Trials@uspto.gov
571-272-7822

Paper 7
Entered: November 30, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
Petitioner,

v.

PROMOS TECHNOLOGIES, INC.,
Patent Owner.

Case IPR2017-01416
Patent 6,172,554 B1

Before JAMESON LEE, KEVIN F. TURNER, and JOHN A. HUDALLA, *Administrative Patent Judges.*

TURNER, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
35 U.S.C. § 314(a) and 37 C.F.R. § 42.108

I. INTRODUCTION

Samsung Electronics Co., Ltd. ("Petitioner") filed a Petition for *inter partes* review of claims 1–3, 14–16, 22, and 28–36 of U.S. Patent No. 6,172,554 B1 (Ex. 1001, "the '554 Patent"). Paper 1 ("Pet."). ProMOS Technologies Inc. ("Patent Owner") did not file a Preliminary Response. Institution of an *inter partes* review is authorized by statute when "the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a); *see* 37 C.F.R. § 42.108 (regarding institution of *inter partes* review); 37 C.F.R § 42.4(a) (delegating authority to institute trial to the Board). Upon consideration of the Petition, we conclude that the information presented shows that there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one of the challenged claims of the '554 Patent.

A. Related Matters

The parties inform us that the challenged patent is the subject of a district court proceeding in the District of Delaware, captioned *ProMOS Technologies, Inc. v. Samsung Electronics Co., Ltd.*, No. 1:16-cv-00335-SLR (D. Del.). Pet. 1, Paper 4. In that action, Patent Owner has asserted other patents against Petitioner, and Petitioner has filed *inter partes* review petitions against those other patents in IPR2017-01412, IPR2017-01413, IPR2017-01414, IPR2017-01415, IPR2017-01417, IPR2017-01418, and IPR2017-01419. *Id.*

Petitioner also identifies these *inter partes* review proceedings, initiated by petitions filed by Petitioner, as involving additional patents

asserted by Patent Owner against Petitioner in *ProMOS Technologies, Inc. v. Samsung Electronics Co., Ltd.*, No. 1:15-cv-00898-SLR-SRF (D. Del.): IPR2017-00032; IPR2017-00033; IPR2017-00035; IPR2017-00036; IPR2017-00037; IPR2017-00038; IPR2017-00039; and IPR2017-00040. Pet. 1–2.

B. The '554 Patent

The '554 Patent is titled "Power Supply Insensitive Substrate Bias Voltage Detector Circuit." Ex. 1001, [54]. The patent issued on January 9, 2001 from an application filed on September 24, 1998. *Id.* at [45], [22]. The patent is directed to "a circuit provid[ing] a bias voltage V1 which is substantially insensitive to variations of a power supply voltage powering the circuit." *Id.* at Abstract, 1:6.

1. The Written Description

The '554 Patent discloses that voltage generating circuits known as back-bias generators may be used in semiconductor devices which require the substrate region to be biased to a predetermined voltage, such as in dynamic random access memories (DRAM), where the substrate region is negatively biased to prevent the DRAM cells from losing stored information. Ex. 1001, 1:8–15. Such a back-bias generator includes a voltage multiplier circuit, commonly referred to as charge pump, for providing the negative Back-Bias Voltage (V_{BB}), and usually includes a V_{BB} detector circuit, which regulates the charge pump such that V_{BB} is maintained as close to a target V_{BB} value as possible. *Id*. at 1:15–21. The detector circuit constantly senses the V_{BB} voltage level, and if V_{BB} becomes more negative than the target V_{BB}, the detector circuit turns off the charge pump thereby allowing V_{BB} to drift back to the target V_{BB}; and if V_{BB} becomes less negative than the target V_{BB},

the detector circuit turns on the charge pump to pump V_{BB} back to the target V_{BB}. *Id*. at 1:22–28.

A conventional V_{BB} detector circuit 17 is illustrated in Figure 1, reproduced below, along with Figure 3A illustrating an alternative, conventional V_{BB} detector circuit 37.

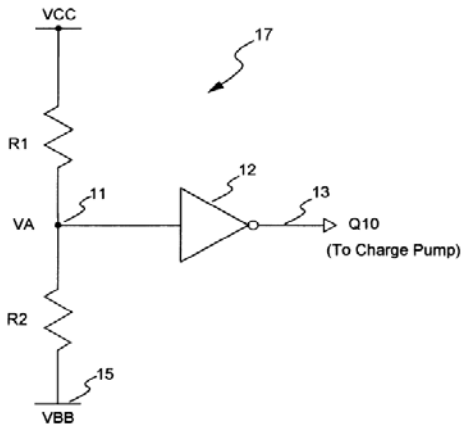

FIG. 1
(Prior Art)

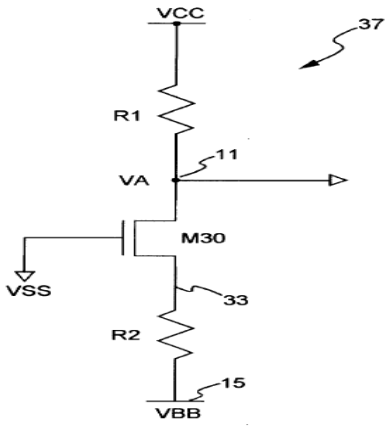

FIG. 3A
(Prior Art)

The conventional V_{BB} detector circuit 17, in Figure 1, has serially connected resistors R1 and R2 coupled between the power supply V_{CC} and V_{BB} terminal 15, where V_{CC} is provided by a power supply external to the device, and V_{BB} is generated internally by a charge pump, which is not shown. *Id*. at 1:29–33. Inverter 12 has its input terminal connected to node 11 which is the node between R1 and R2, and its output connected to the charge pump. *Id*. at 1:33–37.

Resistors R1 and R2 are selected so that the voltage V_A equals the trip point of inverter 12, such that if the charge pump causes V_{BB} to become more negative than the target value, V_A drops below the trip point of inverter 12, causing Q10 to go high. *Id*. at 1:43–49. The high level at Q10 turns off the charge pump, allowing V_{BB} to increase back to the target value. *Id*. Alternatively, if V_{BB} becomes less negative than the target V_{BB}, V_A rises

above the trip point of inverter 12, causing Q10 to go low, which turns on the charge pump causing V_{BB} to become more negative. *Id*. at 1:49–54.

Figure 3A also shows a prior art detector circuit 37 which prevents V_{BB} from becoming positive, with that being identical to circuit 17 of Figure 1 except that NMOS transistor M30 is connected between node 11 and R2, where that transistor causes the charge pump to turn on and pump V_{BB} to a more negative voltage. *Id*. at 2:29–37.

The ’554 Patent details that the conventional circuits have drawbacks, including that V_{BB} varies with changes to V_{CC}, such that higher voltages can result in increases in junction leakage. *Id*. at 1:55–67. As well, the conventional circuits may not prevent V_{BB} from becoming positive, which can damage the device. *Id*. at 2:23–28. Because of these drawbacks, the ’554 Patent discloses embodiments of V_{BB} detector circuits wherein V_{BB} is made insensitive to V_{CC} variations, and also wherein the range of possible V_{BB} values is increased without compromising power consumption. *Id*. at 2:56–59. Figures 4A and 5A are reproduced below:

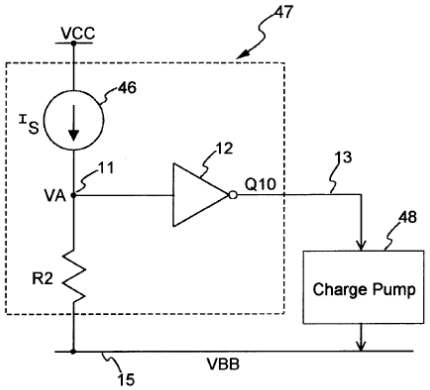

FIG. 4A

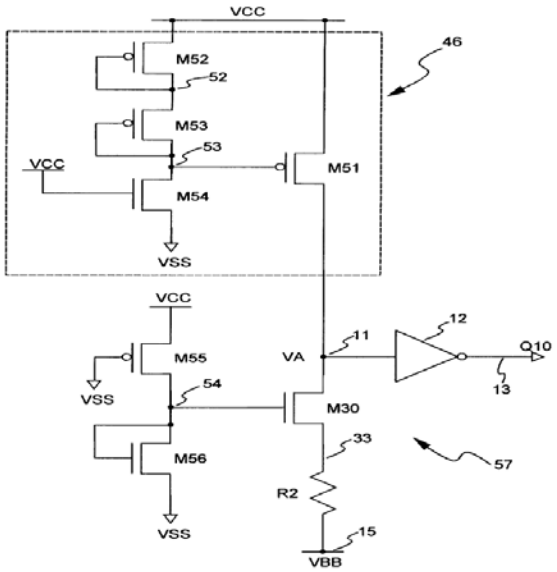

FIG. 5A

DOCKET ALARM

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.