

# Bringing the New Age Display with Social Innovation

**Yasuhisa Itoh**

Sharp Corporation, 2613-1, Ichinomoto-cho, Tenri, Nara, 632-8567, Japan  
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## ABSTRACT

Based on the social infrastructure upgrade, the creation of new applications as well as diversification demands for display technology, it is possible for the display market to grow sustainably in the future. I will talk about next generation display technology aiming at such social innovation.

## 1 INTRODUCTION

Recently, displays used for TVs and Smartphones become much higher resolution. Cars have been equipped more than one displays, and more displays are used in a car as a recent trend, the amount of information provided by displays have increased. Under this background, practical realization of 5G and AI takes an important role for the future display technology development. 5G technology have many superb capability such as “Ultra high speed”, “Super low-delay” and “Multi-concurrent connection”, allowing transfer of large-volume data to many terminals simultaneously. In addition, 5G & AI systems, by utilizing AI mining functions, can deliver the necessary data to the users based on their needs.



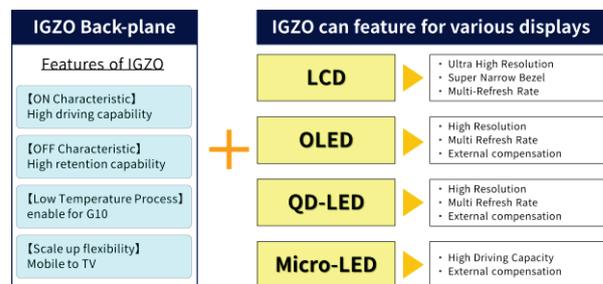
**Fig. 1 Scenes where displays are applied in the age of 5G & AI**

Once this new infrastructure becomes available, displays shall be equipped with all application devices as the interface to connect human with the information. In addition to the existing application, display demands will be expected to increase for the new application devices such as IoT, Auto-driving, Robotics, AR/VR. Best optimized displays for each new application will be required and competitive axes for display performance will be diversified. I would like to talk about such new generation display technology complying with new social demand.

## 2 Future Society and the New Display Systems

Development of most suited display for each application will enable daily life of people more convenient, enjoyable and safer. At present, we are developing LCD, OLED, QD-LED and Micro-LED display. We should check them out for each characteristic and potential and develop them for the most suited applications.

IGZO back-plane technology is taking a platform role for these displays. It is possible to combine IGZO with each one based on the feature of each display and we can realize the next generation display [1].



**Fig. 2 Combination of IGZO back-plane and various displays**

LCD is the most reasonably achieve 8K resolution. Combined with backlight system of super-multi-numerous division, LCD can realize high quality HDR picture, with wide rage gradation from low to high and LCD can perform the ultimate image display. In addition, by adopting a reflective type, LCD can perform high visibility under the ambient light, and can become a super low power display. We can expect the demand increase of this reflective type for digital signage application.

The biggest characteristics of OLED is the flexibility. You can bend precipitously, and it can be formed in such a design shape which cannot be achieved by glass materials and this most appropriate display for foldable or rollup design. By combining precipitous convex-concave shape with the touch UI, it can give users information viscerally. It can also achieve the multi-mode interface, recognizing the secure response to operation action [2].

QD-LED can redeem the week points of OLED. QD has high atmospheric stability and does not require vacuum evaporation process, so that we can process cost is lower than that of OLED. In addition, achieve

better reliability. In this regard, QD has an almighty capability for OLED replacement possibility [3].

Micro-LED is based on the inorganic materials with higher durability suited for the application requiring high brightness, heat-resistant and high reliability. This is also suited for digital signage. Micro-LED is also expected for automotive and AR application display based on its performance.

### **3 SUMMARY**

We will continue searching and developing the most suited and optimum display for the social environment in order to achieve social innovation. In addition, we will continue display technology innovation serving a role of interface between man and information under 5G & AI era.

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