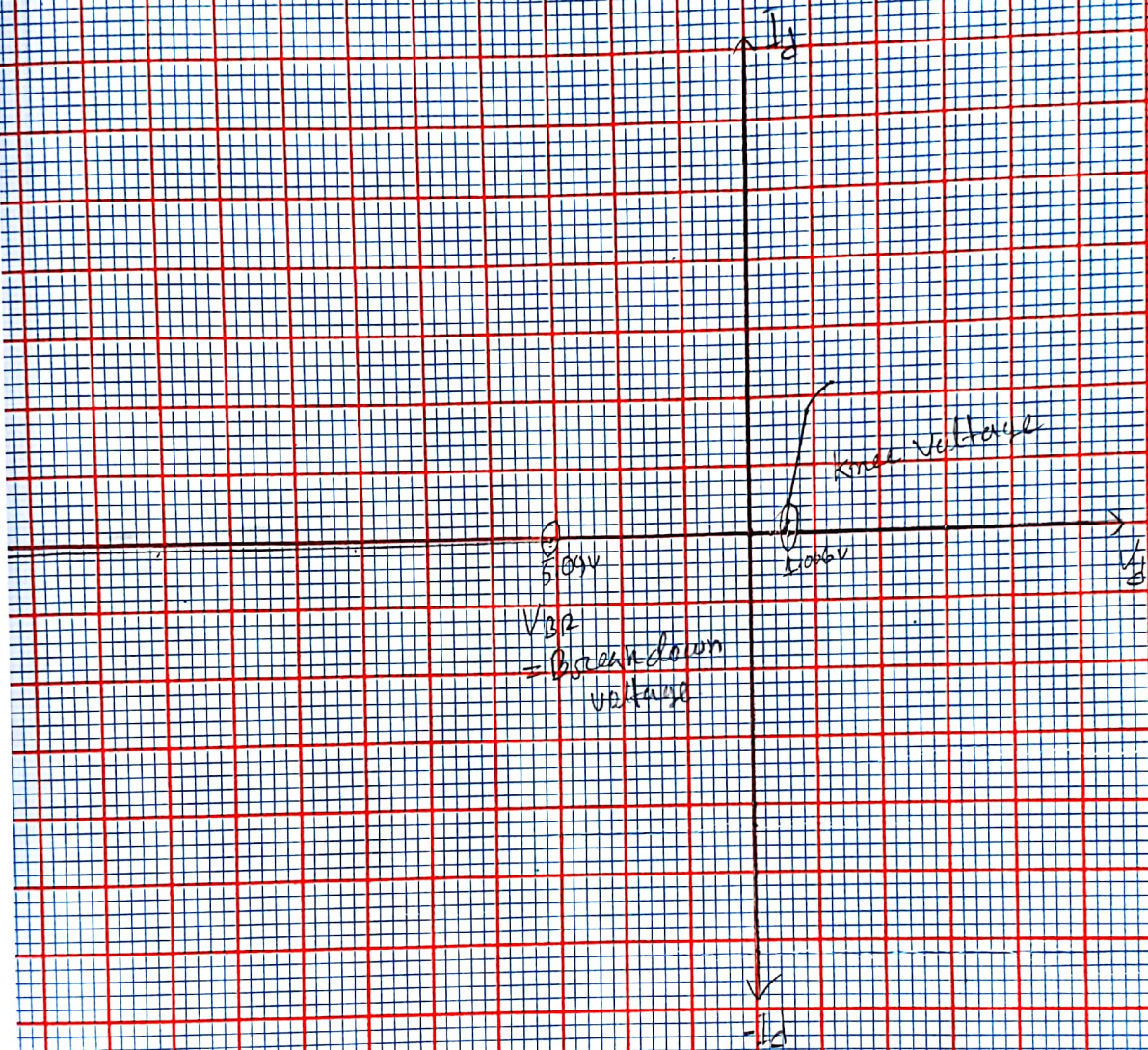
Table - 1

Reverse biased condition

| No. | Supply voltage (V) | V_d (V) | I_d (mA) |
|-----|--------------------|-----------|------------|
| 1. | 0 | 0 | 0 |
| 2. | 5.09 | -9.15 | -0.01 |
| 3. | 10.12 | -11.15 | -0.02 |
| 4. | 15.1 | -12.63 | -0.03 |
| 5. | 20 | -13.05 | -0.04 |

Table - 2

$x \rightarrow \Delta: 2$
 $y \rightarrow 100.1$



⇒ Discussion :-

① After doing this experiment this we got to know about semiconductor region.

② When external DC voltage is applied to the junction in such a direction as fig-1 we got forward bias result.

③ When external DC voltage is applied to the junction in such a direction as fig-2 we got reverse bias result.

④ We got forward bias or positive current after applying 0.7 or more in Si.

⑤ We got reverse bias or negative current after applying negative 5.00 voltage.

⇒ Reference :-

① www.google.com

② www.rotechnology.edu.in

③ www.sjce.ac.in

④ www.dictionary.com

⑤ www.wikipedia.com

Date: 18-09-18

Id: 1373

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Experiment No: 2

Experiment Name: Find out the V-I characteristics of a semiconductor diode under forward and reverse biased condition.

Equipments:

| No. | Equipment Name | Quantity | Rating |
|-----|-----------------|----------|----------------|
| 1. | DC power supply | 1 | (0-30) V |
| 2. | Resistor | 1 | 1K Ω |
| 3. | Diode | 1 | |
| 4. | Ammeter | 1 | 0-5A 0-50mA |
| 5. | Multimeter | 2 | |
| 6. | Conductors | 2 | |