SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution

Coimbatore-35

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

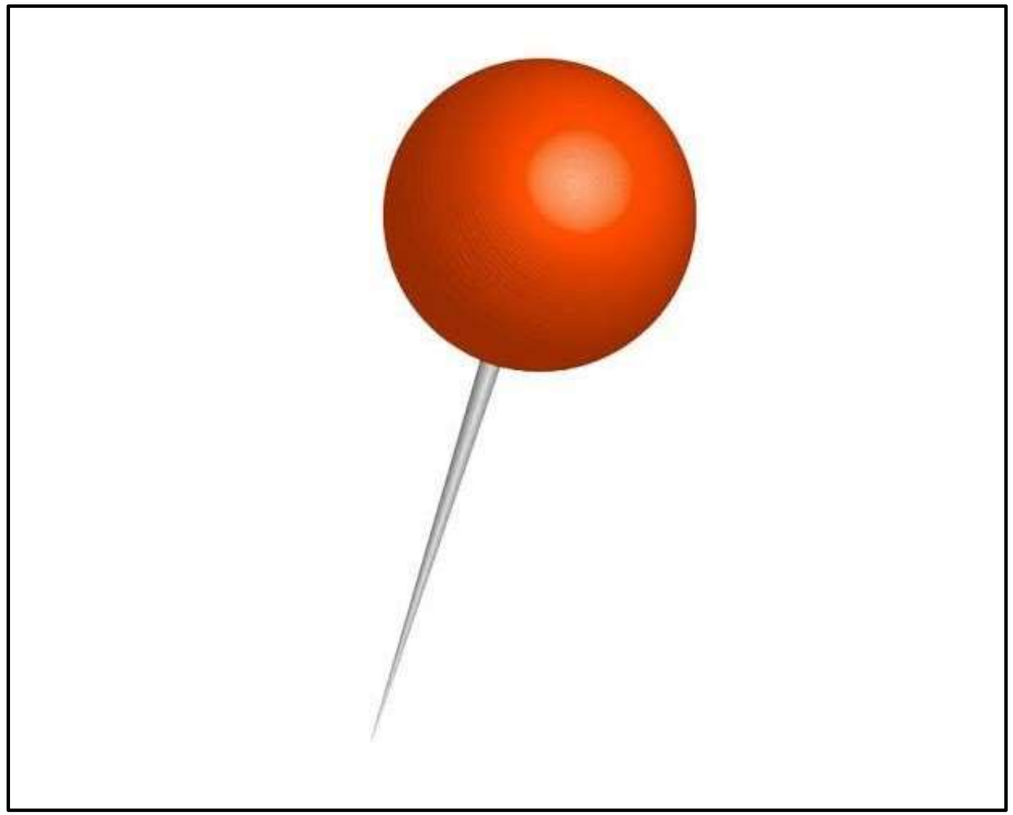
19ECB311- OPTICAL AND MICROWAVE ENGINEERING

III YEAR/ VI SEMESTER

UNIT II-MICROWAVE ACTIVE DEVICES

TOPIC 3-PIN DIODE

Guess the TOPIC



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- Working of Pin diode.
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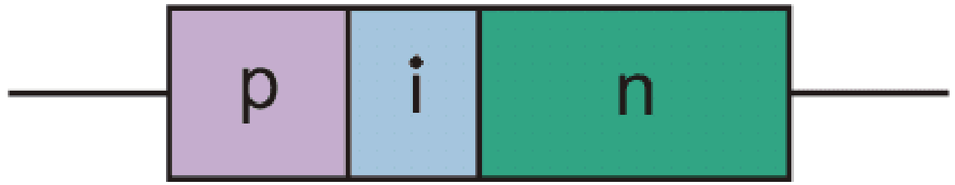
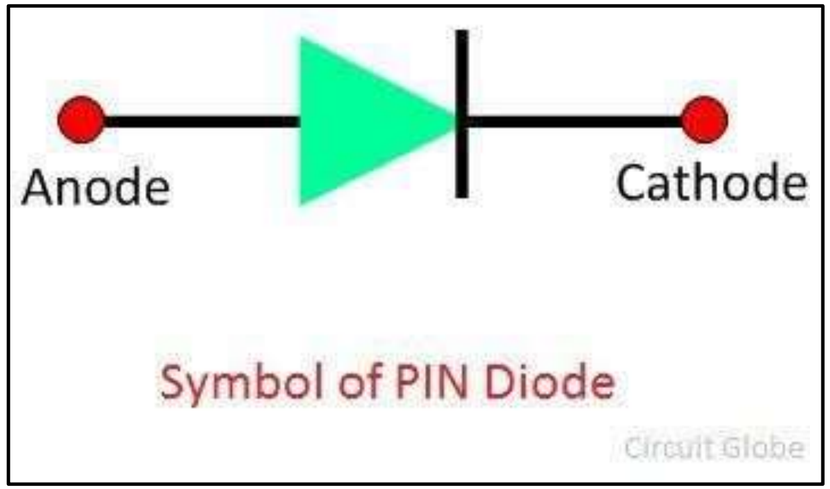
PIN DIODE

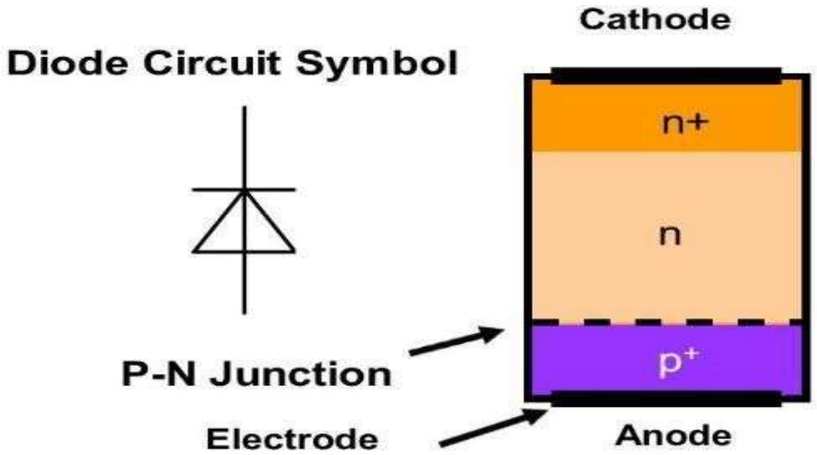


PIN Diode

Wide un-doped intrinsic semiconductor region

Pin diode-symbol



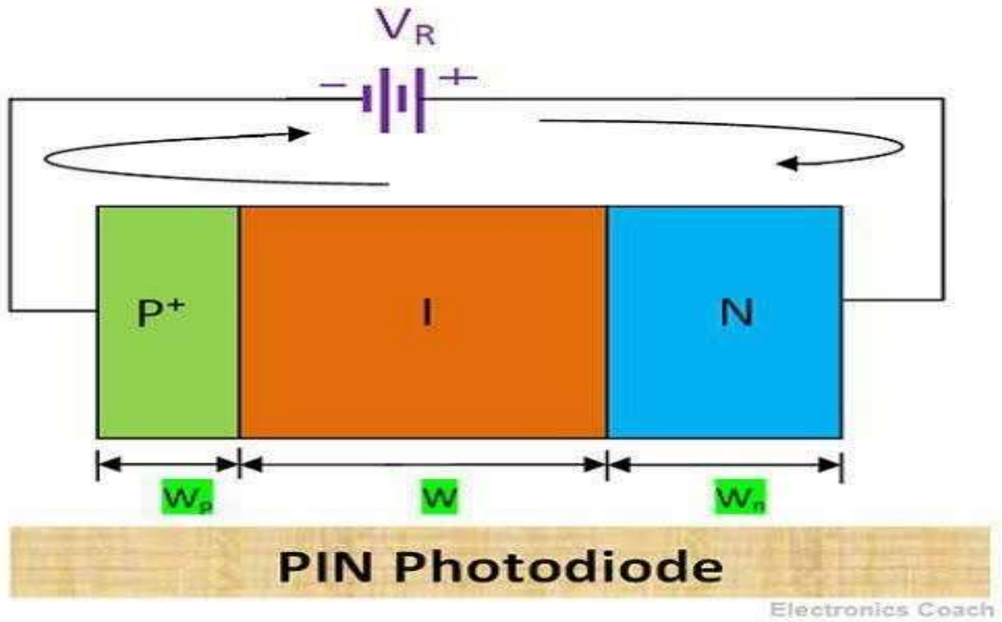


Wide intrinsic region in contrast to an ordinary p-n diode

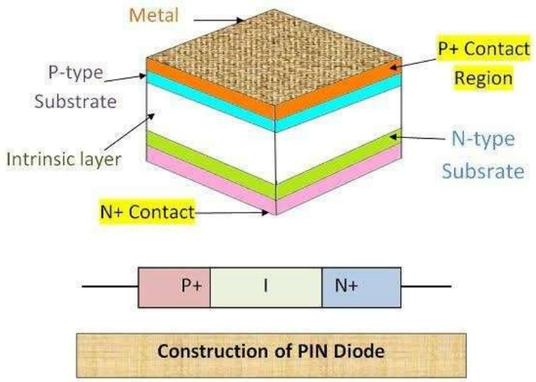
P type and N type regions are heavily doped

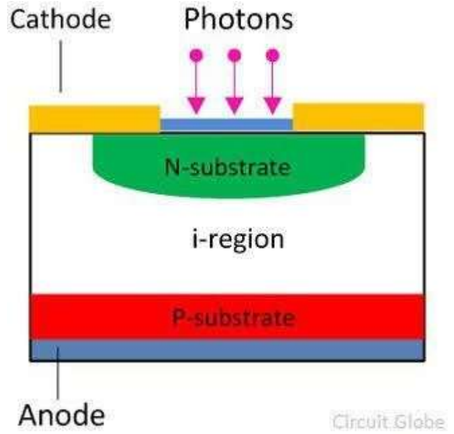
Pin diode-Working Principle

P and N regions are heavily doped because they are used for Ohmic contacts



PIN DIODE-EQUIVALENT CIRCUIT

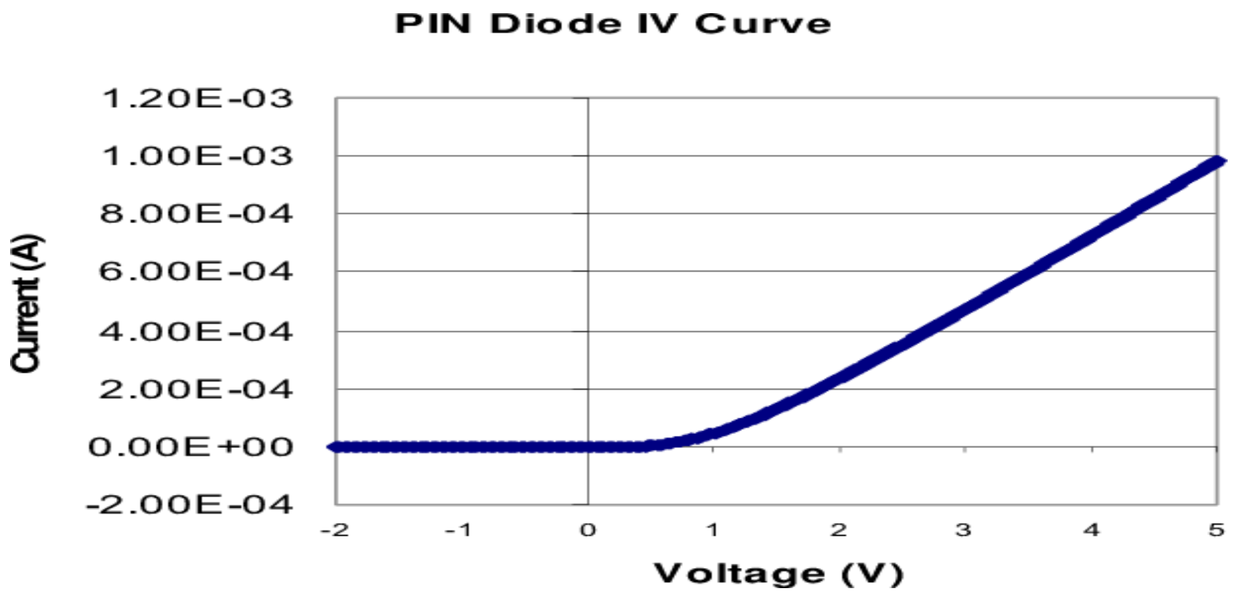




Large stored charge adrift in a thick intrinsic region

Used in RF and Microwave Switches

CHARACTERISTICS



Used in RF and Microwave variable attenuator

ADVANTAGES

High reverse breakdown voltage: The width of the depletion layer in PIN diode is large. It imparts it the ability of high reverse breakdown voltage. Thus, it is suitable for protection of circuits from a large current.

High Capacitance: The width of intrinsic layer is large due to which capacitance of diode is low. As the capacitance of a device is inversely proportional to the distance between the electrodes.

Photodetection: Due to the large width of the intrinsic layer, the photons striking the surface will be more. And the generation of the electron-hole pair will also increase. Due to which more current will flow. Thus, PIN diode helps to achieve improved photo detection.

DISADVANTAGES

High Reverse Recovery Time: The PIN diode has high reverse recovery time due to which power losses are significant..

APPLICATIONS

1.An RF Microwave PIN diode Attenuator.
2.A PIN Diode RF Microwave Switch.
3.Photodetector and photovoltaic cell
4.Limiter
PIN diodes are useful as RF switches, attenuators, photodetectors, and phase shifters

THANK YOU