

PHOTODIODE CHARACTERISTIC APPARATUS

OBJECTIVE

To Study I-V characteristics in reverse bias and to measure variation of photocurrent as a function of reverse voltage and intensity.

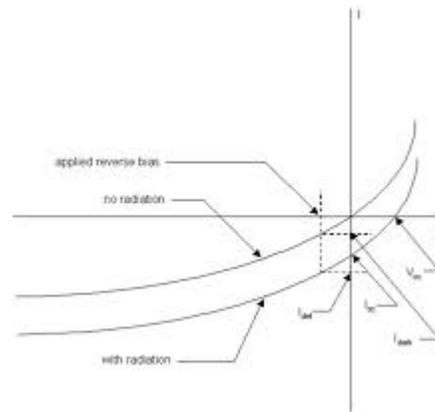


A **photodiode** is a type of photodetector capable of converting light into either current or voltage, depending upon the mode of operation. Photodiodes are similar to regular semiconductor diodes except that they may be either exposed or packaged with a window. Many diodes designed for use specifically as a photodiode will also use a PIN junction rather than the typical PN junction.

PRINCIPLE: When a photon of sufficient energy strikes the diode, it excites an electron, thereby creating a *free electron* and a (positively charged electron) *hole*. If the absorption occurs in the junction's depletion region, or one diffusion length away from it, these carriers are swept from the junction by the built-in field of the depletion region. Thus holes move toward the anode, and electrons toward the cathode, and a photocurrent is produced.

There are two modes of operation of photodiode viz. photovoltaic mode and photoconductive mode. In present study, photodiodes are operated in photoconductive mode. In this mode the diode is operated in reverse biased. The reverse bias induces only a small amount of current (known as saturation or back current) along its direction while the photocurrent remains virtually the same. The photocurrent is linearly proportional to the illuminance.

PROCEDURE: Photodiode is connected in reverse bias arrangement and applied voltage across photodiode is varied & corresponding current is measured for zero illumination. Result is tabulated and plotted on the graph. Now light is made to fall on the photodiode (different intensities) and corresponding reverse I-V characteristics of the photodiode are tabulated and plotted on graph (as shown in fig).



INSTRUMENT

The setup consists of Main Unit having variable power supply, digital voltmeter, digital micro-ammeter, photodiode, light source, provision to vary the intensity of the light source, black box to hold photodiode and source.

Manufacturers:



MITTAL ENTERPRISES®

2151/T-7C, New Patel Nagar, New Delhi – 110008

Telefax: 011-25702784

Mobile: +91-9810681132, +91-9868532156

E-mail : mittalenterprises@bol.net.in, info@mittalenterprises.com

Website : <http://www.mittalenterprises.com>