Diode Types

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This note briefly describes a variety of common diodes. More information will be added over time.

Power rectifier diodes These diodes are used to convert AC power to DC power. The junctions are large to enable high currents. These diodes dissipate significant heat and often must be mounted in a heat sink. These diodes are generally only useful at the low power line frequencies.

Switching diodes These diodes (a common type is 1N4148) are used in various electronic circuits to act as electronic signal switches and perform various signal conditioning and logic operations. There is not a strong distinction between switching diodes and signal diodes and either type can perform the function of the other.

Signal diodes These diodes are made specifically for working with small signals. A 1N277 is a common Germanium type that is much more conductive at low forward voltages (a few tenths of a volt) than silicon switching diodes. At microwave frequencies the diode is often a metal to semiconductor type known as a Schottky diode, named after the inventor.

Zener diodes These diodes are specially made to have specific and well defined reverse breakdown characteristics and are used in the reverse breakdown mode as shunt voltage regulators for low-power applications. In the forward direction they are very similar to an ordinary diode.

Energy emitting diodes These diodes release energy over a narrow band of wavelengths when forward current is applied. They are known as infrared emitters if the emitted wavelength is longer (typically in the 850 to 1100 nm range) than the human eye can respond to. They are known as light emitting diodes (LEDs) if the emitted wavelength is within the human visual response (roughly 350 (far violet) to 700 nm (deep red). They are known as ultraviolet emitters if the emitted wavelength is shorter than the human eye can respond to. Note that most "white" LEDs are actually a blue emitter combined with a phosphor that emits yellow – the proper proportions of blue and yellow form a whitish light. All of these diodes operate by the application of a current. Never force a voltage across them as immediate destruction because of the high resulting current is likely.

Photodiodes These diodes respond to photons at a specific wavelength and are used to receive energy. Most photodiodes operate in the infrared region although visible spectrum types do exist.

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Varactor diodes Although all diodes exhibit the characteristic of an inverse junction capacitance versus reverse voltage, varactors are specifically manufactured to have specific capacitance characteristics. These diodes are very useful in electronic tuning for various radio receivers and phase-locked loops.