



# 2023 Small OLED Display Annual Report

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## 2. Analysis of Issues in the OLED Industry

### 2.2 Forecasts for iPhone 15 panel suppliers in 2023

- The 2023 "iPhone 15" series will all have a punch hole design.
- Samsung Display will supply panels for all iPhone 15 series, with shipments for the entire iPhone series in 2023 expected to be \*\*\* million to \*\*\* million units.
- LG Display will supply panels for the LTPO models \*\*\* and is not expected to supply panels for \*\*\* models.
- LG Display's panel shipments for the entire iPhone series in 2023 are expected to be \*\*\* million to \*\*\* million units.
- BOE will supply panels for \*\*\* \*\*\* in the iPhone 15 series.
- In 2023, BOE's total iPhone series panel shipments are expected to be \*\*\* million to \*\*\* million units, although this is likely to be reduced further as panel development issues have delayed panel shipments for the iPhone 15 series.

iPhone series and expected 2023 models

2020	2021	2022	2023
<b>iPhone 12 Mini</b>	<b>iPhone 13 Mini</b>	<b>iPhone 14</b>	<b>iPhone 15</b>
5.4 inch	5.4 inch	6.12 inch	
2340 x 1080(476ppi)	2340 x 1080(476ppi)	2532 x 1170(460ppi)	
On-cell touch	On-cell touch	On-cell touch	
LTPS TFT	LTPS TFT	LTPS TFT	
Notch	Small Notch	Small Notch	
SDC	SDC, LGD	SDC, LGD, BOE	
<b>iPhone 12</b>	<b>iPhone 13</b>	<b>iPhone 14 Plus</b>	<b>iPhone 15 Plus</b>
6.06 inch	6.06 inch	6.69 inch	
2532 x 1170(460ppi)	2532 x 1170(460ppi)	2778 x 1284(458ppi)	
Add-on touch	On-cell touch	On-cell touch	
LTPS TFT	LTPS TFT	LTPS TFT	
Notch	Small Notch	Small Notch	
SDC, LGD, BOE	SDC, LGD, BOE	SDC	
<b>iPhone 12 Pro</b>	<b>iPhone 13 Pro</b>	<b>iPhone 14 Pro</b>	<b>iPhone 15 Pro</b>
6.06 inch	6.06 inch	6.12 inch	
2532 x 1170(460ppi)	2532 x 1170(460ppi)	2532 x 1170(460ppi)	
Add-on touch	On-cell touch	On-cell touch	
LTPS TFT	LTPO TFT	LTPO TFT	
Notch	Small Notch	Double punch hole	
SDC, LGD, BOE	SDC	SDC	
<b>iPhone 12 Pro Max</b>	<b>iPhone 13 Pro Max</b>	<b>iPhone 14 Pro Max</b>	<b>iPhone 15 Pro Max</b>
6.67 inch	6.67 inch	6.69 inch	
2778 x 1284(458ppi)	2778 x 1284(458ppi)	2778 x 1284(458ppi)	
On-cell touch	On-cell touch	On-cell touch	
LTPS TFT	LTPO TFT	LTPO TFT	
Notch	Small Notch	Double punch hole	
SDC	SDC	SDC, LGD	

Source: UBI Research DB

# 4. Analysis of OLED Panel Development Trend by Company

## 4.1 Samsung Display

### ■ Phosphorescent Blue OLED

- Samsung Display is developing OLED panel with phosphorescent blue.
- Recently, major developers have been commissioned to develop a phosphorescent blue host, and the target for mass production of panels \*\*\*.
- Due to the lifespan issue of phosphorescent blue, it is expected that the pixel size will be applied first to \*\*\*.

### ■ Color Filter on Encapsulation

- Color filter on encapsulation (COE) technology was first applied to the Galaxy Z Fold3, and for the Galaxy Z Fold4, the transmittance of the color filter was improved, resulting in a 37% reduction in power efficiency compared to OLEDs using polarizers.
- Based on the 'Galaxy Z Fold4', there are a total of seven photo processes for COE, including black pixel define layer (black PDL), spacer, and color filter, and Samsung Display plans to apply halftone black PDL material so that black PDL and spacer can be formed in one photo process.
- Initially, the halftone black PDL was expected to be applied to the Galaxy Z Fold5 released in 2023, but due to process issues, the material is expected to be applied to the \*\*\*.
- Samsung Display plans to further reduce the photo process in the future by \*\*\* instead of a color filter.

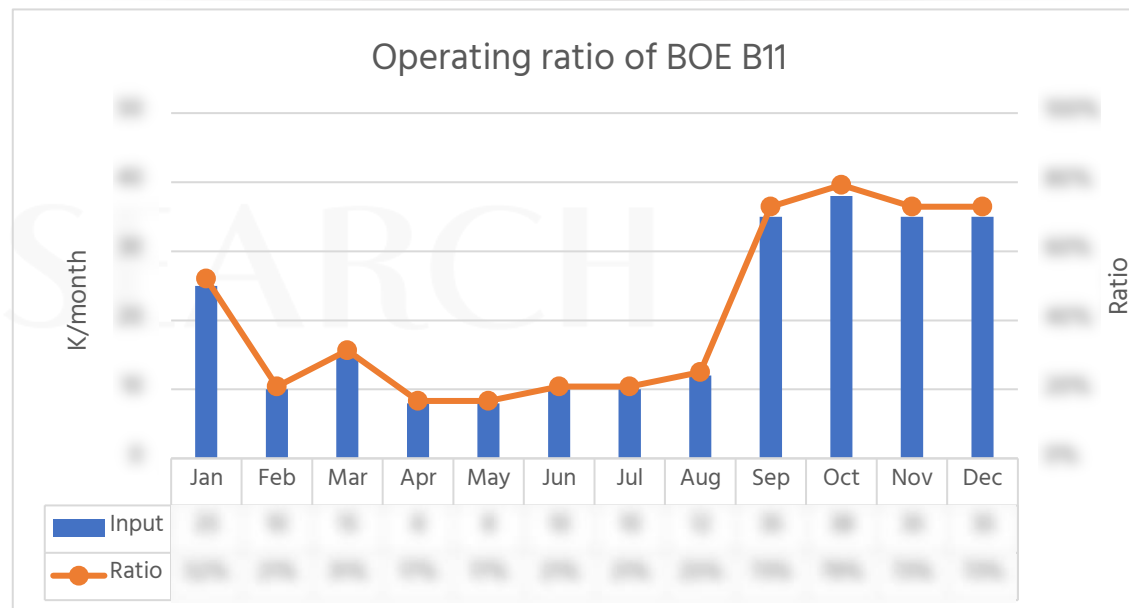
# 5. OLED Line Status Analysis by Company

## 5.3 BOE

### Mianyang B11

- It is a 6G flexible OLED line with a monthly capacity of 48K.
- Panels for the iPhone series are mainly mass-produced, and there is a LTPO TFT capacity of 16K per month.
- There are a total of 21 B11 module lines for Apple (1 demo line + 20 normal lines), and additional investment is planned for 14~20 module lines for Apple.
  - ✓ Second floor: \*\*\* lines
  - ✓ Assuming a maximum of \*\*\* newly invested module lines, BOE can secure an annual module capacity of \*\*\* units for Apple.
  - ✓ Due to lack of space at the existing B11 line site, a new factory is being built near the B11 line, with a target completion date of Q1 2023.
  - ✓ It is likely that the major capa shortage will be covered by the B7 and B12 lines when lines are added.
- Average operating rate for B11 in 2022 is \*\*\*%.

BOE's B11 Line Operation Rate in 2022



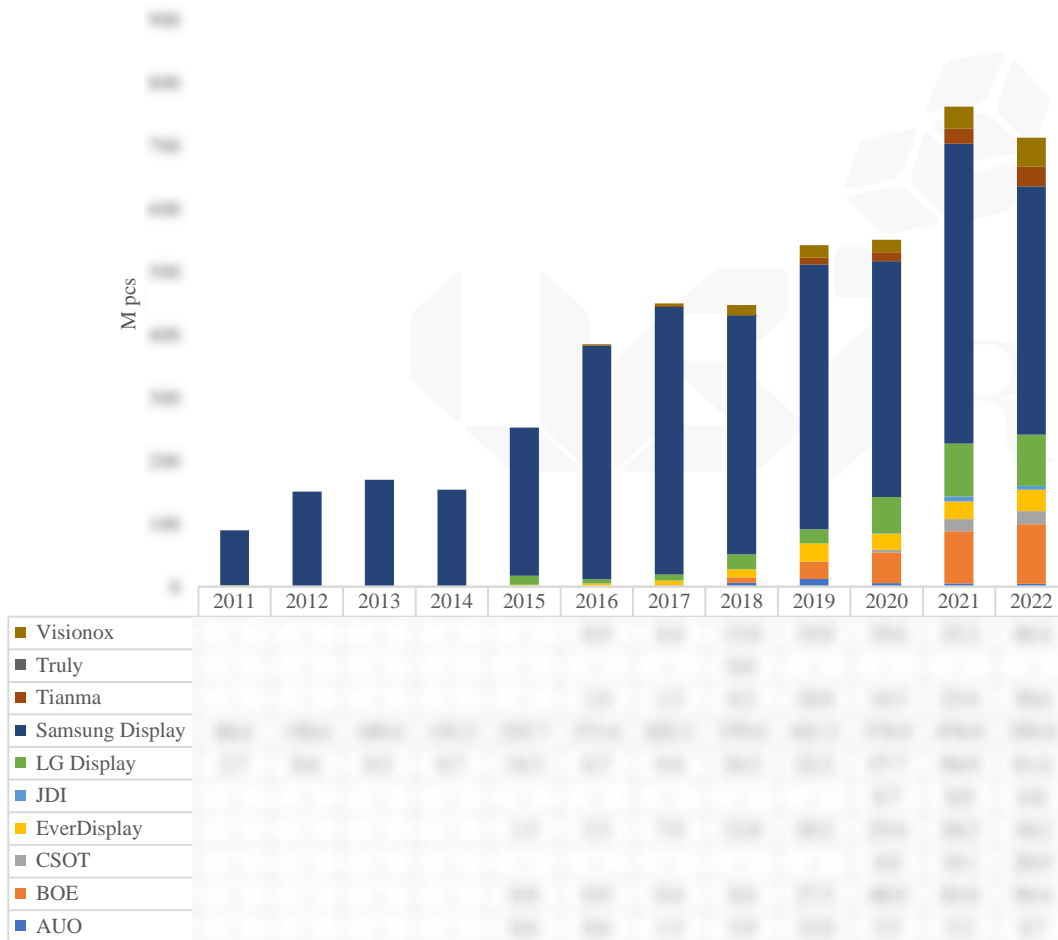
Source: UBI Research DB

# 7. Annual OLED Market Performance Analysis

## 7.2 Small OLED Performance Analysis by Company

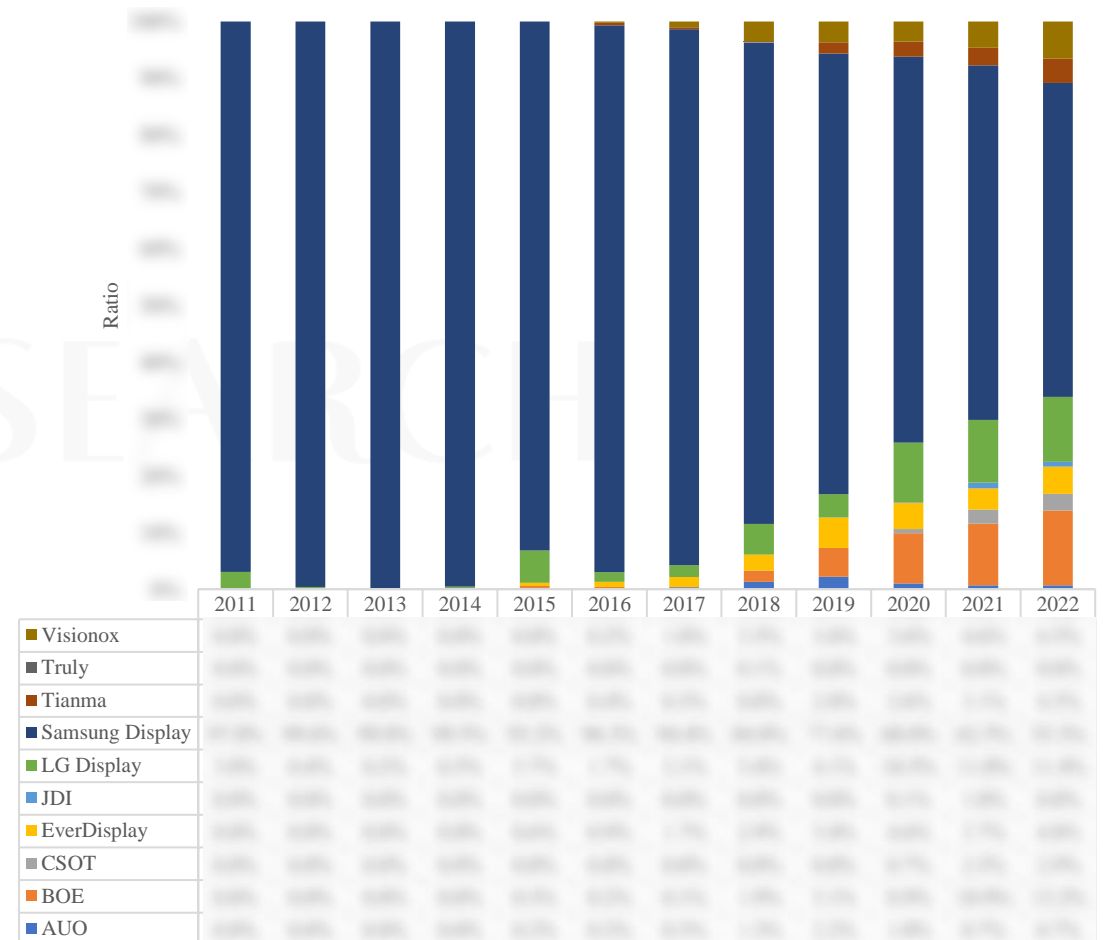
### Annual Shipment Analysis

Shipment by Company



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Shipment Ratio by Company

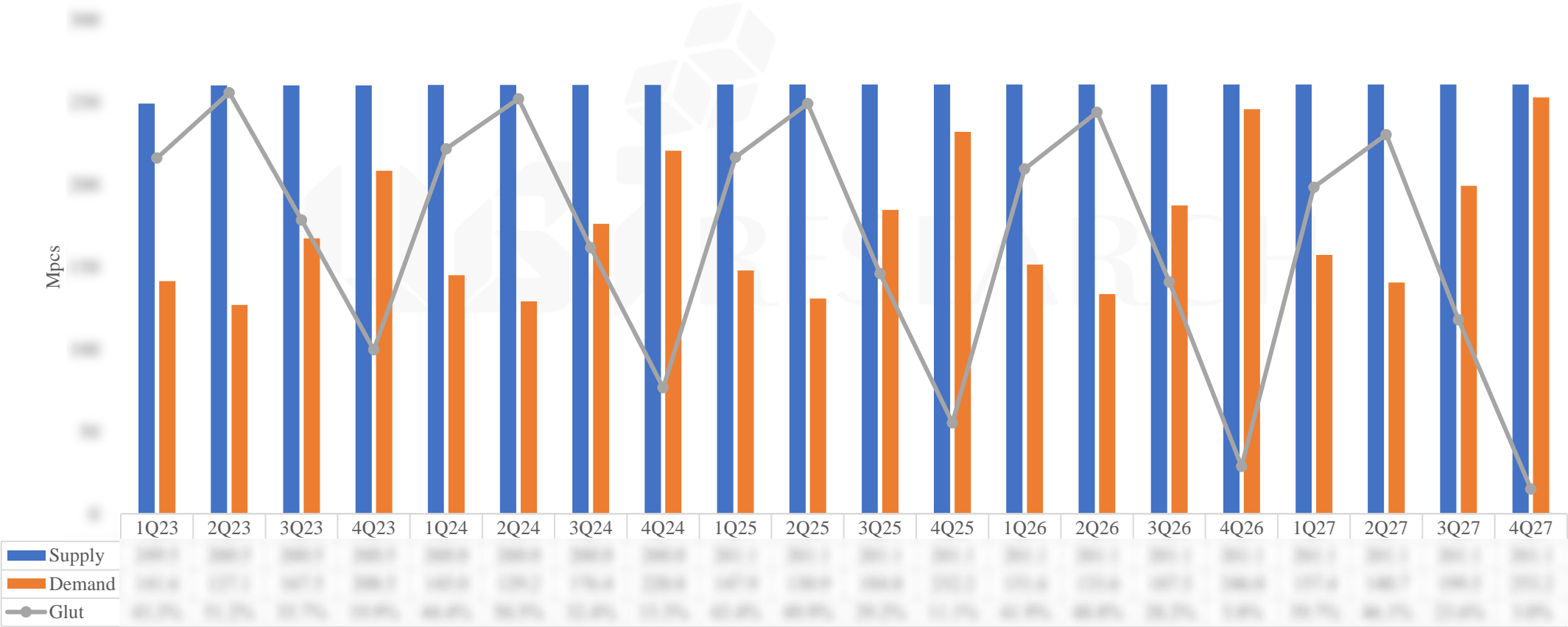


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# 9. Analysis of OLED Demand and Supply for Smartphones

## 9.2 Quarterly Smartphone OLED Demand and Supply Analysis

Quarterly Supply and demand analysis for smartphone



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# 10. OLED Market Forecast

## 10.2 Market Forecast by Panel Maker

Revenue Forecast

(US\$ million)

Company	Application	2023	2024	2025	2026	2027
AUO	Watch					
BOE	Foldable Phone					
	Smart Phone					
	Watch					
CSOT	Foldable Phone					
	Smart Phone					
EDO	Smart Phone					
	Watch					
JDI	Watch					
LG Display	Smart Phone					
	Watch					
Samsung Display	Foldable Phone					
	Game					
	Smart Phone					
	Watch					
Tianma	Smart Phone					
	Watch					
Visionox	Foldable Phone					
	Smart Phone					
	Watch					
Total						