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

DAEDALUS PRIME LLC, Plaintiff, v. TAIWAN SEMICONDUCTOR MANUFACTURING CO. LIMITED, Defendant.	Civil Action No. 2:23-cv-299 **JURY TRIAL DEMANDED**

DAEDALUS PRIME LLC'S
COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Daedalus Prime LLC ("Daedalus" or "Plaintiff") brings this Complaint for Patent infringement ("Complaint") and for Jury Trial against Defendant Taiwan Semiconductor Manufacturing Company Limited ("TSMC"). Daedalus alleges as follows:

THE PARTIES

1. Plaintiff Daedalus Prime LLC is a Delaware limited liability company having its principal place of business at 51 Pondfield Road, Suite 3, Bronxville, New York 10708, and registered agent located at 555 E. Loockerman Street, Suite 120, Dover, DE 19901.

2. Daedalus is the owner by way of assignment of U.S. Patent Nos. 10,727,183 ("the '183 Patent); 9,202,699 ("the '699 Patent"); 9,490,347 ("the '347 Patent"); 10,790,354 ("the '354 Patent"); and 10,593,626 ("the '626 Patent"). All aforementioned patents are collectively the "Asserted Patents."

3. Defendant TSMC is a Taiwanese company having a principal place of business at No. 8, Li Hsin Road VI, Hsinchu Science Park, Hsinchu City 300-78, Taiwan, R.O.C. On information and belief, TSMC manufactures, has manufactured, sells, offers to sell, and/or imports products throughout Texas, including in this judicial district, and introduces infringing products into the stream of commerce knowing that they would be sold in Texas and this judicial district.

4. TSMC makes, uses, sells, offers for sale, and/or imports throughout the United States, including within and into this District, products, such as semiconductor devices and integrated circuits, that infringe the Asserted Patents. TSMC's customers and other downstream entities, such as Apple, Samsung, and Qualcomm 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, integrated circuits, smartphones, tablets, and other electronic devices that include semiconductor devices and integrated circuits. As one example, using TSMC's infringing 5nm node, TSMC manufactures the Apple A15 system-on-chip ("SoC") which is incorporated into, at least, the Apple iPhone 13 and 14 lines of products, which are sold throughout the United States. As another example, using TSMC's infringing 7nm node, TSMC fabricates the Qualcomm Snapdragon 865 SoC, which is incorporated into, at least, Samsung's Galaxy S20 FE smartphone, which is sold throughout the United States.

JURISDICTION AND VENUE

5. This is an action for patent infringement arising under the patent laws of the United States, Title 35 of the United States Code. Accordingly, this Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

6. TSMC is subject to this Court's specific personal jurisdiction pursuant to due process and/or the Texas Long Arm Statute. Daedalus's causes of action arise, at least in part,

from TSMC's contacts with and activities in the State of Texas and this district. Upon information and belief, TSMC has committed acts of infringement within the State of Texas and this district by, *inter alia*, making, having made, using, selling, offering to sell, and/or importing products that infringe, or products manufactured by processes that infringe, one or more claims of the Asserted Patents, and also by inducing and contributing to such infringement by others, including Qualcomm, Samsung, Apple, and end-users of devices sold by those companies, in violation at least of 35 U.S.C. §§ 271(a)-(c), (g).

7. TSMC, directly and through other entities, such as customers, original equipment manufacturers ("OEMs"), subsidiaries, intermediaries (including distributors, retailers, and others), and other downstream entities, has purposefully placed infringing chips and other integrated circuits produced by TSMC using TSMC's process node technology into the stream of commerce with the expectation that those products and/or products that incorporate those products (*e.g.*, smartphones, tablets, and other electronic devices sold by Samsung and Apple, and the Qualcomm and Apple chips they use, manufactured in whole or in large part by TSMC) will be purchased and used by customers and/or consumers in the Eastern District of Texas. These infringing products, including those incorporated in the Samsung and Apple products identified above, are sold, at least, at various retailers, including Best Buy locations throughout this district, including but not limited to: 422 W Loop 281 Ste 100, Longview, TX 75605. On information and belief, the Qualcomm and Apple chips manufactured by TSMC are also sold throughout the United States, including in Texas and in this district.

8. Moreover, on information and belief, TSMC has several wholly-owned U.S. subsidiaries, including TSMC North America ("TSMC NA"), TSMC Technology, Inc. ("TSMC TI"), TSMC Arizona Corporation, WaferTech, LLC, TSMC Development, Inc., and TSMC168,

LLC. Ex. 1 (2022 TSMC Annual Report) (*available at* https://investor.tsmc.com/sites/ir/annual-report/2022/2022%20Annual%20Report-E.pdf) at 177-183; https://opencorporates.com/companies/us_tx/0800144827; https://opencorporates.com/companies/us_tx/0802593507.

9. TSMC is the world's largest semiconductor foundry. https://www.forbes.com/sites/lawrencewintermeyer/2022/08/05/the-chip-company-youve-never-heard-of-that-powers-the-devices-in-your-life--and-its-in-taiwan/?sh=24080c09c6d4. Two-thirds of TSMC's revenue comes from the United States. Ex. 1 (2022 TSMC Annual Report) at 50. Forty percent of TSMC's revenue comes from smartphone applications of its chips, including into smartphones of Samsung and Apple, the world's two largest smartphone makers, which together comprise forty-three percent of the world smartphone market. *Id.*; https://www.counterpointresearch.com/global-smartphone-share/. As to TSMC's U.S. revenue, Texas is the second most populous state in the United States. TSMC therefore knows, expects, intends, and desires that the chips that it manufactures, and products containing the chips it manufactures, will be sold in Texas, including in this district, which includes some of the largest cities in Texas by population.

10. TSMC is thus subject to personal jurisdiction in this district. *See, e.g.*, *World-Wide Volkswagen Corp. v. Woodson*, 444 U.S. 286, 297–98 (1980) (holding that under the stream of commerce theory, a corporation subjects itself to personal jurisdiction in a forum when it "delivers its products into the stream of commerce with the expectation that they will be purchased by consumers in the forum."); *Commonwealth Sci. & Indus. Rsch. Org. v. Mediatek Inc.*, No. 6:12-CV-578, 2013 WL 12152471, at *2 (E.D. Tex. Sept. 12, 2013) (finding personal jurisdiction over Taiwanese chipmaker Realtek, which sold semiconductor chips "to foreign

distributors outside the United States, which then s[old] the Realtek chips exclusively to foreign module makers and foreign original equipment manufacturers, which then integrate[d] Realtek's IC chips into products eventually sold worldwide, including in the Eastern District," including because allegedly "Realtek s[old] the accused products into distribution channels knowing that those products will be sold in the Eastern District of Texas."); *Largan Precision Co. v. Ability Opto-Elecs. Tech. Co.*, No. 4:19-CV-696, 2020 WL 569815, at *7 (E.D. Tex. Feb. 5, 2020) (finding personal jurisdiction over Taiwanese manufacturer of optical lenses then sold to "third-party module integrators," who sold to "system integrators," who sold to "original equipment manufacturer[s]….such as HP, who then turn[ed] around and s[old]…to an end customer" because. . ."the Court has no problem concluding that AOET could have expected that those products [the final products containing its lenses] would be sold in Texas."); *Viavi Sols. Inc. v. Zhejiang Crystal-Optech Co.*, No. 2:21-CV-00378-JRG, 2022 WL 16856099, at *3 (E.D. Tex. Nov. 10, 2022); *Atlas Glob. Techs. LLC v. TP-Link Techs. Co.*, No. 2:21-CV-430-JRG-RSP, 2022 WL 18584501 (E.D. Tex. Dec. 28, 2022), report and recommendation adopted, No. 221CV00430JRGRSP, 2023 WL 1478451 (E.D. Tex. Feb. 2, 2023); *ICON Health & Fitness, Inc. v. Horizon Fitness, Inc.*, 2009 WL 1025467, *14 (E.D. Tex. Mar. 26, 2009).

11. TSMC has established sufficient minimum contacts with the State of Texas such that the exercise of jurisdiction would not offend traditional notions of fair play and substantial justice.

12. Venue is proper, as TSMC is a foreign corporation and thus may be sued in any judicial district. 28 U.S.C. § 1391(c)(3).

ALLEGATIONS OF PATENT INFRINGEMENT

13. Plaintiff incorporates the allegations of all of the foregoing paragraphs as if fully restated herein.

14. As set forth below, the infringing products are or incorporate, without authority from Daedalus, semiconductor devices that infringe by patents owned by Daedalus. Daedalus respectfully seeks relief from this Court for TSMC's infringement.

15. With notice of the Asserted Patents, TSMC has directly infringed, and continues to directly infringe, the Asserted Patents under 35 U.S.C. §§ 271(a) and (g) by making, using, selling and/or offering to sell, in this district and elsewhere in the United States, and/or importing into this district and elsewhere in the United States, infringing semiconductor devices, integrated circuits, and products containing the same which infringe the Asserted Patents, as further described further below. TSMC has been placed on actual notice of the Asserted Patents at least by way of a letter to TSMC dated June 22, 2023. Additionally, the filing of this Complaint also constitutes notice in accordance with 35 U.S.C. § 287. On information and belief, TSMC at least imports its chips to the United States to its customers and its subsidiaries. Moreover, TSMC sells to U.S. companies, such as Qualcomm and Apple, and two-thirds of its revenue comes from sales to the U.S., as explained above. On information and belief, within the United States, TSMC conducts sales activities, negotiations, and other activities related to its chips and sales thereof. TSMC also "provides customer support, account management and engineering services throughout offices in North America." Ex. 1 (TSMC 2022 Annual Report) at 16. Thus, TSMC's sales and offers for sale, even if they include some foreign activity, are "in the United States." *See, e.g.*, *Carnegie Mellon Univ. v. Marvell Tech. Grp., Ltd.*, 807 F.3d 1283, 1308-1309 (Fed. Cir. 2015) (finding that a reasonable jury could conclude that sales of chips manufactured outside the United States were "in the United States" under § 271(a) where fabless chip designer Marvell's design activities were in the U.S., and there was "sales activity by Marvell within the United States, even for chips manufactured, delivered, and used entirely abroad"); *Godo Kaisha*

IP Bridge 1 v. Broadcom Ltd., No. 2:16-CV-00134-JRG, 2017 WL 2869332, at *3 (E.D. Tex. May 18, 2017); *Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

16. In addition, TSMC collaborates closely with universities, including at least "23 universities," including Stanford, MIT, and UC Berkeley on the "TSMC University Collaboration Program," and offers the "TSMC University Shuttle Program," which provides "access to TSMC silicon process technologies for digital and analog/mixed signal circuits, RF designs, non-volatile memory design and ultra-low power designs." Ex. 1 (TSMC 2022 Annual Report) at 102; https://esg.tsmc.com/en/update/innovationAndService/caseStudy/2/index.html. The TSMC University Shuttle Program "was established to provide professors at leading research universities worldwide with access to the advanced silicon process technologies needed to research and develop innovative circuit design concepts, and is one of the world's most important research and development platforms in the semiconductor industry." https://esg.tsmc.com/en/update/innovationAndService/caseStudy/2/index.html (accessed June 22, 2023). On information and belief, TSMC thus makes, uses, sells and/or offers to sell in, and imports into, this district and elsewhere in the United States. Further, TSMC makes, uses, sells and/or offers to sell in, and imports into, this district and elsewhere in the United States its infringing semiconductor devices directly in connection with its CyberShuttle and/or Multi-Project Wafer ("MPW") program. https://www.tsmc.com/english/dedicatedFoundry/services/cyberShuttle (accessed June 22, 2023). TSMC's CyberShuttle program provides a "prototyping service [that] significantly reduces NRE costs by covering the widest technology range (from 0.5um to 7nm) and the most frequent launch schedule (up to 10 shuttles per month)."

https://www.tsmc.com/english/dedicatedFoundry/services/cyberShuttle (accessed June 22, 2023). Moreover, in addition to whatever volumes of infringing products TSMC imports into the United States through the CyberShuttle program, on information and belief, those shipments further result in TSMC securing a "design win" to mass-produce the design incorporated in the CyberShuttle prototype, thus leading significant additional sales that are "within the United States" even if certain aspects of the sale or performance thereof take place in other countries.

17. TSMC has also indirectly infringed, and continues to indirectly infringe, the Asserted Patents under 35 U.S.C. § 271(b) and (c). After receiving actual notice of the Asserted Patents, TSMC proceeded to actively induce infringement of the Asserted Patents by inducing its customers and/or other third parties to make, use, sell and/or offer to sell, in this district and elsewhere in the United States, and/or import into this district and elsewhere in the United States, semiconductor devices, integrated circuits, and/or products containing the same that infringe or were made by processes that infringe the Asserted Patents (*e.g.*, semiconductor devices fabricated using TSMC's 7nm node), and integrated circuits containing the same (e.g., Qualcomm Snapdragon 865 5G chip), and electronic devices incorporating the same (e.g., Samsung smartphones and tablets), as described further below. TSMC knew of and intended to induce the direct infringement in the United States of the Asserted Patents by its customers, *e.g.*, Qualcomm and Apple. Qualcomm, for example, sells directly in the United States through third-party distributors, and, as to its other sales that may have certain aspects take place abroad, Qualcomm's sales should be considered "in the United States," at least pursuant to *Carnegie Mellon Univ. v. Marvell Tech. Grp., Ltd.* and similar cases, as described above, due to Qualcomm's extensive U.S. activity related to design and sales, including negotiation and performance thereof, within the United States. On information and belief, Qualcomm also

imports its TSMC-produced SoCs into the United States for purposes including testing, distribution of samples, demonstrations, and sale. TSMC's customer Apple also imports into the United States and makes, uses, sells, and offers for sale in the United States infringing end-user devices.

18. TSMC also knew of and intended to induce the direct infringement in the United States of the Asserted Patents by other third parties, including makers (*e.g.*, Samsung and Apple) of, and end users of, devices such smartphones, tablets, and other electronic devices sold and used throughout the United States. Apple and Samsung, for example, import into the U.S. and make, use, sell, and offer for sale in the U.S. infringing end-user devices. TSMC has also induced its U.S. subsidiaries, listed above, to directly infringe by making, using, selling and/or offering to sell in, and importing into, this district and elsewhere in the United States, infringing semiconductor devices, integrated circuits, and products containing the same. TSMC has also induced universities, such as Stanford, MIT, and UC Berkeley, and other entities involved with the "TSMC University Collaboration Program," the "TSMC University Shuttle Program," and the Multi-Project Wafer, including entities in this district, to directly infringe by making, using, selling and/or offering to sell in, and importing into, this district and elsewhere in the United States infringing semiconductor devices, integrated circuits, and products containing the same.

19. Additionally, TSMC has contributed to, and continues to contribute to, direct infringement of the Asserted Patents under 35 U.S.C. § 271(c) by offering to sell and/or selling within this district and elsewhere in the United States, and importing into this district and elsewhere in the United States, as explained above, the chips that it manufactures, which are at least components of infringing devices, including Qualcomm and Apple SoCs, and Samsung and Apple smartphones, tablets, and other electronic devices incorporating the same. Those chips

constitute a material part (or in some cases, more than only a part) of the inventions claimed by the Asserted Patents. TSMC knew and intended that those chips were especially made or especially adapted for use in infringing the Asserted Patents. For example, the ordinary, designed, and intended way of using the infringing products infringes the patent claims, and as such, they are especially adapted for use in infringement. TSMC's chips are not staple articles or commodities of commerce suitable for substantial noninfringing use. TSMC has also contributed to the direct infringement of its subsidiaries and the participants in the "TSMC University Collaboration Program," the "TSMC University Shuttle Program," the CyberShuttle program, and the MPW program, as described above.

20. The scope of infringing products includes, but is not limited to, all TSMC semiconductor devices, integrated circuits, and other products manufactured by TSMC using any of TSMC's 16nm and smaller technology nodes (*e.g.*, 16nm, 12nm, 10nm, 7nm, 6nm, 5nm, and 4nm), including, for example, Qualcomm and Apple SoCs and, to the extent TSMC does not manufacture the entire final SoC, the substantial portion of those SoCs that TSMC does manufacture. *See, e.g.*, https://www.tsmc.com/english/dedicatedFoundry/technology/logic/l_16_12nm. The scope of infringing products also includes downstream products that incorporate those TSMC's products (and/or incorporate the Qualcomm and Apple SoCs that incorporate TSMC's products, to the extent there is a distinction), such as Samsung and Apple smartphones, tablets, and other electronic devices. Further patent-specific assertions are below. Daedalus reserves the right to accuse any forthcoming TSMC technology or products not yet commercially available, and any products about which it learns additional relevant information.

21. In particular, on information and belief, all devices manufactured by TSMC at a given "node" size are the same or essentially the same, and are created in the same or essentially the same way, with respect to aspects relevant to the claims of the Asserted Patents. If one product using a TSMC-based SoC or other product manufactured by TSMC at a given node infringes one of the Asserted Patents, details of which are included below in the patent-specific sections, all other devices manufactured by TSMC at that node infringe that Asserted Patent. Daedalus reserves the right to identify additional products that are produced at accused nodes, and to add nodes, as it learns more information.

22. On information and belief, using TSMC's infringing 4nm node, TSMC fabricates the Apple A16 SoC, which is incorporated into, at least, the Apple iPhone 14 lines of products, including the iPhone 14 Pro and iPhone 14 Pro Max, sold throughout the United States. Using the same node, TSMC fabricates Qualcomm Snapdragon 8 Gen 2 Mobile Platform, which is incorporated into the Samsung Galaxy S23 Ultra and the Qualcomm Snapdragon 8 Gen 1 Mobile Platform, which is incorporated into the Samsung Galaxy S22, both sold throughout the United States. TSMC also manufactures other devices using this node, which thus infringe and are incorporated into other electronic devices sold to end user customers in the United States.

23. Using TSMC's infringing 5nm node, TSMC also fabricates the Apple A15 SoC which is incorporated into, at least, the Apple iPhone 13 and 14 lines of products and the Apple A14 SoC, which is incorporated into, at least, the Apple iPhone 12 line of products and the fourth generation iPad Air and tenth generation iPad, all sold throughout the United States. TSMC also manufactures other devices using this node, which thus infringe and are incorporated into other electronic devices sold to end user customers in the United States.

24. Using TSMC's infringing 7nm node, TSMC fabricates the Qualcomm Snapdragon 865 SoC, which is incorporated into, at least, Samsung's Galaxy S20 FE smartphone. Using the same node, TSMC fabricates the Apple A13 SoC, which is incorporated, at least, into the Apple iPhone 11 line of products, iPhone SE (2nd generation), iPad (9th generation), and the Apple Studio Display, and the A12 SoC, which is incorporated, at least, into the Apple iPhone XS and XS Max, iPhone XR, iPad Air (3rd generation), iPad Mini (5th generation), and 8th generation iPad and Apple TV 4K (2nd generation), all sold throughout the United States. TSMC also manufactures other devices using this node, which thus infringe and are incorporated into other electronic devices sold to end user customers in the United States. TSMC's 6nm node also infringes for the same reasons as the 7nm node, as it is a die-shrink of the 7nm node. *See, e.g.*, https://www.anandtech.com/show/14228/tsmc-reveals-6-nm-process-technology-7-nm-with-higher-transistor-density.

25. Using TSMC's infringing 10nm node, TSMC manufactures the Apple A11 SoC, which is incorporated into the iPhone 8, iPhone 8 Plus and iPhone X, and the Apple A10X SoC, which is incorporated into the second-generation 12.9" iPad Pro and the 10.5" iPad Pro, and 3 GB in the 4K Apple TV, all sold throughout the United States. TSMC also manufactures other devices using this node, which thus infringe and are incorporated into other electronic devices sold to end user customers in the United States.

26. Using TSMC's infringing 12nm node, TSMC fabricates the Qualcomm Snapdragon 439 SoC using TSMC's infringing 12nm node, which is incorporated into, at least, Samsung's Galaxy A01, sold throughout the United States. TSMC also manufactures other devices using this node, which thus infringe and are incorporated into other electronic devices sold to end user customers in the United States. TSMC's 16nm node also infringes for the same

reasons as the 12nm node, as 12nm node is a die-shrink of the 16nm node. *See, e.g.*, https://www.tsmc.com/english/dedicatedFoundry/technology/logic/l_16_12nm; https://www.techcenturion.com/7nm-10nm-14nm-fabrication#:~:text=TSMC's%2012nm%20technology%20is%20more,is%20around%2033.8%20MTr%2Fmm%C2%B2.

27. TSMC specifically intends that third parties, such as its customers (such as Qualcomm and Apple), original equipment manufacturers (such as Samsung and Apple) and intermediaries thereof, resellers, retailers, and end users infringe the Asserted Patents and knows that these others perform acts that constitute direct infringement. For example, TSMC designed and/or manufactured the products such that they would each infringe the Asserted Patents if made in the United States and specifically intended that they be used, sold, offered for sale, and imported into the United States. TSMC provided, directly or indirectly, infringing products to others, such as, customers, OEMs and intermediaries thereof, resellers, retailers, and end users knowing and intending that those others would use, sell, offer for sale, and/or import in and into the United States downstream products that include such products, thereby directly infringing one or more claims of the Asserted Patents.

28. Upon information and belief, TSMC knowingly and actively aided and abetted the direct infringement of the Asserted Patents by directly and indirectly instructing and encouraging its customers, OEMs and other downstream manufacturers and implements, purchasers, users, and developers to use the Asserted Patent's technology in the form of TSMC's products. These instructions and encouragement include, but are not limited to, manufacturing infringing products for its customers' and other downstream entities' infringing use, sale, offer for sale, and importing of, advertising of, and promoting the use of the infringing products, and directly and

indirectly providing instructions, support, and technical information regarding infringing products to direct infringers described above.

29. TSMC's acts of infringement have caused damage to Daedalus. Daedalus is entitled to recover from TSMC the damages incurred by Daedalus as a result of TSMC's wrongful acts.

30. TSMC's acts of direct and indirect infringement are willful, and have caused and will continue to cause substantial damage and irreparable harm to Daedalus, and Daedalus has no adequate remedy at law.

COUNT I
(INFRINGEMENT OF U.S. PATENT NO. 10,727,183)

31. Plaintiff incorporates the allegations of all of the foregoing paragraphs as if fully restated herein.

32. Plaintiff is the assignee and lawful owner of all right, title and interest in and to the '183 Patent. The '183 Patent is valid and enforceable.

33. The United States Patent No. 10,727,183 is entitled "Methods and apparatuses to form self-aligned caps," and issued on July 28, 2020 to inventors Boyan Boyanov and Kanwal Jit Singh. The '183 Patent issued from United States Patent Application No. 16/559,086 filed on September 3, 2019. The '183 Patent is a continuation of is a continuation of U.S. patent application Ser. No. 15/477,506 filed Apr. 3, 2017, which is a continuation of U.S. patent application Ser. No. 14/675,613 filed on Mar. 31, 2015, now U.S. Pat. No. 9,627,321 issued Apr. 18, 2017, which is a divisional application of U.S. patent application Ser. No. 13/991,899 filed Jun. 5, 2013, now U.S. Pat. No. 9,373,584 issued Jun. 21, 2016, which is a U.S. National Phase application under 35 U.S.C. § 371 of International Application No. PCT/US2011/059453, filed Nov. 4, 2011, entitled "METHODS AND APPARATUSES TO FORM SELF-ALIGNED CAPS."

34. TSMC has directly and indirectly infringed the '183 Patent through its actions as explained above in the section titled "Allegations of Patent Infringement" with respect at least to its 7nm node products and processes, under which it manufactures infringing devices such as, for example, the Qualcomm Snapdragon 865 5G SoC (or a substantial portion thereof), which is ultimately incorporated into, for example, the Samsung Galaxy S20 FE 5G smartphone, which is sold in this district and throughout the United States. https://www.bestbuy.com/site/samsung-galaxy-s20-fe-5g-128gb-unlocked-cloud-navy/6426276.p?skuId=6426276 (showing availability for pickup in Tyler, TX). Further discovery may reveal additional infringing products and/or models.

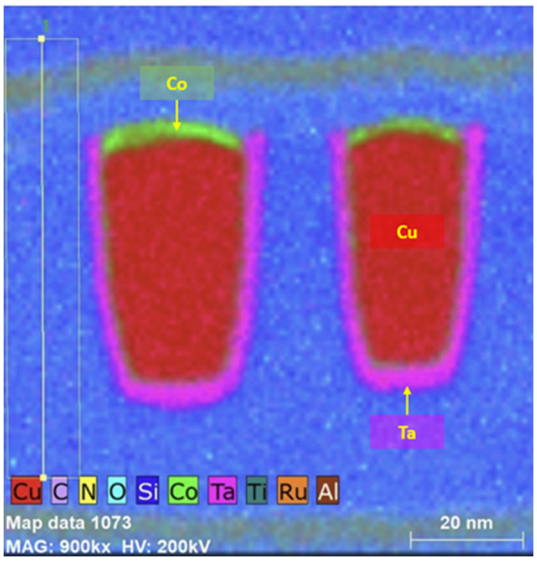
35. For example, and without limitation, the infringing products infringe one or more claims of the '183 Patent, including but not limited to claim 1. The infringing products fall within the scope of and include, either literally under the doctrine of equivalents, all of the elements of at least claim 1 of the '183 Patent.

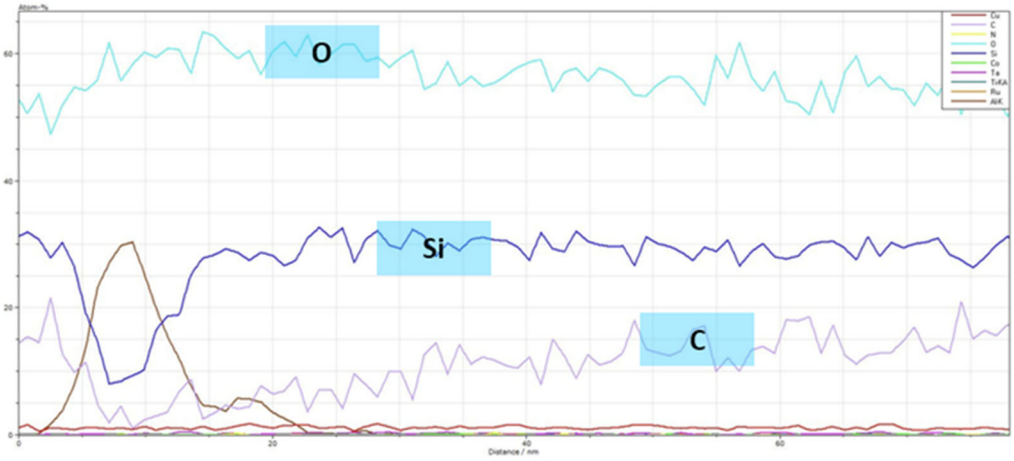
36. With respect to exemplary infringing devices, the Samsung Galaxy S20 FE 5G smartphone, made or sold by Samsung, incorporating the TSMC-made Qualcomm Snapdragon 865 5G SoC system-on-chip directly infringe at least independent 1 of the '183 Patent. To the extent there is any difference between the TSMC chip and the final SoC provided to OEMs, the TSMC-made chip directly infringes at least the same claim as well. Other infringing devices are described above in the section titled "Allegations of Patent Infringement."

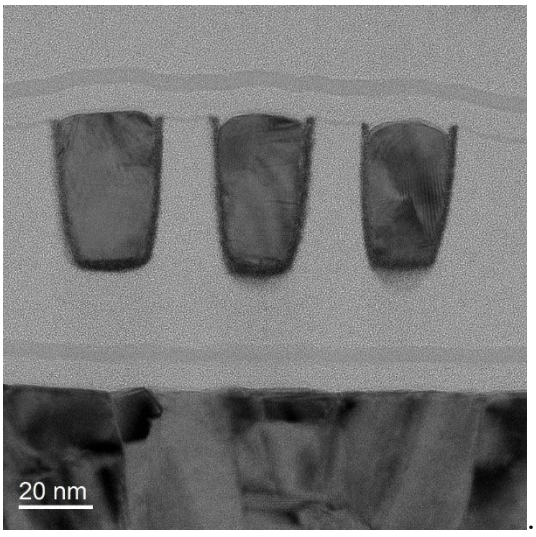
37. The infringing products include all of the limitations of at least claim 1 of the '183 Patent. Specifically, the '183 Patent claims, *e.g.*: an integrated circuit structure, comprising: a dielectric layer having an upper surface, the dielectric layer comprising silicon, oxygen and carbon; a conductive structure in the dielectric layer, the conductive structure

comprising: a first conductive material comprising copper, the first conductive material having an upper surface, with a portion of the upper surface of the first conductive material below a portion of the upper surface of the dielectric layer; and a second conductive material on the upper surface of the first conductive material, the second conductive material comprising cobalt, wherein the first conductive material and the second conductive material have a same width at a location where the first conductive material and the second conductive material meet, wherein the second conductive material has an upper surface having a portion substantially co-planar with the portion of the upper surface of the dielectric layer, and wherein the upper surface of the second conductive material has a curved corner below the portion of the upper surface of the dielectric layer; and a barrier layer partially surrounding the conductive structure, the barrier layer comprising tantalum.

38. The Qualcomm Snapdragon 865 5G SoC is manufactured by TSMC using its 7nm feature size manufacturing process. *See* https://www.anandtech.com/show/15306/qualcomm-announces-snapdragon-865-and-765-5g-for-all-in-2020-all-the-details (accessed June 22, 2023). TSMC's 7nm feature size manufacturing process produces a product that meets all of the limitations of at least claim 1 of the '183 Patent. For example, the Qualcomm Snapdragon 865 5G SoC system-on-chip comprises all elements of claim 1 of the '183 patent, as depicted below in images from analysis of a Qualcomm Snapdragon 865 5G SoC within a Samsung Galaxy S20 FE 5G smartphone:


Co
Cu
Ta
Cu C N O Si Co Ta Ti Ru Al
Map data 1073
MAG: 900kx HV: 200kV
20 nm


O
Si
C
Distance / nm


20 nm

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39. The other products produced by TSMC at the same node size also infringe for the same reasons as above, as explained above in the section titled "Allegations of Patent Infringement."

40. TSMC's acts of direct and indirect infringement of the '183 Patent are willful, and have caused and will continue to cause substantial damage and irreparable harm to Daedalus, and Daedalus has no adequate remedy at law.

COUNT II
(INFRINGEMENT OF U.S. PATENT NO. 9,202,699)

41. Plaintiff incorporates the allegations of all of the foregoing paragraphs as if fully restated herein.

42. Plaintiff is the assignee and lawful owner of all right, title and interest in and to the '699 Patent. The '699 Patent is valid and enforceable.

43. The United States Patent No. 9,202,699 is entitled "Capping dielectric structure for transistor gates," and issued on December 1, 2015 to inventors Aaron W. Rosenbaum, Din-How Mei, and Sameer S. Pradhan. The '699 Patent issued from United States Patent Application No. 13/992,598 filed on June 7, 2013, which was based on PCT No. PCT/US2011/054464, filed on September 30, 2011.

44. TSMC has directly and indirectly infringed the '699 Patent through its actions as explained above in the section titled "Allegations of Patent Infringement" with respect at least to its 12nm node products and processes, under which it manufactures infringing devices such as, for example, the Qualcomm Snapdragon 439 SoC (or a substantial portion thereof), which is ultimately incorporated into, for example, the Samsung Galaxy A01 smartphone, which is sold in this district and throughout the United States. https://www.pcmag.com/reviews/samsung-galaxy-a01. Further discovery may reveal additional infringing products and/or models.

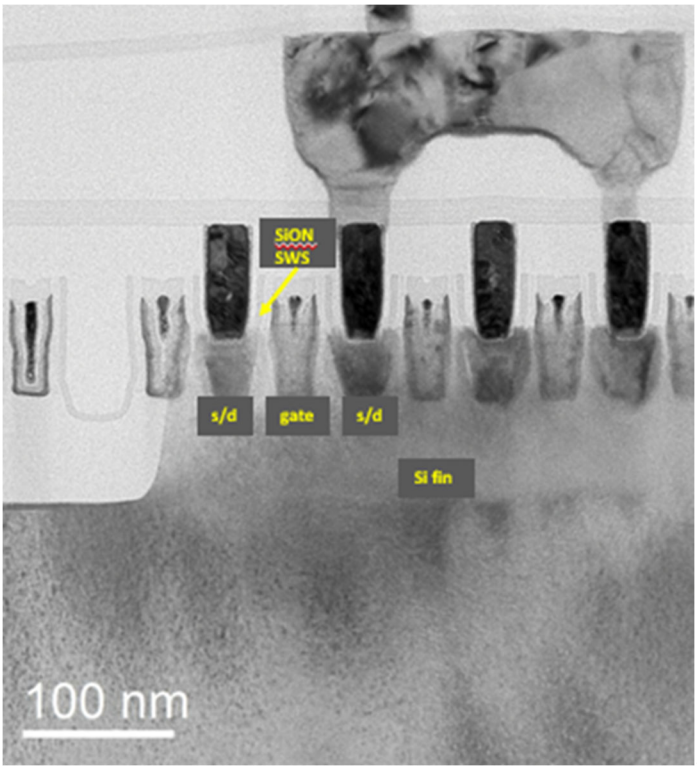
45. For example, and without limitation, the infringing products infringe one or more claims of the '699 Patent, including but not limited to claim 1. The infringing products fall within the scope of and include, either literally under the doctrine of equivalents, all of the elements of at least claim 1 of the '699 Patent.

46. With respect to exemplary infringing devices, the Samsung Galaxy A01 smartphone, made or sold by Samsung, incorporating the TSMC-made Qualcomm Snapdragon 439 system-on-chip directly infringe at least independent 1 of the '699 Patent. To the extent there is any difference between the TSMC chip and the final SoC provided to OEMs, the TSMC-made chip directly infringes at least the same claim as well. Other infringing devices are described above in the section titled "Allegations of Patent Infringement."

47. The infringing products include all of the limitations of at least claim 1 of the '699 Patent. Specifically, the '699 Patent claims, *e.g.*: a method comprising: forming a sacrificial non-planar transistor gate over a non-planar transistor fin; depositing a dielectric material layer over the sacrificial non-planar transistor gate and the non-planar transistor fin; forming non-planar transistor gate spacers from a portion of the dielectric material layer adjacent the sacrificial non-planar transistor gate; forming a source/drain region; removing the sacrificial non-planar transistor gate to form a gate trench between the non-planar transistor gate spacers and expose a portion of the non-planar transistor fin; forming a gate dielectric adjacent the non-planar transistor fin within the gate trench; depositing conductive gate material within the gate trench; removing a portion of the conductive gate material to form a recess between the non-planar transistor gate spacers; forming a capping dielectric structure within the recess by high density plasma depositing a dielectric material; forming at least one dielectric material over the source/drain region, the non-planar transistor gate spacers, and the capping dielectric structure;

and forming a contact opening through the at least one dielectric material to expose at least a portion of the source/drain region.

48. The Qualcomm Snapdragon 439 SoC is manufactured by TSMC using its 12nm feature size manufacturing process. *See* https://www.anandtech.com/show/13000/qualcomm-announces-snapdragon-632-439-and-429-expanding-the-midtier (accessed June 22, 2023); https://www.qualcomm.com/products/mobile/snapdragon/smartphones/snapdragon-4-series-mobile-platforms/snapdragon-439-mobile-platform (accessed June 22, 2023); https://en.wikichip.org/wiki/qualcomm/snapdragon_400/439 (accessed June 22, 2023). TSMC's 12nm feature size manufacturing process produces a product that meets all of the limitations of at least claim 1 of the '699 Patent. For example, the Qualcomm Snapdragon 439 SoC system-on-chip is made by TSMC using a process that includes the steps of claim 1 of the '699 patent, as depicted below in an image from analysis of a Qualcomm Snapdragon 439 SoC from a Samsung Galaxy A01 smartphone:



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49. On information and belief, TSMC uses Applied Materials equipment to perform the steps of claim 1, including forming a capping dielectric structure within the recess by high density plasma depositing a dielectric material. *See, e.g.*, https://www.bloomberg.com/news/articles/2021-08-19/applied-materials-tops-views-in-sign-chip-boom-remains-strong; https://www.fool.com/investing/2022/01/22/2-growth-stocks-that-could-win-big-from-tsmcs-40-b/#:~:text=Applied%20Materials%2C%20according%20to%20the,31; https://www.appliedmaterials.com/products/centura-ultima-hdp-cvd.

50. The other products produced by TSMC at the same node size also infringe for the same reasons as above, as explained above in the section titled "Allegations of Patent Infringement."

51. TSMC's acts of direct and indirect infringement of the '699 Patent are willful, and have caused and will continue to cause substantial damage and irreparable harm to Daedalus, and Daedalus has no adequate remedy at law.

COUNT III
(INFRINGEMENT OF U.S. PATENT NO. 9,490,347)

52. Plaintiff incorporates the allegations of all of the foregoing paragraphs as if fully restated herein.

53. Plaintiff is the assignee and lawful owner of all right, title and interest in and to the '347 Patent. The '347 Patent is valid and enforceable.

54. The United States Patent No. 9,490,347 is entitled "Capping dielectric structure for transistor gates," and issued on November 8, 2016 to inventors Aaron W. Rosenbaum, Din-How Mei, and Sameer S. Pradhan. The '347 Patent issued from United States Patent Application No. 14/925,741 filed on October 28, 2015. The '347 patent is a continuation of U.S. patent

application Ser. No. 13/992,598, filed on Jun. 7, 2013, entitled "CAPPING DIELECTRIC STRUCTURE FOR TRANSISTOR GATES", which claims priority under 35 U.S.C. 371 from International Application No. PCT/US2011/054464, filed on Sep. 30, 2011, entitled "CAPPING DIELECTRONIC STRUCTURE FOR TRANSISTOR GATES."

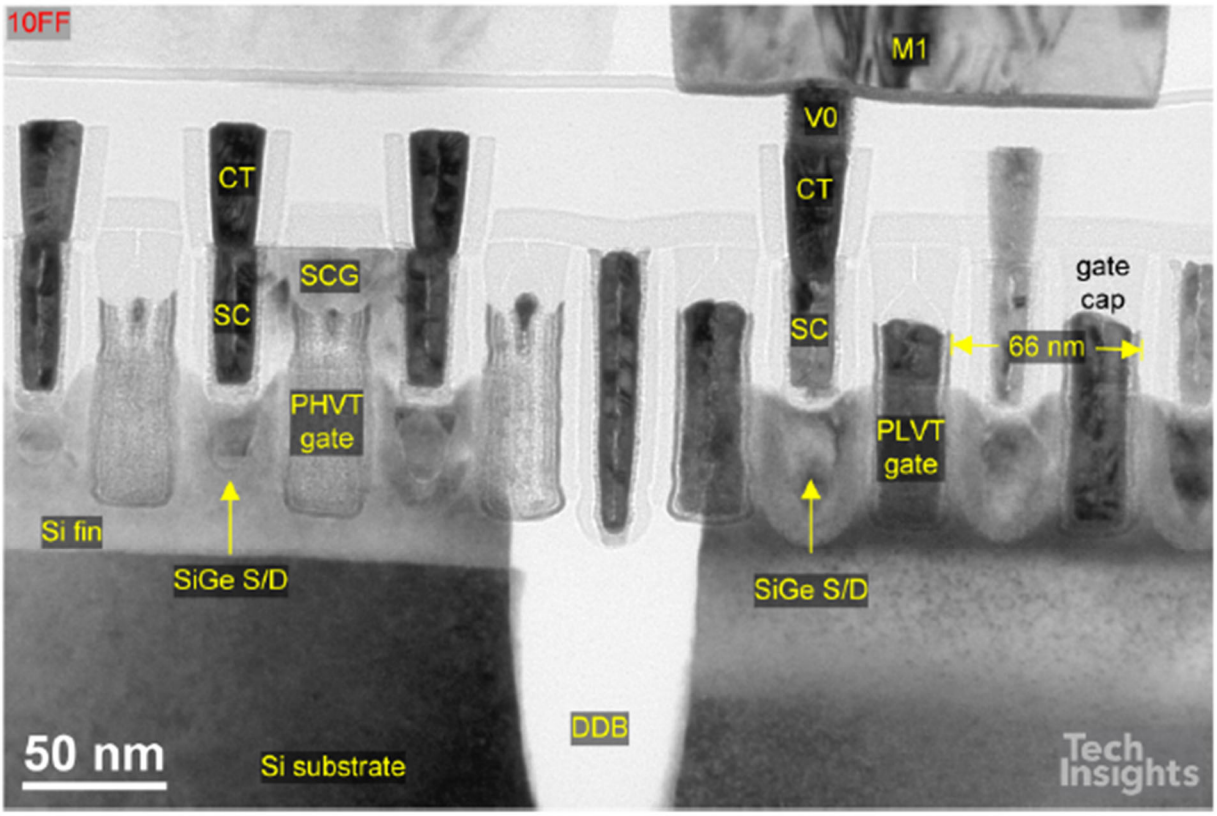
55. TSMC has directly and indirectly infringed the '347 Patent through its actions as explained above in the section titled "Allegations of Patent Infringement" with respect at least to its 10nm node products and processes, under which it manufactures infringing devices such as, for example, the Apple A11 SoC (or a substantial portion thereof), which is incorporated into the iPhone 8, iPhone 8 Plus and iPhone X, which are sold in this district and throughout the United States. https://www.bestbuy.com/site/apple-pre-owned-excellent-iphone-x-64gb-unlocked-space-gray/6518153.p?skuId=6518153 (showing availability for pickup in Tyler, TX). Further discovery may reveal additional infringing products and/or models.

56. For example, and without limitation, the infringing products infringe one or more claims of the '347 Patent, including but not limited to claim 1. The infringing products fall within the scope of and include, either literally under the doctrine of equivalents, all of the elements of at least claim 1 of the '347 Patent.

57. With respect to exemplary infringing devices, the second-generation 12.9" iPad Pro and the 10.5" iPad Pro, and 3 GB in the 4K Apple TV, made or sold by Apple, incorporating the TSMC-made Apple A10X system-on-chip directly infringe at least independent 1 of the '347 Patent. To the extent there is any difference between the TSMC chip and the final SoC provided to OEMs, the TSMC-made chip directly infringes at least the same claim as well. Other infringing devices are described above in the section titled "Allegations of Patent Infringement."

58. The infringing products include all of the limitations of at least claim 1 of the '347 Patent. Specifically, the '347 Patent claims, *e.g.*: a method of fabricating a transistor gate, comprising: forming a pair of gate spacers; forming a gate electrode disposed between and contacting the pair of gate spacers; removing a portion of the gate electrode to form a recess; high density plasma depositing a capping dielectric structure within the recess on a top surface of the recessed gate electrode and between the pair of gate spacers; forming a source/drain region; forming at least one dielectric material over the source/drain region, the non-planar transistor gate spacers, and the capping dielectric structure; and forming a contact opening through the at least one dielectric material to expose at least a portion of the source/drain region and which removes a portion of the capping dielectric structure.

59. The Apple A10X is manufactured by TSMC using its 10nm feature size manufacturing process. *See* https://www.anandtech.com/show/11596/techinsights-confirms-apple-a10x-soc-10nm-tsmc (accessed June 22, 2023). TSMC's 10nm feature size manufacturing process produces a product that meets all of the limitations of at least claim 1 of the '347 Patent. For example, the Apple A10X SoC system-on-chip is made by TSMC using a process that includes the steps of claim 1 of the '347 patent, as depicted below in images from analysis of TSMC's 10 nm node:



60. On information and belief, TSMC uses Applied Materials equipment to perform the steps of claim 1, including forming a capping dielectric structure within the recess by high density plasma depositing a dielectric material. *See, e.g.*, https://www.bloomberg.com/news/articles/2021-08-19/applied-materials-tops-views-in-sign-chip-boom-remains-strong; https://www.fool.com/investing/2022/01/22/2-growth-stocks-that-could-win-big-from-tsmcs-40-b/#:~:text=Applied%20Materials%2C%20according%20to%20the,31; https://www.appliedmaterials.com/products/centura-ultima-hdp-cvd.

61. The other products produced by TSMC at the same node size also infringe for the same reasons as above, as explained above in the section titled "Allegations of Patent Infringement."

62. TSMC's acts of direct and indirect infringement of the '347 Patent are willful, and have caused and will continue to cause substantial damage and irreparable harm to Daedalus, and Daedalus has no adequate remedy at law.

COUNT IV
(INFRINGEMENT OF U.S. PATENT NO. 10,790,354)

63. Plaintiff incorporates the allegations of all of the foregoing paragraphs as if fully restated herein.

64. Plaintiff is the assignee and lawful owner of all right, title and interest in and to the '354 Patent. The '354 Patent is valid and enforceable.

65. The United States Patent No. 10,790,354 is entitled "Self-aligned gate edge and local interconnect," and issued on September 29, 2020 to inventors Milton Clair Webb, Mark Bohr, Tahir Ghani, and Szuya S. Liao. The '354 Patent issued from United States Patent Application No. 16/398,995 filed on April 30, 2019. The '354 Patent is a continuation of U.S. patent application Ser. No. 15/789,315, filed Oct. 20, 2017, which is a continuation of U.S. patent application Ser. No. 15/024,750, filed Mar. 24, 2016, now U.S. Pat. No. 9,831,306 issued Nov. 28, 2017, which is a U.S. National Phase application under 35 U.S.C. § 371 of International Application No. PCT/US13/076673, filed Dec. 19, 2013, entitled "Self-Aligned Gate Edge and Local Interconnect and Method to Fabricate Same."

66. TSMC has directly and indirectly infringed the '354 Patent through its actions as explained above in the section titled "Allegations of Patent Infringement" with respect at least to its 4nm and 5nm node products and processes, under which it manufactures infringing devices such as, for example, the Apple A16 and A15 SoCs (or a substantial portion thereof), which is ultimately incorporated into, for example, the Apple iPhone 13 and 14 lines of smartphones, which are sold in this district and throughout the United States.

https://www.bestbuy.com/site/apple-iphone-14-128gb-yellow-verizon/6418062.p?skuId=6418062 (showing iPhone 14 availability for pickup in Tyler, TX); https://www.apple.com/newsroom/2022/09/apple-introduces-iphone-14-and-iphone-14-plus/. Further discovery may reveal additional infringing products and/or models.

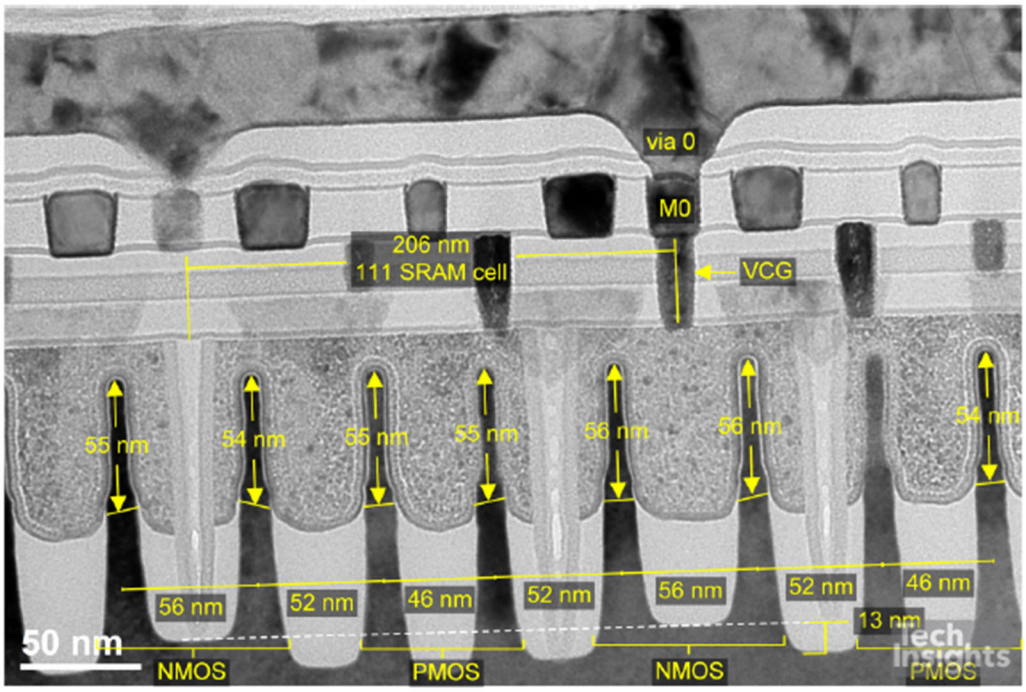
67. For example, and without limitation, the infringing products infringe one or more claims of the '354 Patent, including but not limited to claim 1. The infringing products fall within the scope of and include, either literally under the doctrine of equivalents, all of the elements of at least claim 1 of the '354 Patent.

68. With respect to exemplary infringing devices, the Apple iPhone 13 and 14 smartphones, made or sold by Apple, incorporating the TSMC-made Apple A16 and A15 systems-on-chip directly infringe at least independent 1 of the '354 Patent. To the extent there is any difference between the TSMC chip and the final SoC provided to OEMs, the TSMC-made chip directly infringes at least the same claim as well. Other infringing devices are described above in the section titled "Allegations of Patent Infringement."

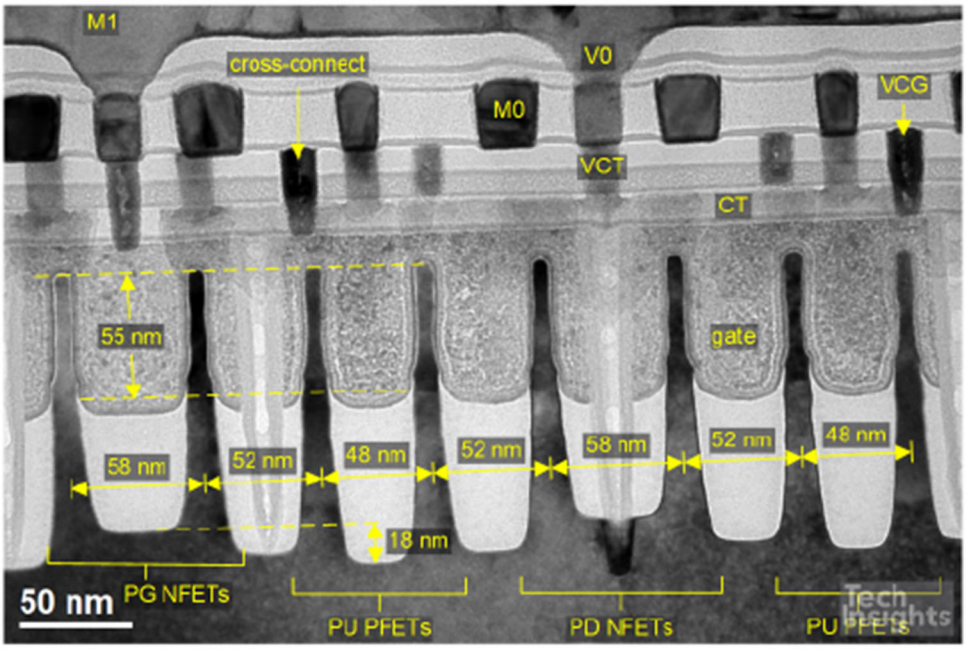
69. The infringing products include all of the limitations of at least claim 1 of the '354 Patent. Specifically, the '354 Patent claims, *e.g.*: an integrated circuit structure, comprising: a first semiconductor fin disposed above a substrate and having a length in a first direction; a first gate structure disposed over the first semiconductor fin, the first gate structure having a first end opposite a second end in a second direction, orthogonal to the first direction; first and second gate edge isolation structures, wherein the first gate edge isolation structure is spaced equally from a first side of the first semiconductor fin as the second gate edge isolation structure is spaced from a second side of the first semiconductor fin; second and third semiconductor fins disposed above the substrate without an intervening gate edge isolation

structure between the second and third semiconductor fins, the second and third semiconductor fins having a length in the first direction, wherein the second gate edge isolation structure is spaced equally from the second side of the first semiconductor fin and a side of the second semiconductor fin proximate the second gate edge isolation structure; a second gate structure disposed over the second and third semiconductor fins, the second gate structure having a first end opposite a second end in the second direction; and a third gate edge isolation structure spaced equally from a side of the third semiconductor fin proximate the third gate edge isolation structure as the second gate edge isolation structure is spaced from the side of the second semiconductor fin proximate the second gate edge isolation structure.

70. The Apple A16 SoC is manufactured by TSMC using its 4nm feature size manufacturing process (N4). https://www.notebookcheck.net/Apple-A16-Bionic-announced-for-the-iPhone-14-Pro-and-iPhone-14-Pro-Max.647967.0.html (accessed June 22, 2023). TSMC's 4nm feature size manufacturing process produces a product that meets all of the limitations of at least claim 1 of the '354 Patent. For example, the Apple A16 SoC system-on-chip comprises all elements of claim 1 of the '354 Patent, as depicted below in images from analysis of an Apple A16 SoC within an Apple product:



71. The Apple A15 SoC is manufactured by TSMC using its 5nm feature size manufacturing process (N5P). *See* https://www.anandtech.com/show/16983/the-apple-a15-soc-performance-review-faster-more-efficient (accessed June 22, 2023); https://unitedlex.com/insights/revealing-the-hidden-innovations-within-the-a15-bionic-soc-found-in-the/ (accessed June 22, 2023); https://en.wikichip.org/wiki/5_nm_lithography_process#N5P (accessed June 22, 2023). TSMC's 5nm feature size manufacturing process produces a product that meets all of the limitations of at least claim 1 of the '354 Patent. For example, the Apple A15 SoC system-on-chip comprises all elements of claim 1 of the '354 Patent, as depicted below in images from analysis of an Apple A15 SoC within an Apple product:



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72. The other products produced by TSMC at the same node size also infringe for the same reasons as above, as explained above in the section titled "Allegations of Patent Infringement."

73. TSMC's acts of direct and indirect infringement of the '354 Patent are willful, and have caused and will continue to cause substantial damage and irreparable harm to Daedalus, and Daedalus has no adequate remedy at law.

COUNT V
(INFRINGEMENT OF U.S. PATENT NO. 10,593,626)

74. Plaintiff incorporates the allegations of all of the foregoing paragraphs as if fully restated herein.

75. Plaintiff is the assignee and lawful owner of all right, title and interest in and to the '626 Patent. The '626 Patent is valid and enforceable.

76. The United States Patent No. 10,593,626 is entitled "AVD hardmask for damascene patterning," and issued on March 17, 2020 to inventors Ruth A. Brain, Kevin J. Fischer, and Michael A. Childs. The '626 Patent issued from United States Patent Application No. 15/723,083 filed on October 2, 2017. The '626 Patent is a continuation of U.S. application Ser. No. 15/332,199, filed Oct. 24, 2016, which is a continuation of U.S. application Ser. No. 13/995,133, filed Jun. 17, 2013, now U.S. Pat. No. 9,502,281 issued on Nov. 22, 2016, which is a U.S. National Phase Application under 35 U.S.C. § 371 of International Application No. PCT/US2011/067764, filed Dec. 29, 2011, entitled AVD HARDMASK FOR DAMASCENE PATTERNING.

77. TSMC has directly and indirectly infringed the '626 Patent through its actions as explained above in the section titled "Allegations of Patent Infringement" with respect at least to its 7nm node products and processes, under which it manufactures infringing devices such as, for example, the Apple A12 SoC (or a substantial portion thereof), which is ultimately incorporated into, for example, the Apple iPhone XS and XS Max, iPhone XR, iPad Air (3rd generation), iPad Mini (5th generation), and 8th generation iPad and Apple TV 4K (2nd generation), which

are sold in this district and throughout the United States. https://www.bestbuy.com/site/apple-pre-owned-iphone-xs-64gb-unlocked-space-gray/6398619.p?skuId=6398619 (showing iPhone XS available for pickup in Tyler, TX); https://tech.hindustantimes.com/tech/news/at-just-7-nanometers-apple-iphone-xs-a12-chipset-takes-a-big-leap-story-NHRmJcE87IkQXPkrKdMl0K.html. Further discovery may reveal additional infringing products and/or models.

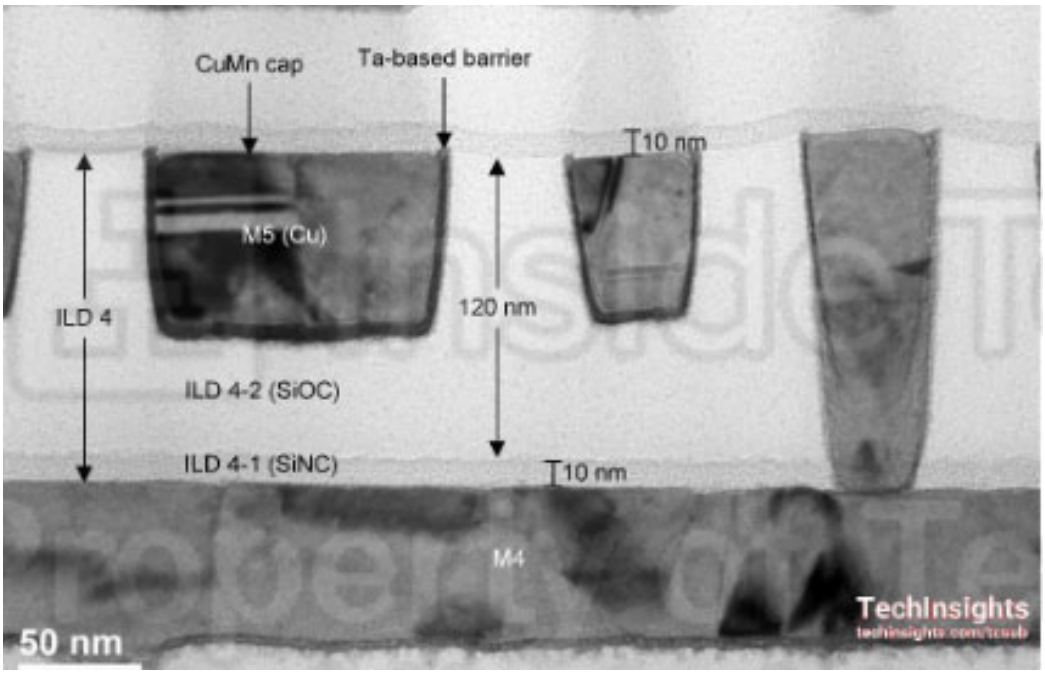
78. For example, and without limitation, the infringing products infringe one or more claims of the '626 Patent, including but not limited to claim 20. The infringing products fall within the scope of and include, either literally under the doctrine of equivalents, all of the elements of at least claim 20 of the '626 Patent.

79. With respect to exemplary infringing devices, the Apple iPhone XS and XS Max, iPhone XR, iPad Air (3rd generation), iPad Mini (5th generation), and 8th generation iPad and Apple TV 4K (2nd generation), made or sold by Apple, incorporating the TSMC-made Apple A12 system-on-chip directly infringe at least independent 1 of the '626 Patent. To the extent there is any difference between the TSMC chip and the final SoC provided to OEMs, the TSMC-made chip directly infringes at least the same claim as well. Other infringing devices are described above in the section titled "Allegations of Patent Infringement."

80. The infringing products include all of the limitations of at least claim 20 of the '626 Patent. Specifically, the '626 Patent claims, *e.g.*: an integrated circuit structure, comprising: a first interconnection line above a substrate; an interlayer dielectric (ILD) material above the first interconnection line, wherein the ILD material is a low-k material, and wherein the ILD material comprises carbon, silicon and oxygen; a conductive via in a lower portion of the ILD material, the conductive via on a portion of the first interconnection line, wherein the

conductive via has substantially vertical sidewalls spaced apart by a width along a first horizontal direction, and wherein the conductive via has a length along a second horizontal direction orthogonal to the first horizontal direction; and a second interconnection line in an upper portion of the ILD material, the second interconnection line on the conductive via, the second interconnection line having substantially vertical sidewalls spaced apart by the width along the first horizontal direction, and the second interconnection line having a length along the second horizontal direction greater than the length of the conductive via along the second horizontal direction, wherein the substantially vertical sidewalls of the second interconnection line are continuous with the substantially vertical sidewalls of the conductive via.

81. The Apple A12 SoC is manufactured by TSMC using its 7nm feature size manufacturing process (N5P). *See* https://www.anandtech.com/show/13392/the-iphone-xs-xs-max-review-unveiling-the-silicon-secrets/2 (accessed June 22, 2023); https://en.wikichip.org/wiki/apple/ax/a12 (accessed June 22, 2023). TSMC's 7nm feature size manufacturing process produces a product that meets all of the limitations of at least claim 20 of the '626 Patent. For example, the Apple A12 SoC system-on-chip comprises all elements of claim 20 of the '626 Patent, as depicted below in images from analysis of an Apple A15 SoC within an Apple product:



82. The other products produced by TSMC at the same node size also infringe for the same reasons as above, as explained above in the section titled "Allegations of Patent Infringement."

83. TSMC's acts of direct and indirect infringement of the '626 Patent are willful, and have caused and will continue to cause substantial damage and irreparable harm to Daedalus, and Daedalus has no adequate remedy at law.

PRAYER FOR RELIEF

WHEREFORE, Daedalus request the Court grant the relief set forth below:

A. Enter judgment that TSMC has infringed, and continues to infringe, one or more claims of the Asserted Patents;

B. Enter judgment that TSMC's acts of patent infringement are willful;

C. Order TSMC to account for and pay damages caused to Daedalus by TSMC's unlawful acts of patent infringement;

D. Award Daedalus increased damages and attorney fees pursuant to 35 U.S.C. §§ 284 and 285;

E. Award Daedalus the interest and costs incurred in this action; and

F. Grant Daedalus such other and further relief, including equitable relief, as the Court deems just and proper.

DEMAND FOR JURY TRIAL

Pursuant to Fed. R. Civ. P. 38, Plaintiff demands a jury trial for all claims and issues deemed to be triable by a jury.

DATED: June 22, 2023

Respectfully submitted,

By */s/ Reza Dokhanchy w/permission Claire Abernathy Henry*

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