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

VISIONX TECHNOLOGIES, LLC	§	
	§	
***Plaintiff*,**	§	
	§	
v.	§	**Civil Action No. _____**
	§	
SONY GROUP CORPORATION,	§	**JURY TRIAL DEMANDED**
SONY CORPORATION,	§	
SONY SEMICONDUCTOR	§	
MANUFACTURING CORPORATION,	§	
AND SONY SEMICONDUCTOR	§	
SOLUTIONS CORPORATION.	§	
***Defendants*.**		

PLAINTIFF'S ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff VisionX Technologies, LLC ("VisionX" or "Plaintiff") hereby submits this Complaint for patent infringement against Defendants Sony Group Corporation, Sony Corporation, Sony Semiconductor Manufacturing Corporation, and Sony Semiconductor Solutions Corporation (collectively, "Defendants" or "Sony") and states as follows:

I. THE PARTIES

1. VisionX is a Limited Liability Company organized under the laws of the state of Texas with its principal place of business at 30025 Alicia Pkwy #7042, Laguna Niguel, CA 92677, U.S.A.

2. On information and belief, Defendant Sony Group Corporation is a corporation organized under the laws of Japan, with its headquarters at 1-7-1 Konan Minato-ku, Tokyo, 108-0075 Japan.

3. On information and belief, Defendant Sony Corporation is a corporation organized under the laws of Japan, with its headquarters at 1-7-1 Konan Minato-ku, Tokyo, 108-0075 Japan.

Sony Exhibit 1021
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4. On information and belief, Defendant Sony Semiconductor Manufacturing Corporation is a corporation organized under the laws of Japan, with its headquarters at 4000-1, Haramizu, Kikuyomachi, Kikuchi-gun, Kumamoto 869-1102, Japan. On information and belief, Sony Semiconductor Manufacturing Corporation is involved with "development and manufacturing of CMOS image sensors and display devices."[1]

5. On information and belief, Defendant Sony Semiconductor Solutions Corporation is a corporation organized under the laws of Japan, with its headquarters at 4-14-1 Asahi-cho, Atsugi-shi, Kanagawa, 243-0014 Japan. On information and belief, Sony Semiconductor Solutions Corporation is involved with "research, development, design, manufacturing, and sales of semiconductor related products and electronic/electric equipment, as well as other associated businesses."[2]

II. JURISDICTION AND VENUE

6. This Court has subject matter jurisdiction under 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.*, including 35 U.S.C. § 271.

7. This Court has personal jurisdiction over Defendants at least because Defendants conduct business and have committed acts of patent infringement and/or have induced acts of patent infringement by others in this judicial district, the State of Texas, and elsewhere in the United States. As described in further detail below, on information and belief, Defendants induce others to make, use, offer for sale, sell, or import various image sensor chips or products containing image sensor chips that infringe one or more of VisionX's patents. On information and belief, these Infringing Products (the '808 Patent Infringing Products (defined below), the '143 Patent

[1] *See* https://www.sony-semicon.co.jp/e/company/base/ (last visited May 24, 2022).
[2] *See* https://www.sony-semicon.co.jp/e/company/base/ (last visited May 24, 2022).

Infringing Products (defined below), and the '366 Patent Infringing Products (defined below) are collectively referred to herein as the "Infringing Products") have been offered for sale, sold, used, and imported in the United States, within the State of Texas and within this judicial district.

8. This court also has personal jurisdiction over Defendants because, acting in consort, Defendants placed the Infringing Products into the stream of commerce, with the expectation that they will be purchased and used by customers in the United States, in the State of Texas and in this judicial district. On information and belief, customers in the State of Texas and in this judicial district have purchased and used and continue to purchase and use the Infringing Products. Accordingly, Defendants' conduct and connections with the State of Texas are such that they should reasonably have anticipated being brought into court here.

9. Venue is proper in this District as to Defendants pursuant to 28 U.S.C. §§ 1391(b), 1391(c) and 1400(b) because, among other things, Defendants are subject to this Court's personal jurisdiction and because, being alien corporations, Defendants may be sued in any district that has personal jurisdiction.

III. BACKGROUND

10. An image sensor is a semiconductor device within a camera that converts an optical image into an electrical signal. Due to the ubiquity of cameras in cell phones, computers, laptops, tablets, cars, drones, standalone cameras, surveillance cameras, and other devices, there is an enormous demand for image sensors and improvements to image sensor manufacturing technologies.

11. According to Defendants, "[a]n image sensor is a crucial component in smartphones for taking pictures."[3] "Though it is hidden behind the camera lens, its performance is

[3] https://www.sony-semicon.co.jp/e/products/IS/mobile/ (last visited Apr. 26, 2022).

directly relevant to the quality of images and videos shot with the camera."[4]

12. In addition to smartphones, Defendants' image sensors are used in other industries. For instance, "Sony pursues the development of image sensors to make 'eyes of vehicles' evolve in the viewing and sensing technology domains, aiming to achieve higher safety performance sooner, thereby contributing to technological advances in active safety."[5] In fact, Sony states that "[t]he camera is 'absolutely essential' to autonomous driving."[6]

13. On January 11, 2011, the United States Patent and Trademark Office ("USPTO") duly and legally issued United States Patent No. 7,867,808 ("the '808 Patent"), titled "Image Sensor and Method for Manufacturing the Same." The '808 Patent is valid and enforceable.

14. On October 11, 2011, the USPTO duly and legally issued United States Patent No. 8,035,143 ("the '143 Patent"), titled "Semiconductor Device and Method for Manufacturing the Same." The '143 Patent is valid and enforceable.

15. On January 11, 2011, the USPTO duly and legally issued United States Patent No. 7,868,366 ("the '366 Patent"), titled "Image Sensor and Method for Manufacturing the Same." The '366 Patent is valid and enforceable.

16. The '808 Patent, the '143 Patent, and the '366 Patent (collectively, the "Asserted Patents") were originally issued to Dongbu HiTek Co., Ltd. ("DB HiTek"). DB HiTek, ranks as one of the top ten foundries in the semiconductor industry.[7] DB HiTek entered the semiconductor industry in 1983, when it began supplying silicon wafers to integrated circuit manufacturers.[8] In 1997, it established the first foundry in South Korea, and since then it has led South Korea's

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[4] *Id.*
[5] https://www.sony-semicon.co.jp/e/products/IS/automotive/ (last visited Apr. 26, 2022).
[6] https://www.sony.com/en/SonyInfo/technology/stories/IMX490/ (last visited Apr. 26, 2022).
[7] *See* https://dbhitek.com/eng/data/introduction/CSR%20Report%202020-2021%20(ENG)_20210812.pdf (last visited May 4, 2022).
[8] *Id.*

semiconductor industry with state-of-the-art wafer fabrication capabilities and significant investments in technological development and innovation.[9]

17. VisionX is the sole and exclusive owner of all rights, title, and interest in the Asserted Patents, including the sole and exclusive right to prosecute this action, to enforce the Asserted Patents against infringers, to collect damages for past, present and future infringement of the Asserted Patents, and to seek injunctive relief as appropriate under the law. Accordingly, Defendants' infringement, as described below, has injured, and continues to injure VisionX.

IV. COUNT I: INFRINGEMENT OF '808 PATENT

18. VisionX incorporates each of the allegations of paragraphs 1-16 above.

19. Defendants have directly infringed and continue to directly infringe the '808 Patent by, for example, making, using, offering to sell, selling, and/or importing into the United States, without authority, products that practice one or more claims of the '808 Patent.

20. Defendants are not licensed or otherwise authorized to make, use, offer for sale, sell or import any products that embody the inventions of the '808 Patent in the United States.

21. Defendants have and continue to directly infringe one or more claims of the '808 Patent, including, for example, claim 1 of the '808 Patent, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States infringing image sensors without authority and in violation of 35 U.S.C. § 271.

22. With respect to the '808 Patent, Defendants' infringing products include, for example, the Sony IMX214, Sony IMX240, Sony IMX260, Sony IMX278, Sony IMX362, Sony IMX400, Sony IMX424, Sony IMX490, Sony IMX540, Sony IMX555, Sony IMX576, Sony IMX586, Sony IMX603, Sony IMX608, Sony IMX610, Sony IMX650, Sony IMX686, Sony

[9] *Id.*

IMX689, Sony IMX700, Sony IMX703, Sony IMX766, Sony ISX014 as well as any other Sony chips in various camera modules that may or may not have Sony part numbers, but are made by Sony with a similar structure (collectively, the "'808 Patent Infringing Products").

23. For example, the Sony IMX703 infringes representative claim 1 of the '808 Patent. On information and belief, the remaining '808 Patent Infringing Products infringe representative claim 1 of the '808 Patent in the same manner.

24. Claim 1 of the '808 Patent claims a method, comprising: providing a first substrate; forming circuitry including a metal interconnection over the first substrate; forming a photodiode in a crystalline semiconductor layer of a second substrate; forming an ion implantation isolation layer in the photodiode; bonding the first substrate to the second substrate to connect the photodiode to the metal interconnection; and removing a lower portion of the second substrate to expose the photodiode, wherein forming the photodiode comprises: forming a second conduction type conduction layer in the crystalline semiconductor layer; and forming a first conduction type conduction layer over the second conduction type conduction layer, wherein forming the ion implantation isolation layer in the photodiode comprises forming a second conduction type first ion implantation isolation layer over the first conduction type conduction layer, wherein forming the ion implantation isolation layer in the photodiode comprises forming a second conduction type second ion implantation isolation layer at an interface between pixels of the photodiode.

25. The Sony IMX703 includes a CMOS image sensor (CIS) die stacked on an image signal processor (ISP) die. Each of the CIS and ISP dies includes a substrate (for example, a silicon substrate) and metal interconnection. Figure 1 (below) illustrates an exemplary cross-section of the stacked CIS and ISP dies.

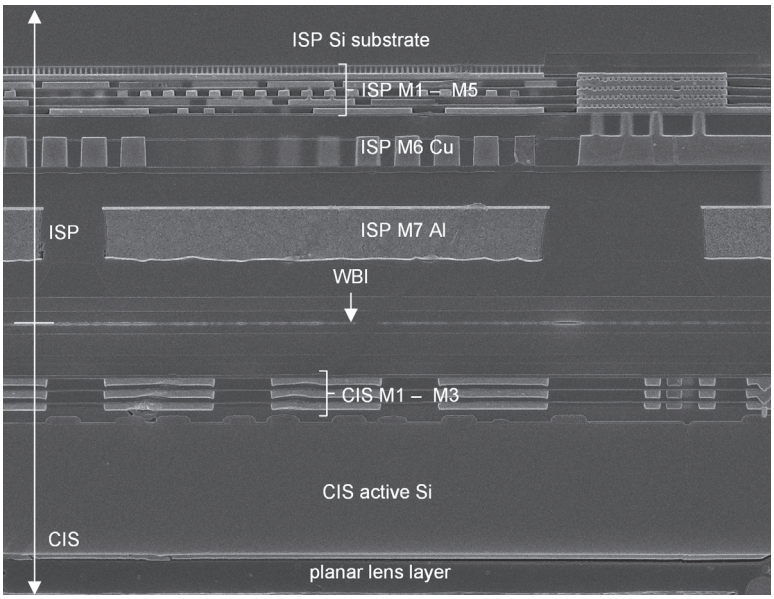


Figure 1

26. The CIS substrate includes an array of pixels. Figure 2 (below) illustrates an exemplary plan view of such pixels. Pixels are highlighted in green.

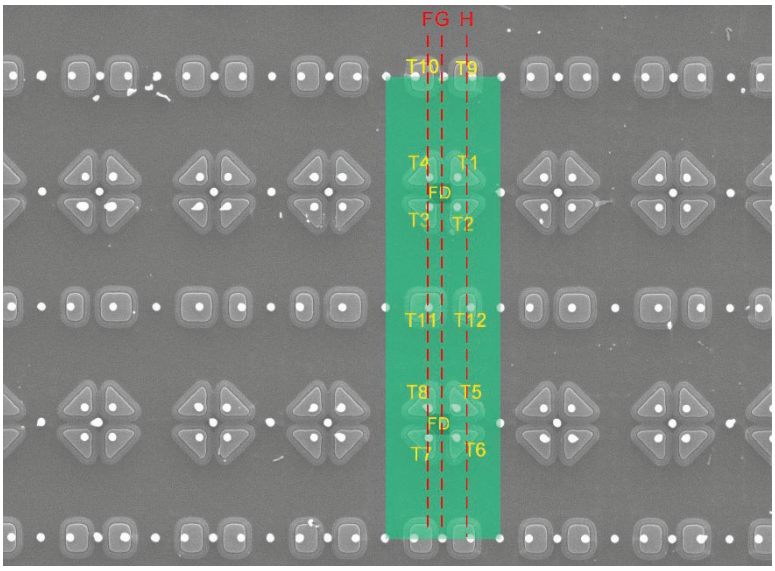


Figure 2

27. Figure 3 (below) illustrates an exemplary scanning capacitance microscope (SCM) cross-section of pixels in the CIS substrate, *e.g.*, a cross-section along line F in Figure 2 (above). As shown in the Figure 3, adjacent pixels are isolated from each other by a combination of P-type isolation layers and back deep trench isolation (B-DTI).

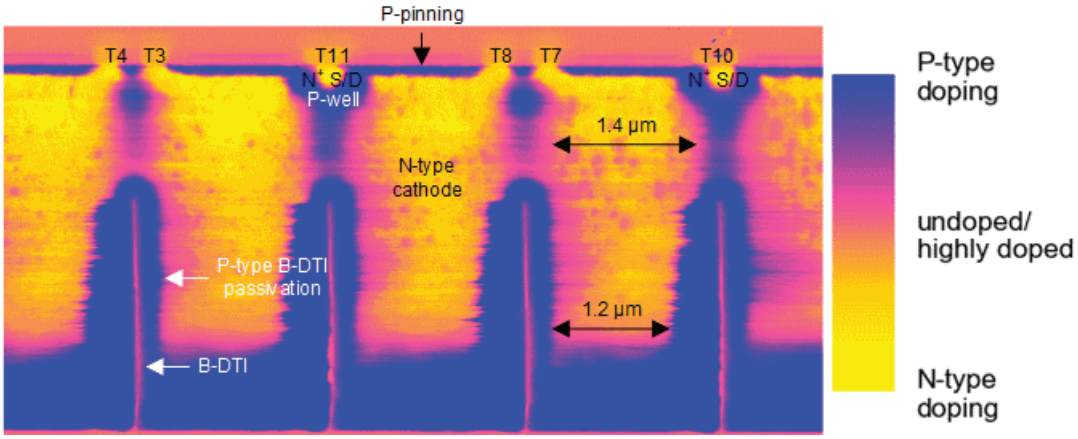


Figure 3

28. The CIS substrate and ISP substrate are connected through direct bonding interconnects (DBIs). Figure 4 (below) represents an exemplary scanning electron microscope (SEM) cross-section of one such DBI.

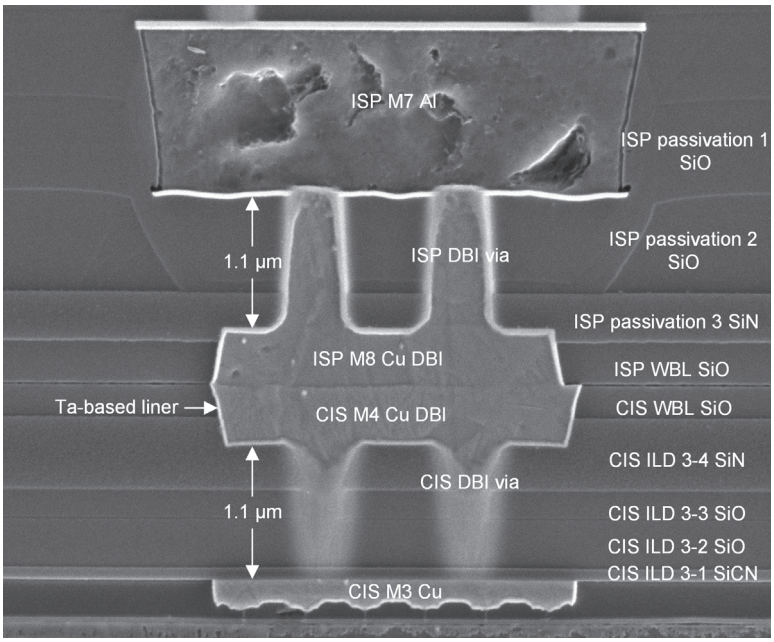
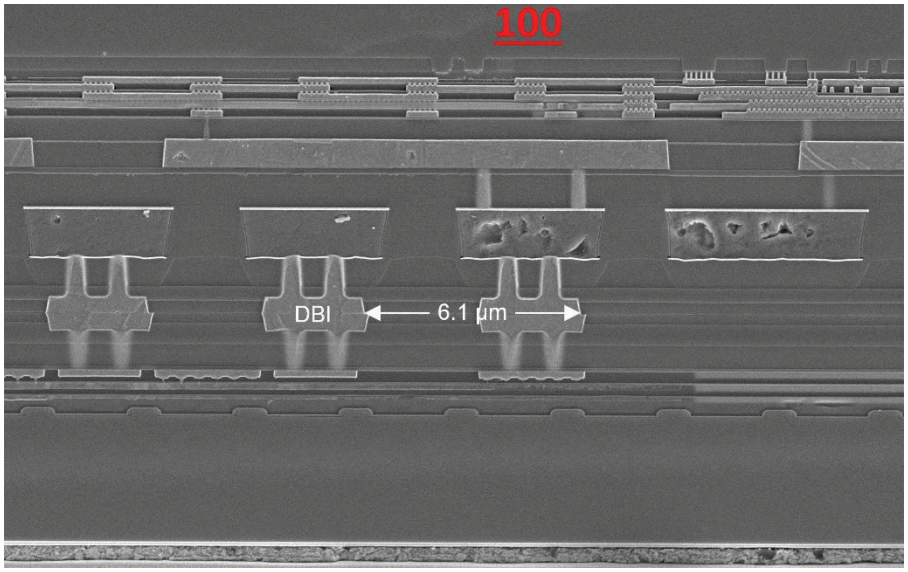
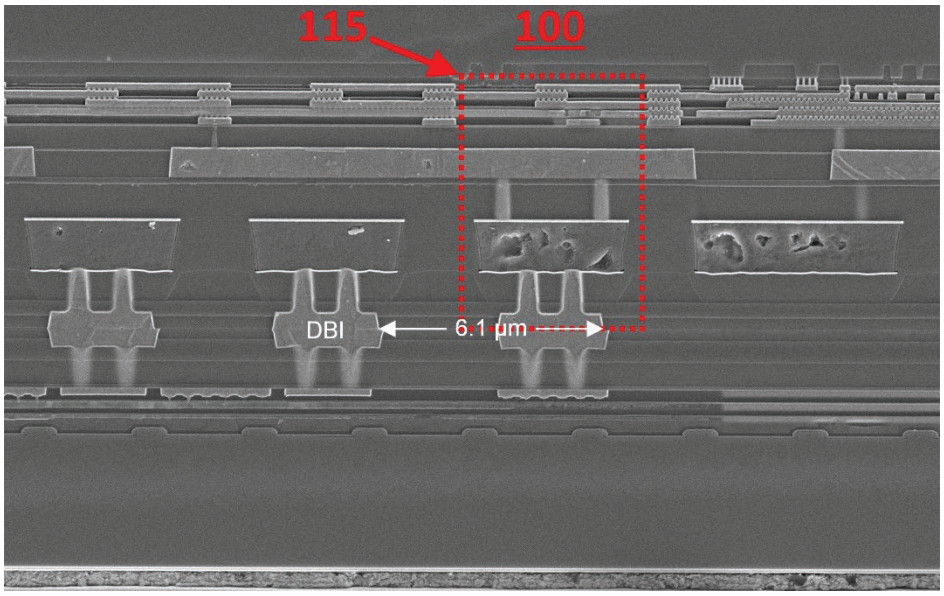
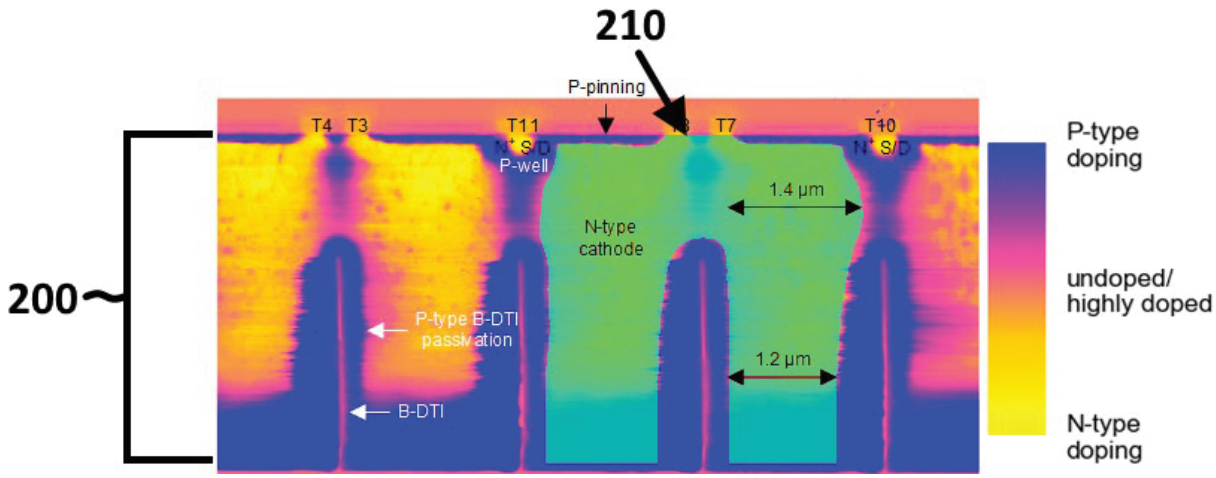


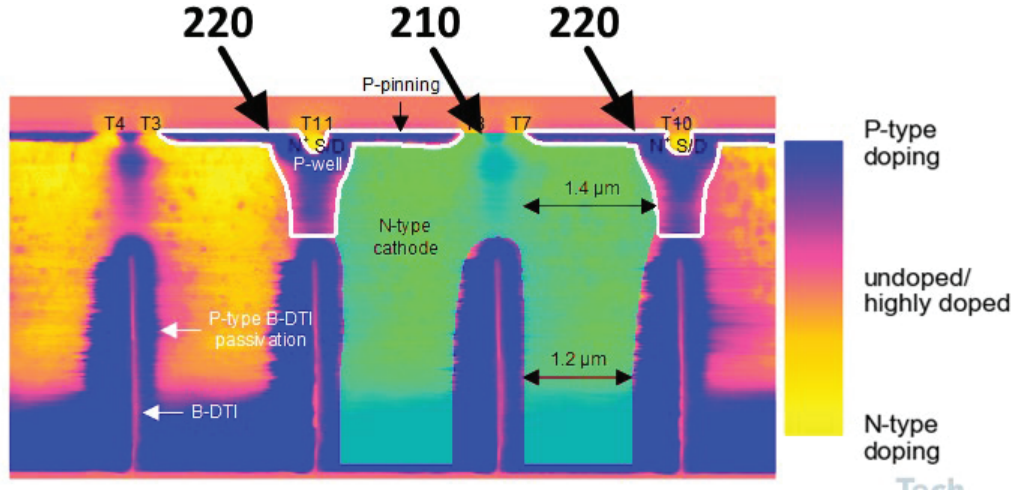
Figure 4

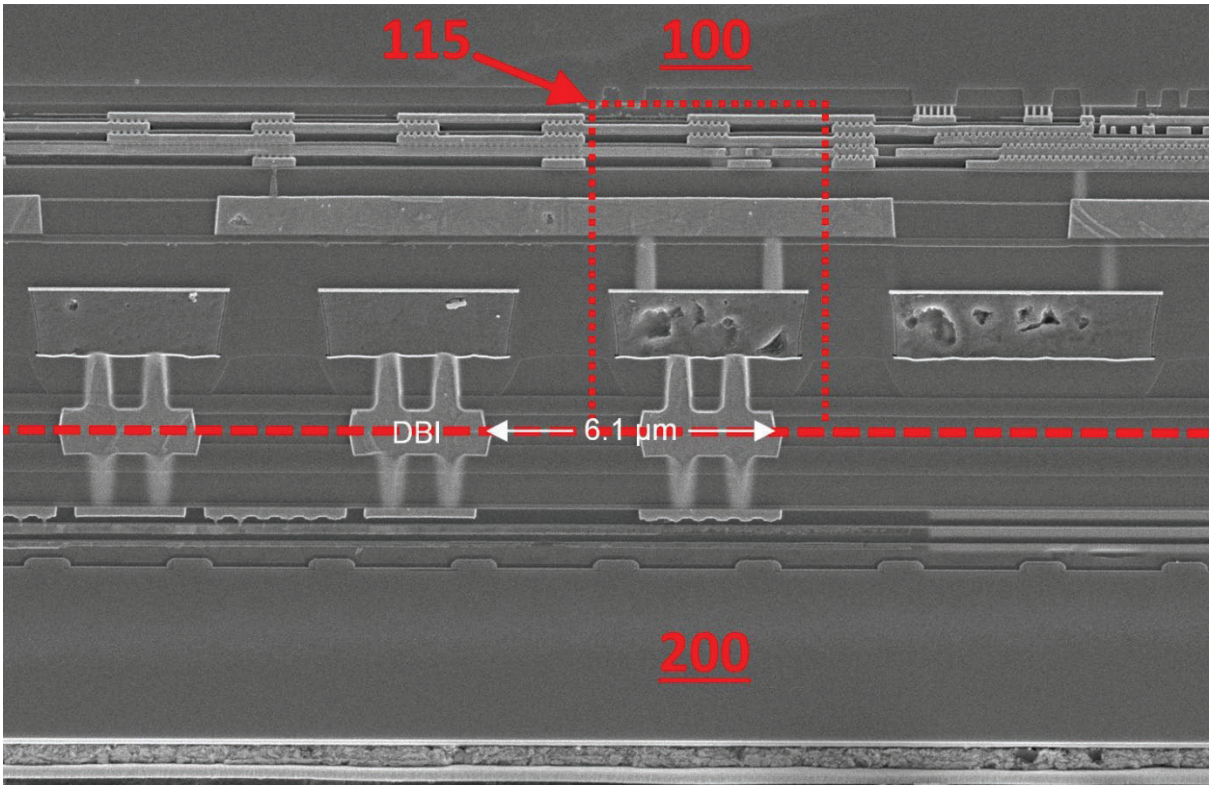
29. As shown in the table below, the Sony IMX703 infringes representative claim 1 of the '808 Patent:

Element 1a: "providing a first substrate;"
The ISP substrate (labeled 100) is provided. 

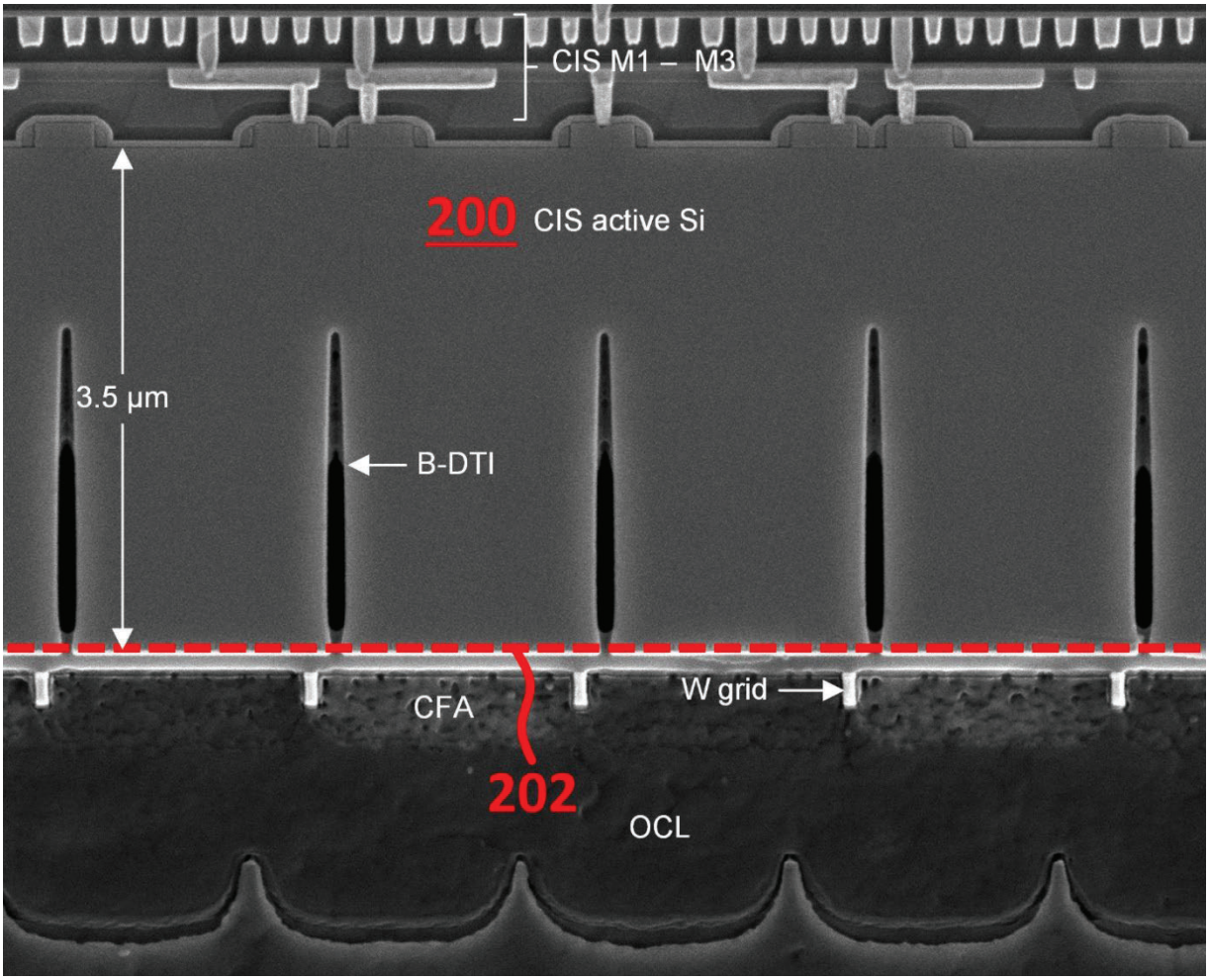
Element 1b: "forming circuitry including a metal interconnection over the first substrate;"
ISP metal interconnect (dotted red line, labeled 115) is formed over ISP substrate 100 (the orientation of the image below is reversed relative to ISP substrate 100). 

Element 1c: "forming a photodiode in a crystalline semiconductor layer of a second substrate;"
A photodiode (labeled 210 and highlighted in green) is formed in CIS substrate (labeled 200). 

Element 1d: "forming an ion implantation isolation layer in the photodiode;"
An isolation layer (outlined in white, labeled 220) of P-type impurity ions is formed in photodiode 210. 

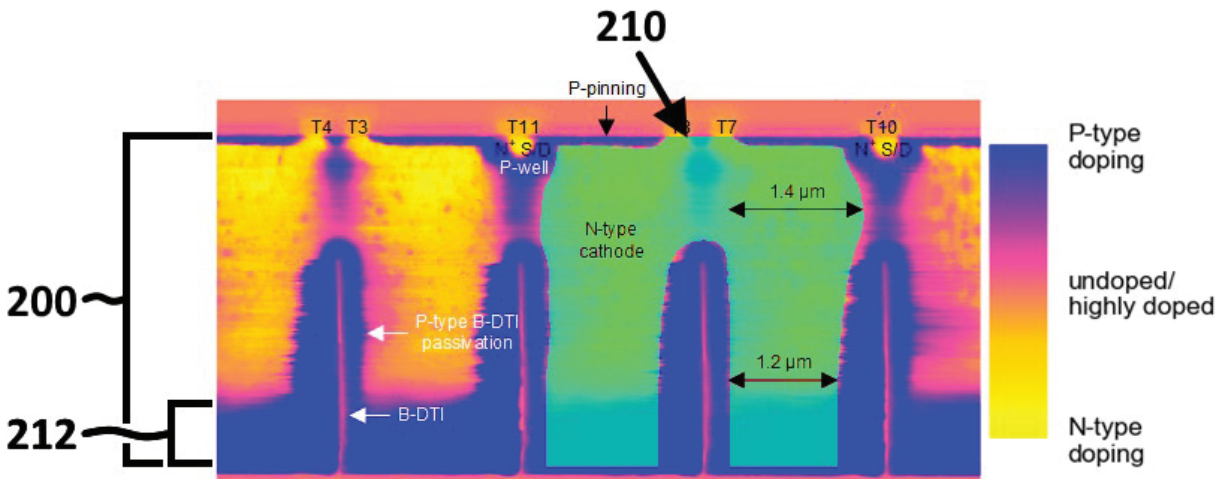
Element 1e: "bonding the first substrate to the second substrate to connect the photodiode to the metal interconnection;"
The ISP and CIS dies are bonded together, and thus, corresponding ISP substrate 100 and CIS substrate 200 are bonded together to facilitate connecting the photodiode and metal interconnection 115. The figure below depicts a column DBI, which electrically connects a photodiode in CIS to ISP metal interconnect 115. 

Element 1f: "and removing a lower portion of the second substrate to expose the photodiode,"
A lower portion of CIS substrate 200 is removed, thinning CIS substrate 200 down to back surface 202. The thinning exposes the photodiode to facilitate subsequent processing.



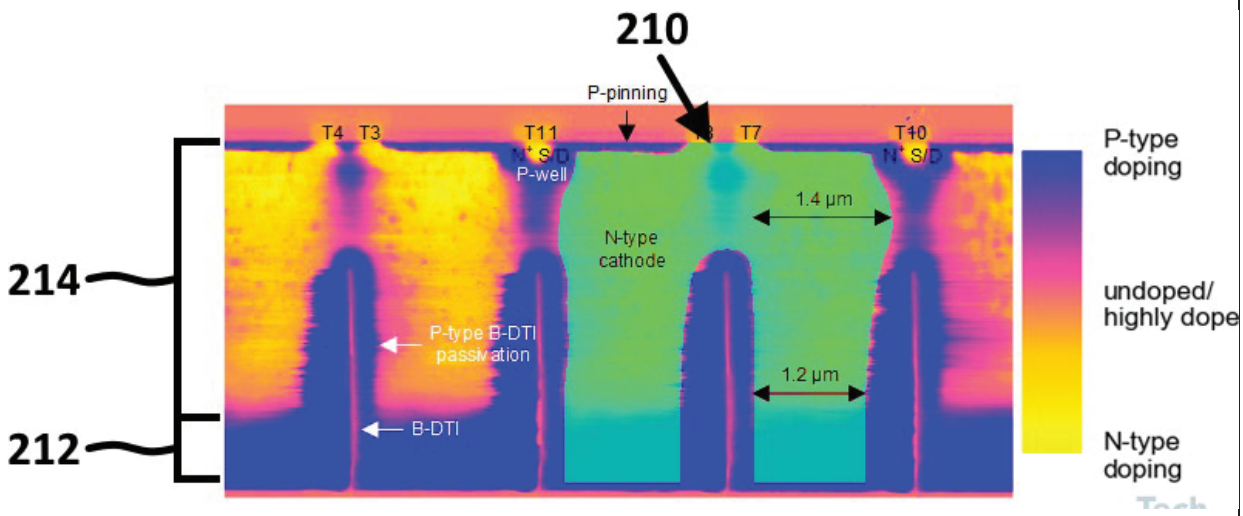
Element 1g: "wherein forming the photodiode comprises: forming a second conduction type conduction layer in the crystalline semiconductor layer;"

A layer (labeled 212) having P-type conduction is formed in CIS substrate 200, which is crystalline. Layer 212 is utilized in forming photodiode 210.



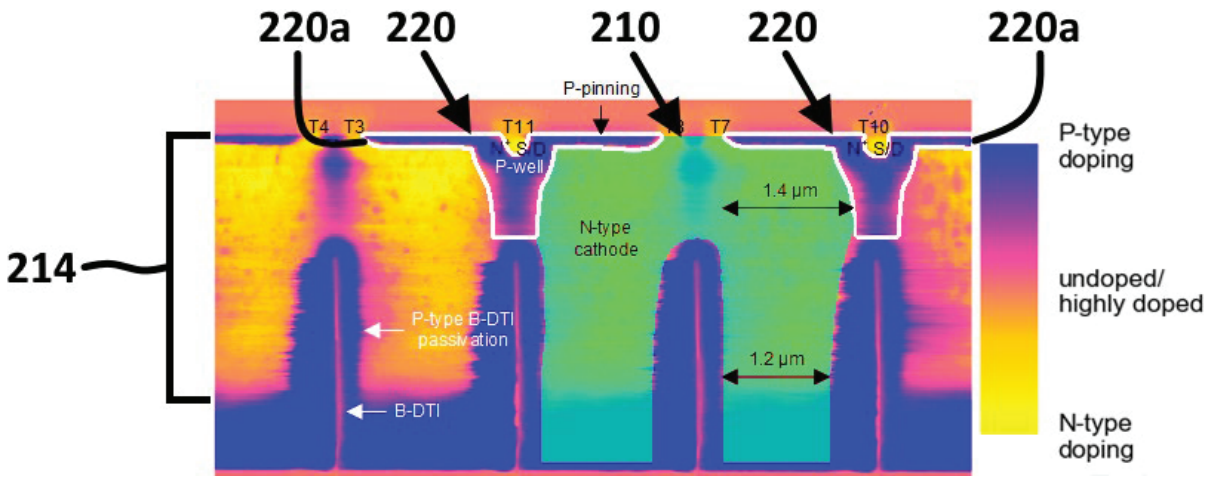
Element 1h: "and forming a first conduction type conduction layer over the second conduction type conduction layer,"

A layer (labeled 214) having N-type conduction is formed over P-type conduction layer 212. Layer 214 is utilized in forming photodiode 210.



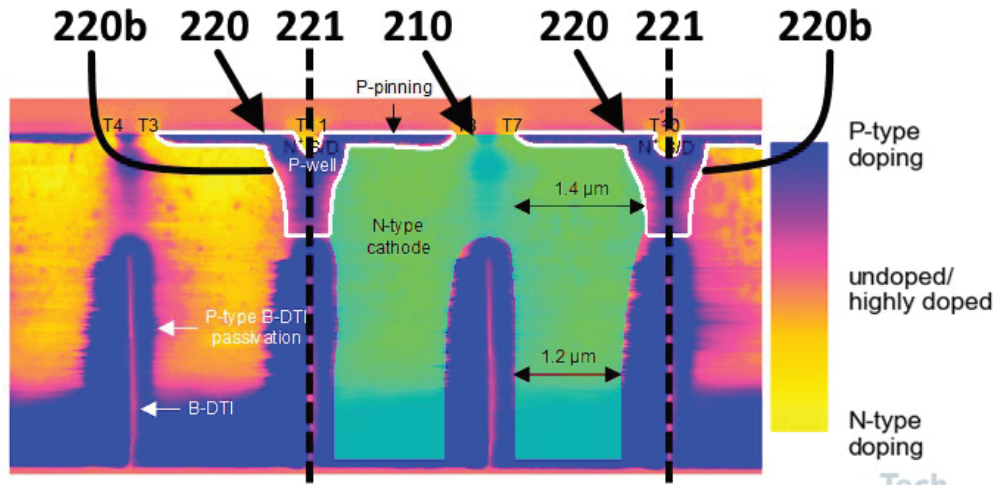
Element 1i: "wherein forming the ion implantation isolation layer in the photodiode comprises forming a second conduction type first ion implantation isolation layer over the first conduction type conduction layer,"

Forming isolation layer 220 in photodiode 210 includes forming P-type impurity ions as a photodiode surface isolation layer (labeled 220a) over N-type conduction layer 214.



Element 1j: "wherein forming the ion implantation isolation layer in the photodiode comprises forming a second conduction type second ion implantation isolation layer at an interface between pixels of the photodiode."

Forming isolation layer 220 in photodiode 210 includes forming P-type impurity ions as a photodiode interface isolation layer (labeled 220b) between (labeled 221) photodiode 210 and other photodiodes.



30. Defendants indirectly infringe the '808 Patent.

31. Defendants have and continue to indirectly infringe one or more claims of the '808 Patent by knowingly and intentionally inducing others to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling and/or importing into the United States infringing products that incorporate and/or use the '808 Patent Infringing Products. Defendants induce direct infringement of the '808 Patent by customers, importers, sellers, resellers, and/or end users of the '808 Patent Infringing Products. On information and belief, the direct infringers include, for example, Apple Inc.,[10] Razer Inc.[11], Huawei Technologies Co., Ltd.[12], Asus[13], Motorola[14], Nokia[15] and Defendants' subsidiary Sony Electronics, Inc.[16]

32. Defendants Sony Corporation, Sony Group Corporation, and Sony Semiconductor Solutions Corporation had actual knowledge of the '808 Patent and that the '808 Patent Infringing Products infringe that patent at least as of May 25, 2022. Accordingly, at least as of May 25, 2022, Defendants Sony Corporation, Sony Group Corporation, and Sony Semiconductor Solutions Corporation were on notice, knew and/or should have known that their actions induced direct infringement by third parties. Accordingly, at least as of May 25, 2022, Defendants Sony Corporation, Sony Group Corporation, and Sony Semiconductor Solutions Corporation induced infringement by third party direct infringers and should have known that their actions would induce actual infringement.

33. Defendant Sony Semiconductor Manufacturing Corporation had actual knowledge

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[10] https://www.kimovil.com/en/list-smartphones-by-lens-model/sony-imx703 (last visited Apr. 27, 2022).
[11] https://www.nextpit.com/razer-phone-review (last visited Apr. 27, 2022).
[12] https://www.kimovil.com/en/list-smartphones-by-lens-model/sony-imx278 (last visited Apr. 29, 2022).
[13] https://www.smartprix.com/bytes/sony-imx686-camera-sensor-phones/ (last visited Apr. 29, 2022).
[14] https://www.kimovil.com/en/list-smartphones-by-lens-model/sony-imx362-exmor-rs (last visited Apr. 29, 2022).
[15] https://www.kimovil.com/en/list-smartphones-by-lens-model/sony-imx362-exmor-rs (last visited Apr. 29, 2022).
[16] https://www.kimovil.com/en/list-smartphones-by-lens-model/sony-imx400-exmor-rs (last visited Apr. 27, 2022).

of the ‘808 Patent and that the ‘808 Patent Infringing Products infringe that patent at least as of May 26, 2022. Accordingly, at least as of May 26, 2022, Defendant Sony Semiconductor Manufacturing Corporation was on notice, knew and/or should have known that its actions induced direct infringement by third parties. Accordingly, at least as of May 26, 2022, Defendant Sony Semiconductor Manufacturing Corporation induced infringement by third party direct infringers and should have known that its actions would induce actual infringement.

34. Additionally, at the very least Defendants had actual knowledge of the ‘808 Patent and their infringement of the same as of the date of this Complaint.

35. Defendants induced infringement by others with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others infringe the ‘808 Patent, but while at best, remaining willfully blind to the infringement.

36. On information and belief, Defendants advertise the ‘808 Patent Infringing Products, publish specifications and promotional literature encouraging customers to implement and incorporate the ‘808 Patent Infringing Products into end user products, create and/or distribute user manuals for the ‘808 Patent Infringing Products that provide instructions and/or encourage infringing use, and offer support and/or technical assistances to their customers that provide instructions on and/or encourage infringing use.

37. Defendants encourage and facilitate their customers to infringe the ‘808 Patent by promoting the ‘808 Patent Infringing Products, for example, stating on their website that “[w]ith the advanced imaging technology powered by years of expertise, Sony’s image sensors make sure the moment is not missed. It opens up new possibilities to smartphone photography.”[17]

38. Defendants’ customers that incorporate the ‘808 Patent Infringing Products into

[17] https://www.sony-semicon.co.jp/e/products/IS/mobile/ (last visited Apr. 26, 2022).

other products (e.g., smartphones, vehicles, etc.) as well as the end users of those products, each directly infringe the Asserted Patents pursuant to Sony's instructions and advertisements.

V. COUNT II: INFRINGEMENT OF '143 PATENT

39. VisionX incorporates each of the allegations of paragraphs 1-36 above.

40. Defendants have directly infringed and continue to directly infringe the '143 Patent by, for example, making, using, offering to sell, selling, and/or importing into the United States, without authority, products that practice one or more claims of the '143 Patent.

41. Defendants are not licensed or otherwise authorized to make, use, offer for sale, sell or import any products that embody the inventions of the '143 Patent in the United States.

42. Defendants have and continue to directly infringe one or more claims of the '143 Patent, including, for example, claim 1 of the '143 Patent, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States infringing image sensors without authority and in violation of 35 U.S.C. § 271.

43. With respect to the '143 Patent, Defendants' infringing products include, for example, the Sony IMX214, Sony IMX240, Sony IMX400, Sony IMX424, Sony IMX490, and Sony ISX014, as well as any other Sony chips in various camera modules that may or may not have Sony part numbers, but are made by Sony with a similar structure (collectively, the "'143 Patent Infringing Products").

44. For example, the Sony IMX490 infringes representative claim 1 of the '143 Patent. On information and belief, the remaining '143 Patent Infringing Products infringe representative claim 1 of the '143 Patent in the same manner.

45. Claim 1 of the '143 Patent claims an image sensor comprising: a semiconductor substrate formed on a first surface thereof with a readout circuitry and a photodiode area; a metal interconnection layer formed on the first surface; a connection via metal extending from the first

surface to a second surface of the semiconductor substrate, the connection via metal having a projection part projecting from the second surface; an insulating layer formed on the second surface of the semiconductor substrate to expose the projection part while surrounding a portion of a lateral side of the projection part; and a metal pad formed on the insulating layer such that the metal pad covers the projection part, wherein the insulating layer has a thickness thinner than a projection height of the projection part.

46. The Sony IMX490 includes a CIS stacked on an ISP. Figure 5 (below) illustrates an exemplary scanning electron microscope (SEM) cross-section of the stacked CIS and ISP where the interface of the CIS and ISP is indicated by a dashed red line.

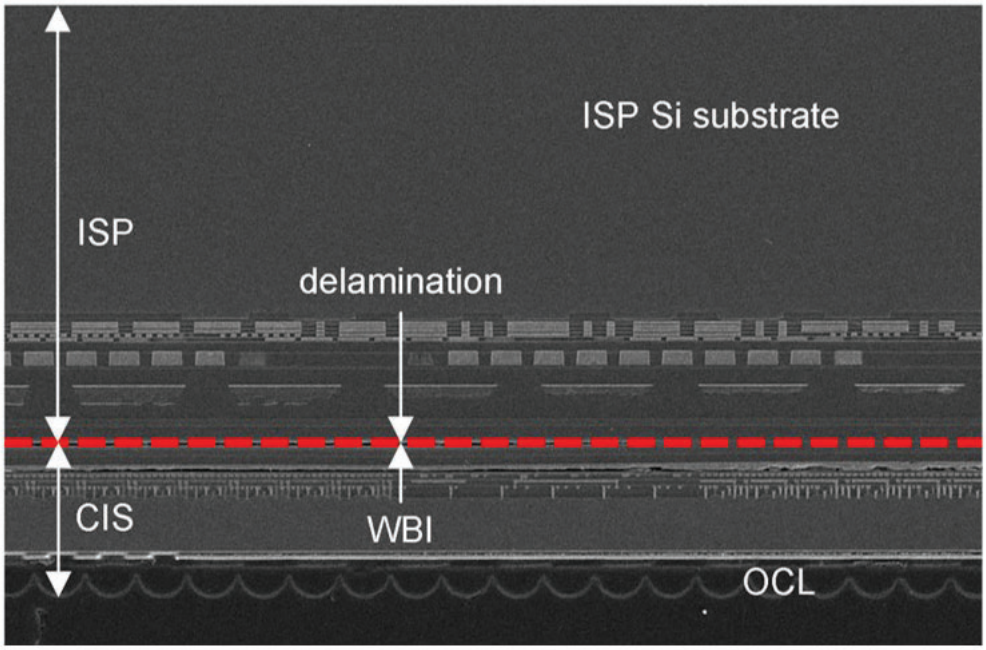
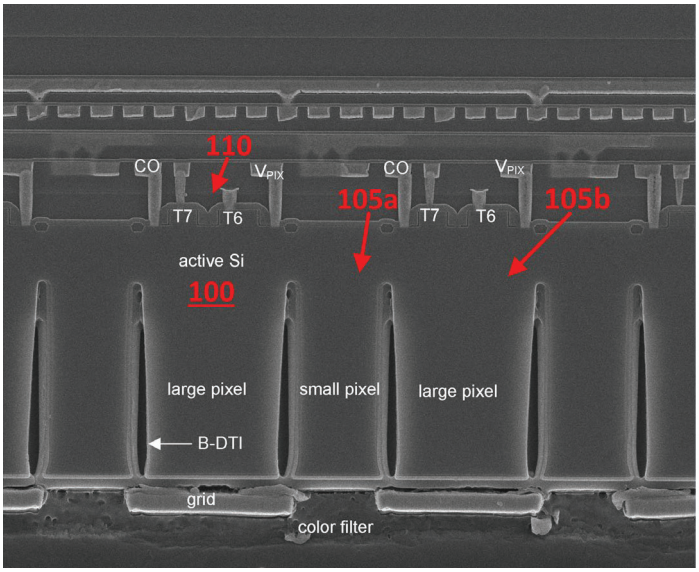
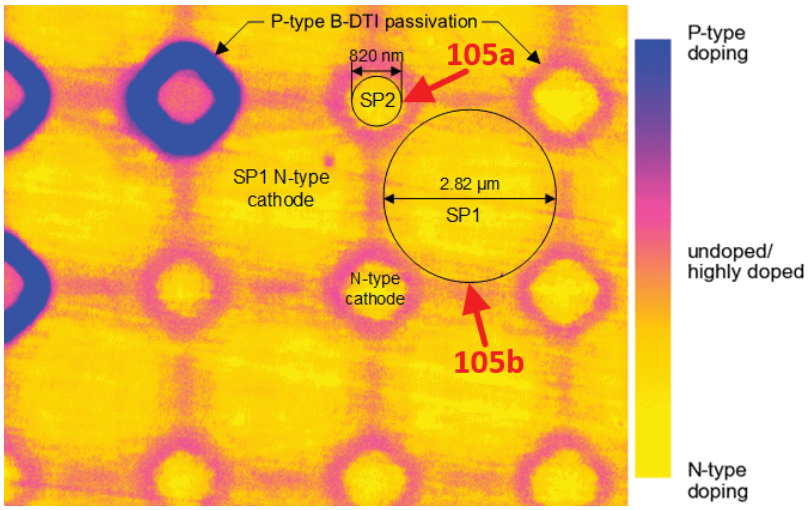


Figure 5

47. As shown in the table below, the Sony IMX490 infringes representative claim 1 of the '143 Patent:

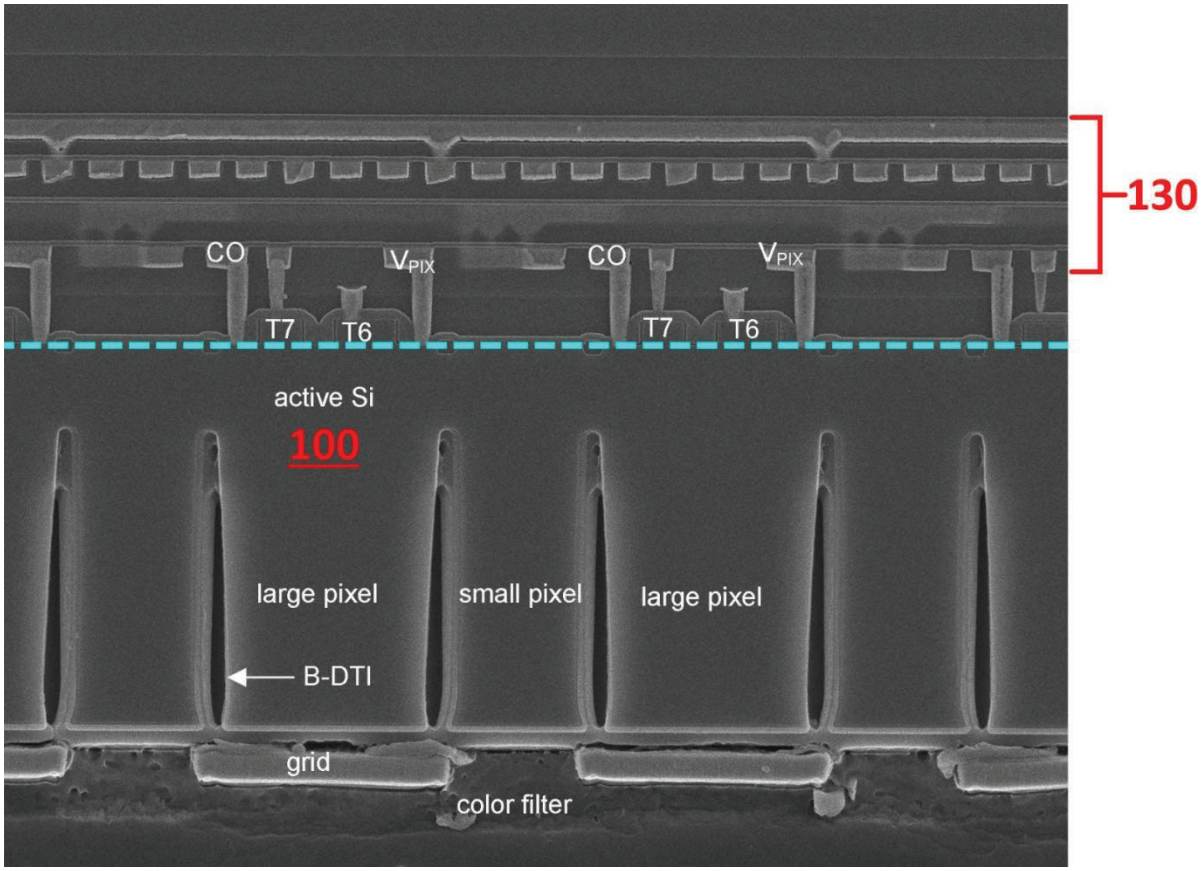
Element 1a: "a semiconductor substrate formed on a first surface thereof with a readout circuitry and a photodiode area;"
The Sony IMX490 comprises a semiconductor substrate (labeled 100) formed on a first surface thereof with a readout circuitry (labeled 110) and a photodiode area (labeled 105a and 105b).





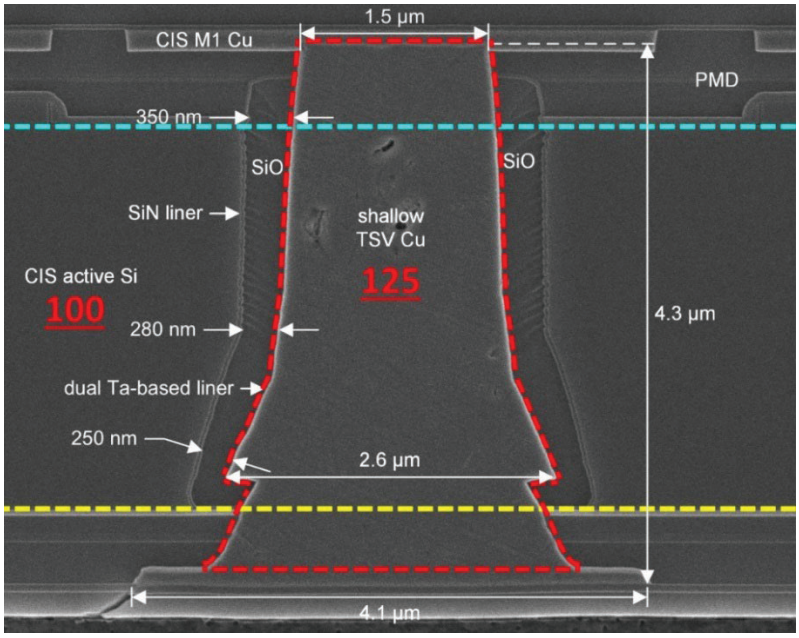
Element 1b: "a metal interconnection layer formed on the first surface;"

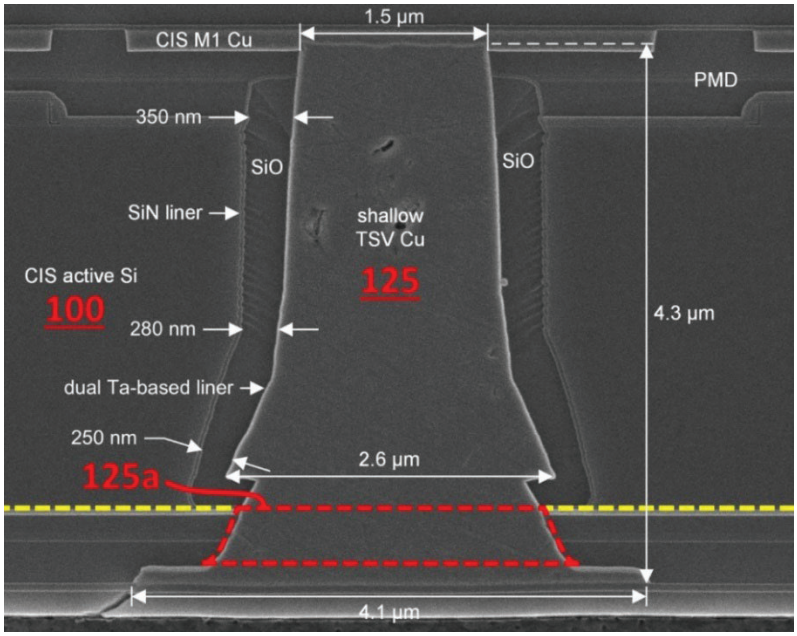
A stack (labeled 130) of metal interconnection layers is situated on the first surface.



Element 1c: "a connection via metal extending from the first surface to a second surface of the semiconductor substrate, the connection via metal having a projection part projecting from the second surface;"

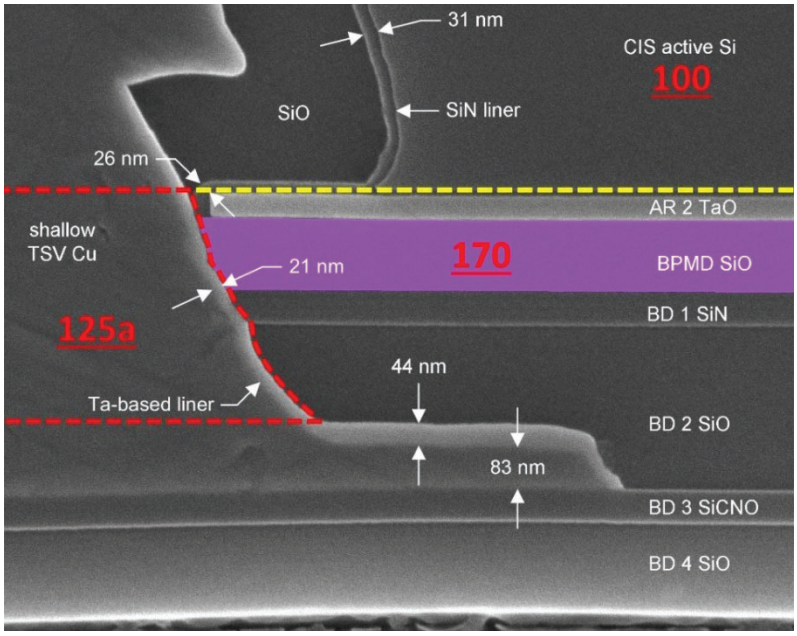
A connection via metal ("shallow TSV" that is labeled 125 and is enclosed by red dashed lines) extends from the first surface (blue dashed line) to a second surface of the semiconductor substrate (yellow dashed line). The connection via metal has a projection part (labeled 125a and enclosed by red dashed lines) projecting from the second surface.

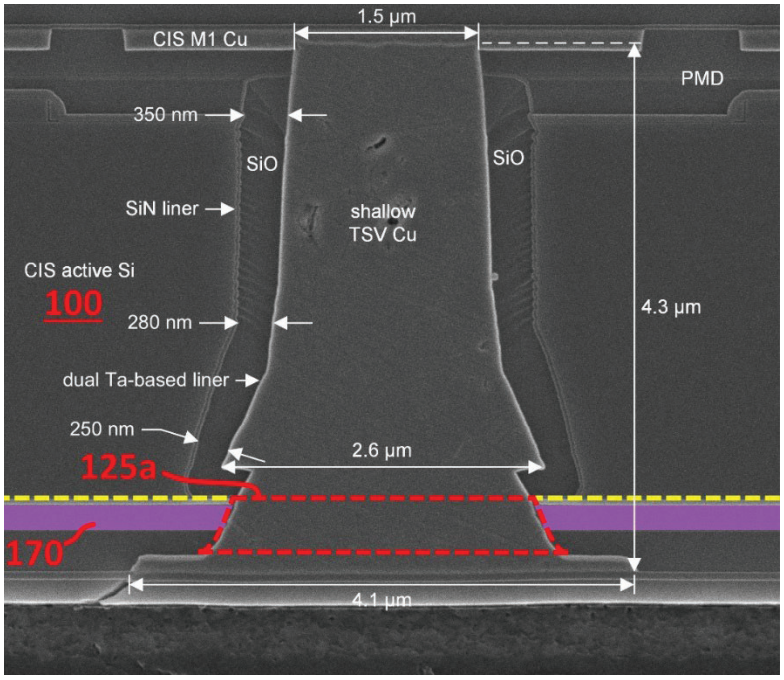




Element 1d: "an insulating layer formed on the second surface of the semiconductor substrate to expose the projection part while surrounding a portion of a lateral side of the projection part; and"

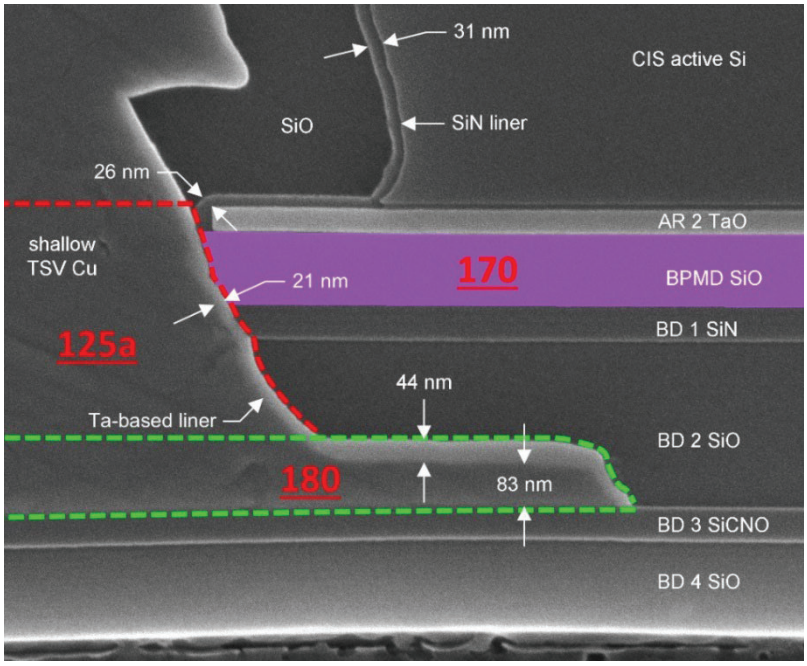
An insulating layer (purple, labeled 170) is formed on the second surface of the semiconductor substrate 100. The insulating layer 170 leaves a top of the projection part 125a exposed while surrounding at least a portion of a lateral side of the projection part 125a.

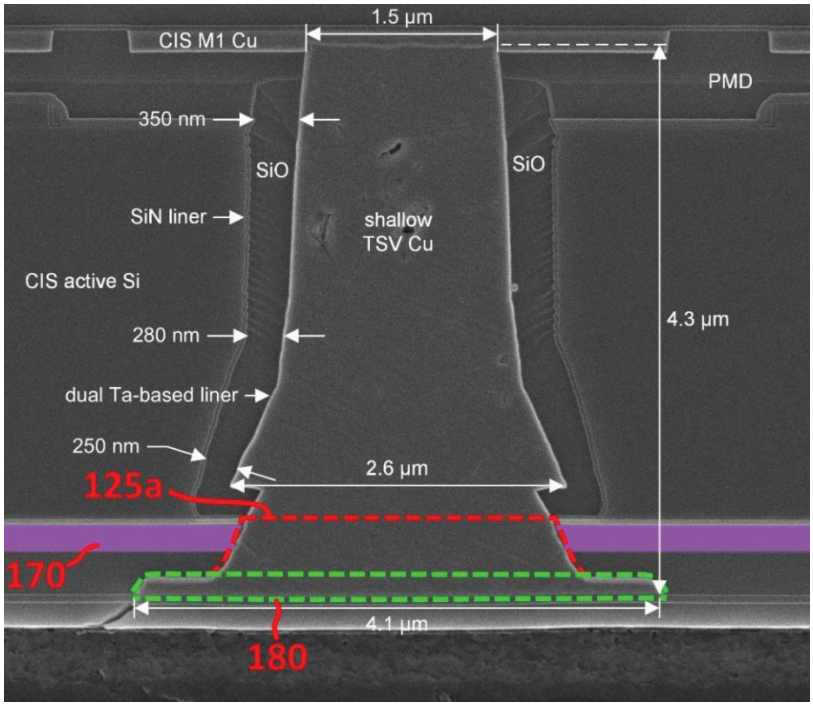




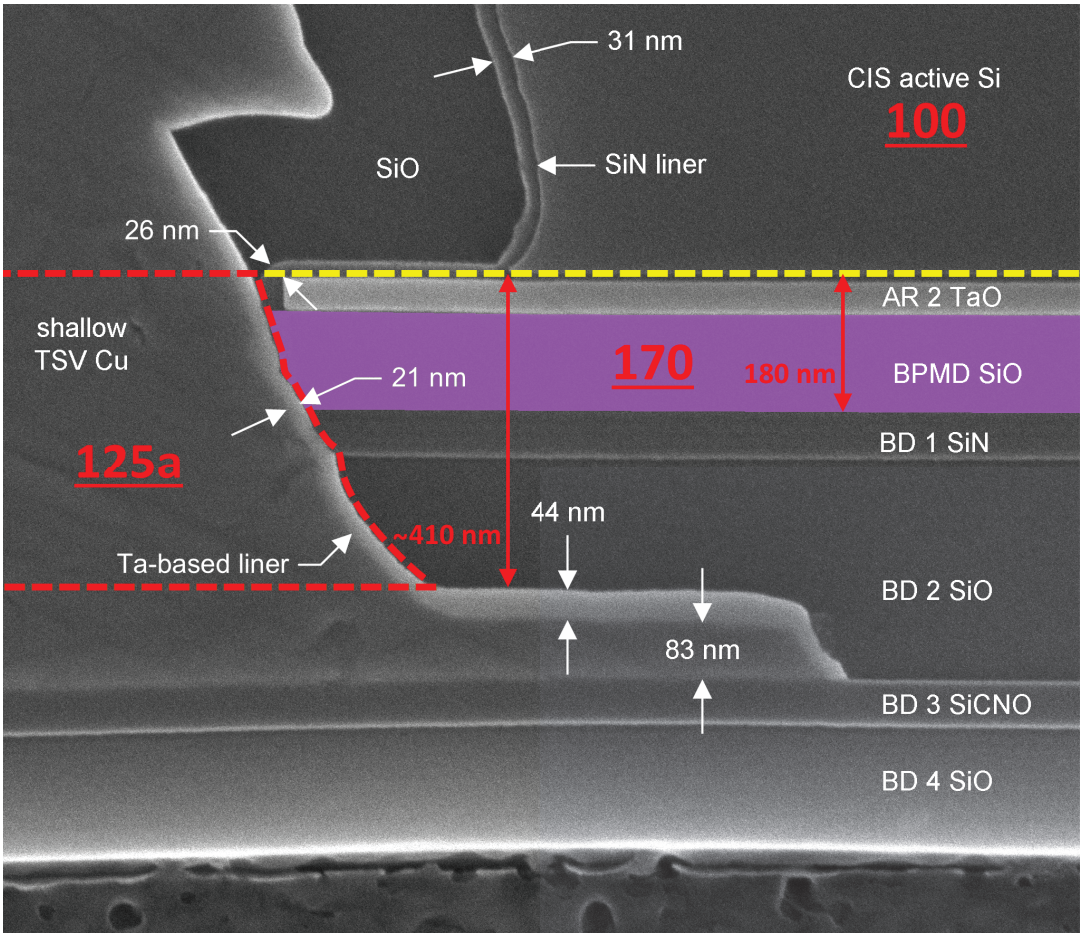
Element 1e: "a metal pad formed on the insulating layer such that the metal pad covers the projection part,"

A metal pad (enclosed by green dashed lines and labeled 180) is formed on the insulating layer 170 such that the metal pad 180 covers the projection part 125a.





Element 1f: "wherein the insulating layer has a thickness thinner than a projection height of the projection part."
The insulating layer 170 has a thickness thinner than a projection height of the projection part 125a.



48. Defendants indirectly infringe the '143 Patent.

49. Defendants have and continue to indirectly infringe one or more claims of the '143 Patent by knowingly and intentionally inducing others to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling and/or importing into the United States infringing products that incorporate and/or use the '143 Patent Infringing Products.

Defendants induce direct infringement of the '143 Patent by customers, importers, sellers, resellers, and/or end users of the '143 Patent Infringing Products. On information and belief, the direct infringers include, for example, Apple Inc.,[18] Tesla, Inc.,[19] Leopard Imaging Inc.,[20] Lucid Vision Labs, Inc.,[21] Sunny Optical Technology,[22] Shenzhen ChuangMu Technology Co., Ltd.,[23] Fujitsu,[24] and Defendants' subsidiary Sony Electronics, Inc.[25] and/or Sony Mobility, Inc.[26]

50. Defendants Sony Corporation, Sony Group Corporation, and Sony Semiconductor Solutions Corporation had actual knowledge of the '143 Patent and that the '143 Patent Infringing Products infringe that patent at least as of May 25, 2022. Accordingly, at least as of May 25, 2022, Defendants Sony Corporation, Sony Group Corporation, and Sony Semiconductor Solutions Corporation were on notice, knew and/or should have known that their actions induced direct infringement by third parties. Accordingly, at least as of May 25, 2022, Defendants Sony Corporation, Sony Group Corporation, and Sony Semiconductor Solutions Corporation induced infringement by third party direct infringers and should have known that their actions would induce actual infringement.

51. Defendant Sony Semiconductor Manufacturing Corporation had actual knowledge of the '143 Patent and that the '143 Patent Infringing Products infringe that patent at least as of May 26, 2022. Accordingly, at least as of May 26, 2022, Defendant Sony Semiconductor Manufacturing Corporation was on notice, knew and/or should have known that its actions induced

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[18] https://www.deviceranks.com/en/camera-sensor/140/sony-isx014-exmor-rs (last visited Apr. 27, 2022).
[19] https://www.laitimes.com/en/article/31qou_3ig7x.html (last visited Apr. 27, 2022).
[20] https://www.leopardimaging.com/product/autonomous-camera/maxim-gmsl2-cameras/li-imx424-gmsl2/li-imx424-gmsl2-065h/ (last visited Apr. 27, 2022).
[21] https://thinklucid.com/product/triton-5-mp-imx490/ (last visited Apr. 27, 2022).
[22] https://www.techinsights.com/products/ipr-1503-901 (last visited Apr. 27, 2022).
[23] http://www.camera-module.com/product/others/13mp-auto-focus-camera-module-sony-imx214-cmos.html (last visited Apr. 27, 2022).
[24] https://www.techinsights.com/products/ipr-1302-801 (last visited Apr. 27, 2022).
[25] https://electronics.sony.com/c/mobile (last visited May 10. 2022).
[26] https://www.sony.com/en/SonyInfo/News/Press/202204/22-016E/ (last visited May 10, 2022).

direct infringement by third parties. Accordingly, at least as of May 26, 2022, Defendant Sony Semiconductor Manufacturing Corporation induced infringement by third party direct infringers and should have known that its actions would induce actual infringement.

52. Additionally, at the very least Defendants had actual knowledge of the '143 Patent and their infringement of the same as of the date of this Complaint.

53. Defendants induced infringement by others with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others infringe the '143 Patent, but while at best, remaining willfully blind to the infringement.

54. On information and belief, Defendants advertise the '143 Patent Infringing Products, publish specifications and promotional literature encouraging customers to implement and incorporate the '143 Patent Infringing Products into end user products, create and/or distribute user manuals for the '143 Patent Infringing Products that provide instructions and/or encourage infringing use, and offer support and/or technical assistances to their customers that provide instructions on and/or encourage infringing use.

55. Defendants encourage and facilitate their customers to infringe the '143 Patent by promoting the '143 Patent Infringing Products, for example, stating on their website that "[w]ith the advanced imaging technology powered by years of expertise, Sony's image sensors make sure the moment is not missed. It opens up new possibilities to smartphone photography."[27]

56. Defendants' customers that incorporate the '143 Patent Infringing Products into other products (e.g., smartphones, vehicles, etc.) as well as the end users of those products, each directly infringe the Asserted Patents pursuant to Sony's instructions and advertisements.

[27] https://www.sony-semicon.co.jp/e/products/IS/mobile/ (last visited Apr. 26, 2022).

VI. COUNT III: INFRINGEMENT OF '366 PATENT

57. VisionX incorporates each of the allegations of paragraphs 1-53 above.

58. Defendants have directly infringed and continue to directly infringe the '366 Patent by, for example, making, using, offering to sell, selling, and/or importing into the United States, without authority, products that practice one or more claims of the '366 Patent.

59. Defendants are not licensed or otherwise authorized to make, use, offer for sale, sell or import any products that embody the inventions of the '366 Patent in the United States.

60. Defendants have and continue to directly infringe one or more claims of the '366 Patent, including, for example, claim 1 of the '366 Patent, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States infringing image sensors without authority and in violation of 35 U.S.C. § 271.

61. With respect to the '366 Patent, Defendants' infringing products include, for example, the Sony IMX278, the Sony chip used in the Apple iPhone 7, as well as any other Sony chips in various camera modules that may or may not have Sony part numbers, but are made by Sony with a similar structure (collectively, the "'366 Patent Infringing Products").

62. For example, the Sony IMX278 infringes representative claim 1 of the '366 Patent. On information and belief, the remaining '366 Patent Infringing Products infringe representative claim 1 of the '366 Patent in the same manner.

63. Claim 1 of the '366 Patent claims an image sensor, comprising: a second semiconductor substrate including a second metal interconnection and a second interlayer dielectric; a second via penetrating the second interlayer dielectric so that the second via is connected to the second metal interconnection; a first semiconductor substrate on the second interlayer dielectric, the first semiconductor substrate having a unit pixel; a pre-metal dielectric on the first semiconductor substrate; a first via penetrating the pre-metal dielectric and the first

semiconductor substrate, the first via being connected to the second via; a first interlayer dielectric on the pre-metal dielectric including the first via; a first metal interconnection on the first interlayer dielectric and connected to the first via and the unit pixel; a conductive barrier layer on the first metal interconnection; and a color filter and a microlens on the first interlayer dielectric on the unit pixel.

64. The Sony IMX278 chip includes a CIS die stacked on an ISP die. Figure 6 (below) illustrates an exemplary cross-section of the stacked CIS and ISP dies.

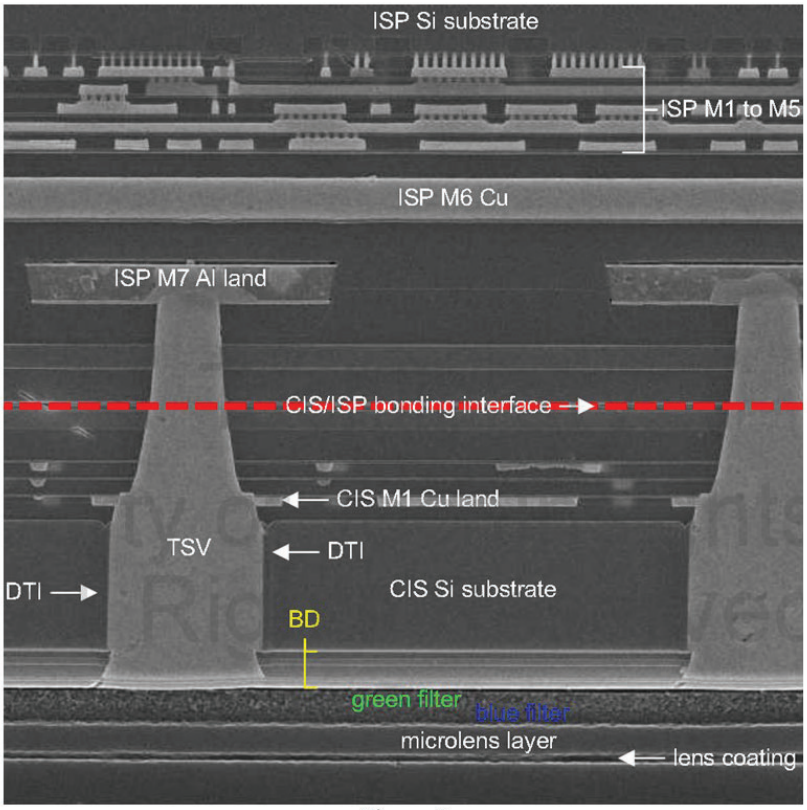


Figure 6

65. The CIS and ISP dies are electrically connected by two vias corresponding to two distinct holes: a first via corresponding to a wider hole reaching to CIS metal level one (CIS M1), and a second via corresponding to a narrower hole reaching to ISP metal level seven (ISP M7). In Figure 7 (below), the first via and the second via are colored green and yellow, respectively.

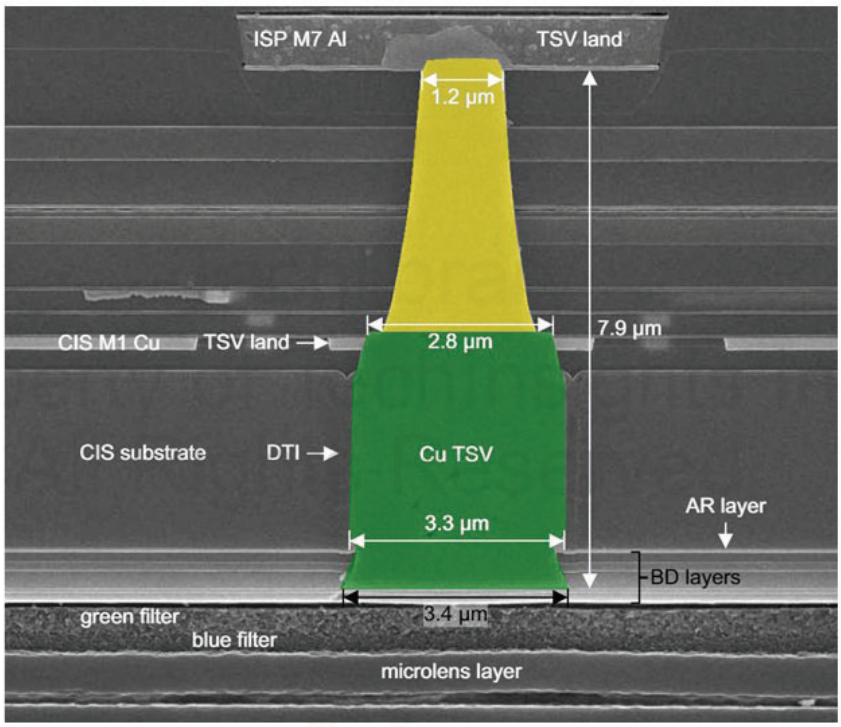
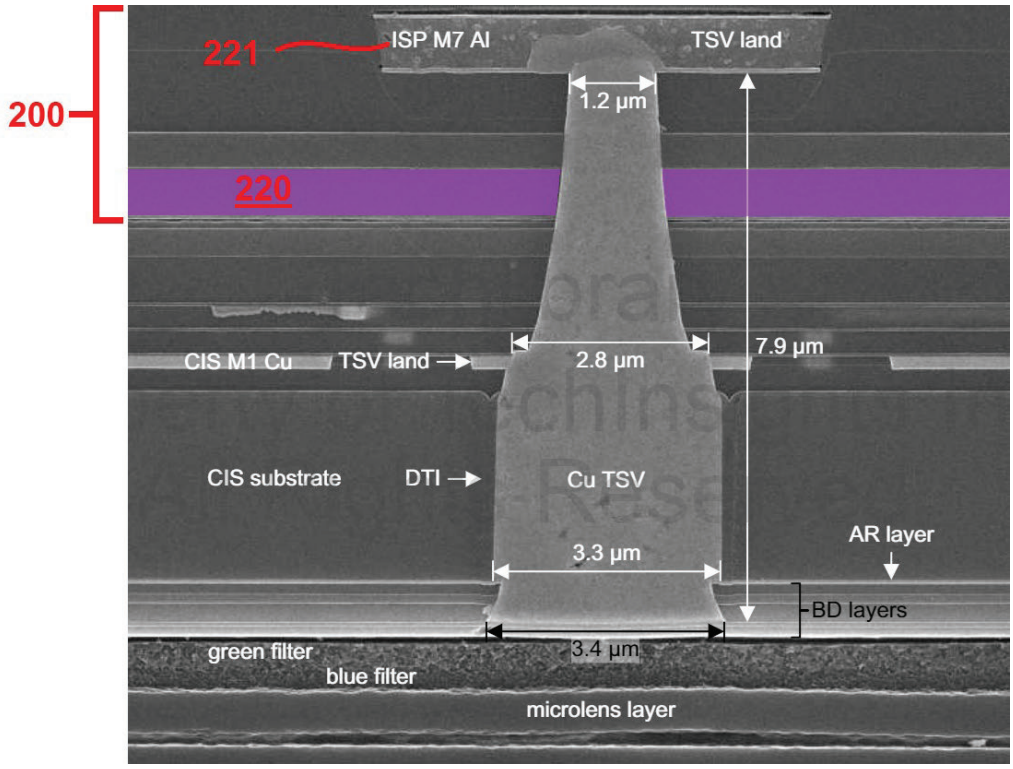
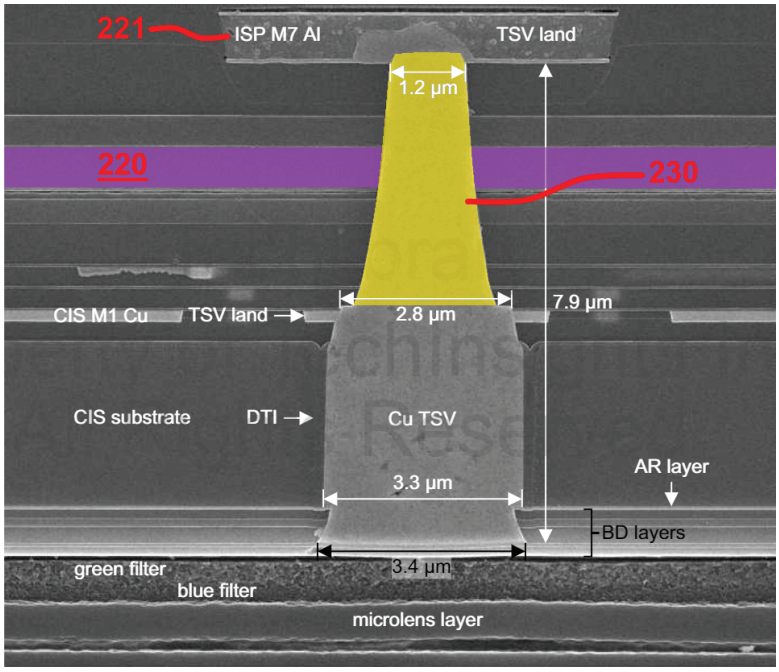


Figure 7

66. As shown in the table below, the Sony IMX278 infringes representative claim 1 of the '366 Patent:

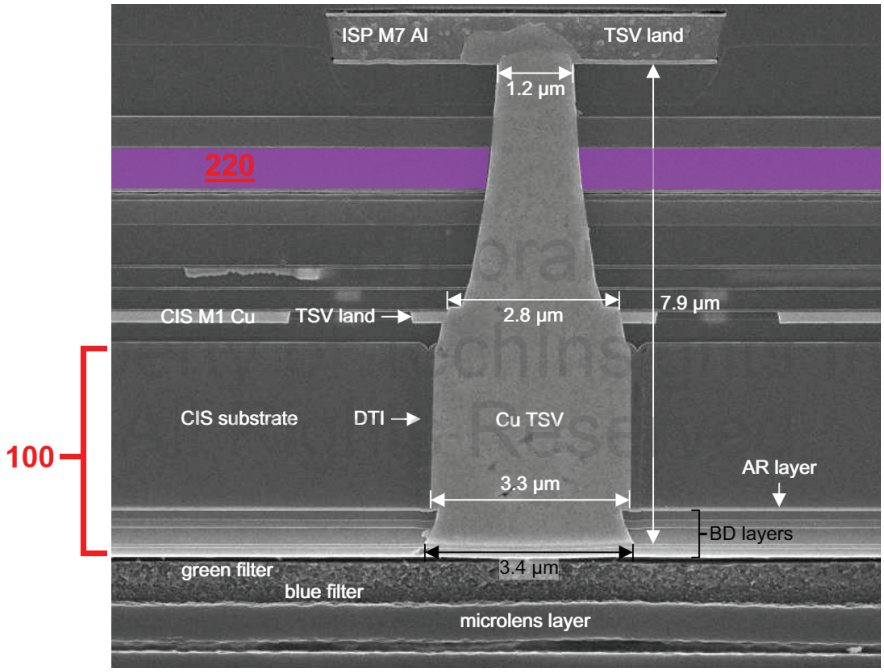
Element 1a: "a second semiconductor substrate including a second metal interconnection and a second interlayer dielectric;"
The Sony IMX278 comprises a second semiconductor substrate (labeled 200); which includes a second metal interconnection (labeled 221) and a second interlayer dielectric (purple, labeled 220).

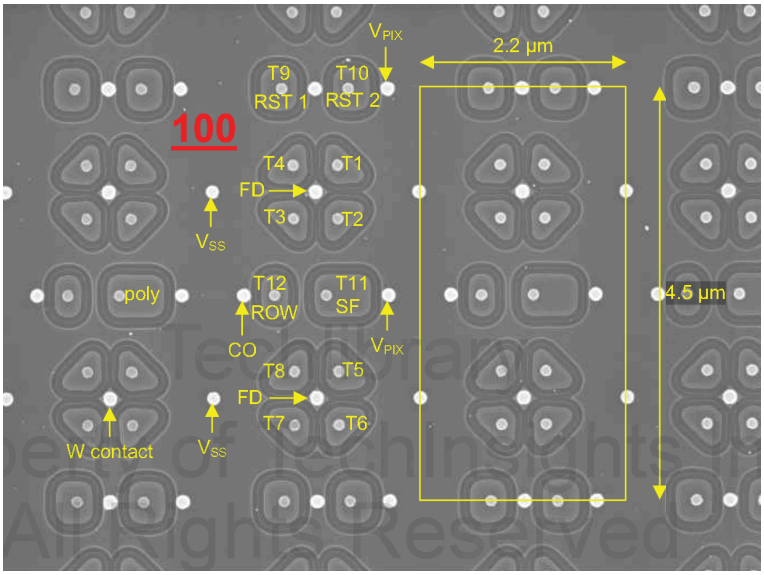


Element 1b: "a second via penetrating the second interlayer dielectric so that the second via is connected to the second metal interconnection;"
A second via (yellow, labeled 230) penetrates the second interlayer dielectric 220. The second via 230 is connected to the second metal interconnection 221. 

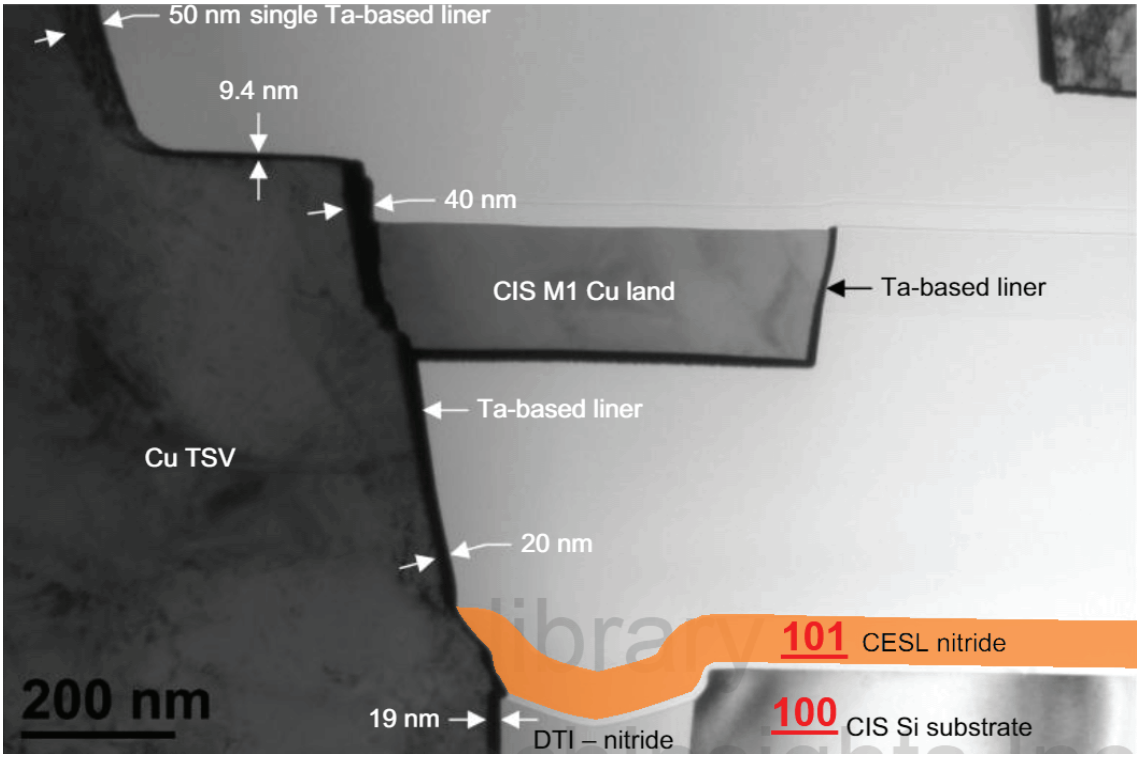
Element 1c: "a first semiconductor substrate on the second interlayer dielectric, the first semiconductor substrate having a unit pixel;"

A first semiconductor substrate (labeled 100) is on the second interlayer dielectric 220 (other interlayer dielectric(s) may additionally or alternatively correspond to the claimed "second interlayer dielectric," since first semiconductor substrate 100 is also on the other interlayer dielectric(s)). The first semiconductor substrate 100 includes pixels . In the second image below, a group of pixels is outlined in yellow.



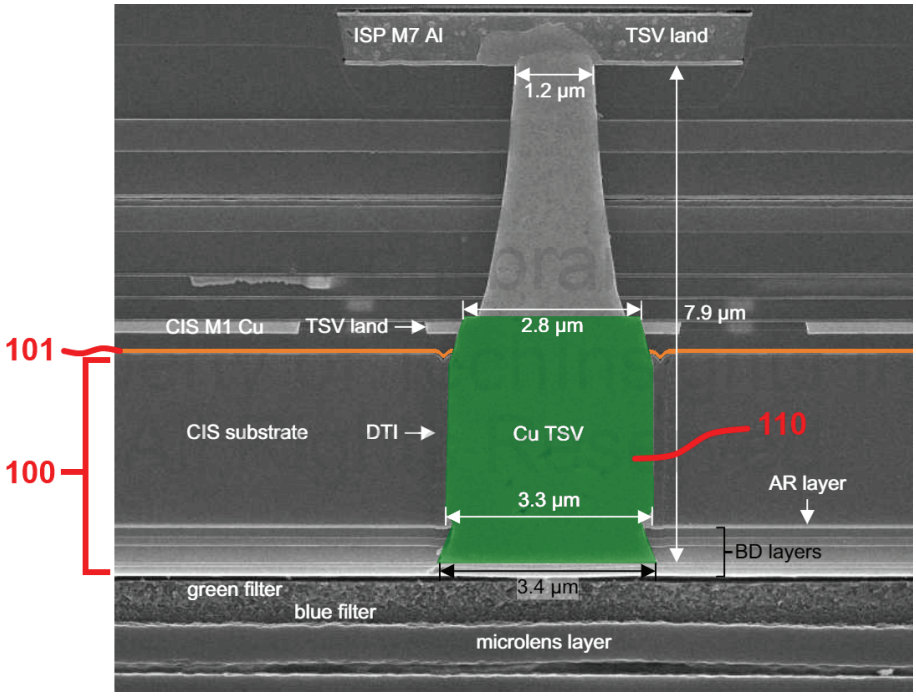


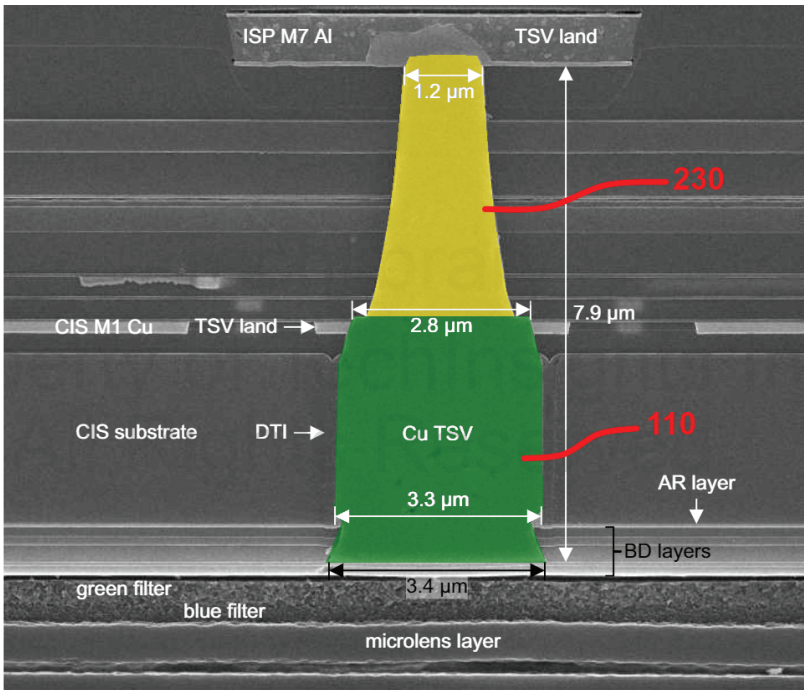
Element 1d: "a pre-metal dielectric on the first semiconductor substrate;"
A pre-metal dielectric (orange, labeled 101) is on the first semiconductor substrate 100.



Element 1e: "a first via penetrating the pre-metal dielectric and the first semiconductor substrate, the first via being connected to the second via;"

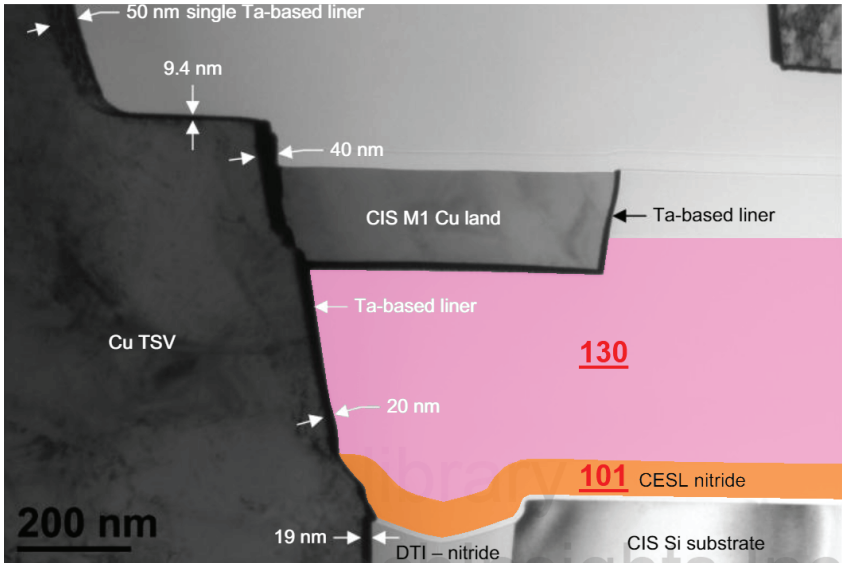
A first via (green, labeled 110) penetrates the pre-metal dielectric 101 and the first semiconductor substrate 100, and is connected to the second via 230.





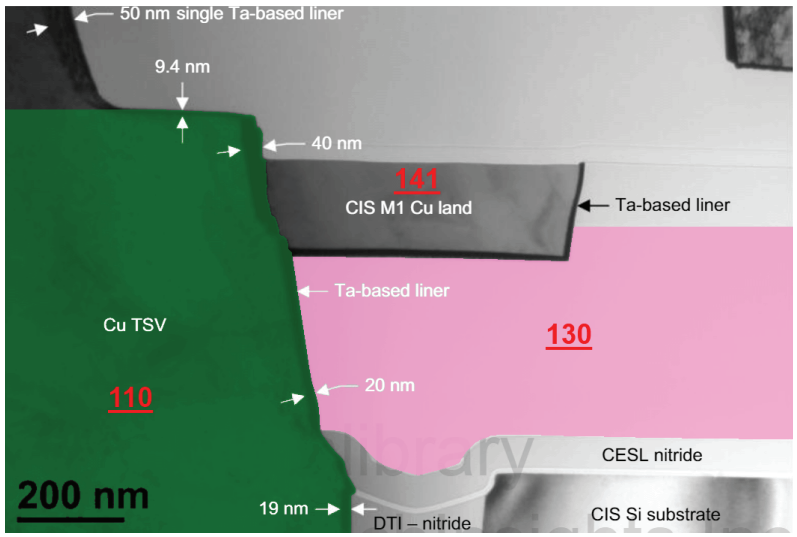
Element 1f: "a first interlayer dielectric on the pre-metal dielectric including the first via;"

A first interlayer dielectric (pink, labeled 130) is on the pre-metal dielectric 101 including the first via.



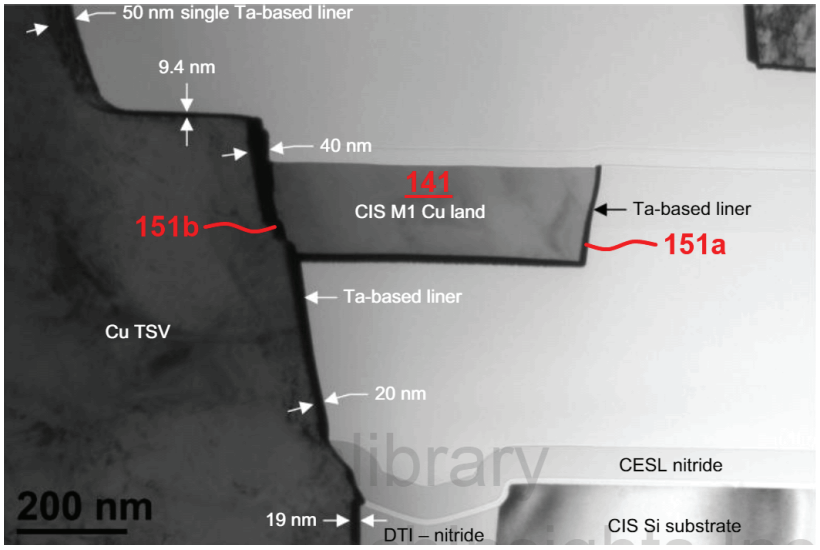
Element 1g: "a first metal interconnection on the first interlayer dielectric and connected to the first via and the unit pixel;"

A first metal interconnection (labeled 141) is on the first interlayer dielectric 130 and is connected to the first via 110. The first metal interconnection 141 is also connected to a pixel.



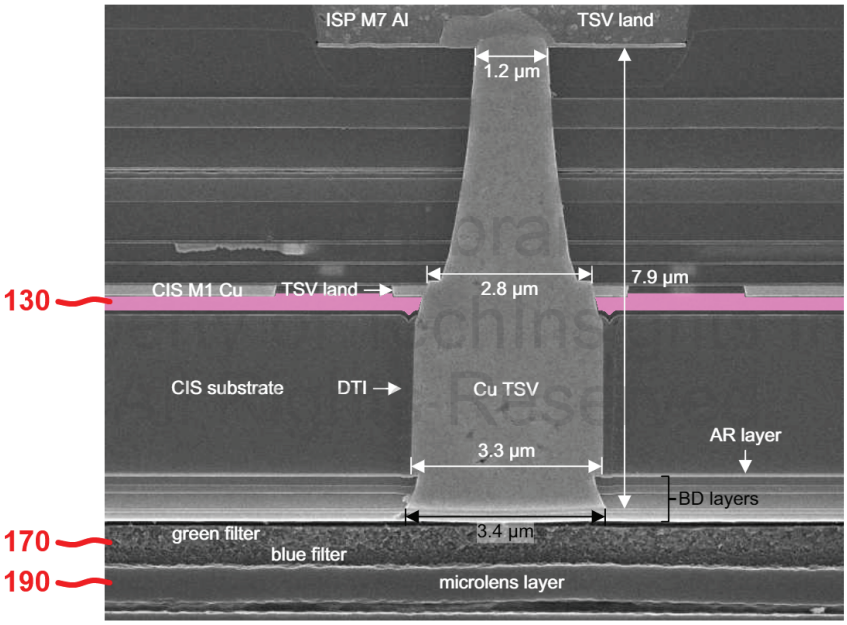
Element 1h: "a conductive barrier layer on the first metal interconnection; and"

A conductive barrier layer (labeled 151a and labeled 151b) is on the first metal interconnection 141.



Element 1i: "a color filter and a microlens on the first interlayer dielectric on the unit pixel."

A color filter layer (labeled 170) for the pixels is on first interlayer dielectric 130. A microlens layer (labeled 190) for the pixels is also on first interlayer dielectric 130.



67. Defendants indirectly infringe the '366 Patent.

68. Defendants have and continue to indirectly infringe one or more claims of the '366 Patent by knowingly and intentionally inducing others to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling and/or importing into the United States infringing products that incorporate and/or use the '366 Patent Infringing Products. Defendants induce direct infringement of the '366 Patent by customers, importers, sellers, resellers, and/or end users of the '366 Patent Infringing Products. On information and belief, the direct infringers include, for example, BLU Products,[28] Huawei Technologies Co., Ltd.[29], Guangdong Oppo Mobile Telecommunications Corp., Ltd.[30] and Meizu Technology Co., Ltd..[31]

69. Defendants Sony Corporation, Sony Group Corporation, and Sony Semiconductor Solutions Corporation had actual knowledge of the '366 Patent and that the '366 Patent Infringing Products infringe that patent at least as of May 25, 2022. Accordingly, at least as of May 25, 2022, Defendants Sony Corporation, Sony Group Corporation, and Sony Semiconductor Solutions Corporation were on notice, knew and/or should have known that their actions induced direct infringement by third parties. Accordingly, at least as of May 25, 2022, Defendants Sony Corporation, Sony Group Corporation, and Sony Semiconductor Solutions Corporation induced infringement by third party direct infringers and should have known that their actions would induce actual infringement.

70. Defendant Sony Semiconductor Manufacturing Corporation had actual knowledge of the '366 Patent and that the '366 Patent Infringing Products infringe that patent at least as of

[28] https://www.bluproducts.com/news/2018-pure-view.html (last visited Apr. 28, 2022).
[29] https://www.techinsights.com/products/ipr-1505-801 (last visited Apr. 27, 2022).
[30] https://www.gsmarena.com/oppo_r7_plus-review-1305p8.php (last visited Apr. 27, 2022).
[31] (https://www.jpnn.com/news/meizu-luncurkan-3-ponsel-anyar-sekaligus-berikut-harganya?page=2 (last visited May 22, 2022).

May 26, 2022. Accordingly, at least as of May 26, 2022, Defendant Sony Semiconductor Manufacturing Corporation was on notice, knew and/or should have known that its actions induced direct infringement by third parties. Accordingly, at least as of May 26, 2022, Defendant Sony Semiconductor Manufacturing Corporation induced infringement by third party direct infringers and should have known that its actions would induce actual infringement.

71. Additionally, at the very least Defendants had actual knowledge of the '366 Patent and their infringement of the same as of the date of this Complaint.

72. Defendants induced infringement by others with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others infringe the '366 Patent, but while at best, remaining willfully blind to the infringement.

73. On information and belief, Defendants advertise the '366 Patent Infringing Products, publish specifications and promotional literature encouraging customers to implement and incorporate the '366 Patent Infringing Products into end user products, create and/or distribute user manuals for the '366 Patent Infringing Products that provide instructions and/or encourage infringing use, and offer support and/or technical assistances to their customers that provide instructions on and/or encourage infringing use.

74. Defendants encourage and facilitate their customers to infringe the '366 Patent by promoting the '366 Patent Infringing Products, for example, stating on their website that "[w]ith the advanced imaging technology powered by years of expertise, Sony's image sensors make sure the moment is not missed. It opens up new possibilities to smartphone photography."[32]

75. Defendants' customers that incorporate the '366 Patent Infringing Products into other products (e.g., smartphones, vehicles, etc.) as well as the end users of those products, each

[32] https://www.sony-semicon.co.jp/e/products/IS/mobile/ (last visited Apr. 26, 2022).

directly infringe the Asserted Patents pursuant to Sony's instructions and advertisements.

JURY DEMAND

76. VisionX hereby demands a trial by jury on all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, VisionX requests entry of judgment in its favor and against Defendants as follows:

a) A declaration that Defendants have directly infringed one or more claims of the Asserted Patents, either literally or under the doctrine of equivalents;

b) A declaration that Defendants have induced infringement and/or are inducing infringement of one or more claims of the Asserted Patents, either literally or under the doctrine of equivalents;

c) An award of damages pursuant to 35 U.S.C. § 284 adequate to compensate VisionX for Defendants' infringement of the Asserted Patents in an amount according to proof at trial (together with prejudgment and post-judgment interest), but no less than a reasonable royalty;

d) An award of costs and expenses pursuant to 35 U.S.C. § 284 or as otherwise permitted by law; and

e) Such other and further relief, whether legal, equitable, or otherwise, to which VisionX may be entitled or which this Court may order.

Dated: May 26, 2022

Respectfully submitted,

/s/ Amir Alavi

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