IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY LIMITED,	)	
Plaintiff,	)	
v.	)	C.A. No. _____
GLOBALFOUNDRIES U.S. INC.,	)	**JURY TRIAL DEMANDED**
Defendant.	)	

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Taiwan Semiconductor Manufacturing Company Limited ("TSMC" or "Plaintiff") brings this action for patent infringement against Defendant GlobalFoundries U.S. Inc. ("GlobalFoundries" or "Defendant") as follows:

NATURE OF THE ACTION

1. This is a civil action for patent infringement under the patent laws of the United States, 35 U.S.C. § 1, *et seq.*

2. Defendant has infringed and continue to infringe, has contributed to and continues to contribute to the infringement of, and has induced and continues to induce the infringement of one or more claims of U.S. Patent Nos. 6,963,114 ("the '114 patent"); 9,634,013 ("the '013 patent"); 7,897,514 ("the '514 patent"); and 8,138,554 ("the '554 patent") (collectively, the "Asserted Patents") at least by making, using, selling, offering for sale, and importing into the United States semiconductor devices and integrated circuits that infringe one or more claims of each of the Asserted Patents.

3. TSMC is the legal owner by assignment of the Asserted Patents, which were duly and legally issued by the United States Patent and Trademark Office ("USPTO"). TSMC seeks monetary damages and injunctive relief to address ongoing infringement of its valuable patent portfolio.

THE PARTIES

4. Taiwan Semiconductor Manufacturing Co., Ltd. is a Taiwanese company and is located at No. 8, Li Hsin Road VI, Hsinchu Science Park, Hsinchu 300-78, Taiwan, R.O.C.

5. GlobalFoundries is a Delaware corporation with its principal place of business at 2600 Great America Way, Santa Clara, California 95054.

6. GlobalFoundries, either itself and/or through the activities of its subsidiaries, makes, uses, sells, offers for sale, and/or imports throughout the United States, including within this District, products, such as semiconductor devices and integrated circuits, that infringe the Asserted Patents. GlobalFoundries customers incorporate these products into downstream products that are made, used, sold, offered for sale, and/or imported throughout the United States, including within this District. These downstream products may include, but are not limited to, semiconductor devices, integrated circuits, computer processors, network controllers, graphics cards, smartphones, tablets, laptop computers, televisions, and various other consumer electronics devices that include infringing semiconductor devices and integrated circuits.

JURISDICTION AND VENUE

7. This is a civil action for patent infringement arising under the patent laws of the United States, 35 U.S.C. §§ 1 *et seq*.

8. This Court has subject matter jurisdiction over the matters asserted herein under 28 U.S.C. §§ 1331 and 1338(a).

9. GlobalFoundries is subject to this Court's personal jurisdiction. GlobalFoundries is incorporated in this District and has infringed TSMC's patents in this District by, among other things, engaging in infringing conduct within and directed at or from this District. For example, GlobalFoundries has purposefully and voluntarily placed one or more of its infringing products, as described below, into the stream of commerce with the expectation that these infringing products will be used in this District. These infringing products have been and continue to be used in this District.

10. On information and belief, GlobalFoundries has regularly and systematically transacted business in this District, directly or through subsidiaries or intermediaries, and/or committed acts of patent infringement in this District as alleged more particularly below. GlobalFoundries has also placed integrated circuits (and products containing those integrated circuits) into the stream of commerce by shipping infringing products into this District, shipping infringing products knowing that those products would be shipped into this District, and/or shipping infringing products knowing that these infringing products would be incorporated into other infringing products that would be shipped into this District.

11. The Court therefore has both general and specific personal jurisdiction over GlobalFoundries.

12. Venue is proper in this District pursuant to 28 U.S.C. § 1400(b) at least because, as discussed above, GlobalFoundries is incorporated in this District and hence resides in this District.

FACTUAL BACKGROUND

13. TSMC is a world-class semiconductor foundry with over 48,000 employees worldwide. TSMC pioneered the pure-play foundry business model in 1987 when it was founded and has been the world's largest dedicated semiconductor foundry ever since. TSMC's

groundbreaking foundry model immediately revolutionized the semiconductor and electronics industries and was the first foundry model that enabled fast and efficient manufacturing of made-to-specification silicon semiconductor wafers. For years, TSMC has been recognized as the world's most advanced and most successful provider of semiconductor fabrication and foundry services for customers who design their own circuit layouts, but who either lack their own semiconductor manufacturing expertise and facilities or simply wish to use TSMC's leading-edge fabrication services and technology to manufacture wafers.

14. Each year, TSMC spends billions of dollars on research and development to improve its semiconductor technology and maintain the most advanced semiconductor manufacturing capability in the world. Today, TSMC is the world's largest semiconductor foundry, manufacturing more than 10,000 different products using more than 250 distinct process technologies for over 480 different customers.

15. TSMC serves its customers with annual capacity of more than 12 million 12-inch equivalent wafers (more than any other foundry). It was also the first foundry in the world to provide production capability for the most advanced manufacturing technologies, including 7-nanometer processes, and will be the first foundry to offer commercial production of the world's most advanced 5-nanometer manufacturing technology in 2020. TSMC's pioneering history and dedication to research and development has helped solidify its position as the most innovative and advanced foundry in the world today.

16. TSMC's history of innovation and dedication to innovation has resulted in a world-class patent portfolio, with thousands of patents awarded in the United States and worldwide every year, and a total of almost 37,000 patents issued to date. Due to its dedication

to innovation and its investment in research and development, TSMC has been one of the top ten U.S. patent holders based on the number of new patent grants for three years running.

17. GlobalFoundries is a foundry owned by a sovereign wealth fund, Mubadala Investment Company. It was created by the divestiture of the manufacturing arm of Advanced Micro Devices (AMD). GlobalFoundries has a history of lackluster performance and outmoded technology. Industry analysts have noted that both the Samsung and TSMC foundries are far ahead of GlobalFoundries in key technology advances and that the technology gap is widening every year. For example, one analyst noted that Samsung and TSMC are both ahead of GlobalFoundries in leading-edge nodes and packaging technologies such as TSMC's CoWoS, a 2.5D chip stack, and InFO, a wafer-level fan-out technique. TSMC's advantage in 7-nanometer manufacturing capability and these critical technologies helped TSMC capture lucrative, high-volume opportunities with all leading smartphone vendors and many mobile and high performance computing providers.

18. On information and belief, in August 2018, unable to keep pace with emerging technology trends and not willing to invest the $2-4 billion required to support a new technology process, GlobalFoundries announced it would be halting all development of its 7 nanometer technology (which GlobalFoundries' new CEO, Tom Caulfield, termed "bleeding edge") in favor of scaling out its 14 and 12 nanometer platforms. This strategic blunder left GlobalFoundries without a viable 10 nanometer or 7 nanometer platform and resulted in the major advanced chip suppliers flocking to TSMC for this mission-critical technology. Even though 7 nanometer manufacturing capability was by all accounts a lucrative investment, GlobalFoundries found itself at least six months behind TSMC in development, so it abandoned all efforts to innovate and support this emerging technology. In fact, on information and belief,

AMD, which spun off its manufacturing arm to create GlobalFoundries, still purchased 7 nanometer solutions from TSMC because GlobalFoundries did not have any applicable 7 nanometer solutions.

19. Starting in late 2018, GlobalFoundries started to sell off portions of its business and decrease manufacturing capacity. In December 2018, GlobalFoundries announced the sale of a major fabrication facility in Singapore to Vanguard International Semiconductor for $236 million. Four months later, in April 2019, GlobalFoundries sold a key fabrication plant in New York to ON Semiconductor for $430 million. Less than one month later, in May 2019, GlobalFoundries sold off its ASIC business and Avera Semiconductor, the chip-design team that GlobalFoundries acquired back in 2015 when it purchased IBM's microelectronics division, for $650 million to Marvell Semiconductor.

20. On information and belief, in August 2019, faced with intense pressure to extract as much income as possible from the business, GlobalFoundries, without notice and unprovoked, launched a massive patent infringement campaign against TSMC and its customers in an attempt to monetize GlobalFoundries' stagnant and outdated patent portfolio. In doing so, GlobalFoundries decided to abandon work on technological advancement and instead shifted focus to wielding the legal process for profit by filing 19 district court lawsuits against TSMC and its customers.

21. Since its inception, GlobalFoundries has failed to adequately invest in developing emerging technologies. It instead decided to use dozens—if not hundreds—of innovative and patented technologies of TSMC without payment or permission. As set forth below, the infringing GlobalFoundries products incorporate or use many technologies that were developed

by TSMC and protected by patents owned by TSMC. TSMC respectfully seeks relief from this Court for GlobalFoundries' extensive infringement.

THE ASSERTED PATENTS

22. The '114 patent, issued on November 8, 2005, is entitled "SOI MOSFET with multi-sided source/drain silicide." Chun-Chieh Lin is the named inventor. TSMC is the original and current owner by assignment of the '114 patent. A true and correct copy of the '114 patent is attached hereto as Exhibit A.

23. The '013 patent, issued on April 25, 2017, is entitled "Contact for semiconductor fabrication." Jhon Jhy Liaw is the named inventor. TSMC is the original and current owner by assignment of the '013 patent. A true and correct copy of the '013 patent is attached hereto as Exhibit B.

24. The '514 patent, issued on March 1, 2011, is entitled "Semiconductor contact barrier." Chung-Shi Liu and Chen-Hua Yu are the named inventors. TSMC is the original and current owner by assignment of the '514 patent. A true and correct copy of the '514 patent is attached hereto as Exhibit C.

25. The '554 patent, issued on March 20, 2012, is entitled "Semiconductor device with local interconnects." Harry Chuang, Kong-Beng Thei, Sheng-Chen Chung, and Mong-Song Liang are the named inventors. TSMC is the original and current owner by assignment of the '554 patent. A true and correct copy of the '554 patent is attached hereto as Exhibit D.

ACTS GIVING RISE TO THIS ACTION

26. The allegations provided below are exemplary and without prejudice to TSMC's infringement contentions. In providing these allegations, TSMC does not convey or imply any

particular claim constructions or the precise scope of the claims. TSMC's claim construction contentions regarding the meaning and scope of the claim terms will be provided under the Court's scheduling order and local rules.

27. The infringing products include, but are not limited to, all GlobalFoundries semiconductor devices, integrated circuits, and products manufactured at 32 nanometer technology nodes and smaller including, but not limited to, semiconductor devices manufactured using GlobalFoundries' 32/28 nanometer High-k Metal Gate (HGMK) processes (including GlobalFoundries' 28 nanometer High Performance Plus (28HPP) and 28 nanometer Super Low Power (28SLP) processes), GlobalFoundries' 22 nanometer technology (including GlobalFoundries' 22 nanometer Fully-Depleted Silicon-On-Insulator (FD-SOI) technology and 22FDX platform), GlobalFoundries' 16 nanometer technology (including GlobalFoundries' 16 nanometer Fin Field Effect Transistor ("FinFET") process), GlobalFoundries' 14 nanometer technology (including GlobalFoundries' 14 nanometer FinFET and 14LPP processes), and GlobalFoundries' 12 nanometer technology (including GlobalFoundries' 12 nanometer FinFET and 12LP process and 12FDX platform), and all chipsets, systems-on-a-chip ("SoCs"), processors, controllers, products, and devices containing or utilizing the foregoing technologies, processes, or platforms ("Accused Products"). Some non-exhaustive examples of the Accused Products include the AMD A8-3800 Llano (32nm), Rockchip RK3188 (28nm), Rockchip RK1808 (22nm), AMD RX480 (14nm), and AMD Ryzen 7 2700 (12nm) devices, as well as any other semiconductor device, integrated circuit, chipset, SoC, processor, controller, product, or device manufactured using an infringing GlobalFoundries' technology.

28. As detailed in more detail below, each element of at least one claim of each of the Asserted Patents is literally present in the Accused Products, or is literally practiced by the

process through which each of the Accused Products is made. To the extent that any element is not literally present or practiced, each such element is present or practiced under the doctrine of equivalents.

29. In short, GlobalFoundries has made extensive use of TSMC's patented technologies, including the technology described and claimed in the Asserted Patents. TSMC has no choice but to defend its proprietary and patented technology. TSMC thus requests that this Court award it damages sufficient to compensate for GlobalFoundries' infringement of the Asserted Patents, find this case exceptional and award TSMC its attorneys' fees and costs, and grant an injunction against GlobalFoundries to prevent ongoing infringement of the Asserted Patents.

COUNT I: INFRINGEMENT OF U.S. PATENT NO. 6,963,114

30. TSMC incorporates by reference and realleges all the foregoing paragraphs of this Complaint as if fully set forth herein.

31. On information and belief, GlobalFoundries has directly infringed, continues to infringe, and/or has induced or contributed to the infringement of at least claim 1 of the '114 patent by making, using, selling, offering for sale, and/or importing into the United States, without authority or license, integrated circuits manufactured by GlobalFoundries using, for example, GlobalFoundries' 14 and 12 nanometer technology and products containing these integrated circuits (collectively, "the '114 Accused Products") in violation of 35 U.S.C. § 271(a). The '114 Accused Products are non-limiting examples that were identified based on publicly available information, and TSMC reserves the right to identify additional infringing activities, products and services, including, for example, on the basis of information obtained during discovery. The '114 Accused Products include at least the AMD RX480 (14nm) and AMD

Ryzen 7 2700 (12nm) devices fabricated using, for example, GlobalFoundries' 14 or 12 nanometer process.

32. On information and belief, GlobalFoundries also actively, knowingly, and intentionally induces infringement of one or more claims of the '114 patent under 35 U.S.C. § 271(b) by actively encouraging others to import into the United States, and/or make, use, sell, and/or offer to sell in the United States, '114 Accused Products or products containing the infringing semiconductor components of the '114 Accused Products.

33. On information and belief, GlobalFoundries further contributes to the infringement of one or more claims of the '114 patent under 35 U.S.C. § 271(c) by offering to sell, selling, and/or importing into the United States a component of the '114 Accused Products, or a material or apparatus for use in practicing a process claimed in the '114 patent, that constitutes a material part of the inventions, knowing the same to be especially made or especially adapted for use in an infringement of the '114 patent, and is not a staple article or commodity of commerce suitable for substantial noninfringing use.

34. By at least September 30, 2019, TSMC disclosed, at least by filing this Complaint, the existence of the '114 patent and identified at least some of GlobalFoundries' and others' activities that infringe the '114 patent. Thus, based on this disclosure, GlobalFoundries had knowledge of the '114 patent and that its activities infringe the '114 patent since at least September 30, 2019. Based on TSMC's disclosures, GlobalFoundries has also known or should have known since at least September 30, 2019 that its customers, distributors, suppliers, and other purchasers of the '114 Accused Products are infringing the '114 patent at least because GlobalFoundries has known that it is infringing the '114 patent.

35. On information and belief, GlobalFoundries infringes one or more claims of the '114 patent under 35 U.S.C. § 271(g) by using, offering to sell, selling, and/or importing into the United States a product made by a process claimed in the '114 patent. For example, on information and belief, GlobalFoundries uses, offers to sell, sells, and/or imports into the United States the '114 Accused Products that were fabricated using a process claimed in the '114 patent and those products were not materially changed by subsequent processes or a trivial and nonessential component of another product.

36. The '114 Accused Products meet all the limitations of at least claim 1 of the '114 patent. Specifically, claim 1 of the '114 patent recites: a microelectronic device, comprising: an insulator extending over at least a portion of a substrate; a semiconductor feature extending over at least a portion of the insulator; and a contact portion having a first portion, a second portion and a third portion, said first portion connecting said second portion and said third portion, wherein the first portion spans a sidewall of the semiconductor feature, and wherein a portion of the semiconductor feature interposes and contacts the second and third portions.

37. The '114 Accused Products are microelectronic devices. For example, the AMD RX480 (14nm) is a graphics card featuring the Polaris GPU. The AMD Ryzen 7 2700 (12nm) is a 64-bit 8-core desktop processor. Each of the '114 Accused Products contain integrated circuits fabricated using, for example, GlobalFoundries' 14 or 12 nanometer processes.

38. The '114 Accused Products have an insulator extending over at least a portion of a substrate. For example, the '114 Accused Products include a silicon oxide (SiO) layer extending over at least a portion of a silicon substrate.

39. The ’114 Accused Products have a semiconductor feature extending over at least a portion of the insulator. For example, the ’114 Accused Products include a semiconductor layer extending over at least a portion of the silicon oxide (SiO) layer.

40. The ’114 Accused Products have a contact portion having a first portion, a second portion and a third portion, said first portion connecting said second portion and said third portion, wherein the first portion spans a sidewall of the semiconductor feature, and wherein a portion of the semiconductor feature interposes and contacts the second and third portions. For example, the ’114 Accused Products contain gate contact structures having a first portion, a second portion, and a third portion. The first portion of the gate contact structure connects the second and third portions, and spans a sidewall of the semiconductor layer. A portion of the semiconductor layer interposes and contacts the second and third portions of the gate contact structure.

41. This description is based on publicly available information and a reasonable investigation of the structure and operation of the ’114 Accused Products. TSMC reserves the right to modify this description, including, for example, on the basis of information about the ’114 Accused Products that it obtains during discovery.

42. GlobalFoundries’ infringement has damaged and continues to damage TSMC in an amount yet to be determined, of at least a reasonable royalty and/or the lost profits that TSMC would have made but for GlobalFoundries’ acts of infringement.

43. This is an exceptional case. TSMC is entitled to attorneys’ fees and costs under 35 U.S.C. § 285 as a result of the infringement of the ’114 patent by GlobalFoundries.

COUNT II: INFRINGEMENT OF U.S. PATENT NO. 9,634,013

44. TSMC incorporates by reference and realleges all the foregoing paragraphs of this Complaint as if fully set forth herein.

45. On information and belief, GlobalFoundries has directly infringed, continues to infringe, and/or has induced or contributed to the infringement of at least claim 1 of the ’013 patent by making, using, selling, offering for sale, and/or importing into the United States, without authority or license, integrated circuits manufactured by GlobalFoundries using, for example, GlobalFoundries’ 12 nanometer technology and products containing these integrated circuits (collectively, “the ’013 Accused Products”) in violation of 35 U.S.C. § 271(a). The ’013 Accused Products are non-limiting examples that were identified based on publicly available information, and TSMC reserves the right to identify additional infringing activities, products and services, including, for example, on the basis of information obtained during discovery. The ’013 Accused Products include at least the AMD Ryzen 7 2700 (12nm) devices fabricated using, for example, GlobalFoundries’ 12 nanometer process.

46. On information and belief, GlobalFoundries also actively, knowingly, and intentionally induces infringement of one or more claims of the ’013 patent under 35 U.S.C. § 271(b) by actively encouraging others to import into the United States, and/or make, use, sell, and/or offer to sell in the United States, ’013 Accused Products or products containing the infringing semiconductor components of the ’013 Accused Products.

47. On information and belief, GlobalFoundries further contributes to the infringement of one or more claims of the ’013 patent under 35 U.S.C. § 271(c) by offering to sell, selling, and/or importing into the United States a component of the ’013 Accused Products, or a material or apparatus for use in practicing a process claimed in the ’013 patent, that constitutes a material part of the inventions, knowing the same to be especially made or especially adapted for use in an infringement of the ’013 patent, and is not a staple article or commodity of commerce suitable for substantial noninfringing use.

48. By at least September 30, 2019, TSMC disclosed, at least by filing this Complaint, the existence of the ’013 patent and identified at least some of GlobalFoundries’ and others’ activities that infringe the ’013 patent. Thus, based on this disclosure, GlobalFoundries had knowledge of the ’013 patent and that its activities infringe the ’013 patent since at least September 30, 2019. Based on TSMC’s disclosures, GlobalFoundries has also known or should have known since at least September 30, 2019 that its customers, distributors, suppliers, and other purchasers of the ’013 Accused Products are infringing the ’013 patent at least because GlobalFoundries has known that it is infringing the ’013 patent.

49. On information and belief, GlobalFoundries infringes one or more claims of the ’013 patent under 35 U.S.C. § 271(g) by using, offering to sell, selling, and/or importing into the United States a product made by a process claimed in the ’013 patent. For example, on information and belief, GlobalFoundries uses, offers to sell, sells, and/or imports into the United States the ’013 Accused Products that were fabricated using a process claimed in the ’013 patent and those produces were not materially changed by subsequent processes or a trivial and nonessential component of another product.

50. The ’013 Accused Products meet all the limitations of at least claim 1 of the ’013 patent. Specifically, claim 1 of the ’013 patent recites: a semiconductor device comprising: a substrate; a fin structure on the substrate, the fin structure comprising a doped region; a first gate over the fin structure, the first gate positioned adjacent the doped region, the first gate having a spacer on a first side and having no spacer on a second side between the gate and the doped region, the first gate including a gate dielectric layer disposed over the fin structure and a gate electrode disposed over the gate dielectric layer and physically contacting the gate dielectric layer, the gate dielectric layer extending along opposing sidewalls of the gate electrode towards a

top of the first gate without extending to the top of the first gate on the second side of the first gate; and a conductive plug that physically contacts the doped region, the gate dielectric layer, one of the sidewalls of the gate electrode and the top of the first gate.

51. The ’013 Accused Products are semiconductor devices. For example, the AMD Ryzen 7 2700 (12nm) is a 64-bit 8-core desktop processor. Each of the ’013 Accused Products contain integrated circuits fabricated using, for example, GlobalFoundries’ 12 nanometer processes.

52. The ’013 Accused Products have a substrate. For example, the ’013 Accused Products include a silicon substrate with integrated circuits thereon.

53. The ’013 Accused Products have a fin structure on the substrate, the fin structure comprising a doped region. For example, the ‘013 Accused Products contain fins on the silicon substrate fabricated using GlobalFoundries’ 12 nanometer processes. The fins have doped source/drain regions, as is customary with FinFET devices.

54. The ’013 Accused Products have a first gate over the fin structure, the first gate positioned adjacent the doped region, the first gate having a spacer on a first side and having no spacer on a second side between the gate and the doped region, the first gate including a gate dielectric layer disposed over the fin structure and a gate electrode disposed over the gate dielectric layer and physically contacting the gate dielectric layer, the gate dielectric layer extending along opposing sidewalls of the gate electrode towards a top of the first gate without extending to the top of the first gate on the second side of the first gate. For example, the ‘013 Accused Products have PMOS and NMOS gates over the fins, with gates positioned adjacent to the doped source/drain regions on the fins. The ’013 Accused Products contain a first gate having a spacer on a first side and having no spacer on a second side between the gate and the

doped source/drain region on the fin. The first gate in the '013 Accused Products includes a gate dielectric layer disposed over the fin structure and a gate electrode disposed over the gate dielectric layer and physically contacting the gate dielectric layer. In the '013 Accused Products, the gate dielectric layer included on the first gate extends along opposing sidewalls of the gate electrode towards a top of the first gate without extending to the top of the first gate on the second side of the first gate.

55. The '013 Accused Products have a conductive plug that physically contacts the doped region, the gate dielectric layer, one of the sidewalls of the gate electrode and the top of the first gate. For example, the '013 Accused Products contain conductive plugs that physically contact the doped source/drain region, the gate dielectric layer, one of the sidewalls of the gate electrode and the top of the first gate discussed above.

56. This description is based on publicly available information and a reasonable investigation of the structure and operation of the '013 Accused Products. TSMC reserves the right to modify this description, including, for example, on the basis of information about the '013 Accused Products that it obtains during discovery.

57. GlobalFoundries' infringement has damaged and continues to damage TSMC in an amount yet to be determined, of at least a reasonable royalty and/or the lost profits that TSMC would have made but for GlobalFoundries' acts of infringement.

58. This is an exceptional case. TSMC is entitled to attorneys' fees and costs under 35 U.S.C. § 285 as a result of the infringement of the '013 patent by GlobalFoundries.

COUNT III: INFRINGEMENT OF U.S. PATENT NO. 7,897,514

59. TSMC incorporates by reference and realleges all the foregoing paragraphs of this Complaint as if fully set forth herein.

60. On information and belief, GlobalFoundries has directly infringed, continues to infringe, and/or has induced or contributed to the infringement of at least claim 1 of the ’514 patent by making, using, selling, offering for sale, and/or importing into the United States, without authority or license, integrated circuits manufactured by GlobalFoundries using, for example, GlobalFoundries’ 32, 28, 14, 12 nanometer technology and products containing these integrated circuits (collectively, “the ’514 Accused Products”) in violation of 35 U.S.C. § 271(a). The ’514 Accused Products are non-limiting examples that were identified based on publicly available information, and TSMC reserves the right to identify additional infringing activities, products and services, including, for example, on the basis of information obtained during discovery. The ’514 Accused Products include at least the AMD A8-3800 Llano (32nm), Rockchip RK3188 (28nm), AMD RX480 (14nm), and AMD Ryzen 7 2700 (12nm) devices fabricated using, for example, GlobalFoundries’ 32, 28, 14, 12 nanometer process.

61. On information and belief, GlobalFoundries also actively, knowingly, and intentionally induces infringement of one or more claims of the ’514 patent under 35 U.S.C. § 271(b) by actively encouraging others to import into the United States, and/or make, use, sell, and/or offer to sell in the United States, ’514 Accused Products or products containing the infringing semiconductor components of the ’514 Accused Products.

62. On information and belief, GlobalFoundries further contributes to the infringement of one or more claims of the ’514 patent under 35 U.S.C. § 271(c) by offering to sell, selling, and/or importing into the United States a component of the ’514 Accused Products, or a material or apparatus for use in practicing a process claimed in the ’514 patent, that constitutes a material part of the inventions, knowing the same to be especially made or

especially adapted for use in an infringement of the ’514 patent, and is not a staple article or commodity of commerce suitable for substantial noninfringing use.

63. By at least September 30, 2019, TSMC disclosed, at least by filing this Complaint, the existence of the ’514 patent and identified at least some of GlobalFoundries’ and others’ activities that infringe the ’514 patent. Thus, based on this disclosure, GlobalFoundries had knowledge of the ’514 patent and that its activities infringe the ’514 patent since at least September 30, 2019. Based on TSMC’s disclosures, GlobalFoundries has also known or should have known since at least September 30, 2019 that its customers, distributors, suppliers, and other purchasers of the ’514 Accused Products are infringing the ’514 patent at least because GlobalFoundries has known that it is infringing the ’514 patent.

64. On information and belief, GlobalFoundries infringes one or more claims of the ’514 patent under 35 U.S.C. § 271(g) by using, offering to sell, selling, and/or importing into the United States a product made by a process claimed in the ’514 patent. For example, on information and belief, GlobalFoundries uses, offers to sell, sells, and/or imports into the United States the ’514 Accused Products that were fabricated using a process claimed in the ’514 patent and those produces were not materially changed by subsequent processes or a trivial and nonessential component of another product.

65. For example, the ’514 Accused Products meet all the limitations of at least claim 1 of the ’514 patent. Specifically, claim 1 of the ’514 patent recites: a method for forming a contact comprising: forming a conductive region; forming a dielectric layer over the conductive region; forming at least one opening through the dielectric layer to expose at least a portion of the conductive region, the at least one opening comprising sidewalls and a bottom above the conductive region; selectively forming a contact barrier layer along the bottom of the opening,

the contact barrier layer comprising a first material; treating at least a portion of the contact barrier layer to form a second material within the contact barrier layer; and forming a conductive material in contact with the sidewalls and over the contact barrier layer.

66. The ’514 Accused Products are semiconductor devices that include contacts. For example, the AMD A8-3800 Llano (32nm) is a 64-bit 4-core microprocessor. The Rockchip RK3188 (28nm) is a 4-core mobile processor. The AMD RX480 (14nm) is a graphics card featuring the Polaris GPU. The AMD Ryzen 7 2700 (12nm) is a 64-bit 8-core desktop processor. Each of the ’514 Accused Products contain integrated circuits fabricated using, for example, GlobalFoundries’ 32, 28, 14, or 12 nanometer processes.

67. The ’514 Accused Products have a formed conductive region. For example, the ’514 Accused Products include a silicon substrate formed to include a conductive region.

68. The ’514 Accused Products have a dielectric layer formed over the conductive region. For example, the ’514 Accused Products have a dielectric layer, for example, of silicon oxide (SiO), silicon oxycarbide (SiOC), or other suitable material, formed over the conductive region.

69. The ’514 Accused Products have at least one opening formed through the dielectric layer to expose at least a portion of the conductive region, where the at least one opening includes sidewalls and a bottom above the conductive region. For example, the ’514 Accused Products have at least one opening formed in the dielectric layer to expose at least a portion of the conductive region. The at least one opening includes sidewalls and a bottom above the conductive region.

70. The ’514 Accused Products have a selectively formed contact barrier layer along the bottom of the opening, where the contact barrier layer includes a first material. For example,

the ’514 Accused Products have a contact barrier layer that is selectively formed along the bottom of the opening. The contact barrier layer includes, for example, a titanium-based material such as titanium nitride (TiN), or other suitable material.

71. The ’514 Accused Products have at least a portion of the contact barrier layer treated to form a second material within the contact barrier layer. For example, at least a portion of the contact barrier layer of the ’514 Accused Products is treated to form another material, such as titanium silicide (TiSi), titanium silicon germanium (TiSiGe), or other suitable material.

72. The ’514 Accused Products have a conductive material formed in contact with the sidewalls and over the contact barrier layer. For example, the ’514 Accused Products include a conductive material, such a tungsten (W), copper (Cu), or other suitable material, in contact with the sidewalls of the opening and over the contact barrier layer.

73. This description is based on publicly available information and a reasonable investigation of the structure and operation of the ’514 Accused Products. TSMC reserves the right to modify this description, including, for example, on the basis of information about the ’514 Accused Products that it obtains during discovery.

74. GlobalFoundries’ infringement has damaged and continues to damage TSMC in an amount yet to be determined, of at least a reasonable royalty and/or the lost profits that TSMC would have made but for GlobalFoundries’ acts of infringement.

75. This is an exceptional case. TSMC is entitled to attorneys’ fees and costs under 35 U.S.C. § 285 as a result of the infringement of the ’514 patent by GlobalFoundries.

COUNT IV: INFRINGEMENT OF U.S. PATENT NO. 8,138,554

76. TSMC incorporates by reference and realleges all the foregoing paragraphs of this Complaint as if fully set forth herein.

77. On information and belief, GlobalFoundries has directly infringed, continues to infringe, and/or has induced or contributed to the infringement of at least claim 1 of the '554 patent by making, using, selling, offering for sale, and/or importing into the United States, without authority or license, integrated circuits manufactured by GlobalFoundries using, for example, GlobalFoundries' 14 and 12 nanometer technology and products containing these integrated circuits (collectively, "the '554 Accused Products") in violation of 35 U.S.C. § 271(a). The '554 Accused Products are non-limiting examples that were identified based on publicly available information, and TSMC reserves the right to identify additional infringing activities, products and services, including, for example, on the basis of information obtained during discovery. The '554 Accused Products include at least the AMD RX480 (14nm) and AMD Ryzen 7 2700 (12nm) devices fabricated using, for example, GlobalFoundries' 14 or 12 nanometer process.

78. On information and belief, GlobalFoundries also actively, knowingly, and intentionally induces infringement of one or more claims of the '554 patent under 35 U.S.C. § 271(b) by actively encouraging others to import into the United States, and/or make, use, sell, and/or offer to sell in the United States, '554 Accused Products or products containing the infringing semiconductor components of the '554 Accused Products.

79. On information and belief, GlobalFoundries further contributes to the infringement of one or more claims of the '554 patent under 35 U.S.C. § 271(c) by offering to sell, selling, and/or importing into the United States a component of the '554 Accused Products, or a material or apparatus for use in practicing a process claimed in the '554 patent, that constitutes a material part of the inventions, knowing the same to be especially made or

especially adapted for use in an infringement of the ’554 patent, and is not a staple article or commodity of commerce suitable for substantial noninfringing use.

80. By at least September 30, 2019, TSMC disclosed, at least by filing this Complaint, the existence of the ’554 patent and identified at least some of GlobalFoundries’ and others’ activities that infringe the ’554 patent. Thus, based on this disclosure, GlobalFoundries had knowledge of the ’554 patent and that its activities infringe the ’554 patent since at least September 30, 2019. Based on TSMC’s disclosures, GlobalFoundries has also known or should have known since at least September 30, 2019 that its customers, distributors, suppliers, and other purchasers of the ’554 Accused Products are infringing the ’554 patent at least because GlobalFoundries has known that it is infringing the ’554 patent.

81. The ’554 Accused Products meet all the limitations of at least claim 1 of the ’554 patent. Specifically, claim 1 of the ’554 patent recites: a semiconductor device with local interconnects, comprising: a first gate line structure and a second gate line structure disposed on a substrate and substantially collinear; a first pair of source/drain regions formed in the substrate on both sides of the first gate line structure and a second pair of source/drain regions formed in the substrate on both sides of the second gate line structure; and a pair of conductive lines disposed on the substrate on the both sides of the first gate line structure and the second gate line structure, such that each conductive line has first and second portions in direct contact with and across one of the first pair of source/drain regions and one of the second pair of source/drain regions, respectively, for electrical connection therebetween.

82. The ’554 Accused Products are semiconductor devices. For example, the AMD RX480 (14nm) is a graphics card featuring the Polaris GPU. The AMD Ryzen 7 2700 (12nm) is a 64-bit 8-core desktop processor. Each of the ’554 Accused Products contain semiconductor

devices with local interconnects fabricated using, for example, GlobalFoundries' 14 or 12 nanometer processes.

83. The '554 Accused Products have a first gate line structure and a second gate line structure disposed on a substrate and substantially collinear. For example, the '554 Accused Products include a NMOS gate line structure and a PMOS line gate structure disposed on a silicon substrate. The NMOS and PMOS gate line structures are substantially collinear.

84. The '554 Accused Products have a first pair of source/drain regions formed in the substrate on both sides of the first gate line structure and a second pair of source/drain regions formed in the substrate on both sides of the second gate line structure. For example, the '554 Accused Products include a first pair of source/drain regions formed in the silicon substrate on both sides of the NMOS gate line structure and a second pair of source/drain regions formed in the silicon substrate on both sides of the PMOS gate line structure.

85. The '554 Accused Products have a pair of conductive lines disposed on the substrate on the both sides of the first gate line structure and the second gate line structure, such that each conductive line has first and second portions in direct contact with and across one of the first pair of source/drain regions and one of the second pair of source/drain regions, respectively, for electrical connection therebetween. For example, the '554 Accused Products include a pair of electrically conductive lines disposed on the silicon substrate on both sides of the NMOS gate line structure and the PMOS gate line structure. Each electrically conductive line has first and second portions contacting and across the pairs of source/drain regions for electrical connection between the pairs of source/drain regions.

86. This description is based on publicly available information and a reasonable investigation of the structure and operation of the '554 Accused Products. TSMC reserves the

right to modify this description, including, for example, on the basis of information about the '554 Accused Products that it obtains during discovery.

87. GlobalFoundries' infringement has damaged and continues to damage TSMC in an amount yet to be determined, of at least a reasonable royalty and/or the lost profits that TSMC would have made but for GlobalFoundries' acts of infringement.

88. This is an exceptional case. TSMC is entitled to attorneys' fees and costs under 35 U.S.C. § 285 as a result of the infringement of the '554 patent by GlobalFoundries.

PRAYER FOR RELIEF

WHEREFORE, TSMC respectfully requests:

1. That Judgment be entered that GlobalFoundries has infringed one or more of the Asserted Patents, directly and indirectly, by way of inducement or contributory infringement, literally or under the doctrine of equivalents;

2. That, in accordance with 35 U.S.C. § 283, GlobalFoundries and all affiliates, employees, agents, officers, directors, attorneys, successors, and assigns and all those acting on behalf of or in active concert or participation with any of them, be preliminarily and permanently enjoined from (1) infringing the Asserted Patents and (2) making, using, selling, offering for sale and/or importing the Accused Products;

3. An award of damages sufficient to compensate TSMC for GlobalFoundries' infringement under 35 U.S.C. § 284;

4. That the case be found exceptional under 35 U.S.C. § 285 and that TSMC be awarded its attorneys' fees;

5. Costs and expenses in this action;

6. An award of prejudgment and post-judgment interest; and

7. Such other and further relief as the Court may deem just and proper.

DEMAND FOR JURY TRIAL

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, TSMC respectfully demands a trial by jury on all issues raised by the Complaint.

Respectfully submitted,

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