

Experiment Number -01

PEC-101/201 Fundamental of Electronics Engineering Lab
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OBJECT

To study the V-I characteristics of a Semiconductor Diode.

APPARATUS REQUIRED

1. Diode Characteristics Kit.
2. Connecting Probes (Leads).
3. DC Ammeter (0-20 mA)
4. DC Voltmeter (0-20 V)
5. Power Supply

THEORY

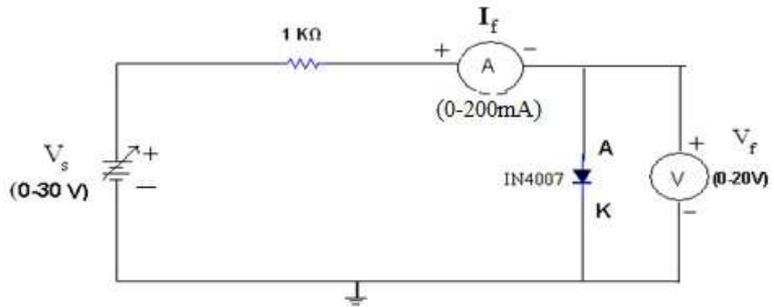
There are two operating regions and three possible “biasing” conditions for the standard **Junction Diode** and these are:

1. **Zero or No Bias** – No external voltage potential is applied to the PN junction diode.
 2. **Reverse Bias** – The voltage potential is connected negative, (-ve) to the P-type material and positive, (+ve) to the N-type material across the diode which has the effect of **Increasing** the PN junction diode’s width.
 3. **Forward Bias** – The voltage potential is connected positive, (+ve) to the P-type material and negative, (-ve) to the N-type material across the diode which has the effect of **Decreasing** the PN junction diodes width.
- When a diode is **Zero or No Biased** no external energy source is applied and a natural **Potential Barrier** is developed across a depletion layer which is approximately 0.5 to 0.7v for silicon diodes and approximately 0.3 of a volt for germanium diodes.
 - When a junction diode is **Forward Biased** the thickness of the depletion region reduces and the diode acts like a short circuit allowing full current to flow.

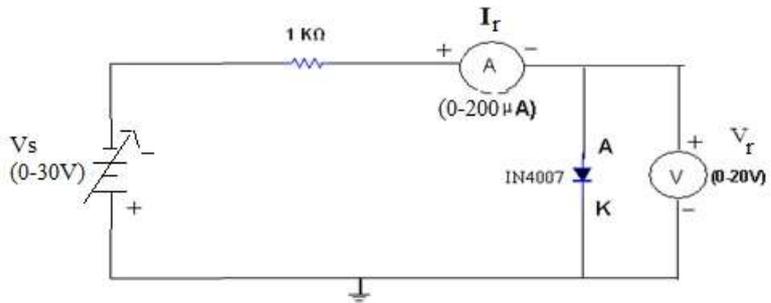
- When a junction diode is **Reverse Biased** the thickness of the depletion region increases and the diode acts like an open circuit blocking any current flow, (only a very small leakage current).

CIRCUIT DIAGRAM

Case I – When Diode is Forward Bias



Case II – When Diode is Reverse Bias



PROCEDURE

Connect the circuit as shown in the figure. Switch ON the power and note down the reading of Ammeter and Voltmeter for variable voltage in forward bias and reverse biased condition.

OBSERVATION TABLE

S.No.	When Diode is Forward Bias		When Diode is Reverse Bias	
	V_D	I_D	V_D	I_D
1				
2				
3				
4				
5				
6				

RESULT

The V-I characteristics of semiconductor diode successfully plotted on the basis of observation table.

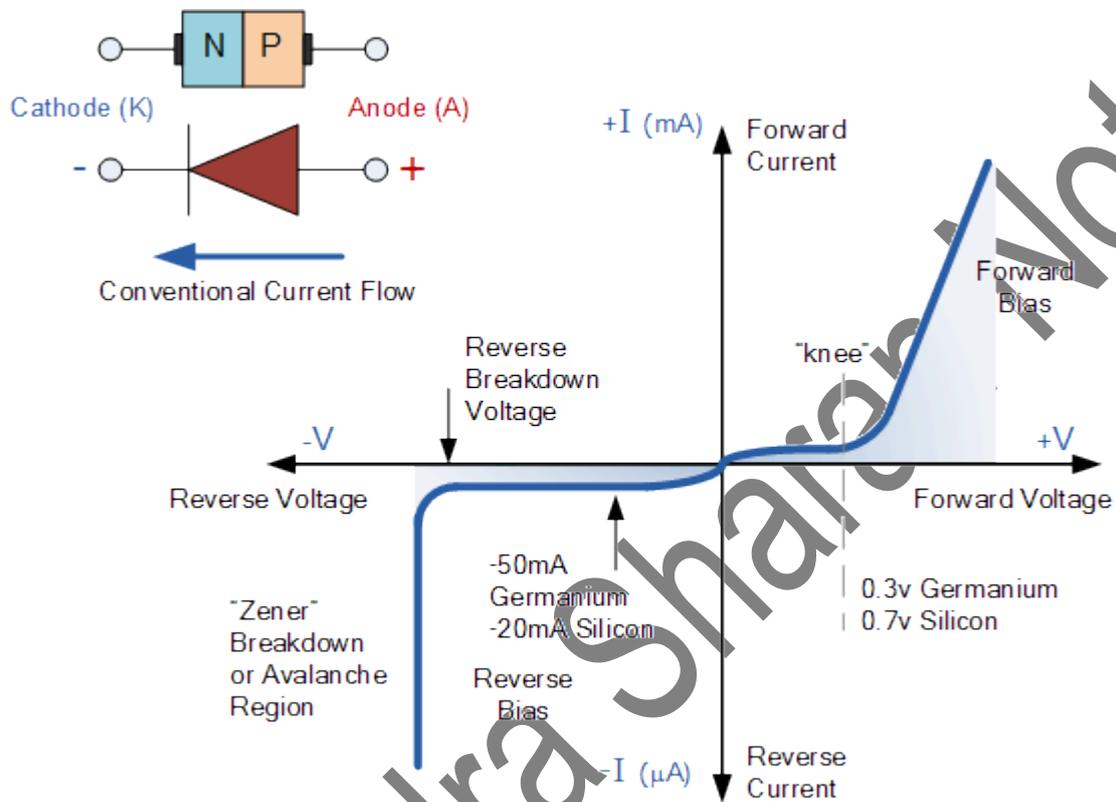


Fig.1 Junction Diode Symbol and Static I-V Characteristics

DISCUSSION

The Diode do not conduct in the Reverse Bias condition but it will conduct in the Forward Bias Condition.

PRECAUTIONS

1. Always connect the voltmeter in parallel and Ammeter in series as shown in the figure.
2. Connections should be proper and tight.
3. Switch "ON" the power after completing the circuit.
4. DC voltage should be increased slowly in steps.
5. Reading on the Voltmeter and Ammeter should be accurate.