

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

LONE STAR SILICON INNOVATIONS LLC,

Plaintiff,

v.

TOSHIBA CORPORATION,
TOSHIBA AMERICA, INC.,
TOSHIBA AMERICA ELECTRONICS
COMPONENTS, INC., SANDISK
CORPORATION, and WESTERN DIGITAL
CORPORATION,

Defendants.

Civil Action No. 2:16-cv-1170-JRG RSP

JURY TRIAL DEMANDED

FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff, Lone Star Silicon Innovations LLC, complains against Defendants Toshiba Corporation, Toshiba America, Inc., Toshiba America Electronics Components, Inc., SanDisk Corporation, and Western Digital Corporation (collectively “Defendants”) as follows:

NATURE OF ACTION

1. This is an action for patent infringement of United States Patent Nos. 5,912,188; 6,023,085; 6,388,330; and Reissue No. 39,518 (collectively, the “Patents in Suit”) under the Patent Laws of the United States, 35 U.S.C. § 1, *et seq.*

THE PARTIES

2. Plaintiff Lone Star Silicon Innovations LLC (“Lone Star”) is a corporation organized and existing under the laws of the State of Texas with its principle place of business at

8105 Rasor Blvd., Suite 210, Plano, Texas, 75024. Lone Star is in the business of licensing patented technology. Lone Star is the assignee of the Patents in Suit.

3. Toshiba Corporation (“Toshiba”) is a Japanese multinational company with its principal place of business at 1-1, Shibaura 1-chome, Minato-ku, Tokyo 105-8001, Japan. Toshiba Corporation conducts business in and is doing business in Texas and in this District and elsewhere in the United States, including, without limitation, using, promoting, offering to sell, importing and/or selling memory devices and/or devices that incorporate memory devices that embody the patented technology, and enabling end-user purchasers to use such devices in this District.

4. Toshiba America, Inc. (“Toshiba America”) is a corporation organized under the laws of the state of Delaware with its principal place of business at 1251 Avenue of the Americas, Suite 4110, New York, NY 10020. Toshiba America’s registered agent for service of process in the State of Texas is CT Corporation System, located at 1999 Bryan St., Ste. 900, Dallas, TX 75201. Upon information and belief, Toshiba America is a wholly-owned subsidiary of Toshiba. Defendant Toshiba America conducts business in and is doing business in Texas and in the District and elsewhere in the United States, including, without limitation, using, promoting, offering to sell, importing and/or selling memory devices and/or devices that incorporate memory devices that embody patented technology, and enabling end-user purchasers to use such devices in this District.

5. Toshiba America Electronic Components, Inc. (“TAEC”) is a corporation organized under the laws of the State of California with principal places of business at 9740 Irvine Blvd, Suite D700, Irvine, CA 92618. TAEC’s registered agent for service of process in the State of Texas is CT Corporation System, located at 1999 Bryan St., Ste. 900, Dallas, TX 75201. Upon information and belief, TAEC is a wholly-owned subsidiary of Toshiba America. TAEC conducts business in and is doing business in Texas and in the District and elsewhere in the United States,

including, without limitation, using, promoting, offering to sell, importing and/or selling memory devices and/or devices that incorporate memory devices that embody patented technology, and enabling end-user purchasers to use such devices in this District.

6. Upon information and belief, Toshiba Corporation controls and is the majority owner of Toshiba America and TAEC and these defendants are joint tortfeasors with one another with respect to the matters alleged herein.

7. SanDisk Corporation (“SanDisk”) is a corporation organized under the laws of the State of Delaware having a principal place of business at 951 Sandisk Drive, Milpitas, California 95035. SanDisk’s registered agent for service of process in the State of Texas is CT Corporation System, 1999 Bryan St., Suite 900, Dallas, Texas 75201. SanDisk conducts business in and is doing business in Texas and in this District and elsewhere in the United States, including, without limitation, using, promoting, offering to sell, importing and/or selling memory devices and/or devices that incorporate memory devices that embody the patented technology, and enabling end-user purchasers to use such devices in this District.

8. Western Digital Corporation (“Western Digital”) is a corporation organized under the laws of the State of Delaware having a principal place of business at 3355 Michelson Drive, Suite 100, Irvine, California 92612. Western Digital, by itself and through its subsidiaries, conducts business in and is doing business in Texas and in this District and elsewhere in the United States, including, without limitation, using, promoting, offering to sell, importing and/or selling memory devices and/or devices that incorporate memory devices that embody the patented technology, and enabling end-user purchasers to use such devices in this District.

9. Upon information and belief, in May 2016, SanDisk was acquired by Western Digital pursuant to a merger agreement dated October 21, 2015 (the “Merger Agreement”). Upon

information and belief, pursuant to the Merger Agreement, SanDisk continues as a wholly owned subsidiary of Western Digital Technologies, Inc., which is a wholly owned subsidiary of Western Digital. Western Digital refers to SanDisk as one of its brands.

10. Upon information and belief, subsequent to the acquisition, Western Digital and SanDisk are joint tortfeasors with one another with respect to the matters alleged herein.

JURISDICTION AND VENUE

11. This action arises under the Patent Laws of the United States, Title 35 of the United States Code. This Court has subject matter jurisdiction over this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

12. On information and belief, Defendants are subject to this Court's specific and general personal jurisdiction pursuant to due process and/or the Texas Long Arm Statute, due at least to their substantial business conducted in this forum, directly and/or through intermediaries, including (i) having solicited business in the State of Texas, transacted business within the State of Texas and attempted to derive financial benefit from residents of the State of Texas, including benefits directly related to the instant patent infringement causes of action set forth herein; (ii) having placed their products and services into the stream of commerce throughout the United States and having been actively engaged in transacting business in Texas and in this District; and (iii) either alone or in conjunction with others, having committed acts of infringement within Texas and in this District. On information and belief, within this district Defendants, directly and/or through intermediaries, have advertised (including through websites), offered to sell, sold and/or distributed infringing products, and/or have induced the sale and use of infringing products in the United States and in Texas. Each Defendant has, directly or through its distribution network, purposefully and voluntarily placed such products in the stream of commerce knowing and

expecting them to be purchased and used by consumers in Texas. Each Defendant has either committed direct infringement in Texas or committed indirect infringement based on acts of direct infringement in Texas. Further, on information and belief, Defendants are subject to this Court's general jurisdiction, including from regularly doing or soliciting business, engaging in other persistent courses of conduct, and/or deriving substantial revenue from goods and services provided to individuals in Texas and in this District.

13. On information and belief, Defendants do one or more of the following with memory devices and/or devices that incorporate memory devices that embody the patented technology that they or their foundries manufacture: (a) make these devices in the United States for sale to customers, including customers in Texas; (b) import these devices into the United States for sale to consumers, including consumers in Texas; (c) sell them or offer them for sale in the United States, including to customers in Texas; and/or (d) sell them to customers who incorporate them into products that such customers import, sell or offer for sale in the United States, including in Texas.

14. Venue lies in this District pursuant to 28 U.S.C. §§ 1391(b), 1391(c) and 1400(b) because each Defendant is subject to personal jurisdiction in this District, resides in, has regularly conducted business in this District and/or has committed acts of patent infringement in this District. Without limitation, on information and belief, within this District Defendants, directly and/or through intermediaries, have advertised (including through websites), offered to sell, sold and/or distributed infringing products, and/or have induced the sale and use of infringing products.

THE PATENTS IN SUIT

15. On June 15, 1999, U.S. Patent No. 5,912,188 ("the '188 patent"), entitled "Method Of Forming A Contact Hole In An Interlevel Dielectric Layer Using Dual Etch Stops," a copy of

which is attached hereto as Exhibit A, was duly and legally issued. The '188 patent issued from U.S. patent application Serial Number 08/905,686 filed August 4, 1997, and discloses and relates to the design of and processes for fabricating semiconductor memory devices. The inventors assigned all right, title, and interest in the '188 patent to Advanced Micro Devices, Inc. (hereinafter "AMD"). AMD assigned its entire right, title, and interest in the '188 patent to Lone Star, and Lone Star is the sole owner of all rights, title and interest in and to the '188 patent including the right to sue for and collect past, present and future damages and to seek and obtain injunctive or any other relief for infringement of the '188 patent.

16. On February 8, 2000, U.S. Patent No. 6,023,085 ("the '085 patent"), entitled "Core Cell Structure And Corresponding Process For NAND-Type High Performance Flash Memory Device," a copy of which is attached hereto as Exhibit B, was duly and legally issued. The '085 patent issued from U.S. patent application Serial Number 08/993,910 filed December 18, 1997, and discloses and relates to the design of and processes for fabricating NAND-type flash memory semiconductor devices. The inventors assigned all right, title, and interest in the '085 patent to AMD. AMD assigned its entire right, title, and interest in the '085 patent to Lone Star, and Lone Star is the sole owner of all rights, title and interest in and to the '085 patent including the right to sue for and collect past, present and future damages and to seek and obtain injunctive or any other relief for infringement of the '085 patent.

17. On May 14, 2002, U.S. Patent No. 6,388,330 ("the '330 patent"), entitled "Low Dielectric Constant Etch Stop Layers In Integrated Circuit Interconnects," a copy of which is attached hereto as Exhibit C, was duly and legally issued. The '330 patent issued from U.S. patent application Serial Number 09/776,012 filed February 1, 2001, and discloses and relates to the design of and processes for fabricating semiconductor devices. The inventors assigned all right,

title, and interest in the '330 patent to AMD. AMD assigned its entire right, title, and interest in the '330 patent to Lone Star, and Lone Star is the sole owner of all rights, title and interest in and to the '330 patent including the right to sue for and collect past, present and future damages and to seek and obtain injunctive or any other relief for infringement of the '330 patent.

18. On March 13, 2007, U.S. Reissue Patent No. 39,518 (“the '518 patent”), entitled “Run To Run Control Process For Controlling Critical Dimensions,” a copy of which is attached hereto as Exhibit D, was duly and legally issued. The '518 patent issued from U.S. patent application Serial Number 09/908,390, filed July 18, 2001, and discloses and relates to the design of and processes for fabricating semiconductor memory devices. The '518 patent is a reissue of U.S. Patent No. 5,926,690, which originally issued from an application filed May 28, 1997. The inventors assigned all right, title, and interest in the '518 patent to AMD. AMD assigned its entire right, title, and interest in the '518 patent to Lone Star, and Lone Star is the sole owner of all rights, title and interest in and to the '518 patent including the right to sue for and collect past, present and future damages and to seek and obtain injunctive or any other relief for infringement of the '518 patent.

DEFENDANTS' INFRINGING PRODUCTS AND METHODS

The Toshiba Defendants

19. Defendants Toshiba Corporation, Toshiba America and TAEC (collectively “the Toshiba Defendants”) make, use, sell, offer for sale and/or import into the United States NAND Flash memory devices and storage products incorporating such devices. These NAND Flash memory devices are electrically re-writeable, non-volatile semiconductor memory devices that retain content when power is turned off. The Toshiba Defendants' NAND Flash memory devices are integrated into a variety of applications that are imported, sold, and used in the United States,

including mobile devices, computers, wearable devices, industrial robots, audiovisual systems, automotive applications, and networking and other commercial and consumer applications. The Toshiba Defendants' NAND Flash memory devices are also incorporated into removable storage devices, such as SD and microSD memory cards, wireless LAN memory cards, SDHC and SDXC memory cards, and USB Flash drives. The Toshiba Defendants also provide enterprise and client solid state drives ("SSDs") incorporating their NAND Flash memory, which are components of notebooks, desktops, workstations and other consumer computing products, as well as servers and storage devices. The Toshiba Defendants also offer products which incorporate their NAND Flash memory with control functionality. For example, the Toshiba Defendants' e-MMC products combine NAND Flash control functionality such as Error Code Correction, wear leveling, and bad block management. NAND Flash memory devices manufactured by Toshiba Corporation are also incorporated into a variety of NAND Flash storage products made, used, sold, offered for sale and/or imported by SanDisk.

20. Despite not having a license to the '188 patent or '518 patent, the Toshiba Defendants have used the semiconductor fabrication methods claimed therein in making Flash memory devices and storage products. Despite not having a license to the '085 patent and '330 patent, the Toshiba Defendants' Flash memory devices and storage products adopt the designs claimed therein.

Defendant SanDisk Corporation and Western Digital

21. SanDisk makes, uses, sells, offers for sale and/or imports into the United States NAND Flash memory devices. These Flash storage devices contain electrically re-writeable, non-volatile semiconductor memory devices that retain content when power is turned off. SanDisk's Flash memory devices are utilized in a variety of storage applications, including SSDs, embedded

products, removable memory cards, USB drives, wireless media drives, digital media players, and wafers and components. They are imported, sold, and used in the United States in various forms, such as in mobile devices, computers, digital camcorders, digital cameras, e-readers, game consoles, GPS devices, other commercial and consumer applications. Subsequent to the acquisition of SanDisk, Western Digital has sold and offered for sale SanDisk Flash memory devices.

22. Despite not having a license to the '188 patent or '518 patent, SanDisk has used the semiconductor fabrication methods claimed therein in making Flash memory devices and storage products. Despite not having a license to the '085 patent and '330 patent, SanDisk Flash memory devices and storage products adopt the designs claimed therein.

Toshiba/SanDisk Joint Venture for Production of NAND Flash Memory

23. Upon information and belief, since at least 1999 SanDisk and Toshiba Corporation have collaborated as joint venturers with respect to their NAND Flash memory products. Through multiple joint ventures, SanDisk and Toshiba collaborate in the research, development, and manufacture of NAND Flash memory wafers, which are fabricated at Toshiba Corporation's facilities in Yokkaichi, Japan, using semiconductor manufacturing equipment owned or leased by the joint venture.

24. Upon information and belief, SanDisk and Toshiba currently operate jointly through three business ventures: Flash Partners Ltd., formed in 2004, which operates primarily in Toshiba's Fab 3 facility; Flash Alliance Ltd., formed in 2006, which operates primarily in Toshiba's Fab 4 facility; and Flash Forward Ltd., formed in 2010, which operates primarily in Toshiba's Fab 5 facility. Collectively, these joint ventures provide SanDisk and Toshiba with NAND wafers for use in their end products and the products of their respective customers. Upon

information and belief, in October 2015, SanDisk entered into an agreement with Toshiba related to the construction and operation of Toshiba's "New Fab 2" fabrication facility, and SanDisk and the Toshiba Defendants began production of NAND Flash wafers in the New Fab 2 in January 2016.

25. Upon information and belief, SanDisk and Toshiba Corporation co-own the joint venture entities, through which they each contribute funds to pay the costs of the joint ventures' operations and purchase a portion of the joint ventures' NAND Flash wafer supply. Upon information and belief, SanDisk purchases substantially all of its NAND Flash supply through these joint venture relationships with Toshiba Corporation.

26. Toshiba Corporation and SanDisk are joint tortfeasors with respect to their respective NAND Flash memory devices developed and manufactured through their joint venture relationship, and storage products incorporating those memory devices, which Defendants use, sell, offer for sale, and/or import into the United States and supply to various customers or resellers who in turn use, sell, offer for sale, and /or import them into the United States.

27. The causes of action alleged against the Defendants herein arise out of the same transaction, occurrence, or series of transactions or occurrences, such that the Toshiba Defendants, SanDisk, and Western Digital are properly joined as Defendants. Upon information and belief, all or substantially all of the products accused of infringement in this action, and the associated manufacturing methods, were developed jointly by Toshiba Corporation and SanDisk, and the Defendants have and will continue to jointly utilize the fabrication processes and facilities involved in producing the accused products. The Patents in Suit are directed to methods used in the manufacture of NAND Flash wafers made through the joint venture relationship and to design features of the memory circuits fabricated on those wafers. Thus the same operative facts underlie

the claims of patent infringement asserted against each Defendant. Because the alleged acts of infringement against the Toshiba Defendants, SanDisk, and Western Digital involve the same accused processes and product features, and because the NAND Flash memory devices and storage products made, used, sold, offered for sale, and/or imported by the Toshiba Defendants, SanDisk, and Western Digital are produced using the same processes and facilities and have the identical accused product features, the facts underlying Lone Star's claims of infringement against Defendants, therefore, are closely linked and the claims arise out of the same transaction, occurrence, or series of transactions or occurrences.

FIRST CAUSE OF ACTION – INFRINGEMENT OF THE '188 PATENT

28. Plaintiff hereby repeats and re-alleges the allegations contained in paragraphs 1 to 27, as if fully set forth herein.

29. Defendants directly and/or through their subsidiaries, affiliates, agents, and/or business partners, have in the past and continue to directly infringe the '188 patent pursuant to 35 U.S.C. § 271(g) by importing, using, selling or offering to sell NAND Flash memory semiconductor devices in the United States made using the methods claimed in the '188 patent, including at least claims 1-5 and 7-10. On information and belief, NAND Flash memory semiconductor devices manufactured by Defendants and/or other related entities that they control, are made using a process that practices the claims of the '188 patent including practicing the steps of: (a) providing a semiconductor substrate; (b) forming a gate over the substrate; (c) forming a source/drain region in the substrate; (d) providing a source/drain contact electrically coupled to the source/drain region; (e) forming an interlevel dielectric layer that includes first, second and third dielectric layers over the source/drain contact; (f) forming an etch mask over the interlevel dielectric layer; (g) applying a first etch which is highly selective of the first dielectric layer with

respect to the second dielectric layer through an opening in the etch mask using the second dielectric layer as an etch stop, to form a first hole in the first dielectric layer that extends to the second dielectric layer without extending to the third dielectric layer; (h) applying a second etch which is highly selective of the second dielectric layer with respect to the third dielectric layer through the opening in the etch mask using the third dielectric layer as an etch stop, to form a second hole in the second dielectric layer that extends to the third dielectric layer without extending to the source/drain contact; and (i) applying a third etch which is highly selective of the third dielectric layer with respect to the source/drain contact through the opening in the etch mask, form a third hole in the third dielectric layer that extends to the source/drain contact, such that the first, second and third holes in combination provide a contact hole in the interlevel dielectric layer.

30. Defendants have been and are engaged in one or more of these direct infringing activities related to their NAND Flash memory devices manufactured using their 15 nanometer process, a representative example being Defendants' SDSAQ-032G 32 GB Class 4 UHS-I MicroSDHC NAND Flash card; NAND Flash devices made using Defendants' 19 nanometer process, a representative example being Defendants' TH58TEG7D2JBA4C 128 GB MLC Toggle-mode NAND flash chip; NAND Flash devices made using Defendants' 24 nanometer process, a representative example being Defendants' 24 nanometer X3 (3 bit per cell) 64GB NAND Flash contained in the SanDisk SDSAQY-064G-A11A MicroSDXC Memory Card; NAND Flash devices made using Defendants' 32 nanometer process, a representative example being Defendants' 32 nanometer 32 GB X3 (3 bit per cell) NAND Flash contained in the SanDisk 32GB microSDHC card; and all other NAND flash devices that include transistors and related structures having a contact hole extending through first, second and third dielectric layers to a source/drain

contact formed using a process involving dual etch stops in accordance with the methods of the asserted claims of the '188 patent ("the '188 Patent Accused NAND Flash Products").

31. With regard to the Toshiba Defendants, the '188 Patent Accused NAND Flash Products are sold as NAND Flash wafers, NAND Flash chips, or included as components of NAND Flash storage products, such products including at least SLC NAND Flash Memory (used in products such as mobile phones, printers, game consoles, servers, digital TVs, industrial equipment, and SSDs), NAND Flash Memories with an Integrated Controller, NAND Flash media cards, and USB Flash Memory. With regard to SanDisk and Western Digital, the '188 Patent Accused NAND Flash Products are sold in a variety of forms, including enterprise and client NAND Flash solid state drives, embedded NAND Flash products, removable NAND Flash products, and as memory wafers and memory components.

32. Defendants, directly and/or through their subsidiaries, affiliates, agents, and/or business partners, have been and are now indirectly infringing the '188 patent, including at least claims 1-5 and 7-10, pursuant to 35 U.S.C. § 271(b) by actively inducing acts of direct infringement performed by others. Defendants have actual notice of the '188 patent and the infringement alleged herein at least upon the service of this Complaint. Upon information and belief, Defendants have numerous lawyers and other active agents of Defendants and of their owned and controlled subsidiaries who regularly review patents and published patent applications relevant to technology in the fields of the Patents in Suit, specifically including patents directed to semiconductor memory devices issued to competitors such as AMD, the original assignee of the '188 patent. Upon information and belief, the Toshiba Defendants themselves have been issued over 46,000 patents held in the name of one of the Toshiba Defendants or the related entity, Kabushiki Kaisha Toshiba, including more than 150 patents prosecuted in the USPTO in the same

classifications as the '188 patent, giving the Toshiba Defendants intimate knowledge of the art in fields relevant to this civil action. Upon information and belief, SanDisk itself has been issued over 3,900 patents, including numerous patents prosecuted in the USPTO in the same classifications as the '188 patent, giving SanDisk intimate knowledge of the art in fields relevant to this civil action. The timing, circumstances and extent of Defendants obtaining actual knowledge of the '188 patent prior to the commencement of this lawsuit will be confirmed during discovery.

33. Upon gaining knowledge of the '188 patent, it was, or became, apparent to Defendants that the manufacture, sale, importing, offer for sale, and use of their '188 Accused NAND Flash Products results in infringement of the '188 patent. Upon information and belief, Defendants have continued and will continue to engage in activities constituting inducement of infringement, notwithstanding their knowledge, or willful blindness thereto, that the activities they induce result in infringement of the '188 patent.

34. The '188 Accused NAND Flash Products are intended for integration into products known to be sold widely in the United States. As joint venturers, Defendants Toshiba Corporation and SanDisk make NAND Flash semiconductor devices using methods claimed in the '188 patent, which devices infringe when they are imported into, or sold, used, or offered for sale in, the United States. Defendants indirectly infringe by inducing customers (such as makers of mobile devices, desktop computers and other devices that use NAND Flash memory) to import products that integrate NAND Flash semiconductor devices made using the methods claimed in the '188 patent, or to sell or use such products, or offer them for sale, in the United States. For example, Defendants induce third-party manufacturers, original equipment manufacturers (OEMs), importers, resellers, and other customers who purchase devices manufactured at the overseas facilities pursuant to the

joint venture relationship, to import devices made using the methods claimed in the '188 patent, or to sell or use such devices, or offer them for sale in the United States without authority.

35. Defendants encourage customers, resellers, OEMs, or others to import into the United States and sell and use in the United States the '188 Accused NAND Flash Products made using the methods claimed in the '188 patent with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties. On information and belief, after Defendants obtained knowledge of the '188 patent, the '188 Accused NAND Flash Products have been and will continue to be imported into the United States and sold in large volumes by themselves and by others, such as customers, distributors, and resellers. Defendants are aware that the '188 Accused NAND Flash Products are always made using the same fabrication methods under Defendants' direction and control such that Defendants' customers will infringe one or more claims of the '188 patent by incorporating such NAND Flash semiconductor devices in other products, and that subsequent importation, sale and use of such products in the United States would be a direct infringement of the '188 patent. Therefore, Defendants are aware that their customers will infringe the '188 patent by importing, selling and using the products supplied by Defendants.

36. Defendants directly benefit from and actively and knowingly encourage customers, resellers, and users' importation of these products into the United States and sale and use within the United States. Defendants actively encourage customers and downstream users, OEMs, and resellers to import, use, and sell in the United States the '188 Accused NAND Flash Products that they manufacture and supply, including through advertising, marketing and sales activities directed at United States sales. On information and belief, Defendants are aware of the size and importance of the United States market for customers of Defendants' products, and also distribute or supply these products intended for importation, use, and sale in the United States. Defendants routinely

market their infringing NAND Flash memory products to third parties for inclusion in products that are sold to customers in the United States, as well as directly to end-user customers. Defendants have publicly stated that their Flash products are targeted for applications such as mobile phones, SSDs, tablets, computers, industrial and automotive applications, and removable storage devices, all of which are widely sold and used in the United States. Defendants have numerous direct sales, distributors, and reseller outlets for these products in the United States. Defendants' marketing efforts show that they have specifically intended to and have induced direct infringement in the United States.

37. Defendants also provide OEMs, manufacturers, importers, resellers, customers, and end users instructions, user guides, and technical specifications on how to incorporate the '188 Accused NAND Flash Products into electronics products that are made, used, sold, offered for sale in and/or imported into the United States. When OEMs, manufacturers, importers, resellers, customers, and end users follow such instructions, user guides, and technical specifications and embed the products in end products and make, use, offer to sell, sell, and/or import them into the United States, they directly infringe one or more claims of the '188 patent. Defendants know that by providing such instructions, user guides, and technical specifications, OEMs, manufacturers, importers, resellers, customers, and end users follow them, and therefore directly infringe one or more claims of the '188 patent. Defendants thus know that their actions actively induce infringement.

38. Defendants have engaged and will continue to engage in additional activities to specifically target the United States market for the '188 Accused NAND Flash products and actively induce OEMs, manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the '188 patent in the United States. For example, Defendants have

showcased their NAND Flash memory technologies at various industry events, including CES and the Flash Memory Summit, and through written materials distributed in the United States, in an effort to encourage various OEMs, manufacturers, importers, resellers, customers, and end users to include the infringing technology in their computers, mobile devices, removable storage devices and other products. These events are attended by the direct infringers mentioned above and generally by companies that make, use, offer to sell, sell, and/or import into the United States products that use NAND Flash memory components such as those made by Defendants.

39. Defendants derive significant revenue by selling their NAND Flash memory products to third parties who directly infringe the '188 patent in the United States. Defendants' extensive sales and marketing efforts, sales volume, and partnerships all evidence their intent to induce companies to infringe one or more claims of the '188 patent by using, offering to sell, selling, or importing products that incorporate the '188 Accused NAND Flash Products in the United States. Defendants have had specific intent to induce infringement or have been willfully blind to the direct infringement they are inducing.

40. Defendants' direct and indirect infringement of the '188 patent has injured Lone Star, and Lone Star is entitled to recover damages adequate to compensate for such infringement pursuant to 35 U.S.C. § 284. Unless they cease their infringing activities, Defendants will continue to injure Lone Star by infringing the '188 patent.

41. On information and belief, Defendants acted egregiously and with willful misconduct in that their actions constituted direct or indirect infringement of a valid patent, and this was either known or so obvious that Defendants should have known about it. Defendants continue to infringe the '188 patent by making, using, selling, offering for sale and importing in the United States the '188 Accused NAND Flash Products and to induce the direct infringement

of others performing these acts, or they have acted at least in reckless disregard of Lone Star's patent rights. On information and belief, Defendants will continue their infringement notwithstanding actual knowledge of the '188 patent and without a good faith basis to believe that their activities do not infringe any valid claim of the '188 patent. All infringement of the '188 patent following Defendants' knowledge of the '188 patent is willful and Lone Star is entitled to treble damages and attorneys' fees and costs incurred in this action under 35 U.S.C. §§ 284 and 285.

SECOND CAUSE OF ACTION – INFRINGEMENT OF THE '085 PATENT

42. Plaintiff hereby repeats and re-alleges the allegations contained in paragraphs 1 to 27, as if fully set forth herein.

43. Defendants, directly and/or through their subsidiaries, affiliates, agents, and/or business partners, have in the past and continue to directly infringe the '085 patent, including at least claims 1, 3, 4 and 6, pursuant to 35 U.S.C. § 271(a) by making, using, selling, offering to sell, and/or importing NAND Flash memory devices that embody the inventions claimed in the '085 patent, within the United States and within this District. In violation of the '085 patent, for example, Defendants' accused NAND Flash memory devices: include (a) a core region including a stacked gate flash memory cell structure and a select gate transistor, and a periphery region including a low voltage transistor and a high voltage transistor; and (b) the select gate transistor and the low voltage transistor both have a gate oxide layer and a gate electrode layer; and (c) a thickness of the gate oxide layer of the select gate transistor and the low voltage transistor are substantially the same; and (d) a thickness of the gate electrode layer of the select gate transistor and the low voltage transistor are substantially the same.

44. Defendants have been and are engaged in one or more of these direct infringing activities related to their NAND Flash memory devices manufactured using their 15 nanometer process, a representative example being Defendants' SDSAQ-032G 32 GB Class 4 UHS-I MicroSDHC NAND Flash card; NAND Flash devices made using Defendants' 19 nanometer process, a representative example being Defendants' TH58TEG7D2JBA4C 128 GB MLC Toggle-mode NAND flash chip; NAND Flash devices made using Defendants' 24 nanometer process, a representative example being Defendants' 24 nanometer X3 (3 bit per cell) 64GB NAND Flash contained in the SanDisk SDSAQY-064G-A11A MicroSDXC Memory Card; NAND Flash devices made using Defendants' 32 nanometer process, a representative example being Defendants' 32 nanometer 32 GB X3 (3 bit per cell) NAND Flash contained in the SanDisk 32GB microSDHC card; and all other NAND Flash devices having a select gate transistor, a low voltage transistor and a high voltage transistor with gate oxide layers and gate electrode layers of thicknesses that are in accordance with the asserted structures of the claims of the '085 Patent ("the '085 Patent Accused NAND Flash Products").

45. With regard to the Toshiba Defendants, the '085 Accused NAND Flash Products are sold as NAND Flash wafers, NAND Flash chips, or included as components of NAND Flash storage products, such products including at least SLC NAND Flash Memory (used in products such as mobile phones, printers, game consoles, servers, digital TVs, industrial equipment, and SSDs), NAND Flash Memories with an Integrated Controller, NAND Flash media cards, and USB Flash Memory. With regard to SanDisk and Western Digital, the '085 Accused NAND Flash Products are sold in a variety of forms, including enterprise and client NAND Flash solid state drives, embedded NAND Flash products, removable NAND Flash products, and as memory wafers and memory components.

46. Defendants, directly and/or through their subsidiaries, affiliates, agents, and/or business partners, have been and are now indirectly infringing the '085 patent, including at least claims 1, 3, 4 and 6, pursuant to 35 U.S.C. § 271(b) by actively inducing acts of direct infringement performed by others. Defendants have actual notice of the '085 patent and the infringement alleged herein at least upon the service of this Complaint. Upon information and belief, Defendants have numerous lawyers and other active agents of Defendants and of their owned and controlled subsidiaries who regularly review patents and published patent applications relevant to technology in the fields of the Patents in Suit, specifically including patents directed to semiconductor memory devices issued to competitors such as AMD, the original assignee of the '085 patent. Upon information and belief, the Toshiba Defendants themselves have been issued over 46,000 patents held in the name of one of the Toshiba Defendants or the related entity, Kabushiki Kaisha Toshiba, including over 650 patents prosecuted in the USPTO in the same classifications as the '085 patent, giving the Toshiba Defendants intimate knowledge of the art in fields relevant to this civil action. The Toshiba Defendants have had previous actual notice of the '085 patent prior to the filing of this Complaint at least through their efforts to patent related technologies. The '085 patent is listed on the face of U.S. Patent No. 6,214,665 ("the '665 patent") issued to Kabushiki Kaisha Toshiba on April 10, 2001, indicating that it was among the references reference cited against and considered by the USPTO and Kabushiki Kaisha Toshiba during prosecution of the '665 patent. Accordingly, the Toshiba Defendants have had actual notice of the '085 patent since at least the issue date of the '665 patent. The '085 patent is also listed on the face of U.S. Patent No. 7,109,547, issued to Kabushi Kaisha Toshiba on September 19, 2006, and on the face of U.S. Patent No. 7,579,647, issued to Kabushi Kaisha Toshiba on August 25, 2009, and on the face of U.S. Patent No. 7,307,307, issued to Kabushi Kaisha Toshiba on December 11, 2007, demonstrating that the

Toshiba Defendants had further notice of the '085 patent well prior to the commencement of this legal action. Upon information and belief, SanDisk itself has been issued over 3,900 patents, including over 100 patents prosecuted in the USPTO in the same classifications as the '085 patent, giving SanDisk intimate knowledge of the art in fields relevant to this civil action. The timing, circumstances and extent of Defendants obtaining actual knowledge of the '085 patent prior to the commencement of this lawsuit will be confirmed during discovery.

47. Upon gaining knowledge of the '085 patent, it was, or became, apparent to Defendants that the manufacture, sale, importing, offer for sale and use of their '085 Accused NAND Flash Products results in infringement of the '085 patent. Upon information and belief, Defendants have continued and will continue to engage in activities constituting inducement of infringement, notwithstanding their knowledge, or willful blindness thereto, that the activities they induce result in infringement of the '085 patent.

48. The '085 Accused NAND Flash Products are intended for integration into products known to be sold widely in the United States. As joint venturers, Defendants Toshiba Corporation and SanDisk make NAND Flash semiconductor devices that embody the inventions claimed in the '085 patent, which devices infringe when they are imported into, or sold, used, or offered for sale in, the United States. Defendants indirectly infringe by inducing customers (such as makers of mobile devices, desktop computers and other devices that use Flash memory) to import products that integrate Flash semiconductor devices embodying inventions claimed in the '085 patent, or to sell or use such products, or offer them for sale, in the United States. For example, Defendants induce third-party manufacturers, OEMs, importers, resellers, and other customers who purchase devices manufactured at the overseas facilities pursuant to the joint venture relationship, to import

devices embodying inventions claimed in the '085 patent, or to sell or use such devices, or offer them for sale in the United States without authority.

49. Defendants encourage customers, resellers, OEMs, or others to import into the United States and sell and use in the United States the '085 Accused NAND Flash Products embodying inventions claimed in the '085 patent with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties. On information and belief, after Defendants obtained knowledge of the '085 patent, the '085 Accused NAND Flash Products have been and will continue to be imported into the United States and sold in large volumes by themselves and by others, such as customers, distributors, and resellers. Defendants are aware that the '085 Accused NAND Flash Products are integral components of the computer and mobile products incorporating them, that the infringing NAND Flash Products are built into the computer and other products, and cannot be removed or disabled by a purchaser of the consumer products containing the infringing Flash memory devices, such that Defendants' customers will infringe one or more claims of the '085 patent by incorporating such Flash semiconductor devices in other products, and that subsequent importation, sale and use of such products in the United States would be a direct infringement of the '085 patent. Therefore, Defendants are aware that their customers will infringe one or more claims of the '085 patent by selling, offering for sale, importing and/or using the products as-sold and as-marketed by Defendants.

50. Defendants directly benefit from and actively and knowingly encourage customers, resellers, and users' importation of these products into the United States and sale and use within the United States. Defendants actively encourage customers and downstream users, OEMs, and resellers to import, use, and sell in the United States the '085 Accused NAND Flash Products that they manufacture and supply, including through advertising, marketing and sales activities directed

at United States sales. On information and belief, Defendants are aware of the size and importance of the United States market for customers of Defendants' products, and also distribute or supply these products intended for importation, use, and sale in the United States. Defendants routinely market their infringing NAND Flash memory products to third parties for inclusion in products that are sold to customers in the United States, as well as directly to end-user customers. Defendants have publicly stated that their Flash products are targeted for applications such as mobile phones, SSDs, tablets, computers, industrial and automotive applications, and removable storage devices, all of which are widely sold and used in the United States. Defendants have numerous direct sales, distributors, and reseller outlets for these products in the United States. Defendants' marketing efforts show that they have specifically intended to and have induced direct infringement in the United States.

51. Defendants also provide OEMs, manufacturers, importers, resellers, customers, and end users instructions, user guides, and technical specifications on how to incorporate the '085 Accused NAND Flash Products into electronics products that are made, used, sold, offered for sale in and/or imported into the United States. When OEMs, manufacturers, importers, resellers, customers, and end users follow such instructions, user guides, and technical specifications and embed the products in end products and make, use, offer to sell, sell, and/or import into the United States, they directly infringe one or more claims of the '085 patent. Defendants know that by providing such instructions, user guides, and technical specifications, OEMs, manufacturers, importers, resellers, customers, and end users follow them, and therefore directly infringe one or more claims of the '085 patent. Defendants thus know that their actions actively induce infringement.

52. Defendants have engaged and will continue to engage in additional activities to specifically target the United States market for the '085 Accused NAND Flash products and actively induce OEMs, manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the '085 patent in the United States. For example, Defendants have showcased their NAND Flash memory technologies at various industry events, including CES and the Flash Memory Summit, and through written materials distributed in the United States, in an effort to encourage various OEMs, manufacturers, importers, resellers, customers, and end users to include the infringing technology in their computers, mobile devices, removable storage devices and other products. These events are attended by the direct infringers mentioned above and generally by companies that make, use, offer to sell, sell, and/or import into the United States products that use NAND Flash memory components such as those made by Defendants.

53. Defendants derive significant revenue by selling the '085 Accused NAND Flash Products to third parties who directly infringe the '085 patent in the United States. Defendants' extensive sales and marketing efforts, sales volume, and partnerships all evidence their intent to induce companies to infringe one or more claims of the '085 patent by, using, offering to sell, selling, or importing products that incorporate the '085 Accused NAND Flash Products, in the United States. Defendants have had specific intent to induce infringement or have been willfully blind to the direct infringement they are inducing.

54. Upon information and belief, Defendants have continued and will continue to engage in activities constituting contributory infringement of the '085 patent, including at least claims 1, 3, 4 and 6, pursuant to 35 U.S.C. § 271(c). Defendants contributorily infringe with knowledge that the '085 Accused NAND Flash Products, or the use thereof, infringe the '085 patent. Defendants knowingly and intentionally contributed to the direct infringement of the '085

patent by others, by supplying these NAND Flash memory chipset products, that embody a material part of the claimed invention of the '085 patent, that are known by the Defendants to be specially made or adapted for use in an infringing manner. For example, and without limitation, the '085 Accused NAND Flash Products are used in end products, including solid state drives, thumb drives, computers, laptops and mobile telephones. The '085 Accused NAND Flash Products are not staple articles or commodities of commerce suitable for non-infringing use and are especially made for or adapted for use in infringing the '085 patent. There are no substantial uses of the '085 Accused NAND Flash Products that do not infringe the '085 patent. By contributing a material part of the infringing computing products sold, offered for sale, imported and used by their customers, resellers and users, Defendants have been and are now indirectly infringing the '085 patent under 35 U.S.C. § 271(c).

55. Defendants' direct and indirect infringement of the '085 patent has injured Lone Star, and Lone Star is entitled to recover damages adequate to compensate for such infringement pursuant to 35 U.S.C. § 284. Unless they cease their infringing activities, Defendants will continue to injure Lone Star by infringing the '085 patent.

56. On information and belief, Defendants acted egregiously and with willful misconduct in that their actions constituted direct or indirect infringement of a valid patent, and this was either known or so obvious that Defendants should have known about it. Defendants continue to infringe the '085 patent by making, using, selling, offering for sale and importing in the United States the '085 Accused NAND Flash Products and to induce the direct infringement of others performing these acts, or they have acted at least in reckless disregard of Lone Star's patent rights. On information and belief, Defendants will continue their infringement notwithstanding actual knowledge of the '085 patent and without a good faith basis to believe that

their activities do not infringe any valid claim of the '085 patent. All infringement of the '085 patent following Defendants' knowledge of the '085 patent is willful and Lone Star is entitled to treble damages and attorneys' fees and costs incurred in this action under 35 U.S.C. §§ 284 and 285.

THIRD CAUSE OF ACTION – INFRINGEMENT OF THE '330 PATENT

57. Plaintiff hereby repeats and re-alleges the allegations contained in paragraphs 1 to 27, as if fully set forth herein.

58. Defendants, directly and/or through their subsidiaries, affiliates, agents, and/or business partners, have in the past and continue to directly infringe the '330 patent pursuant to 35 U.S.C. § 271(a) by making, using, selling, offering to sell, and/or importing NAND Flash memory semiconductor devices that embody the inventions claimed in the '330 patent, within the United States and within this District, including at least claims 1 and 5. In violation of the '330 patent, Defendants' accused NAND Flash memory devices include: (a) a semiconductor substrate having a semiconductor device provided thereon; (b) a first dielectric layer formed over the semiconductor substrate having a first opening; (c) a first conductor core filling the first opening and connected to the semiconductor device; (d) an etch stop layer of silicon nitride formed over the first dielectric layer and the first conductor core, the etch stop layer having a dielectric constant below 5.5; (e) a second dielectric layer formed over the etch stop layer and having a second opening open to the first conductor core; and (f) a second conductor core filling the second opening and connected to the first conductor core.

59. Defendants have been and are engaged in one or more of these direct infringing activities related to their NAND Flash memory devices manufactured using their 15 nanometer process, a representative examples being Defendants' SDSDQ-032G 32 GB Class 4 UHS-I

MicroSDHC NAND Flash card; NAND Flash devices made using Defendants' 19 nanometer process, a representative example being Defendants' TH58TEG7D2JBA4C 128 GB MLC Toggle-mode NAND flash chip; and all other NAND flash devices having transistor interconnects designed in accordance with the asserted claims of the '330 Patent ("the '330 Patent Accused NAND Flash Products").

60. With regard to the Toshiba Defendants, the '330 Accused NAND Flash Products are sold as NAND Flash wafers, NAND Flash chips, or included as components of NAND Flash storage products, such products including at least SLC NAND Flash Memory (used in products such as mobile phones, printers, game consoles, servers, digital TVs, industrial equipment, and SSDs), NAND Flash Memories with an Integrated Controller, NAND Flash media cards, and USB Flash Memory. With regard to SanDisk and Western Digital, the '330 Accused NAND Flash Products are sold in a variety of forms, including enterprise and client NAND Flash solid state drives, embedded NAND Flash products, removable NAND Flash products, and as memory wafers and memory components.

61. Defendants, directly and/or through their subsidiaries, affiliates, agents, and/or business partners, have been and are now indirectly infringing the '330 patent under 35 U.S.C. § 271(b) by actively inducing acts of direct infringement performed by others. Defendants have actual notice of the '330 patent and the infringement alleged herein at least upon the service of this Complaint, including at least claims 1 and 5. Upon information and belief, Defendants have numerous lawyers and other active agents of Defendants and of their owned and controlled subsidiaries who regularly review patents and published patent applications relevant to technology in the fields of the Patents in Suit, specifically including patents directed to semiconductor memory devices issued to competitors such as AMD, the original assignee of the '330 patent. Upon

information and belief, the Toshiba Defendants themselves have been issued over 46,000 patents held in the name of one of the Toshiba Defendants or the related entity, Kabushiki Kaisha Toshiba, including over 300 patents prosecuted in the USPTO in the same classifications as the '330 patent, giving the Toshiba Defendants intimate knowledge of the art in fields relevant to this civil action. Upon information and belief, SanDisk itself has been issued over 3,900 patents, including numerous patents prosecuted in the USPTO in the same classifications as the '330 patent, giving SanDisk intimate knowledge of the art in fields relevant to this civil action. The timing, circumstances and extent of Defendants obtaining actual knowledge of the '330 patent prior to the commencement of this lawsuit will be confirmed during discovery.

62. Upon gaining knowledge of the '330 patent, it was, or became, apparent to Defendants that the manufacture, sale, importing, offer for sale, and use of their '330 Accused NAND Flash Products result in infringement of the '330 patent. Upon information and belief, Defendants have continued and will continue to engage in activities constituting inducement of infringement, notwithstanding their knowledge, or willful blindness thereto, that the activities they induce result in infringement of the '330 patent under 35 U.S.C. § 271(b).

63. The '330 Accused NAND Flash Products are intended for integration into products known to be sold widely in the United States. As joint venturers, Defendants Toshiba Corporation and SanDisk make NAND Flash devices that embody the inventions claimed in the '330 patent, which devices infringe when they are imported into, or sold, used, or offered for sale in, the United States. Defendants indirectly infringe by inducing customers (such as makers of mobile devices, desktop computers and other devices that use NAND Flash memory) to import products that integrate NAND Flash devices embodying inventions claimed in the '330 patent, or to sell or use such products, or offer them for sale, in the United States. For example, Defendants induce third-

party manufacturers, OEMs, importers, resellers, and other customers who purchase devices manufactured at the overseas facilities pursuant to the joint venture relationship, to import devices embodying inventions claimed in the '330 patent, or to sell or use such devices, or offer them for sale in the United States without authority.

64. Defendants encourage customers, resellers, OEMs, or others to import into the United States and sell and use in the United States the '330 Accused NAND Flash Products embodying inventions claimed in the '330 patent with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties. On information and belief, after Defendants obtained knowledge of the '330 patent, the '330 Accused NAND Flash Products have been and will continue to be imported into the United States and sold in large volumes by themselves and by others, such as customers, distributors, and resellers. Defendants are aware that the '330 Accused NAND Flash Products are integral components of the computer and mobile products incorporating them, that the infringing NAND Flash Products are built into the computer and other products, and cannot be removed or disabled by a purchaser of the consumer products containing the infringing NAND Flash memory devices, such that Defendants' customers will infringe one or more claims of the '330 patent by incorporating such NAND Flash devices in other products, and that subsequent importation, sale and use of such products in the United States would be a direct infringement of the '330 patent. Therefore, Defendants are aware that their customers will infringe one or more claims of the '330 patent by selling, offering for sale, importing and/or using the products as-sold and as-marketed by Defendants.

65. Defendants directly benefit from and actively and knowingly encourage customers, resellers, and users' importation of these products into the United States and sale and use within the United States. Defendants actively encourage customers and downstream users, OEMs, and

resellers to import, use, and sell in the United States the '330 Accused NAND Flash Products that they manufacture and supply, including through advertising, marketing, and sales activities directed at United States sales. On information and belief, Defendants are aware of the size and importance of the United States market for customers of Defendants' products, and also distribute or supply these products intended for importation, use, and sale in the United States. Defendants routinely market their infringing NAND Flash memory products to third parties for inclusion in products that are sold to customers in the United States, as well as directly to end-user customers. Defendants have publicly stated that their NAND Flash products are targeted for applications such as mobile phones, SSDs, tablets, computers, industrial and automotive applications and removable storage devices, all of which are widely sold and used in the United States. Defendants have numerous direct sales, distributors, and reseller outlets for these products in the United States. Defendants' marketing efforts show that they have specifically intended to and have induced direct infringement in the United States.

66. Defendants also provide OEMs, manufacturers, importers, resellers, customers, and end users instructions, user guides, and technical specifications on how to incorporate the '330 Accused NAND Flash Products into electronics products that are made, used, sold, offered for sale in and/or imported into the United States. When OEMs, manufacturers, importers, resellers, customers, and end users follow such instructions, user guides, and technical specifications and embed the products in end products and make, use, offer to sell, sell, and/or import into the United States, they directly infringe one or more claims of the '330 patent. Defendants know that by providing such instructions, user guides, and technical specifications, OEMs, manufacturers, importers, resellers, customers, and end users follow them, and therefore directly infringe one or

more claims of the '330 patent. Defendants thus know that their actions actively induce infringement.

67. Defendants have engaged and will continue to engage in additional activities to specifically target the United States market for the '330 Accused NAND Flash Products and actively induce OEMs, manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the '330 patent in the United States. For example, Defendants have set up a global sales network that includes the United States to encourage various OEMs, manufacturers, importers, resellers, customers, and end users to include their infringing technology in their computers, mobile devices, removable storage devices and other products.

68. Defendants derive significant revenue by selling the '330 Accused NAND Flash Products to third parties who directly infringe the '330 patent in the United States. Defendants' extensive sales and marketing efforts, sales volume, and partnerships all evidence their intent to induce companies to infringe one or more claims of the '330 patent by, using, offering to sell, selling, or importing products that incorporate the '330 Accused NAND Flash Products, in the United States. Defendants have had specific intent to induce infringement or have been willfully blind to the direct infringement they are inducing.

69. Upon information and belief, Defendants have continued and will continue to engage in activities constituting contributory infringement of the '330 patent under 35 U.S.C. § 271(c), including at least claims 1 and 5. Defendants contributorily infringe with knowledge that the '330 Accused NAND Flash Products, or the use thereof, infringe the '330 patent. Defendants knowingly and intentionally contributed to the direct infringement of the '330 patent by others, by supplying these NAND Flash memory chipset products, that embody a material part of the claimed invention of the '330 patent, that are known by the Defendants to be specially made or adapted for

use in an infringing manner. For example, and without limitation, the '330 Accused NAND Flash Products are used in end products, including computers, laptops, tablets and mobile telephones. The '330 Accused NAND Flash Products are not staple articles or commodities of commerce suitable for non-infringing use and are especially made for or adapted for use in infringing the '330 patent. There are no substantial uses of the '330 Accused NAND Flash Products that do not infringe the '330 patent. By contributing a material part of the infringing computing products sold, offered for sale, imported and used by their customers, resellers and users, Defendants have been and are now indirectly infringing the '330 patent under 35 U.S.C. § 271(c).

70. Defendants' direct and indirect infringement of the '330 patent has injured Lone Star, and Lone Star is entitled to recover damages adequate to compensate for such infringement pursuant to 35 U.S.C. § 284. Unless they cease their infringing activities, Defendants will continue to injure Lone Star by infringing the '330 patent.

71. On information and belief, Defendants acted egregiously and with willful misconduct in that their actions constituted direct or indirect infringement of a valid patent, and this was either known or so obvious that Defendants should have known about it. Defendants continue to infringe the '330 patent by making, using, selling, offering for sale and importing in the United States the '330 Accused NAND Flash Products and to induce the direct infringement of others performing these acts, or they have acted at least in reckless disregard of Lone Star's patent rights. On information and belief, Defendants will continue their infringement notwithstanding actual knowledge of the '330 patent and without a good faith basis to believe that its activities do not infringe any valid claim of the '330 patent. All infringement of the '330 patent following Defendants' knowledge of the '330 patent is willful and Lone Star is entitled to treble damages and attorneys' fees and costs incurred in this action under 35 U.S.C. §§ 284 and 285.

FOURTH CAUSE OF ACTION – INFRINGEMENT OF THE '518 PATENT

72. Plaintiff hereby repeats and re-alleges the allegations contained in paragraphs 1 to 27, as if fully set forth herein.

73. Defendants directly and/or through their subsidiaries, affiliates, agents, and/or business partners, have in the past and continue to directly infringe the '518 patent pursuant to 35 U.S.C. § 271(g) by importing, using, selling or offering to sell NAND Flash memory semiconductor devices in the United States made using the methods claimed in the '518 patent, including at least claims 1-9, 13 and 15-17. On information and belief, NAND Flash memory semiconductor devices manufactured by Defendants and/or other related entities that they control, are made using a process that practices the claims of the '518 patent including practicing the steps of: (a) patterning, exposing, and developing a photoresist layer on a wafer in a photolithography process that forms a plurality of structures on the integrated circuit including a gate; (b) measuring a DICD critical dimension of the gate following developing of the photoresist layer in a Develop Inspection Critical Dimensions (DICD) operation; (c) etching the wafer including etching of the gate; (d) measuring a FICD critical dimension of the gate following etching of the wafer in a Final Inspection Critical Dimensions (FICD) operation; (e) feeding forward the DICD critical dimension to a process model; (f) feeding back the FICD critical dimension to the process model; and (g) controlling a photoresist deposit and etch process recipe parameter in the process model according to the DICD critical dimension and the FICD critical dimension of the gate to improve critical dimension uniformity.

74. Defendants have been and are engaged in one or more of these direct infringing activities related to all NAND Flash memory devices manufactured using their 15 nanometer process node, a representative example being Defendants' SDSAQ-032G 32 GB Class 4 UHS-I

MicroSDHC NAND Flash card made using their 15 nanometer process; NAND Flash devices made using Defendants' 19 nanometer process node, a representative example being Defendants' TH58TEG7D2JBA4C 128 GB MLC Toggle-mode NAND flash chip; NAND Flash devices made using Defendants' 24 nanometer process, a representative example being Defendants' 24 nanometer X3 (3 bit per cell) 64GB NAND Flash contained in the SanDisk SDSDQY-064G-A11A MicroSDXC Memory Card; NAND Flash devices made using Defendants' 32 nanometer process, a representative example being Defendants' 32 nanometer 32 GB X3 (3 bit per cell) NAND Flash contained in the SanDisk 32GB microSDHC card; NAND Flash devices made using Defendants' 43 nanometer process node; and all other NAND Flash devices made by a substantially similar process involving controlling photoresist etch parameters as a function of D1CD critical dimension and F1DC critical dimensions of the gate in accordance with the asserted methods of the claims of the '518 patent ("the '518 Accused NAND Flash Products").

75. With regard to the Toshiba Defendants, the '518 Accused NAND Flash Products are sold as NAND Flash wafers, NAND Flash chips, or included as components of NAND Flash storage products, such products including at least SLC NAND Flash Memory (used in products such as mobile phones, printers, game consoles, servers, digital TVs, industrial equipment, and SSDs), NAND Flash Memories with an Integrated Controller, NAND Flash media cards, and USB Flash Memory. With regard to SanDisk and Western Digital, the '518 Accused NAND Flash Products are sold in a variety of forms, including enterprise and client NAND Flash solid state drives, embedded NAND Flash products, removable NAND Flash products, and as memory wafers and memory components.

76. Defendants, directly and/or through their subsidiaries, affiliates, agents, and/or business partners, have been and are now indirectly infringing the '518 patent, including at least

claims 1-9, 13 and 15-17, pursuant to 35 U.S.C. § 271(b) by actively inducing acts of direct infringement performed by others. Defendants have actual notice of the '518 patent and the infringement alleged herein at least upon the service of this Complaint. Upon information and belief, Defendants have numerous lawyers and other active agents of Defendants and of their owned and controlled subsidiaries who regularly review patents and published patent applications relevant to technology in the fields of the Patents in Suit, specifically including patents directed to semiconductor memory devices issued to competitors such as AMD, the original assignee of the '518 patent. Upon information and belief, the Toshiba Defendants themselves have been issued over 46,000 patents held in the name of one of the Toshiba Defendants or the related entity, Kabushiki Kaisha Toshiba, including dozens of patents prosecuted in the USPTO in the same classifications as the '518 patent, giving the Toshiba Defendants intimate knowledge of the art in fields relevant to this civil action. Upon information and belief, SanDisk itself has been issued over 3,900 patents, including numerous patents prosecuted in the USPTO in the same classifications as the '518 patent, giving SanDisk intimate knowledge of the art in fields relevant to this civil action. The timing, circumstances and extent of Defendants obtaining actual knowledge of the '518 patent prior to the commencement of this lawsuit will be confirmed during discovery.

77. Upon gaining knowledge of the '518 patent, it was, or became, apparent to Defendants that the manufacture, sale, importing, offer for sale, and use of their '518 Accused NAND Flash Products results in infringement of the '518 patent. Upon information and belief, Defendants have continued and will continue to engage in activities constituting inducement of infringement, notwithstanding their knowledge, or willful blindness thereto, that the activities they induce result in infringement of the '518 patent.

78. The '518 Accused NAND Flash Products are intended for integration into products known to be sold widely in the United States. As joint venturers, Defendants Toshiba Corporation and SanDisk make NAND Flash semiconductor devices using methods claimed in the '518 patent, which devices infringe when they are imported into, or sold, used, or offered for sale in, the United States. Defendants indirectly infringe by inducing customers (such as makers of mobile devices, desktop computers and other devices that use NAND Flash memory) to import products that integrate NAND Flash semiconductor devices made using the methods claimed in the '518 patent, or to sell or use such products, or offer them for sale, in the United States. For example, Defendants induce third-party manufacturers, OEMs, importers, resellers, and other customers who purchase devices manufactured at the overseas facilities pursuant to the joint venture relationship, to import devices made using the methods claimed in the '518 patent, or to sell or use such devices, or offer them for sale in the United States without authority.

79. Defendants encourage customers, resellers, OEMs, or others to import into the United States and sell and use in the United States the '518 Accused NAND Flash Products made using the methods claimed in the '518 patent with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties. On information and belief, after Defendants obtained knowledge of the '518 patent, the '518 Accused NAND Flash Products have been and will continue to be imported into the United States and sold in large volumes by themselves and by others, such as customers, distributors, and resellers. Defendants are aware that the '518 Accused NAND Flash Products are always made using the same fabrication methods under Defendants' direction and control such that Defendants' customers will infringe one or more claims of the '518 patent by incorporating such NAND Flash semiconductor devices in other products, and that subsequent importation, sale and use of such products in the United States would

be a direct infringement of the '518 patent. Therefore, Defendants are aware that their customers will infringe the '518 patent by importing, selling and using the products supplied by Defendants.

80. Defendants directly benefit from and actively and knowingly encourage customers, resellers, and users' importation of these products into the United States and sale and use within the United States. Defendants actively encourage customers and downstream users, OEMs, and resellers to import, use, and sell in the United States the '518 Accused NAND Flash Products that they manufacture and supply, including through advertising, marketing and sales activities directed at United States sales. On information and belief, Defendants are aware of the size and importance of the United States market for customers of Defendants' products, and also distribute or supply these products intended for importation, use, and sale in the United States. Defendants routinely market their infringing NAND Flash memory products to third parties for inclusion in products that are sold to customers in the United States, as well as directly to end-user customers. Defendants have publicly stated that their Flash products are targeted for applications such as mobile phones, SSDs, tablets, computers, industrial and automotive applications and removable storage devices, all of which are widely sold and used in the United States. Defendants have numerous direct sales, distributors, and reseller outlets for these products in the United States. Defendants' marketing efforts show that they have specifically intended to and have induced direct infringement in the United States.

81. Defendants also provide OEMs, manufacturers, importers, resellers, customers, and end users instructions, user guides, and technical specifications on how to incorporate the '518 Accused NAND Flash Products into electronics products that are made, used, sold, offered for sale in and/or imported into the United States. When OEMs, manufacturers, importers, resellers, customers, and end users follow such instructions, user guides, and technical specifications and

embed the products in end products and make, use, offer to sell, sell, and/or import them into the United States, they directly infringe one or more claims of the '518 patent. Defendants know that by providing such instructions, user guides, and technical specifications, OEMs, manufacturers, importers, resellers, customers, and end users follow them, and therefore directly infringe one or more claims of the '518 patent. Defendants thus know that their actions actively induce infringement.

82. Defendants have engaged and will continue to engage in additional activities to specifically target the United States market for the '518 Accused NAND Flash products and actively induce OEMs, manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the '518 patent in the United States. For example, Defendants have showcased their NAND Flash memory technologies at various industry events, including CES and the Flash Memory Summit, and through written materials distributed in the United States, in an effort to encourage various OEMs, manufacturers, importers, resellers, customers, and end users to include the infringing technology in their computers, mobile devices, removable storage devices and other products. These events are attended by the direct infringers mentioned above and generally by companies that make, use, offer to sell, sell, and/or import into the United States products that use NAND Flash memory components such as those made by Defendants.

83. Defendants derive significant revenue by selling their NAND Flash memory products to third parties who directly infringe the '518 patent in the United States. Defendants' extensive sales and marketing efforts, sales volume, and partnerships all evidence their intent to induce companies to infringe one or more claims of the '518 patent by, using, offering to sell, selling, or importing products that incorporate the '518 Accused NAND Flash Products in the

United States. Defendants have had specific intent to induce infringement or have been willfully blind to the direct infringement they are inducing.

84. Defendants' direct and indirect infringement of the '518 patent has injured Lone Star, and Lone Star is entitled to recover damages adequate to compensate for such infringement pursuant to 35 U.S.C. § 284. Unless they cease their infringing activities, Defendants will continue to injure Lone Star by infringing the '518 patent.

85. On information and belief, Defendants acted egregiously and with willful misconduct in that their actions constituted direct or indirect infringement of a valid patent, and this was either known or so obvious that Defendants should have known about it. Defendants continue to infringe the '518 patent by making, using, selling, offering for sale and importing in the United States the '518 Accused NAND Flash Products and to induce the direct infringement of others performing these acts, or they have acted at least in reckless disregard of Lone Star's patent rights. On information and belief, Defendants will continue their infringement notwithstanding actual knowledge of the '518 patent and without a good faith basis to believe that their activities do not infringe any valid claim of the '518 patent. All infringement of the '518 patent following Defendants' knowledge of the '518 patent is willful and Lone Star is entitled to treble damages and attorneys' fees and costs incurred in this action under 35 U.S.C. §§ 284 and 285.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff prays for:

1. Judgment that the '188, '085, '330 and '518 patents are each valid and enforceable;
2. Judgment that the '188, '085, '330 and '518 patents are infringed by Defendants;

3. Judgment that Defendants' acts of patent infringement relating to the patents are willful;
4. An award of damages arising out of Defendants' acts of patent infringement, together with pre-judgment and post-judgment interest;
5. Judgment that the damages so adjudged be trebled in accordance with 35 U.S.C. § 284;
6. An award of Plaintiff's attorneys' fees, costs and expenses incurred in this action in accordance with 35 U.S.C. § 285; and
7. Such other and further relief as the Court may deem just and proper.

JURY DEMAND

Plaintiff demands trial by jury of all issues triable of right by a jury.

RESERVATION OF RIGHTS

Plaintiff's investigation is ongoing, and certain material information remains in the sole possession of Defendants or third parties, which will be obtained via discovery herein. Plaintiff expressly reserves the right to amend or supplement the causes of action set forth herein in accordance with Rule 15 of the Federal Rules of Civil Procedure.

Date: January 30, 2017

Respectfully submitted,

/s/ Timothy P. Maloney

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CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing document was filed electronically in compliance with Local Rule CV-5(a). All other counsel of record not deemed to have consented to electronic service will be served with a true and correct copy of the foregoing by email on January 30, 2017.

/s/ Joseph F. Marinelli

Joseph F. Marinelli

Attorney for Plaintiff