United States Patent [19]

Konishi

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[45] Date of Patent: Feb. 12, 1985

[54] **INTEGRATED CIRCUIT FORMED ON A SEMICONDUCTOR SUBSTRATE WITH A VARIABLE CAPACITOR CIRCUIT**

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[73] Assignee: Tokyo Shibaura Denki Kabushiki Kaisha, Japan

[21] Appl. No.: 446,724

[22] Filed: Dec. 3, 1982

[30] Foreign Application Priority Data

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Jan. 18, 1982 [JP] Japan 57-5680

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[52] U.S. Cl. 307/443; 307/246; 307/451; 307/469; 307/585; 307/268; 307/591
[58] Field of Search 307/443, 448, 451, 468, 307/469, 246, 574–576, 579, 581, 584, 585, 267, 268, 591, 594, 601, 603, 605, 263

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,852,619	12/1974	Carbrey	307/268
3,872,321	3/1975	Matsue	307/448
3,944,848	3/1976	Heeren	307/448
4,130,766	12/1978	Patel et al.	307/578 X
4,346,310	8/1982	Carter	307/578 X
4,393,318	7/1983	Takahashi et al.	307/584 X
4,424,456	1/1984	Shiraki et al.	307/246 X
4,455,495	6/1984	Masuhara et al.	307/465 X

OTHER PUBLICATIONS

Kokkonen et al., "Redundancy Techniques for Fast Static RAMs"; ISSCC 81/Wednesday, Feb. 18, 1981, IEEE International Solid–State Conference, pp. 80–81.

Primary Examiner—Stanley D. Miller
Assistant Examiner—David R. Hudspeth
Attorney, Agent, or Firm—Finnegan, Henderson, Farabow, Garrett & Dunner

[57] **ABSTRACT**

A MOS type semiconductor integrated circuit comprising a C-MOS inverter including P- and N-channel MOS transistors connected in series between V_{DD} and V_{SS} power supply terminals, the gates of the MOS transistors being supplied with an input signal; a variable capacitor connected between a node at which the transistors are interconnected and a reference voltage; and a voltage generator for producing an output voltage to the variable capacitor, the voltage generator being capable of irreversibly changing the level of the output voltage, thereby changing a capacitance of the variable capacitor.
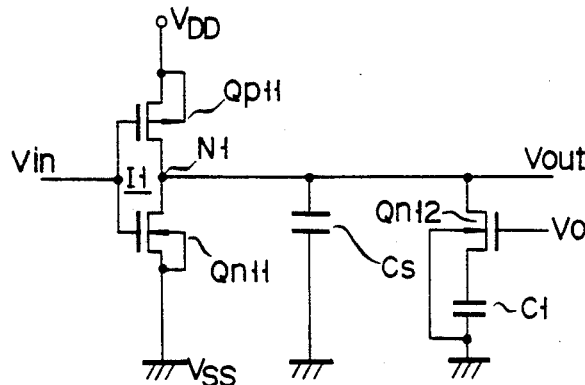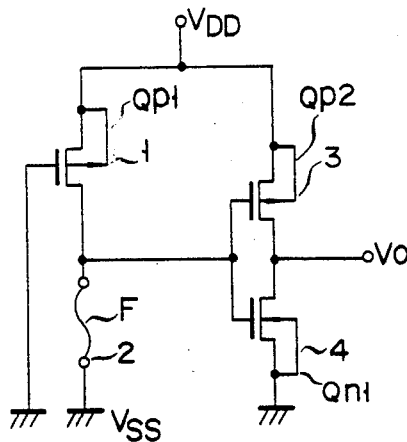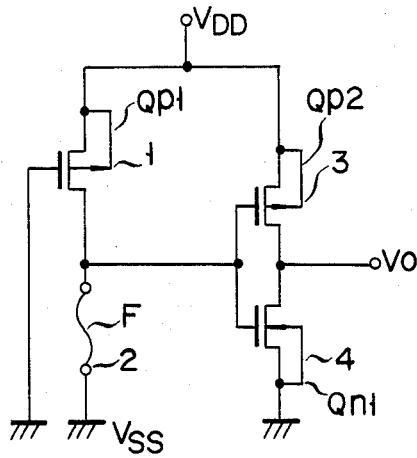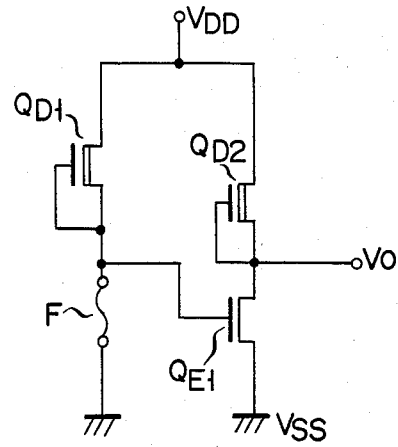
23 Claims, 89 Drawing Figures

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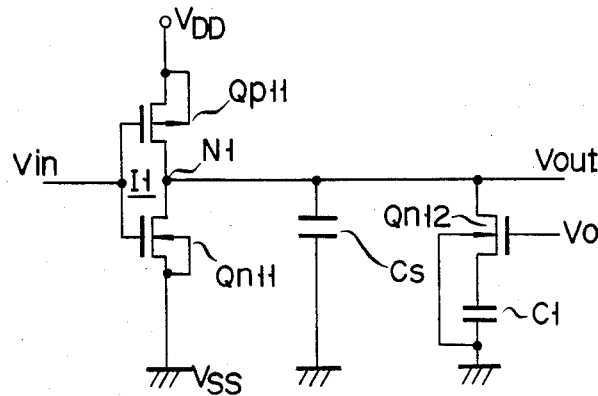
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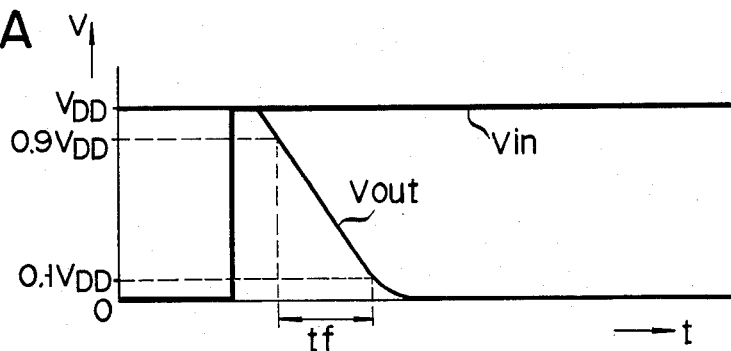
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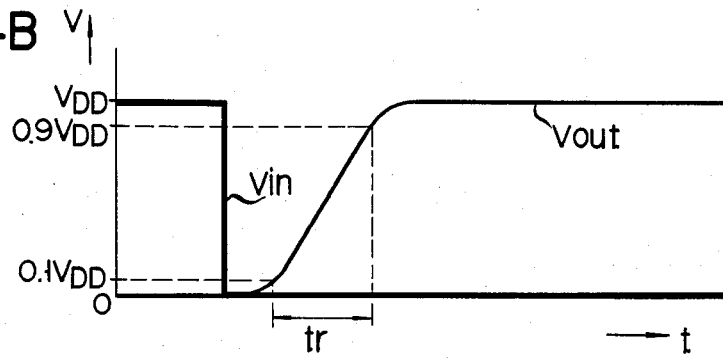
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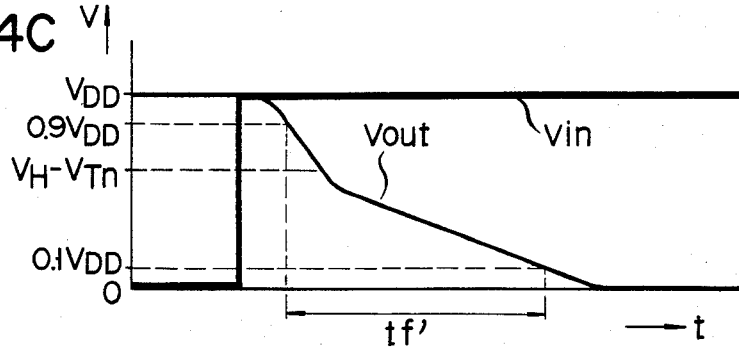
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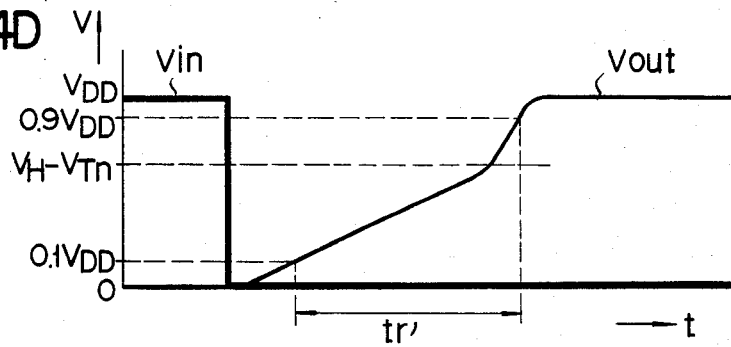
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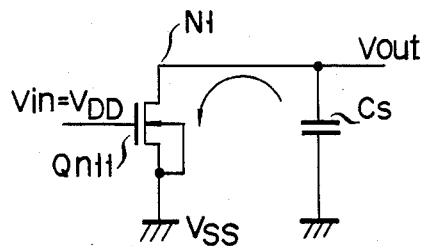
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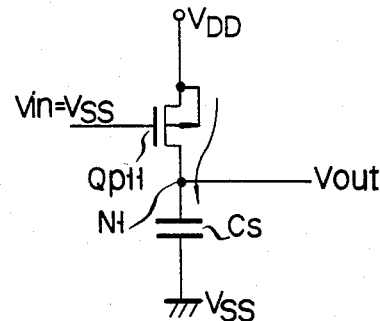
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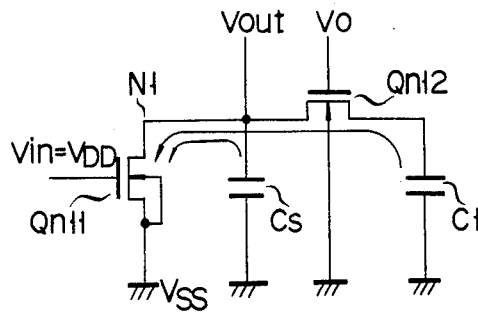
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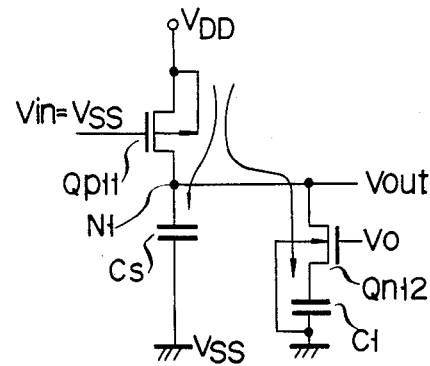
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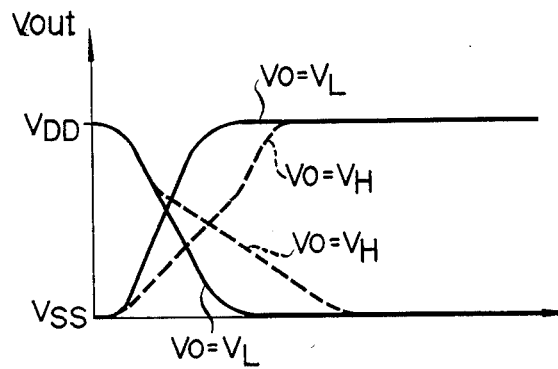
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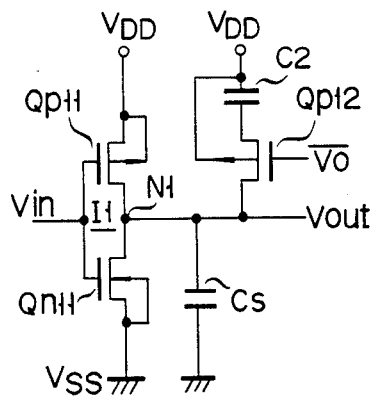
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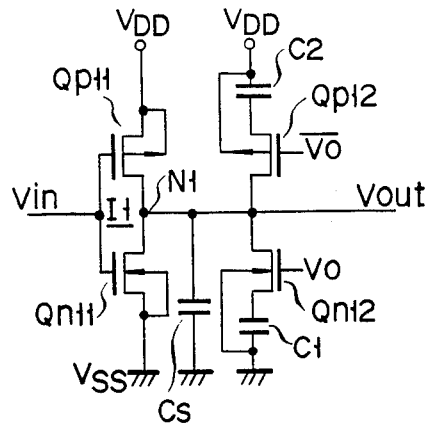
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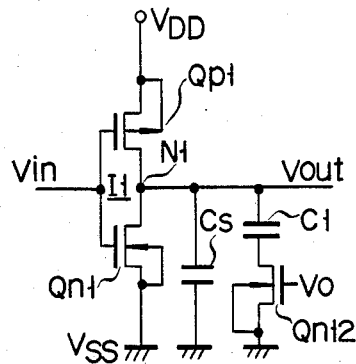
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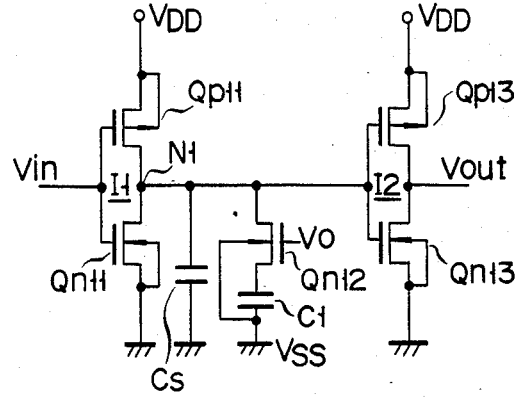
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F I G. 11B

F I G. 12

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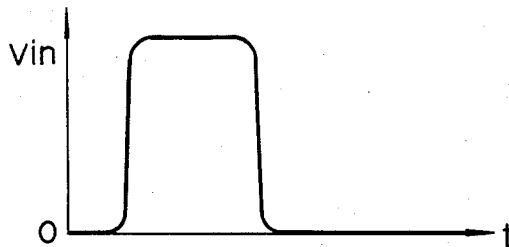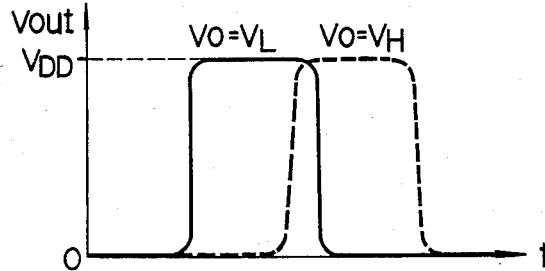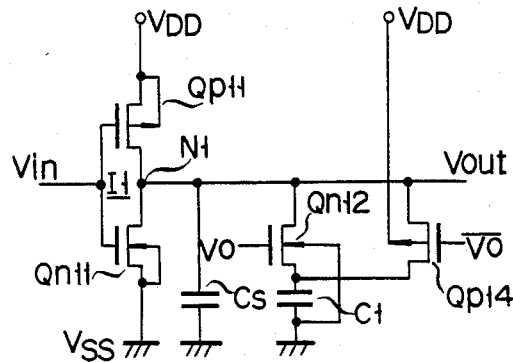
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