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**Ex. 1001**



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**Sasagawa et al.**

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(54) **SEMICONDUCTOR DEVICE AND METHOD FOR MANUFACTURING THE SAME**

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See application file for complete search history.

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(73) Assignee: **Semiconductor Energy Laboratory Co., Ltd.**, Kanagawa-ken (JP)

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Kaneko.K et al., "Highly Reliable BEOL-Transistor with Oxygen-controlled InGaZnO and Gate/Drain Offset Design for High/Low Voltage Bridging I/O Operations", IEDM 11: Technical Digest of International Electron Devices Meeting, Dec. 1, 2011, pp. 155-158.

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(57) **ABSTRACT**

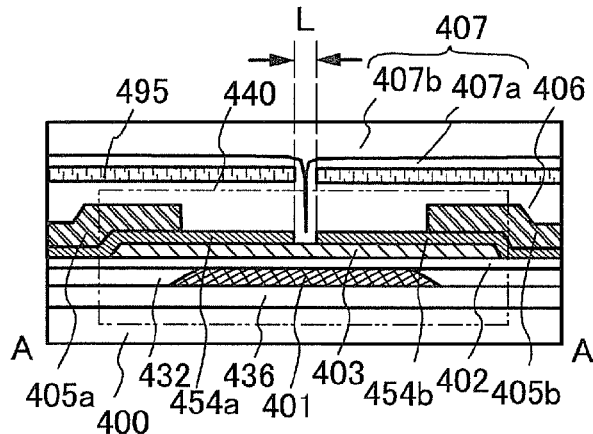
(51) **Int. Cl.**  
**H01L 29/80** (2006.01)  
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A bottom-gate transistor with a short channel length and a method for manufacturing the transistor are provided. A bottom-gate transistor with a short channel length in which portions of a source electrode and a drain electrode which are proximate to a channel formation region are thinner than other portions thereof was devised. In addition, the portions of the source electrode and the drain electrode which are proximate to the channel formation region are formed in a later step than the other portions thereof, whereby a bottom-gate transistor with a short channel length can be manufactured.

(52) **U.S. Cl.**  
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(58) **Field of Classification Search**  
CPC ..... H01L 29/78; H01L 29/166477; H01L 29/7869

**22 Claims, 17 Drawing Sheets**





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