Junction Diode

Lecture - 11

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B.Sc (Electronics)
TDC PART - I
Paper – 1 (Group – B)
Unit – 5
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➢ Metal Semiconductor Junctions

⇨ It has assumed that the **external bias voltage (forward or reverse)** appears directly **across the junction** and **has the effect of lowering or raising the Electrostatic Potential across the junction.**

⇨ In order to justify the above assumption it should be specified how Electrical Contact is made to the semiconductor from the external bias circuit. In **Figure (1)** and **Figure (2),** we indicate **Metal Contacts** with which the **homogeneous P – type** and **N – type** materials are provided. Thus **two metal-semiconductor junctions**, **one at each end of the diode, have been introduced.** So a **Contact Potential** is expected to be developed across these **additional junctions.**

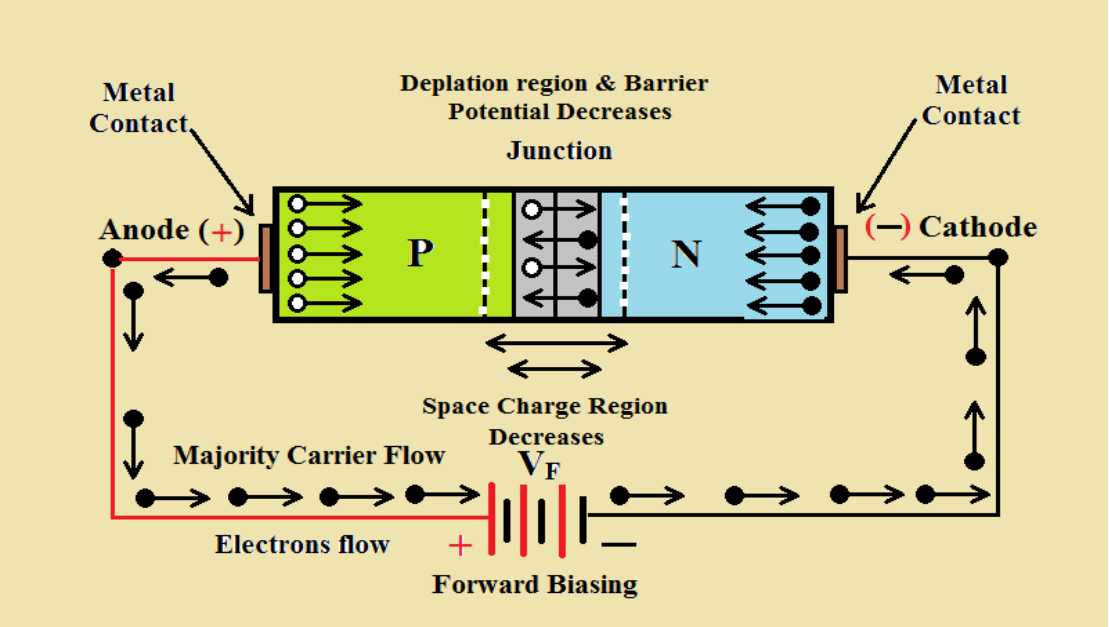

Fig. (1) Shown A P-N Junction Metal-Semiconductor Contact with Forward Biasing, indicating the Direction of the Electric Field Induced by Voltage $\mathbf{V_F}$ and Space Charge Region.

⇨ However, it can be assumed that **Metal-Semiconductor Contact** shown in **Figure (1)** and **Figure (2)** have been manufactured in such a way that they are **Non-Rectifying** i.e., the **Contact Potential** across these junctions is **almost independent of direction and magnitude of Current.** A contact of this type is referred to as an Ohmic Contact.

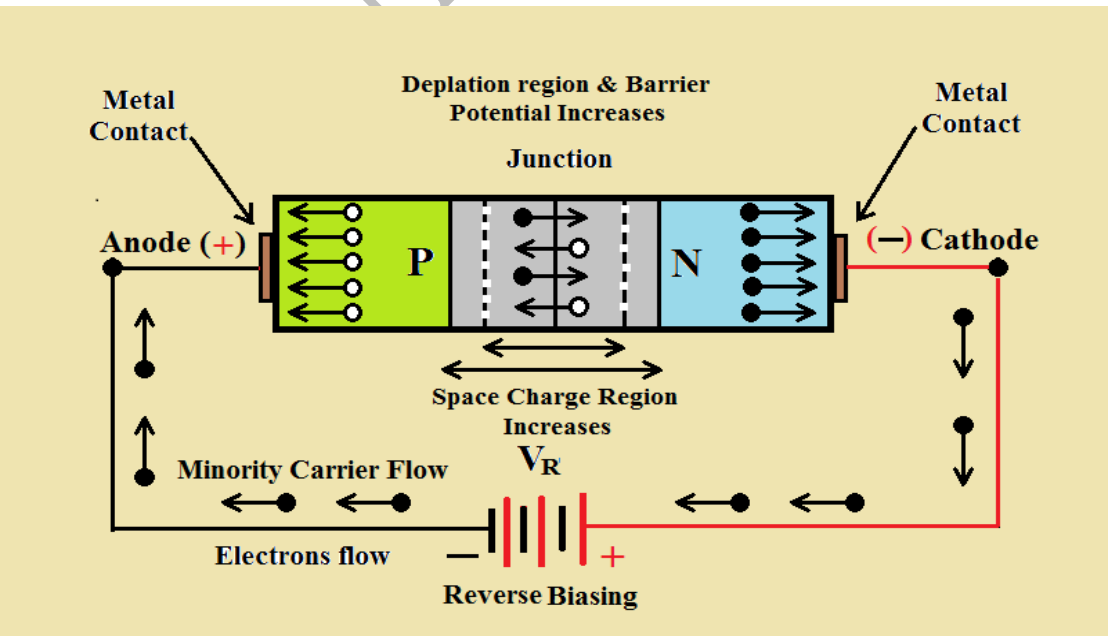

Fig. (2) Shown A P-N Junction Metal-Semiconductor Contact with Reverse Biasing, indicating the Direction of the Electric Field Induced by Voltage $\mathbf{V_R}$ and Space Charge Region.

⇨ We are now in a position to justify our assumption that the **entire applied voltage appears as a change in the height of the Potential Barrier.** In as much as the **Metal-Semiconductor Contacts** are **Low-Resistance Ohmic Contacts** and the **Voltage drop** across **bulk of the crystal is negligible**, approximately the **entire applied voltage** will indeed **appear as a change in the height of the Potential Barrier at the P-N Junction.**

⇨ In the next **Lecture - 12,** we will discuss the detailed of the **P-N Junction as a Diode and P-N Junction Diode Forward Biasing.**

to be continued .....

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