

# JDI Unveils Ultra-Bright OLED with eLEAP Technology

Recently, Japan Display Inc. (JDI) unveiled for the first time its next-generation organic light-emitting diode (OLED) display, which has tripled the peak brightness of conventional OLEDs. The new OLED was developed as a 14-inch model for notebook PCs by applying the “eLEAP” technology, which the company is preparing for mass production.

eLEAP is a revolutionary, next-generation OLED technology that uses photolithography instead of fine metal mask (FMM) for pixel patterning. eLEAP more than doubles the OLED emission efficiency (aperture ratio) of FMM OLED to over 60%. Thus, it overcomes the low brightness and short lifetime weaknesses of conventional OLED technology.

## Brighter Image even under Sunlight

According to the company, the newly developed display “tests the limits of how far the peak brightness of eLEAP can be increased.”

The peak luminance was at 1600 nits, brighter than 400 nits of a competitor product with outstanding brightness

and darkness. OLEDs, which do not require a backlight and emit light on their own, are capable of completely eliminating light in areas where black color is expressed, thus enabling clear and vivid expression. The new model, which has three times the peak brightness, takes advantage of this feature to make the difference between brightness and darkness even clearer.

JDI’s new ultra-high brightness 14-inch eLEAP display uses a single-stack structure to deliver the 1600-nits brightness. This extraordinary brightness allows for full display use even in sunny, outdoor environments.

For conventional OLED to achieve similar brightness levels requires using a double-stack tandem structure, but this makes both the product and the manufacturing process more complex and results in higher costs. JDI’s 14-inch eLEAP technology delivers customers what they want: higher performance at a lower cost.

Furthermore, by employing a tandem structure, eLEAP can achieve brightness levels exceeding 3,000 nits, thus paving way for ultra-realistic, ultra-high brightness visual experiences.

The company claims that the weather resistance is as good as conventional products and can withstand usage outdoors.

## Wide Emitting Area

The high peak luminance is caused by the wide luminous area of the panel. eLEAP does not use a fine metal mask, a metal

plate with tiny holes, to place the light-emitting material on the glass substrate at the targeted position during the manufacturing process. The light-sensitive material is solidified by exposing it to light, and the light-emitting material is accurately placed over a larger area using the photolithography method to remove unnecessary portions. In the R&D stage, the luminous area was at 60%, twice that of the FMM method, and the new 14-inch model has achieved a luminous area of 54%.

The company explains that the product life is three times longer than the conventional method because there is no contamination from the FMM to the substrate.

In general, the higher the brightness, the higher the power consumption, but the company claims that its thin-film transistor (TFT) technology, which controls brightness, is one of its strengths. Specifically, it enables reduction of power consumption compared to other companies' products with the same brightness.

## Challenges in Mass Production

JDI is currently ramping up eLEAP production at the Mobara Fab (Chiba Prefecture in Japan) targeting Decem-



Clear and crisp display of black and white



Sample comparison of images of the same flower. Left image: the conventional model appeared to sink into the dark background; Right image: the flower was vividly bright with each petal standing out.

ber 2024 mass production. However, the Mobara Fab manufactures 6-Gen (1500×1850mm) glass substrates. This makes it impossible to efficiently produce 14-inch screens. For the time being, the company will focus on production of smart watches, which can produce more than 1,000 units from a single substrate.

Meanwhile, the new plant to be built in the Wuhu Economic and Technical Development Zone (WEDZ) (Anhui Province, China) will start mass-producing 8.7-Gen substrates, which are 2.2 times larger, in December 2026. In the future, this plant will also produce products for notebook PCs and smartphones.

If production expands, a second and third plant in China will be considered.

### **Open Strategy**

The company reiterated its positive stance towards providing technology to outside parties. After concluding a memorandum of understanding (MOU) for a strategic alliance in 2023 with HKC Corporation Limited, the company terminated the MOU but said that it may renegotiate it. Talks with an Indian company have also been revealed, but negotiations are underway elsewhere as well.

The open strategy of eLEAP is important because major manufacturers are

looking to diversify their panel supply sources, and they intend to expand the number of partners while building mass production experience at the Mobara Fab.

### **Notes:**

<sup>1</sup>eLEAP:

*environment positive*

*Lithography with maskless deposition*

*Extreme long life, lower power, and high luminance*

*Any shape Patterning*

### **About This Article:**

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*Japan Display Inc. provided the contents of this article.*