

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.,
Petitioner,

v.

GODO KAISHA IP BRIDGE 1,
Patent Owner.

Case IPR2016-01379
Patent 6,197,696 B1

Before JUSTIN T. ARBES, MICHAEL J. FITZPATRICK, and
JENNIFER MEYER CHAGNON, *Administrative Patent Judges*.

CHAGNON, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Taiwan Semiconductor Manufacturing Company, Ltd. (“Petitioner”) filed a Petition for *inter partes* review of claims 10 and 12 (“the challenged claims”) of U.S. Patent No. 6,197,696 B1 (Ex. 1001, “the ’696 patent”). Paper 2 (“Pet.”). Godo Kaisha IP Bridge 1 (“Patent Owner”) filed a Preliminary Response to the Petition. Paper 6 (“Prelim. Resp.”). Pursuant to our authorization (Paper 7), Petitioner filed a Reply (Paper 9, “Reply”) and Patent Owner filed a Sur-Reply (Paper 10, “Sur-Reply”), directed to the issue of the parties’ respective burdens of production if disputes arise prior to institution as to whether a challenged claim or cited prior art is entitled to the benefit of an earlier priority date.

We have authority to determine whether to institute *inter partes* review. *See* 35 U.S.C. § 314(b); 37 C.F.R. § 42.4(a). Upon consideration of the Petition, the Preliminary Response, Petitioner’s Reply, and Patent Owner’s Sur-Reply, and for the reasons explained below, we determine that the information presented shows a reasonable likelihood that Petitioner would prevail on at least one asserted ground with respect to all of the challenged claims. *See* 35 U.S.C. § 314(a). Accordingly, we institute trial as to claims 10 and 12 of the ’696 patent.

A. *Related Proceedings*

The parties indicate that the ’696 patent has been asserted in *Godo Kaisha IP Bridge 1 v. Broadcom Ltd.*, No. 2-16-cv-00134 (E.D. Tex. 2016). Paper 4, 2; Pet. 81. Petitioner has filed three additional petitions challenging claims of the ’696 patent—namely, in IPR2016-01376, IPR2016-01377, and IPR2016-01378. Pet. 80–81; Paper 4, 2–3.

B. The Applied References and Evidence

Petitioner relies on the following references.

Reference	Date	Exhibit
U.S. Patent No. 6,140,226 (“Grill”)	Oct. 31, 2000	Ex. 1005
U.S. Patent No. 5,592,024 (“Aoyama”)	Jan. 7, 1997	Ex. 1018
U.S. Patent No. 5,920,790 (“Wetzel”)	July 6, 1999	Ex. 1019

Petitioner further relies on the Declaration of Bruce W. Smith, Ph.D. (Ex. 1002, “Smith Declaration”).

C. The Asserted Grounds

Petitioner sets forth its challenges to claims 10 and 12 as follows. Pet. 36–79.

Reference(s)	Basis	Claim(s) Challenged
Grill and Wetzel	§ 103	10
Grill, Aoyama, and Wetzel	§ 103	10, 12

D. The ’696 Patent

The ’696 patent relates to a “method for forming an interconnection structure in a semiconductor integrated circuit.” Ex. 1001, 1:5–7. According to the ’696 patent, “[a]n object of the present invention is providing a method for forming an interconnection structure in which an insulating film with a low dielectric constant can be formed by an ordinary resist application process.” *Id.* at 3:2–5.

The ’696 patent describes various embodiments of methods of forming an interconnection structure. *Id.* at Abstract. The manufacturing process for a modified example of the fifth embodiment is depicted in Figures 24(a)–(c), 25(a)–(c), and 26(a)–(d). *Id.* at 24:52–27:60.

Figure 24(a) of the '696 patent is reproduced below.

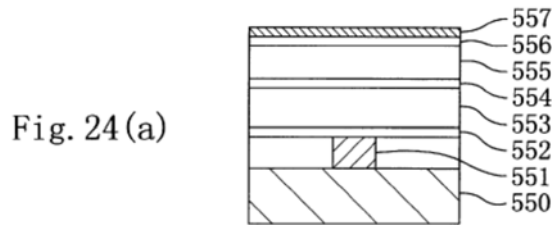


Figure 24(a), reproduced above, is a cross-sectional view of a partially-formed interconnection structure during a process step for forming the same. Ex. 1001, 9:28–31. As seen in Figure 24(a), silicon nitride film 552 is formed over first metal interconnects 551, which are formed on semiconductor substrate 550. *Id.* at 24:60–62. First organic film 553, first silicon dioxide film 554, second organic film 555, second silicon dioxide film 556, and titanium nitride film 557 are deposited sequentially. *Id.* at 24:65–25:11.

Figure 24(b) of the '696 patent, illustrating a subsequent step in the method of this embodiment, is reproduced below.

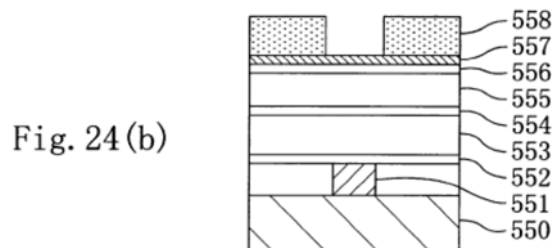


Figure 24(b), reproduced above, is a cross-sectional view of a partially-formed interconnection structure during a process step for forming the same. *Id.* at 9:28–31. In this step, first resist pattern 558 is formed on titanium nitride film 557. *Id.* at 25:19–21. First resist pattern 558 includes openings for forming wiring grooves of the interconnection structure. *Id.*

Figure 24(c) of the '696 patent, illustrating a subsequent step in the method of this embodiment, is reproduced below.

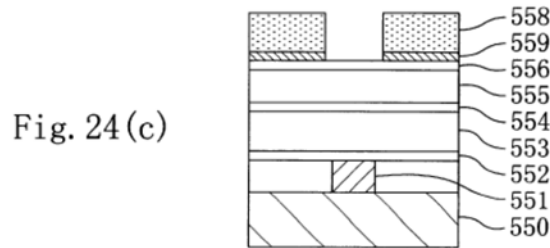


Figure 24(c), reproduced above, is a cross-sectional view of a partially-formed interconnection structure during a process step for forming the same. Ex. 1001, 9:28–31. In this step, titanium nitride film 557 is dry-etched using first resist pattern 558 as a mask, thereby forming mask pattern 559. *Id.* at 25:21–23.

Figure 25(a) of the '696 patent, illustrating a subsequent step in the method of this embodiment, is reproduced below.

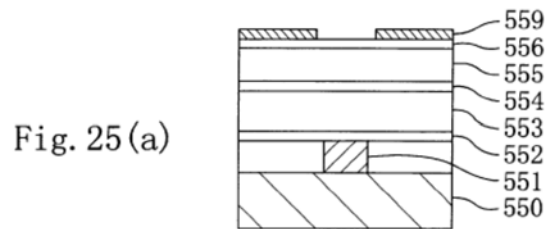


Figure 25(a), reproduced above, is a cross-sectional view of a partially-formed interconnection structure during a process step for forming the same. *Id.* at 9:32–35. In this step, first resist pattern 558 is removed. *Id.* at 25:26–27.

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