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Japan Display Inc. (Tokyo Stock Exchange First Section, 6740)
Representative: Scott Callon, Chairman & CEO
Inquiries: Akihito Okochi, CFO
Telephone: +81-3-6732-8100
www.j-display.com/english

JDI Develops World’s First G6 Oxide Semiconductor TFT
with 4X Improvement in Field-Effect Mobility
— Breakthrough in Display Performance —

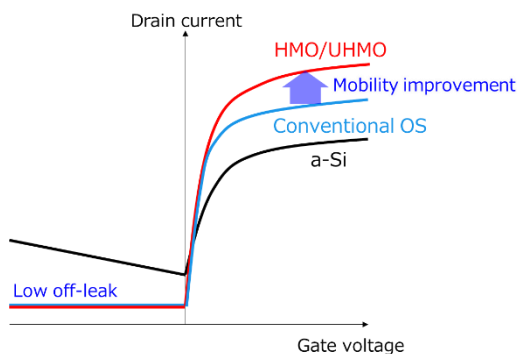
Japan Display Inc. (JDI) has successfully developed the world’s first backplane technology to radically improve the properties of conventional oxide semiconductor thin film transistors (OS-TFT) at its G6 Plant in Mobarra, Japan, and will begin immediate commercialization of this new technology.

1. Details of JDI’s New Technology

JDI’s new OS-TFT technology generates high-mobility oxide semiconductors (HMO), which have 2X the field-effect mobility of conventional OS-TFTs, and ultra-high mobility oxide semiconductors (UHMO), which have 4X higher field-effect mobility than conventional OS-TFT (hereafter, HMO/UHMO collectively referred to as “HMO”). UHMO’s field-effect mobility on JDI’s G6 mass production line is 52cm²/Vs, an extraordinarily high level. More broadly, HMO enables the same level of on-current flow as LTPS, while maintaining low off-leak current.

A further advantage of HMO is that while conventional high-mobility AMOLED backplanes require LTPS technology, which limits glass substrate sizes to G6, HMO can be used in G8 or larger production lines.

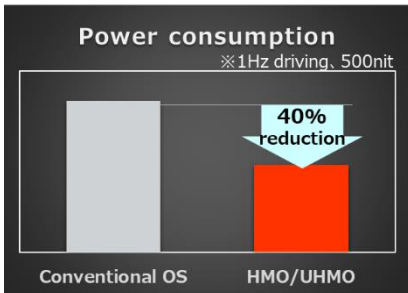
	Conventional OS	HMO	UHMO
Field-Effect Mobility	12cm ² /Vs	36cm ² /Vs	52cm ² /Vs



Transistor I-V Characteristic Comparison

JDI believes HMO will drastically accelerate display technology innovation and contribute to significant improvements in both OLED and LCD display performance, including:

- Lower power consumption;
- For Metaverse VR/AR displays, higher resolutions and higher refresh rates, driving deeper immersion and reality integration for users in the Metaverse;
- For transparent displays, higher transparency and image quality and bigger displays.



Conventional OS



HMO/UHMO
High resolution image

Lower Power Consumption

Higher Resolution

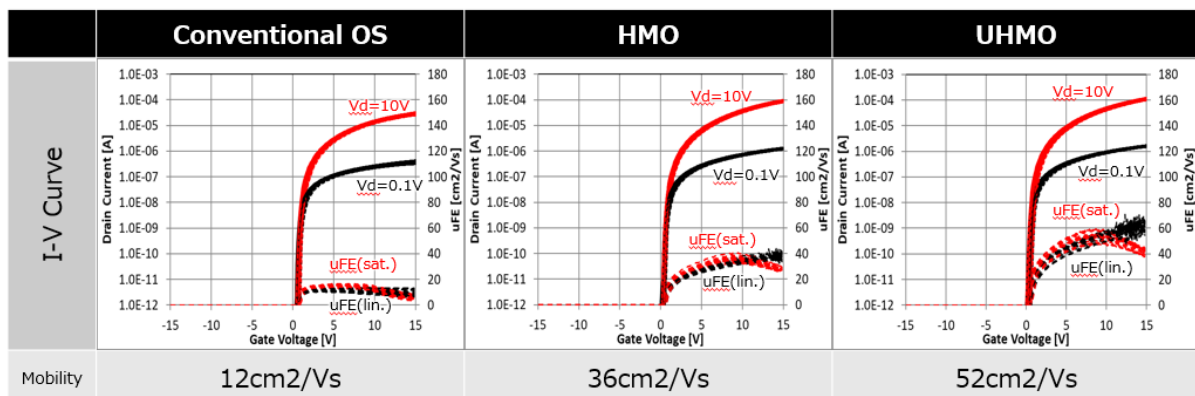
HMO Attributes

Conventional OS-TFTs have a problem of bias temperature stress (BTS), which causes poor reliability and image deterioration when trying to obtain high field-effect mobility.

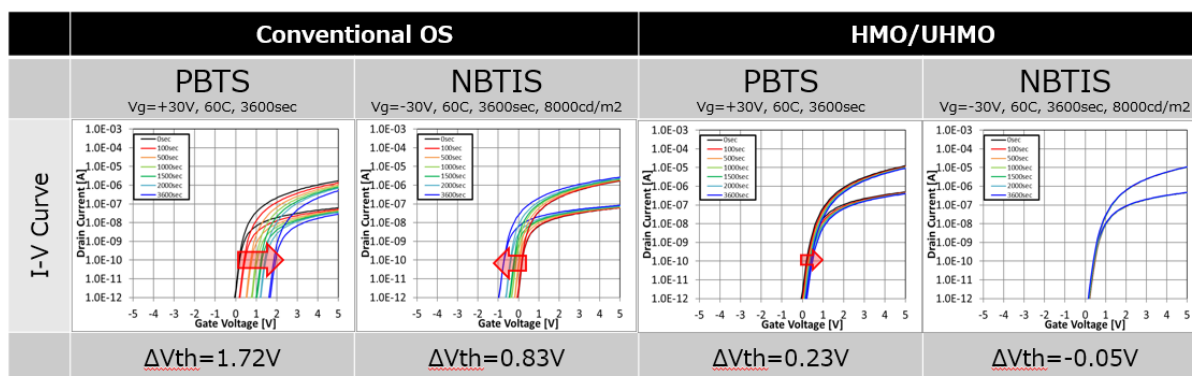
However, by leveraging the manufacturing process know-how JDI has developed over many years, JDI has overcome these challenges with HMO, which is a new, breakthrough OS-TFT with superior characteristics. HMO achieves both high field-effect mobility and stable BTS to concurrently realize OS-TFT's low off-leak current and LTPS's image driving stability.

HMO uses crystalline oxide materials developed by Idemitsu Kosan Co., Ltd.

Field-Effect Mobility Comparison



Bias Temperature Stress Variability Characteristic Comparison



PBTS : Positive Bias Temperature Stress

NBTIS : Negative Bias Temperature Irradiation Stress

2. Forward Outlook

(1) HMO Mass Production Start

JDI is already in HMO deployment discussions with multiple customers and plans to start mass production in 2024.

(2) HMO Sales Target

JDI believes that HMO is a breakthrough technology that has extremely broad application across display types and customer applications. As one use case, JDI plans to combine HMO with JDI's next-generation OLED technology to expand G6 wearable display production, with a sales target for this use case of c. JPY 25 billion in FY26/3 and JPY 50 billion in FY27/3.

(3) HMO Development Costs

HMO builds upon JDI's core capabilities in backplane technology built over many years. Thus, additional expenses required for HMO commercialization will be less than JPY 1 billion.

(4) HMO Earnings Impact

While HMO will have minimal impact on JDI's current FY22/3 consolidated earnings, JDI believes it will reinforce JDI's global display technology leadership and drive JDI's long-term, sustainable growth.

JDI will promptly disclose the details if matters requiring further disclosure arise.