

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
SAMSUNG ELECTRONICS AMERICA, INC.,
AND SAMSUNG SEMICONDUCTOR, INC.,¹
Petitioner,

v.

TESSERA ADVANCED TECHNOLOGIES, INC.,
Patent Owner.

Case IPR2018-00798
Patent 6,954,001 B2

Before BARBARA A. PARVIS, ROBERT J. WEINSCHENK, and
SCOTT B. HOWARD, *Administrative Patent Judges*.

HOWARD, *Administrative Patent Judge*.

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

¹ The Notice of Filing Date Accorded inadvertently omitted “Samsung” from “Samsung Semiconductor, Inc.” in the caption. *See* Paper 5, 1. The parties are encouraged to use the heading on the first page of this Decision, and not the first page of the Notice of Filing Date Accorded (Paper 5), for all future filings in the proceeding.

I. INTRODUCTION

Samsung Electronics Co., Ltd, Samsung Electronics America, Inc., and Samsung Semiconductor, Inc. (collectively “Petitioner”) filed a Petition to institute an *inter partes* review of claims 1–18 of U.S. Patent No. 6,954,001 B2 (Ex. 1001, “the ’001 patent”) pursuant to 35 U.S.C. §§ 311–319. Paper 1 (“Pet.”). Tessera Advanced Technologies, Inc. (“Patent Owner”) did not file a Patent Owner Preliminary Response.

We have authority, acting on the designation of the Director, to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). *Inter partes* review may be not instituted unless “the information presented in the petition filed under section 311 and any response filed under section 313 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). On April 24, 2018, the Supreme Court held that a decision to institute under 35 U.S.C. § 314 may not institute on less than all claims challenged in the petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018). For the reasons set forth below, upon considering the Petition and evidence of record, we determine that the information presented in the Petition establishes a reasonable likelihood that Petitioner will prevail with respect to at least one of the challenged claims. Accordingly, we institute *inter partes* review on all of the challenged claims based on the all of the grounds identified in the Petition.

Our findings of fact and conclusions of law discussed below are based on the evidentiary record developed thus far and made for the sole purpose of determining whether the Petition meets the threshold for initiating review. This decision to institute trial is not a final decision as to the patentability of

any challenged claim or the construction of any claim limitation. Any final decision will be based on the full record developed during trial.

A. *Real Party-In-Interest*

Petitioner identifies itself—Samsung Electronics Co., Ltd, Samsung Electronics America, Inc., and Samsung Semiconductor, Inc.—as the real parties-in-interest. Pet. 2.

B. *Related Proceedings*

The parties identify the following current patent litigation proceedings in which the '001 patent is asserted: (1) the Matter of *Certain Wafer-Level Packaging Semiconductor Devices And Products Containing Same (Including Cellular Phones, Tablets, Laptops, And Notebooks) And Components Thereof*, Inv. No. 337-TA-1080 (USITC); and (2) *Tessera Advanced Techs., Inc. v. Samsung Elecs. Am., Inc.*, Civ. No. 2:17-cv-07621 (D.N.J.). *Id.* at 2–3; Paper 7, 2. In addition, Petitioner identifies the following completed patent litigation proceeding in which the '001 patent was asserted: *Tessera, Inc. v. Broadcom Corp.*, Div. No. 1:16-cv-00380 (D. Del.). Pet. 2–3.

Additionally, the parties identify two pending *inter partes* review proceedings: (1) *Samsung Elecs. Co. v. Tessera Advanced Techs., Inc.*, Case IPR2018-00799 (involving the '001 patent); and (2) *Samsung Elecs. Co. v. Tessera Advanced Techs., Inc.*, Case IPR2018-00466 (involving a related patent, U.S. Patent No. 6,784,557). Pet. 3; Paper 7, 2. Petitioner also identifies *Broadcom Corp. v. Tessera Advanced Techs., Inc.*, Case IPR2017-01486, which was terminated pursuant to a settlement agreement after trial was instituted. *See* Pet. 3; *see also* *Broadcom Corp. v. Tessera Advanced*

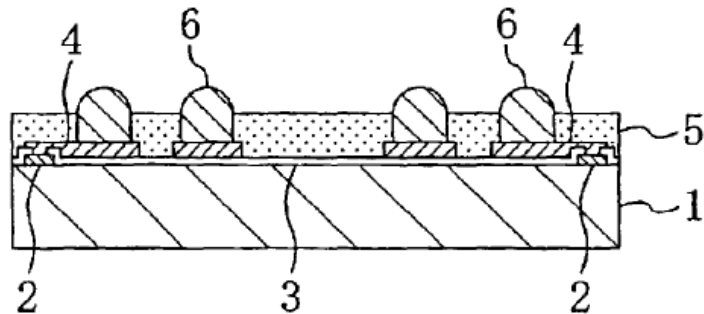
Techs., Inc., Case IPR2017-01486, slip op. at 2 (PTAB Jan. 2, 2018) (Paper 13).

C. *The '001 Patent*

The '001 patent, titled “Semiconductor Device Including a Diffusion Layer,” states that an object of the invention is to provide a semiconductor device “having improved junction reliability between the metal wiring and a ball electrode mounted on an external electrode portion of the metal wiring.” Ex. 1001, [54], 2:35–41.

Figure 15, reproduced below, illustrates a cross section of a conventional semiconductor device.

FIG. 15B
Prior Art



As shown in Figure 15 above and as described in the '001 patent, in a conventional semiconductor device, “the wiring electrodes of the substrate on which the semiconductor device is mounted are respectively connected to metal wirings 4 of [copper (Cu)] formed on the surface of semiconductor element 1 through ball electrodes 6 formed from the solder.” *Id.* at 2:4–9. According to the '001 patent, “tin (Sn) contained in solder of the ball electrode 6 diffuses into [copper (Cu)] of the metal wiring 4 to form a Sn–Cu alloy layer.” *Id.* at 2:15–18. The '001 patent states that, “[a]s a result, in the portion of the metal wiring 4 on which the ball electrode 6 is mounted (i.e., the external electrode portion) and the portion near the external

electrode portion, the Sn–Cu alloy grows in the most part of the metal wiring.” *Id.* at 2:18–22. The ’001 patent states that “[t]he Sn–Cu alloy is weak and hard” and “is likely to be broken by the stresses” generated due to differences in the thermal expansion coefficients of the semiconductor element, the resin film (if included), and the substrate. *Id.* at 2:1–3, 2:22–31.

Figure 2 of the ’001 patent is reproduced below.

FIG. 2

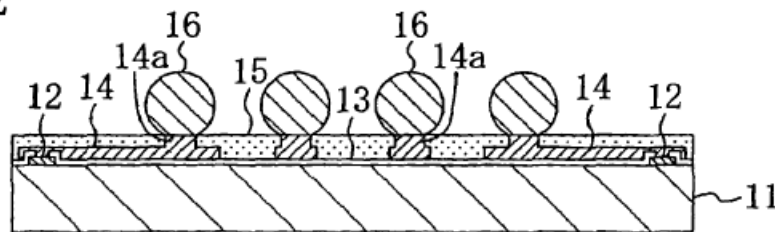


Figure 2 illustrates a cross-sectional view of “the semiconductor device of the first embodiment.” *Id.* at 8:11–12. As illustrated in Figure 2 above, electrodes 12 are formed on the surface of semiconductor element 11. *Id.* at 8:10–11. A passivation film 13, also formed over the surface of semiconductor element 11, has an opening on each electrode 12. *Id.* at 8:13–17. According to the ’001 patent, metal wirings 14 containing copper are formed on passivation film 13, and “[e]ach metal wiring 14 is electrically connected to a corresponding one of the electrodes 12.” *Id.* at 8:18–21. The ’001 patent discloses that insulating film 15 is formed on metal wirings 14 and passivation film 13 and “has openings in order to expose a portion of each metal wiring 14 which functions as an external electrode (hereinafter, referred to as ‘external electrode portion 14a’).” *Id.* at 8:21–26. According to the ’001 patent, “ball electrodes 16, which are formed from solder, are connected in a molten state to the openings of the insulating film 15, that is,

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