IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

HARBOR ISLAND DYNAMIC, LLC, *Plaintiff*, v. SAMSUNG ELECTRONICS CO., LTD, AND SAMSUNG ELECTRONICS AMERICA, INC., *Defendants*.	Case No. 2:24-CV-00140-JRG-RSP **JURY TRIAL DEMANDED**

DEFENDANTS' INVALIDITY CONTENTIONS

Pursuant to Local Patent Rules 3-3 and 3-4 and the Court's Docket Control Order (Dkt. 38), Defendants Samsung Electronics Co., Ltd. ("SEC") and Samsung Electronics America, Inc. ("SEA") (collectively, "Samsung" or "Defendants") provide these Invalidity Contentions and accompanying document production to Plaintiff Harbor Island Dynamic, LLC ("HID").

I. Overview

In this action, Plaintiff asserted in its P.R. 3-1 and 3-2 Disclosures of July 18, 2024 ("Infringement Contentions") that Defendants allegedly infringe claims 1 and 3 of U.S. Patent No. 7,745,886 (the "'886 patent"), claims 1, 3, 5, 7, 10, 12, 14, and 15 of U.S. Patent No. 7,772,673 (the "'673 patent"), claims 1, 2, 4, and 5 of U.S. Patent No. 9,147,609 (the "'609 patent"), and claims 1, 2, 4, 9, 11, 12, 14, and 19 of U.S. Patent No. 9,245,826 (the "'826 patent") (collectively, the "Patents-in-Suit" and the "Asserted Claims").

This Court has not yet construed any of the terms in the Patents-in-Suit. Defendants' Invalidity Contentions are based on Defendants' present understanding of Plaintiff's apparent interpretation of the Asserted Claims, as advanced by Plaintiff in its Complaint and Infringement Contentions, and Defendants' own understanding of the scope of the Asserted Claims. Defendants take no position on any matter of claim construction or interpretation in these contentions. Defendants' contentions herein are not, and should in no way be seen as, admissions about or adoptions of any particular claim scope or construction, or any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim constructions from any identification or application of potential prior art. Any statement herein describing or tending to describe any claim element is provided solely for the purpose of understanding the relevant prior art. By including prior art that anticipates or renders obvious claims based on Plaintiff's apparent claim construction, Defendants do not thereby adopt Plaintiff's apparent claim construction.

Moreover, nothing herein should be construed as an admission that Defendants agree with Plaintiff's claim interpretations or that Plaintiff have a plausible basis to allege infringement. Similarly, nothing herein shall be construed as an admission regarding the application of the Asserted Claims to any of Defendants' accused products. Defendants do not agree with Plaintiff's application of the claims to the accused products, and Defendants deny infringement. Furthermore, these contentions do not represent an agreement with Plaintiff's views as to the meaning, definiteness, written description support for, or enablement of any of the Asserted Claims. In fact, Defendants provide grounds for invalidity under § 112 below. Pursuant to the Court's Docket Control Order (Dkt. 38), Defendants reserve the right to include arguments directed to indefiniteness in their *Markman* briefing. Nothing stated herein shall be construed as a waiver of

any argument available under 35 U.S.C. §§ 101, 102, 103, and/or 112. Defendants expressly reserve the right to propose alternative interpretations to those advocated by Plaintiff and to rebut Plaintiff's actual claim interpretation and infringement positions. Defendants reserve the right to modify or supplement these contentions in response to the Court's construction of the claim terms at issue.

Prior art not included in this disclosure may also become relevant. Defendants are currently unaware of the extent, if any, to which Plaintiff may contend that certain limitations of the Asserted Claims are not disclosed in the prior art identified by Defendants. Defendants reserve the right to identify other relevant prior art with respect to such allegedly missing limitation(s).

Defendants' invalidity claim charts attached hereto cite to exemplary portions, teachings, and disclosures of the prior art as applied to limitations of the Asserted Claims. Persons skilled in the art, however, would recognize these as exemplary and may view an item of prior art in the context of other publications, literature, products, and understanding. Again, this is because the cited portions of prior art identified herein are exemplary only. The citations and discussion in the charts are organized by claim (and claim limitation) for convenience, but each limitation or claim section applies to the larger context of each claim, to any related dependent or independent claims, as well as all claims containing similar limitations or elements in the particularly asserted patent or other related patents also being asserted by Plaintiff. For example, citations as to any recited limitation, step, or component in the claims apply wherever each such limitation, step, or component is repeated elsewhere in the claim of that patent or other related patent also being asserted by Plaintiff. Any and all citations to particular figures in the attached charts or elsewhere in these contentions shall be deemed to wholly incorporate the figure by reference, and include the figure as if it had been inserted into the chart itself, as well as any text discussing the figure.

Similarly, where Defendants cite to particular text in a prior art reference concerning a drawing or figure, the citation encompasses that drawing or figure as well as any other associated information in the prior art reference. Defendants may therefore rely on the entirety of the prior art references listed herein, including uncited portions of those prior art references, as well as additional information including products, documents, materials, and expert testimony.

The references cited herein disclose the limitations of the Asserted Claims explicitly or inherently, and/or they may be relied upon to demonstrate how the state of the art in the relevant time frame invalidates each asserted patent claim. In the context of the knowledge of a person of ordinary skill in the art, each reference's disclosure applies in the context of both anticipation and obviousness. Therefore, any suggested single reference obviousness positions and obviousness combinations are provided in the alternative to Defendants' anticipation contentions and are not to be construed to suggest that any reference included in the combinations is somehow deficient or is not by itself anticipatory. Further, the combinations listed herein are exemplary and not exhaustive. There are many possible invalidating combinations of the references listed herein, and it is not practical, at this early stage, to identify and list all potentially relevant combinations without the benefit of further factual investigation and the Court's claim construction.

In addition to the positions and prior art identified below, and the accompanying invalidity claim charts, Defendants also incorporate by reference all invalidity contentions, prior art, invalidity claim charts, and expert declarations (including, without limitation, all anticipation positions, obviousness positions (including all prior art combinations and motivations to combine), indefiniteness positions, written description positions, and enablement positions) that have been or will be disclosed in any other action involving any of the Patents-in-Suit, as well as any U.S. Patent and Trademark Office (USPTO) proceeding involving any of the Patents-in-Suit (e.g.,

IPR2024-01402, IPR2024-01403, IPR2024-01404, IPR2024-01405) and that have or will be disclosed in any pending USPTO proceeding involving related patents. Such art and positions would have been obvious to combine with the prior art and combinations identified in these Invalidity Contentions. To the extent Plaintiff or the Board puts forth an argument in any USPTO proceedings contrary to the positions in the litigation, Defendants reserve the right to raise and/or address such argument or position in this litigation.

Defendants expect to rely on testimony of one or more expert witnesses and materials referenced by those expert witnesses in support of these contentions and incorporate those forthcoming expert reports as if fully set forth herein. Subsequent expert statements—including deposition and trial testimony, declarations, and reports—related to invalidity, interrogatory responses, and other discovery or pleadings may expand and elaborate upon the positions contained in these Invalidity Contentions as originally prepared or subsequently amended, and Defendants reserve the right to incorporate such by reference. Defendants may further rely on any inventor admissions concerning the scope of the prior art relevant to the Patents-in-Suit found in, *inter alia*: the patent prosecution histories for the Patents-in-Suit and related patents, patent applications, and/or re-examinations; deposition testimony of the named inventors listed on the Patents-in-Suit; and the papers and any evidence submitted by Plaintiff in these actions.

Discovery has only just begun, and Defendants' investigation into prior art—including third-party prior art, and related evidence, documents, and knowledgeable witnesses—remains ongoing. Moreover, prior art may become relevant depending on the claim interpretations and/or validity positions Plaintiff or its expert witness(es) may assert, Defendants' further understanding of Plaintiff's Infringement Contentions, and any findings as to the priority date of the Asserted Claims. Accordingly, Defendants reserve the right to supplement or modify these Invalidity

Contentions based on further discovery and in a manner consistent with the Federal Rules of Civil Procedure and the Court's rules and schedule. To the extent Plaintiff contend that any prior art presented in these contentions does not qualify as prior art to one or more Patents-in-Suit, the prior art remains relevant as evidence of simultaneous development as an indicia of obviousness. *See George M. Martin Co. v. Alliance Mach. Sys. Int'l LLC,* 618 F.3d 1294, 1305 (Fed. Cir. 2010) ("Independently made, simultaneous inventions … are persuasive evidence that the claimed apparatus was the product only of ordinary mechanical or engineering skill.").

As set forth in detail below, and in the claim charts which accompany these Invalidity Contentions as exhibits A1-A6, B1-B10, C1-C9, and D1-D10, and in IPR2024-01402, IPR2024-01403, IPR2024-01404, IPR2024-01405 (herein, incorporated by reference), the Asserted Claims of the Patents-in-Suit are invalid over the cited prior art listed below under pre-AIA 35 U.S.C. §§ 102 and/or 103 and their post-AIA counterparts. Regarding the obviousness of certain claims under 35 U.S.C. § 103, one or more of the principles enumerated by the United States Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007) apply to the Asserted Claims of the Patents-in-Suit, including, for example:

(a) combining various claimed elements known in the prior art according to known methods to yield a predictable result;

(b) making a simple substitution of one or more known elements for another to obtain a predictable result;

(c) using a known technique to improve a similar device or method in the same way;

(d) applying a known technique, known device or method ready for improvement to yield a predictable result;

(e) choosing from a finite number of identified, predictable solutions with a reasonable expectation of success or, in other words, the solution was one which was "obvious to try;

(f) a known work in one field of endeavor prompting variations of it for use either in the same field or a different based on given design incentives or other market forces in which the variations were predictable to one of ordinary skill in the art; and/or

(g) a teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine the teachings of various prior art references to arrive at the claimed invention.

The above criteria may be collectively referred to herein as the "*KSR* Criteria."

Based on these considerations, as further detailed below and/or in the attached exhibits, one of ordinary skill in the art could and would have readily combined the teachings of the prior art references discussed and charted in those exhibits. The combinations of these references would have rendered obvious to one of ordinary skill in the art the subject matter of the Asserted Claims. The references identified in the attached exhibits for the respective Asserted Claims are analogous prior art to the subject matter of the Asserted Claims and, for at least the reasons set forth below and/or in the claim chart exhibits, are properly combinable. Because many, if not all, of these prior art references exist within a single field of art, particularly one in which individuals in the field often shared and/or collaborated on their work, it would have been obvious for one of ordinary skill in the art to look from one piece of prior art to another in order to find any missing functionality they desired to implement. The art is replete with instances of skilled artisans looking to the same field or related fields for purposes of implementing signal processing techniques for health monitoring. Therefore, these references provide interrelated teachings and one of ordinary

skill would have looked to the concepts in any of these references when seeking to solve the problems purportedly addressed by the Patents-in-Suit.

Numerous prior art references and/or systems, including in the attached exhibits, reflect common knowledge and the state of the prior art before the earliest effective priority date of the Patents-in-Suit. As it would be unduly burdensome to create detailed claim charts for all of the invalidating combinations, for at least the reasons described in these Invalidity Contentions, it would have been obvious to one of ordinary skill in the art to combine any of a number of prior art references, including any admitted prior art or any combination of those identified in the attached exhibits, to meet the limitations of the Asserted Claims. Defendants' inclusion of exemplary combinations, in view of the factors and motivations identified here, does not preclude Defendants from identifying other invalidating combinations and/or motivations as appropriate.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts, because each combination of art would have no unexpected results, and at most would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S. Ct. at 1739-40 (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, instead espousing an "expansive and flexible" approach). That said, the Supreme Court's rationale, that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle," applies equally here. *Id.* at 1742.

Additional evidence that there would have been a motivation or reason to combine the prior art references identified herein includes but is not limited to the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in the

marketplace; the existence of a known problem for which there was an obvious solution; the existence of a known need or problem in the field of endeavor at the time of the alleged inventions; and the background knowledge that would have been possessed by one of ordinary skill in the art. For example, the prior art references are generally directed to the same problems. Thus, a skilled artisan seeking to solve these problems would look to these cited references in combination.

Defendants contend there are no secondary considerations of non-obviousness evidencing the validity of any of the Asserted Claims. If Plaintiff present any alleged evidence of secondary considerations of non-obviousness, Defendants reserve their right to respond to any such alleged evidence. Further, to the extent Plaintiff identify any product as allegedly practicing the claims and having been successful, there is no nexus between the claimed invention and the products' success and Defendants reserve their right to respond to any such alleged evidence.

II. P.R. 3-3(a): Identification of Prior Art

Pursuant to Patent Rule 3-3 and subject to Defendants' reservations of rights in these Invalidity Contentions, Defendants identify the following prior art that anticipates and/or renders obvious one or more Asserted Claims of the Patents-in-Suit as detailed in the claim chart exhibits and elsewhere in these Invalidity Contentions. Below are tables identifying individual items of prior art. The prior art references, systems, and products listed below and in the accompanying claim chart exhibits may be relied upon for certain limitations, state of the art, and background of the art; indicia of obviousness; as evidence of the level of skill in the art at the time of the filing of the Patents-in-Suit; and/or in support of assertions that it is proper to combine certain prior art references in certain ways.

Defendants also incorporate by reference each and every prior art reference of record in the prosecution of the Patents-in-Suit and patents or patent applications related to the Patents-in-

Suit, the prior art referred to in the specifications of the Patents-in-Suit, as well as the prior art identified in the USPTO proceeding involving any of the Patents-in-Suit (e.g., IPR2024-01402, IPR2024-01403, IPR2024-01404, IPR2024-01405). In these Invalidity Contentions, Defendants have identified each item of prior art, based on currently available information, including:

(a) each patent, constituting prior art under pre-AIA 35 U.S.C. §§ 102(a), (b), and/or (e) or under AIA 35 U.S.C. §§ 102(a)(1) and/or (a)(2), by its patent number, country of origin, and date of issue;

(b) each non-patent publication, constituting prior art under pre-AIA 35 U.S.C. §§ 102(a) and/or (b) or under AIA 35 U.S.C. §§ 102(a)(1) and/or (a)(2), by its title, date of publication, and, where feasible, author and publisher;

(c) sales or public disclosures, constituting prior art under pre-AIA 35 U.S.C. § 102(a) and/or (b) or under AIA 35 U.S.C. § 102(a)(1), by the item offered for sale or publicly used or known, the date the offer or use took place or the information became known, and the identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known;

(d) prior art under pre-AIA 35 U.S.C. § 102(f), by the name of the person(s) from whom and the circumstances under which the invention or any part of it was derived; and

(e) prior art under pre-AIA 35 U.S.C. § 102(g), by the identities of the person(s) or entities involved in and the circumstances surrounding the making of the invention before the patent applicant(s).

Defendants' identification of patents and publications as prior art herein and in the attached invalidity claim charts includes the publications themselves as well as the use of the products and

systems described therein. Defendants' investigation continues, but information available to date indicates that such products and systems were (1) known or used in the country before the alleged invention(s) of the claimed subject matter of the Asserted Claims, (2) were in public use and/or on sale in this country more than one year before the filing date of the Patents-in-Suit, and/or (3) were invented by another who did not abandon, suppress, or conceal, before the alleged invention(s) of the claimed subject matter of the Asserted Claims. Upon information and belief, these prior art products and systems and their associated references anticipate and/or render obvious one or more of the Asserted Claims of the Patents-in-Suit.

A. Prior Art Patents, Patent Applications, and Publications

Table 1: Prior Art Patents and Patent Applications

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
US	4,789,885	February 10, 1987	December 6, 1988	Brighton et al.	SAM-HID_00021219 - SAM-HID_00021226
US	4,946,376	April 6, 1989	August 7, 1990	Sharma et al.	SAM-HID_00022576 - SAM-HID_00022579
US	5,104,816	March 5, 1990	April 14, 1992	Verret	SAM-HID_00024641 - SAM-HID_00024655
US	5,683,075	June 5, 1995	November 4, 1997	Gaul et al.	SAM-HID_00021227 - SAM-HID_00021232
US	5,945,724	April 9, 1998	August 31, 1999	Parekh et al.	SAM-HID_00021233 - SAM-HID_00021244
US	6,121,102	March 18, 1998	September 19, 2000	Norström et al.	SAM-HID_00021245 - SAM-HID_00021274
US	6,121,148	January 26, 1999	September 19, 2000	Bashir et al.	SAM-HID_00020695 - SAM-HID_00020701
US	6,140,703	December 26, 1996	October 31, 2000	Cronin et al.	SAM-HID_00022580 – SAM-HID_00022584
US	6,362,040	February 9, 2000	March 26, 2002	Tews	SAM-HID_00024592 – SAM-HID_00024604
US	6,372,567	April 20, 2000	April 16, 2002	Tews et al.	SAM-HID_00021275 - SAM-HID_00021281
US	6,437,381	April 27, 2000	August 20, 2002	Gruening et al.	SAM-HID_00021282 - SAM-HID_00021291
US	6,498,371	July 31, 2001	December 24, 2002	Krishnan et al.	SAM-HID_00025524 – SAM-HID_00025531

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
US	6,544,855	October 19, 2001	April 8, 2003	Tews et al.	SAM-HID_00021292 - SAM-HID_00021302
US	6,642,599	August 13, 1996	November 4, 2003	Watabe et al.	SAM-HID_00021303 - SAM-HID_00021393
US	6,667,551	January 22, 2001	December 23, 2003	Hanaoka et al.	SAM-HID_00021394 - SAM-HID_00021413
US	6,737,682	July 30, 2002	May 18, 2004	Yu	SAM-HID_00021414 - SAM-HID_00021425
US	6,740,555	September 29, 1999	May 25, 2004	Tews et al.	SAM-HID_00021426 - SAM-HID_00021436
US	6,777,738	November 17, 1999	August 17, 2004	Takata	SAM-HID_00021437 - SAM-HID_00021452
US	6,836,172	May 22, 2003	December 28, 2004	Okashita	SAM-HID_00021453 - SAM-HID_00021482
US	6,933,569	September 24, 2003	August 23, 2005	Koh	SAM-HID_00025801 - SAM-HID_00025845
US	6,995,449	May 10, 2004	February 7, 2006	Yin	SAM-HID_00024061 - SAM-HID_00024074
US	7,015,115	February 20, 2003	March 21, 2006	Yin et al.	SAM-HID_00021483 - SAM-HID_00021497
US	7,151,035	October 23, 2003	December 19, 2006	Koshimizu et al.	SAM-HID_00021498 - SAM-HID_00021523
US	7,521,776	December 29, 2006	April 21, 2009	Cannon et al.	SAM-HID_00021524 - SAM-HID_00021531
US	7,528,494	November 3, 2005	May 5, 2009	Furukawa et al.	SAM-HID_00021532 - SAM-HID_00021541
US	7,579,682	July 28, 2006	August 25, 2009	Hierholzer	SAM-HID_00022922 - SAM-HID_00022941

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
US	7,709,966	December 7, 2007	May 4, 2010	Conn	SAM-HID_00021542 - SAM-HID_00021551
US	7,799,678	January 30, 2008	September 21, 2010	Kropewnicki et al.	SAM-HID_00026257 - SAM-HID_00026267
US	7,863,180	May 6, 2008	January 4, 2011	Cooney, III et al.	SAM-HID_00021552 - SAM-HID_00021563
US	7,919,834	December 4, 2007	April 5, 2011	Davis et al.	SAM-HID_00021564 - SAM-HID_00021581
US	7,939,369	May 14, 2009	May 10, 2011	Farooq et al.	SAM-HID_00022585 – SAM-HID_00022596
US	7,939,941	June 27, 2007	May 10, 2011	Chiou et al.	SAM-HID_00021582 - SAM-HID_00021601
US	7,956,442	December 11, 2008	June 7, 2011	Hsu et al.	SAM-HID_00021602 - SAM-HID_00021611
US	7,960,282	May 21, 2009	June 14, 2011	Yelehanka et al.	SAM-HID_00026268 - SAM-HID_00026285
US	7,982,264	November 26, 2007	July 19, 2011	Izumi	SAM-HID_00021612 - SAM-HID_00021623
US	8,030,870	October 16, 2008	October 4, 2011	Kirby et al.	SAM-HID_00021624 - SAM-HID_00021642
US	8,039,314	August 4, 2008	October 18, 2011	DeGraw et al.	SAM-HID_00021643 - SAM-HID_00021658
US	8,039,385	September 13, 2010	October 18, 2011	West et al.	SAM-HID_00021659 - SAM-HID_00021668
US	8,097,964	December 29, 2009	January 17, 2012	West et al.	SAM-HID_00021669 – SAM-HID_00021680
US	8,119,527	August 4, 2009	February 21, 2012	Chadrashekar et al.	SAM-HID_00021681 – SAM-HID_00021697

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
US	8,124,531	January 28, 2011	February 28, 2012	Chadrashekar et al.	SAM-HID_00021698 – SAM-HID_00021722
US	8,136,084	September 9, 2009	March 13, 2012	Dean, Jr. et al.	SAM-HID_00021723 – SAM-HID_00021735
US	8,174,124	April 8, 2010	May 8, 2012	Chiu et al.	SAM-HID_00021736 – SAM-HID_00021746
US	8,183,580	March 2, 2010	May 22, 2012	Wang	SAM-HID_00022597 – SAM-HID_00022605
US	8,174,124	April 8, 2010	May 8, 2012	Chiu et al.	SAM-HID_00021736 - SAM-HID_00021746
US	8,199,516	March 25, 2009	June 12, 2012	Ishii et al.	SAM-HID_00021747 – SAM-HID_00021786
US	8,202,800	May 20, 2011	June 19, 2012	Chen et al.	SAM-HID_00021787 – SAM-HID_00021796
US	8,232,626	June 14, 2010	July 31, 2012	Tsui et al.	SAM-HID_00021797 – SAM-HID_00021825
US	8,263,492	April 29, 2009	September 11, 2012	Cotte et al.	SAM-HID_00021826 – SAM-HID_00021842
US	8,283,601	January 3, 2008	October 9, 2012	Jin	SAM-HID_00021843 – SAM-HID_00021861
US	8,294,261	September 22, 2010	October 23, 2012	Mawatari et al.	SAM-HID_00021862 – SAM-HID_00021872
US	8,299,584	March 8, 2010	October 30, 2012	Shneyder et al.	SAM-HID_00021873 – SAM-HID_00021893
US	8,338,961	April 26, 2012	December 25, 2012	Su et al.	SAM-HID_00021894 – SAM-HID_00021909
US	8,344,512	August 20, 2009	January 1, 2013	Knickerbocker	SAM-HID_00021910 – SAM-HID_00021927

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
US	8,344,515	May 18, 2010	January 1, 2013	Nishio et al.	SAM-HID_00021928 – SAM-HID_00021945
US	8,354,730	January 31, 2008	January 15, 2013	Moriya et al.	SAM-HID_00021946 – SAM-HID_00021976
US	8,399,936	May 28, 2010	March 19, 2013	Birner et al.	SAM-HID_00021977 – SAM-HID_00022008
US	8,431,481	April 11, 2012	April 30, 2013	Burnham et al.	SAM-HID_00022606 – SAM-HID_00022614
US	8,431,977	June 10, 2011	April 30, 2013	Yang	SAM-HID_00022009 – SAM-HID_00022065
US	8,441,104	November 16, 2011	May 14, 2013	Hu et al.	SAM-HID_00022066 – SAM-HID_00022081
US	8,455,983	November 22, 2011	June 4, 2013	Wood et al.	SAM-HID_00022615 – SAM-HID_00022627
US	8,466,559	December 17, 2010	June 18, 2013	Manepalli et al.	SAM-HID_00022082 – SAM-HID_00022098
US	8,552,563	January 6, 2010	October 8, 2013	Law et al.	SAM-HID_00022099 – SAM-HID_00022116
US	8,575,760	November 23, 2011	November 5, 2013	Phee et al.	SAM-HID_00022117 – SAM-HID_00022178
US	8,581,419	December 15, 2010	November 12, 2013	Su et al.	SAM-HID_00022179 – SAM-HID_00022197
US	8,604,619	November 22, 2011	December 10, 2013	Hsieh et al.	SAM-HID_00022198 – SAM-HID_00022209
US	8,643,191	January 26, 2012	February 4, 2014	Ding et al.	SAM-HID_00022210 – SAM-HID_00022236
US	8,664,540	May 27, 2011	March 4, 2014	Lu et al.	SAM-HID_00022237 – SAM-HID_00022253

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
US	8,673,769	June 20, 2007	March 18, 2014	Boyd et al.	SAM-HID_00022254 – SAM-HID_00022268
US	8,759,950	May 5, 2011	June 24, 2014	Kamgaing et al.	SAM-HID_00022269 – SAM-HID_00022283
US	8,791,550	June 15, 2013	July 29, 2014	Gu et al.	SAM-HID_00022284 – SAM-HID_00022298
US	8,912,091	January 10, 2013	December 16, 2014	Burnham et al.	SAM-HID_00022628 – SAM-HID_00022638
US	8,928,159	September 2, 2010	January 6, 2015	Chang et al.	SAM-HID_00022299 – SAM-HID_00022312
US	9,406,562	June 13, 2011	August 2, 2016	Bonn et al.	SAM-HID_00022313 – SAM-HID_00022325
US	9,559,001	February 9, 2011	January 31, 2017	Yen et al.	SAM-HID_00022326 – SAM-HID_00022345
US	10,221,496	May 24, 2011	March 5, 2019	Richardson et al.	SAM-HID_00020532 – SAM-HID_00020584
US	10,347,559	March 16, 2011	July 9, 2019	Fan et al.	SAM-HID_00020585 – SAM-HID_00020598
US	2009/0026619	July 24, 2007	January 29, 2009	Zeng et al.	SAM-HID_00022382 - SAM-HID_00022386
US	2009/0079056	December 7, 2007	March 26, 2009	Conn	SAM-HID_00022387 - SAM-HID_00022397
US	2002/0027293	October 22, 2001	March 7, 2002	Hoshino	SAM-HID_00020599 – SAM-HID_00020615
US	2002/0030245	January 1, 2001	March 14, 2002	Hanaoka et al.	SAM-HID_00020616 – SAM-HID_00020648
US	2003/0111733	December 19, 2001	June 19, 2003	Pogge et al.	SAM-HID_00020649 – SAM-HID_00020668

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
US	2003/0173678	February 14, 2003	September 18, 2003	Mizukoshi	SAM-HID_00020669 – SAM-HID_00020681
US	2003/0221969	May 16, 2003	December 4, 2003	Tomisaka et al.	SAM-HID_00020682 – SAM-HID_00020694
US	2004/0150045	December 19, 2003	August 5, 2004	Nonaka et al.	SAM-HID_00022346 – SAM-HID_00022367
US	2005/0181569	April 16, 2002	August 18, 2005	Koshimizu	SAM-HID_00024095 - SAM-HID_00024123
US	2005/0212048	March 18, 2005	September 29, 2005	Litwin	SAM-HID_00020695 - SAM-HID_00020701
US	2006/0027934	October 3, 2005	February 9, 2006	Edelstein et al.	SAM-HID_00020725 - SAM-HID_00020751
US	2006/0054949	June 27, 2005	March 16, 2006	Ichimori	SAM-HID_00020702 - SAM-HID_00020713
US	2006/0237723	April 21, 2006	October 26, 2006	Ito	SAM-HID_00020714 - SAM-HID_00020724
US	2006/0270367	August 7, 2006	November 30, 2006	Burgener	SAM-HID_00024124 – SAM-HID_00024143
US	2007/0158859	July 28, 2006	July 12, 2007	Hierholzer	SAM-HID_00026316 - SAM-HID_00026335
US	2007/0249163	April 20, 2007	October 25, 2007	Oikawa	SAM-HID_00020752 - SAM-HID_00020771
US	2008/0157287	January 2, 2008	July 3, 2008	Choi et al.	SAM-HID_00020772 - SAM-HID_00020786
US	2009/0026619	July 24, 2007	January 29, 2009	Zeng et al.	SAM-HID_00022382 – SAM-HID_00022386
US	2009/0079056	December 7, 2007	March 26, 2009	Conn	SAM-HID_00022387 – SAM-HID_00022397

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
US	2009/0140395	December 4, 2007	June 4, 2009	Davis et al.	SAM-HID_00022398 – SAM-HID_00022415
US	2009/0278237	May 6, 2008	November 12, 2009	Cooney, III et al.	SAM-HID_00020787 - SAM-HID_00020798
US	2009/0280643	May 6, 2008	November 12, 2009	Andry et al.	SAM-HID_00020799 - SAM-HID_00020813
US	2009/0302480	June 6, 2008	December 10, 2009	Birner et al.	SAM-HID_00026224 - SAM-HID_00026256
US	2010/0032843	August 5, 2008	February 11, 2010	Chen et al.	SAM-HID_00020814 - SAM-HID_00020825
US	2010/0065949	September 17, 2008	March 18, 2010	Thies et al.	SAM-HID_00020826 - SAM-HID_00020864
US	2010/0090318	December 11, 2008	April 15, 2010	Hsu et al.	SAM-HID_00022416 – SAM-HID_00022426
US	2010/0096759	October 16, 2008	April 22, 2010	Kirby et al.	SAM-HID_00020865 - SAM-HID_00020883
US	2010/0171226	December 29, 2009	July 8, 2010	West et al.	SAM-HID_00020884 - SAM-HID_00020895
US	2010/0225005	May 18, 2010	September 9, 2010	Nishio et al.	SAM-HID_00020896 - SAM-HID_00020914
US	2010/0252934	January 6, 2010	October 7, 2010	Law et al.	SAM-HID_00022427 – SAM-HID_00022443
US	2010/0032843	August 5, 2008	February 11, 2010	Chen et al.	SAM-HID_00024656 – SAM-HID_00024667
US	2010/0065949	September 17, 2008	March 18, 2010	Thies et al.	SAM-HID_00020826 – SAM-HID_00020864
US	2010/0096759	October 16, 2008	April 22, 2010	Kirby et al.	SAM-HID_00020865 – SAM-HID_00020883

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
US	2011/0018109	May 20, 2010	January 27, 2011	Blaschke et al.	SAM-HID_00022444 – SAM-HID_00022454
US	2011/0057319	September 9, 2009	March 10, 2011	Dean, Jr. et al.	SAM-HID_00020915 - SAM-HID_00020927
US	2011/0089572	September 17, 2010	April 21, 2011	Tezcan et al.	SAM-HID_00022455 – SAM-HID_00022476
US	2011/0095435	October 28, 2009	April 28, 2011	Volant et al.	SAM-HID_00022477 – SAM-HID_00022488
US	2011/0159690	January 28, 2011	June 30, 2011	Chandrashekar et al.	SAM-HID_00020928 - SAM-HID_00020952
US	2011/0186990	September 22, 2010	August 4, 2011	Mawatari et al.	SAM-HID_00026058 – SAM-HID_00026068
US	2011/0193197	February 5, 2010	August 11, 2011	Farooq et al.	SAM-HID_00020953 - SAM-HID_00020968
US	2011/0193241	February 9, 2011	August 11, 2011	Yen et al.	SAM-HID_00020969 - SAM-HID_00020987
US	2011/0215361	March 2, 2010	September 8, 2011	Wang	SAM-HID_00020988 - SAM-HID_00020997
US	2011/0248404	April 8, 2010	October 13, 2011	Chiu et al.	SAM-HID_00020998 - SAM-HID_00021007
US	2011/0304026	June 14, 2010	December 15, 2011	Tsui et al.	SAM-HID_00021008 - SAM-HID_00021036
US	2012/0056315	September 2, 2010	March 8, 2012	Chang et al.	SAM-HID_00021037 - SAM-HID_00021049
US	2012/0074583	September 28, 2010	March 29, 2012	Dao	SAM-HID_00021067 - SAM-HID_00021082
US	2012/0074579	September 24, 2010	March 29, 2012	Su et al.	SAM-HID_00021050 - SAM-HID_00021066

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
US	2012/0104546	November 1, 2010	May 3, 2012	Ding et al.	SAM-HID_00022489 – SAM-HID_00022499
US	2012/0241917	March 22, 2012	September 27, 2012	Ide et al.	SAM-HID_00022500 – SAM-HID_00022521
US	2012/0256310	April 5, 2012	October 11, 2012	Ide	SAM-HID_00021083 – SAM-HID_00021123
US	2013/0082382	September 28, 2012	April 4, 2013	Torii	SAM-HID_00021124 – SAM-HID_00021164
US	2013/0113103	June 5, 2012	May 9, 2013	West et al.	SAM-HID_00021165 – SAM-HID_00021175
US	2013/0147038	December 6, 2012	June 13, 2013	Ishikawa	SAM-HID_00021176 – SAM-HID_00021195
US	2013/0154108	December 14, 2011	June 20, 2013	Lin et al.	SAM-HID_00022522 – SAM-HID_00022557
US	2013/0277845	July 23, 2012	October 24, 2013	Chen et al.	SAM-HID_00021196 – SAM-HID_00021205
US	2013/0334699	June 19, 2012	December 19, 2013	Kuo et al.	SAM-HID_00022558 – SAM-HID_00022565
US	2014/0138844	November 21, 2012	May 22, 2014	Gambino et al.	SAM-HID_00022566 – SAM-HID_00022575
US	2014/0225231	February 12, 2013	August 14, 2014	Gambino et al.	SAM-HID_00026069 – SAM-HID_00026079
US	2015/0028482	July 23, 2013	January 29, 2015	Ning et al.	SAM-HID_00021206 – SAM-HID_00021218
DE	41 33 219 A1	October 7, 1991	June 4, 1992	Beragnolli et al.	SAM-HID_00019592 – SAM-HID_00019610
EP	2,555,239 A2	May 30, 2012	February 6, 2013	Lundberg	SAM-HID_00019761 – SAM-HID_00019774

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
JP	2003/332441A	May 8, 2002	November 21, 2003	Matsuoka	SAM-HID_00019791 – SAM-HID_00019805
JP	2004/153140A	October 31, 2002	May 27, 2004	Fujishima et al.	SAM-HID_00019806 – SAM-HID_00019851
JP	2005/005322A	June 9, 2003	January 6, 2005	Takao et al.	SAM-HID_00019852 – SAM-HID_00019874
JP	2006/093184A	September 21, 2004	April 6, 2006	Morota	SAM-HID_00020027 – SAM-HID_00020045
JP	2006/303350A	April 25, 2005	November 2, 2006	Ogura et al.	SAM-HID_00019875 – SAM-HID_00019897
JP	2007/201154A	January 26, 2006	August 9, 2007	Yamamoto	SAM-HID_00019898 – SAM-HID_00019916
JP	2007/335886A	July 26, 2007	December 27, 2007	Kobayashi	SAM-HID_00019917 – SAM-HID_00019948
JP	2009/021433A	July 12, 2007	January 29, 2009	Sudo	SAM-HID_00019949 – SAM-HID_00019982
JP	2010/287704A	June 11, 2009	December 24, 2010	Furumura et al.	SAM-HID_00019983 – SAM-HID_00019999
JP	2011/129663A	December 17, 2009	June 30, 2011	Okubo	SAM-HID_00020000 – SAM-HID_00020026
JP	3,141,621 B2	May 27, 1993	December 2, 1994	Matsuzaki et al.	SAM-HID_00020046 – SAM-HID_00020055
KR	10-1275991 B1	January 7, 2011	March 14, 2012	Chang et al.	SAM-HID_00020056 – SAM-HID_00020069
KR	2001/0003206A	June 22, 1999	January 15, 2001	Choi	SAM-HID_00020070 – SAM-HID_00020080
KR	2003/0001713A	June 27, 2001	January 8, 2003	Kim	SAM-HID_00020081 – SAM-HID_00020093

Country	Patent/ Application/ Publication No.	Date of Filing	Date of Issue/ Publication	Inventor(s)	Bates Range
KR	2005/0063315A	December 22, 2003	June 28, 2005	Kim	SAM-HID_00020094 – SAM-HID_00020104
KR	10-2004-0003491	July 3, 2002	January 13, 2004	Cho	SAM-HID_00025774 – SAM-HID_00025792
KR	10-2010-0011480	July 25, 2008	February 3, 2010	Kim	SAM-HID_00025793 – SAM-HID_00025800

Table 2: Non-Patent Publications

Title	Publication Date	Author(s)	Publisher	Bates Range
A Path Toward Non-Destructive 3D Metrology for Through-Silicon Vias	October 9-13, 2011	Gelb et al.	International Symposium on Microelectronics	SAM-HID_00022699 - SAM-HID_00022706
TSV Stress Testing and Modeling	2010	Amagai et al.	Electronic Components and Technology Conference	SAM-HID_00022643 – SAM-HID_00022650
Applying x-ray microscopy and finite element modeling to identify the mechanism of stress-assisted void growth in through-silicon vias	September 6, 2011	Kong et al.	Journal of Applied Physics / AIP Publishing	SAM-HID_00018406 – SAM-HID_00018413
Placement for Fast and Reliable Through-Silicon-Via (TSV) Based 3D-IC Layouts	December 2012	Athikulwongse	Georgia Institute of Technology	SAM-HID_00018414 – SAM-HID_00018550

Title	Publication Date	Author(s)	Publisher	Bates Range
Stress-Driven 3D-IC Placement with TSV Keep-Out Zone and Regularity Study	2010	Athikulwongse et al.	IEEE	SAM-HID_00022651 - SAM-HID_00022656
Integrated Interconnect Technologies for 3D Nanoelectronic Systems	2009	Bakir et al.	Artech House	SAM-HID_00018551 – SAM-HID_00019101
Ultra-thin Chip Technology and Applications	2011	Burghartz	Springer	SAM-HID_00019102 – SAM-HID_00019591
Study of TSV Filling Performance with Wide-range Pattern Densities by Using a Novel Plating Chamber with Surface Paddle Agitation	2013	Chen et al.	IEEE	SAM-HID_00022666 - SAM-HID_00022667
Engineering and Structural Adhesives	November 1, 2004	Dunn	Rapra Review Reports	SAM-HID_00019611– SAM-HID_00019760
Placement of Thermal Vias in 3-D ICs Using Various Thermal Objectives	April 2006	Goplen et al.	IEEE	SAM-HID_00022707 - SAM-HID_00022724
Thermal Via Placement in 3D ICs	April 3 2005	Goplen et al.	University of Minnesota	SAM-HID_00019775– SAM-HID_00019782
Compact Models of Voltage Drops in Power Delivery Network for TSV-Based Three-Dimensional Integration	January 24, 2013	Hu et al.	Rensselaer Polytechnic Institute	SAM-HID_00022725 - SAM-HID_00022727

Title	Publication Date	Author(s)	Publisher	Bates Range
Influence of Temperature on the Coefficient of Thermal Expansion of Monocrystals of Silicon	July 2005	Mazur et al.	Materials Science, Vol. 41, No. 4, 2005	SAM-HID_00019783 – SAM-HID_00019790
Influence of ageing on rivet-bonded joint properties	October 14, 2010	Kachlik et al.	Taylor & Francis	SAM-HID_00020105 – SAM-HID_00020110
Designing TSVs for 3D Integrated Circuits	2013	Khan et al.	Springer	SAM-HID_00020111 – SAM-HID_00020191
TSV Density-driven Global Placement for 3D Stacked ICs	2011	Kim et al.	IEEE ISOCC	SAM-HID_00022732 - SAM-HID_00022735
Novel Multi-Layer Through-Die Connections for Package to Chip Power and Ground Connections	2003	Kommera et al.	IEEE	SAM-HID_00022736 - SAM-HID_00022742
Linear thermal expansion coefficients of amorphous and microcrystalline silicon films	2002	Takimoto et al.	Journal of Non-Crystalline Solids / Elsevier Science B.V.	SAM-HID_00020192 – SAM-HID_00020195
Thermo-Mechanical Reliability of 3-D ICs containing Through Silicon Vias	2009	Lu et al.	IEEE	SAM-HID_00022743 - SAM-HID_00022747
An Overview of Joining Processes	2011	Messler, Jr.	ASM International	SAM-HID_00020196 – SAM-HID_00020205
The challenges for joining to keep pace with advancing materials and designs	1996	Messler, Jr.	Materials & Design Volume 16, No. 5	SAM-HID_00020206 – SAM-HID_00020214
Reliability Assessment of Deep Trench Isolation Structures	2005	Moens et al.	IEEE	SAM-HID_00022870 - SAM-HID_00022876

Title	Publication Date	Author(s)	Publisher	Bates Range
Optimized Deep Trench Isolation for High Voltage Smart Power Process	May 2005	Lerner et al.	IEEE	SAM-HID_00020215 – SAM-HID_00020218
3D Integration for NoC-based SoC Architectures	2011	Sheibanyrad et al.	Springer	SAM-HID_00020219 – SAM-HID_00020508
Packaging and Non-Hermetic Encapsulation Technology for Flip Chip on Implantable MEMS Devices	April 11, 2012	Sutanto et al.	IEEE	SAM-HID_00022900 - SAM-HID_00022914
The Effect of Trench Corner Shapes on Local Stress Fields: A Three-Dimensional Finite-Element Modeling Study	March 1993	Stiffler et al.	IEEE	SAM-HID_00022884 - SAM-HID_00022890
Thermal expansion behavior of through-silicon-via structures in three-dimensional microelectronic packaging	November 23, 2011	Cheng et al.	Elsevier	SAM-HID_00020509 – SAM-HID_00020515
Thermal expansion of low-pressure chemical vapor deposition polysilicon films	July 2002	Khan et al.	Materials Research Society; J. Mater. Res. Vol. 17, No. 7	SAM-HID_00020516 – SAM-HID_00020523
Thermal Stresses Analysis of 3-D Interconnect	June 18, 2009	Lu et al.	AIP Publishing	SAM-HID_00020524 – SAM-HID_00020531
Winning the Battle Against Latch-up in CMOS Analog Switches	2001	Redmond	Analog Dialogue 35-05	SAM-HID_00022379 – SAM-HID_00022381

Title	Publication Date	Author(s)	Publisher	Bates Range
Methodology for Analysis of TSV Stress Induced Transistor Variation and Circuit Performance	2012	Yu et al.	IEEE	SAM-HID_00022942 - SAM-HID_00022948
TSV Interposer Fabrication for 3D IC Packaging	2009	Rao et al.	IEEE	SAM-HID_00023098 - SAM-HID_00023104
Stress Characterization of Tungsten-filled Through Silicon Via Arrays using Very High Resolution Multi-Wavelength Raman Spectroscopy	2011	Gambino et al.	The Electrochemical Society	SAM-HID_00023017 - SAM-HID_00023027
Silicon Processing For the VLSI Era; Vol. 2	1990	Wolf et al.	Lattice Press	SAM-HID_00024201 – SAM-HID_00024591
Integrated Circuit Design, Fabrication and Test	1996	Shepherd et al.	Palgrave Macmillan	SAM-HID_00024697 – SAM-HID_00024935
Fabrication of Superconducting Devices and Circuits, Frontiers of Thin Film Technology	2001	Murduck	Academic Press	SAM-HID_00024936 – SAM-HID_00025430
Active and Isolation Trench Fabrication for 100V Vertical LOCOS Power MOSFETS with VICTORY PROCESS and ATHENA	2009	Silvaco	Silvaco	SAM-HID_00023156 - SAM-HID_00023161
A Deep Silicon Via (DSV) Ground for SiGe Power Amplifiers	2010	Blaschke et al.	IEEE	SAM-HID_00022969 - SAM-HID_00022972

Title	Publication Date	Author(s)	Publisher	Bates Range
On-wafer inductance and resistance characterization of sub-5pH deep silicon via (DSV)	2010	Blaschke et al.	IEEE	SAM-HID_00022965 - SAM-HID_00022968
Deep Trench Isolation for 6000V SOI Power Devices	2003	Clavelier et al.	IEEE	SAM-HID_00023013 - SAM-HID_00023016
Electromigration of Cu-Sn-Cu Micropads in 3D Interconnect	2008	Huang et al.	IEEE	SAM-HID_00023028 – SAM-HID_00023033
A 0.35 um SiGe BiCMOS Technology for Power Amplifier Applications	2007	Joseph et al.	IEEE	SAM-HID_00023039- SAM-HID_00023042
Through-Silicon Vias Enable Next-Generation SiGe Power Amplifiers for Wireless Communications	2008	Joseph et al.	IBM	SAM-HID_00023043 - SAM-HID_00023056
A 0.25um CMOS Based 70V Smart Power Technology with Deep Trench for High-Voltage Isolation	2002	Parthasarathy et al.	IEEE	SAM-HID_00023082 - SAM-HID_00023085
The Optimization of Deep Trench Isolation Structure for High Voltage Devices on SOI Substrate	2011	Qian et al.	Elsevier	SAM-HID_00023086 - SAM-HID_00023089
Tower Expands Collaboration with Singapore's IME	2011	Globes' correspondent	Globes	SAM-HID_00026196 - SAM-HID_00026199

Title	Publication Date	Author(s)	Publisher	Bates Range
IME and TowerJazz Combine Expertise to Accelerate MEMS Device Industry Development	2011	TowerJazz	Tower Semiconductor	SAM-HID_00026200 - SAM-HID_00026201
Tower and Jazz Semiconductor Announce Deep-Silicon-Via™ Technology for Cellular and WiFi SiGe Power Amplifiers and Front-End Modules	2009	Tower Semiconductor	Tower Semiconductor	SAM-HID_00026202 - SAM-HID_00026205
Product Catalog, Semiconductor Intellectual Property & Technology Licensing Program, Freescale Semiconductor	2004	Freescale Semiconductor	Freescale Semiconductor	SAM-HID_00022691 - SAM-HID_00022698
Heavy-Ion Broad-Beam and Microprobe Studies of Single-Event Upsets in 0.20-um SiGe Heterojunction Bipolar Transistors and Circuits	2003	Reed et al.	IEEE	SAM-HID_00023140 - SAM-HID_00023146
Autonomous Bit Error Rate Testing at Multi-Gbit/s Rates Implemented in a 5AM SiGe Circuit for Radiation Effects Self Test (CREST)	2005	Marshall et al.	IEEE	SAM-HID_00022657 - SAM-HID_00022665

Title	Publication Date	Author(s)	Publisher	Bates Range
A Comparative Study of Heavy-Ion and Proton-Induced Bit-Error Sensitivity and Complex Burst-Error Modes in Commercially Available High-Speed SiGe BiCMOS	2004	Marshall et al.	IEEE	SAM-HID_00023070 - SAM-HID_00023076
Structure Optimization of Trench-Isolated SiGe HBTs for Simultaneous Improvements in Thermal and Electrical Performances	2005	Rieh et al.	IEEE	SAM-HID_00023147 - SAM-HID_00023155
Excerpt of WEBSTER'S Ninth New Collegiate Dictionary	1985	Merriam-Webster, Inc.	Merriam-Webster, Inc.	SAM-HID_00026191 – SAM-HID_00026195
Excerpt of Merriam-Webster's Collegiate Dictionary	2011	Merriam-Webster, Inc.	Merriam-Webster, Inc.	SAM-HID_00026055 – SAM-HID_00026057
SOI Design: Analog, Memory and Digital Techniques	2003	Marshall et al.	Kluwer Academic Publishers	SAM-HID_00025846 – SAM-HID_00026049
CMOS Logic Circuit Design	2002	Uyemura	Kluwer Academic Publishers	SAM-HID_00024668 – SAM-HID_00024691
The Stuff Dreams Are Made Of [Part 1]	2002	DeMone	Real World Tech	SAM-HID_00022915 - SAM-HID_00022921
SOI for Digital CMOS VLSI: Design Considerations and Advances	1998	Chuang et al.	IEEE	SAM-HID_00024027 - SAM-HID_00024058

Title	Publication Date	Author(s)	Publisher	Bates Range
1Giga bit SOI DRAM with Fully Bulk Compatible Process and Body-Contacted SOI MOSFET Structure	1997	Koh et al.	IEDM	SAM-HID_00025440 – SAM-HID_00025444
Speeding up Transistors: IBM to Make SOI Chips	1998	Derbyshire	Semiconductor Online	SAM-HID_00024059 - SAM-HID_00024060
SOI-CMOS Device Technology	2001	Fukuda, et al.	OKI Technical Review	SAM-HID_00025503 – SAM-HID_00025506
Temperature-Dependent Thermal Conductivity of Single-Crystal Silicon Layers in SOI Substrates	1998	Asheghi et al.	ASME J Heat and Mass Transfer	SAM-HID_00024020 - SAM-HID_00024026
Current Mode Digital Gates for Mixed Mode Reprogrammable Integrated System	2002	Pawlowski	IEEE Int'l Conference on Circuits and Systems for Communications	SAM-HID_00025583 – SAM-HID_00025588
Electronics Circuits and Analysis	2005	Dube	Alpha Science International Ltd.	SAM-HID_00024625 – SAM-HID_00024633
Impact of high-k gate stack material with metal gates on LF noise in n- and p-MOSFETs	2005	Srinivasan et al.	Elsevier B.V.	SAM-HID_00025507 – SAM-HID_00025510
Fundamentals of Semiconductor Physics and Devices	1996	Enderlin et al.	World Scientific	SAM-HID_00024605 – SAM-HID_00024624
Adhesive Chemistry: Developments and Trends	1984	Lieng-Huang Lee (ed.)	Plenum Press	SAM-HID_00023165 - SAM-HID_00024010
OMNIVISION Announces 1.3-Megapixel CMOS Image Sensors	2001	OmniVision	OmniVision	SAM-HID_00022679 - SAM-HID_00022681

Title	Publication Date	Author(s)	Publisher	Bates Range
OMNIVISION Announces Expanded Image Sensor	2001	OmniVision	OmniVision	SAM-HID_00022682 - SAM-HID_00022686
OMNIVISION Datasheet OV9610/OV9110 CMOS Image Sensors	2001	OmniVision	OmniVision	SAM-HID_00026303 - SAM-HID_00026315
Performance Analysis of a Color CMOS Photogate Image Sensor	2000	Blanksby et al.	IEEE	SAM-HID_00026286 - SAM-HID_00026295
Through Silicon Vias Technology for CMOS Image Sensors Packaging	2008	Henry et al.	IEEE	SAM-HID_00026296 - SAM-HID_00026302
Intel Releases 971 PC Camera Kit For Production Of Affordable, Easy-To-Use, Portable PC Cameras	1997	Intel	Intel	SAM-HID_00022673 - SAM-HID_00022675
CMOS Sensor Inc. website describing Contact Image Sensor (CIS)	2002	CMOS Sensor Inc.	CMOS Sensor Inc.	SAM-HID_00022687 - SAM-HID_00022687

Defendants further incorporate by reference all "U.S. Patent Documents" and "Other Publications" cited on the face of the Patents-in-Suit. Any citation to one or more of the above prior art references, or other prior art references regarding any method or system, should be construed to constitute not only a citation to the prior art reference itself, but also a reference to the system itself. Discovery has only just begun in this case, and Defendants will supplement if and when more information becomes available from Plaintiff or third parties.

B. Prior Art Disclosures—Known/Use/Sales/Offers for Sale

Defendants believe that there were prior art disclosures in the form of sales, offers for sale, and/or uses by others of products that qualify as prior art under pre-AIA 35 U.S.C. § 102(a) and/or (b) or under AIA 35 U.S.C. § 102(a)(1) against one or more of the Asserted Claims of the Patents-in-Suit. The below-identified prior art products include products Defendants are currently aware of through an on-going diligent and reasonable investigation at this early stage of discovery and/or based on publicly available information. Details regarding such offers for sale and public uses may be within the possession of third parties. As discovery progresses, Defendants intend and reserve the right to promptly supplement and/or amend the lists below to include additional prior art products that anticipate and/or render obvious the asserted claims. To the extent Plaintiff contends that any systems presented below do not qualify as prior art to one or more Patents-in-Suit, Defendants reserve the right to rely on any of such systems as evidence of simultaneous development as an indicia of obviousness.

Table 3: Prior Art Products

System	Sale or Use Date
Intel Corp.'s 971 PC Camera Kit including CMOS Image Sensor for "portable PC cameras for home and business users"	At least as early as November 3, 1997
OMNIVISION Technologies, Inc.'s CMOS Image Sensors, including 1.3-Megapixel CMOS Image Sensors, OV8610 and OV8110 SVGA Sensors, OV5116 TV Sensor, OV6630 and OV6130 CIF Sensors.	At least as early as April 23, 2001
CMOS Image Sensor, Inc.'s CMOS image sensors.	At least as early as May 3, 2002
Tower Semiconductor's 0.18 µm SiGe BiCMOS product	At least as early as September 29, 2009

System	Sale or Use Date
Freescale/NXP product with deep trench isolation	At least as early as 2002
IBM's SiGe HBT with deep trench isolation	At least as early as 2005
Freescale/NXP RF CMOS product	At least as early as 2004

For the public uses identified herein, Defendants are investigating the identities of the individuals who knew about and/or were involved in the making, first public use, offer for sale and/or sale of these products and systems. Defendants are also investigating the exact date that these products and systems were first made, first publicly used, offered for sale and/or sold. In addition, Defendants are currently investigating the dates of conception and reduction to practice of these products and systems and when these products and systems were first known or used by others.

In the course of their investigation, Defendants may identify additional prior art documents describing these products, systems, and/or disclosures that may also anticipate and/or render obvious as invalidating printed publications. Any citation to one or more of prior art references regarding these products, systems, and/or disclosures should be construed to constitute not only a citation to the prior art reference itself, but also a reference to the associated products, systems, and/or disclosures.

C. Invalidity by Anticipation or Obviousness

Subject to the Defendants' reservation of rights stated in these Invalidity Contentions and based on Defendants' present understanding of the Asserted Claims and the apparent interpretations that Plaintiff are asserting based on Plaintiff's Complaint and its Infringement Contentions, Defendants provide below exemplary references and combinations of references that

anticipate and/or render obvious the Asserted Claims of the ’886 patent in Table 4, exemplary references and combinations of references that anticipate and/or render obvious the Asserted Claims of the ’673 patent in Table 5, exemplary references and combinations of references that anticipate and/or render obvious the Asserted Claims of the ’609 patent in Table 6, and exemplary references and combinations of references that anticipate and/or render obvious the Asserted Claims of the ’826 patent in Table 7.

Aspects of these Invalidity Contentions are based, in whole or in part, on Defendants’ present understanding of Plaintiff’s apparent interpretations of the Asserted Claims based on Plaintiff’s Complaint and its Infringement Contentions. Given Plaintiff’s apparent interpretations of the Asserted Claims, Defendants have attempted to apply those interpretations, but this application of Plaintiff’s interpretations is not an agreement or admission that any of Plaintiff’s interpretations are correct. To be clear, Defendants do not agree with Plaintiff’s Infringement Contentions but are merely offering Invalidity Contentions based on those interpretations.

The references identified in the exhibits attached to these Invalidity Contentions may disclose the elements of the Asserted Claims explicitly and/or inherently, and/or they may be relied upon to show how the state of the art in the relevant time frame invalidates the asserted patent claims. In some instances, multiple prior art publications discuss the same underlying system, software, or other project. For example, some patents and published patent applications reflect commercial products or services offered in the market. It would have been obvious to consider and combine the teachings of a patent or patent application that relate to a certain product or service with the features of that product or service as provided commercially. Similarly, where multiple publications discuss the same underlying product, service, project, or system, it would have been obvious to combine the discussions and disclosures of the publications as they would have been

understood to describe features or potential features of the underlying subject matter. Likewise, where one publication discusses another publication, it would have been obvious to consider and combine the teachings of each publication in combination with each other.

Defendants' contentions that the references in this section, in various combinations, render the Asserted Claims of the Patents-in-Suit obvious under pre-AIA 35 U.S.C. § 103 or AIA 35 U.S.C. § 103 are in no way an admission or suggestion that each reference does not independently anticipate the Asserted Claims under pre-AIA 35 U.S.C. § 102 or AIA 35 U.S.C. § 102. Any of these references may be combined with other disclosed references, the disclosed products and systems, and/or with the knowledge of one of ordinary skill in the art during the relevant time period to render obvious, and, therefore, invalidate, the Asserted Claims of the Patents-in-Suit.

Although Defendants have identified at least one disclosure of a limitation for each prior art reference, each and every disclosure of the same limitation in the same reference is not necessarily identified. To focus on the issues, Defendants cite only exemplary and representative portions of an identified reference, even where a reference may contain additional support for a particular claim limitation. Persons of ordinary skill in the art read an item of prior art as a whole and in the context of other publications and literature. Thus, to understand and interpret any specific statement or disclosure within a prior art reference that Defendants identify as exemplary and representative, such persons of ordinary skill in the art would rely on other information within the reference, along with other publications and their general scientific or engineering knowledge. As such, Defendants may rely upon uncited portions of the prior art references and on other publications and expert testimony to provide context, and as aids to understanding and interpreting the exemplary portions that are cited.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts, as each combination of art would have no unexpected results, and at most would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S. Ct. at 1739-40 (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, instead espousing an "expansive and flexible" approach). That said, the Supreme Court's rationale, that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle," applies equally here. *Id.* at 1742. Nevertheless, in addition to the information contained in the section(s) above and elsewhere in these contentions, Defendants hereby identify additional motivations and reasons to combine the cited art. Further motivations are provided in the attached charts.

One or more combinations of the prior art references identified herein would have been obvious because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompts variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combinations of the prior art references identified above would have been obvious because the combinations represent the known potential options with a reasonable expectation of success.

Motivation to combine any two or more of the identified references, systems, and/or products comes from the fact that one would have been motivated by considerations of miniaturizing components, increasing performance, lowering power consumption, improving noise immunity, reducing manufacturing costs, and improving manufacturing processes, to combine the various teachings. Additional evidence that there would have been a motivation or reason to combine the prior art references identified above includes the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in the marketplace; the existence of a known problem for which there was an obvious solution; the existence of a known need or problem in the field of endeavor at the time of the invention; and the background knowledge that would have been possessed by a person having ordinary skill in the art. For example, the prior art references, systems, and/or products are generally directed to the same or similar problems. Some references expressly incorporate others by reference or are authored by the same inventor. Thus, a skilled artisan seeking to solve these problems would have looked to these cited references in combination.

Thus, the motivation or reason to combine the teachings of the prior art references disclosed herein is found in the references themselves and in: (1) the nature of the problem being solved; (2) the express, implied, and inherent teachings of the prior art; (3) the knowledge of persons of ordinary skill in the art; (4) the fact that the prior art is generally directed towards the same problem; (5) the predictable results obtained in combining the different elements of the prior art; (6) the use of a known technique to improve similar devices, methods, or products in the same way; (7) the predictable results obtained in applying a known technique to a known device, method, or product ready for improvement; (8) the finite number of identified predictable solutions having a reasonable expectation of success; and/or (9) known work in various technological fields

that could be applied to the same or different technological fields based on design incentives or other market forces.

1. '886 Patent

Table 4: Exemplary Anticipatory and Combinations for the Asserted Claims of the '886 Patent

Chart	Prior Art References
A1	Okashita either alone or in combination with one or more of Yu, Nonaka, Krishnan, Watabe, Chuang, Koh-1997, Pawlowski, MARSHALL, and/or Koh-569
A2	Yu either alone or in combination with one or more of UYEMURA, Okashita, Nonaka, Krishnan, Watabe, Chuang, Koh-1997, Pawlowski, MARSHALL, and/or Koh-569
A3	Nonaka either alone or in combination with one or more of MARSHALL, Okashita, Yu, Krishnan, Watabe, Chuang, Koh-1997, Pawlowski, and/or Koh-569
A4	Krishnan either alone or in combination with one or more of MARSHALL, Okashita, Yu, Nonaka, Watabe, Chuang, Koh-1997, and/or Pawlowski
A5	Watabe either alone or in combination with one or more of Okashita, Yu, Nonaka, Krishnan, Chuang, Koh-1997, Pawlowski, and/or MARSHALL
A6	Freescale SOI CMOS Product either alone or in combination with one or more of Okashita, Yu, Nonaka, Krishnan, Watabe, Chuang, Koh-1997, Pawlowski, MARSHALL, and/or Koh-569

The prior art identified above, and in the attached '886 charts, individually anticipate and/or can properly be combined in multiple ways to demonstrate the obviousness of the Asserted Claims of the '886 patent. Various combinations of the references would have naturally been considered as part of the exercise of ordinary skill by one skilled in the art. The references disclosed in the attached charts and herein are also directed to the same or similar features as the purported invention claimed in the Asserted Claims of the '886 patent. To the extent Plaintiff contend that

any of these features solved a problem in the art, the references cited herein show that that problem was known to those of ordinary skill and had already been solved using obvious solutions.

To that end, the Asserted Claims of the ’886 patent simply combine elements already disclosed and well known in the art and yield no more than what one skilled in the art would have expected from such a combination. For example, with respect to the ’886 patent, when confronted with the alleged problems described in the ’886 patent, one of ordinary skill in the art at the time of the alleged invention would have been motivated to consider the techniques taught by the prior art cited in these Invalidity Contentions. Consideration of the teachings of this prior art, both individually and in combination, would necessarily lead to the alleged invention claimed in the ’886 patent. This is demonstrated by the cited prior art, which disclose all of the elements of the Asserted Claims of the ’886 patent, as well as motivations to modify or combine their individual teachings. One of skill in the art would have been motivated to either modify the prior art identified in the claim charts or to combine that prior art in the manner indicated by, for example, their background knowledge, design incentives, effects of demands known to the design community, or other market forces. Moreover, the cited prior art share commonalities. To the extent it is argued that any cited prior art does not expressly disclose a particular claim or element, it would have been inherent in the disclosure and/or obvious to a person of ordinary skill in the art to include the claimed element to perform the invention as claimed in the ’886 patent.

As described in the attached charts, all the elements of the Asserted Claims of the ’886 patent were commonplace before the alleged date of inventions. For each element, there exists evidence from the cited prior art that it was well known in the art prior to the date of invention. To the extent it is argued that any of the cited prior art references, systems, and/or products do not anticipate the Asserted Claims, it would have been obvious to a person of ordinary skill in the art

that the Asserted Claims are merely combinations of well-known methods and systems resulting in expected results.

Additionally, Defendants hereby incorporate by reference the motivations to combine references set forth during the prosecution of the Asserted Claims of the ’886 patent, including the statements and reasoning set forth by the examiner, as to why it would have been obvious to modify or combine references to arrive at the limitations of the Asserted Claims of the ’886 patent. Defendants also incorporate by reference the admissions made in the ’886 patent and/or during prosecution regarding what was already known in the art.

2. ’673 Patent

Table 5: Exemplary Anticipatory and Combinations for the Asserted Claims of the ’673 Patent

Chart	Prior Art References
B1	Yin either alone or in combination with one or more of Norström, Koshimizu, Tews, and/or Wolf
B2	Norström either alone or in combination with Wolf
B3	Koshimizu either alone or in combination with Wolf
B4	Tews either alone or in combination with Wolf
B5	Wolf either alone or in combination with one or more of Norström, Koshimizu, and/or Tews
B6	Freescale CMOS product either alone or in combination with one or more of Yin, Norström, Koshimizu, Tews, and/or Wolf
B7	IBM’s SiGe product either alone or in combination with one or more of Yin, Norström, Koshimizu, Tews, and/or Wolf
B8	Omnivision CMOS product either alone or in combination with one or more of Yin, Norström, Koshimizu, Tews, and/or Wolf
B9	Intel CMOS product either alone or in combination with one or more of Yin, Norström, Koshimizu, Tews, and/or Wolf

Chart	Prior Art References
B10	CMOS Sensor product either alone or in combination with one or more of Yin, Norström, Koshimizu, Tews, and/or Wolf

The prior art identified above, and in the attached ’673 charts, individually anticipate and/or can properly be combined in multiple ways to demonstrate the obviousness of the Asserted Claims of the ’673 patent. Various combinations of the references would have naturally been considered as part of the exercise of ordinary skill by one skilled in the art. The references disclosed in the attached charts and herein are also directed to the same or similar features as the purported invention claimed in the Asserted Claims of the ’673 patent. To the extent Plaintiff contend that any of these features solved a problem in the art, the references cited herein show that that problem was known to those of ordinary skill and had already been solved using obvious solutions.

To that end, the Asserted Claims of the ’673 patent simply combine elements already disclosed and well known in the art and yield no more than what one skilled in the art would have expected from such a combination. For example, with respect to the ’673 patent, when confronted with the alleged problems described in the ’673 patent, one of ordinary skill in the art at the time of the alleged invention would have been motivated to consider the techniques taught by the prior art cited in these Invalidity Contentions. Consideration of the teachings of this prior art, both individually and in combination, would necessarily lead to the alleged invention claimed in the ’673 patent. This is demonstrated by the cited prior art, which disclose all of the elements of the Asserted Claims of the ’673 patent, as well as motivations to modify or combine their individual teachings. One of skill in the art would have been motivated to either modify the prior art identified in the claim charts or to combine that prior art in the manner indicated by, for example, their background knowledge, design incentives, effects of demands known to the design community, or

other market forces. Moreover, the cited prior art share commonalities. To the extent it is argued that any cited prior art does not expressly disclose a particular claim or element, it would have been inherent in the disclosure and/or obvious to a person of ordinary skill in the art to include the claimed element to perform the invention as claimed in the ’673 patent.

As described in the attached charts, all the elements of the Asserted Claims of the ’673 patent were commonplace before the alleged date of inventions. For each element, there exists evidence from the cited prior art that it was well known in the art prior to the date of invention. To the extent it is argued that any of the cited prior art references, systems, and/or products do not anticipate the Asserted Claims, it would have been obvious to a person of ordinary skill in the art that the Asserted Claims are merely combinations of well-known methods and systems resulting in expected results.

Additionally, Defendants hereby incorporate by reference the motivations to combine references set forth during the prosecution of the Asserted Claims of the ’673 patent, including the statements and reasoning set forth by the examiner, as to why it would have been obvious to modify or combine references to arrive at the limitations of the Asserted Claims of the ’673 patent. Defendants also incorporate by reference the admissions made in the ’673 patent and/or during prosecution regarding what was already known in the art.

3. ’609 Patent

Table 6: Exemplary Anticipatory and Combinations for the Asserted Claims of the ’609 Patent

Chart	Prior Art References
C1	Cooney either alone or in combination with one or more of Edelstein, Pogge, Chandrashekar, Yen, Tsui, Kim, Cho, and/or Fujishima
C2	Pogge either alone or in combination with one or more of Edelstein, Chandrashekar, Yen, Tsui, Kim, Cooney, Cho, and/or Fujishima

Chart	Prior Art References
C3	Edelstein either alone or in combination with one or more of Pogge, Chandrashekar, Yen, Tsui, Kim, Cooney, Cho, and/or Fujishima
C4	Chandrashekar either alone or in combination with one or more of Pogge, Edelstein, Yen, Tsui, Kim, Cooney, Cho, and/or Fujishima
C5	Rao either alone or in combination with one or more of Pogge, Edelstein, Tsui, Kim, Kropewnicki, Yelehanka, and/or Gambino
C6	TowerJazz SiGe product either alone or in combination with one or more of Pogge, Edelstein, Tsui, Kim, Cooney, and/or Rao
C7	Omnivision CMOS product either alone or in combination with one or more of Cooney, Edelstein, Pogge, Chandrashekar, Yen, Tsui, Kim, Cho, and/or Fujishima
C8	Intel CMOS product either alone or in combination with one or more of Cooney, Edelstein, Pogge, Chandrashekar, Yen, Tsui, Kim, Cho, and/or Fujishima
C9	CMOS Sensor product either alone or in combination with one or more of Cooney, Edelstein, Pogge, Chandrashekar, Yen, Tsui, Kim, Cho, and/or Fujishima

The prior art identified above, and in the attached ’609 charts, individually anticipate and/or can properly be combined in multiple ways to demonstrate the obviousness of the Asserted Claims of the ’609 patent. Various combinations of the references would have naturally been considered as part of the exercise of ordinary skill by one skilled in the art. The references disclosed in the attached charts and herein are also directed to the same or similar features as the purported invention claimed in the Asserted Claims of the ’609 patent. To the extent Plaintiff contend that any of these features solved a problem in the art, the references cited herein show that that problem was known to those of ordinary skill and had already been solved using obvious solutions.

To that end, the Asserted Claims of the ’609 patent simply combine elements already disclosed and well known in the art and yield no more than what one skilled in the art would have expected from such a combination. For example, with respect to the ’609 patent, when confronted

with the alleged problems described in the ’609 patent, one of ordinary skill in the art at the time of the alleged invention would have been motivated to consider the techniques taught by the prior art cited in these Invalidity Contentions. Consideration of the teachings of this prior art, both individually and in combination, would necessarily lead to the alleged invention claimed in the ’609 patent. This is demonstrated by the cited prior art, which disclose all of the elements of the Asserted Claims of the ’609 patent, as well as motivations to modify or combine their individual teachings. One of skill in the art would have been motivated to either modify the prior art identified in the claim charts or to combine that prior art in the manner indicated by, for example, their background knowledge, design incentives, effects of demands known to the design community, or other market forces. Moreover, the cited prior art share commonalities. To the extent it is argued that any cited prior art does not expressly disclose a particular claim or element, it would have been inherent in the disclosure and/or obvious to a person of ordinary skill in the art to include the claimed element to perform the invention as claimed in the ’609 patent.

As described in the attached charts, all the elements of the Asserted Claims of the ’609 patent were commonplace before the alleged date of inventions. For each element, there exists evidence from the cited prior art that it was well known in the art prior to the date of invention. To the extent it is argued that any of the cited prior art references, systems, and/or products do not anticipate the Asserted Claims, it would have been obvious to a person of ordinary skill in the art that the Asserted Claims are merely combinations of well-known methods and systems resulting in expected results.

Additionally, Defendants hereby incorporate by reference the motivations to combine references set forth during the prosecution of the Asserted Claims of the ’609 patent, including the statements and reasoning set forth by the examiner, as to why it would have been obvious to modify

or combine references to arrive at the limitations of the Asserted Claims of the ’609 patent. Defendants also incorporate by reference the admissions made in the ’609 patent and/or during prosecution regarding what was already known in the art.

4. ’826 Patent

Table 7: Exemplary Anticipatory and Combinations for the Asserted Claims of the ’428 Patent

Chart	Prior Art References
D1	Conn either alone or in combination with Wang and/or Hsu
D2	Gambino844 either alone or in combination with one or more of Conn, Chiu, and/or Burnham
D3	Torii either alone or in combination with Ide917 and/or Ishikawa
D4	Ide310 either alone or in combination with Chang
D5	Ishikawa either alone or in combination with Ide917
D6	Chiu either alone or in combination with Nishio and/or West
D7	Mawatari either alone or in combination with Conn and/or Chiu
D8	Omnivision CMOS product either alone or in combination with one or more of Conn, Burnham, Wang, and/or Hsu
D9	Intel CMOS product either alone or in combination with one or more of Conn, Burnham, Wang, and/or Hsu
D10	CMOS Sensor product either alone or in combination with one or more of Conn, Burnham, Wang, and/or Hsu

The prior art identified above, and in the attached ’826 charts, individually anticipate and/or can properly be combined in multiple ways to demonstrate the obviousness of the Asserted Claims of the ’826 patent. Various combinations of the references would have naturally been considered as part of the exercise of ordinary skill by one skilled in the art. The references disclosed in the attached charts and herein are also directed to the same or similar features as the purported

invention claimed in the Asserted Claims of the ’826 patent. To the extent Plaintiff contend that any of these features solved a problem in the art, the references cited herein show that that problem was known to those of ordinary skill and had already been solved using obvious solutions.

To that end, the Asserted Claims of the ’826 patent simply combine elements already disclosed and well known in the art and yield no more than what one skilled in the art would have expected from such a combination. For example, with respect to the ’826 patent, when confronted with the alleged problems described in the ’826 patent, one of ordinary skill in the art at the time of the alleged invention would have been motivated to consider the techniques taught by the prior art cited in these Invalidity Contentions. Consideration of the teachings of this prior art, both individually and in combination, would necessarily lead to the alleged invention claimed in the ’826 patent. This is demonstrated by the cited prior art, which disclose all of the elements of the Asserted Claims of the ’826 patent, as well as motivations to modify or combine their individual teachings. One of skill in the art would have been motivated to either modify the prior art identified in the claim charts or to combine that prior art in the manner indicated by, for example, their background knowledge, design incentives, effects of demands known to the design community, or other market forces. Moreover, the cited prior art share commonalities. To the extent it is argued that any cited prior art does not expressly disclose a particular claim or element, it would have been inherent in the disclosure and/or obvious to a person of ordinary skill in the art to include the claimed element to perform the invention as claimed in the ’826 patent.

As described in the attached charts, all the elements of the Asserted Claims of the ’826 patent were commonplace before the alleged date of inventions. For each element, there exists evidence from the cited prior art that it was well known in the art prior to the date of invention. To the extent it is argued that any of the cited prior art references, systems, and/or products do not

anticipate the Asserted Claims, it would have been obvious to a person of ordinary skill in the art that the Asserted Claims are merely combinations of well-known methods and systems resulting in expected results.

Additionally, Defendants hereby incorporate by reference the motivations to combine references set forth during the prosecution of the Asserted Claims of the '826 patent, including the statements and reasoning set forth by the examiner, as to why it would have been obvious to modify or combine references to arrive at the limitations of the Asserted Claims of the '826 patent. Defendants also incorporate by reference the admissions made in the '826 patent and/or during prosecution regarding what was already known in the art.

III. Invalidity Under 35 U.S.C. § 112

Defendants contend that one or more of the Asserted Claims are invalid under 35 U.S.C. § 112. As explained below, these claims lack priority, are indefinite, and/or fail to satisfy the written description and/or enablement requirements.[1]

A. '886 Patent

Defendants contend one or more of the Asserted Claims of the '886 patent may be invalid under 35 U.S.C. § 112. Plaintiff's assertions in this forum and/or in the USPTO Patent Trial and

[1] For each of the asserted patents, there exists a wealth of prior art that leads to conclusions of prior art invalidity under Sections 102 and 103. In terms of the teachings provided by this prior art and the motivations to combine different individual prior art references within this wealth of art, these Invalidity Contentions provide numerous examples. Should Plaintiff try to later dispute the teachings provided by this prior art and/or dispute any of the motivations to combine individual references within this wealth of prior art, Plaintiff's later arguments in dispute of what would have been known to person of ordinary skill may well raise additional Section 112 bases for the invalidity of the Asserted Claims, including additional examples of written description deficiencies as well as a lack of an enabling disclosure. Since Plaintiff have not yet shared those positions, should it later choose to do so, Defendants reserve their rights to amend these contentions based on this later provided information.

Appeal Board ("PTAB") may lead to several § 112 invalidity positions on indefiniteness, written description, and/or enablement.

For example, Plaintiff's positions in this forum and/or the PTAB may lead to the '886 patent not providing an adequate written description, much less one that enables the full scope of the claims as Plaintiff intends to present that claim scope. These § 112 issues may apply to at least the following claim terms in combination with the other recited limitations of the claim:

- "thereby forming a source/drain junction capacitance" (claim 1);
- "thereby electrically isolating at least one of said plurality of cascaded transistors" (claim 1); and
- "so as to reduce voltage and current fluctuations in said device layer" (claim 1).

Accordingly, the foregoing claim—and any claim(s) depending directly or indirectly therefrom—may be invalid under 35 U.S.C. § 112, ¶ 1, or 35 U.S.C. § 112(a).

Defendants contend one or more of the Asserted Claims of the '886 patent may be invalid as indefinite under 35 U.S.C. § 112, ¶ 2, or 35 U.S.C. § 112(b) based on the manner in which Plaintiff argues infringement and/or validity of the asserted patent claims. Plaintiff's assertions may lead to the asserted claims failing to inform, with reasonable certainty, those skilled in the art about the scope of the invention. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). Accordingly, these claims may be invalid as indefinite. For example, an artisan of ordinary skill could not discern, with reasonable certainty, the scope of the following claim terms of the '886 patent:

- "having a source/drain junction that does not contact said buried oxide layer, thereby forming a source/drain junction capacitance" (claim 1);
- "at least one trench extending through said device layer and contacting a top

surface of said buried oxide layer, thereby electrically isolating at least one of said plurality of cascaded transistors in said switching circuit so as to reduce voltage and current fluctuations in said device layer" (claim 1); and

- "said plurality of cascaded transistors is situated within an isolated island in said device layer" (claim 3).

Accordingly, these claims—and any claim(s) depending directly or indirectly therefrom—may be invalid under 35 U.S.C. § 112, ¶ 2, or 35 U.S.C. § 112(b) as indefinite.

B. '673 Patent

Defendants contend one or more of the Asserted Claims of the '673 patent may be invalid under 35 U.S.C. § 112. Plaintiff's assertions in this forum and/or in the PTAB may lead to several § 112 invalidity positions on indefiniteness, written description, and/or enablement.

For example, Plaintiff's positions in this forum and/or the PTAB may lead to the '673 patent not providing an adequate written description, much less one that enables the full scope of the claims as Plaintiff intends to present that claim scope. These § 112 issues may apply to at least the following claim terms in combination with the other recited limitations of the claim:

- "[t]he semiconductor die of claim 1, wherein said semiconductor die is enclosed in a semiconductor package" (claim 7); and
- "[t]he semiconductor die of claim 10, wherein said semiconductor die is enclosed in a semiconductor package" (claim 15).

Accordingly, the foregoing claims—and any claim(s) depending directly or indirectly therefrom—may be invalid under 35 U.S.C. § 112, ¶ 1, or 35 U.S.C. § 112(a).

Defendants contend one or more of the Asserted Claims of the '673 patent may be invalid as indefinite under 35 U.S.C. § 112, ¶ 2, or 35 U.S.C. § 112(b) based on the manner in which

Plaintiff argues infringement and/or validity of the asserted patent claims. Plaintiff's assertions may lead to the asserted claims failing to inform, with reasonable certainty, those skilled in the art about the scope of the invention. *Nautilus,* 572 U.S. 898, 901. Accordingly, these claims may be invalid as indefinite. For example, an artisan of ordinary skill could not discern, with reasonable certainty, the scope of the following claim terms of the '673 patent:

- "said at least one trench chamfered corner causes a reduction in a thickness of a polysilicon layer within said trench" (claim 1); and
- "each of said four trench chamfered corners causing a reduction in a thickness of a polysilicon layer within said at least one trench" (claim 10).

Accordingly, these claims—and any claim(s) depending directly or indirectly therefrom—may be invalid under 35 U.S.C. § 112, ¶ 2, or 35 U.S.C. § 112(b) as indefinite.

C. '609 Patent

Defendants contend one or more of the Asserted Claims of the '609 patent may be invalid under 35 U.S.C. § 112. Plaintiff's assertions in this forum and/or in the PTAB may lead to several § 112 invalidity positions on indefiniteness, written description, and/or enablement.

For example, Plaintiff's positions in this forum and/or the PTAB may lead to the '609 patent not providing an adequate written description, much less one that enables the full scope of the claims as Plaintiff intends to present that claim scope. These § 112 issues may apply to at least the following claim terms in combination with the other recited limitations of the claim:

- "each of said plurality of through silicon vias having a hollow center to reduce thermal stress in said semiconductor substrate, said hollow center being entirely surrounded by said conductive filler to provide space for said conductive filler to expand inward" (claim 1);

- "each of said plurality of through silicon vias has a pinched off region at a bottom portion" (claim 1);
- "said hollow center is tapered in said pinched off region" (claim 1); and
- "said pinched off region is formed by tapering a bottom portion of each of said plurality of through silicon vias" (claim 2);

Accordingly, the foregoing claims—and any claim(s) depending directly or indirectly therefrom—may be invalid under 35 U.S.C. § 112, ¶ 1, or 35 U.S.C. § 112(a).

Defendants contend one or more of the Asserted Claims of the '609 patent may be invalid as indefinite under 35 U.S.C. § 112, ¶ 2, or 35 U.S.C. § 112(b) based on the manner in which Plaintiff argues infringement and/or validity of the asserted patent claims. Plaintiff's assertions may lead to the asserted claims failing to inform, with reasonable certainty, those skilled in the art about the scope of the invention. *Nautilus*, 572 U.S. at 901. Accordingly, these claims may be invalid as indefinite. For example, an artisan of ordinary skill could not discern, with reasonable certainty, the scope of the following claim terms of the '609 patent:

- "a plurality of through silicon vias disposed in said substrate extending from a top surface of said substrate to a bottom surface of said substrate" (claim 1);
- "each of said plurality of through silicon vias having a hollow center to reduce thermal stress in said semiconductor substrate" (claim 1);
- "said hollow center being entirely surrounded by said conductive filler to provide space for said conductive filler to expand inward" (claim 1); and
- "each of said plurality of through silicon vias has a pinched off region at a bottom portion to prevent contamination during processing of said semiconductor substrate" (claim 1).

Accordingly, this claim—and any claim(s) depending directly or indirectly therefrom—may be invalid under 35 U.S.C. § 112, ¶ 2, or 35 U.S.C. § 112(b) as indefinite.

D. ’826 Patent

Defendants contend one or more of the Asserted Claims of the ’826 patent may be invalid under 35 U.S.C. § 112. Plaintiff’s assertions in this forum and/or in the PTAB may lead to several § 112 invalidity positions on indefiniteness, written description, and/or enablement.

For example, Plaintiff’s positions in this forum and/or the PTAB may lead to the ’826 patent not providing an adequate written description, much less one that enables the full scope of the claims as Plaintiff intends to present that claim scope. These § 112 issues may apply to at least the following claim terms in combination with the other recited limitations of the claims:

- “A method comprising: forming at least one anchor via in at least one corner of a semiconductor substrate; depositing a metal filler within said at least one anchor via, said metal filler having a protruding portion extending from a backside of said semiconductor substrate; forming a backside metal layer on a bottom surface of said semiconductor substrate, said backside metal layer being bonded to said protruding portion of said metal filler of said at least one anchor via; wherein said metal filler within said at least one anchor via does not provide ground connection to one or more active devices in said semiconductor substrate” (claim 11);
- “wherein said forming said at least one anchor via comprises forming a cluster of anchor vias” (claim 12);
- “wherein said forming said at least one anchor via comprises forming a plurality of anchor vias in a straight line along a periphery of said semiconductor substrate” (claim 14); and

- "further comprising bonding said metal filler within said at least one anchor via to a metal layer overlying said semiconductor substrate" (claim 19).

Accordingly, the foregoing claims—and any claim(s) depending directly or indirectly therefrom—may be either invalid under 35 U.S.C. § 112, ¶ 1, or 35 U.S.C. § 112(a) or lack priority.

Defendants contend one or more of the Asserted Claims of the '826 patent may be invalid as indefinite under 35 U.S.C. § 112, ¶ 2, or 35 U.S.C. § 112(b) based on the manner in which Plaintiff argues infringement and/or validity of the asserted patent claims. Plaintiff's assertions may lead to the asserted claims failing to inform, with reasonable certainty, those skilled in the art about the scope of the invention. *Nautilus*, 572 U.S. at 901. Accordingly, these claims may be invalid as indefinite. For example, an artisan of ordinary skill could not discern, with reasonable certainty, the scope of the following claim terms of the '826 patent:

- "corner of a semiconductor substrate" (claims 1, 11); and
- "wherein said metal filler within said at least one anchor via does not provide ground connection to one or more active devices in said semiconductor substrate" (claims 1, 11).

Accordingly, these claims—and any claim(s) depending directly or indirectly therefrom—may be invalid under 35 U.S.C. § 112, ¶ 2, or 35 U.S.C. § 112(b) as indefinite.

IV. P.R. 3-4: Document Production Accompanying Invalidity Contentions

Defendants have produced documents, including SAM-HID_00000158 through SAM-HID_00000837, SAM-HID_00000951 through SAM-HID_00006268, SAM-HID_00006359 through SAM-HID_00008909, SAM-HID_00009232 through SAM-HID_00010284, SAM-HID_00010364 through SAM-HID_00018405, and SAM-HID_00026336 through SAM-HID_00028399, pursuant to P.R. 3-4(a) and P.R. 3-4(b).

Dated: September 26, 2024

/s/ Benjamin Schlesinger
Otis W. Carroll, Jr.
Texas State Bar No. 03895700
Collin M. Maloney
Texas State Bar No. 00794219
Mandy Nelson
Texas State Bar No. 24055270
CARROLL MALONEY HENRY & NELSON, PLLC
1327 Dominion Plaza, Ste. 100
Tyler, Texas 75703
Telephone: (903) 561-1600
Facsimile: (903) 581-1071
otis@cmhnlaw.com
collin@cmhnlaw.com
mandy@cmhnlaw.com

Gerald F. Ivey (*pro hac vice*)
Parmanand K. Sharma (*pro hac vice*)
Christina Ji-Hye Yang (*pro hac vice*)
Chen Zhang (*pro hac vice*)
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, LLP
901 New York Avenue, N.W.
Washington, D.C. 20001-4413
Telephone: (202) 408-4000
Facsimile: (202) 408-4400
gerald.ivey@finnegan.com
parmanand.sharma@finnegan.com
christina.yang@finnegan.com
chen.zhang@finnegan.com

Charles H. Suh (*pro hac vice*)
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, LLP
1875 Explorer Street, 8th Floor
Reston, VA 20190-6023
Telephone: (571) 203-2700
Facsimile: (202) 408-4400
charles.suh@finnegan.com

Benjamin Schlesinger (*pro hac vice*)
Shawn S. Chang (*pro hac vice*)
Wyatt L. Bazrod (*pro hac vice*)

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, LLP
271 17th St. NW Suite 1400
Atlanta, GA 30363-6209
Telephone: (404) 653-6400
Facsimile: (202) 408-4400
benjamin.schlesinger@finnegan.com
shawn.chang@finnegan.com
wyatt.bazrod@finnegan.com

Jinwoo Kim (*pro hac vice*)
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, LLP
3300 Hillview Avenue, 2nd Floor
Palo Alto, CA 94304
Telephone: (650) 849-6600
Facsimile: (650) 849-6666

Attorneys for Defendants
Samsung Electronics Co., Ltd. &
Samsung Electronics America, Inc

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on September 26, 2024, copies of the foregoing Defendants' Invalidity Contentions and Exhibits have been served to Plaintiff through its counsel of record via email.

/s/ Seth D. Katz
Seth D. Katz
Case Manager