

OLED (Organic Light Emitting Diodes)

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About Organic Light Emitting Diode (OLED)

- OLED is a flat light emitting technology, made by placing a series of organic thin films between two conductors. It consists of an organic layer sandwiched between two conducting sheets (an Anode and a cathode) with a glass plate the top and bottom. OLED is a newer display technology for mobiles and monitors.
- When electrical current is applied, a bright light is emitted.
- OLED displays offer improved image quality— better contrast, higher brightness, fuller viewing angle, a wider colour range and much faster refresh rates and lower power consumption over an LED display.
- The carbon-based organic material emits electro-luminescent light when electricity is applied across the two conducting sheets.
- OLEDs are superior in their exceptional colour reproduction, fast response times, higher brightness and extremely light weight designs.

Advantages of OLED

- **Better picture quality:** Provide greater contrast ratio and wider viewing angle because OLED pixels have the capability to emit lights directly.
- **Lightweight and flexible:** The plastic substrates have the advantage of being shatter resistance and like the glass displays that are used in LCD monitors.
- **Faster response time:** The response time can be up to 1000 times faster than LCD displays which can be under 10 μ s.

- **Lower cost:** Roll-to-roll vapour deposition methods ensure that mass production can be done for minimal cost, but this technique has some challenges of accuracy.
- **Environment friendly:** The materials do not use Lead or such other material.
- **Better power efficiency:** OLED displays do not use backlight due to which the power consumption is less. These devices are thinner than their LCD counterparts.

Disadvantages of OLED

- **Lifespan:** have lower lifetime due to limited lifetime of organic materials. Historically blue OLED had the lowest lifetime of around 14000 hours to half brightness level.
- **Power Consumption:** Power consumption in OLED displays are uneven. These consume around 40% of the power of LCD for Black images, 60 to 80% for the majority of images. This can reduce battery life in mobile devices when white backgrounds are used.
- **Water Damage:** water can cause instant damage to the organic materials of the OLED displays. It can limit the longevity of more flexible displays.
- **Outdoor Performance:** OLED uses metallic cathode which acts as a mirror with reflectance approaching 80%. This leads to poor readability in the bright light outdoors.

The Differences between LED and OLED

OLED	LED
Made of organic materials.	Made from inorganic compounds.
The pixels are self illuminating.	The LEDs used to light an LED display

Colours do not get washed out when viewers watch from extreme angles.	Colours do not get washed out when viewers watch from extreme angles.
Wider viewing angle than do LED.	LED feature a limited viewing angle.
Ability to develop lighter and thinner displays.	LED are heavier and thicker displays.
Response Time faster	Response Time of LED is slower than that of OLED.
More energy efficient	LED consume more energy efficient when compared to their OLED