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# United States Patent [19]

Tobita et al.

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[45] Date of Patent: **Aug. 6, 1996**

[54] SEMICONDUCTOR MEMORY DEVICE INCLUDING STABILIZING CAPACITIVE ELEMENTS EACH HAVING A MOS CAPACITOR STRUCTURE

4,980,799 12/1990 Tobita ..... 361/311

### FOREIGN PATENT DOCUMENTS

49-114337 of 1974 Japan .  
2-273393 of 1990 Japan .

[75] Inventors: **Yoichi Tobita; Kenji Tokami**, both of Hyogo, Japan

### OTHER PUBLICATIONS

Martino Jr., et al., "An On-Chip Back-Bias Generator for MOS Dynamic Memory", IEEE Journal of Solid-State Circuits, vol. SC-15, No. 5, Oct. 1980, pp. 820-826.

[73] Assignee: **Mitsubishi Denki Kabushiki Kaisha**, Tokyo, Japan

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*Attorney, Agent, or Firm*—Lowe, Price, LeBlanc & Becker

[21] Appl. No.: **471,047**

[22] Filed: **Jun. 6, 1995**

### Related U.S. Application Data

[63] Continuation of Ser. No. 151,248, Nov. 12, 1993.

### Foreign Application Priority Data

Dec. 18, 1992 [JP] Japan ..... 4-338705

[51] Int. Cl.<sup>6</sup> ..... **G11C 7/00**

[52] U.S. Cl. .... **365/189.09; 365/189.01; 365/226**

[58] Field of Search ..... 365/189.09, 226, 365/189.01, 149, 182

### References Cited

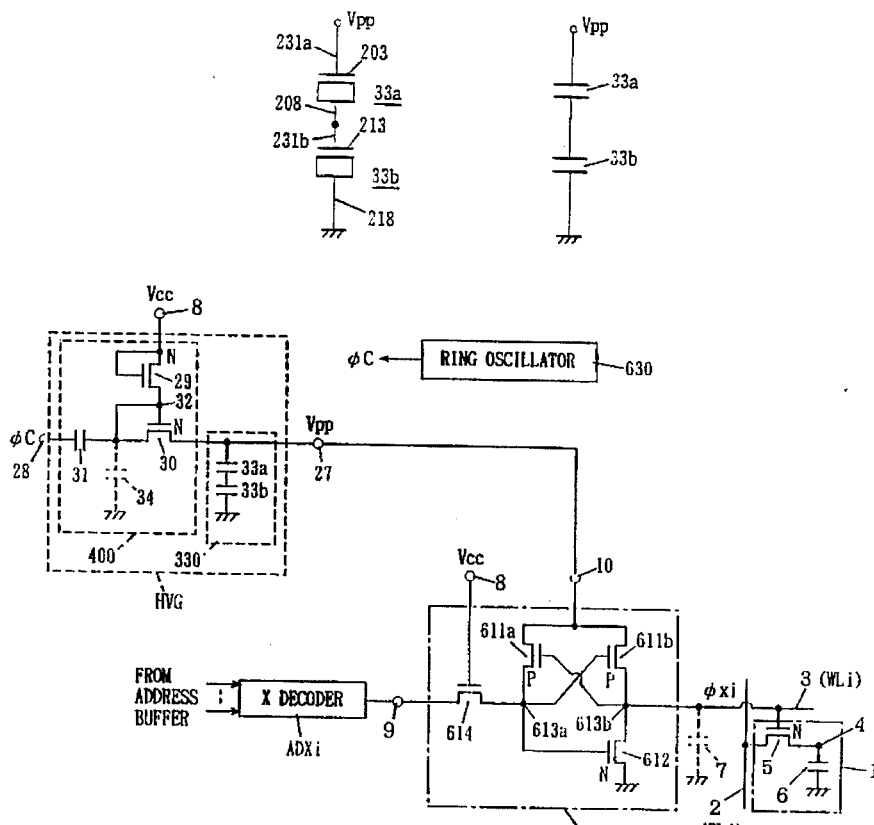
#### U.S. PATENT DOCUMENTS

4,788,664 11/1988 Tobita ..... 361/311

### [57] ABSTRACT

In a semiconductor memory device including a boosting circuit for generating a high voltage constantly, and a word line driving circuit for transmitting a high voltage from the boosting circuit on a selected word line, a capacitor for stabilizing the high voltage generated by the boosting circuit is formed of a series of capacitive elements using a FET having a gate insulating film identical in thickness to that of an insulating gate type field effect transistor in the memory device. A voltage applied across each capacitive element is relaxed, and the capacitor is improved in dielectric breakdown voltage characteristics, to stably supply the high voltage.

6 Claims, 18 Drawing Sheets



AMD EX1022

FIG. 1

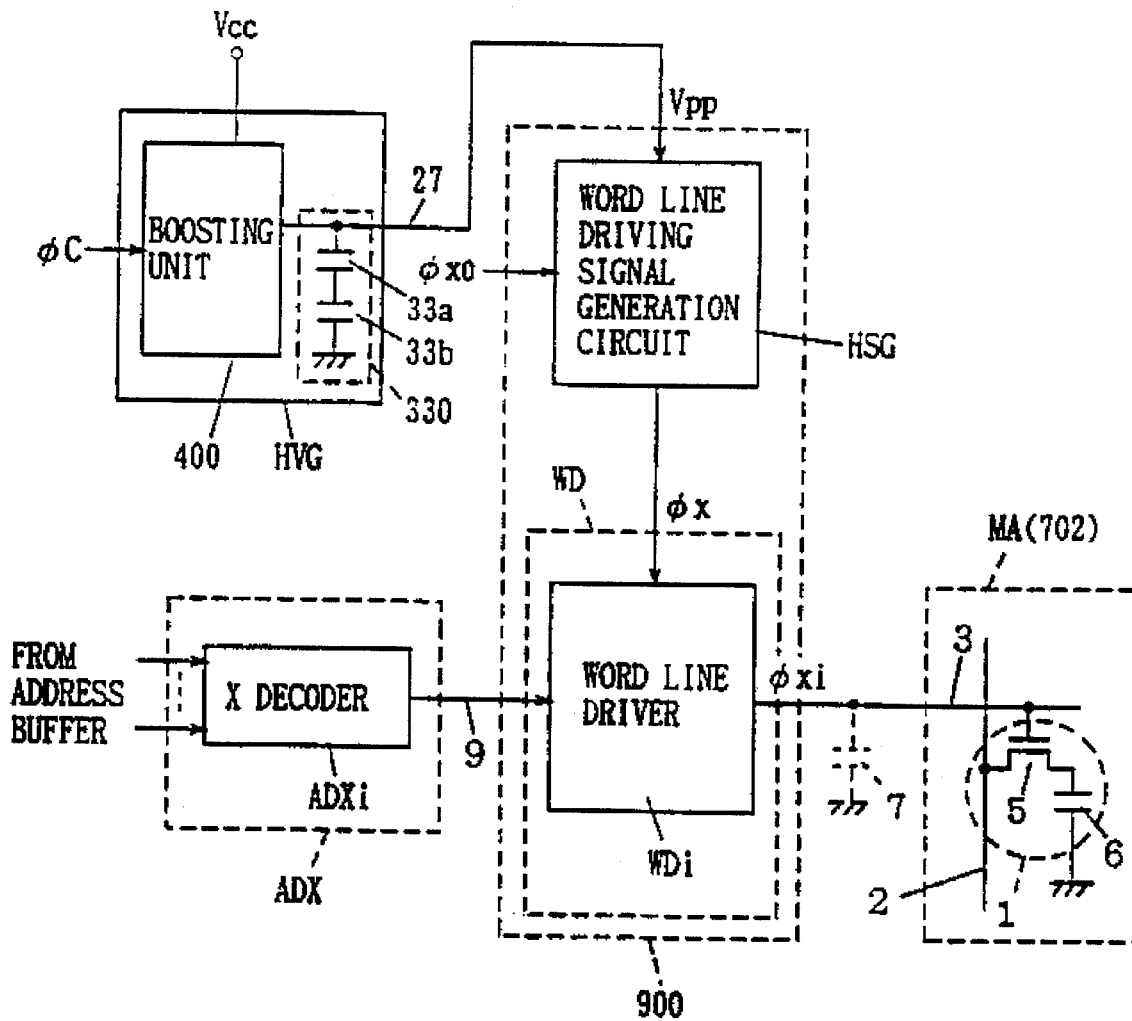


FIG. 2

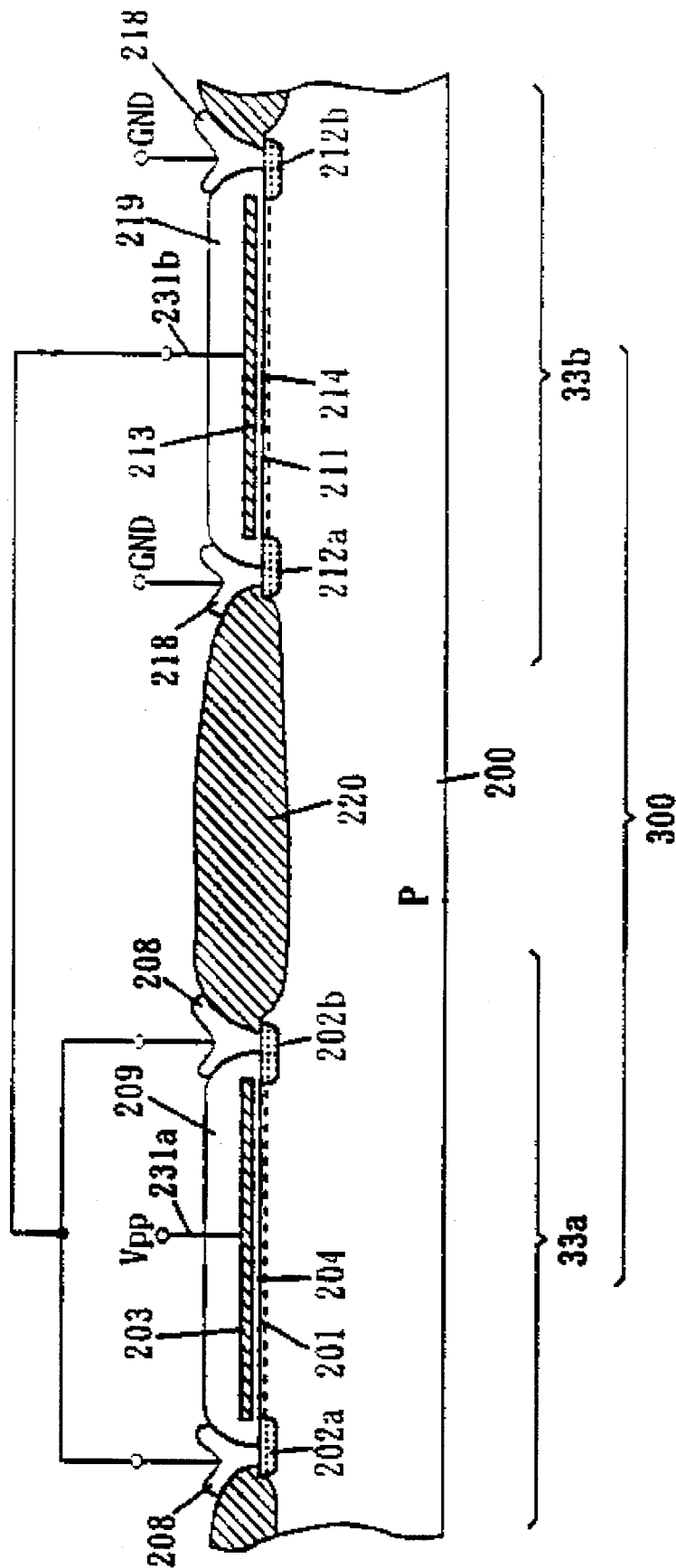


FIG. 3

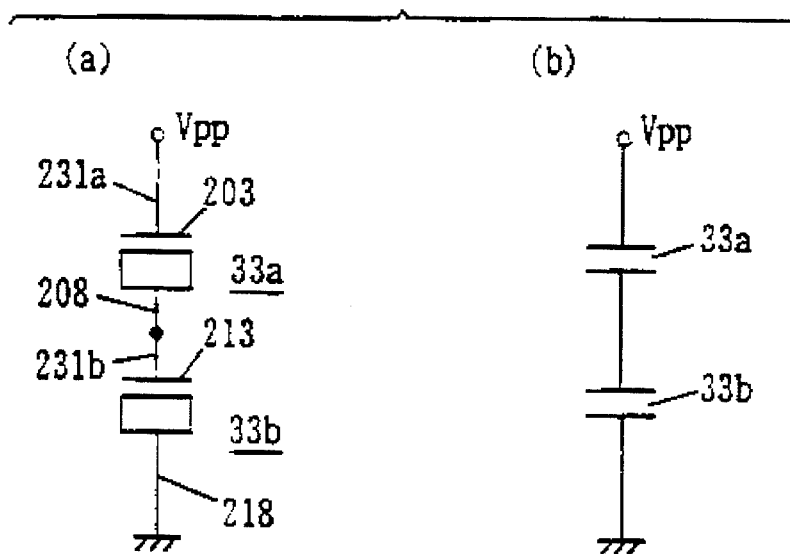


FIG. 4A

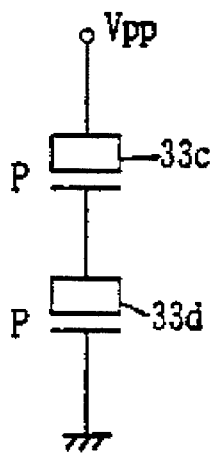


FIG. 4B

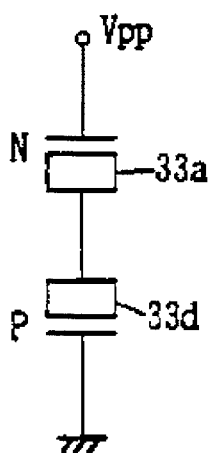


FIG. 4C

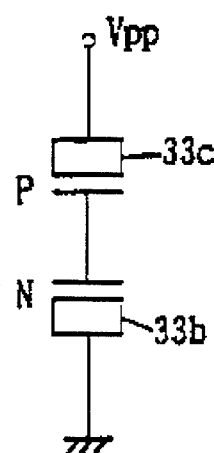


FIG. 5

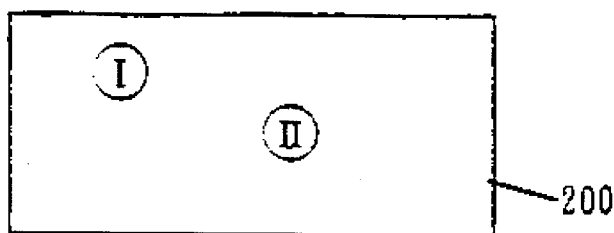


FIG. 6

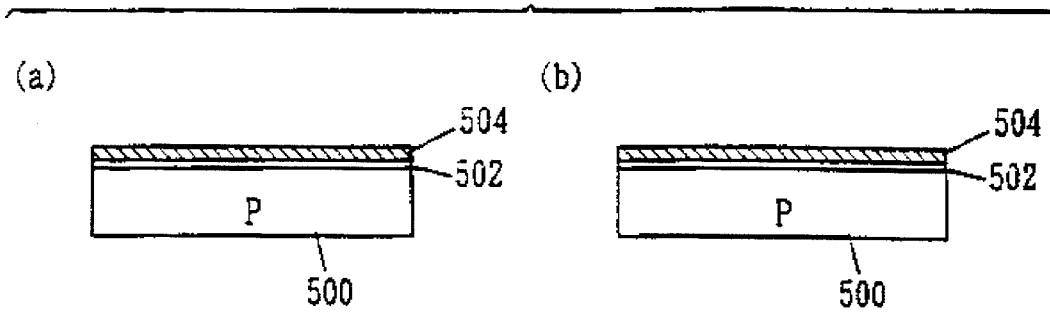


FIG. 7

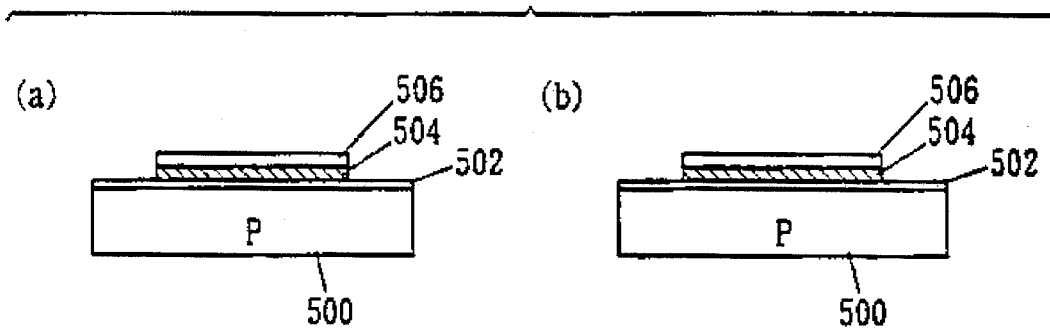


FIG. 8

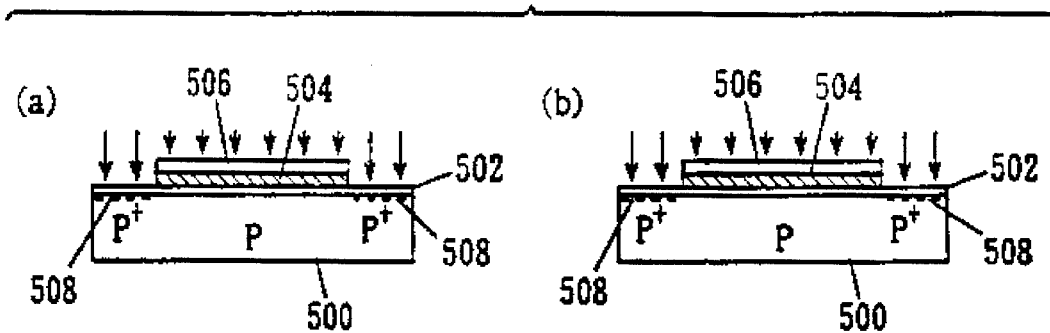
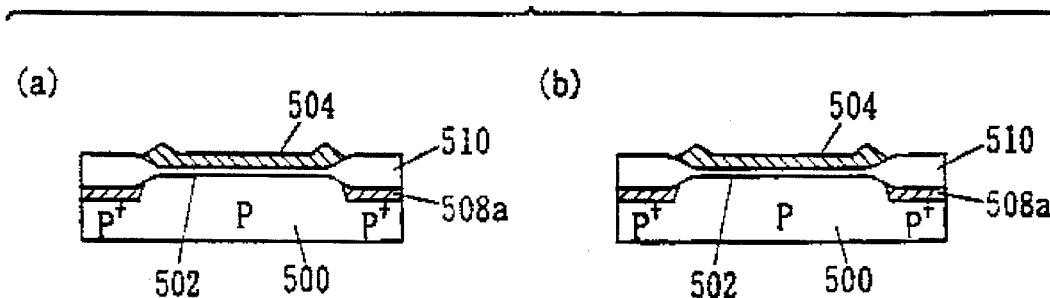


FIG. 9



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