Improvement of Brightness Uniformity by Compensating the Threshold Voltages of both the Driving TFT and the OLED for AMOLED Displays

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Abstract

This paper proposes a novel pixel design and driving method for active-matrix organic light-emitting diode (AM-OLED) displays using low-temperature polycrystalline silicon thin-film transistors (LTPS-TFTs). The proposed threshold voltage compensation circuit, which comprised five transistors and two capacitors, has been verified to perform uniform output current by the simulation work using the AIM-SPICE simulator. The driving scheme of this voltage programming method includes four periods: pre-charge, compensation, data-input and emission. The simulated results demonstrate excellent properties in terms of low error rate of OLED anode voltage variation (<1%) and high output current. The proposed pixel circuit has high immunity to the threshold voltage deviation characteristics of both the driving poly-Si TFT and the OLED.

Keyword：Active-Matrix Organic Light-Emitting Diode (AM-OLED), Voltage Programming Method, Low-Temperature Polycrystalline Silicon Thin-Film Transistors (LTPS-TFTs).