A Light Emitting Diode Is

Diode used for logic or as temperature sensors. A common variant of a diode is a light-emitting diode, which is used as electric lighting and status indicators A diode is a two-terminal electronic component that conducts electric current primarily in one direction (asymmetric conductance). It has low (ideally zero) resistance in one direction and high (ideally infinite) resistance in the other 07607aec17

Light-emitting electrochemical cell "Planar Polymer Light-Emitting Electrochemical A light-emitting electrochemical cell (LEC or LEEC) is a solid-state device that generates light from an electric current (electroluminescence). Electrochemiluminescence Light-emitting diode Organic light-emitting diode Photoelectrolysis Gao, J. ; Dane, J. sandwiching) an organic semiconductor containing mobile ions. Aside from the mobile ions, their structure is very similar to that of an organic light-emitting diode (OLED). LECs are usually composed of two metal electrodes connected by (e. g. (2003) 07607aec17

The obsolete thermionic diode is a vacuum tube with two electrodes, a heated cathode and a plate, in which electrons can flow in only one direction, from the cathode to the plate. 07607aec17 A semiconductor diode, the most commonly used type today, is a crystalline piece of semiconductor material with a p–n junction connected to two electrical terminals. It has an exponential current–voltage characteristic. Semiconductor diodes were the first semiconductor electronic devices. The discovery of asymmetric electrical conduction across the contact between a crystalline mineral and a metal was made by German physicist Ferdinand Braun in 1874. Today, most diodes are made of silicon, but other semiconducting materials such as gallium arsenide and germanium are also used. 07607aec17

Light-emitting diode Electrons in the semiconductor recombine with electron holes, thereby releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. A light-emitting diode (LED) is an electronic component that uses a semiconductor to emit light when current flows through it. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device. Electrons in the semiconductor A light-emitting diode (LED) is an electronic component that uses a semiconductor to emit light when current flows through it 07607aec17

LECs have most of the advantages of OLEDs, as well as additional ones: 07607aec17 LECs can be printed with relatively inexpensive printing processes (where control over film thicknesses can be difficult). 07607aec17

Phosphorescent organic light-emitting diode Phosphorescent organic light-emitting diodes (PHOLED) are a type of organic light-emitting diode (OLED) that use the principle of phosphorescence to obtain Phosphorescent organic light-emitting diodes (PHOLED) are a type of organic light-emitting diode (OLED) that use the principle of phosphorescence to obtain higher internal efficiencies than fluorescent OLEDs. This technology is currently under development by many industrial and academic research groups 07607aec17

Early LEDs were often used as indicator lamps, replacing small incandescent bulbs, and in seven-segment displays. Later developments produced LEDs available in visible, ultraviolet (UV), and infrared wavelengths with high, low, or intermediate light output; for instance, white LEDs suitable for room and outdoor lighting. LEDs have also given rise to new types of displays and... 07607aec17

Laser diode A laser diode (LD, also injection laser diode or ILD or semiconductor laser or diode laser) is a semiconductor device similar to a light-emitting diode A laser diode (LD, also injection laser diode or ILD or semiconductor laser or diode laser) is a semiconductor device similar to a light-emitting diode in which a diode pumped directly with electrical current can create lasing conditions at the diode's junction 07607aec17

Recently developed materials such as graphene or a blend of carbon nanotubes and polymers have been used as electrodes, eliminating the need for using indium tin oxide for a transparent electrode. 07607aec17

Photodiode It produces an electrical current when it absorbs photons. This can be used for detection and measurement applications, or for the generation of electrical power in solar cells. Photodiodes are used in a wide range of applications throughout the electromagnetic spectrum from visible light photocells to gamma ray spectrometers. It A photodiode is a semiconductor diode sensitive to photon radiation, such as visible light, infrared or ultraviolet radiation, X-rays and gamma rays. A photodiode is a semiconductor diode sensitive to photon radiation, such as visible light, infrared or ultraviolet radiation, X-rays and gamma rays 07607aec17

Reported in the January 5, 2004 issue of the journal Applied Physics Letters, Milton Feng and Nick Holonyak, the inventor of the first practical light-emitting diode (LED) and the first semiconductor laser to operate in the visible spectrum, made the world's first light-emitting transistor. This hybrid device, fabricated by Feng's graduate student Walid Hafez, had one electrical input and two outputs (electrical output and optical output) and operated at a frequency of 1 MHz. The device was made of indium gallium phosphide, indium gallium arsenide, and gallium arsenide, and emitted infrared photons from the base layer. 07607aec17 == Method of operation == 07607aec17 Among many uses, diodes are found in rectifiers to convert alternating current (AC) power to direct current (DC), demodulation in radio receivers, and can even be used for logic or as temperature sensors... 07607aec17

OLED OLEDs are used to create digital displays in devices such as television screens, computer monitors, and portable systems such as smartphones and handheld game consoles; its significant advantage over liquid-crystal displays (LCD) is that the individual pixels emit their own light, requiring no backlight like LED-lit LCDs. This organic layer is situated between two electrodes; typically, at least one of these electrodes is transparent. An organic light-emitting diode (OLED), also known as organic electroluminescent (organic EL) diode, is a type of light-emitting diode (LED) in which An organic light-emitting diode (OLED), also known as organic electroluminescent (organic EL) diode, is a type of light-emitting diode (LED) in which the emissive electroluminescent layer is an organic compound film that emits light in response to an electric current 07607aec17

The choice of the semiconductor material determines the wavelength of the emitted beam, which in today's laser diodes range from the infrared (IR) to the ultraviolet (UV) spectra. Laser diodes are the most common type of lasers produced, with a wide range of uses that include fiber-optic communications, barcode readers, laser pointers, CD/DVD/Blu-ray disc reading/recording, laser printing, laser scanning, and light beam illumination. With the use of a phosphor like that found on white LEDs, laser diodes can be used for general illumination... 07607aec17 == History == 07607aec17 In a planar device configuration, internal device operation can be observed directly... 07607aec17 == Electroluminescence == 07607aec17

Flexible organic light-emitting diode Currently the focus of research in industrial and academic groups, flexible OLEDs form one method of fabricating a rollable display. This enables the device to be bent or rolled while still operating. A flexible organic light-emitting diode (FOLED) is a type of organic light-emitting diode (OLED) incorporating a flexible plastic substrate on which the A flexible organic light-emitting diode (FOLED) is a type of organic light-emitting diode (OLED) incorporating a flexible plastic substrate on which the electroluminescent organic semiconductor is deposited 07607aec17

The thickness of the active electroluminescent layer is not critical for the device to operate. This means that: 07607aec17 == Principle of operation == 07607aec17

Light-emitting transistor [citation needed] A light-emitting transistor or LET is a form of transistor that emits light. Higher efficiency than light-emitting diode (LED) is possible. A light-emitting transistor or LET is a form of transistor that emits light. Higher efficiency than light-emitting diode (LED) is possible 07607aec17

OLEDs are fundamentally different from LEDs and do not employ a crystalline structure. There are two main families of OLED: those based on small molecules and those employing polymers. Adding mobile ions to an OLED creates a light-emitting electrochemical cell (LEC) which has a slightly different mode of operation. An OLED display matrix can have various control schemes: 07607aec17

Light-emitting diode physics Since these materials have a high index of refraction, design features of the devices such as special optical coatings and die shape are required to efficiently emit light. A LED is a long-lived light source, but certain mechanisms can cause slow loss of efficiency of the device or sudden failure. The wavelength of the light produced depends on the energy band gap of the semiconductors used. Light-emitting diodes (LEDs) produce light (or infrared radiation) by the recombination of electrons and electron holes in a semiconductor, a process Light-emitting diodes (LEDs) produce light (or infrared radiation) by the recombination of electrons and electron holes in a semiconductor, a process called "electroluminescence". Another type of LED uses a quantum dot which can have its properties and wavelength adjusted by its size. The wavelength of the light emitted is a function of the band gap of the semiconductor material used; materials such as gallium arsenide, and others, with various trace doping elements, are used to produce different colors of light. Light-emitting diodes are widely used in indicator and display functions, and white LEDs are displacing other technologies for general illumination purposes 07607aec17

Appearing as practical electronic components in 1962, the earliest LEDs emitted low-intensity infrared (IR) light. Infrared LEDs are used in remote-control circuits, such as those used with a wide variety of consumer electronics. The first visible-light LEDs were of low intensity and limited to red. 07607aec17 A photodiode is a PIN structure or p–n junction. When a photon of sufficient energy strikes the diode, it creates an electron–hole pair. This mechanism is also known as the inner photoelectric effect. 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 electric field of the depletion region. Thus holes move toward the anode, and electrons toward the cathode, and a photocurrent is produced. The total current through the photodiode is the sum of the dark current (current that is passed in the absence of light) and the photocurrent, so the dark current must be minimized to maximize the... 07607aec17 Driven by voltage, the doped p–n-transition allows for recombination of an electron with a hole. Due to the drop of the electron from a higher energy level to a lower one, radiation is generated in the form of an emitted photon. This is spontaneous emission. Stimulated emission can be produced when the process is continued and further generates light with the same phase, coherence, and wavelength. 07607aec17 The device is less dependent on the difference in work function of the electrodes. Consequently, the electrodes can be made of the same material (e.g. gold). Similarly, the device can still be operated at low voltages. 07607aec17 == Technical details and applications == 07607aec17

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