

How White LED Gives light?

LEDs form an inevitable part in the modern electronics as simple indicators to optical communication devices. Light Emitting Diodes exploit the property of the p-n junction to emit photons when it is forward biased. LEDs are specially made diodes to emit light when a potential is applied to its anode and cathode. The history of LED date backs to 1907 when Captain Henry Joseph observed the property of electro-luminescence in Silicon Carbide. The first LED was designed in 1962. It was developed by Holonyak worked at General Electric (GE). It was a GaAsP device. The first commercial version of LED came in the market during 1960s. LED industry became a boom during 1970s with the introduction of Gallium Aluminium Arsenide (GaAlAs). These LEDs are high bright types and are many times brighter than the old diffused types. Blue and White LEDs was introduced in 1990 which uses Indium Gallium Nitride (InGaN) as the semiconductor. White LED contains a blue chip with white inorganic Phosphor. When blue light strikes the phosphor, it emits white light.

The Trick of White LED

There is no semiconductor material that emits pure white light. White light is a feeling created by the mixing of the primary colors - Red, Green and Blue. The white LED has an Indium gallium nitride blue chip coated with phosphor. This phosphor can emit white light when energized with blue or ultraviolet photons. The blue light emitting chip in the LED is coated with a converter material. When this converter material is activated by blue light, it emits yellow light. The mixture of blue and yellow light is perceived by the eye as white light. The light from the white LED has both peaks in the blue and yellow region but human eye will identify the peaks as white light. That is why, some white LEDs looks more blue and some more yellow. This is due to the difference in the peaks. White LED requires minimum 3 volts for its operation and its forward current can go up to 40 Ma