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

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| ADVANCED INTEGRATED CIRCUIT PROCESS LLC,<br><br>Plaintiffs,<br><br>vs.<br><br>UNITED MICROELECTRONICS CORPORATION,<br><br>Defendant. | Civil Action No. 2:24-cv-000730<br><br>**JURY TRIAL DEMANDED** |

## COMPLAINT FOR PATENT INFRINGEMENT

This is an action for patent infringement in which Plaintiff Advanced Integrated Circuit Process LLC ("AICP" or "Plaintiff") makes the following allegations against Defendant United Microelectronics Corporation ("UMC" or "Defendant") for infringing the Patents asserted in this matter.

## PARTIES

1. Plaintiff AICP is a Texas limited liability company with its principal place of business at 825 Watters Creek Blvd, Suite 250, Allen, Texas 75013.

2. Defendant UMC is a company organized and existing under the laws of Taiwan. It has a principal place of business located No. 3, Li-Hsin 2nd Road, Hsinchu Science Park, Hsinchu, Taiwan, R.O.C. UMC engages in business in Texas. Pursuant to Section 17.044 of the Texas Civil Practice & Remedies Code, UMC has designated the Secretary of State as its agent for service of process and may be served with process through the Secretary of State. The Secretary of State may forward service to UMC at its home office address of No. 3, Li-Hsin 2nd Road, Hsinchu Science Park, Hsinchu, Taiwan, R.O.C. Alternatively, UMC may be served with process by serving the

Registered Agent of its wholly owned subsidiary UMC Group (USA), Yi Chi (Megan) Su at 488 De Guigne Dr., Sunnyvale, CA 94085.

## JURISDICTION AND VENUE

3. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a) because this action arises under the patent laws of the United States, 35 U.S.C. §§ 1 *et seq.*

4. UMC is subject to this Court's specific personal jurisdiction pursuant to due process and the Texas Long Arm Statute because it directly and/or through subsidiaries and agents makes, imports, ships, distributes, offers for sale, sells, uses, and advertises (including offering products and services through its websites) infringing semiconductor products in the United States, Texas, and this District.

5. UMC is also subject to this Court's specific personal jurisdiction pursuant to due process and the Texas Long Arm Statute because it directly and/or through its subsidiaries and agents induced its direct and indirect customers to commit acts of infringement in the United States, Texas, and this District.

6. UMC is also subject to this Court's specific personal jurisdiction pursuant to due process and the Texas Long Arm Statute because it directly and/or through its subsidiaries and agents contributed to its direct and indirect customers' acts of infringement in the United States, Texas, and this District.

7. UMC's subsidiaries and agents include at least (i) UMC Group (USA), which is a wholly owned subsidiary of UMC that is registered in Texas as a foreign corporation, with a registered agent at 1999 Bryan St., Suite 900, Dallas, TX 75201, (ii) United Microtechnology Corporation, which is a wholly owned subsidiary of UMC, and (iii) Wavetek Microelectronics Corporation (USA), which is a majority-owned subsidiary of UMC.

8. Per UMC's latest annual report, the "Major Business / Production Items" for these subsidiaries are "IC Sales" for UMC Group (USA), "Research & development" for United Microtechnology Corporation, and "Marketing service[s]" for Wavetek Microelectronics Corporation (USA). These subsidiaries were incorporated in 1997, 2014, and 2013, respectively. *See* 2023 UMC Annual Report.

9. UMC directly, through its subsidiaries and agents, and through its direct and indirect customers has purposefully and voluntarily placed infringing semiconductor products in the stream of commerce while knowing, expecting, and intending them to be sold in and purchased and used by consumers in the United States, Texas, and this District.

10. UMC is traded on the New York Stock Exchange. For at least the last five years, UMC has derived a significant portion of its operating revenue from business in the United States and that portion has steadily grown. Most recently, in 2022 and 2023, 26.6% and 24.2% of UMC's operating revenue was derived from customers headquartered in the United States.

11. Much of UMC's sales are driven by customers in the consumer electronics industry. In 2023, sales for customer devices in the "Communication," "Consumer," and "Computer" categories accounted for 80.1% of UMC's total sales. That figure was 86% in 2022, 89.5% in 2021, 90.3% in 2020, and 92.2% in 2019.

12. In its 2023 Form 20-F, UMC identified Intel, MediaTek, Qualcomm, and Novatek Microelectronics as among its "primary customers[] in terms of [its] sales revenues" and explained that its top ten customers "accounted for 62.0% of [its] operating revenues." All of these companies have been identified in UMC's Form 20-F as among its major customers for at least the last five years.

13. Intel and Qualcomm are nationwide companies headquartered in the United States,

and they each maintain physical places of business in Texas. MediaTek and Novatek Microelectronics, both foreign entities, maintain substantial operations in the United States.

14. On information and belief, all of thethe UMC customers make, import, ship, distribute, offer for sale, sell, use, and advertise (including offering products and services through websites) UMC's infringing semiconductor products (or products incorporating UMC's infringing semiconductor products) in the United States, Texas, and this District.

15. Moreover, several of UMC's customers, including Intel, MediaTek, Qualcomm, Qorvo, and Novatek, supply semiconductor products to national end-device makers, like Apple and Samsung. Those end-device makers directly or indirectly make, import, ship, distribute, offer for sale, sell, use, and advertise (including offering products and services through websites) products incorporating UMC's infringing semiconductor products in the United States, Texas, and this District.

16. For example, over the last several years, UMC has secured an important role in Apple's supply chain. Both Novatek Microelectronics and Anokiwave (recently acquired by Qorvo) supply semiconductor components to Apple for its iPhone and iPad products, and both companies partner with UMC to manufacture those devices. Qualcomm also supplies semiconductor components for Apple's smartphone products, and in 2021, Qualcomm entered into a six-year partnership with UMC to manufacture Qualcomm semiconductor products. Similarly, as discussed below, UMC manufactures the Qualcomm MDM9625, which Qualcomm describes as a "chipset[] . . . for use in mobile broadband data devices" and which has been used in several different Apple products, including iPhones and iPads.

17. Certain end-device makers, like Samsung, are also direct customers of UMC. Samsung has contracted with UMC to manufacture semiconductor components on UMC's 28

nanometer process node, including components such as display drivers and image sensors, which are then incorporated into Samsung's consumer end-devices, including smartphones and displays. Samsung maintains a significant presence in this District, operating a large Samsung Research America facility at 6105 Tennyson Pkwy Plano, TX 75024.

18. Apple and Samsung are among the largest consumer electronics companies in the United States, and they maintain substantial operations and physical places of business throughout Texas. Using their vast, national distribution channels, Apple and Samsung, directly or indirectly, make, import, ship, distribute, offer for sale, sell, use, and advertise (including offering products and services through their websites) products incorporating UMC's infringing semiconductor products in the United States, Texas, and this District.

19. UMC's relationship and ongoing business with end-device makers like Apple and Samsung is sufficient to establish specific personal jurisdiction over UMC in Texas and this District.

20. The nature of UMC's "primary business"—which it describes as "the manufacture, or 'fabrication', of semiconductors, sometimes called 'chips' or 'integrated circuits', for others" and "[u]sing our own proprietary processes and techniques[] [to] make chips to the design specifications of our many customers"—requires that UMC form close relationships with its customers and actively assist them in the development and manufacture of their products. *See* 2023 UMC Form 20-F. Indeed, UMC describes itself as a "customer-driven foundry" that "collaborate[s] closely with [its] customers" and operates on a "Customer-focused Partnership Business model." *Id.* Among its chief goals, and at the cornerstone of its "partnership business model," is "understand[ing] our customers' requirements and, accordingly, better accommodate[ing] our customers' needs in a number of ways." *Id.*

21. To achieve this, UMC "work[s] closely with [its] customers throughout the design development and prototyping processes" and its "design support team closely interacts with customers . . . to facilitate the design process." 2023 UMC Form 20-F. UMC also operates a robust customer support system, including a "total online supply chain solution" called "MyUMC" and other "system-to-system connecting services to provide direct data exchange between [its] system and [its] customers' systems." *Id.*

22. Close customer collaboration also figures heavily into UMC's ongoing strategy. According to its 2023 Annual Report, "UMC will continue to devote itself to collaborating closely with customers in all regions, to meet market trends and satisfy the growing needs of customers" to remain competitive in the semiconductor industry. Also, "UMC will continue to establish long-term collaborative relationships with leading customers in various application fields, leveraging the technological competitive advantages of both customers and UMC to ensure the long-term stability of the Company's growth." *See* 2023 UMC Annual Report; *see also id.* ("UMC will continue to devote itself to collaborating closely with customers in all regions, to meet market trends and satisfy the growing needs of customers.").

23. Specific examples of UMC's collaboration with its customers abound. On January 25, 2024, Intel and UMC "announced that they will collaborate on the development of a 12-nanometer semiconductor process platform to address high-growth markets such as mobile, communication infrastructure and networking." This partnership is an important part of UMC's strategy to increase its foothold in the United States market. As Jason Wang, President of UMC, commented: "We are excited for this strategic collaboration with Intel, which broadens our addressable market and significantly accelerates our development roadmap," and he noted that UMC's customers would benefit from "the resiliency of an added Western footprint."

24. UMC even goes so far as to invest in some of its customers. For example, according to its 2023 Annual Report, UMC holds 2-3% of the stock of Novatek Microelectronics.

25. UMC has also collaborated with companies in this District on technology relating to its semiconductor manufacturing processes. In January 2022, Siemens Digital Industries Software "announced it ha[d] collaborated with United Microelectronics Corporation (UMC) to develop process design kits (PDKs) for the foundry's 110-nanometer (nm) and 180-nm BCD technology platforms." Siemens Digital Industries Software is headquartered in this District, at 5800 Granite Parkway, Suite 600, Plano, TX 75024.

26. In recognition of UMC's long history of collaboration, another Texas-based customer gave UMC a Supplier Excellence Award in 2019. Commenting on the award, T.J. Lin, a UMC executive, said "UMC is pleased to receive this honor" and appreciated the customer's "commitment to working with UMC throughout the years."

27. As UMC itself summarized: "We believe our success in attracting these customers is a direct result of our commitment to high quality service and our intense focus on customer needs and performance." *See* 2023 UMC Form 20-F.

28. For many years, the United States and its consumer electronics market has been a key driver of UMC's business. UMC knows this and has worked closely with various technology companies based in the United States and this District to win and maintain their business. UMC works hard and takes steps to ensure successful integration of its infringing semiconductor products into its direct and indirect customers' products. It makes itself extensively available to its customers, including through various resources and assets based in the United States.

29. With UMC's knowledge, its customers, directly or indirectly, sell products incorporating UMC's infringing semiconductor products throughout the United States, Texas, and

this District—products that UMC helps to design and manufacture. In working with and supplying its customers, UMC knew and desired that its infringing semiconductor products would reach throughout the United States, including Texas (the second most populous state in the United States) and this District.

30. UMC also directly and/or through its agents and subsidiaries offers to sell, sells, imports, and/or advertises its infringing semiconductor products throughout the United States, including Texas and this District.

31. UMC therefore knows, expects, intends, and desires that its infringing semiconductor products, and products containing its infringing semiconductor products, will be sold in the United States, Texas, and this District.

32. Further, on information and belief, this Court has personal jurisdiction over Defendant UMC at least by virtue of Federal Rule of Civil Procedure 4(k)(2).

33. Venue is proper against Defendant UMC in this District pursuant to 28 U.S.C. § 1391(c)(3) and 28 U.S.C. § 1400(b). UMC is not a resident of the United States and may be sued in any district, including this District.

## THE PATENTS

34. This complaint asserts causes of action for infringement of United States Patent No. 7,579,227 (the "'227 Patent"), United States Patent No. 7,923,764 (the "'764 Patent"), United States Patent No. 8,198,686 (the "'686 Patent"), United States Patent No. 8,253,180 (the "'180 Patent"), United States Patent No. 8,587,076 (the "'076 Patent"), United States Patent No. 8,796,779 (the "'779 Patent"), and United States Patent No. 8,907,425 (the "'425 Patent") (collectively, the "Asserted Patents").

35. Each of the seven Asserted Patents claims patent-eligible subject matter and is a

valid and enforceable U.S. patent, the entire right, title, and interest to which AICP owns by assignment.

**U.S. Patent No. 7,579,227**

36. U.S. Patent No. 7,579,227 is entitled "Semiconductor Device and Method for Fabricating the Same," and was issued by the U.S. Patent and Trademark Office (the "PTO") to inventors Junji Hirase, Akio Sebe, Naoki Kotani, Gen Okazaki, Kazuhiko Aida, and Shinji Takeoka on August 25, 2009. Plaintiff holds by assignment all rights and title to the '227 Patent, including the sole and exclusive right to bring a claim for its infringement. A copy of the '227 Patent is attached to this complaint as **Exhibit A**.

37. The '227 Patent generally claims a structure of a MISFET (metal insulator semiconductor field-effect transistor) semiconductor device.

38. To the extent applicable, Plaintiff has complied with 35 U.S.C. § 287(a) with respect to the '227 Patent.

39. UMC is not licensed to practice the '227 Patent in either an express or implied manner, nor does it enjoy or benefit from any rights in or to the '227 Patent whatsoever.

**U.S. Patent No. 7,923,764**

40. U.S. Patent No. 7,923,764 is entitled "Semiconductor Device and Method for Fabricating the Same," and was issued by the PTO to inventors Junji Hirase, Akio Sebe, Naoki Kotani, Gen Okazaki, Kazuhiko Aida, and Shinji Takeoka on April 12, 2011. Plaintiff holds by assignment all rights and title to the '764 Patent, including the sole and exclusive right to bring a claim for its infringement. A copy of the '764 Patent is attached to this complaint as **Exhibit B**.

41. The application preceding the '764 Patent was a divisional of U.S. Patent Application No. 11/491,260, which became the '227 Patent.

42. The '764 Patent generally claims a structure of a MISFET (metal insulator semiconductor field-effect transistor) semiconductor device.

43. To the extent applicable, Plaintiff has complied with 35 U.S.C. § 287(a) with respect to the '764 Patent.

44. UMC is not licensed to practice the '764 Patent in either an express or implied manner, nor does it enjoy or benefit from any rights in or to the '764 Patent whatsoever.

**U.S. Patent No. 8,253,180**

45. U.S. Patent No. 8,253,180 is entitled "Semiconductor Device," and was issued by the PTO to inventors Junji Hirase, Akio Sebe, Naoki Kotani, Gen Okazaki, Kazuhiko Aida, and Shinji Takeoka on August 28, 2012. Plaintiff holds by assignment all rights and title to the '180 Patent, including the sole and exclusive right to bring a claim for its infringement. A copy of the '180 Patent is attached to this complaint as **Exhibit C**.

46. The application preceding the '180 Patent was a divisional of U.S. Patent Application No. 12/505,799, which became the '764 Patent.

47. The '180 Patent generally claims a structure of a MISFET (metal insulator semiconductor field-effect transistor) semiconductor device.

48. To the extent applicable, Plaintiff has complied with 35 U.S.C. § 287(a) with respect to the '180 Patent.

49. UMC is not licensed to practice the '180 Patent in either an express or implied manner, nor does it enjoy or benefit from any rights in or to the '180 Patent whatsoever.

**U.S. Patent No. 8,587,076**

50. U.S. Patent No. 8,587,076 is entitled "Semiconductor Device," and was issued by the PTO to inventors Junji Hirase, Akio Sebe, Naoki Kotani, Gen Okazaki, Kazuhiko Aida, and

Shinji Takeoka on November 19, 2013. Plaintiff holds by assignment all rights and title to the '076 Patent, including the sole and exclusive right to bring a claim for its infringement. A copy of the '076 Patent is attached to this complaint as **Exhibit D**.

51. The application preceding the '076 Patent was a divisional of U.S. Patent Application No. 13/037,831, which became the '180 Patent.

52. The '076 Patent generally claims a structure of a MISFET (metal insulator semiconductor field-effect transistor) semiconductor device.

53. To the extent applicable, Plaintiff has complied with 35 U.S.C. § 287(a) with respect to the '076 Patent.

54. UMC is not licensed to practice the '076 Patent in either an express or implied manner, nor does it enjoy or benefit from any rights in or to the '076 Patent whatsoever.

**U.S. Patent No. 8,198,686**

55. U.S. Patent No. 8,198,686 is entitled "Semiconductor Device," and was issued by the PTO to inventors Yoshihiro Sato and Hisashi Ogawa on June 12, 2012. Plaintiff holds by assignment all rights and title to the '686 Patent, including the sole and exclusive right to bring a claim for its infringement. A copy of the '686 Patent is attached to this complaint as **Exhibit E**.

56. The '686 Patent generally claims a semiconductor device including Metal Insulator Semiconductor Field Effect Transistors (MISFET) having varying gate structures.

57. To the extent applicable, Plaintiff has complied with 35 U.S.C. § 287(a) with respect to the '686 Patent.

58. UMC is not licensed to practice the '686 Patent in either an express or implied manner, nor does it enjoy or benefit from any rights in or to the '686 Patent whatsoever.

**U.S. Patent No. 8,796,779**

59. U.S. Patent No. 8,796,779 is entitled "Semiconductor Device," and was issued by the PTO to inventors Satoru Ito, Yoshiya Moriyama, Hiroshi Ohkawa, and Susumu Akamatsu on August 5, 2014. Plaintiff holds by assignment all rights and title to the '779 Patent, including the sole and exclusive right to bring a claim for its infringement. A copy of the '779 Patent is attached to this complaint as **Exhibit F**.

60. The '779 Patent generally claims a semiconductor device including metal insulator semiconductor (MIS) devices with varying gate structures.

61. To the extent applicable, Plaintiff has complied with 35 U.S.C. § 287(a) with respect to the '779 Patent.

62. UMC is not licensed to practice the '779 Patent in either an express or implied manner, nor does it enjoy or benefit from any rights in or to the '779 Patent whatsoever.

**U.S. Patent No. 8,907,425**

63. U.S. Patent No. 8,907,425 is entitled "Semiconductor Device," and was issued by the PTO to inventors Satoru Ito and Toshie Kutsunnai on December 9, 2014. Plaintiff holds by assignment all rights and title to the '425 Patent, including the sole and exclusive right to bring a claim for its infringement. A copy of the '425 Patent is attached to this complaint as **Exhibit G**.

64. The '425 Patent generally claims a structure of a MISFET (metal insulator semiconductor field-effect transistor) semiconductor device with stress layer and a source/drain region that includes a silicon compound layer.

65. To the extent applicable, Plaintiff has complied with 35 U.S.C. § 287(a) with respect to the '425 Patent.

66. UMC is not licensed to practice the '425 Patent in either an express or implied

manner, nor does it enjoy or benefit from any rights in or to the '425 Patent whatsoever.

**UMC'S USE OF AICP'S PATENTED TECHNOLOGY**

67. UMC manufactures semiconductor devices at several different process nodes (i.e., minimum physical feature size or line width), including the 22 nanometer and 28 nanometer process nodes. The semiconductor devices UMC manufactures are, in turn, incorporated by UMC's customers into third-party electronic components and products, such as computer chips, mobile devices, and computer graphics cards.

68. For example, UMC has manufactured and, on information and belief, continues to manufacture the MDM9625M semiconductor device for Qualcomm (the "MDM9625M") at its 28 nanometer process node. *See, e.g.*:

69. UMC has also manufactured and, on information and belief, continues to manufacture the MPF300T-FCG484E semiconductor device for Microsemi (the "PolarFire") on its 28 nanometer process node. *See, e.g.*,:

70. Hereafter, the term "Accused Instrumentalities" refers to all products manufactured by UMC by practicing the '227 Patent, '764 Patent, '686 Patent, '076 Patent, '180 Patent, '779 Patent, and/or '425 Patent, including at least all semiconductor devices manufactured according to UMC's 22 nanometer and 28 nanometer process nodes and electronic components and products incorporating such semiconductor devices and processes.

**COUNT ONE**
**INFRINGEMENT OF U.S. PATENT NO. 7,579,227**

71. Plaintiff repeats and incorporates by reference each preceding paragraph as if fully set forth herein and further states:

72. UMC has directly infringed and continues to directly infringe the '227 Patent under 35 U.S.C. § 271(a), either literally or through the doctrine of equivalents, by making, using, selling, offering to sell, and/or importing in or into the United States Accused Instrumentalities and other products made by practicing and by performing processes that result in practicing the '227 Patent as described below, including at least Claim 1. By way of example, such Accused Instrumentalities include the MDM9625M devices manufactured, used, sold, offered for sale, and/or imported by UMC.

73. For example, Claim 1 is illustrative of the claims of the '227 Patent. It recites "[a] semiconductor device comprising:

> a high dielectric constant gate insulating film formed on an active region in a substrate;
>
> a gate electrode formed on the high dielectric constant gate insulating film; and
>
> an insulating sidewall formed on each side surface of the gate electrode,
>
> wherein the high dielectric constant gate insulating film is continuously formed so as to extend from under the gate electrode to under the insulating sidewall,
>
> at least part of the high dielectric constant gate insulating film located under the insulating sidewall has a smaller thickness than a thickness of part of the high dielectric constant gate insulating film located under the gate electrode,
>
> the insulating sidewall includes a first insulating sidewall formed on a side surface of the gate electrode and a second insulating sidewall formed on the side surface of the gate electrode with the first insulating sidewall interposed therebetween,
>
> the high dielectric constant gate insulating film is continuously formed so as to extend from under the gate electrode to under the first insulating sidewall, and
>
> part of the high dielectric constant gate insulating film located under the first insulating sidewall has a smaller thickness than a thickness of part of the high dielectric constant gate insulating film located under the gate electrode."

74. The exemplar MDM9625M device manufactured by UMC meets every element of this claim.[1]

75. The MDM9625M is a semiconductor device comprising a high dielectric constant gate insulating film formed on an active region in a substrate. It further comprises a gate electrode formed on the high dielectric constant gate insulating film, and an insulating sidewall formed on each side surface of the gate electrode, wherein the high dielectric constant gate insulating film is continuously formed so as to extend from under the gate electrode to under the insulating sidewall.

76. At least part of the high dielectric constant gate insulating film located under the

[1] This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which the MDM9625M device infringes.

insulating sidewall has a smaller thickness than a thickness of part of the high dielectric constant gate insulating film located under the gate electrode. For example, in the MDM9625M, the tapered edge of the high dielectric constant insulating film is thinner than the non-tapered area under the gate electrode.

77. In the MDM9625M, the insulating sidewall includes a first insulating sidewall formed on a side surface of the gate electrode and a second insulating sidewall formed on the side surface of the gate electrode with the first insulating sidewall interposed therebetween, and the high dielectric constant gate insulating film is continuously formed so as to extend from under the gate electrode to under the first insulating sidewall.

78. Part of the high dielectric constant gate insulating film located under the first insulating sidewall in the MDM9625M has a smaller thickness than a thickness of part of the high dielectric constant gate insulating film located under the gate electrode.

79. Because the MDM9625M practices at least Claim 1 of the '227 Patent, all semiconductor devices manufactured according to UMC's 28 nanometer process node likewise infringe because infringement occurs as a result of UMC's manufacturing process at this node. For example, on information and belief, UMC uses common MIS transistor structures for all semiconductor devices that it manufactures with its 28 nanometer process node such that all semiconductor devices manufactured at the 28 nanometer node invariably infringe at least Claim 1 of the '227 Patent in the same manner the MDM9625M does. The same is true for all semiconductor devices that UMC manufactures with its 22 nanometer process node because that process node is "derived from the company's 28nm technology."[2]

[2] UMC, *22nm* (last accessed Aug. 20, 2024), available at: https://www.umc.com/en/Product/technologies/Detail/22nm. *See also* UMC, *22 Nanometer*, (last accessed Aug. 20, 2024), available at:

80. In addition to directly infringing the '227 Patent by making, using, selling, offering to sell, and/or importing Accused Instrumentalities into the United States, UMC likewise has induced infringement of the '227 Patent under 35 U.S.C. § 271(b). UMC has actively encouraged its customers (*e.g.*, Qualcomm) to directly infringe the '227 Patent by using, selling, offering for sale, and/or importing electronic devices and products containing the Accused Instrumentalities (*e.g.*, the MDM9625M). UMC actively encouraged its customers to employ UMC's infringing process nodes to manufacture their semiconductor devices, electronic components, and products by and through UMC's sales, engineering, and technical marketing efforts and staff. UMC's sales engineers and technical marketing staff interface with UMC's customers and potential customers to obtain contracts with customers to develop and manufacture infringing chips. In attempting to obtain customer contracts, UMC's sales engineers and technical marketing staff tout the technological and economic benefits of the infringing chips and actively encourage use of the infringing chips. UMC has known that their customers' acts constituted direct infringement of at least one claim of the '227 Patent since at least as of the filing of this Complaint. As a result of UMC's active encouragement and intentional inducement, its customers have committed acts directly infringing the '227 Patent.

81. Moreover, UMC intends to cause, and has taken affirmative steps to induce infringement by customers and end-users by at least, *inter alia*, encouraging, promoting, instructing, and/or directing the infringing use of the Accused Instrumentalities.

82. UMC actively promotes its 22 nanometer and 28 nanometer process nodes through vehicles like its website, which features detailed descriptions of both technologies. UMC also

(https://www.umc.com/upload/media/05_Press_Center/3_Literatures/Process_Technology/22nm_Brochure.pdf) (describing "UMC's 22nm process" as "an optimized platform based on UMC's 28nm technology.")

publishes and distributes brochures promoting the benefits of its 22 and 28 nanometer process nodes.

83. UMC's promotional efforts have paid off. Its reported financial results for 2024 Q2 show that a third of its revenue is driven by its 22 and 28 nanometer process nodes, and that this has been true for the last five quarters. These process nodes contribute more to UMC's revenue than any other process node.

Revenue contribution from 22/28nm was 33% of the wafer revenue, while 40nm contribution declined to 12% of sales.

**Revenue Breakdown by Geometry**

| Geometry | 2Q24 | 1Q24 | 4Q23 | 3Q23 | 2Q23 |
|---|---|---|---|---|---|
| 14nm and below | 0% | 0% | 0% | 0% | 0% |
| 14nm<x<=28nm | 33% | 33% | 36% | 32% | 29% |
| 28nm<x<=40nm | 12% | 14% | 14% | 13% | 12% |
| 40nm<x<=65nm | 15% | 18% | 16% | 19% | 23% |
| 65nm<x<=90nm | 12% | 10% | 9% | 8% | 10% |
| 90nm<x<=0.13um | 11% | 9% | 9% | 12% | 10% |
| 0.13um<x<=0.18um | 10% | 11% | 9% | 9% | 9% |
| 0.18um<x<=0.35um | 5% | 4% | 5% | 5% | 5% |
| 0.5um and above | 2% | 1% | 2% | 2% | 2% |

84. Switching customers to its 22 and 28 nanometer process technology and away from older, larger nodes benefits UMC by allowing it to shift resources away from older, outdated, and less profitable nodes and toward the higher-profit 22 and 28 nanometer nodes. On a 2022 earnings call, Jason Wang, UMC's President, described the 28 nanometer node as a sweet spot and said that UMC expected its customers "to migrate to 28nm and that 28nm demand will continue to grow."

85. As detailed above, the MDM9625M and Accused Instrumentalities infringe at least Claim 1 of the '227 Patent. Accordingly, by encouraging, promoting, instructing, and/or directing users to use the MDM9625M and Accused Instrumentalities, UMC is actively inducing infringement of the '227 Patent in violation of 35 U.S.C. § 271(b).

86. UMC likewise is liable as a contributory infringer of the '227 Patent under 35 U.S.C. § 271(c). UMC has offered to sell and/or sold within the United States services for

manufacturing and designs for the Accused Instrumentalities that practice the '227 Patent. The Accused Instrumentalities comprise semiconductor devices, each of which constitutes a material part of the '227 Patent's invention that can be incorporated into electronic components and products.

87. For example, such manufacturing services and designs were offered for sale, sold, and marketed by and through UMC's sales, engineering, and technical marketing efforts and staff. Such efforts resulted in UMC's manufacturing of the infringing MDM9625M chip. Upon information and belief, UMC's customers do not manufacture the Accused Instrumentalities on their own, but contract with others, such as UMC, to manufacture such devices. UMC has known such Accused Instrumentalities to be especially adapted for practicing, and thus infringing, the '227 Patent since at least the filing of this Complaint. The Accused Instrumentalities are not staple articles nor a commodity of commerce suitable for substantial non-infringing use because they cannot be used individually without incorporation into electronic components and products. Thus, UMC is liable as a contributory infringer.

88. UMC's direct, induced, and contributory infringement of the '227 Patent has caused, and will continue to cause, substantial damage to AICP. Therefore, AICP is entitled to an award of damages adequate to compensate for UMC's infringement, but not less than reasonable royalty, together with pre-and post-judgment interest, attorneys' fees, and costs as fixed by the Court under 35 U.S.C. §§ 284 and 285.

## COUNT TWO
## INFRINGEMENT OF U.S. PATENT NO. 7,923,764

89. Plaintiff repeats and incorporates by reference each preceding paragraph as if fully set forth herein and further states:

90. UMC has directly infringed and continues to directly infringe the '764 Patent under

35 U.S.C. § 271(a), either literally or through the doctrine of equivalents, by making, using, selling, offering to sell, and/or importing in or into the United States Accused Instrumentalities and other products made by practicing and by performing processes that result in practicing the '764 Patent as described below, including at least Claim 1. By way of example, such Accused Instrumentalities include the MDM9625M devices manufactured, used, sold, offered for sale, and/or imported by UMC.

91. For example, Claim 1 is illustrative of the claims of the '764 Patent. It recites "[a] semiconductor device comprising:

> a high dielectric constant gate insulating film formed on an active region in a substrate;
>
> a gate electrode formed on the high dielectric constant gate insulating film;
>
> a first insulating sidewall formed on each side surface of the gate electrode;
>
> and a second insulating sidewall formed on said each side surface of the gate electrode with the first insulating sidewall interposed therebetween,
>
> wherein the high dielectric constant gate insulating film is continuously formed so as to extend from under the gate electrode to under the first insulating sidewall, and
>
> part of the high dielectric constant gate insulating film located under the first insulating sidewall has a smaller thickness than a thickness of part of the high dielectric constant gate insulating film located under the gate electrode."

92. The exemplar MDM9625M device manufactured by UMC meets every element of this claim.[3]

93. The MDM9625M is a semiconductor device comprising a high dielectric constant gate insulating film formed on an active region in a substrate. It further comprises a gate electrode formed on the high dielectric constant gate insulating film, and a first insulating sidewall formed on each side surface of the gate electrode, and a second insulating sidewall formed on said each

[3] This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which the MDM9625M device infringes.

side surface of the gate electrode with the first insulating sidewall interposed therebetween, wherein the high dielectric constant gate insulating film is continuously formed so as to extend from under the gate electrode to under the first insulating sidewall.

94. In the MDM9625M, part of the high dielectric constant gate insulating film located under the first insulating sidewall has a smaller thickness than a thickness of part of the high dielectric constant gate insulating film located under the gate electrode. For example, in the MDM9625M, the tapered edge of the high dielectric constant insulating film is thinner than the non-tapered area under the gate electrode.

95. Because the MDM9625M practices at least Claim 1 of the '764 Patent, all semiconductor devices manufactured according to UMC's 28 nanometer process node likewise infringe because infringement occurs as a result of UMC's manufacturing process at this node. For example, on information and belief, UMC uses common MIS transistor structures for all semiconductor devices that it manufactures with its 28 nanometer process node such that all semiconductor devices manufactured at the 28 nanometer node invariably infringe at least Claim 1 of the '764 Patent in the same manner the MDM9625M does. The same is true for all semiconductor devices that UMC manufactures with its 22 nanometer process node because that process node is "derived from the company's 28nm technology."

96. In addition to directly infringing the '764 Patent by making, using, selling, offering to sell, and/or importing Accused Instrumentalities into the United States, UMC likewise has induced infringement of the '764 Patent under 35 U.S.C. § 271(b). UMC has actively encouraged its customers (*e.g.*, Qualcomm) to directly infringe the '764 Patent by using, selling, offering for sale, and/or importing electronic devices and products containing the Accused Instrumentalities (*e.g.*, the MDM9625M). UMC actively encouraged its customers to employ UMC's infringing

process nodes to manufacture their semiconductor devices, electronic components, and products by and through UMC's sales, engineering, and technical marketing efforts and staff. UMC's sales engineers and technical marketing staff interface with UMC's customers and potential customers to obtain contracts with customers to develop and manufacture infringing chips. In attempting to obtain these new customer contracts, UMC's sales engineers and technical marketing staff tout the technological and economic benefits of the infringing chips and actively encourage use of the infringing chips. UMC has known that their customers' acts constituted direct infringement of at least one claim of the '764 Patent since at least as of the filing of this Complaint. As a result of UMC's active encouragement and intentional inducement, its customers have committed acts directly infringing the '764 Patent.

97. Moreover, UMC intends to cause, and has taken affirmative steps to induce, infringement by customers and end-users by at least, *inter alia*, encouraging, promoting, instructing, and/or directing the infringing use of the Accused Instrumentalities. As discussed above, UMC took direct steps to encourage, promote, instruct, and/or direct its customers and end-users use of the Accused Instrumentalities. Pushing its customers toward the 22 and 28 nanometer nodes benefits UMC.

98. As detailed above, the MDM9625M and Accused Instrumentalities infringe at least Claim 1 of the '764 Patent. Accordingly, by encouraging, promoting, instructing, and/or directing users to use the MDM9625M and Accused Instrumentalities, UMC is actively inducing infringement of the '764 Patent in violation of 35 U.S.C. § 271(b).

99. UMC likewise is liable as a contributory infringer of the '764 Patent under 35 U.S.C. § 271(c). UMC has offered to sell and/or sold within the United States services for manufacturing and designs for the Accused Instrumentalities that practice the '764 Patent. The

Accused Instrumentalities comprise semiconductor devices, each of which constitutes a material part of the '764 Patent's invention that can be incorporated into electronic components and products.

100. For example, such manufacturing services and designs were offered for sale, sold, and marketed by and through UMC's sales, engineering, and technical marketing efforts and staff. Such efforts resulted in UMC's manufacturing of the infringing MDM9625M chip. Upon information and belief, UMC's customers do not manufacture the Accused Instrumentalities on their own, but contract with others, such as UMC, to manufacture such devices. UMC has known such Accused Instrumentalities to be especially adapted for practicing, and thus infringing, the '764 Patent since at least the filing of this Complaint. The Accused Instrumentalities are not staple articles nor a commodity of commerce suitable for substantial non-infringing use because they cannot be used individually without incorporation into electronic components and products. Thus, UMC is liable as a contributory infringer.

101. UMC's direct, induced, and contributory infringement of the '764 Patent has caused, and will continue to cause, substantial damage to AICP. Therefore, AICP is entitled to an award of damages adequate to compensate for UMC's infringement, but not less than reasonable royalty, together with pre-and post-judgment interest, attorneys' fees, and costs as fixed by the Court under 35 U.S.C. §§ 284 and 285.

## COUNT THREE
## INFRINGEMENT OF U.S. PATENT NO. 8,198,686

102. Plaintiff repeats and incorporates by reference each preceding paragraph as if fully set forth herein and further states:

103. UMC has directly infringed and continues to directly infringe the '686 Patent under 35 U.S.C. § 271(a), either literally or through the doctrine of equivalents, by making, using, selling,

offering to sell, and/or importing in or into the United States Accused Instrumentalities and other products made by practicing and by performing processes that result in practicing the '686 Patent as described below, including at least Claim 25. By way of example, such Accused Instrumentalities include the MDM9625M devices manufactured, used, sold, offered for sale, and/or imported by UMC.

104. For example, Claim 25 is illustrative of the claims of the '686 Patent. It recites "[a] semiconductor device comprising:

a first MIS transistor; and a second MIS transistor, wherein:

the first MIS transistor includes:

a first gate insulating film formed on a first active region in a semiconductor substrate;

a first gate electrode including a second metal film formed on the first gate insulating film;

first sidewall spacers formed on side surfaces of the first gate electrode, the first sidewall spacers being insulative; and

a silicon nitride film formed, extending over the side surfaces of the first gate electrode on which the first sidewall spacers are formed and upper surfaces of regions located in the first active region laterally outside the first sidewall spacers,

the second MIS transistor includes:

a second gate insulating film formed on a second active region in the semiconductor substrate;

a second gate electrode including a first metal film formed on the second gate insulating film and a conductive film formed on the first metal film;

second sidewall spacers formed on side surfaces of the second gate electrode, the second sidewall spacers being insulative; and

the silicon nitride film formed, extending over the side surfaces of the second gate electrode on which the second sidewall spacers are formed and upper surfaces of regions located in the second active region laterally outside the second sidewall spacers,

the first and second metal films are made of different metal materials,

the silicon nitride film is not formed on any of upper surfaces of the first and second gate electrodes, and

the silicon nitride film causes first stress in a gate length direction of a channel region in the first active region."

105. The exemplar MDM9625M device manufactured by UMC meets every element of this claim.[4]

106. The MDM9625M is a semiconductor device comprising a first MIS transistor and a second MIS transistor. For example, in the MDM9625M, a first MIS transistor comprises an NMOS transistor, and a second MIS transistor comprises a PMOS transistor.

107. The first MIS transistor in the MDM9625M includes a first gate insulating film formed on a first active region in a semiconductor substrate, a first gate electrode including a second metal film formed on the first gate insulating film, first sidewall spacers formed on side surfaces of the first gate electrode with the first sidewall spacers being insulative; and a silicon nitride film formed, extending over the side surfaces of the first gate electrode on which the first sidewall spacers are formed and upper surfaces of regions located in the first active region laterally outside the first sidewall spacers.

108. The second MIS transistor in the MDM9625M includes a second gate insulating film formed on a second active region in the semiconductor substrate, a second gate electrode including a first metal film formed on the second gate insulating film and a conductive film formed on the first metal film, second sidewall spacers formed on side surfaces of the second gate electrode with the second sidewall spacers being insulative, and a silicon nitride film formed, extending over

[4] This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which the MDM9625M device infringes.

the side surfaces of the second gate electrode on which the second sidewall spacers are formed and upper surfaces of regions located in the second active region laterally outside the second sidewall spacers,

109. Within the MDM9625M, the first and second metal films are made of different metal materials. For example, the metal film in the first MIS transistor (the NMOS transistor) is comprised of TiN material, whereas the metal film in the second MIS transistor (the PMOS transistor) is comprised of TaN material.

110. In the MDM9625M, the silicon nitride film is not formed on any of upper surfaces of the first and second gate electrodes, and the silicon nitride film causes first stress in a gate length direction of a channel region in the first active region.

111. Because the MDM9625M practices at least Claim 25 of the '686 Patent, all semiconductor devices manufactured according to UMC's 28 nanometer process node likewise infringe because infringement occurs as a result of UMC's manufacturing process at this node. For example, on information and belief, UMC uses common MIS transistor structures for all semiconductor devices that it manufactures with its 28 nanometer process node such that all semiconductor devices manufactured at the 28 nanometer node invariably infringe at least Claim 25 of the '686 Patent in the same manner the MDM9625M does. The same is true for all semiconductor devices that UMC manufactures with its 22 nanometer process node because that process node is "derived from the company's 28nm technology."

112. In addition to directly infringing the '686 Patent by making, using, selling, offering to sell, and/or importing Accused Instrumentalities into the United States, UMC likewise has induced infringement of the '686 Patent under 35 U.S.C. § 271(b). UMC has actively encouraged its customers (*e.g.*, Qualcomm) to directly infringe the '686 Patent by using, selling, offering for

sale, and/or importing electronic devices and products containing the Accused Instrumentalities (*e.g.*, the MDM9625M). UMC actively encouraged its customers to employ UMC's infringing process nodes to manufacture their semiconductor devices, electronic components, and products by and through UMC's sales, engineering, and technical marketing efforts and staff. UMC's sales engineers and technical marketing staff interface with UMC's customers and potential customers to obtain contracts with customers to develop and manufacture infringing chips. In attempting to obtain these new customer contracts, UMC's sales engineers and technical marketing staff tout the technological and economic benefits of the infringing chips and actively encourage use of the infringing chips. UMC has known that their customers' acts constituted direct infringement of at least one claim of the '686 Patent since at least as of the filing of this Complaint. As a result of UMC's active encouragement and intentional inducement, its customers have committed acts directly infringing the '686 Patent.

113. Moreover, UMC intends to cause, and has taken affirmative steps to induce, infringement by customers and end-users by at least, *inter alia*, encouraging, promoting, instructing, and/or directing the infringing use of the Accused Instrumentalities. As discussed above, UMC took direct steps to encourage, promote, instruct, and/or direct its customers and end-users use of the Accused Instrumentalities. Pushing its customers toward the 22 and 28 nanometer nodes benefits UMC.

114. As detailed above, the MDM9625M and Accused Instrumentalities infringe at least Claim 25 of the '686 Patent. Accordingly, by encouraging, promoting, instructing, and/or directing users to use the MDM9625M and Accused Instrumentalities, UMC is actively inducing infringement of the '686 Patent in violation of 35 U.S.C. § 271(b).

115. UMC likewise is liable as a contributory infringer of the '686 Patent under 35

U.S.C. § 271(c). UMC has offered to sell and/or sold within the United States services for manufacturing and designs for the Accused Instrumentalities that practice the '686 Patent. The Accused Instrumentalities comprise semiconductor devices, each of which constitutes a material part of the '686 Patent's invention that can be incorporated into electronic components and products.

116. For example, such manufacturing services and designs were offered for sale, sold, and marketed by and through UMC's sales, engineering, and technical marketing efforts and staff. Such efforts resulted in UMC's manufacturing of the infringing MDM9625M chip. Upon information and belief, UMC's customers do not manufacture the Accused Instrumentalities device on their own, but contract with others, such as UMC, to manufacture such devices. UMC has known such Accused Instrumentalities to be especially adapted for practicing, and thus infringing, the '686 Patent since at least the filing of this Complaint. The Accused Instrumentalities are not staple articles nor a commodity of commerce suitable for substantial non-infringing use because they cannot be used individually without incorporation into electronic components and products. Thus, UMC is liable as a contributory infringer.

117. UMC's direct, induced, and contributory infringement of the '686 Patent has caused, and will continue to cause, substantial damage to AICP. Therefore, AICP is entitled to an award of damages adequate to compensate for UMC's infringement, but not less than reasonable royalty, together with pre-and post-judgment interest, attorneys' fees, and costs as fixed by the Court under 35 U.S.C. §§ 284 and 285.

## COUNT FOUR
## INFRINGEMENT OF U.S. PATENT NO. 8,253,180

118. Plaintiff repeats and incorporates by reference each preceding paragraph as if fully set forth herein and further states:

119. UMC has directly infringed and continues to directly infringe the '180 Patent under 35 U.S.C. § 271(a), either literally or through the doctrine of equivalents, by making, using, selling, offering to sell, and/or importing in or into the United States Accused Instrumentalities and other products made by practicing and by performing processes that result in practicing the '180 Patent as described below, including at least Claim 1. By way of example, such Accused Instrumentalities include the MDM9625M devices manufactured, used, sold, offered for sale, and/or imported by UMC.

120. For example, Claim 1 is illustrative of the claims of the '180 Patent. It recites "[a] semiconductor device comprising:

> a high dielectric constant gate insulating film formed on an active region in a substrate;
>
> a gate electrode formed on the high dielectric constant gate insulating film;
>
> a insulating sidewall formed on each side surface of the gate electrode; and
>
> wherein the high dielectric constant gate insulating film is continuously formed so as to extend from under the gate electrode to under the insulating sidewall, and
>
> an end of the high dielectric constant gate insulating film under the insulating sidewall is located at a predetermined distance from an outer end of the insulating sidewall toward the gate electrode."

121. The exemplar MDM9625M device manufactured by UMC meets every element of this claim.[5]

122. The MDM9625M is a semiconductor device comprising a high dielectric constant gate insulating film formed on an active region in a substrate, a gate electrode formed on the high dielectric constant gate insulating film, and an insulating sidewall formed on each side surface of the gate electrode, wherein the high dielectric constant gate insulating film is continuously formed

[5] This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which the MDM9625M device infringes.

so as to extend from under the gate electrode to under the insulating sidewall.

123. In the MDM9625M, an end of the high dielectric constant gate insulating film under the insulating sidewall is located at a predetermined distance from an outer end of the insulating sidewall toward the gate electrode.

124. Because the MDM9625M practices at least Claim 1 of the '180 Patent, all semiconductor devices manufactured according to UMC's 28 nanometer process node likewise infringe because infringement occurs as a result of UMC's manufacturing process at this node. For example, on information and belief, UMC uses common MIS transistor structures for all semiconductor devices that it manufactures with its 28 nanometer process node such that all semiconductor devices manufactured at the 28 nanometer node invariably infringe at least Claim 1 of the '180 Patent in the same manner the MDM9625M does. The same is true for all semiconductor devices that UMC manufactures with its 22 nanometer process node because that process node is "derived from the company's 28nm technology."

125. In addition to directly infringing the '180 Patent by making, using, selling, offering to sell, and/or importing Accused Instrumentalities into the United States, UMC likewise has induced infringement of the '180 Patent under 35 U.S.C. § 271(b). UMC has actively encouraged its customers (*e.g.*, Qualcomm) to directly infringe the '180 Patent by using, selling, offering for sale, and/or importing electronic devices and products containing the Accused Instrumentalities (*e.g.*, the MDM9625M). UMC actively encouraged its customers to employ UMC's infringing process nodes to manufacture their semiconductor devices, electronic components, and products by and through UMC's sales, engineering, and technical marketing efforts and staff. UMC's sales engineers and technical marketing staff interface with UMC's customers and potential customers to obtain contracts with customers to develop and manufacture infringing chips. In attempting to

obtain these new customer contracts, UMC's sales engineers and technical marketing staff tout the technological and economic benefits of the infringing chips and actively encourage use of the infringing chips. UMC has known that their customers' acts constituted direct infringement of at least one claim of the '180 Patent since at least as of the filing of this Complaint. As a result of UMC's active encouragement and intentional inducement, its customers have committed acts directly infringing the '180 Patent.

126. Moreover, UMC intends to cause, and has taken affirmative steps to induce, infringement by customers and end-users by at least, *inter alia*, encouraging, promoting, instructing, and/or directing the infringing use of the Accused Instrumentalities. As discussed above, UMC took direct steps to encourage, promote, instruct, and/or direct its customers and end-users use of the Accused Instrumentalities. Pushing its customers toward the 22 and 28 nanometer nodes benefits UMC.

127. As detailed above, the MDM9625M and Accused Instrumentalities infringe at least Claim 1 of the '180 Patent. Accordingly, by encouraging, promoting, instructing, and/or directing users to use the MDM9625M and Accused Instrumentalities, UMC is actively inducing infringement of the '180 Patent in violation of 35 U.S.C. § 271(b).

128. UMC likewise is liable as a contributory infringer of the '180 Patent under 35 U.S.C. § 271(c). UMC has offered to sell and/or sold within the United States services for manufacturing and designs for the Accused Instrumentalities that practice the '180 Patent. The Accused Instrumentalities comprise semiconductor devices, each of which constitutes a material part of the '180 Patent's invention that can be incorporated into electronic components and products.

129. For example, such manufacturing services and designs were offered for sale, sold,

and marketed by and through UMC's sales, engineering, and technical marketing efforts and staff. Such efforts resulted in UMC's manufacturing of the infringing MDM9625M chip. Upon information and belief, UMC's customers do not manufacture the Accused Instrumentalities on their own, but contract with others, such as UMC, to manufacture such devices. UMC has known such Accused Instrumentalities to be especially adapted for practicing, and thus infringing, the '180 Patent since at least the filing of this Complaint. The Accused Instrumentalities are not staple articles nor a commodity of commerce suitable for substantial non-infringing use because they cannot be used individually without incorporation into electronic components and products. Thus, UMC is liable as a contributory infringer.

130. UMC's direct, induced, and contributory infringement of the '180 Patent has caused, and will continue to cause, substantial damage to AICP. Therefore, AICP is entitled to an award of damages adequate to compensate for UMC's infringement, but not less than reasonable royalty, together with pre-and post-judgment interest, attorneys' fees, and costs as fixed by the Court under 35 U.S.C. §§ 284 and 285.

## COUNT FIVE
## INFRINGEMENT OF U.S. PATENT NO. 8,587,076

131. Plaintiff repeats and incorporates by reference each preceding paragraph as if fully set forth herein and further states:

132. UMC has directly infringed and continues to directly infringe the '076 Patent under 35 U.S.C. § 271(a), either literally or through the doctrine of equivalents, by making, using, selling, offering to sell, and/or importing in or into the United States Accused Instrumentalities and other products made by practicing and by performing processes that result in practicing the '076 Patent as described below, including at least Claim 1. By way of example, such Accused Instrumentalities include the MDM9625M devices manufactured, used, sold, offered for sale, and/or imported by

UMC.

133. For example, Claim 1 is illustrative of the claims of the '076 Patent. It recites "[a] semiconductor device comprising:

> a gate insulating film formed on an active region in a substrate and including Hf;
>
> a gate electrode formed on the gate insulating film;
>
> a insulating sidewall formed on each side surface of the gate electrode; and
>
> wherein a width of the gate insulating film along a gate length is larger than a width of the gate electrode along the gate length, and
>
> an end of the gate insulating film under the insulating sidewall is retracted from an outer end of the insulating sidewall toward the gate electrode."

134. The exemplar MDM9625M device manufactured by UMC meets every element of this claim.[6]

135. The MDM9625M is a semiconductor device comprising a gate insulating film formed on an active region in a substrate that includes Hf with a gate electrode formed on the gate insulating film and an insulating sidewall formed on each side surface of the gate electrode, wherein a width of the gate insulating film along a gate length is larger than a width of the gate electrode along the gate length.

136. In the MDM9625M, an end of the gate insulating film under the insulating sidewall is retracted from an outer end of the insulating sidewall toward the gate electrode.

137. Because the MDM9625M practices at least Claim 1 of the '076 Patent, all semiconductor devices manufactured according to UMC's 28 nanometer process node likewise infringe because infringement occurs as a result of UMC's manufacturing process at this node. For example, on information and belief, UMC uses common MIS transistor structures for all

[6] This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which the MDM9625M device infringes.

semiconductor devices that it manufactures with its 28 nanometer process node such that all semiconductor devices manufactured at the 28 nanometer node invariably infringe at least Claim 1 of the '076 Patent in the same manner the MDM9625M does. The same is true for all semiconductor devices that UMC manufactures with its 22 nanometer process node because that process node is "derived from the company's 28nm technology."

138. In addition to directly infringing the '076 Patent by making, using, selling, offering to sell, and/or importing Accused Instrumentalities into the United States, UMC likewise has induced infringement of the '076 Patent under 35 U.S.C. § 271(b). UMC has actively encouraged its customers (*e.g.*, Qualcomm) to directly infringe the '076 Patent by using, selling, offering for sale, and/or importing electronic devices and products containing the Accused Instrumentalities (*e.g.*, the MDM9625M). UMC actively encouraged its customers to employ UMC's infringing process nodes to manufacture their semiconductor devices, electronic components, and products by and through UMC's sales, engineering, and technical marketing efforts and staff. UMC's sales engineers and technical marketing staff interface with UMC's customers and potential customers to obtain contracts with customers to develop and manufacture infringing chips. In attempting to obtain these new customer contracts, UMC's sales engineers and technical marketing staff tout the technological and economic benefits of the infringing chips and actively encourage use of the infringing chips. UMC has known that their customers' acts constituted direct infringement of at least one claim of the '076 Patent since at least as of the filing of this Complaint. As a result of UMC's active encouragement and intentional inducement, its customers have committed acts directly infringing the '076 Patent.

139. Moreover, UMC intends to cause, and has taken affirmative steps to induce, infringement by customers and end-users by at least, *inter alia*, encouraging, promoting,

instructing, and/or directing the infringing use of the Accused Instrumentalities. As discussed above, UMC took direct steps to encourage, promote, instruct, and/or direct its customers and end-users use of the Accused Instrumentalities. Pushing its customers toward the 22 and 28 nanometer nodes benefits UMC.

140. As detailed above, the MDM9625M and Accused Instrumentalities infringe at least Claim 1 of the '076 Patent. Accordingly, by encouraging, promoting, instructing, and/or directing users to use the MDM9625M and Accused Instrumentalities, UMC is actively inducing infringement of the '076 Patent in violation of 35 U.S.C. § 271(b).

141. UMC likewise is liable as a contributory infringer of the '076 Patent under 35 U.S.C. § 271(c). UMC has offered to sell and/or sold within the United States services for manufacturing and designs for the Accused Instrumentalities that practice the '076 Patent. The Accused Instrumentalities comprise semiconductor devices, each of which constitutes a material part of the '076 Patent's invention that can be incorporated into electronic components and products.

142. For example, such manufacturing services and designs were offered for sale, sold, and marketed by and through UMC's sales, engineering, and technical marketing efforts and staff. Such efforts resulted in UMC's manufacturing of the infringing MDM9625M chip. Upon information and belief, UMC's customers do not manufacture the Accused Instrumentalities on their own, but contract with others, such as UMC, to manufacture such devices. UMC has known such Accused Instrumentalities to be especially adapted for practicing, and thus infringing, the '076 Patent since at least the filing of this Complaint. The Accused Instrumentalities are not staple articles nor a commodity of commerce suitable for substantial non-infringing use because they cannot be used individually without incorporation into electronic components and products. Thus,

UMC is liable as a contributory infringer.

143. UMC's direct, induced, and contributory infringement of the '076 Patent has caused, and will continue to cause, substantial damage to AICP. Therefore, AICP is entitled to an award of damages adequate to compensate for UMC's infringement, but not less than reasonable royalty, together with pre-and post-judgment interest, attorneys' fees, and costs as fixed by the Court under 35 U.S.C. §§ 284 and 285.

## COUNT SIX
## INFRINGEMENT OF U.S. PATENT NO. 8,796,779

144. Plaintiff repeats and incorporates by reference each preceding paragraph as if fully set forth herein and further states:

145. UMC has directly infringed and continues to directly infringe the '779 Patent under 35 U.S.C. § 271(a), either literally or through the doctrine of equivalents, by making, using, selling, offering to sell, and/or importing in or into the United States Accused Instrumentalities and other products made by practicing and by performing processes that result in practicing the '779 Patent as described below, including at least Claim 1. By way of example, such Accused Instrumentalities include the MDM9625M semiconductor devices manufactured, used, sold, offered for sale, and/or imported by UMC.

146. For example, Claim 1 is illustrative of the claims of the '779 Patent. It recites "[a] semiconductor device comprising:

> a first MIS transistor and a second MIS transistor of an identical conductivity type provided on an identical semiconductor substrate,
>
> wherein the first MIS transistor includes a first gate insulating film formed on a first active region in the semiconductor substrate and a first gate electrode formed on the first gate insulating film,
>
> the second MIS transistor includes a second gate insulating film formed on a second active region in the semiconductor substrate and a second gate electrode formed on

the second gate insulating film,

the first gate insulating film includes a first interface layer being in contact with the semiconductor substrate and a first high dielectric constant insulating film formed on the first interface layer,

the second gate insulating film includes a second interface layer being in contact with the semiconductor substrate and a second high dielectric constant insulating film formed on the second interface layer,

each of the first interface layer has a thickness larger than that of the second interface layer, and each of the first interface layer and the second interface layer is made of a silicon dioxide film or a silicon oxynitride film."

147. The exemplar MDM9625M device manufactured by UMC meets every element of this claim.[7]

148. The MDM9625M is a semiconductor device comprising a first MIS transistor and a second MIS transistor of an identical conductivity type provided on an identical semiconductor substrate. For example, the MDM9625M comprises a first MIS transistor and second MIS transistor that are both PMOS transistors.

149. The first MIS transistor in the MDM9625M includes a first gate insulating film formed on a first active region in the semiconductor substrate and a first gate electrode formed on the first gate insulating film.

150. The second MIS transistor in the MDM9625M includes a includes a second gate insulating film formed on a second active region in the semiconductor substrate and a second gate electrode formed on the second gate insulating film.

151. The first gate insulating film in the MDM9625M includes a first interface layer being in contact with the semiconductor substrate and a first high dielectric constant insulating film formed on the first interface layer.

[7] This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which the MDM9625M device infringes.

152. The second gate insulating film includes a second interface layer being in contact with the semiconductor substrate and a second high dielectric constant insulating film formed on the second interface layer.

153. For example, in the MDM9625M, the first high dielectric constant insulating film and second high dielectric constant insulating film consist of hafnium oxide.

154. In the MDM9625M, each of the first interface layer has thickness, as measured in nanometers, that is larger than that of the second interface layer, and each of the first interface layer and the second interface layer is made of silicon dioxide film or a silicon oxynitride film. For example, in the MDM9625M, the first and second interface layers are made of $SiO_2$.

155. Because the MDM9625M practices at least Claim 1 of the '779 Patent, all semiconductor devices manufactured according to UMC's 28 nanometer process node likewise infringe because infringement occurs as a result of UMC's manufacturing process at this node. For example, on information and belief, UMC uses common MIS transistor structures for all semiconductor devices that it manufactures with its 28 nanometer process node such that all semiconductor devices manufactured at the 28 nanometer node invariably infringe at least Claim 1 of the '779 Patent in the same manner the MDM9625M does. The same is true for all semiconductor devices that UMC manufactures with its 22 nanometer process node because that process node is "derived from the company's 28nm technology."

156. In addition to directly infringing the '779 Patent by making, using, selling, offering to sell, and/or importing Accused Instrumentalities into the United States, UMC likewise has induced infringement of the '779 Patent under 35 U.S.C. § 271(b). UMC has actively encouraged its customers (*e.g.*, Qualcomm) to directly infringe the '779 Patent by using, selling, offering for sale, and/or importing electronic devices and products containing the Accused Instrumentalities

(*e.g.*, the MDM9625M). UMC actively encouraged its customers to employ UMC's infringing process nodes to manufacture their semiconductor devices, electronic components, and products by and through UMC's sales, engineering, and technical marketing efforts and staff. UMC's sales engineers and technical marketing staff interface with UMC's customers and potential customers to obtain contracts with customers to develop and manufacture infringing chips. In attempting to obtain these new customer contracts, UMC's sales engineers and technical marketing staff tout the technological and economic benefits of the infringing chips and actively encourage use of the infringing chips. UMC has known that its customers' acts constituted direct infringement of at least one claim of the '779 Patent since at least as of the filing of this Complaint. As a result of UMC's active encouragement and intentional inducement, its customers have committed acts directly infringing the '779 Patent.

157. Moreover, UMC intends to cause, and has taken affirmative steps to induce, infringement by customers and end-users by at least, *inter alia*, encouraging, promoting, instructing, and/or directing the infringing use of the Accused Instrumentalities. As discussed above, UMC took direct steps to encourage, promote, instruct, and/or direct its customers and end-users use of the Accused Instrumentalities. Pushing its customers toward the 22 and 28 nanometer nodes benefits UMC.

158. As detailed above, the MDM9625M and Accused Instrumentalities infringe at least Claim 1 of the '779 Patent. Accordingly, by encouraging, promoting, instructing, and/or directing users to use the MDM9625M and Accused Instrumentalities, UMC is actively inducing infringement of the '779 Patent in violation of 35 U.S.C. § 271(b).

159. UMC likewise is liable as a contributory infringer of the '779 Patent under 35 U.S.C. § 271(c). UMC has offered to sell and/or sold within the United States services for

manufacturing and designs for the Accused Instrumentalities that practice the '779 Patent. The Accused Instrumentalities comprise semiconductor devices, each of which constitutes a material part of the '779 Patent's invention that can be incorporated into electronic components and products.

160. For example, such manufacturing services and designs were offered for sale, sold, and marketed by and through UMC's sales, engineering, and technical marketing efforts and staff. Such efforts resulted in UMC's manufacturing of the infringing MDM9625M chip. Upon information and belief, UMC's customers do not manufacture the Accused Instrumentalities on their own, but contract with others, such as UMC, to manufacture such devices. UMC has known such Accused Instrumentalities to be especially adapted for practicing, and thus infringing, the '779 Patent since at least the filing of this Complaint. The Accused Instrumentalities are not staple articles nor a commodity of commerce suitable for substantial non-infringing use because they cannot be used individually without incorporation into electronic components and products. Thus, UMC is liable as a contributory infringer.

161. UMC's direct, induced, and contributory infringement of the '779 Patent has caused, and will continue to cause, substantial damage to AICP. Therefore, AICP is entitled to an award of damages adequate to compensate for UMC's infringement, but not less than reasonable royalty, together with pre-and post-judgment interest, attorneys' fees, and costs as fixed by the Court under 35 U.S.C. §§ 284 and 285.

## COUNT SEVEN
## INFRINGEMENT OF U.S. PATENT NO. 8,907,425

162. Plaintiff repeats and incorporates by reference each preceding paragraph as if fully set forth herein and further states:

163. UMC has directly infringed and continues to directly infringe the '425 Patent under

35 U.S.C. § 271(a), either literally or through the doctrine of equivalents, by making, using, selling, offering to sell, and/or importing in or into the United States Accused Instrumentalities and other products made by practicing and by performing processes that result in practicing the '425 Patent as described below, including at least claim 1. By way of example, such Accused Instrumentalities include the PolarFire devices manufactured, used, sold, offered for sale, and/or imported by UMC.

164. For example, Claim 1 is illustrative of the claims of the '425 Patent. It recites "[a] semiconductor device comprising:

a first MIS transistor, wherein:

the first MIS transistor includes:

> a first gate insulating film formed on a first active region in a semiconductor substrate,
>
> a first gate electrode formed on the first gate insulating film,
>
> a first sidewall spacer formed on a side surface of the first gate electrode,
>
> a first source/drain region of a first conductivity type which is formed in a trench provided in the first active region on a lateral side of the first sidewall spacer, and which includes a silicon compound layer causing a first stress in a gate length direction of a channel region in the first active region, and
>
> a stress insulating film which is formed on the first active region to cover the first gate electrode, the first side wall spacer, and the first source/drain region, and which causes a second stress opposite to the first stress,
>
> an uppermost surface of the silicon compound layer is located higher than a surface of the semiconductor substrate located directly under the first gate electrode,
>
> a first stress-relief film is formed in a space between the silicon compound layer and the first sidewall spacer,
>
> the first stress-relief film is formed on the side surface of the first gate electrode with the first sidewall spacer interposed therebetween, and
>
> the first stress-relief film is not in direct contact with the side surface of the first gate electrode."

165. The exemplar PolarFire device manufactured by UMC meets every element of this claim.[8]

166. The PolarFire device is a semiconductor device comprising a first MIS transistor, wherein the first MIS transistor includes a first gate insulating film formed on a first active region in a semiconductor substrate, a first gate electrode formed on the first gate insulating film, a first sidewall spacer formed on a side surface of the first gate electrode, and a first sidewall spacer formed on a side surface of the first gate electrode.

167. The first MIS transistor also includes a first source/drain region of a first conductivity type which is formed in a trench provided in the first active region on a lateral side of the first sidewall spacer, and which includes a silicon compound (SiGe) layer causing a first stress in a gate length direction of a channel region in the first active region.

168. The first MIS transistor also includes a stress insulating film which is formed on the first active region to cover the first gate electrode, the first side wall spacer, and the first source/drain region, and which causes a second stress opposite to the first stress.

169. The first MIS transistor also includes an uppermost surface of the silicon compound (SiGe) layer located higher than a surface of the semiconductor substrate located directly under the first gate electrode.

170. The first MIS transistor also includes a first stress-relief film formed in a space between the silicon compound layer and the first sidewall spacer. The first stress-relief film is formed on the side surface of the first gate electrode with the first sidewall spacer interposed therebetween, and the first stress-relief film is not in direct contact with the side surface of the first gate electrode.

[8] This description of infringement is illustrative and not intended to be an exhaustive or limiting explanation of every manner in which the PolarFire device infringes.

171. Because the PolarFire device practices at least Claim 1 of the '425 Patent, all semiconductor devices manufactured according to UMC's 28 nanometer process node likewise infringe because infringement occurs as a result of UMC's manufacturing process at this node. For example, on information and belief, UMC uses common MIS transistor structures for all semiconductor devices that it manufactures with its 28 nanometer process node such that all semiconductor devices manufactured at the 28 nanometer node invariably infringe at least Claim 1 of the '425 Patent in the same manner the PolarFire does. The same is true for all semiconductor devices that UMC manufactures with its 22 nanometer process node because that process node is "derived from the company's 28nm technology."

172. In addition to directly infringing the '425 Patent by making, using, selling, offering to sell, and/or importing Accused Instrumentalities into the United States, UMC likewise has induced infringement of the '425 Patent under 35 U.S.C. § 271(b). UMC has actively encouraged its customers (*e.g.*, Microsemi) to directly infringe the '425 Patent by using, selling, offering for sale, and/or importing electronic devices and products containing the Accused Instrumentalities (*e.g.*, the PolarFire). UMC actively encouraged its customers to employ UMC's infringing process nodes to manufacture their semiconductor devices, electronic components, and products by and through UMC's sales, engineering, and technical marketing efforts and staff. UMC's sales engineers and technical marketing staff interface with UMC's customers and potential customers to obtain contracts with customers to develop and manufacture infringing chips. In attempting to obtain these new customer contracts, UMC's sales engineers and technical marketing staff tout the technological and economic benefits of the infringing chips and actively encourage use of the infringing chips. UMC has known that their customers' acts constituted direct infringement of at least one claim of the '425 Patent since at least as of the filing of this Complaint. As a result of

UMC's active encouragement and intentional inducement, its customers have committed acts directly infringing the '425 Patent.

173. Moreover, UMC intends to cause, and has taken affirmative steps to induce, infringement by customers and end-users by at least, *inter alia*, encouraging, promoting, instructing, and/or directing the infringing use of the Accused Instrumentalities. As discussed above, UMC took direct steps to encourage, promote, instruct, and/or direct its customers and end-users use of the Accused Instrumentalities. Pushing its customers toward the 22 and 28 nanometer nodes benefits UMC.

174. As detailed above, the PolarFire device and Accused Instrumentalities infringe at least Claim 1 of the '425 Patent. Accordingly, by encouraging, promoting, instructing, and/or directing users to use the PolarFire device and Accused Instrumentalities, UMC is actively inducing infringement of the '425 Patent in violation of 35 U.S.C. § 271(b).

175. UMC likewise is liable as a contributory infringer of the '425 Patent under 35 U.S.C. § 271(c). UMC has offered to sell and/or sold within the United States services for manufacturing and designs for the Accused Instrumentalities that practice the '425 Patent. The Accused Instrumentalities comprise semiconductor devices, each of which constitutes a material part of the '425 Patent's invention that can be incorporated into electronic components and products.

176. For example, such manufacturing services and designs were offered for sale, sold, and marketed by and through UMC's sales, engineering, and technical marketing efforts and staff. Such efforts resulted in UMC's manufacturing of the infringing PolarFire device. Upon information and belief, UMC's customers do not manufacture the Accused Instrumentalities on their own, but contract with others, such as UMC, to manufacture such devices. UMC has known

such Accused Instrumentalities to be especially adapted for practicing, and thus infringing, the '425 Patent since at least the filing of this Complaint. The Accused Instrumentalities are not staple articles nor a commodity of commerce suitable for substantial non-infringing use because they cannot be used individually without incorporation into electronic components and products. Thus, UMC is liable as a contributory infringer.

177. UMC has had actual knowledge of the '425 Patent since at least 2019, when the examiner cited the '425 Patent as a reference during the prosecution of UMC's U.S. Patent No. 10,510,884. UMC's continued infringement following that date, despite its knowledge of the '425 Patent, was intentional and deliberate and willful.

178. UMC's direct, induced, contributory, and willful infringement of the '425 Patent has caused, and will continue to cause, substantial damage to AICP. Therefore, AICP is entitled to an award of damages adequate to compensate for UMC's infringement, but not less than reasonable royalty, together with pre-and post-judgment interest, attorneys' fees, and costs as fixed by the Court under 35 U.S.C. §§ 284 and 285.

## DEMAND FOR JURY TRIAL

179. Plaintiff hereby demands a jury trial for all issues so triable.

## PRAYER FOR RELIEF

WHEREFORE, Plaintiff requests entry of judgment in its favor and against Defendant UMC as follows:

A. Declaring that UMC has directly infringed, either literally and/or under the doctrine of equivalents, and continues to directly infringe United States Patent Nos. 7,579,227, 7,923,764, 8,198,686, 8,253,180, 8,587,076, 8,796,779, and 8,907,425;

B. Declaring that UMC has induced infringement and continues to induce infringement of

United States Patent Nos. 7,579,227, 7,923,764, 8,198,686, 8,253,180, 8,587,076, 8,796,779, and 8,907,425;

C. Declaring that UMC has contributorily infringed and continues to contributorily infringe United States Patent Nos. 7,579,227, 7,923,764, 8,198,686, 8,253,180, 8,587,076, 8,796,779, and 8,907,425;

D. Awarding lost profits and/or reasonable royalty damages, including treble damages for willful infringement, to Plaintiff in an amount no less than a reasonable royalty for UMC's infringement of the Asserted Patents, together with prejudgment and post-judgment interest and costs as permitted under 35 U.S.C. § 284;

E. Awarding attorneys' fees pursuant to 35 U.S.C. § 285 or as otherwise permitted by law;

F. Ordering UMC to pay supplemental damages to Plaintiff, including any ongoing royalties and interest, with an accounting, as needed;

G. Enjoining UMC from practicing the Asserted Patents; and

H. Awarding such other costs and further relief as the Court may deem just and proper.

Dated: September 6, 2024

Respectfully submitted,

*/s/ Justin Nelson w/ permission Andrea Fair*
Justin A. Nelson – Lead Counsel
Texas State Bar No. 24034766
SUSMAN GODFREY LLP
1000 Louisiana Street, Suite 5100
Houston, Texas 77002
Telephone: (713) 651-9366
Facsimile: (713) 654-6666
jnelson@susmangodfrey.com

Kalpana Srinivasan
California State Bar No. 237460
SUSMAN GODFREY LLP
1900 Avenue of the Stars, Suite 1400
Los Angeles, CA 90067
Telephone: (310) 789-3100
Facsimile: (310) 789-3150
ksrinivasan@susmangodfrey.com

Ian Gore
Washington State Bar No. 54519
Kemper Diehl
Washington State Bar No. 53212
401 Union Street, Suite 3000
Seattle, Washington 98101
Telephone: (206) 516-3880
Facsimile: (206) 516-3883
igore@susmangodfrey.com
kdiehl@susmangodfrey.com

Ravi Bhalla
New York State Bar No. 5748223
SUSMAN GODFREY LLP
One Manhattan West, 50th Floor
New York, NY 10001
Telephone: (212) 336-8330
Facsimile: (212) 336-8340

*Of Counsel:*
Claire Abernathy Henry
Texas State Bar No. 24053063
Andrea Fair
Texas State Bar No. 24078488
WARD, SMITH & HILL, PLLC

1507 Bill Owens Parkway
Longview, TX 75604
Telephone: (903) 757-6400
Fax: (903) 757-2323
claire@wsfirm.com

*Attorneys for Plaintiff AICP*