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Abe et al.

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(54) **IN-PLANE SWITCHING LIQUID CRYSTAL DISPLAY APPARATUS WITH REDUCED CAPACITANCE BETWEEN PIXEL ELECTRODES AND COMMON ELECTRODES**

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(51) Int. Cl.⁷ **G02F 1/1343**

(52) U.S. Cl. **349/141; 349/138**

(58) Field of Search **349/141**

(56) **References Cited**

U.S. PATENT DOCUMENTS

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(57) **ABSTRACT**

A liquid crystal display unit in which a voltage is applied to a pixel electrode and a common signal electrode constituted by two upper and lower transparent conductive layers having insulation layers disposed therebetween so that a liquid crystal is driven to control display can improve any one or both of reduction of a writing time of the liquid crystal (reduction of a capacitance between the pixel electrode and the common signal electrode) and reduction of a driving voltage of the liquid crystal. An inter-layer insulation layer between the transparent electrodes formed of different layers is constituted by at least one or a laminated structure of a part of a gate insulation layer, a part of a surface protection layer of a thin film transistor and an applied-type insulation layer and insulation layers in an area which is positioned above the lower transparent electrode.

26 Claims, 36 Drawing Sheets

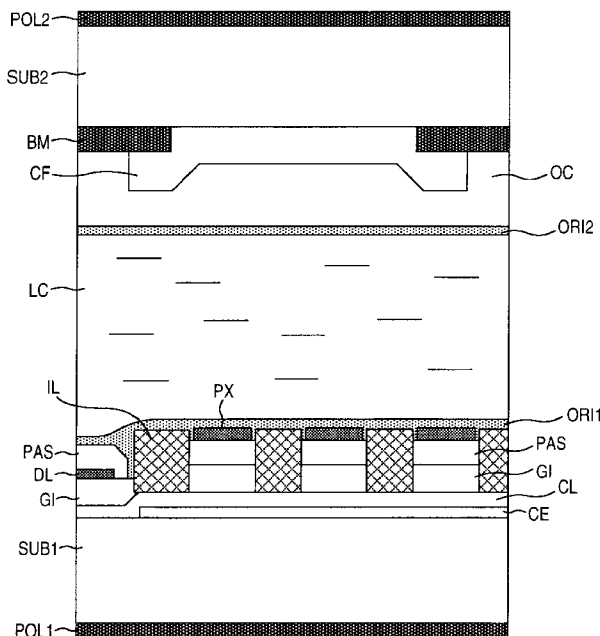
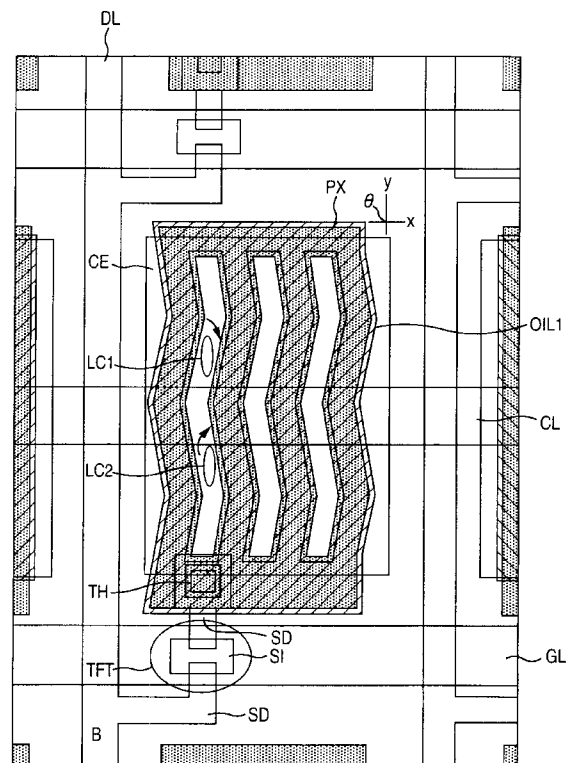


FIG. 1

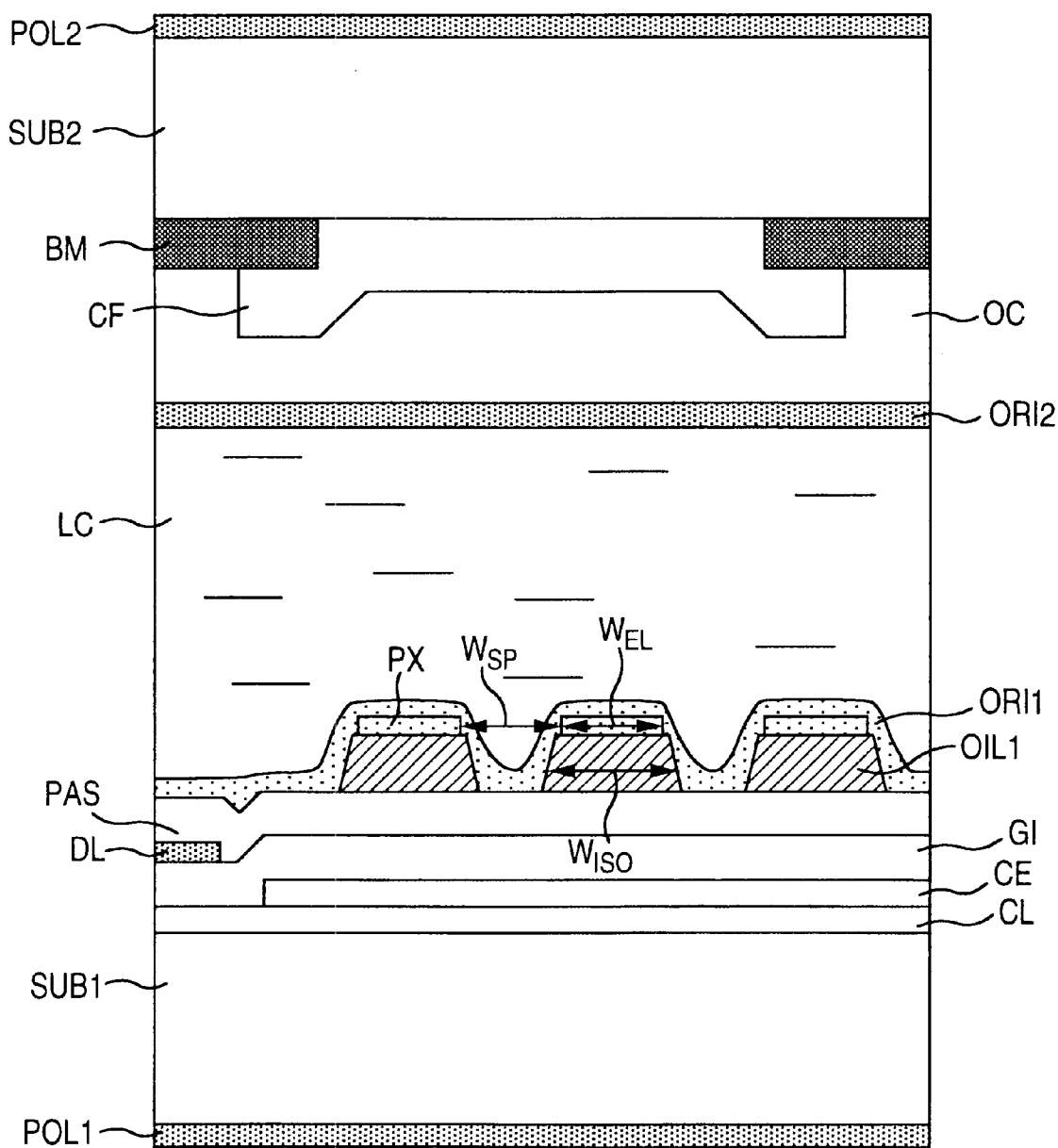


FIG. 2

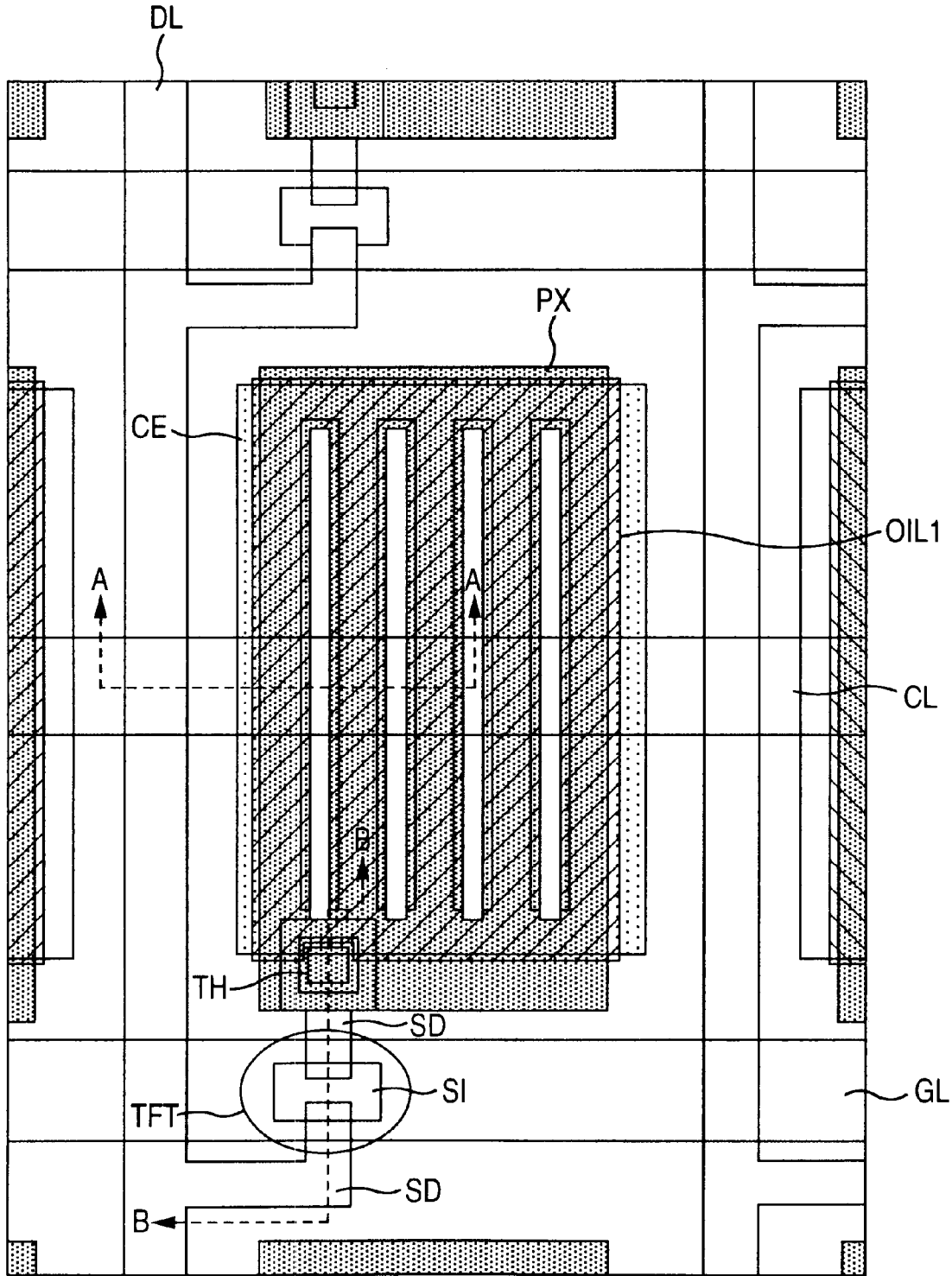


FIG. 3

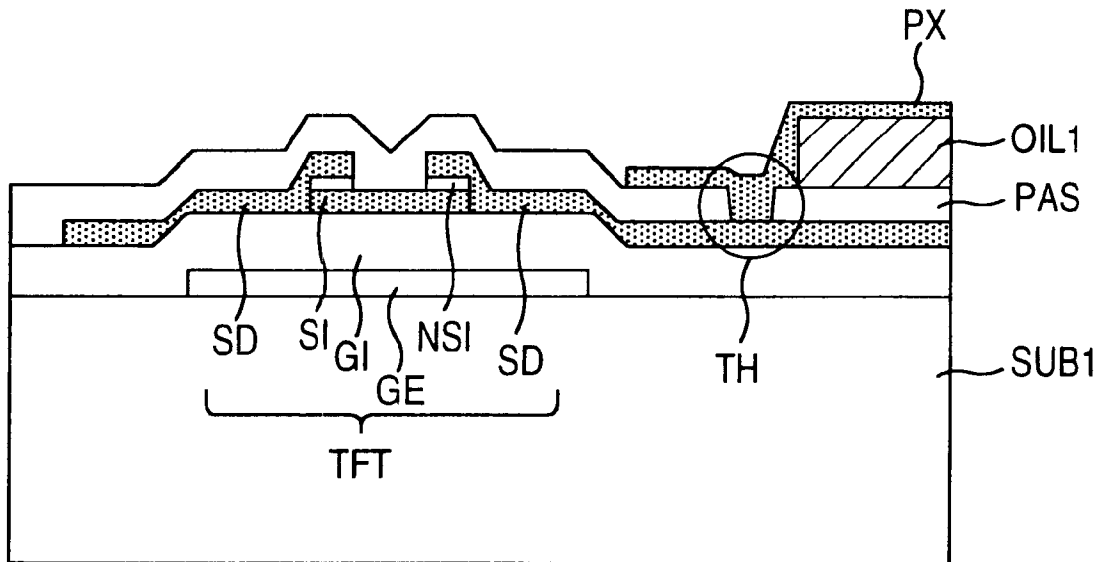
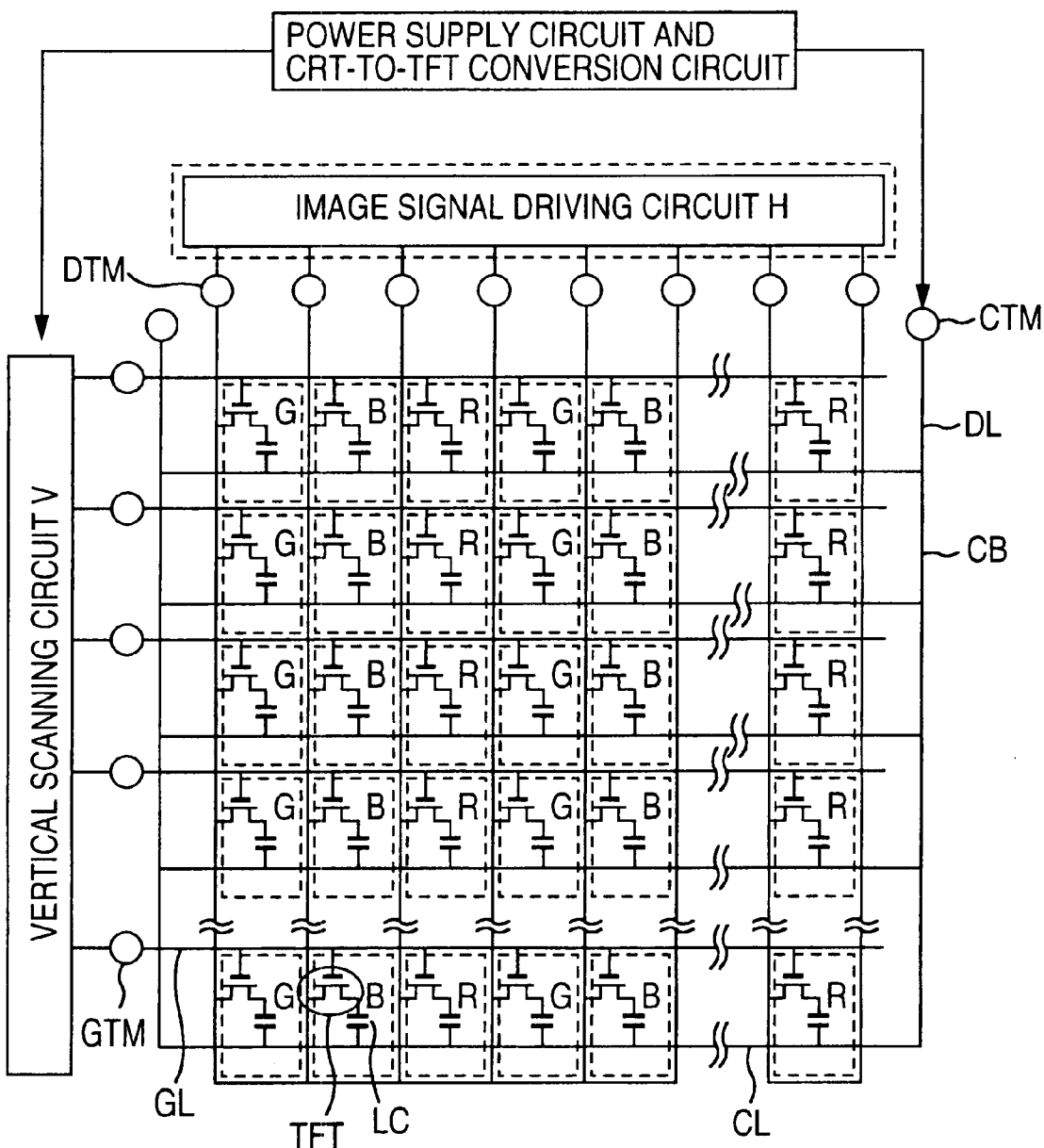


FIG. 4



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