# SOLAR CELL

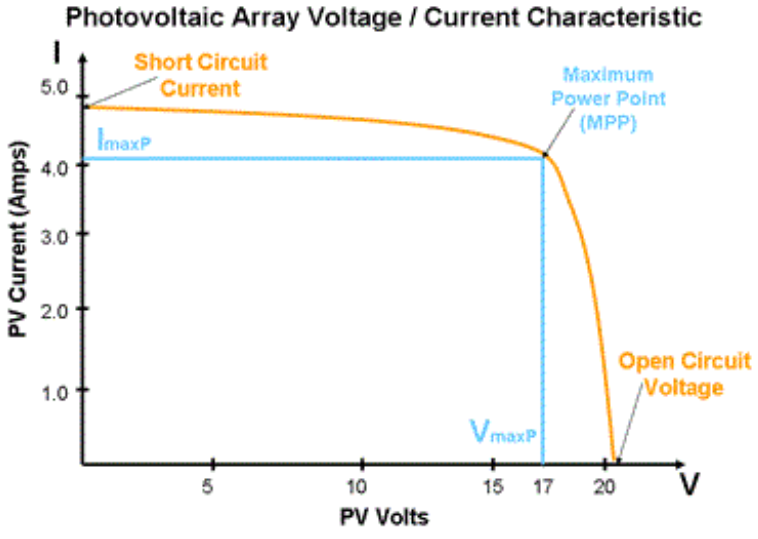
A **solar cell** (also known as a photovoltaic cell or PV cell) is defined as an electrical device that converts light energy into electrical energy through the photovoltaic effect.
A solar cell is basically a p-n junction diode. Solar cells are a form of photoelectric cell, defined as a device whose electrical characteristics – such as current, voltage, or resistance – vary when exposed to light.

## Working Principle:

When light reaches the p-n junction, the light energy, in the form of photons, supplies sufficient energy to the junction to create a number of electron-hole pairs. The incident light breaks the thermal equilibrium condition of the junction. The free electrons in the depletion region can quickly come to the n-type side of the junction.
Similarly, the holes in the depletion can quickly come to the p-type side of the junction.

Once, the newly created free electrons come to the n-type side, these electrons cannot further cross the junction because of barrier potential of the junction. Similarly, the newly created holes once come to the p-type side cannot further cross the junction became of same barrier potential of the junction.

As the concentration of electrons becomes higher in one side, i.e. n-type side of the junction and concentration of holes becomes more in another side, i.e. the p-type side of the junction, the p-n junction will behave like a small battery cell. A voltage is set up which is known as photo voltage. If we connect a small load across the junction, there will be a tiny current flowing through it.




V-I Characteristics of a Photovoltaic Cell

**Materials Used in Solar Cell:**

The materials which are used for this purpose must have band gap close to 1.5ev. Commonly used materials are-

1. Silicon.
2. GaAs.
3. CdTe.
4. $CuInSe_2$

**Advantages of Solar Cell:**

1. No pollution associated with it.
2. It must last for a long time.
3. No maintenance cost.

**Disadvantages of Solar Cell:**

1. It has high cost of installation.
2. It has low efficiency.
3. During cloudy day, the energy cannot be produced and also at night we will not get solar energy.

**Uses of Solar Generation Systems:**

1. It may be used to charge batteries.
2. Used in light meters.
3. It is used to power calculators and wrist watches.
4. It can be used in spacecraft to provide electrical energy.