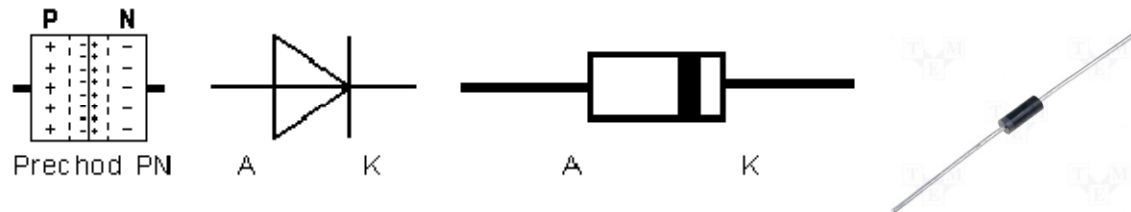


Diode

A semiconductor diode is a two-terminal electronic component that conducts electric current in only one direction. Therefore we say that diode is rectifying the current. This property is also expressed by diode's schematic symbol. The symbol consists of an arrow pointing in the direction of the flow of the current passing through a junction polarized by the outside voltage in one direction. Diode contains one PN junction with two leads encased in a hard shell.



The lead attached to the P-type semiconductor is called an **anode** and is marked with letter **A**. The lead attached to the N-type semiconductor is called a **cathode** and is denoted by letter **C**.

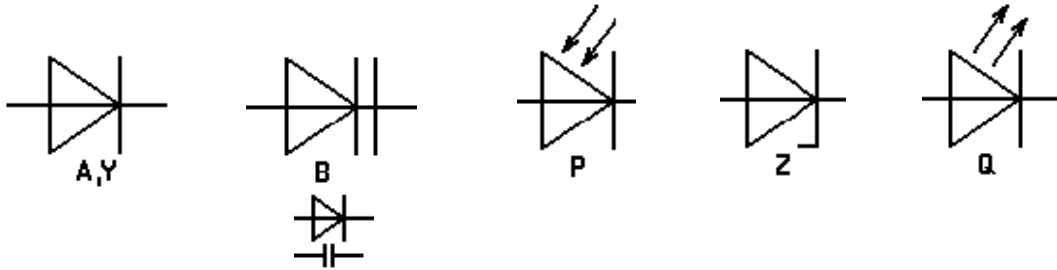
	When source of direct current is connected to a diode in such a way that + is at the anode and – is at the cathode, the diode will pass current (I_F); the diode is conducting.
	When reversing the power supply, the diode is not passing current through it or the reverse current (I_R) is very small; the diode is not conducting.
A diode's "I-V characteristic" can be approximated by four regions of operation (see the figure at right). At very large reverse bias, beyond the peak inverse voltage, a process called reverse breakdown occurs which causes a large increase in current that usually damages the device permanently.	

Types of semiconductor diode

- rectifier diodes – Y (large voltage or current)
- Schottky diodes (also known as hot carrier diode)
- detection diode – A (small-signal circuits and higher frequency)

- light-emitting diode (LED) – Q
- photodiode – P
- varactor diode (varicap) – B (voltage-controlled capacitors)
- Zener diode – Z (voltage regulator/stabilization)
- tunnel diode (Esaki diodes)

Schematic diode symbols



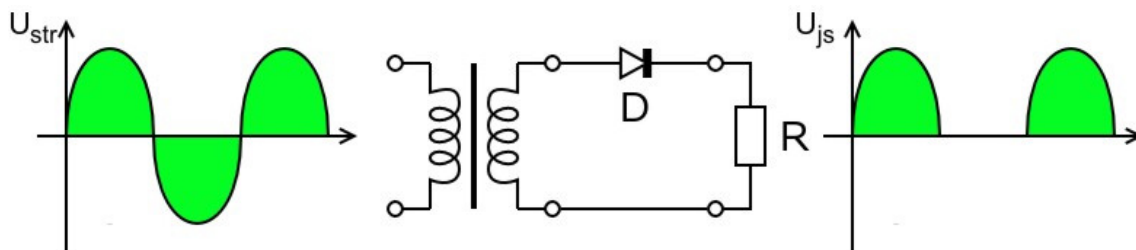
Rectifier

A rectifier is an electrical device that converts alternating current (AC) to direct current (DC), a process known as rectification. A device which performs the opposite function (converting DC to AC) is known as an inverter.

Most of electronic devices require direct current to function. However for efficient distribution of electric energy alternating current is used.

Half-wave rectifier

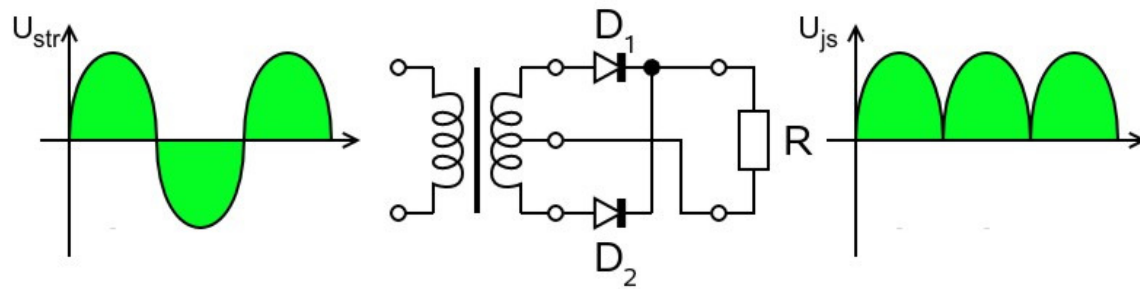
In half wave rectification, either the positive or negative half of the AC wave is passed, while the other half is blocked. Because only one half of the input waveform reaches the output, it is very inefficient if used for power transfer. Half-wave rectification can be achieved with a single diode.



Diode D serves as the rectifying element. This diode passes current only when voltage potential at the anode is higher than at the cathode. Diode D is therefore opened (it is polarized in one direction). When the diode D is opened (i.e. the current passes through) a direct, rectified and pulsating current is passing through the resistor R which is creating a directed, pulsating voltage on the resistor.

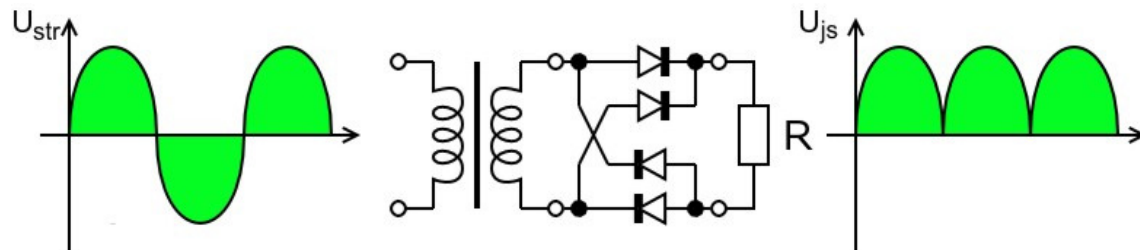
Full-wave rectifier

Full-wave rectifier is more efficient but also more complicated than the half-wave rectifier. It requires two rectifying diodes and a transformer with dual secondary windings.



Bridge (Graetz) rectifier

Bridge rectifier in its functionality is equivalent to the full-wave rectifier. Its main advantage is the use of regular transformer, as opposed to the special dual secondary winding transformer. However bridge rectifier employs four diodes as opposed to just two.



VOCABULARY

semiconductor – polovodič
two-terminal – dvojpólový

rectifier – usmerňovač
winding – vinutie