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United States Patent [19]

Seo

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[54] **SENSE AMPLIFIER DRIVER FOR MEMORY DEVICE HAVING REDUCED POWER DISSIPATION**

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[73] Assignee: **Samsung Electronics Co., Ltd.**, Rep. of Korea

[21] Appl. No.: **358,679**

[22] Filed: **May 30, 1989**

[30] **Foreign Application Priority Data**

Jul. 11, 1988 [KR] Rep. of Korea 88-8607

[51] **Int. Cl.**[5] **G11C 7/00**

[52] **U.S. Cl.** **307/530**; 307/263; 307/592; 307/601; 365/205; 365/233

[58] **Field of Search** 307/263, 530, 592, 601, 307/603, 481; 365/194, 205, 233

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Assistant Examiner—Terry D. Cunningham

Attorney, Agent, or Firm—Morgan & Finnegan

[57] **ABSTRACT**

An improved sense amplifier driver for sensing and restoring data in memory cells is disclosed. Pull-up means in the form of p-channel MOS transistors are respectively provided for forcibly pulling up the gate voltage of delayable p-channel MOS transistors within the first inverter of the sensing clock driver and the second inverter of the restore clock driver in the trailing transient periods of the sensing and restoring clock signals. The formation of a DC current path between the power line and the ground line in any one of the delayable p-channel MOS transistors is prevented, thereby making it possible to avoid the unnecessary power dissipation. Further, delaying resistances are installed respectively in the first inverter of the sensing clock driver and in the second inverter of the restoring clock driver to make the slope of the leading edges of the sensing and restoring clocks less steep, thereby making it possible to exclude the occurrence of noise.

3 Claims, 5 Drawing Sheets

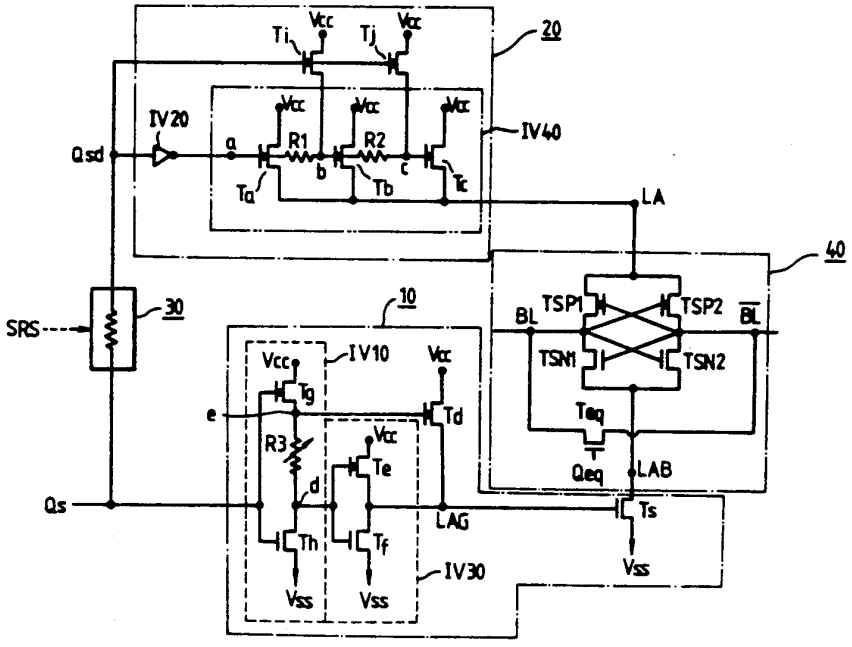


FIG.1 (Prior Art)

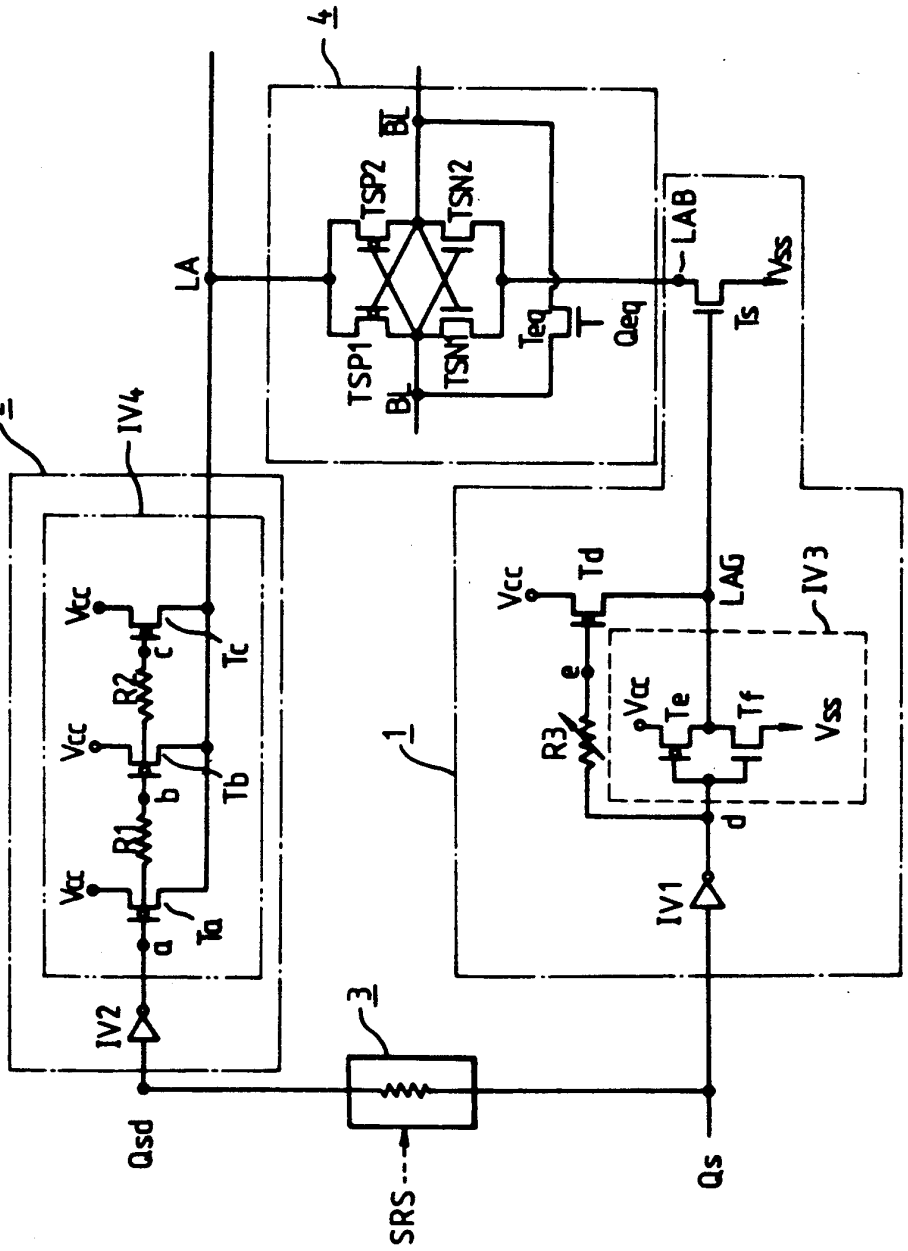


FIG.2 (Prior Art)

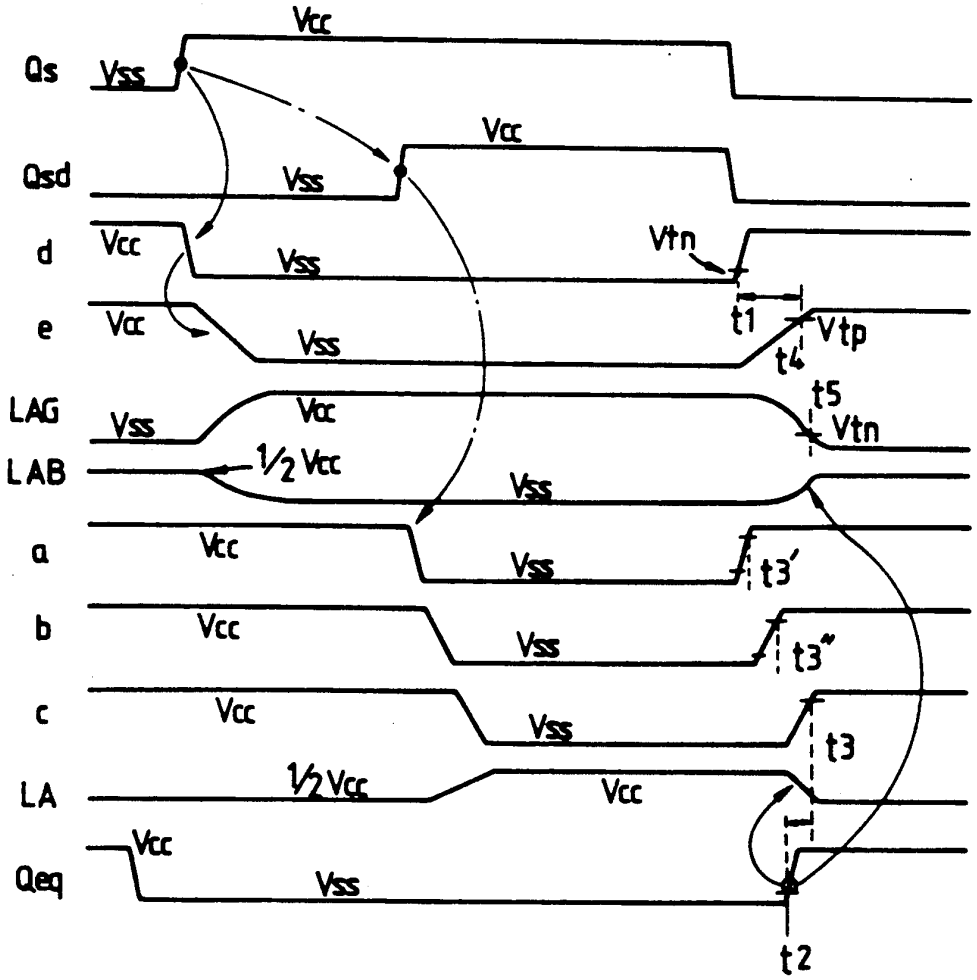


FIG.3 (Prior Art)

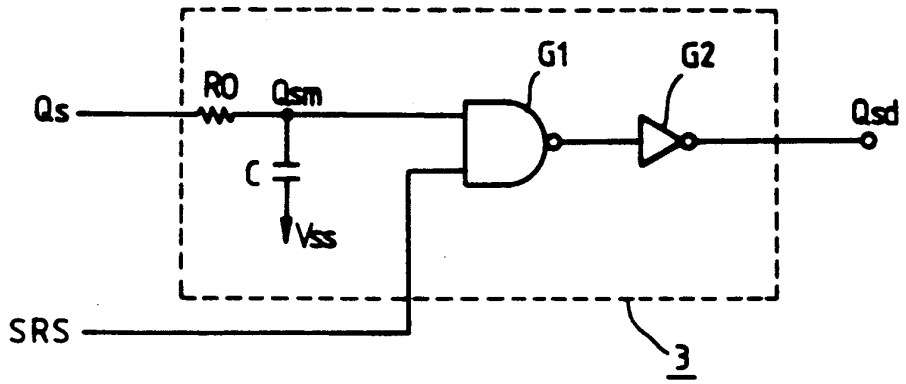


FIG.4 (Prior Art)

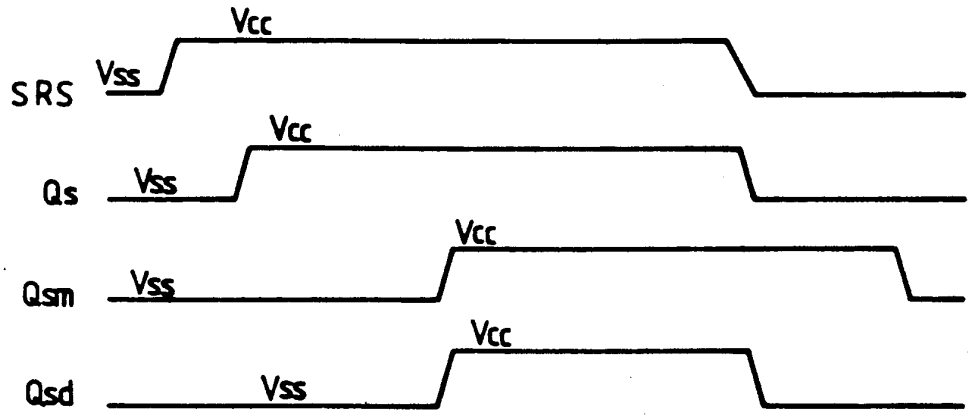
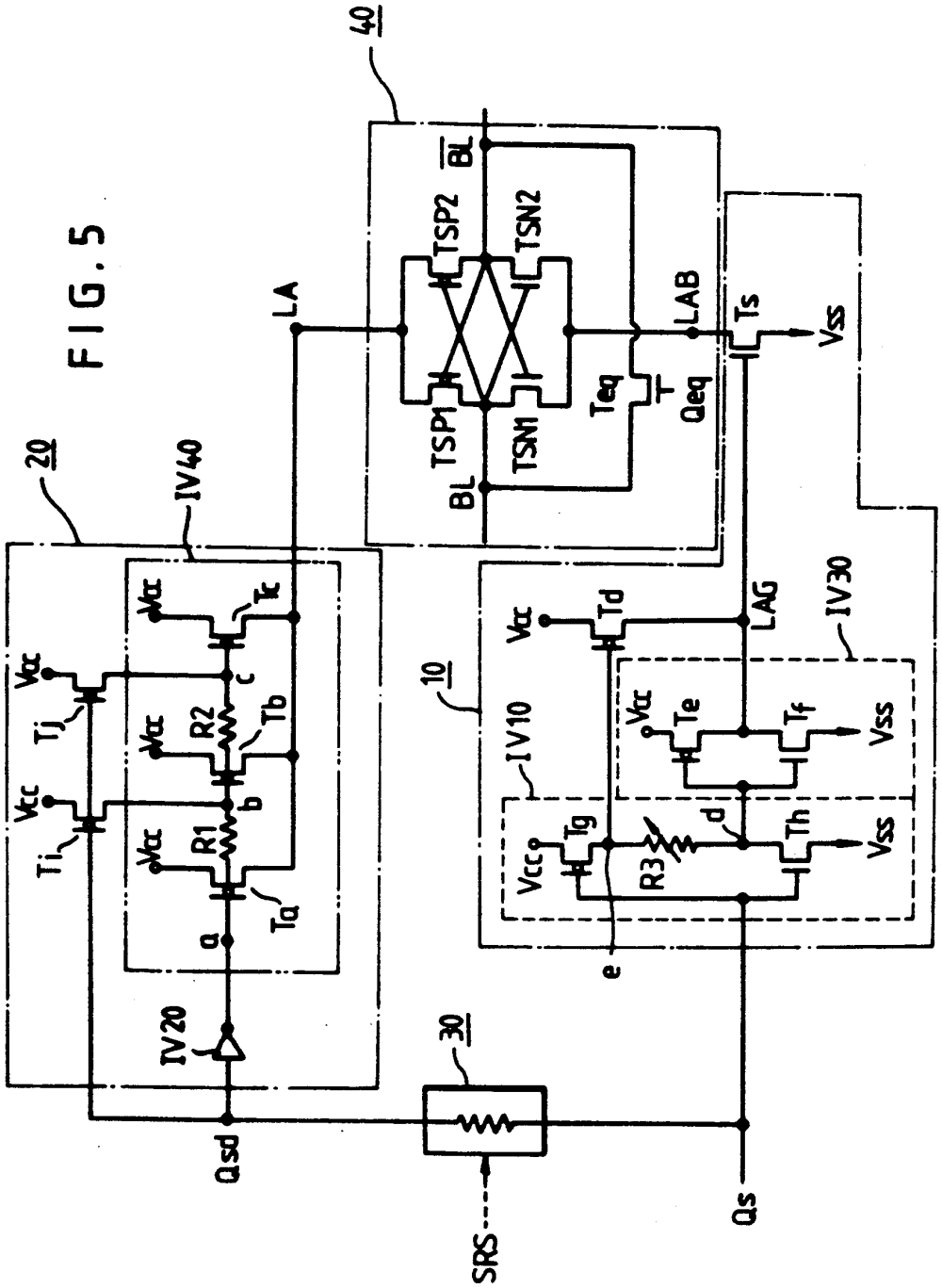


FIG. 5



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