The diode is an electronic component that allows the passage of current in only one direction. They are solid state semiconductor devices and typically need more than 0.6 volts to operate. In a normal diode, current flows from the positive anode to the negative cathode. Early diodes were in reality, vacuum-tube rectifiers, consisting of an evacuated glass or steel envelope containing two electrodes—a cathode and an anode. Because electrons can flow in only one direction, from cathode to anode, the vacuum-tube diode could be used as a rectifier. That is still a use of diodes in today's electronic circuits; now they are all semiconductor diodes. The simplest of these, the germanium point-contact diode, dates from the early days of radio, when the received radio signal was detected by means of a germanium crystal and a fine, pointed wire that rested on it. In modern germanium (or silicon) point-contact diodes, the wire and a tiny crystal plate are mounted inside a small glass tube and connected to two wires that are fused into the ends of the tube. Junction-type diodes consist of a junction of two different kinds of semiconductor material. There are literally thousands of different specification diodes. They are usually identified with a number but some are color coded.

The Zener diode is a special junction-type diode, using silicon, in which the voltage across the junction is independent of the current through the junction. Because of this characteristic, Zener diodes are used as voltage regulators.

Another special junction-type diode is used in solar cells; a voltage appears spontaneously when the junction is illuminated. In light-emitting diodes, commonly called LEDs, the exact opposite happens. A voltage applied to the semiconductor junction results in the emission of light energy. LEDs are used in numerical displays such as those on electronic digital watches and pocket calculators. They are usually in one of two shapes, bars or dots, and come in various sizes. Bars are placed in a particular pattern to form letters or numbers; when the are letters, they are called an alpha display. When the are numbers, they are called a numeric display. In may cases, they can be either and are known as an alpha-numeric display.

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