



SNS College of Engineering

An Autonomous Institution

Accredited by NAAC-UGC with 'A' Grade,
Approved by AICTE, Recognized by UGC and Affiliated to Anna University, Chennai

Redesigning Common Mind & Business Towards Excellence



Build an Entrepreneurial Mindset Through Our Design Thinking FrameWork

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE NAME : 19EC602 – Microwave and Optical Engineering

III YEAR / VI SEMESTER

Unit IV – OPTICAL COMMUNICATION

Topic: Optical Sources - LED

Optical Sources - LED/ 19EC602/ Microwave and Optical Engineering/Mrs.D.Vishnu Priya
/ECE/SNSCE



INTRODUCTION

Light Emitting Diode (LED) Principle:

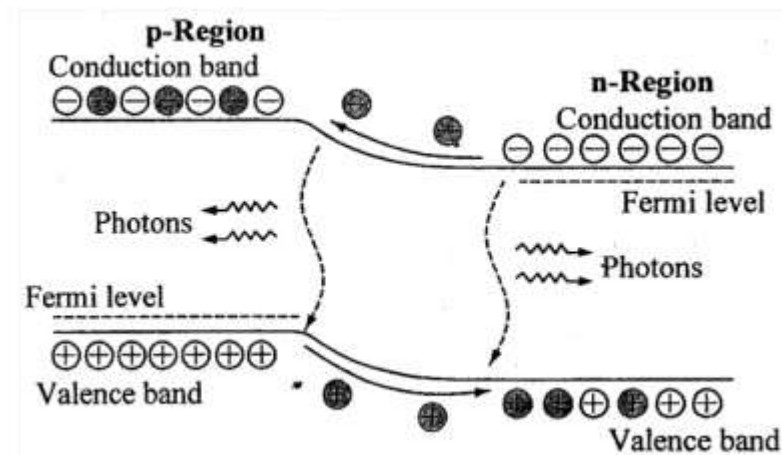
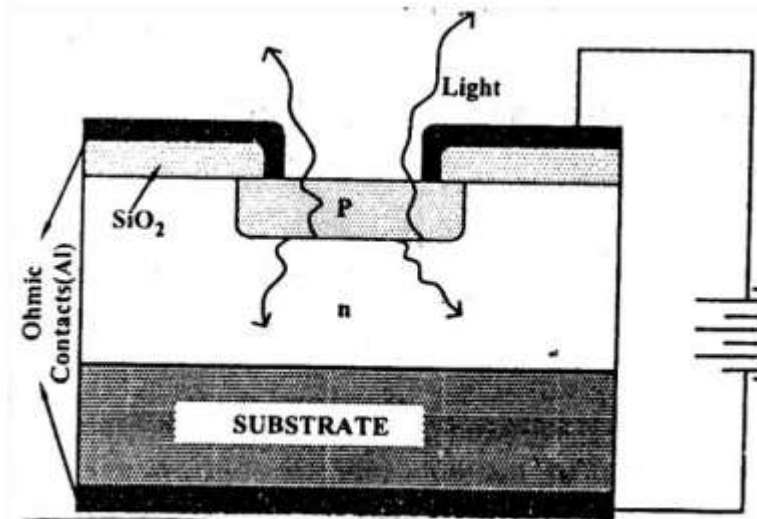
- It's a device used to convert the electrical energy into light energy.
- When it is forward biased, the majority charge carriers of electrons from n-type and holes from p-type are diffuse into each other.
- At the junction the electron hole recombination process takes place and energy is emitting in the form of visible light and IR region.



STRUCTURE OF OPTICAL SOURCE - LED



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BLOCK DIAGRAM

Constructions :

- The light emitting diode is made by Gallium Arsenide semiconductors. First the PN Junction is formed by epitaxial growth technique. $\text{Si}+\text{Ga}=\text{n-type}$; $\text{Si}+\text{As}=\text{p-type}$.
- The thickness of the n-layer is always larger than the p-layer, because of increasing the radioactive recombination.
- Proper electric connection (forward bias) given to the semiconductor through aluminium contact.
- P-jn is slightly open for out coming light rays.

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Working :

- When the p-n junction diode is forward biased, the barrier width is reduced, raising the potential energy on the n-side and lowering that on the p-side.
- The free electrons and holes have sufficient energy to move into the junction region. If a free electron meets a hole, it recombines and releases a photon.
- Thus, light radiation from the LED is caused by the recombination of holes and electrons that are injected into the junction by a forward bias voltage.

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ADVANTAGES

1. Very small in size
2. Less cost and longlife time.
3. It needs less voltage for operate

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DISADVANTAGES

1. It requires high power.
2. Its preparation cost is high



Any Query????

Thank you.....

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