



US006459331B1

(12) **United States Patent**
Takeuchi et al.

(10) **Patent No.: US 6,459,331 B1**
(45) **Date of Patent: Oct. 1, 2002**

(54) **NOISE SUPPRESSION CIRCUIT, ASIC, NAVIGATION APPARATUS, COMMUNICATION CIRCUIT, AND COMMUNICATION APPARATUS HAVING THE SAME**

6,191,647 B1 * 2/2001 Tanaka et al. 327/551

FOREIGN PATENT DOCUMENTS

JP 59-212027 11/1984
JP 360217724 A * 10/1985

OTHER PUBLICATIONS

Takashima et al., Noise Suppression Scheme for Giga-Scale DRAM with Hundreds of I/Os, (1996), pp 43-49.

* cited by examiner

(75) Inventors: **Hideki Takeuchi**, Tokyo (JP); **Masami Murakata**, Tokyo (JP); **Masaaki Yamada**, Tokyo (JP); **Reiko Nojima**, Tokyo (JP); **Takashi Ishioka**, Tokyo (JP); **Mutsunori Igarashi**, Tokyo (JP)

(73) Assignee: **Kabushiki Kaisha Toshiba**, Kawasaki (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

Primary Examiner—Dinh T. Le
(74) *Attorney, Agent, or Firm*—Foley & Lardner

(57) **ABSTRACT**

A noise suppression circuit encompasses an internal circuit, a bypass capacitor, first and second transistors. The internal circuit has high and low level terminals, and the low level terminal is connected to a low level power supply line. The internal circuit is supplied with enable and inverted enable signals. The first transistor has a first control electrode, and one main electrode is connected to the high level terminal. The first control electrode is supplied with the inverted enable signal. The bypass capacitor is connected between the other main electrode of the first transistor and the low level power supply line. The second transistor is connected between the other main electrode of the first transistor and a high level power supply line. The second transistor has a second control electrode supplied with the enable signal. The second transistor is not conductive when the internal circuit is active.

(21) Appl. No.: **09/146,035**

(22) Filed: **Sep. 2, 1998**

(30) **Foreign Application Priority Data**

Sep. 2, 1997 (JP) 9-237303
Sep. 11, 1997 (JP) 9-247202
Mar. 26, 1998 (JP) 10-079156

(51) **Int. Cl.⁷ H03K 5/00**

(52) **U.S. Cl. 327/554; 327/311; 327/558; 327/551**

(58) **Field of Search 327/552, 551, 327/553, 554, 555, 556, 557, 558, 311; 333/172, 173; 257/401, 202**

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,367,187 A * 11/1994 Yuen 257/401

5 Claims, 40 Drawing Sheets

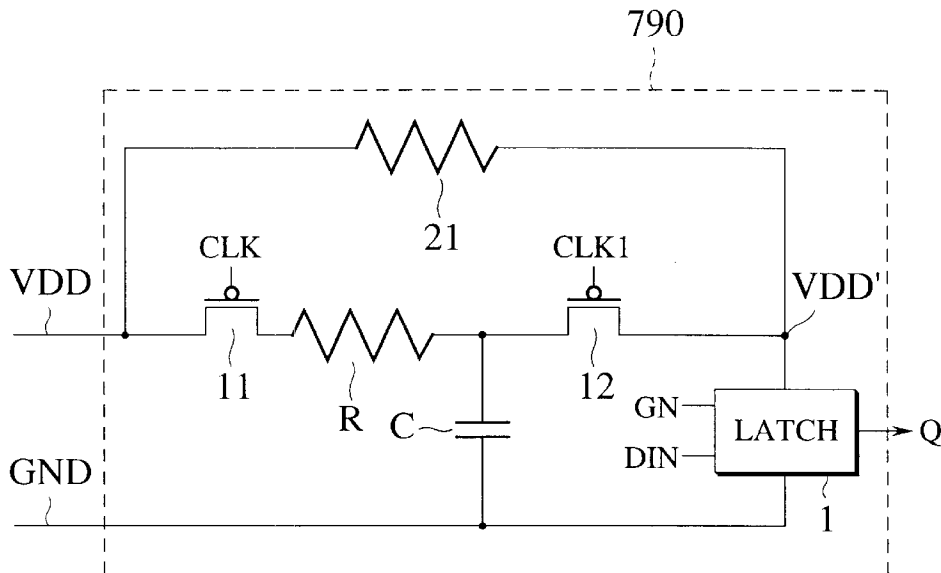
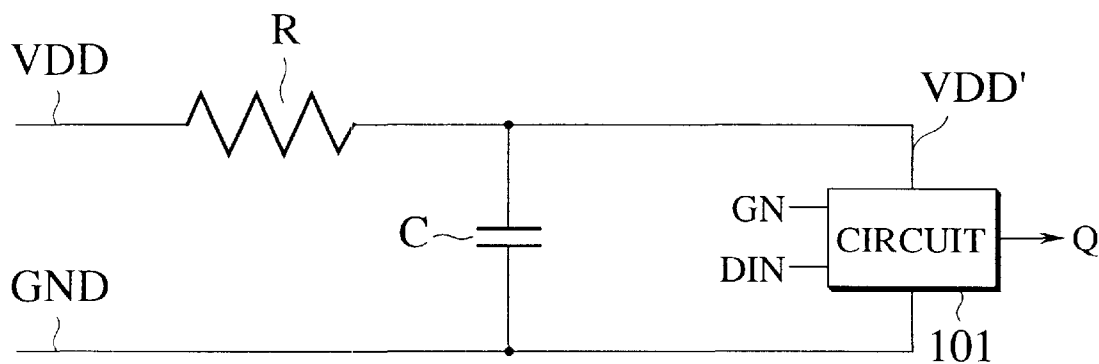


FIG. 1
PRIOR ART



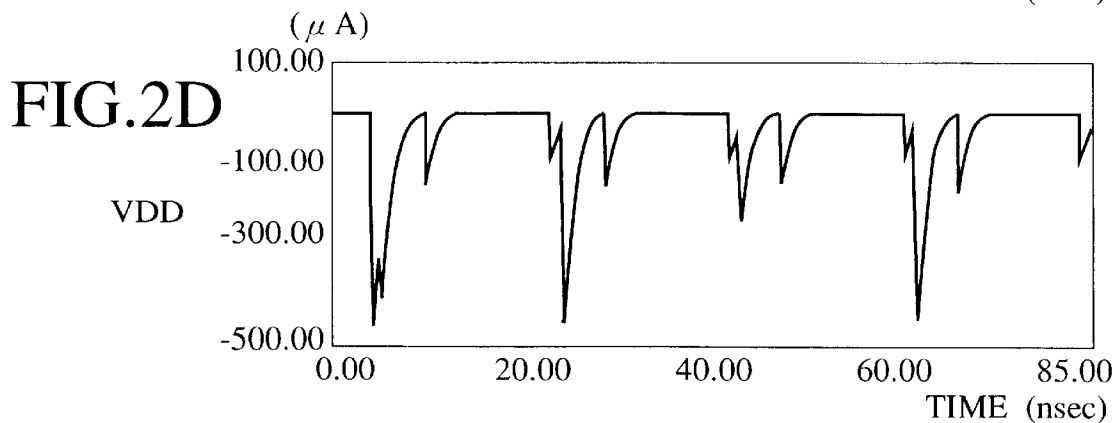
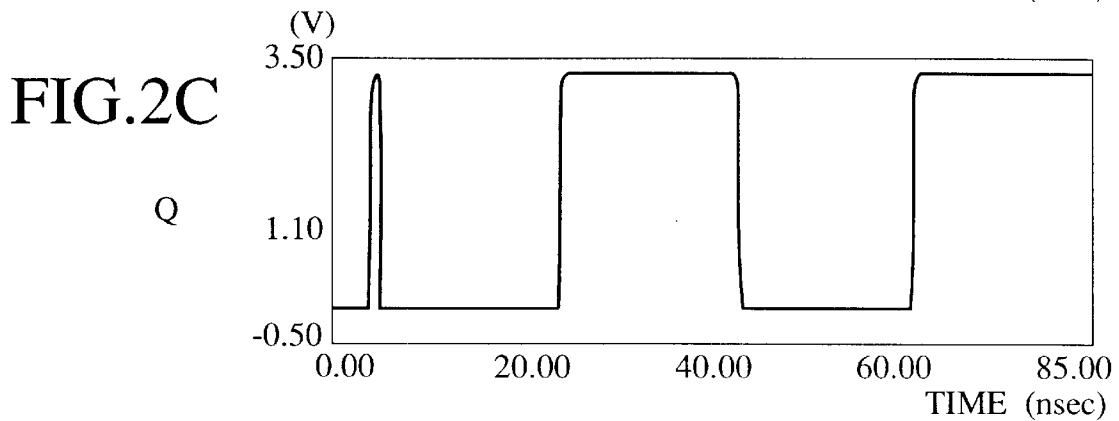
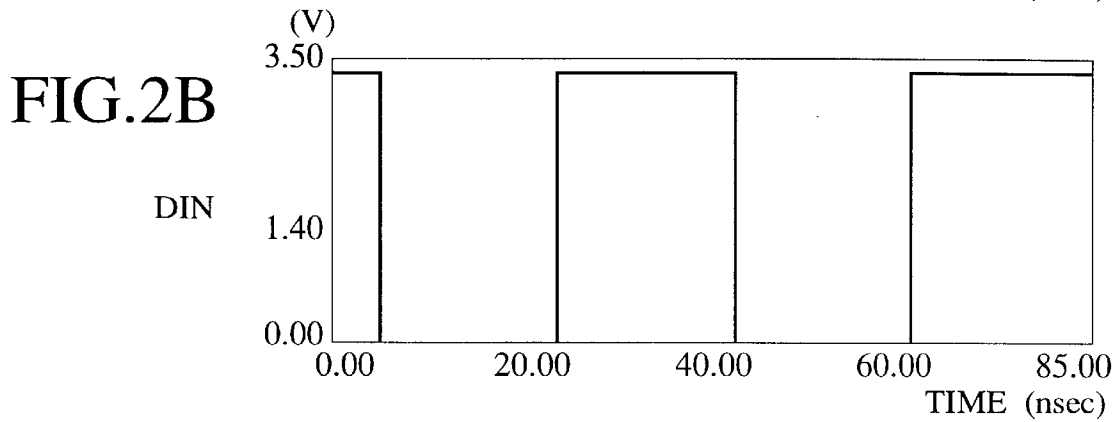
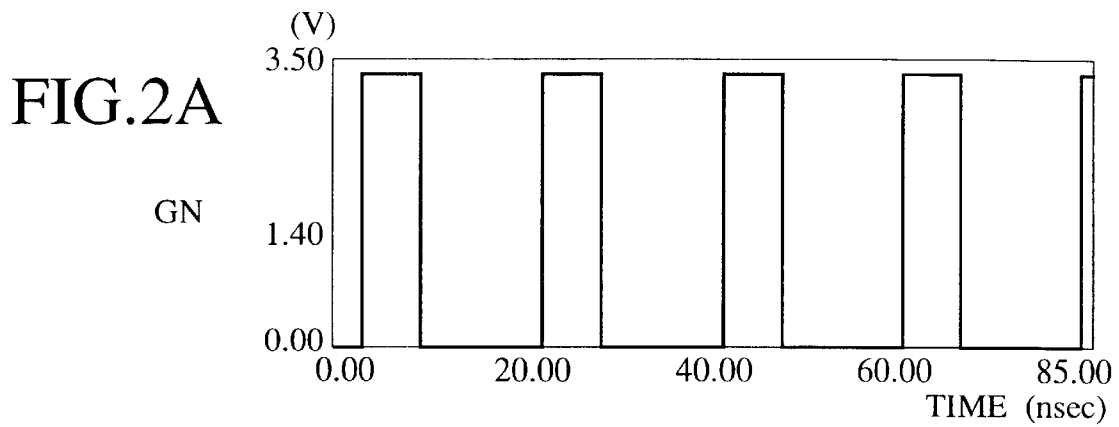


FIG.3

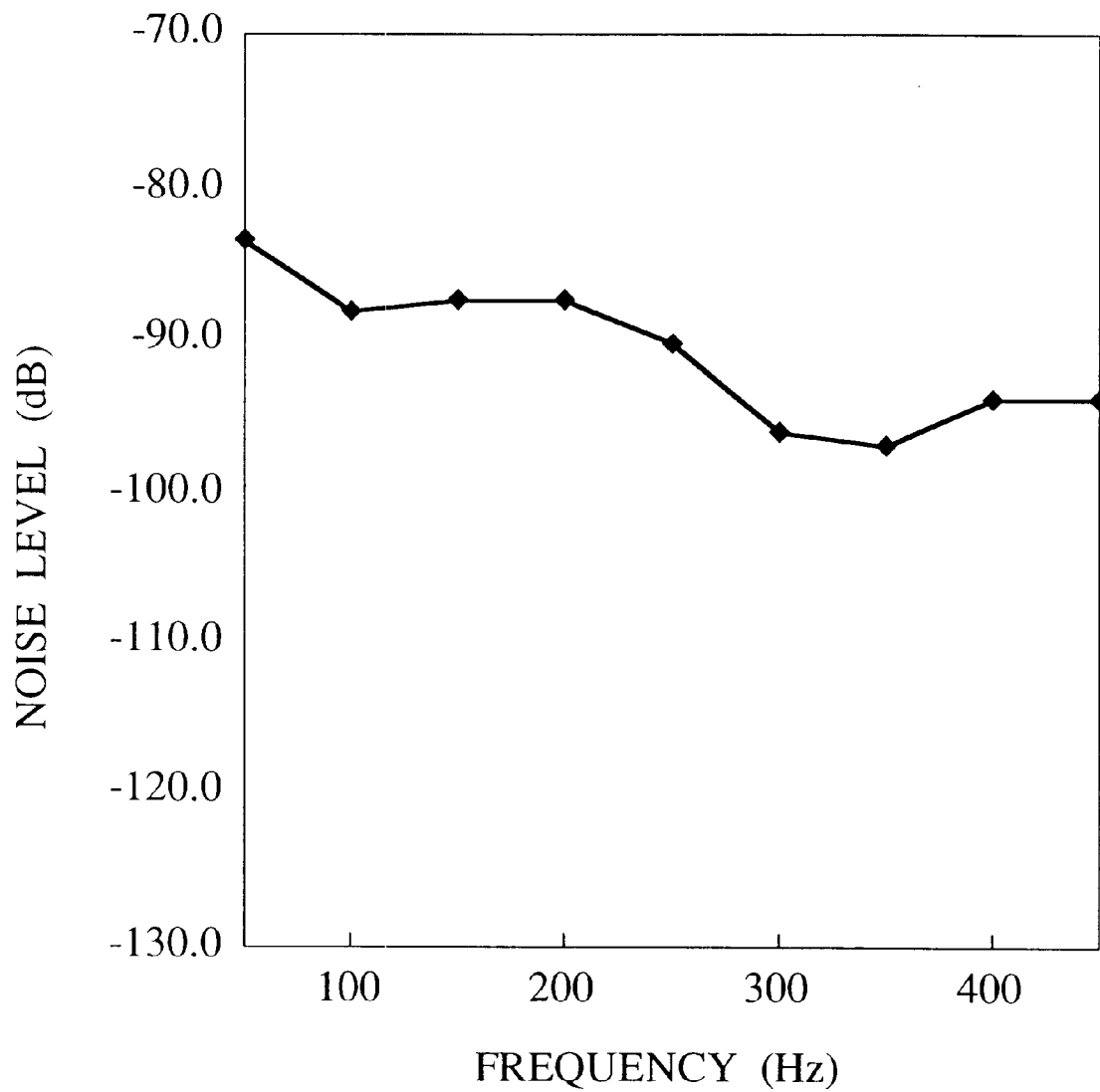


FIG.4A
PRIOR ART

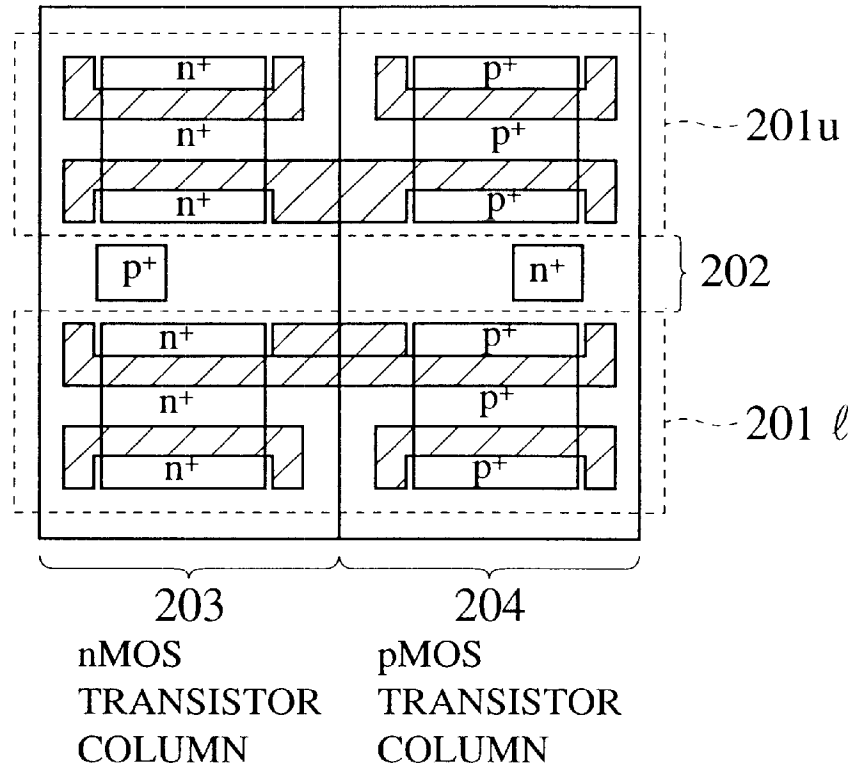
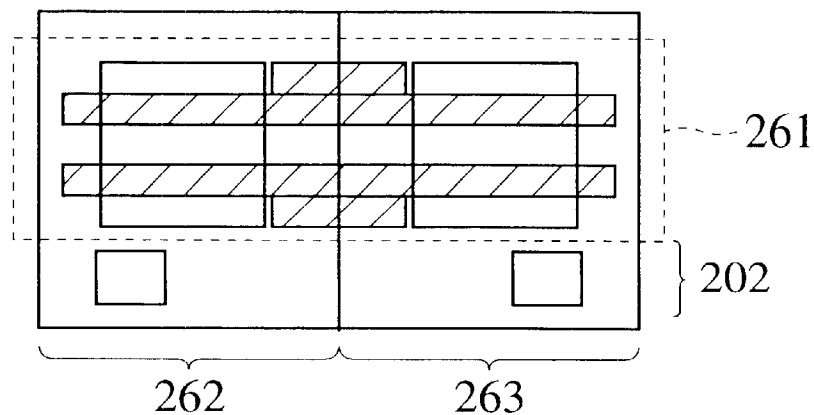


FIG.4B
PRIOR ART



Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.