

An Analysis of Abnormal Phenomenon On TFT-LCD Panel With High Resolution(8K) and Large Size(>82inch)

Shou Li¹, ChulGyuJung², Chengqi Zhou³ and Weixu Li⁴

¹Dept. of Module, BOE Technology Group, Beijing, 100176, China

Tel.:18610676983, E-mail: lishou@boe.com.cn

²Dept. of Module, BOE Technology Group, Beijing, 100176, China

³Dept. of Module, BOE Technology Group, Beijing, 100176, China

⁴Dept. of Module, BOE Technology Group, Beijing, 100176, China

According to the forecast provided by some famous organizations, such as DS, the UHD resolution will become mainstream with the cost reduction, the resolution will be improved from FHD to 4k2k, 8k4k or even higher. With the improvement in resolution, the gamut, power consumption and other characters are demanded more strictly. High gamut, high resolution and low power consumption will become basic requirement during the research of large-screen television.

As the manufacturing technique and IC chip technology developed, the size of television increased, resolution, gamut and other key specifications improved, aperture ratio of TFT-LCD panel decreased. In order to reduce the power consumption of backlight and increase aperture ratio, the signal wire is becoming narrower, which result the increase of resistance, delay times and risk of defect at the center of screen.

In the present development of high resolution television, in order to ensure the charging time and C-rate, designers usually use 2G2D+/1G1D+ as the driving mode of the large-screen television, which means that the screen is divided as four pieces of small screen, the time of 1H can be reduced to half its amount by this way. In this kind of design, the screen is driven by two sides, the problems of synchronization or data overlap can be resulted easily, the center part of the whole screen will show white (1G1D+) or black (2G2D+). Since the problems described above are affected by the gate line and gate line delay, it is logical to consider the gate line and gate line delay carefully during the design of large-screen television. As shown in the picture 1 below, the screen uses 2G2D+ structure, the X-type defect is triggered at the center of the screen. The defects of screen with 2G2D+ structure usually are occurred in some patterns with high power consumption, such as H1V2, H2V2 and H2 stripe. The defects of screen with 1G1D+ structure usually are occurred in some solid color pictures.

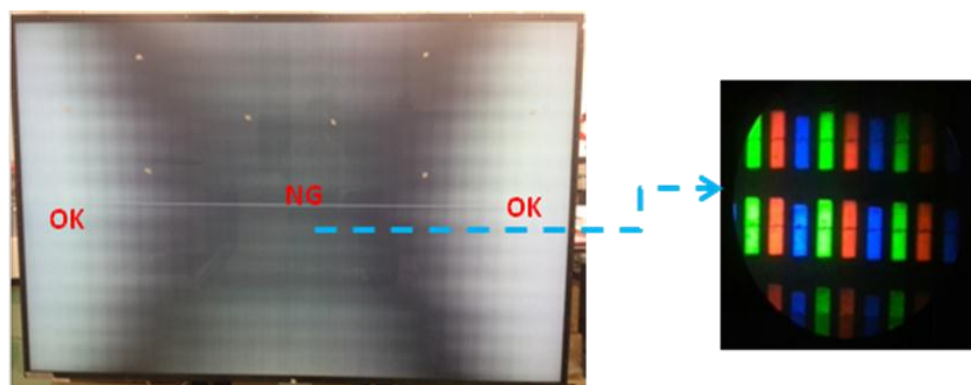


Figure 1. X-type defect at the center of screen;

References

1. C. Hsu, C. Tsai, S. Chen, and M. Ker, " Board-Level ESD of Driver ICs on LCD Panel," in *Device and Materials Reliability*. Vol. 9, pp. 59-64, March 2009.
2. L. Y. Pan, S. C. Chang, M. Y. Liao, and Y. T. Lin, "The future development of global LCD TV industry," in

Proceeding of PICMET, pp. 1818-1821, Aug. 2007.

3. M. Lee, Y. Lee, S. Moon, D. Kim, K. Kim, N. Kim, and S. Kim, "Driving Method of Integrated Gate Driver for Large Area LCD-TV," in *SID Symposium Digest of Technical Papers*, Vol. 39, pp. 838-841, May 2008.
4. J. Lee, S. Park, S. Son, and W. Chung, "A study of TFT-LCD source driver using new pre-charge method for large panel," in *ITC-CSCC*, Vol. 1, pp.7-8, July 2005.