

1 RUSS, AUGUST & KABAT
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7

8 **UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA**

9 LONGITUDE LICENSING LIMITED,

10 Plaintiff,

11 v.

12 HP INC.,

13 Defendant.
14

Case No

**COMPLAINT FOR PATENT
INFRINGEMENT**

JURY TRIAL DEMANDED

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1 1. Plaintiff Longitude Licensing Limited (“Longitude” or “Plaintiff”) for its
2 Complaint against Defendant HP Inc. (“HP” or “Defendant”) hereby alleges as
3 follows:

4 **PARTIES**

5 2. Longitude is an entity formed under the laws of Ireland with its principal place
6 of business at Plaza 255 Suite 2A, Blanchardstown Corporate Park 2, Dublin D15
7 YH6H, Ireland.

8 3. On information and belief, Defendant HP Inc. is a Delaware
9 corporation with its principal place of business at 1051 Page Mill Road, Palo Alto,
10 California 94304.

11 **NATURE OF THE ACTION**

12 4. This is a civil action for the infringement of United States Patent Nos.
13 7,697,369 (the “’369 patent”), 9,379,233 (the “’233 patent”), and RE43,539 the
14 “’539 Patent) (collectively, the “Patents-in-Suit”) under the patent laws of the United
15 States, 35 U.S.C. § 1, et seq.

16 5. This action involves Defendant’s manufacture, use, sale, offer for sale, and/or
17 importation into the United States of infringing products, methods, processes,
18 services and systems that incorporate certain memory chips and components that
19 infringe one or more of the claims of the Patents-in-Suit.

20 **JURISDICTION AND VENUE**

21 6. This Court has original jurisdiction over the subject matter of this Complaint
22 under 28 U.S.C. §§ 1331 and 1338(a) because this action arises under the patent laws
23 of the United States, including 35 U.S.C. §§ 271, et seq.

24 7. Defendant is subject to personal jurisdiction in this judicial district because
25 Defendant regularly transacts business in this judicial district by, among other
26 things, offering Defendant’s products and services to customers, business affiliates
27 and partners located in this judicial district. In addition, Defendant has committed
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1 acts of direct infringement of one or more of the claims of one or more of the Patents-
2 in-Suit in this judicial district.

3 8. Venue in this district is proper under 28 U.S.C. §§ 1400(b) and 1391(b)
4 and (c), because Defendant is subject to personal jurisdiction in this district and has
5 committed acts of infringement in this district. Longitude is informed and believes
6 that Defendant has a regular and established place of business in this District. Among
7 other things, Defendant currently solicits job postings for locations within this
8 District, including for a regional account manager in Fountain Valley and a service
9 delivery manager in Glendale.

10 **FACTUAL BACKGROUND**

11 9. Longitude operates in one of the most dynamic segments of the international
12 knowledge-based economy. Longitude operates by partnering with patent owners to
13 prosecute and license patent portfolios. The company has also formed customized
14 arrangements that combine exclusive licensing rights and ownership positions, and
15 it also has acquired patents outright from other global patent owners. Longitude has
16 the licensing rights to portfolios totaling nearly 4,000 semiconductor and computer
17 memory patents and patent applications originally filed by well-known technology
18 companies.

19 10. Longitude is the owner by assignment of the patents-in-suit.

20 11. Longitude has licensed the patents-in-suit to a majority of the worldwide
21 memory industry responsible for solid state memory devices used in products sold
22 in the United States, including SK Hynix, Kingston, Winbond, Micron, Samsung
23 Electronics and Kioxia (formerly the memory division of Toshiba).

24 12. One major player in the industry that has refused to license the Patent-in-Suit
25 is Western Digital Corporation (“Western Digital”). Western Digital is a computer
26 hard disk drive manufacturer and data storage company. Western Digital designs,
27 manufactures, and sells data technology products, including storage devices, data
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1 center systems, and cloud storage services. Longitude is informed and believes that
2 Western Digital acquired SanDisk in 2016.

3 13. Since February 2018, Longitude has requested that Western Digital negotiate
4 licenses for patents (including the Patents-in-Suit) that it is infringing, but Western
5 Digital has refused to negotiate, claiming that Longitude may not assert its licensing
6 rights as a result of covenants in two contracts between Western Digital and third
7 parties that have never owned any of the patents-in-suit. Those contracts do not
8 apply to Longitude, but Western Digital nonetheless contended that it could only be
9 sued after every other market participant (apparently including Western Digital's
10 customers) was sued.

11 14. Longitude initiated an arbitration claim against Western Digital for
12 declaratory relief concerning Western Digital's interpretation of the agreements.
13 Western Digital objected to the jurisdiction of the arbitration tribunal to avoid any
14 consideration of the merits of contract arguments.

15 15. After the arbitration against Western Digital was dismissed on jurisdictional
16 grounds, Longitude gave notice to Defendant that it was infringing the patents-in-
17 suit by letter dated September 6, 2022. This letter included a table that identified a
18 number of products that were believed to infringe the patents. Among other things,
19 the letter stated:

20 A number of HP products incorporate and use features and
21 functionality covered by Longitude patents, including, for example,
22 the patents and exemplary products identified in the attached table
23 ("Table 1"). In reviewing the Table, you will note that the infringing
24 products contain devices manufactured by Western Digital
25 Corporation ("Western Digital"). While our normal approach is to
26 engage with, and license, suppliers such as Western Digital rather than
27 their customers, Western Digital has refused to engage in any
28 licensing discussions. Consequently, we are contacting Western
Digital customers who are selling products that infringe Longitude
patents.

16. Defendant did not take a license following receipt of this letter and continued
to infringe as stated in the letter. As of the filing of this Complaint, Defendant has
not responded in any manner to Longitude.

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1 17. Among the other products referenced in the letter was the HP laptop computer
2 as well as numerous other HP computers, laptops, and tablets having Western Digital
3 SSDs.

4 **THE PATENTS-IN-SUIT**

5 18. Longitude is the owner by assignment of the Patents-in-Suit. Longitude owns
6 all rights to the Patents-in-Suit, including the right to enforce the Patents-in-Suit.

7 19. All maintenance fees for the Patents-in-Suit have been timely paid, and there
8 are no fees currently due.

9 20. United States Patent No. 7,697,369, entitled "System with Controller and
10 Memory," issued on April 13, 2010 from United States Patent Application No.
11 11/759,862 filed on June 7, 2007.

12 21. United States Patent No. RE43,539, entitled "Output Buffer Circuit and
13 Integrated Semiconductor Circuit Device With Such Output Buffer Circuit," issued
14 on July 24, 2012 from United States Patent Application No. 11/798,773 filed on May
15 16, 2007. The '539 Patent is a re-issue of U.S. Patent No. 6,894,547, which issued
16 on May 17, 2005 from United States Patent Application No. 10/320,059 filed
17 December 16, 2002.

18 22. United States Patent No. 9,379,233, entitled "Semiconductor Device," issued
19 on June 28, 2016 from United States Patent Application No. 14/872,844 filed
20 October 1, 2015.

21 **COUNT I**

22 **(DEFENDANT'S INFRINGEMENT OF THE '369 PATENT)**

23 23. Paragraphs 1 through 22 are incorporated by reference as if fully restated
24 herein.

25 24. United States Patent No. 7,697,369, entitled "System with Controller and
26 Memory," issued on April 13, 2010 from United States Patent Application No.
27 11/759,862 filed on June 7, 2007.

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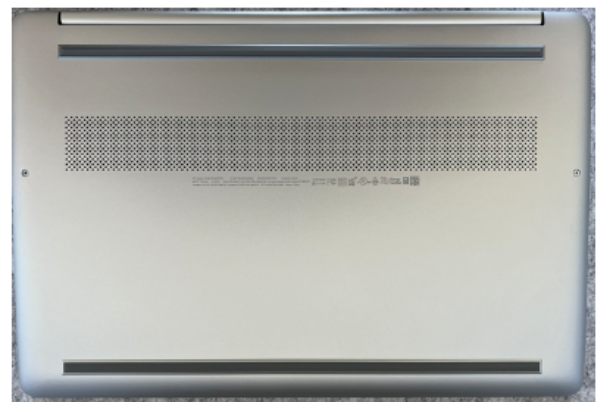
1 25.Longitude is the owner of the '369 patent with full rights to pursue recovery
2 of royalties for damages for infringement, including full rights to recover past and
3 future damages.

4 26.Each claim of the '369 patent is valid, enforceable, and patent-eligible.

5 27.Longitude and its predecessors in interest have satisfied the requirements of
6 35 U.S.C. § 287(a) with respect to the '369 patent, and Longitude is entitled to
7 damages for Defendant's past infringement. Among other things, Longitude
8 provided actual notice of infringement to the component supplier, Western Digital.

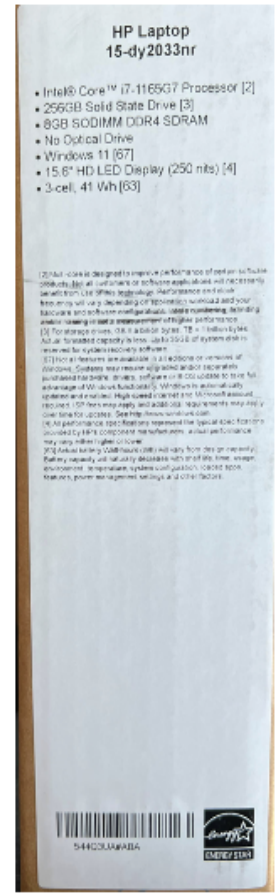
9 28.Defendant has directly infringed (literally and equivalently) and induced
10 others to infringe the '369 patent by making, using, selling, offering for sale, or
11 importing products that infringe the claims of the '369 patent and by inducing others
12 to infringe the claims of the '369 patent without a license or permission from
13 Longitude. These products include without limitation all HP laptop computers (e.g.,
14 model 15-dy2003nr), all other HP computers, laptops, and tablets having Western
15 Digital PC SN530 NVMe SSDs, Western Digital SSDs, and/or Western Digital
16 NAND memory chips and all versions and variations of them offered for sale since
17 the issuance of the '369 patent.

18 29.A non-limiting example of Defendant's infringement is the HP laptop (e.g.,
19 model 15-dy2033nr) computer which infringes at least claim 1 of the '369 patent.
20 Exemplary photographs of the HP laptop, and its packaging are set forth below:



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30. The HP laptop computer includes the Western Digital PC SN530 NVMe SSD as shown below:

1 31. Longitude is informed and believes that the Western Digital PC SN530 NVMe
2 SSD Operates in Compliance with the Open NAND Flash Interface Specification,
3 Revision 4.0 dated April 2, 2014 (ONFI Standard).

4 32. The Western Digital PC SN530 NVMe SSD is a system:

5 **A system [A]**



17 33. The Western Digital PC SN530 NVMe SSD includes a controller:

18 **a controller [B]**

19 SanDisk 20-82-10023-A1
20 SSD Controller



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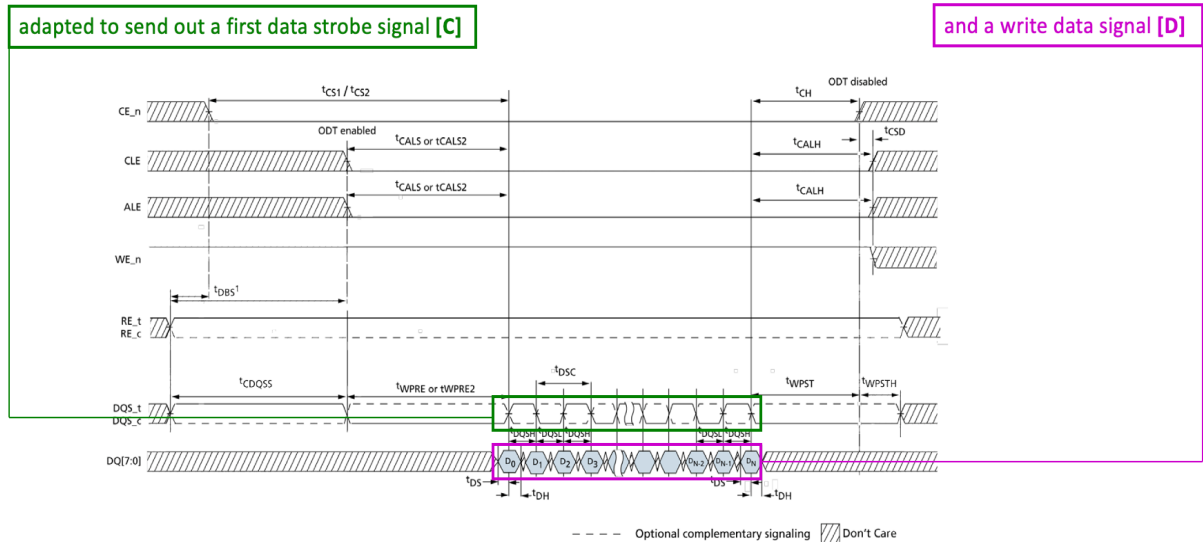
1 34.The Western Digital PC SN530 NVMe SSD includes a controller that is
 2 adapted to send out a first strobe signal and a write data signal in a write operation,
 3 the write data signal being synchronized with the first data strobe signal:
 4

Signal Name	Input / Output	Description
ALE_x	I	Address Latch Enable The Address Latch Enable signal is one of the signals used by the host to indicate the type of bus cycle (command, address, data). Refer to section 4.3.
WE_x_n	I	Write Enable The Write Enable signal controls the latching of commands, addresses, and input data in the SDR data interface. The Write Enable signal controls the latching of commands and addresses in the NV-DDR2 or NV-DDR3 data interface. Data, commands, and addresses are latched on the rising edge of WE_x_n. This signal shares the same pin as CLK_x in the NV-DDR data interface.
CLK_x	I	Clock The Clock signal is used as the clock in the NV-DDR data interface. This signal shares the same pin as WE_x_n in the SDR, NV-DDR2, and NV-DDR3 data interface.
WP_x_n	I	Write Protect The Write Protect signal disables Flash array program and erase operations. See section 2.19 for requirements.
IO0_0 – IO7_0 (DQ0_0 – DQ7_0)	I/O	I/O Port 0, bits 0-7 The I/O port is an 8-bit wide bidirectional port for transferring address, command, and data to and from the device. Also known as DQ0_0 – DQ7_0 for the NV-DDR, NV-DDR2, and NV-DDR3 data interfaces.
DQS	I/O	Data Strobe (True) The data strobe signal that indicates the data valid window for the NV-DDR and NV-DDR2 data interfaces.
DQS_x_c	I/O	Data Strobe Complement The Data Strobe Complement signal is the complementary signal to Data Strobe True, optionally used in the NV-DDR2 or NV-DDR3 data interface. Specifically, Data Strobe Complement has the opposite value of Data Strobe True when CE_n is low, i.e. if DQS_x_t is high then DQS_x_c is low; if DQS_x_t is low then DQS_x_c is high.
IO8 – IO15	I/O	I/O Port 0, bits 8-15 These signals are used in a 16-bit wide target configuration. The signals are the upper 8 bits for the 16-bit wide bidirectional port used to transfer data to and from the device. These signals are only used in the SDR data interface.

5 adapted to send out a first data strobe signal [C]

6 and a write data signal [D]

7 ONFI Standard at 30.



8 adapted to send out a first data strobe signal [C]

9 and a write data signal [D]

10 Figure 71 Data input cycle timing

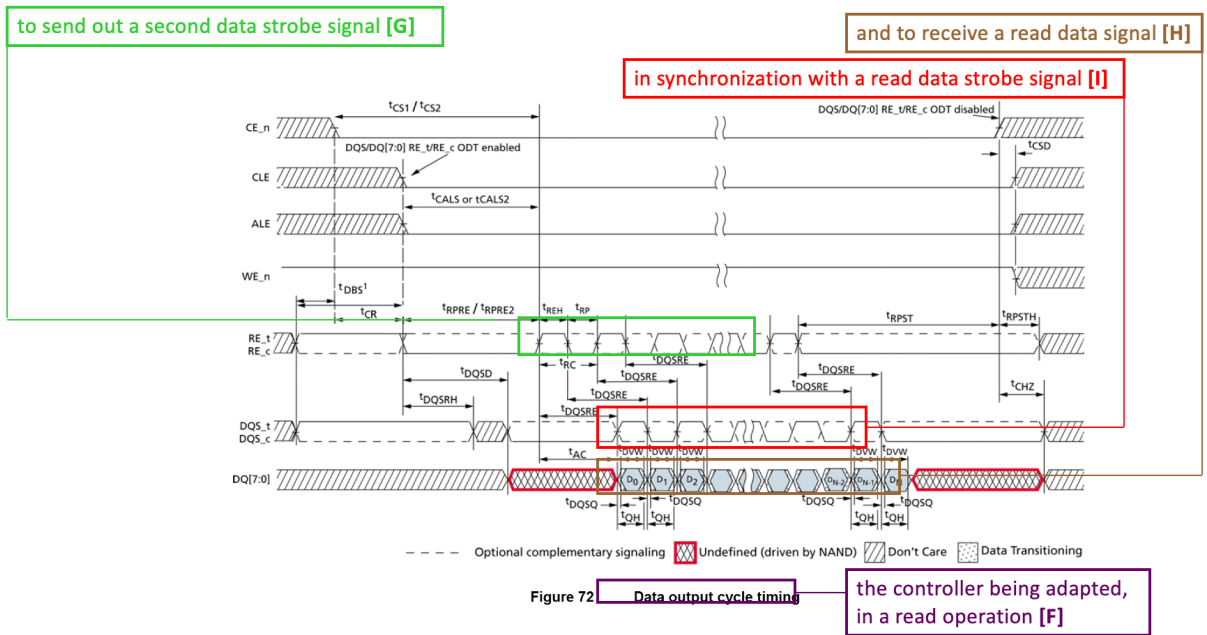
11 in a write operation, the write data signal being synchronized with the first data strobe signal [E]

12 ONFI Standard at 165.

13 35.The Western Digital PC SN530 NVMe SSD further includes a controller
 14 being adapted in a read operation to send out a second data strobe signal and to
 15 receive a read data signal in synchronization with a read strobe signal.
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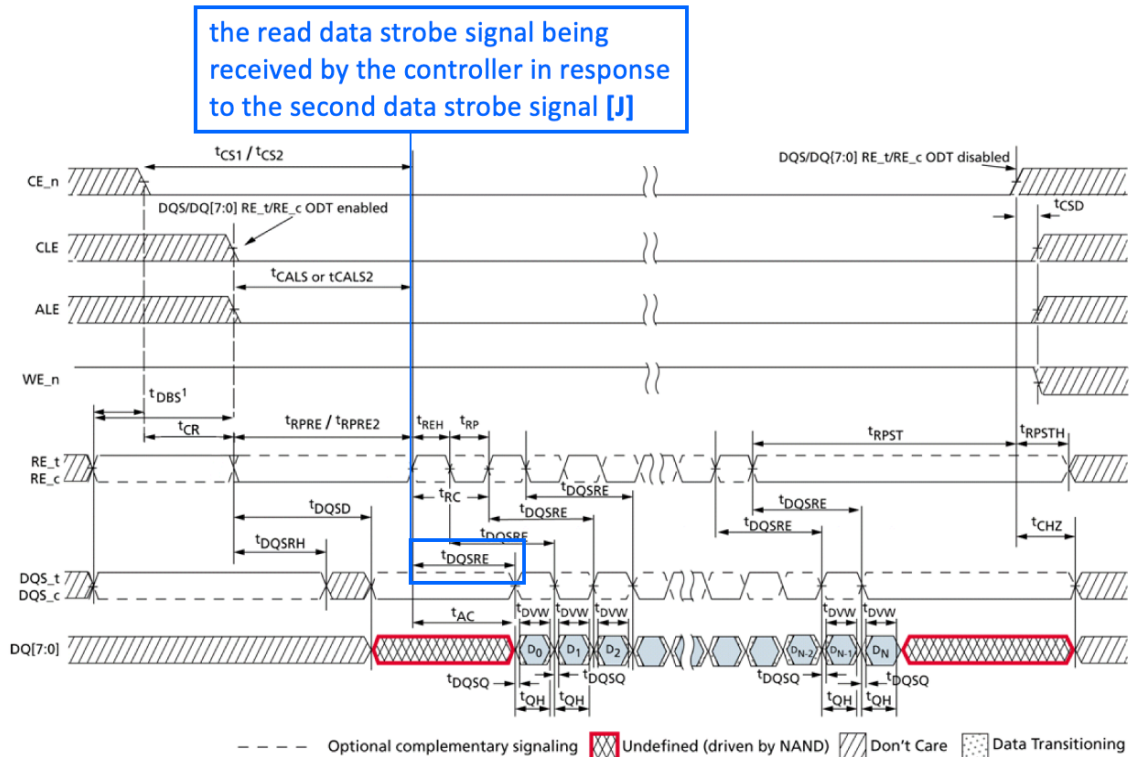
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ONFI Standard at 167.

36. The Western Digital PC SN530 NVMe SSD further includes the read strobe signal being received by the controller in response to the second data strobe signal:



ONFI Standard at 167.

37. The Western Digital PC SN530 NVMe SSD further includes a memory:

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38. The Western Digital PC SN530 NVMe SSD further includes a memory adapted to receive the write data signal in synchronization with the first data strobe signal in the write operation:

adapted to receive the write data signal in synchronization with the first data strobe signal in the write operation [L]

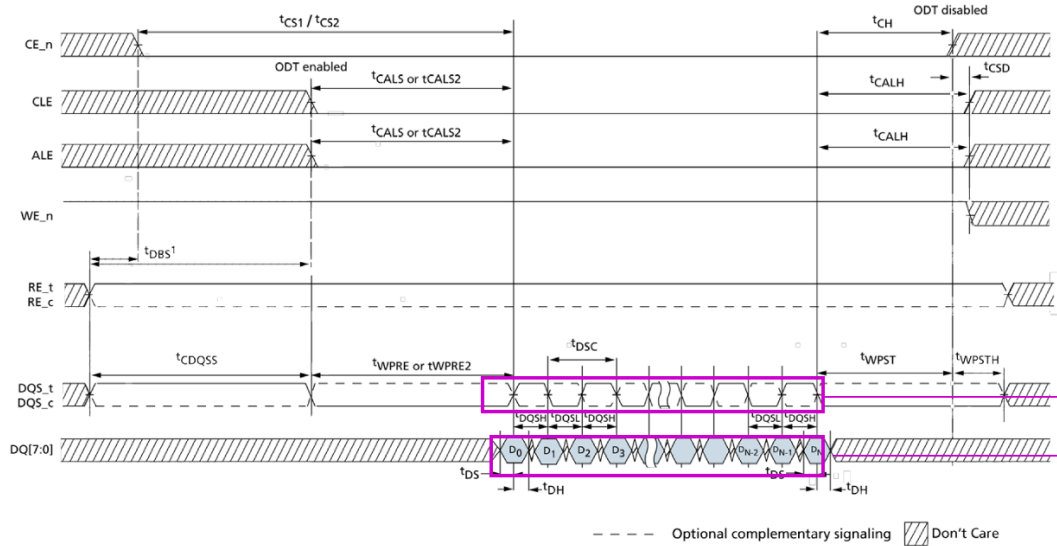


Figure 71 Data input cycle timing

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1 43. Defendant specifically intends its customers and/or end users infringe the ‘369
2 patent, either literally or by the doctrine of equivalents, because Defendant has
3 known about the ‘369 patent and how Defendant's products infringe the claims of
4 the ‘369 patent but Defendant has not taken steps to prevent infringement by its
5 customers and/or end users. Accordingly, Defendant has acted with the specific
6 intent to induce infringement of the ‘369 patent.

7 44. Accordingly, Defendant has induced, and continues to induce, infringement
8 of the ‘369 patent under 35 U.S.C. §271(b).

9 45. As discussed above, Defendant has had knowledge of and notice of the ‘369
10 patent and its infringement since at least September 6, 2022. Despite this
11 knowledge, Defendant continues to commit tortious conduct by way of patent
12 infringement.

13 46. Defendant has been and continues to infringe one or more of the claims of the
14 ‘369 patent through the aforesaid acts.

15 47. Defendant has committed these acts of infringement without license or
16 authorization.

17 48. Plaintiff is entitled to recover damages adequate to compensate for the
18 infringement.

19 49. Defendant has and continues to infringe the ‘369 patent, acting with an
20 objectively high likelihood that its actions constitute infringement of the ‘369
21 patent. Defendant has known or should have known of this risk at least as early as
22 September 6, 2022. Accordingly, Defendant’s infringement of the ‘369 patent has
23 been and continues to be willful.

24 **COUNT II**

25 **(DEFENDANT'S INFRINGEMENT OF THE '539 PATENT)**

26 50. Paragraphs 1 through 49 are incorporated by reference as if fully restated
27 herein.

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1 51. United States Patent No. RE43,539, entitled “Output Buffer Circuit and
2 Integrated Semiconductor Circuit Device With Such Output Buffer Circuit,” issued
3 on July 24, 2012 from United States Patent Application No. 11/798,773 filed on May
4 16, 2007. The ‘539 Patent is a re-issue of U.S. Patent No. 6,894,547, which issued
5 on May 17, 2005 from United States Patent Application No. 10/320,059 filed
6 December 16, 2002.

7 52. Longitude is the owner of the ‘539 patent with full rights to pursue recovery
8 of royalties for damages for infringement, including full rights to recover past and
9 future damages.

10 53. Each claim of the ‘539 patent is valid, enforceable, and patent-eligible.

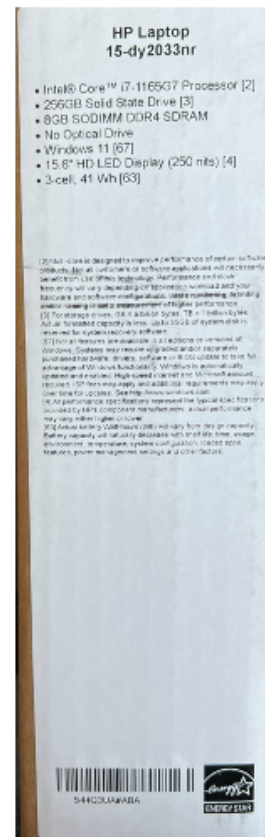
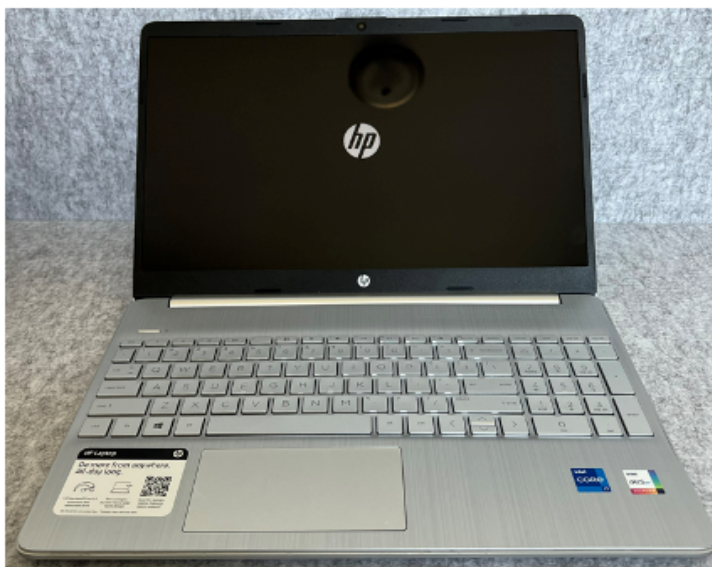
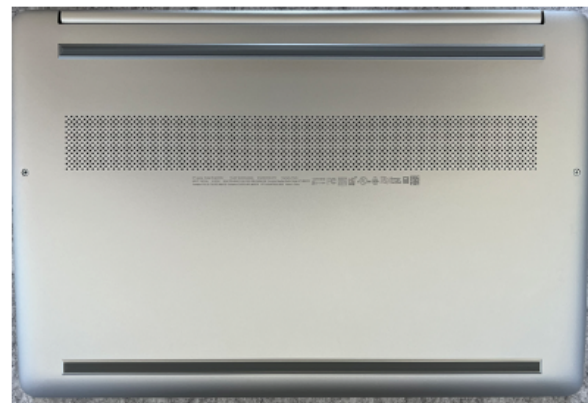
11 54. Longitude and its predecessors in interest have satisfied the requirements of
12 35 U.S.C. § 287(a) with respect to the ‘539 patent, and Longitude is entitled to
13 damages for Defendant’s past infringement. Among other things, Longitude
14 provided actual notice of infringement to the component supplier, Western Digital.

15 55. Defendant has directly infringed (literally and equivalently) and induced
16 others to infringe the ‘539 patent by making, using, selling, offering for sale, or
17 importing products that infringe the claims of the ‘539 patent and by inducing others
18 to infringe the claims of the ‘539 patent without a license or permission from
19 Longitude. These products include without limitation all HP laptop computers (e.g.,
20 model 15-dy2003nr), all other HP computers, laptops, and tablets having Western
21 Digital PC SN530 NVMe SSDs, Western Digital SSDs, and/or Western Digital
22 NAND memory chip and all versions and variations of them offered for sale since
23 the issuance of the ‘369 patent.

24 56. A non-limiting example of Defendant’s infringement is the HP laptop (e.g.,
25 model 15-dy2003nr) computer which infringes at least claim 1 of the ‘539 patent.
26 Exemplary photographs of the HP laptop, and its packaging are set forth below:
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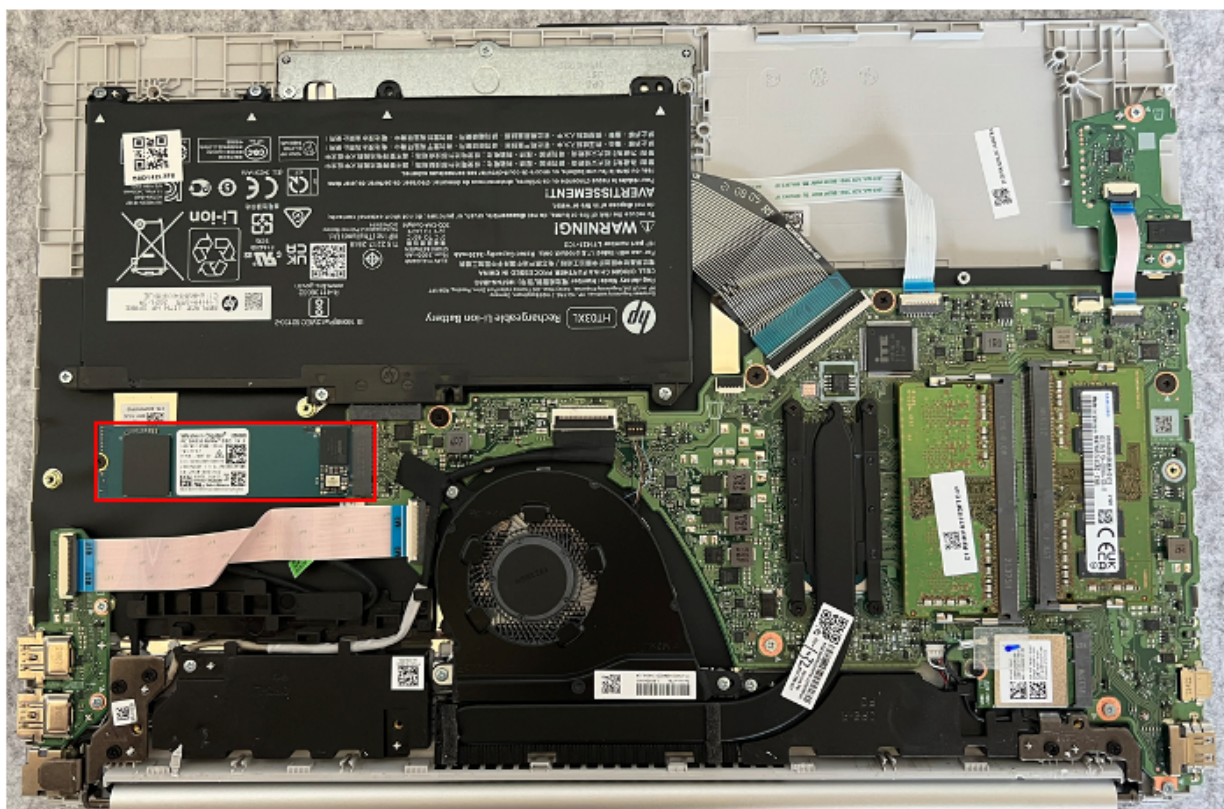
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57. The HP laptop includes the Western Digital PC SN530 NVMe SSD as shown below:

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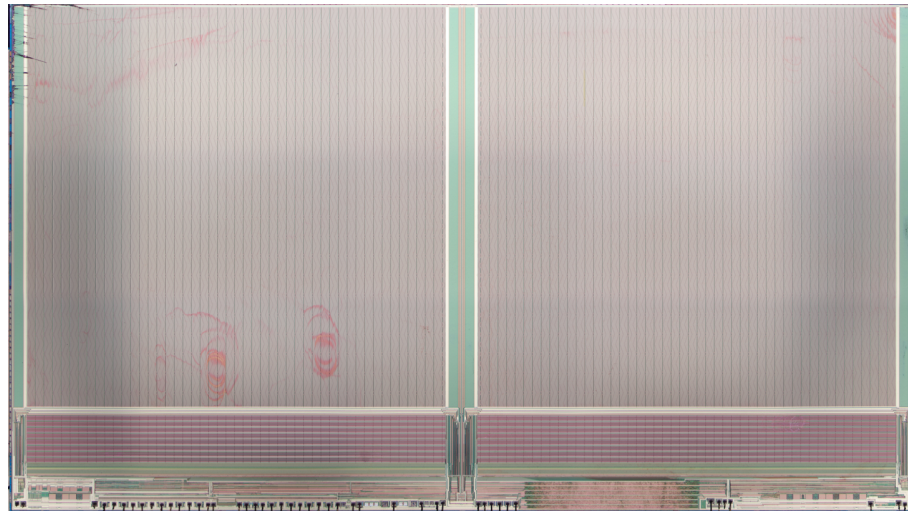


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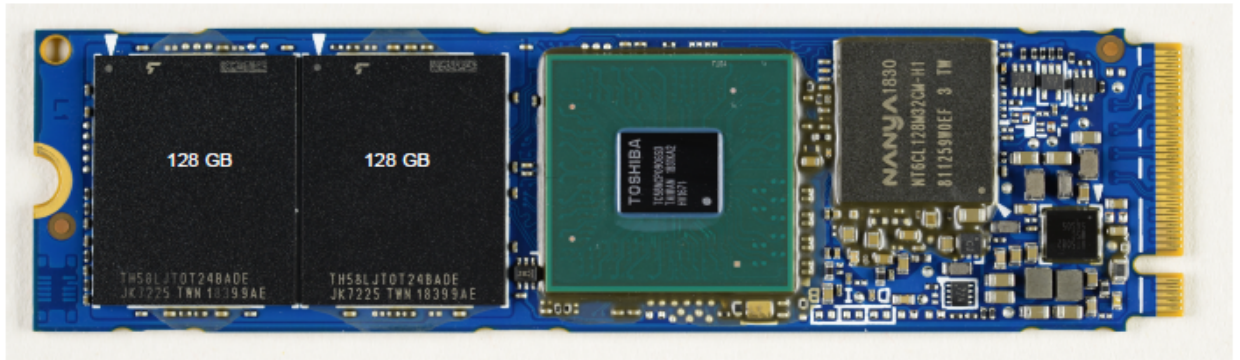
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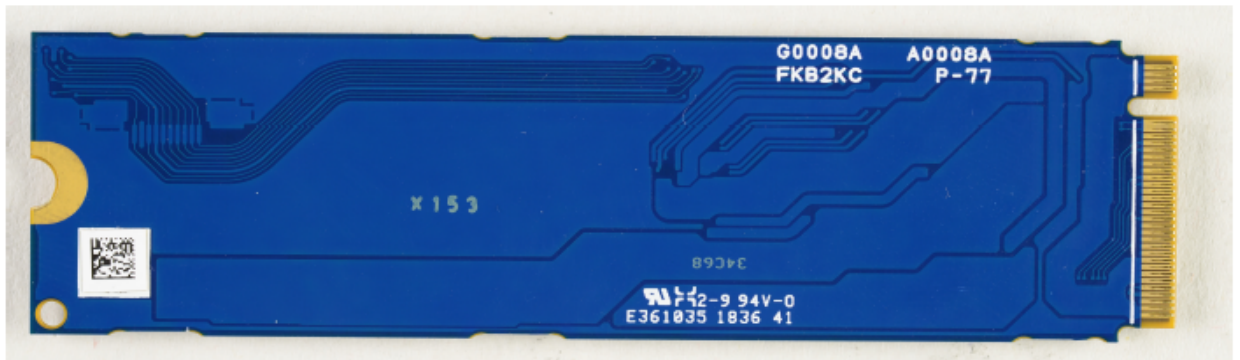
58. The below image shows the pin layout and corners of the SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD:



59. On information and belief, the Western Digital PC SN530 NVMe SSD used in the HP laptop computer is substantially similar to the Toshiba KXG60ZNV256G SSD Package (“Toshiba SSD”) for all matters relevant to this complaint. The Toshiba SSD is depicted below:

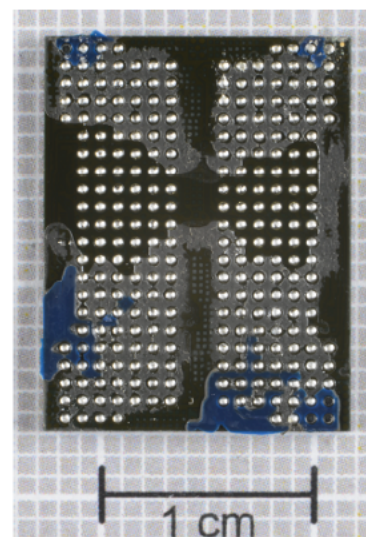


Toshiba KXG60ZNV256G SSD Package – Top



Toshiba KXG60ZNV256G SSD Package – Bottom

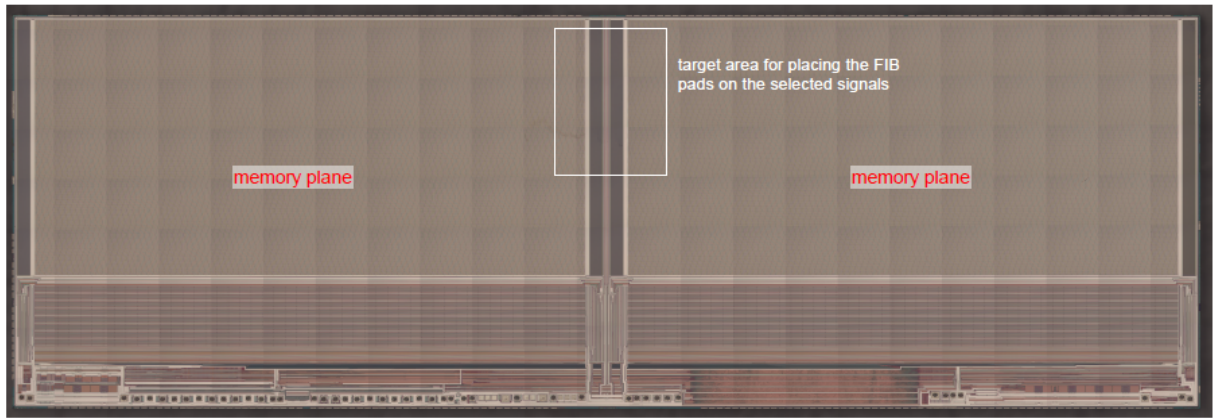
60. The memory chip of the Toshiba SSD, the Toshiba TH58LJT0T24BADE Package is depicted in the images below:



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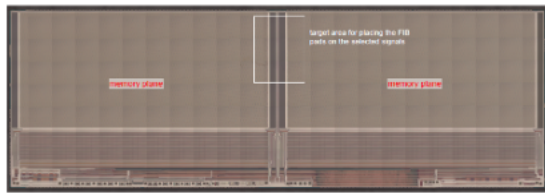
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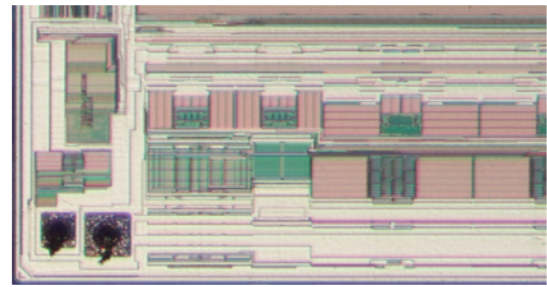
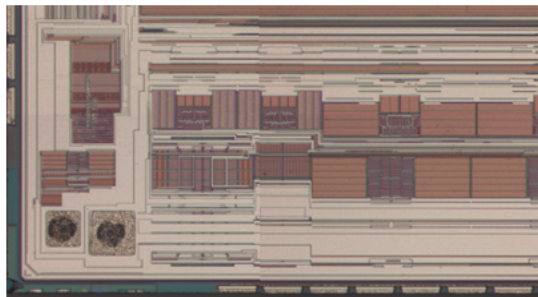
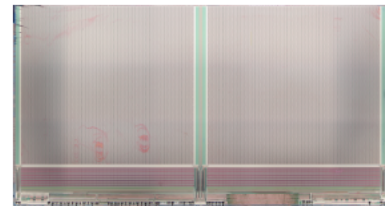


Toshiba 256 Gb 96L 3D NAND Flash Memory Die Photograph

61. A side-by-side comparison of the SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD and the Toshiba TH58LJT0T24BADE Package used in the Toshiba SSD is depicted below:



Toshiba 256 Gb 96L 3D NAND Flash Memory Die Photograph

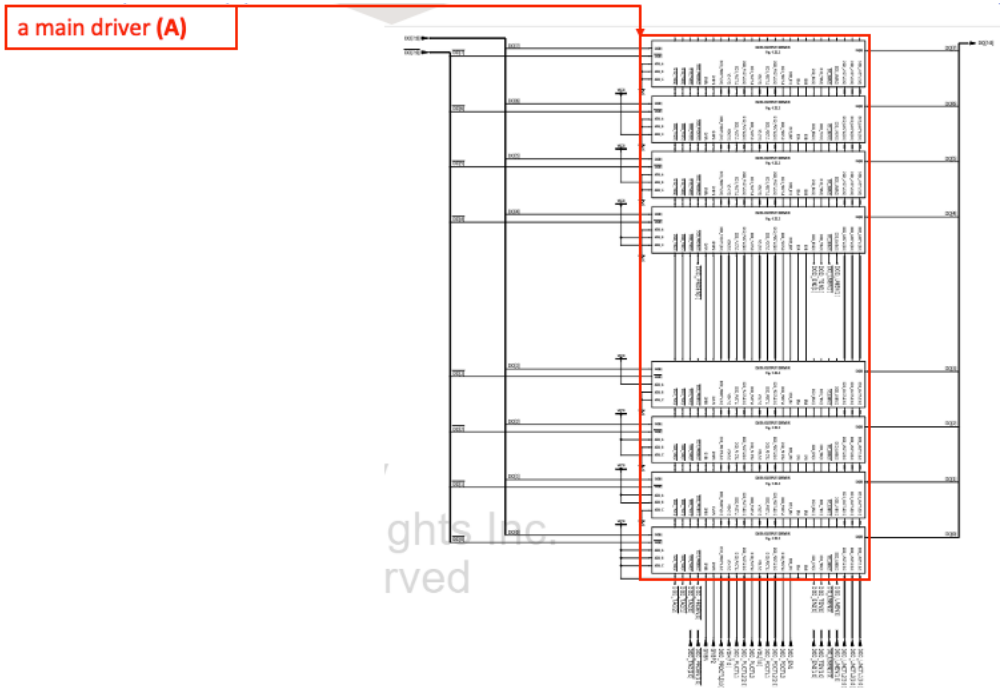


62. Based at least on the above, Longitude is informed and believes, that the corners of the dies of the SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD and the Toshiba TH58LJT0T24BADE Package are substantially the same. Among other things, the corners are substantially the same. Accordingly, Longitude is informed and believes that the various I/Os and peripheral circuits are the same between the Toshiba and Western Digital/SanDisk chips. Furthermore, Longitude is informed and believes that Toshiba and Western Digital shared the

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1 designs for 96 layer chips. Accordingly, the SanDisk memory chip is substantially
2 the same as the Western Digital PC SN530 NVMe SSD and the Toshiba
3 TH58LJT0T24BADE Package. For this reason, Longitude is informed and believes
4 that technical documents and other analysis concerning the Toshiba
5 TH58LJT0T24BADE Package also describe the layout and functionality of the
6 Western Digital PC SN530 NVMe SSD.

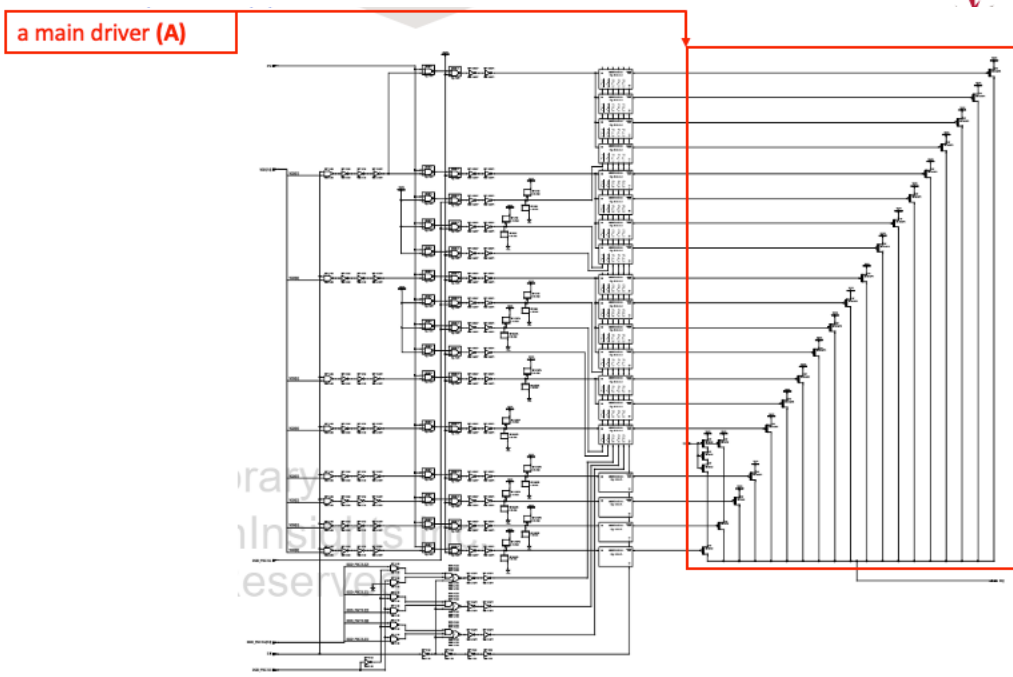
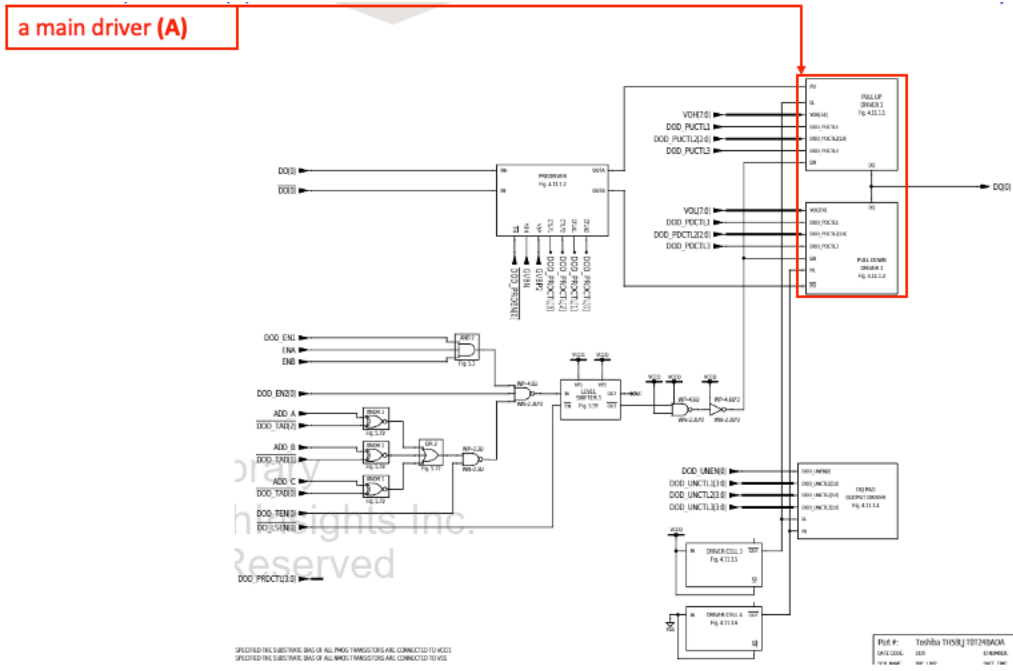
7 63. The Western Digital PC SN530 NVMe SSD used in the HP laptop
8 computer includes an output buffer circuit for outputting data in the form of an input
9 pulse train at a predetermined output impedance and slew rate comprising a main
10 driver:



Source: [TechInsights Report](#) ID#: CAR-1902-801 Figure 4.11 DATA OUTPUT DRIVERS

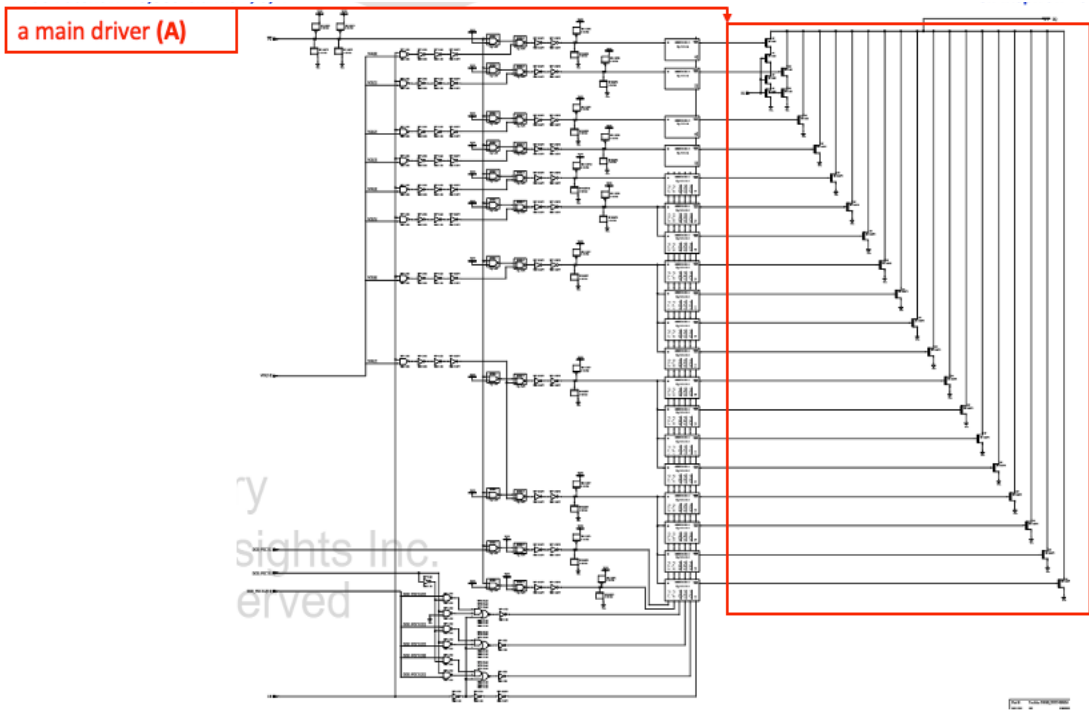
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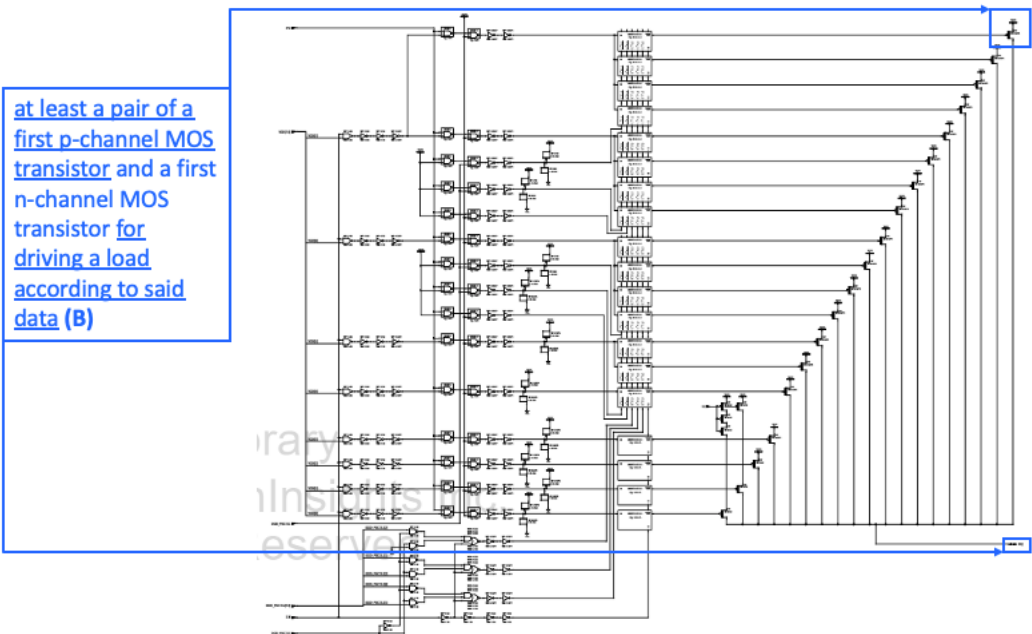
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Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.1.3 PULL DOWN DRIVER 1

64. The Western Digital PC SN530 NVMe SSD used in the HP laptop computer further includes at least a pair of a first p-channel MOS transistor and a first n-channel MOS transistor for driving a load according to said data:

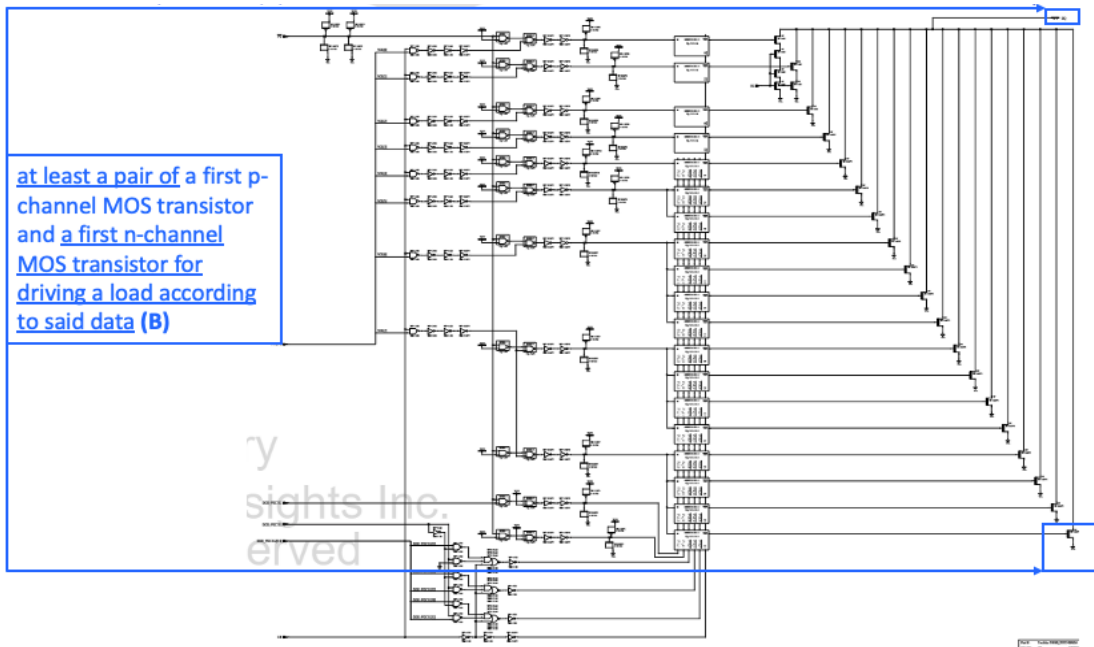


at least a pair of a first p-channel MOS transistor and a first n-channel MOS transistor for driving a load according to said data (B)

Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.1.1 PULL UP DRIVER 1

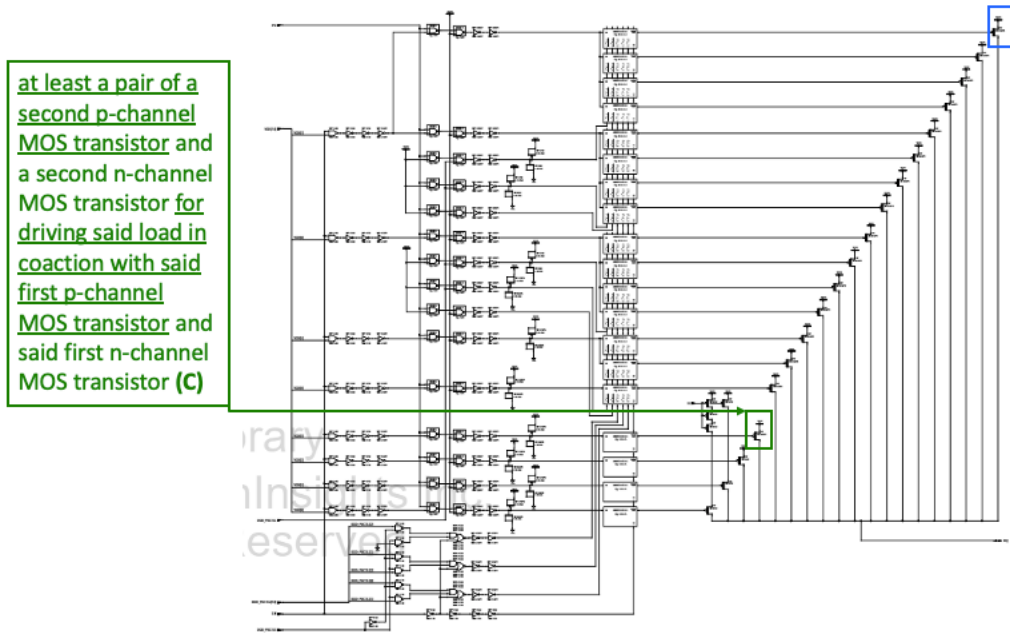
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Source: [Technights Report ID#: CAR-1902-801](#) Figure 4.11.1.3 PULL DOWN DRIVER 1

65. The Western Digital PC SN530 NVMe SSD used in the HP laptop computer further includes at least a pair of a second p-channel MOS transistor and a second n-channel MOS transistor for driving said load in coaction with said first p-channel MOS transistor and said first n-channel MOS transistor:

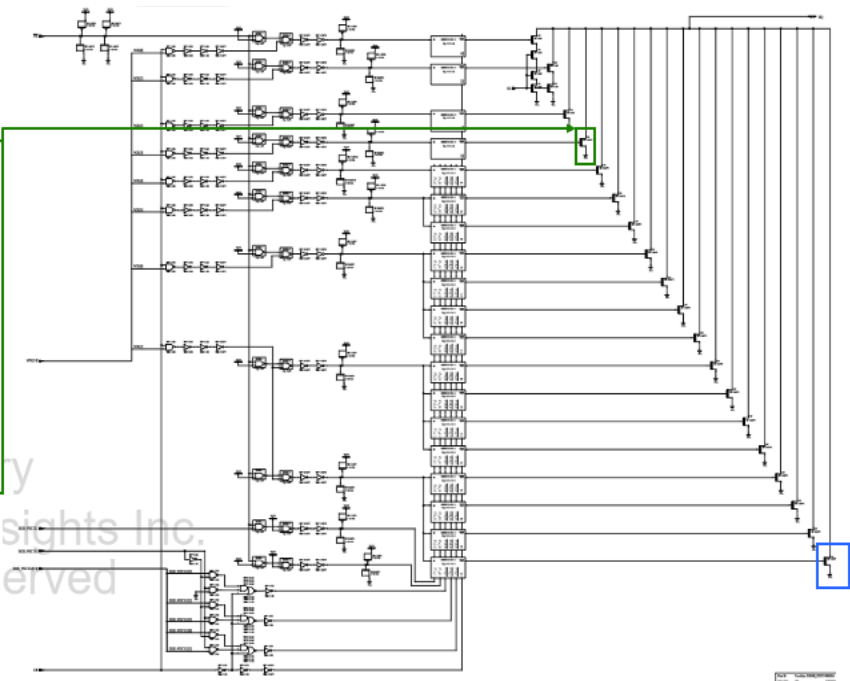


Source: [Technights Report ID#: CAR-1902-801](#) Figure 4.11.1.1 PULL UP DRIVER 1

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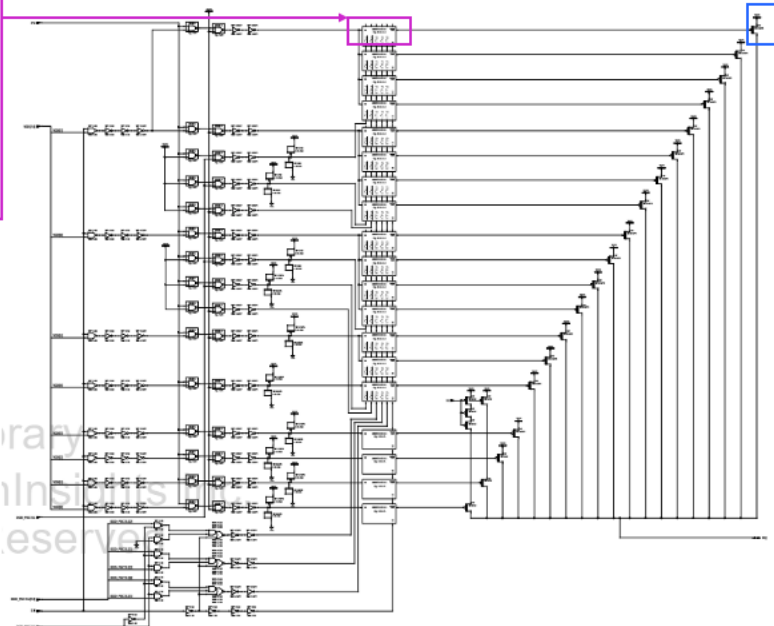
at least a pair of a second p-channel MOS transistor and a second n-channel MOS transistor for driving said load in coaction with said first p-channel MOS transistor and said first n-channel MOS transistor (C)



Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.1.3 PULLDOWN DRIVER 1

66. The Western Digital PC SN530 NVMe SSD used in the HP laptop computer includes a predriver with outputs for driving only said first n-channel MOS transistor and only said first p-channel MOS transistor:

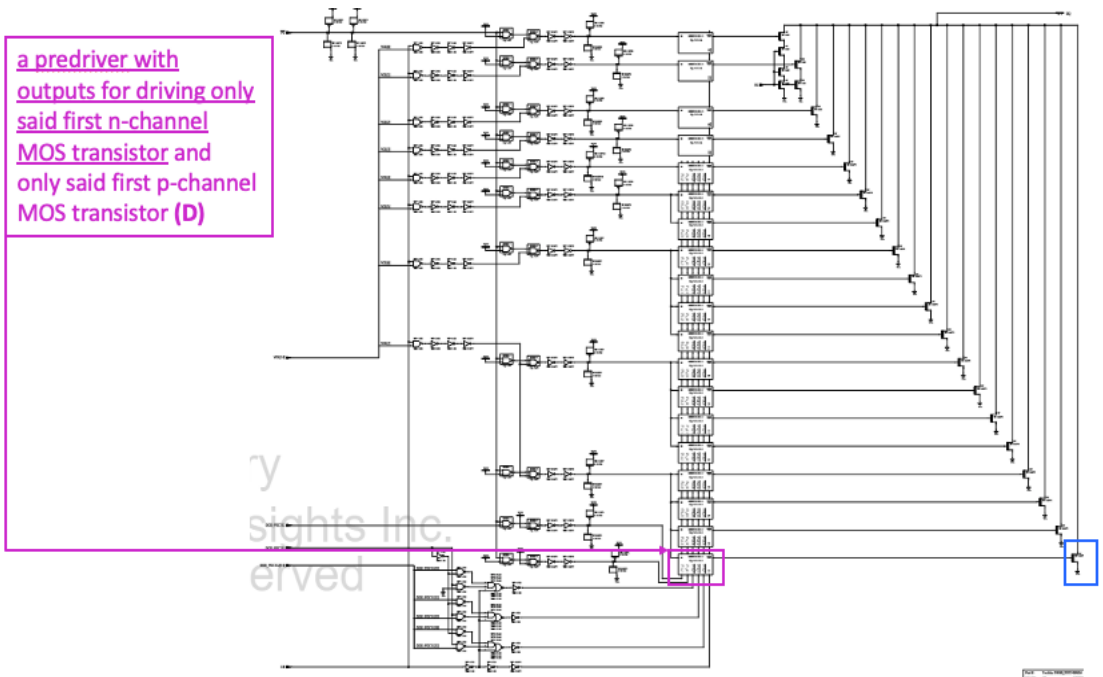
a predriver with outputs for driving only said first n-channel MOS transistor and only said first p-channel MOS transistor (D)



Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.1.1 PULL UP DRIVER 1

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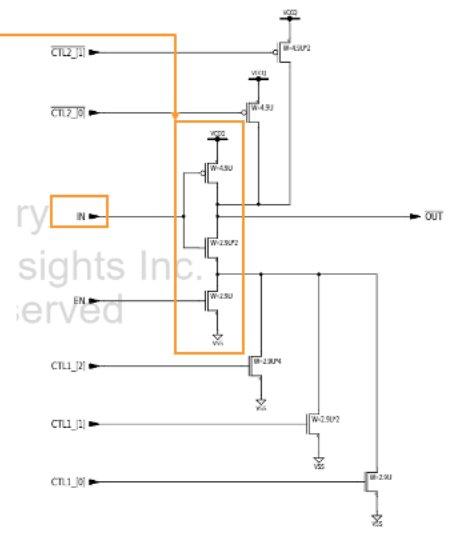
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Source: [TechInsights Report ID#: CAR-1902-801](#) Figure 4.11.1.3 PULL DOWN DRIVER 1

67. The Western Digital PC SN530 NVMe SSD used in the HP laptop computer further comprises at least a pair of a third p-channel MOS transistor and a third n-channel MOS transistor for driving said first p-channel MOS transistor according to said data:

at least a pair of a third p-channel MOS transistor and a third n-channel MOS transistor for driving said first p-channel MOS transistor according to said data (E)

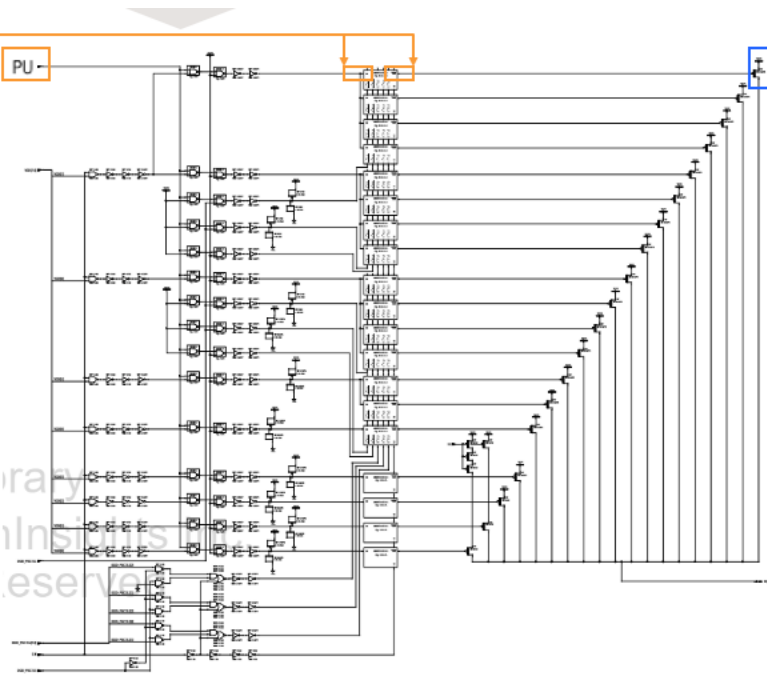


Source: [TechInsights Report ID#: CAR-1902-801](#) Figure 4.11.1.1 DRIVER CELL 1

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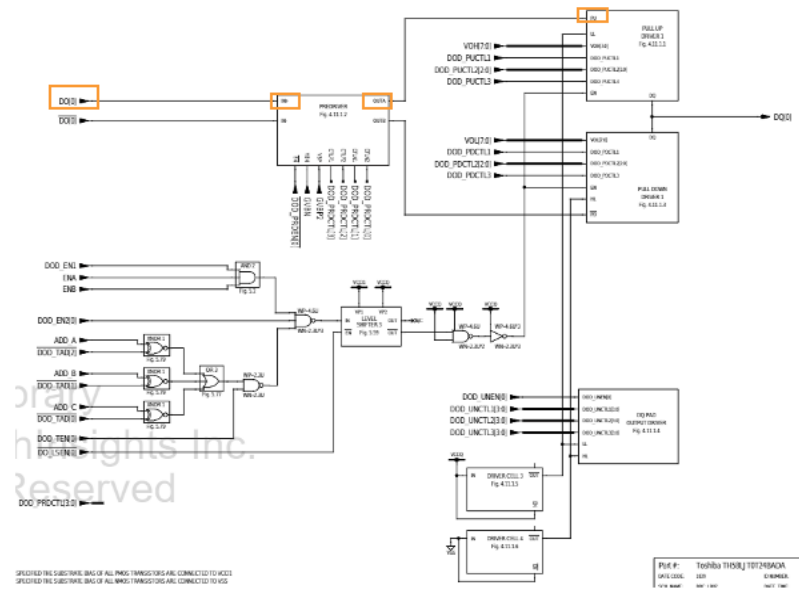
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at least a pair of a third p-channel MOS transistor and a third n-channel MOS transistor for driving said first p-channel MOS transistor according to said data (E)



Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.11 PULLUP DRIVER 1

at least a pair of a third p-channel MOS transistor and a third n-channel MOS transistor for driving said first p-channel MOS transistor according to said data (E)



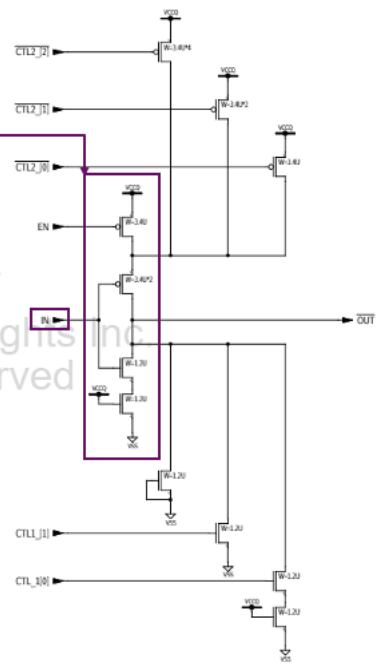
Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.11 PULLUP DRIVER 1

68. The Western Digital PC SN530 NVMe SSD used in the HP laptop computer further includes at least a pair of fourth p-channel MOS transistor and a fourth n-channel MOS transistor for driving said first n-channel MOS transistor according to said data:

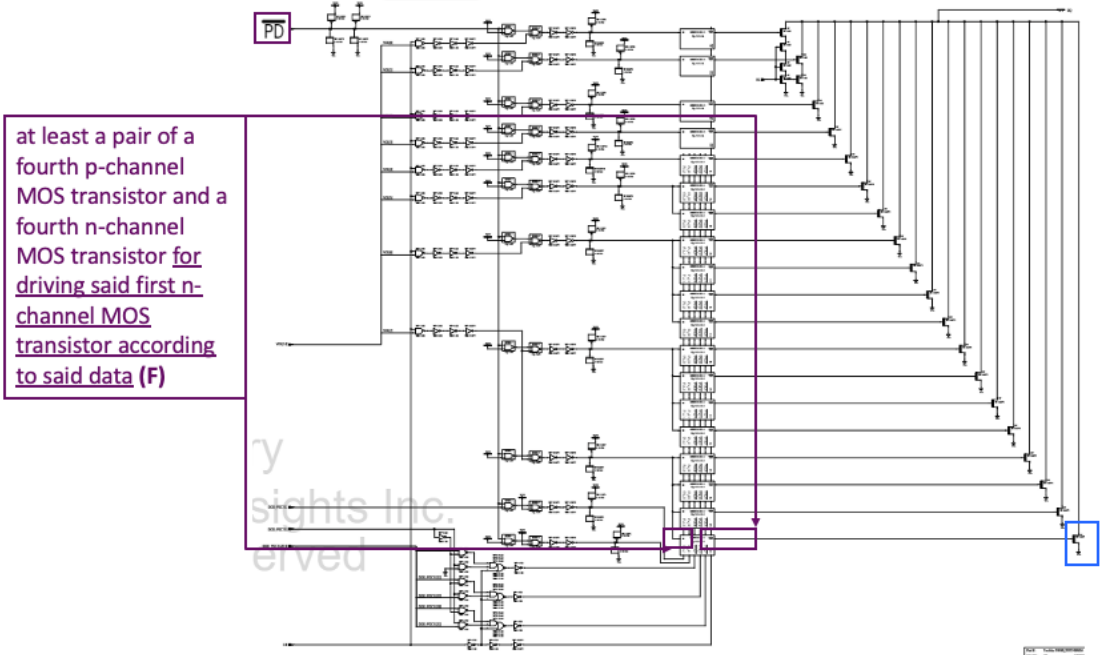
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at least a pair of a fourth p-channel MOS transistor and a fourth n-channel MOS transistor for driving said first n-channel MOS transistor according to said data (F)



Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.13.1 DRIVER CELL 2



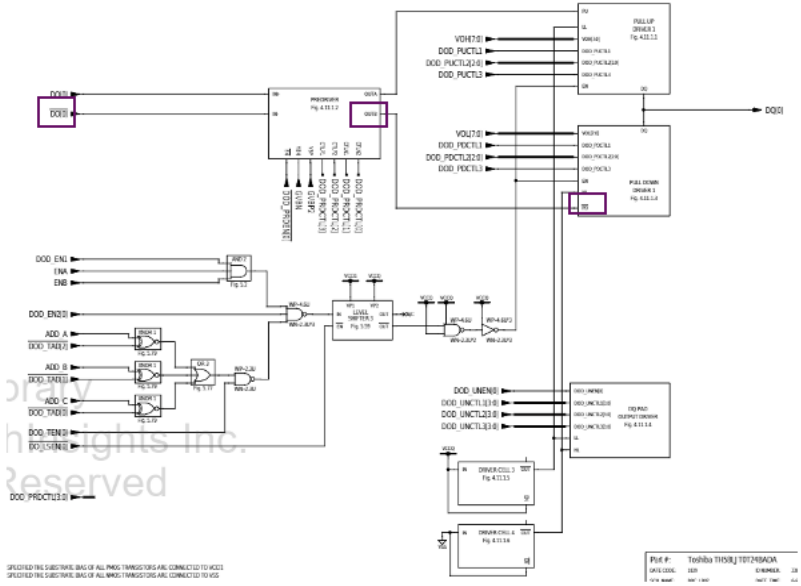
at least a pair of a fourth p-channel MOS transistor and a fourth n-channel MOS transistor for driving said first n-channel MOS transistor according to said data (F)

Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.13 PULL DOWN DRIVER 1

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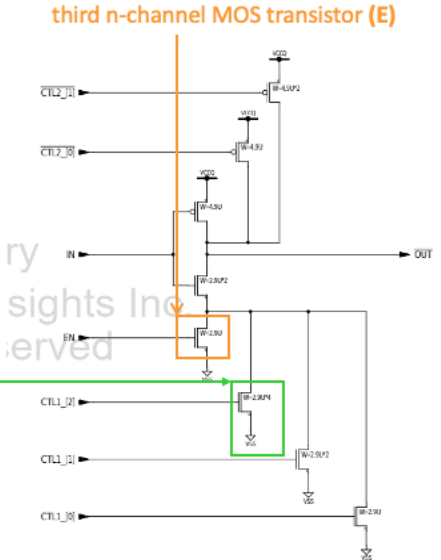
at least a pair of a fourth p-channel MOS transistor and a fourth n-channel MOS transistor for driving said first n-channel MOS transistor according to said data (F)



Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.1.1 FULL UP DRIVER 1

69. The Western Digital PC SN530 NVMe SSD used in the HP laptop computer further includes at least one fifth n-channel MOS transistor for driving said first p-channel MOS transistor in coaction with said third n-channel MOS transistor:

at least one fifth n-channel MOS transistor for driving said first p-channel MOS transistor in coaction with said third n-channel MOS transistor (G)

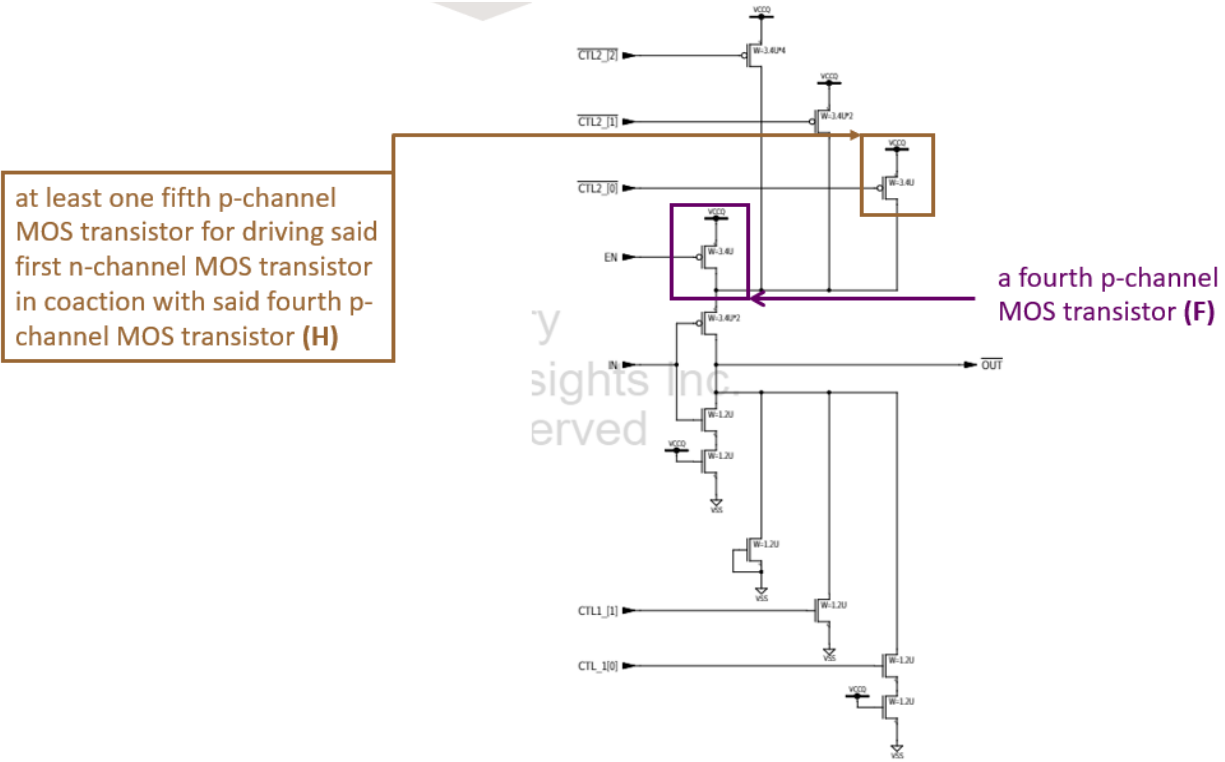


Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.1.1.1 DRIVER CELL 1

70. The Western Digital PC SN530 NVMe SSD used in the HP laptop computer further includes at least one fifth p-channel MOS transistor in coaction with said fourth p-channel MOS transistor:

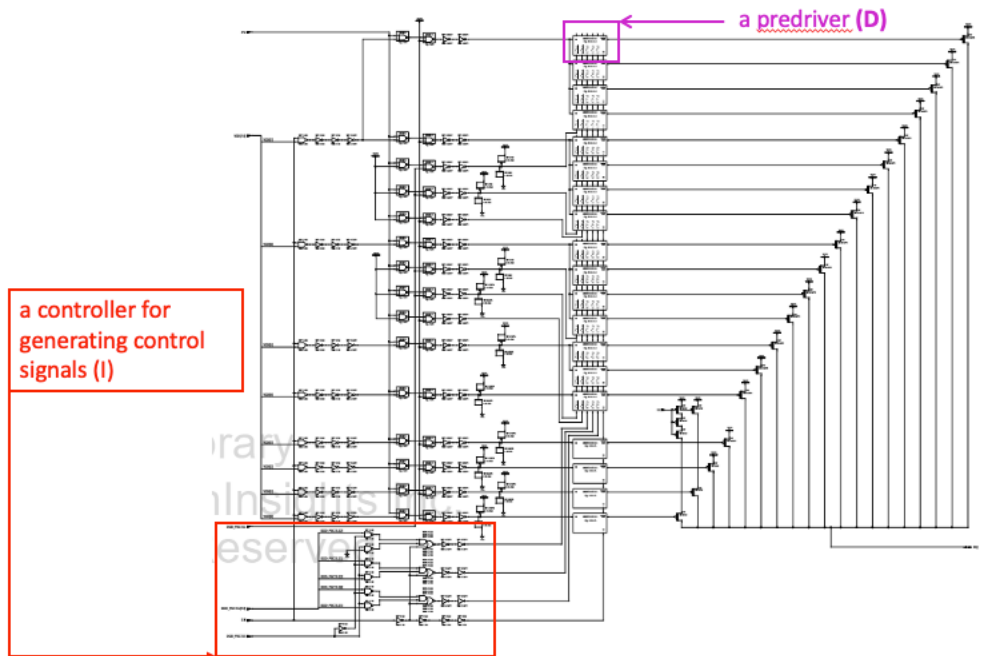
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Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.1.3.1 DRIVER CELL 2

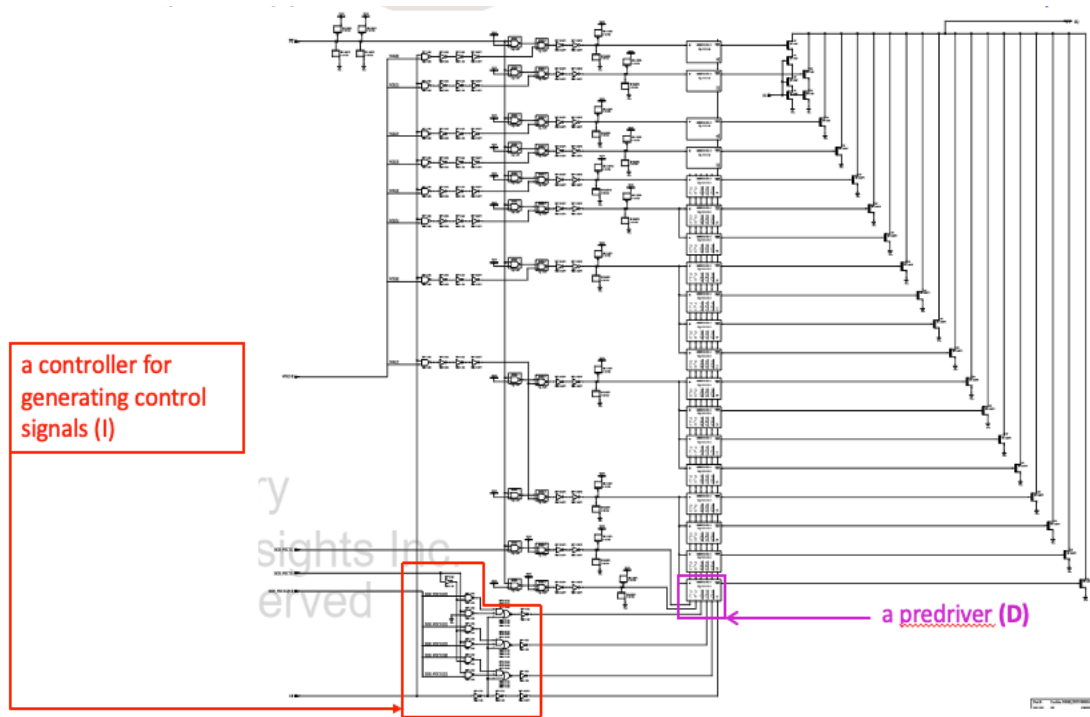
71. The Western Digital PC SN530 NVMe SSD used in the HP laptop computer further includes a controller for generating control signals:



Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.1.1 PULL UP DRIVER 1

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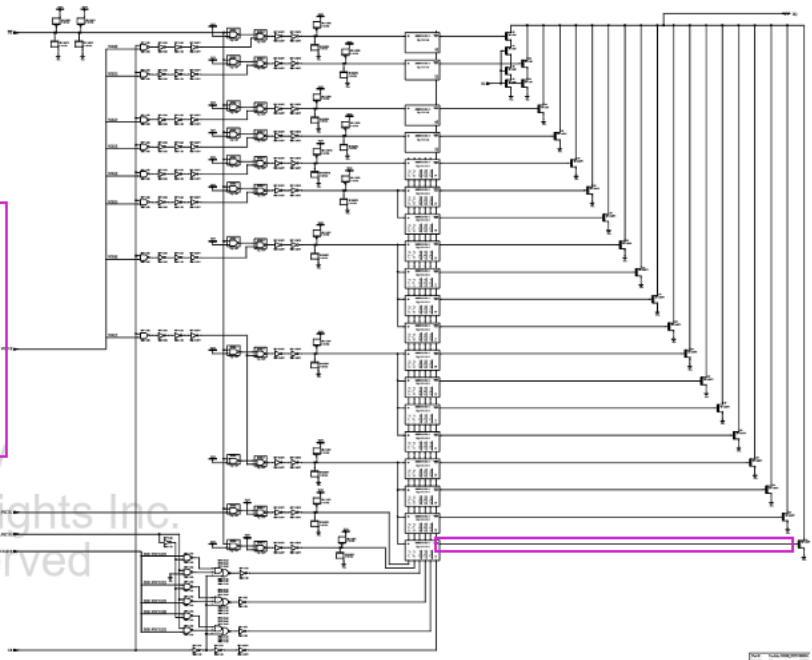
Source: TechInsights Report ID#: CAR-1902-801 Figure 4.11.1.3 PULL DOWN DRIVER 1

72. The Western Digital PC SN530 NVMe SSD used in the HP laptop computer further includes a controller for generating control signals to control said fifth n-channel MOS transistor into and out of operation in coaction with said second p-channel MOS transistor:

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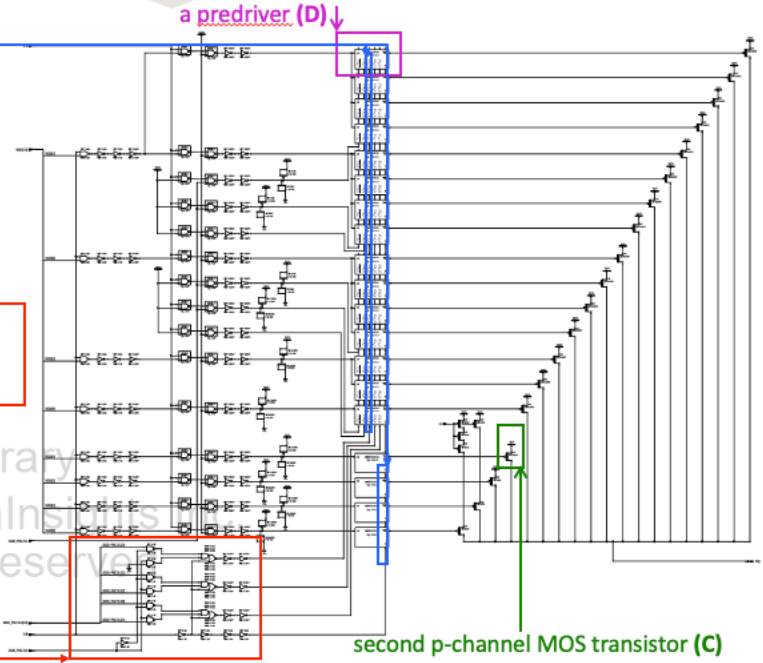
the output of the predriver is directly connected only to said first p-channel MOS transistor and said first n-channel MOS transistor of said main driver (L)



Source: TechInsights Report ID#: CAR-1902-801 Figure 4.111.3 PULL DOWN DRIVER 1

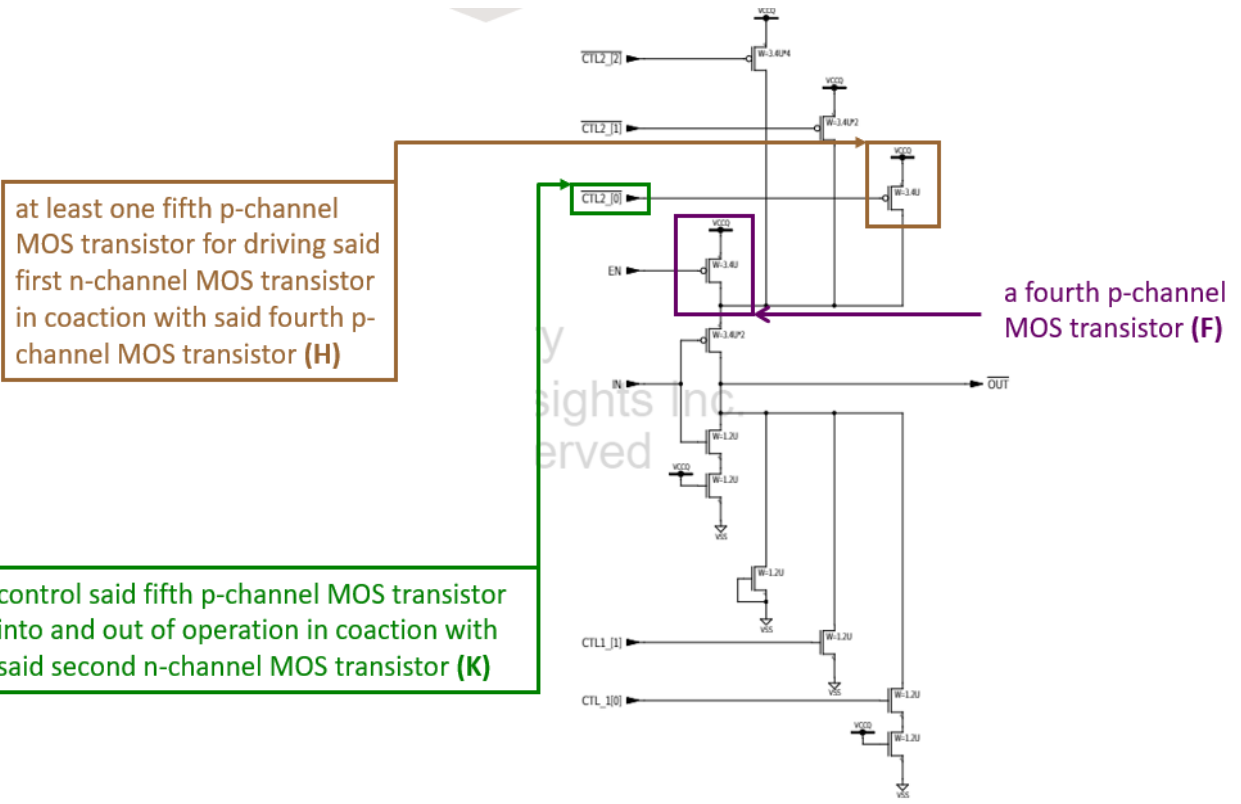
control said fifth n-channel MOS transistor into and out of operation in coaction with said second p-channel MOS transistor (J)

a controller for generating control signals (I)



Source: TechInsights Report ID#: CAR-1902-801 Figure 4.111.1 PULL UP DRIVER 1

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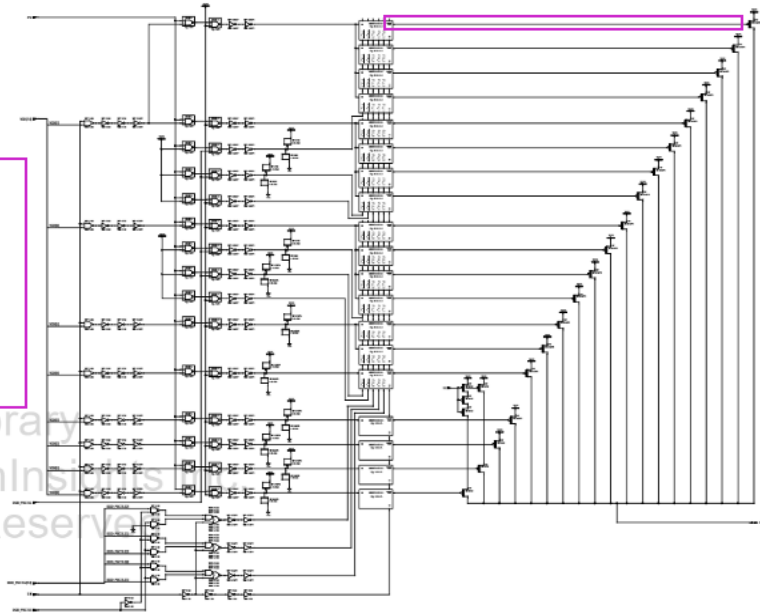
Source: [TechInsights Report ID#: CAR-1902-801](#) Figure 4.11.1.3.1 DRIVER CELL 2

74. The Western Digital PC SN530 NVMe SSD used in HP laptop computer further includes a controller wherein the output of the predriver is directly connected only to said first p-channel MOS transistor and said first n-channel MOS transistor of said main driver:

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the output of the predriver is directly connected only to said first p-channel MOS transistor and said first n-channel MOS transistor of said main driver (L)



Source: TechInsights Report ID#: CAR-1902-801

Figure 411.11 FULL UP DRIVER 1

75. Defendant actively, knowingly, and intentionally induces, and continues to actively, knowingly, and intentionally induce, infringement of the '539 patent under 35 U.S.C. §271(b) by its customers and end users.

76. Defendant has had knowledge of and notice of the '539 patent and its infringement since at least September 6, 2022 when Longitude gave Defendant notice of its infringing actions. In any event, Defendant has had knowledge and notice of the '539 patent since at least the filing of this complaint.

77. Defendant has induced its customers and end users to infringe the '539 patent by using their products as shown above. For example, Defendant encourages its customers and end users to perform infringing methods by the very nature of the products.

78. Defendant specifically intends its customers and/or end users infringe the '539 patent, either literally or by the doctrine of equivalents, because Defendant has known about the '539 patent and how Defendant's products infringe the claims of the '539 patent but Defendant has not taken steps to prevent infringement by its

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1 customers and/or end users. Accordingly, Defendant has acted with the specific
2 intent to induce infringement of the ‘539 patent.

3 79. Accordingly, Defendant has induced, and continues to induce, infringement
4 of the ‘539 patent under 35 U.S.C. §271(b).

5 80. As discussed above, Defendant has had knowledge of and notice of the ‘539
6 patent and its infringement since at least September 6, 2022. Despite this
7 knowledge, Defendant continues to commit tortious conduct by way of patent
8 infringement.

9 81. Defendant has been and continues to infringe one or more of the claims of the
10 ‘539 patent through the aforesaid acts.

11 82. Defendant has committed these acts of infringement without license or
12 authorization.

13 83. Plaintiff is entitled to recover damages adequate to compensate for the
14 infringement.

15 84. Defendant has and continues to infringe the ‘539 patent, acting with an
16 objectively high likelihood that its actions constitute infringement of the ‘539 patent.
17 Defendant has known or should have known of this risk at least as early as September
18 6, 2022. Accordingly, Defendant’s infringement of the ‘539 patent has been and
19 continues to be willful.

20 **COUNT III**

21 **(DEFENDANT’S INFRINGEMENT OF THE ‘233 PATENT)**

22 85. Paragraphs 1 through 84 are incorporated by reference as if fully restated
23 herein.

24 86. United States Patent No. 9,379,233, entitled “Semiconductor Device,” issued
25 on June 28, 2016 from United States Patent Application No. 14/872,844 filed
26 October 1, 2015.

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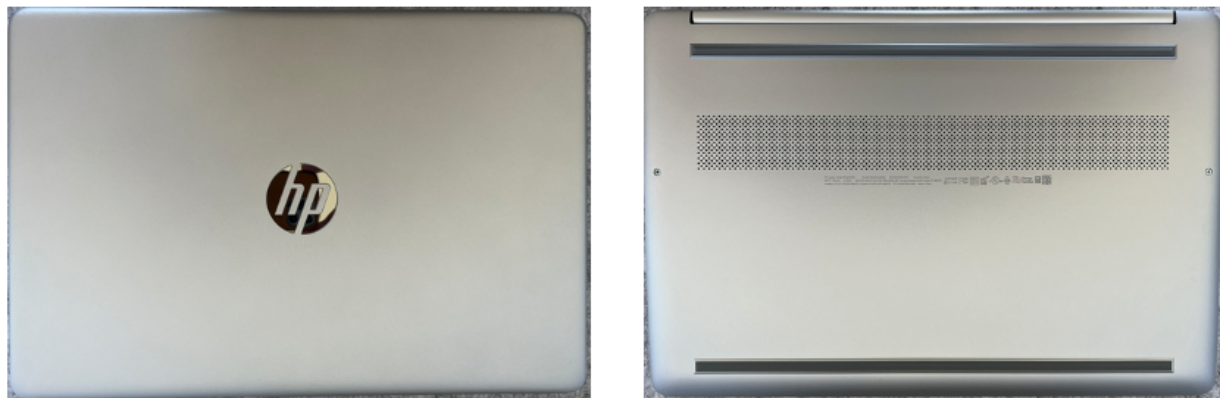
1 87. Longitude is the owner of the '233 patent with full rights to pursue recovery
2 of royalties for damages for infringement, including full rights to recover past and
3 future damages.

4 88. Each claim of the '233 patent is valid, enforceable, and patent-eligible.

5 89. Longitude and its predecessors in interest have satisfied the requirements of
6 35 U.S.C. § 287(a) with respect to the '233 patent, and Longitude is entitled to
7 damages for Defendant's past infringement. Among other things, Longitude
8 provided actual notice of infringement to the component supplier, Western Digital.

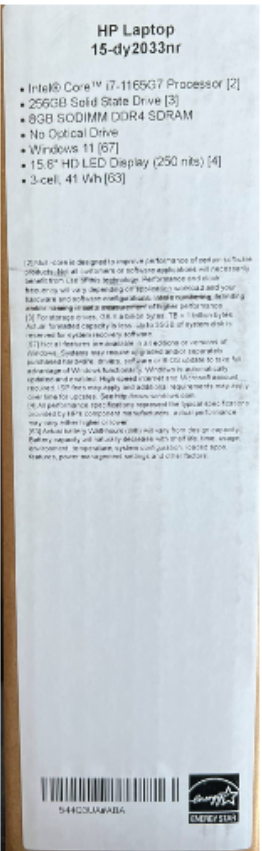
9 90. Defendant has directly infringed (literally and equivalently) and induced
10 others to infringe the '233 patent by making, using, selling, offering for sale, or
11 importing products that infringe the claims of the '233 patent and by inducing others
12 to infringe the claims of the '233 patent without a license or permission from
13 Longitude. These products include without limitation all HP laptop computers (e.g.,
14 model 15-dy2003nr), all other HP computers, laptops, and tablets having Western
15 Digital PC SN530 NVMe SSDs, Western Digital SSDs, and/or Western Digital 3D
16 NAND memory chips and all versions and variations of them offered for sale since
17 the issuance of the '369 patent.

18 91. A non-limiting example of Defendant's infringement is the SanDisk memory
19 chip contained within the HP laptop computer (e.g., model 15-dy2003nr) which
20 infringes at least claim 1 of the '369 patent. Exemplary photographs of the HP
21 laptop, and its packaging are set forth below:



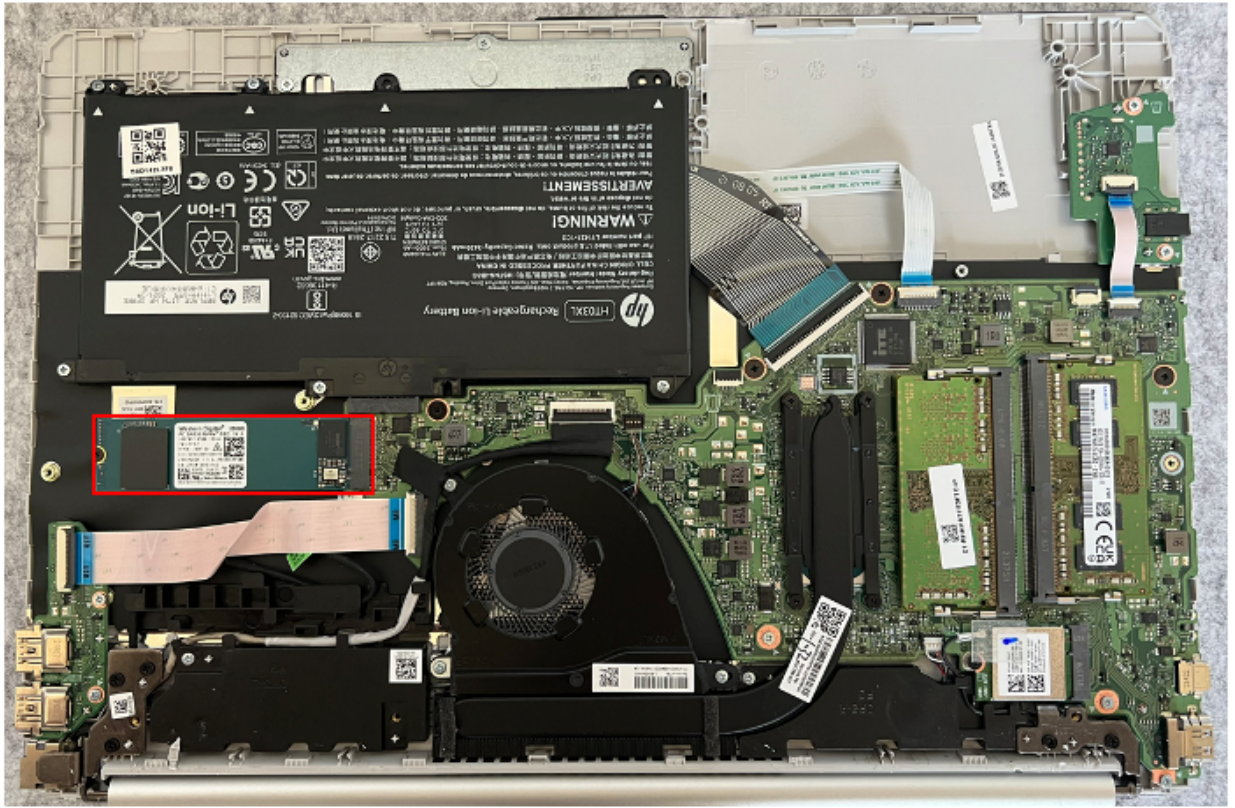
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92. The HP laptop includes the Western Digital PC SN530 NVMe SSD as shown below:

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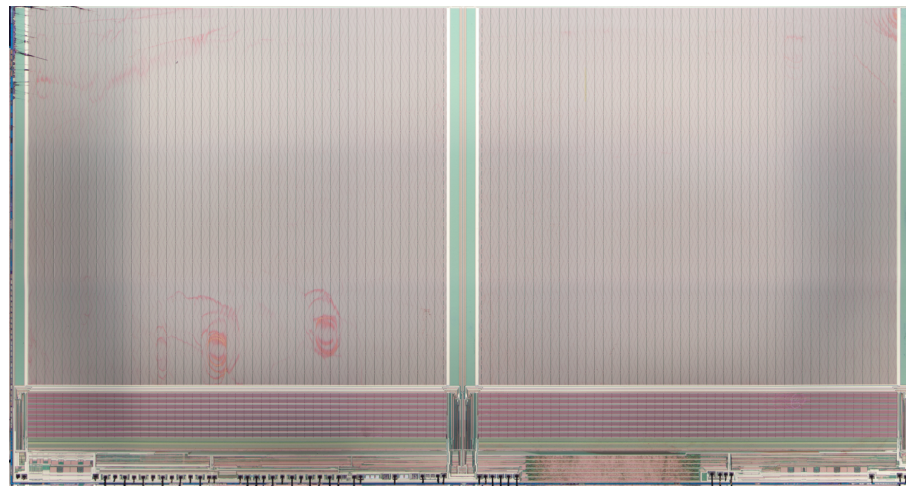
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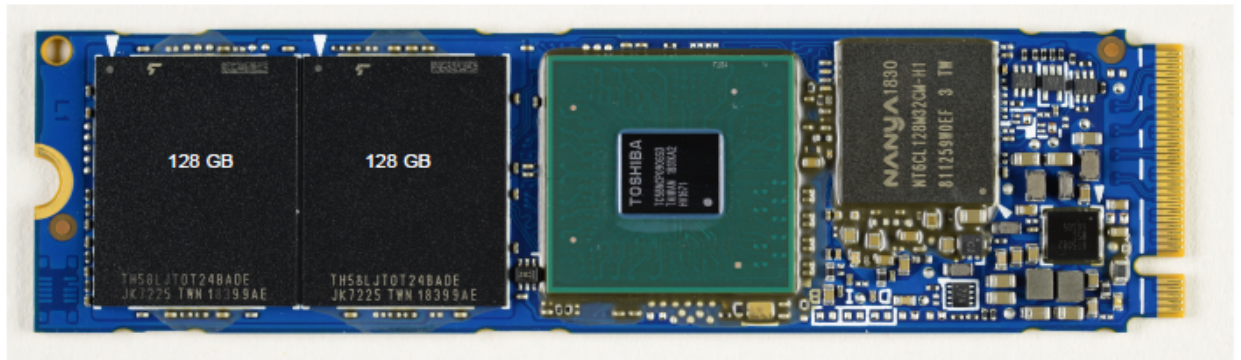
93. The below image shows the pin layout and corners of the SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD:

RUSS, AUGUST & KABAT

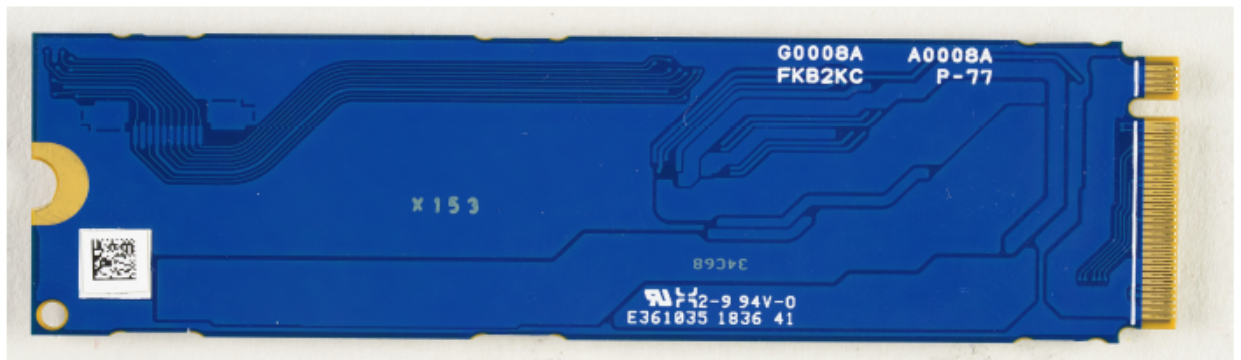
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94. On information and belief, the Western Digital PC SN530 NVMe SSD used in the HP laptop is substantially similar to the Toshiba KXG60ZNV256G SSD Package (“Toshiba SSD”) for all matters relevant to this complaint. The Toshiba SSD is depicted below:



Toshiba KXG60ZNV256G SSD Package – Top

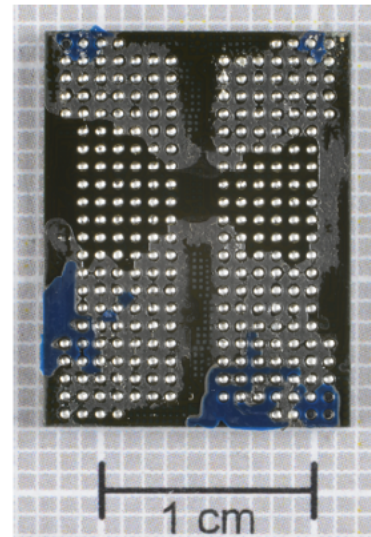


Toshiba KXG60ZNV256G SSD Package – Bottom

95. The memory chip of the Toshiba SSD, the Toshiba TH58LJT0T24BADE Package, is depicted in the images below:

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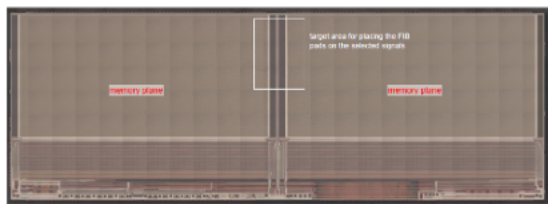


Toshiba 256 Gb 96L 3D NAND Flash Memory Die Photograph

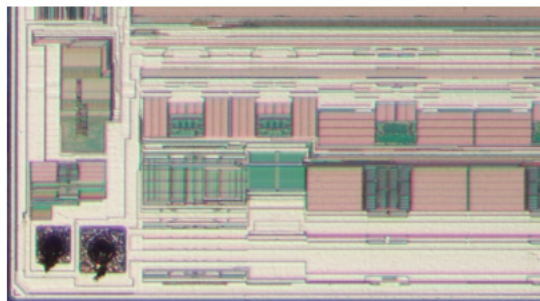
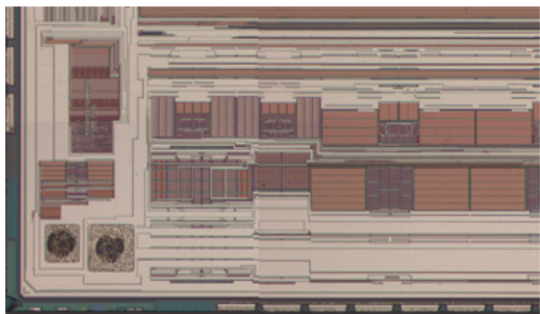
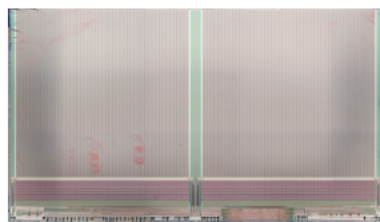
96. A side-by-side comparison of the SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD and the Toshiba TH58LJT0T24BADE Package used in the Toshiba SSD is depicted below:

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Toshiba 256 Gb 96L 3D NAND Flash Memory Die Photograph

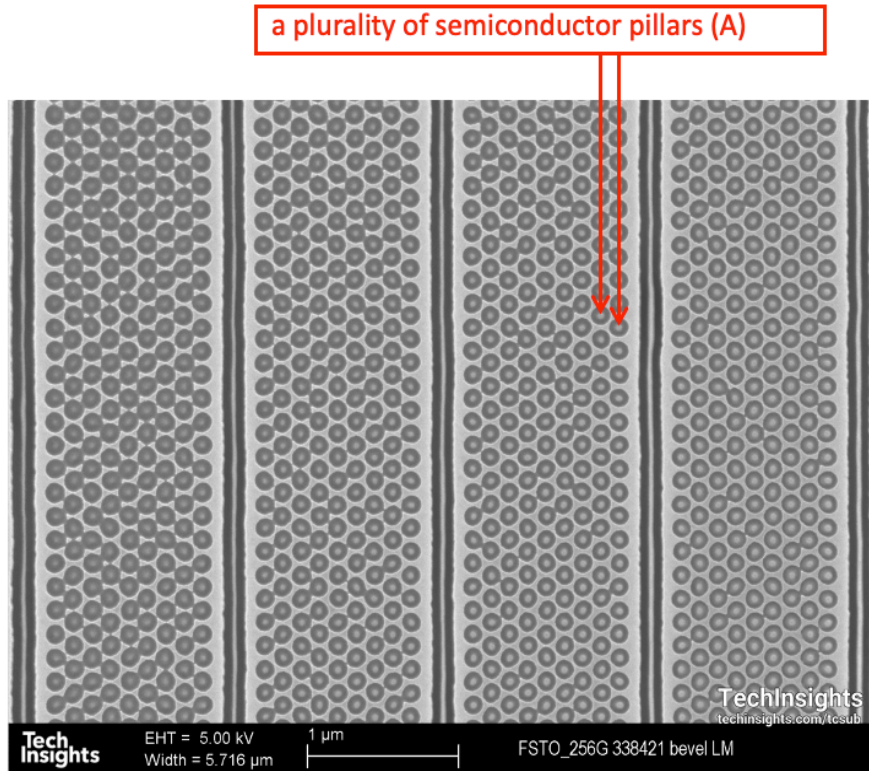
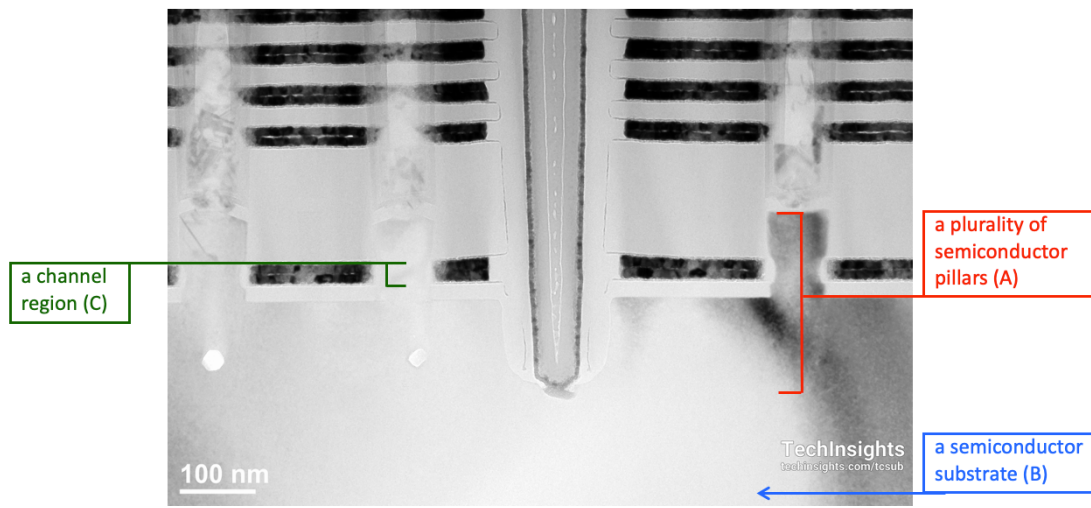


97. Based at least on the above, Longitude is informed and believes that the corners of the dies of the SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD and the Toshiba TH58LJT0T24BADE Package are substantially the same. Accordingly, Longitude is informed and believes that the various I/Os and peripheral circuits are the same between the Toshiba and Western Digital/SanDisk chips. Furthermore, Longitude is informed and believes that Toshiba and Western Digital shared the designs for 96 layer chips. As shown above, the SanDisk memory chip is substantially the same as the Western Digital PC SN530 NVMe SSD and the Toshiba TH58LJT0T24BADE Package. For this reason, Longitude is informed and believes that technical documents and other analysis concerning the Toshiba TH58LJT0T24BADE Package also describe the layout and functionality of the Western Digital PC SN530 NVMe SSD and the SanDisk memory chip therein.

98. The SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD is a semiconductor device comprising a plurality of semiconductor pillars provided to stand from a semiconductor substrate, each of the semiconductor pillars comprising a channel region:

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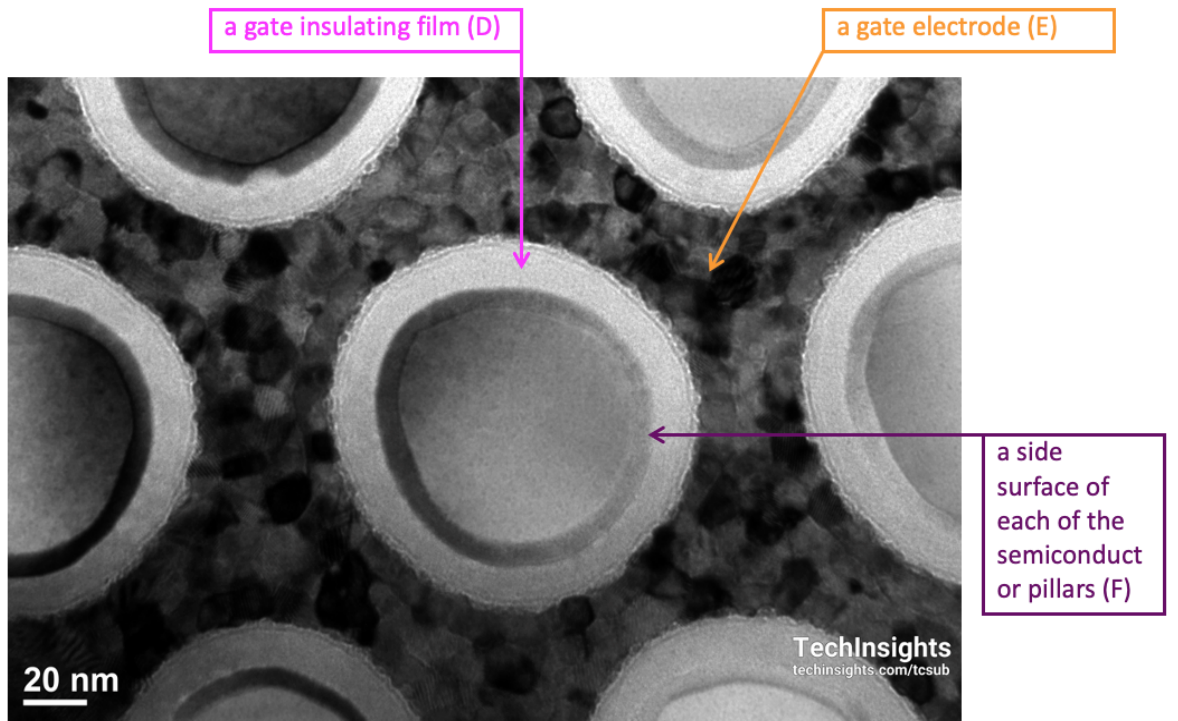
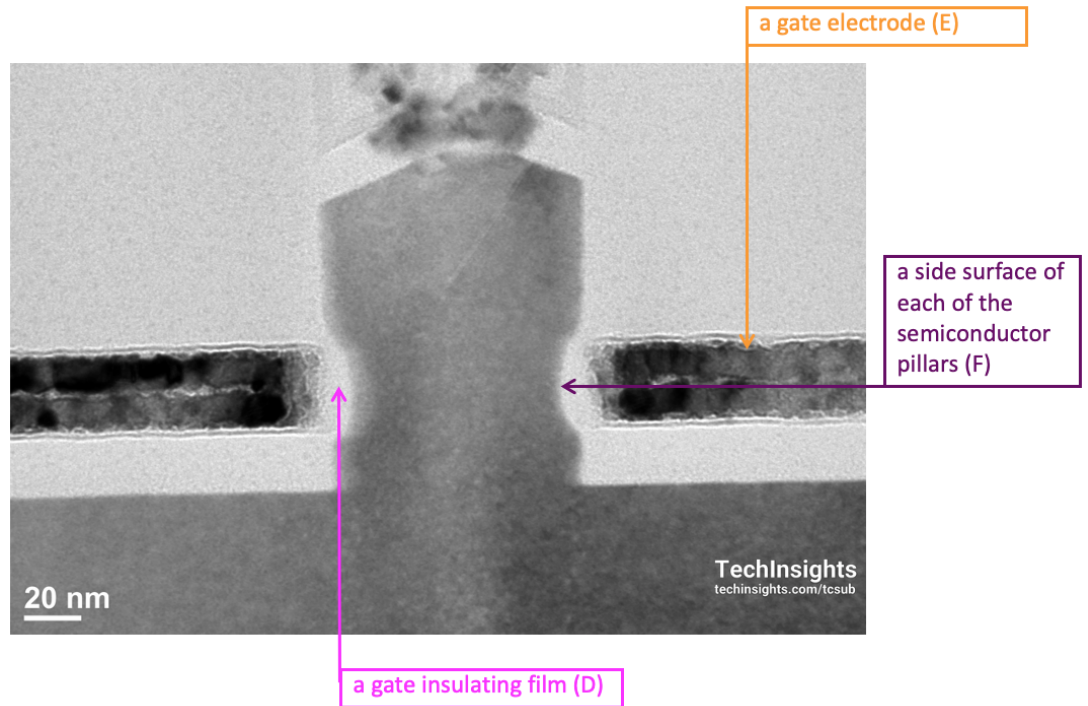
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99. The SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD is a semiconductor device comprising a gate insulating film and a gate electrode provided over a side surface of each of the semiconductor pillars:

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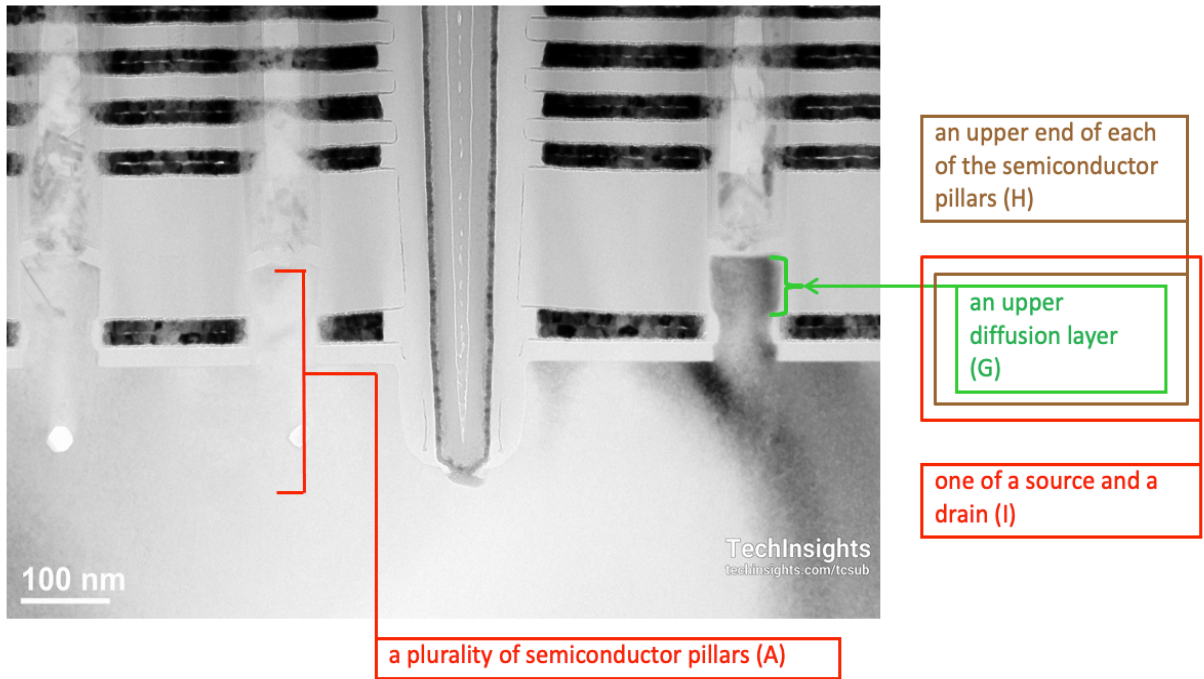
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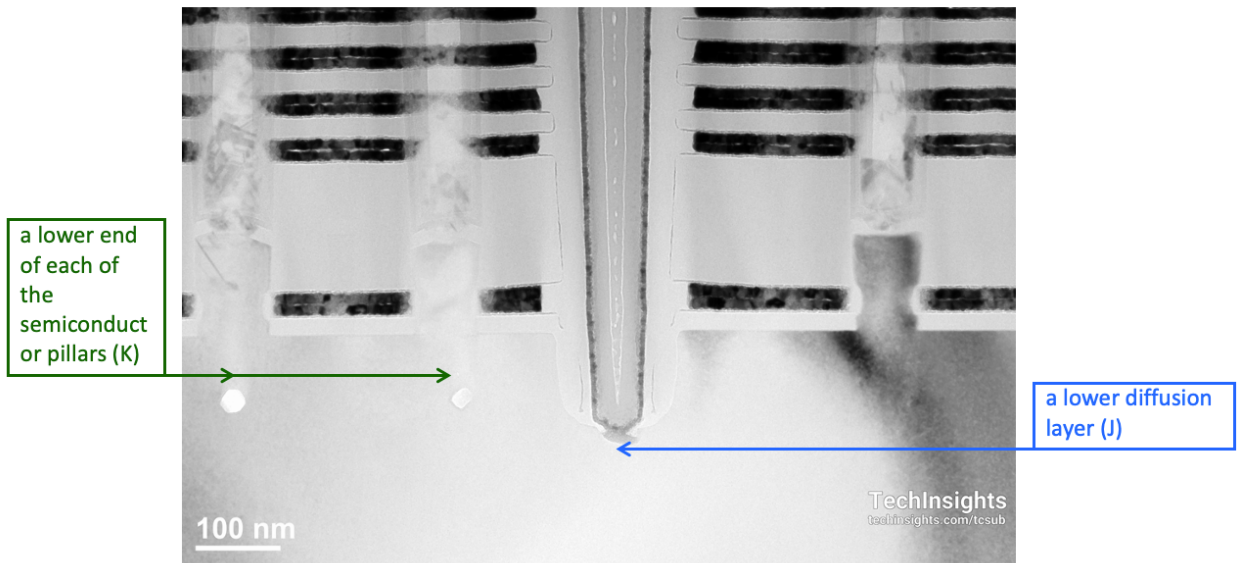
100. The SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD is a semiconductor device comprising an upper diffusion layer provided at an upper end of each of the semiconductor pillars to serve as one of a source and a drain:

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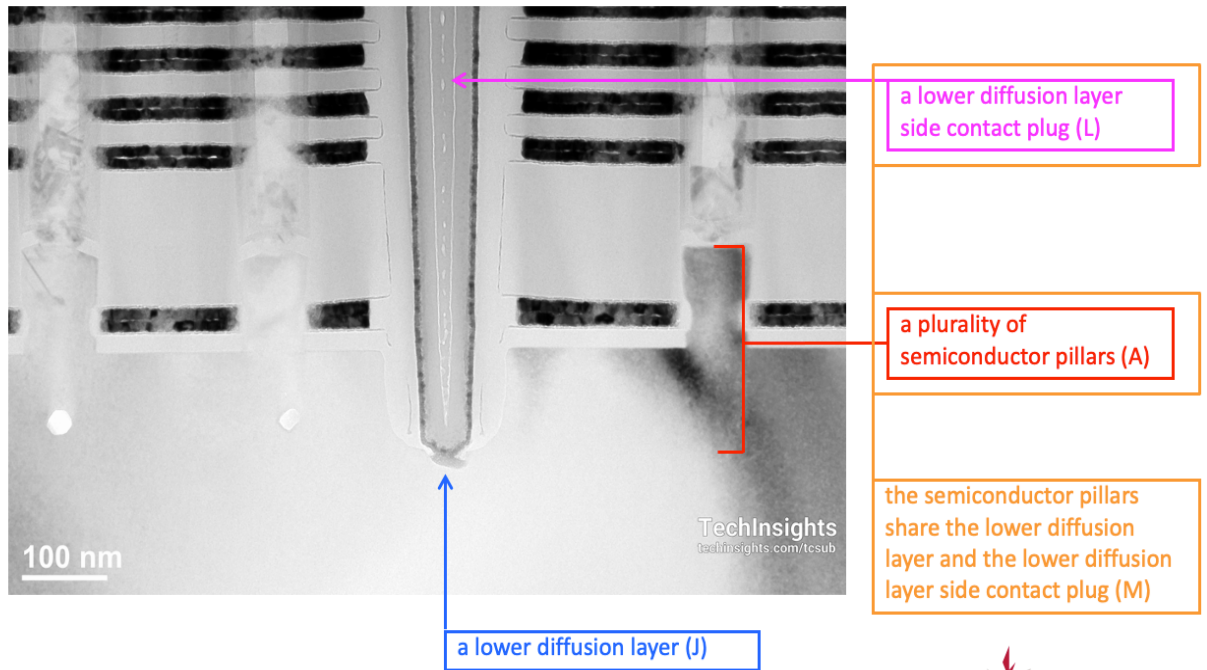
101. The SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD is a semiconductor device comprising a lower diffusion layer operatively coupled to a lower end of each of the semiconductor pillars to serve as the other of the source and the drain:



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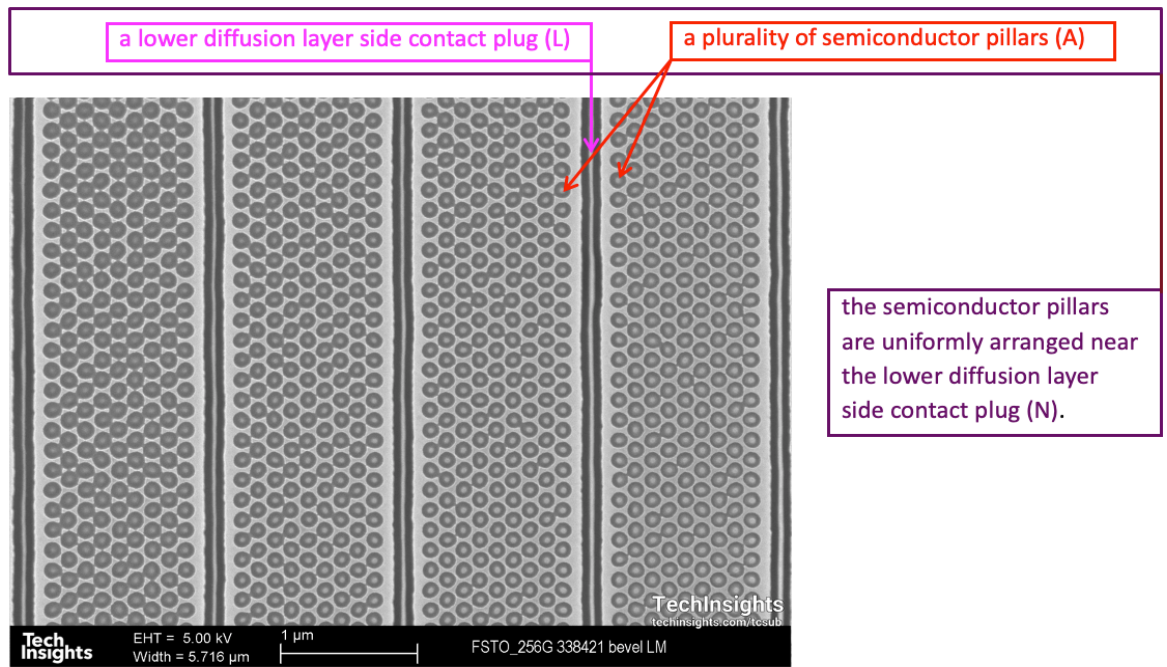
102. The SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD is a semiconductor device comprising a lower diffusion layer side contact plug connected to the lower diffusion layer, wherein the semiconductor pillars share the lower diffusion layer and the lower diffusion layer side contact plug:



103. The SanDisk memory chip used in the Western Digital PC SN530 NVMe SSD is a semiconductor device wherein the semiconductor pillars are uniformly arranged near the lower diffusion side contact:

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104. Defendant actively, knowingly, and intentionally induces, and continues to actively, knowingly, and intentionally induce, infringement of the '233 patent under 35 U.S.C. §271(b) by its customers and end users.

105. Defendant has had knowledge of and notice of the '233 patent and its infringement since at least September 6, 2022 when Longitude gave Defendant notice of its infringing actions. In any event, Defendant has had knowledge and notice of the '233 patent since at least the filing of this complaint.

106. Defendant has induced its customers and end users to infringe the '233 patent by using their products as shown above. For example, Defendant encourages its customers and end users to perform infringing methods by the very nature of the products.

107. Defendant specifically intends its customers and/or end users infringe the '233 patent, either literally or by the doctrine of equivalents, because Defendant has known about the '233 patent and how Defendant's products infringe the claims of the '233 patent but Defendant has not taken steps to prevent infringement by its customers and/or end users. Accordingly, Defendant has acted with the specific intent to induce infringement of the '233 patent.

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1 108. Accordingly, Defendant has induced, and continues to induce,
2 infringement of the '233 patent under 35 U.S.C. §271(b).

3 109. As discussed above, Defendant has had knowledge of and notice of the
4 '233 patent and its infringement since at least September 6, 2022. Despite this
5 knowledge, Defendant continues to commit tortious conduct by way of patent
6 infringement.

7 110. Defendant has been and continues to infringe one or more of the claims
8 of the '233 patent through the aforesaid acts.

9 111. Defendant has committed these acts of infringement without license or
10 authorization.

11 112. Plaintiff is entitled to recover damages adequate to compensate for the
12 infringement.

13 113. Defendant has and continues to infringe the '233 patent, acting with an
14 objectively high likelihood that its actions constitute infringement of the '233 patent.
15 Defendant has known or should have known of this risk at least as early as September
16 6, 2022. Accordingly, Defendant's infringement of the '233 patent has been and
17 continues to be willful.

18 **PRAYER FOR RELIEF**

19 Wherefore, Longitude, respectfully requests the following relief:

- 20 a) A judgment that Defendant has infringed the '369 patent;
21 b) A judgment that Defendant has infringed the '539 patent;
22 c) A judgement that Defendant has infringed the '233 patent;
23 d) A judgment that awards Plaintiff all appropriate damages under 35 U.S.C. §
24 284 for Defendant's past infringement, and any continuing or future
25 infringement of the Patents-in-Suit, up until the date such judgment is entered,
26 including interest, costs, and disbursements as justified under 35 U.S.C. § 284
27 to adequately compensate Plaintiff for Defendant's infringement;
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- e) An adjudication that Defendant’s infringement of the Patents-in-Suit has been willful and deliberate;
- f) An adjudication that Plaintiff be awarded treble damages and pre-judgment interest under 35 U.S.C. § 284 as a result of Defendant’s willful and deliberate infringement of the Patents-in-Suit;
- g) An adjudication that this case is exceptional within the meaning of 35 U.S.C. § 285;
- h) An adjudication that Plaintiff be awarded the attorneys’ fees, costs, and expenses it incurs in prosecuting this action; and
- i) An adjudication that Plaintiff be awarded such further relief at law or in equity as the Court deems just and proper.

JURY TRIAL DEMANDED

Plaintiff hereby demands a trial by jury of all issues so triable.

Respectfully submitted,

DATED: January 9, 2023

RUSS, AUGUST & KABAT

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