1.3. DRIFT CURRENT AND DIFFUSION CURRENT DENSITIES

Drift Current

Drift current can be defined as the charge carrier's moves in a semiconductor because of the electric field. There are two kinds of charge carriers in a semiconductor like holes and electrons. Once the voltage is applied to a semiconductor, then electrons move toward the +Ve terminal of a battery whereas the holes travel toward the –Ve terminal of a battery.

Here, holes are positively charged carriers whereas the electrons are negatively charged carriers. Therefore, the electrons attract by the +Ve terminal of a battery whereas the holes attract by the -Ve terminal of a battery.

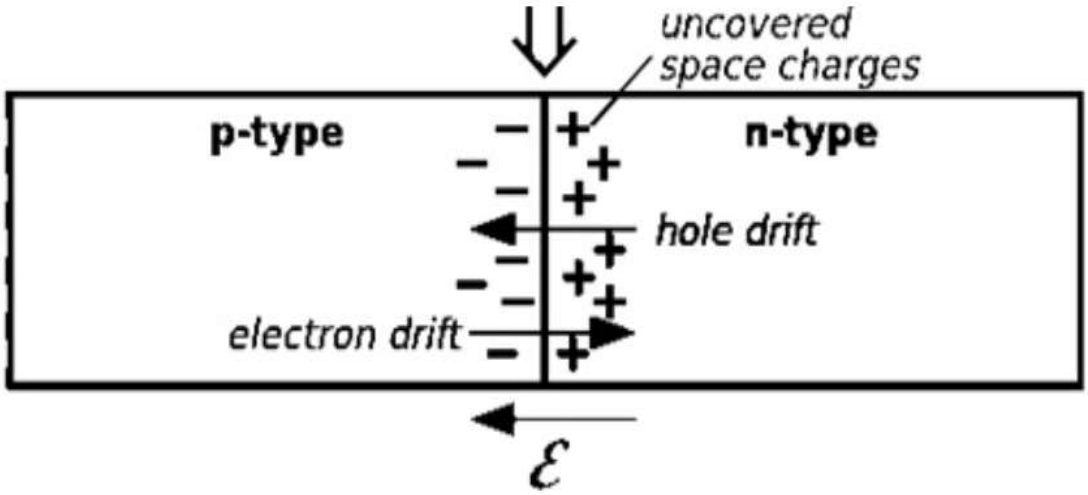

Fig:1.3.1 Drift Current

Diffusion Current

The diffusion current can be defined as the flow of charge carriers within a semiconductor travels from a higher concentration region to a lower concentration region. A higher concentration region is nothing but where the number of electrons present in the semiconductor. Similarly, a lower concentration region is where the less number of electrons present in the semiconductor. The process of diffusion mainly occurs when a semiconductor is doped non-uniformly.

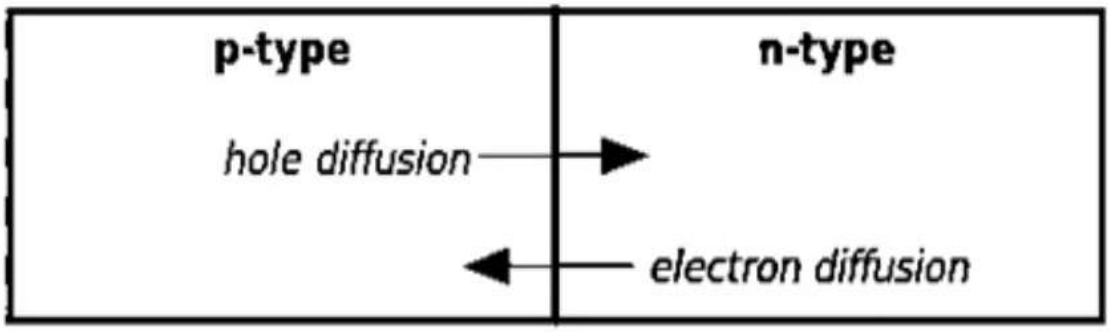

Fig:1.3.2 Diffusion Current

In an N-type semiconductor, when it is doped non-uniformly then a higher concentration region can be formed at the left side whereas the lower concentration region can be formed at the right side. The electrons in the higher concentration region are more in the semiconductor so they will experience a repulsive force from each other.

Difference between Drift Current and Diffusion Currents

Drift Current	Diffusion Current
The movement of charge carriers is because of the applied electric field is known as drift current.	The diffusion current can be occurred because of the diffusion in charge carriers.
It requires electrical energy for the process of drift current.	Some amount of external energy is enough for the process of diffusion current.
This current obeys Ohm's Law.	This current obeys Fick's Law.
The direction of charge carriers in the semiconductor is reverse to each other.	For charge carriers, the densities of diffusion are reverse in symbol to each other.
The direction of the drift current, as well as the electric field, will be the same.	The direction of this current can be decided by the concentration of the carrier slope.
It depends on the permittivity	It is independent of permittivity
The direction of this current mainly depends on the polarity of the applied electric field.	The direction of this current mainly depends on the charge within the concentrations of carrier