PURDUE INNOVATES | Office of Technology Commercialization

# Variation-Tolerant Self-Repair Design for Low-Temp Poly-Si LCD and OLED Displays

**This new design method for LCD and organic LED displays compensates for defective and low-drivability pixels, which decreases voltage requirements for portable devices and increases the yield of large panel displays.**

Most electronic devices, portable computers, and desktops use liquid crystal or light-emitting diode technology in their display. LCD and LED technologies are well refined, but still have disadvantages such as grain boundaries in the panel result in low-drivability pixels or dead pixels. The voltage supplied to the panel must be higher in order to account for the low-drivability pixels and large scale displays still suffer from defective pixels. There is a need to increase the yield of large panel displays and decrease the power requirements of those used in portable devices.

Purdue University researchers have devised a new method for the design of LCD and organic LED based displays that compensates for defective and low-drivability pixels. Using this method, the voltage requirements of small LCD panels were decreased by 20 percent with no drawback in brightness or performance. In large panel displays, the yield was increased by 7 percent with a negligible increase in power requirements.

**Advantages**:

-Design compensates for defective and low-drivability pixels

-Decreased voltage requirements

Potential Applications:

-Electronics industry

-LCD and LED manufacturers

**TRL:** 4

**Intellectual Property:**

**Technology ID**
65755

**Category**
Semiconductors/Fabrication & Process Technologies
Semiconductors/Devices & Components
Semiconductors/IC Design & EDA Tools

**Authors**
Chih-Hsiang Ho
Chao Lu
Debabrata Mohapatra
Kaushik Roy

**Further information**
Matt Halladay
MRHalladay@prf.org

Erinn Frank
EEFrank@prf.org

**View online**

Provisional-Patent, 2011-01-14, United States

Utility Patent, 2012-01-13, United States

**Keywords:** LCD display technology, LED display design, low-drivability pixels compensation, defective pixel compensation, increased panel yield, decreased display voltage requirements, Purdue display research, organic LED design method, electronics industry display solutions, large panel yield increase, Displays, Electrical Engineering, Electronic Devices, Electronics, LEDs