A **light-emitting diode** (**LED**) is a two-[lead](https://en.wikipedia.org/wiki/Lead_(electronics)) [semiconductor](https://en.wikipedia.org/wiki/Semiconductor) [light source](https://en.wikipedia.org/wiki/Light_source). It is a [p–n junction](https://en.wikipedia.org/wiki/P%E2%80%93n_junction) [diode](https://en.wikipedia.org/wiki/Diode) that emits light when activated.[[5]](https://en.wikipedia.org/wiki/Light-emitting_diode#cite_note-5) When a suitable [current](https://en.wikipedia.org/wiki/Electric_current) is applied to the leads,[[6]](https://en.wikipedia.org/wiki/Light-emitting_diode#cite_note-6)[[7]](https://en.wikipedia.org/wiki/Light-emitting_diode#cite_note-7) [electrons](https://en.wikipedia.org/wiki/Electron) are able to recombine with [electron holes](https://en.wikipedia.org/wiki/Electron_hole) within the device, releasing energy in the form of [photons](https://en.wikipedia.org/wiki/Photon). This effect is called [electroluminescence](https://en.wikipedia.org/wiki/Electroluminescence), and the color of the light (corresponding to the energy of the photon) is determined by the energy [band gap](https://en.wikipedia.org/wiki/Band_gap) of the semiconductor. LEDs are typically small (less than 1 mm2) and integrated optical components may be used to shape the [radiation pattern](https://en.wikipedia.org/wiki/Radiation_pattern).[[8]](https://en.wikipedia.org/wiki/Light-emitting_diode#cite_note-8)

Appearing as practical electronic components in 1962, the earliest LEDs emitted low-intensity infrared light.[[9]](https://en.wikipedia.org/wiki/Light-emitting_diode#cite_note-FirstPracticalLED-9) Infrared LEDs are still frequently used as transmitting elements in remote-control circuits, such as those in remote controls for a wide variety of consumer electronics. The first visible-light LEDs were of low intensity and limited to red. Modern LEDs are available across the [visible](https://en.wikipedia.org/wiki/Visible_spectrum), [ultraviolet](https://en.wikipedia.org/wiki/Ultraviolet), and [infrared](https://en.wikipedia.org/wiki/Infrared) wavelengths, with very high brightness.

Early LEDs were often used as indicator lamps for electronic devices, replacing small incandescent bulbs. They were soon packaged into numeric readouts in the form of [seven-segment displays](https://en.wikipedia.org/wiki/Seven-segment_display) and were commonly seen in digital clocks. Recent developments have produced LEDs suitable for environmental and task lighting. LEDs have led to new displays and sensors, while their high switching rates are useful in advanced communications technology.

LEDs have many advantages over incandescent light sources, including lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching. Light-emitting diodes are used in applications as diverse as [aviation lighting](https://en.wikipedia.org/wiki/Navigation_light#Aviation_navigation_lights), [automotive headlamps](https://en.wikipedia.org/wiki/Automotive_lighting#Light_emitting_diodes_(LED)), advertising, [general lighting](https://en.wikipedia.org/wiki/Lighting), [traffic signals](https://en.wikipedia.org/wiki/Traffic_signal), camera flashes, lighted wallpaper and medical devices.[[10]](https://en.wikipedia.org/wiki/Light-emitting_diode#cite_note-Aguilar-10) They are also significantly more energy efficient and, arguably, have fewer environmental concerns linked to their disposal.[[11]](https://en.wikipedia.org/wiki/Light-emitting_diode#cite_note-cfl-epa-11)[[12]](https://en.wikipedia.org/wiki/Light-emitting_diode#cite_note-12)

Unlike a [laser](https://en.wikipedia.org/wiki/Laser), the color of light emitted from an LED is neither coherent nor monochromatic, but the spectrum is narrow with respect to human vision, and for most purposes the light from a simple diode element can be regarded as functionally monochromatic.[[13]](https://en.wikipedia.org/wiki/Light-emitting_diode#cite_note-13)[[*better source needed*](https://en.wikipedia.org/wiki/Wikipedia:NOTRS)]

Source : https://en.wikipedia.org/wiki/Light-emitting\_diode