



US006119250A

United States Patent [19]

[11] Patent Number: **6,119,250**

Nishimura et al.

[45] Date of Patent: **Sep. 12, 2000**

[54] SEMICONDUCTOR INTEGRATED CIRCUIT

07038417 2/1995 Japan .
7-38417 2/1995 Japan .

[75] Inventors: **Kazuko Nishimura**, Kyoto; **Hironori Akamatsu**, Osaka; **Akira Matsuzawa**, Kyoto; **Mitsuyasu Ohta**, Osaka, all of Japan

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[73] Assignee: **Matsushita Electric Industrial Co., Ltd.**, Osaka, Japan

C.Q. Tong, et al., "IDDQ Testing in Low Power Supply CMOS Circuits", Proc. of IEEE 1996 Custom Integrated Circuits Conference, pp. 467-470, 1996.

[21] Appl. No.: **09/083,389**

T. Kuroda, "A High-Speed Low Power 0.3 μm CMOS Gate Array with Variable Threshold Voltage (VT) Scheme", Proc. of IEEE 1996 Custom Integrated Circuits Conference, pp. 53-56, 1996.

[22] Filed: **May 22, 1998**

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Related U.S. Application Data

[63] Continuation of application No. 08/888,920, Jul. 7, 1997, Pat. No. 5,978,948.

Primary Examiner—Hoa T. Nguyen
Attorney, Agent, or Firm—McDermott, Will & Emery

Foreign Application Priority Data

May 7, 1996 [JP] Japan 8-175304
May 23, 1997 [JP] Japan 9-133369

[57] ABSTRACT

[51] **Int. Cl.**⁷ **G11C 29/00**
[52] **U.S. Cl.** **714/718; 365/201**
[58] **Field of Search** 714/718, 724,
714/736, 733, 735; 365/201

A test-target circuit is constructed of circuit blocks each comprising low-V_{th} MOS transistors including address buffers and a timing generator. A test enable signal for indication of a test, an operation selection signal for indication of an operation, and a block selection signal used to select a desired circuit block are provided. A high-V_{th} NMOS and a high-V_{th} PMOS transistor are provided in order to provide to a test circuit one of detected currents of the circuit blocks that was selected by placing a block selection signal and the test enable signal in the state of HIGH.

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11 Claims, 19 Drawing Sheets

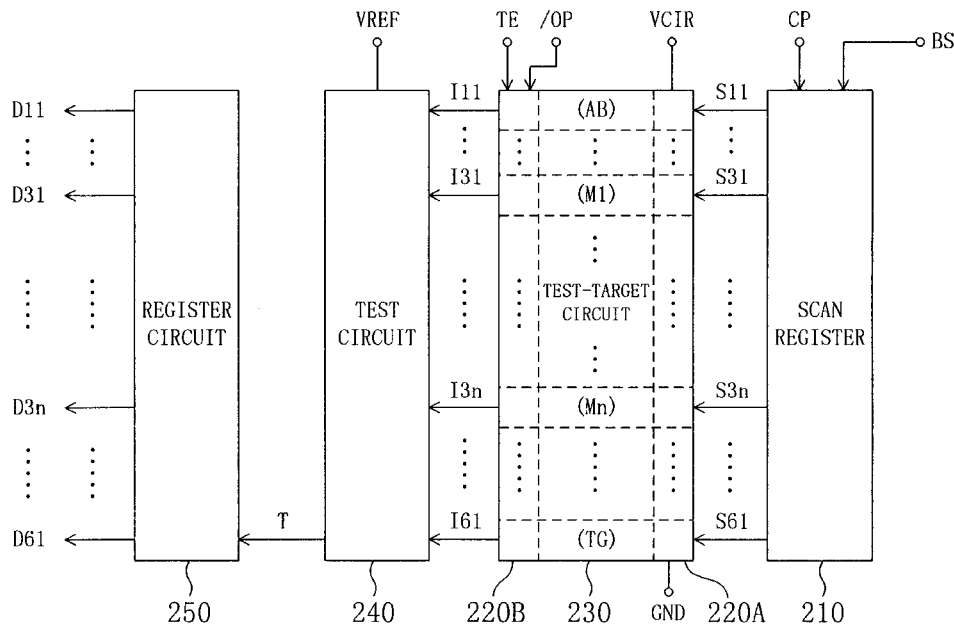


Fig. 1
PRIOR ART

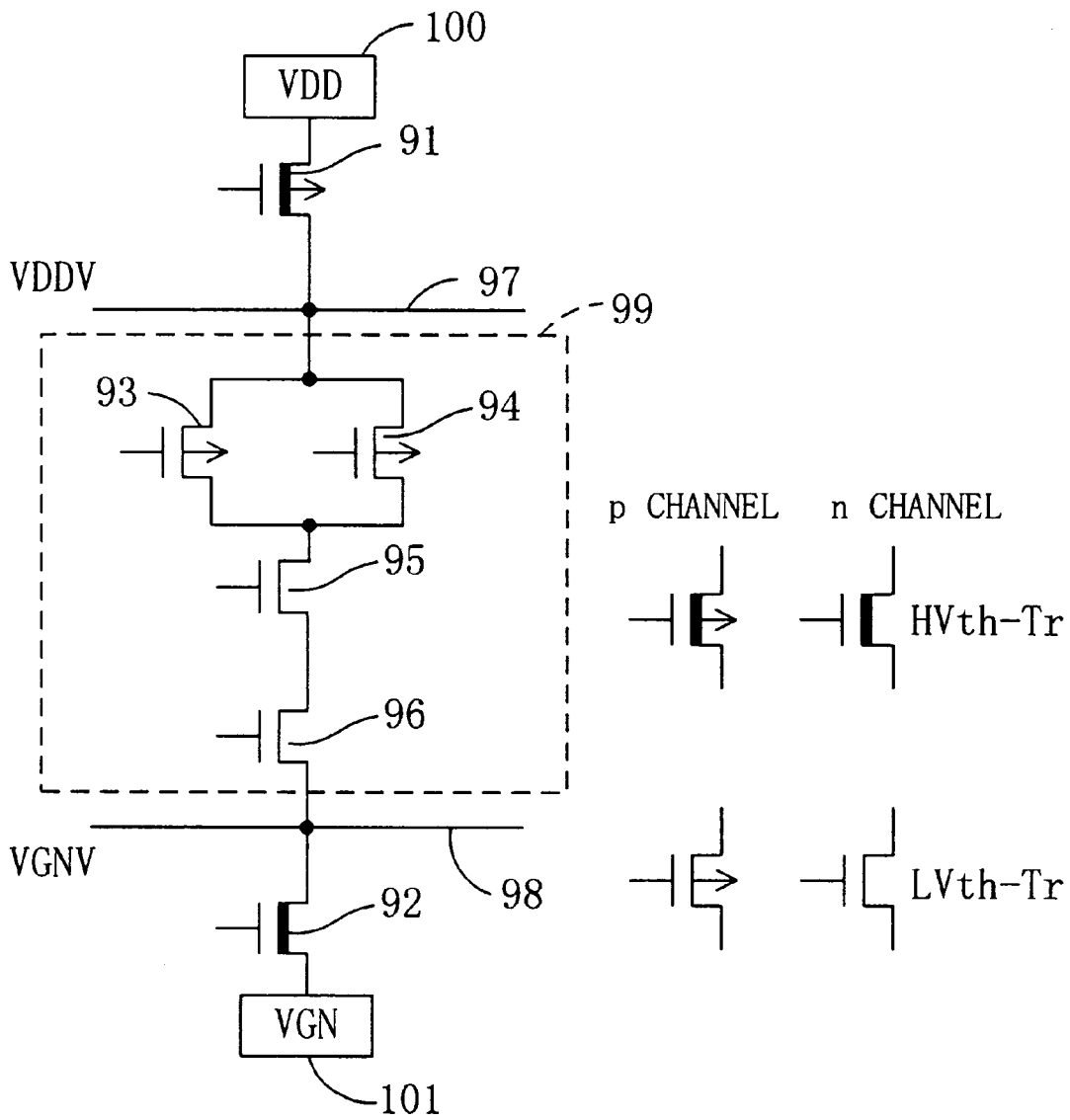


Fig. 2

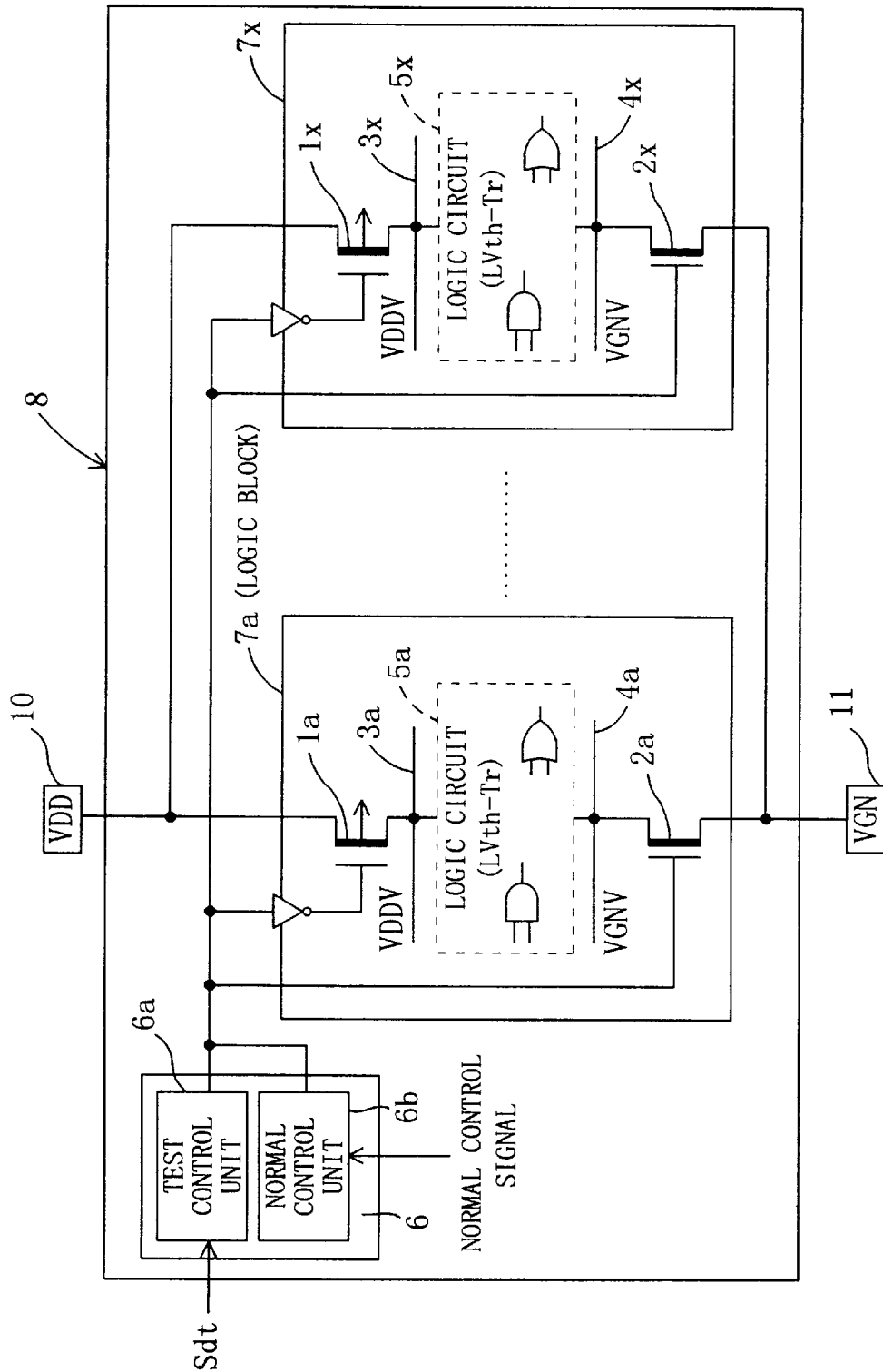


Fig. 3

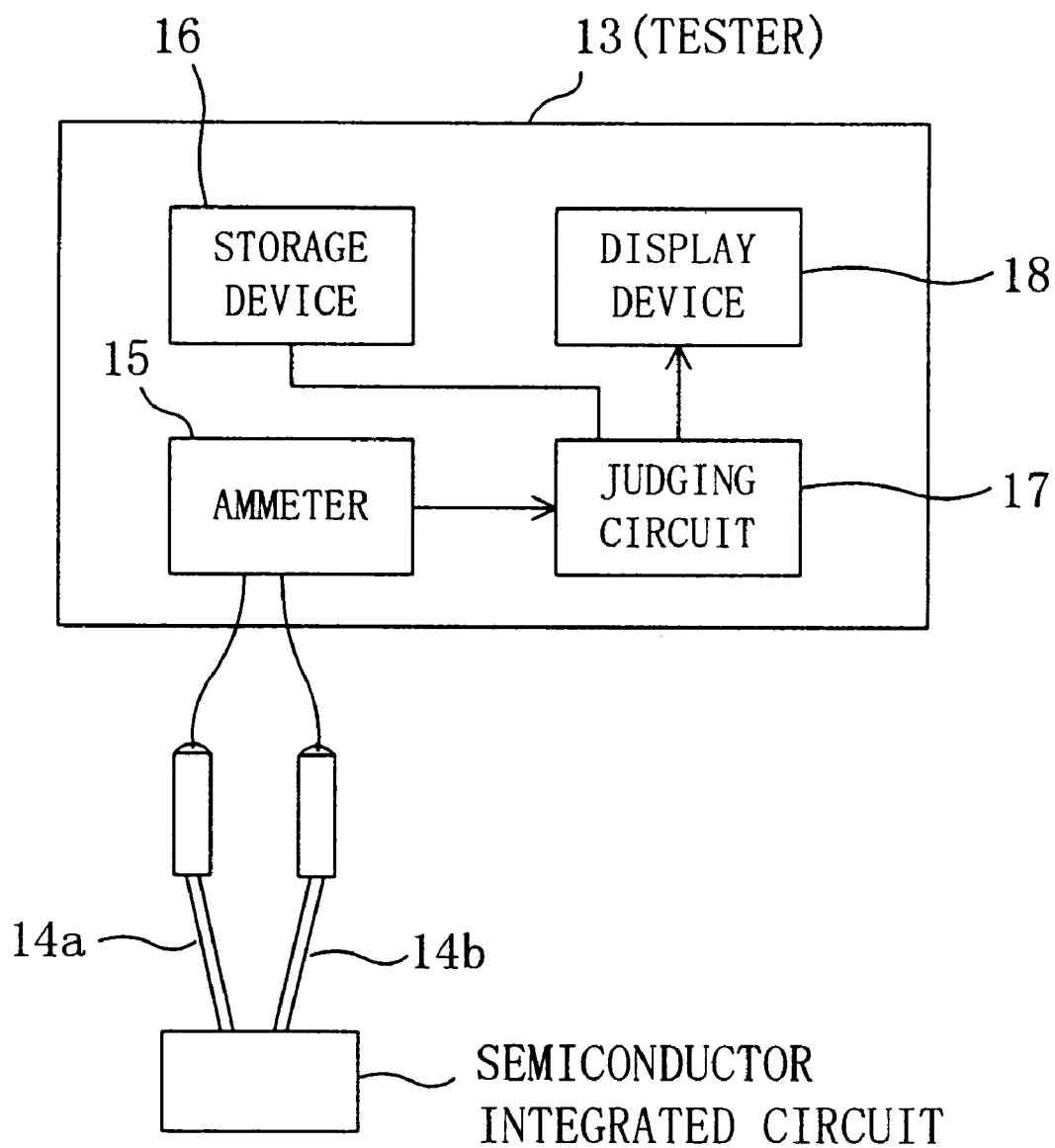
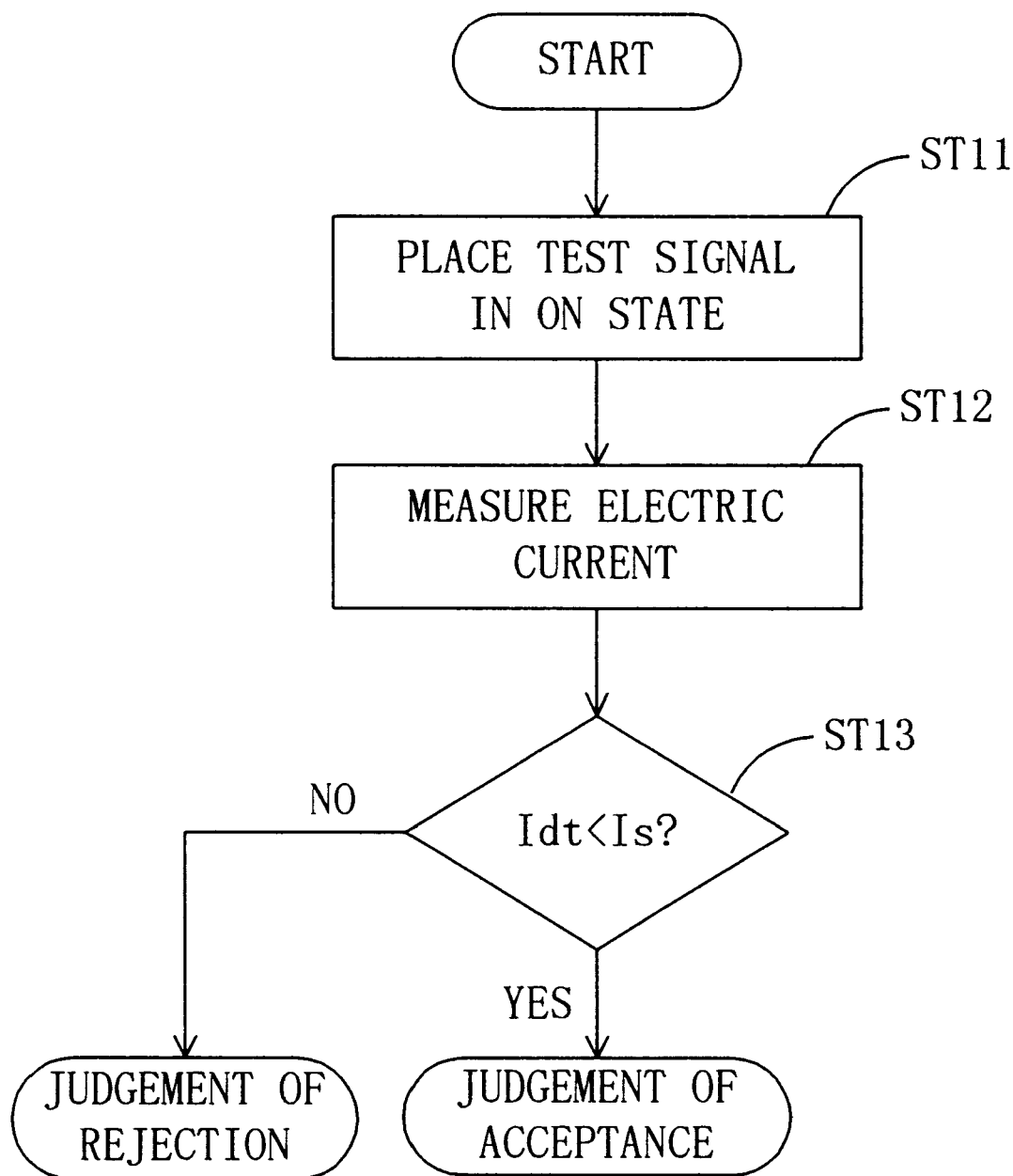


Fig. 4



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