

PMOLED (Passive Matrix OLED): introduction and basics

OLED displays use organic materials that emit light when electricity is applied. OLEDs enable emissive, bright, thin, flexible and efficient displays. OLEDs are set to replace LCDs in all display applications - from small displays to large TV sets.

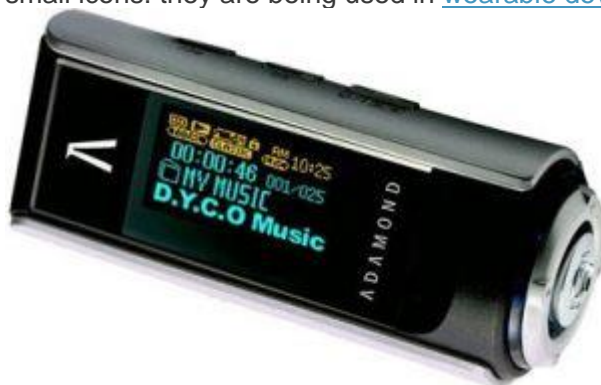
PMOLED: Passive Matrix OLED

PMOLED stands for Passive-Matrix OLED, which relates to the way you control (or drive) the display. A PMOLED display uses a simple control scheme in which you control each row (or line) in the display sequentially (one at a time). PMOLED electronics do not contain a storage capacitor and so the pixels in each line are actually off most of the time. To compensate for this you need to use more voltage to make them brighter. If you have 10 lines, for example, you have to make the one line that is on 10 times as bright (the real number is less than 10, but that's the general idea).



A PMOLED panel by Univision

So while PMOLEDs are easy (and cheap) to fabricate, they are not efficient and the OLED materials suffer from lower lifetime (due to the high voltage needed). PMOLED displays are also restricted in resolution and size (the more lines you have, the more voltage you have to use). PMOLED displays are usually small (up to 3" typically) and are used to display character data or small icons: they are being used in [wearable devices](#), small gadgets and sub displays



PMOLED vs AMOLED (taken from Engadget)

The other kind of OLED display is called an [AMOLED](#) (or Active-Matrix OLED). An AMOLED uses a TFT that contains a storage capacitor which maintains the line pixels lit all the time (even though just one line is changed each time). AMOLEDs consume less power than PMOLEDs, have faster refresh rates and allows to build larger display with higher resolutions. AMOLEDs are also more complicated and expensive to fabricate.



AMOLEDs today are being used as displays for [smartphones](#), [digital cameras](#) - and even [OLED TVs](#).

Flexible PMOLEDs

Some small and simple flexible (conformable) PMOLED displays are already on the market. Japan's Futaba is producing [1.4" 128x16 film PMOLED display](#) that can be curved. Futaba's panels are adopted in several fitness bands from Garmin, HTC and others.



Transparent PMOLEDs

Transparent PMOLEDs are also on the market. Several companies are producing those T-OLED displays, which are currently up to 2.4" in size (segmented T-OLEDs can be larger).



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