

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

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MICRON TECHNOLOGY, INC., :

Petitioner,: Case No.

v. : IPR2024-00789

YANGTZE MEMORY TECHNOLOGIES :

COMPANY, LTD., :

Patent Owner.:

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REMOTE STENOGRAPHIC DEPOSITION OF KELIN KUHN, PhD

Friday, March 28, 2025

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CALIFORNIA CSR 14424

Deposition of KELIS KUHN, held remotely,
via videoconference at:

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A P P E A R A N C E S

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E X H I B I T I N D E X

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P R O C E E D I N G S

COURT REPORTER: Dr. Kuhn, please raise
your right hand.

Do you swear to tell the truth, the whole
truth, and nothing but the truth?

THE WITNESS: I so swear.

COURT REPORTER: Okay. We can start.

ATTORNEY LANG: For the record, this is
Jason Lang on behalf of petitioner, Micron.
Go ahead.

ATTORNEY BONNY: Christopher Bonny, on
behalf of patent owner, YMTC, and the witness,
Dr. Kuhn. And I'm here with my colleague,
Allen Cross, also from Ropes & Gray.

KELIN KUHN

Having been duly sworn testified as follows:

EXAMINATION BY ATTORNEY LANG:

Q. Dr. Kuhn, if we could -- I guess if we can
just start, is there any reason you can't testify
truthfully today?

A. There is no reason I'm aware of.

Q. And I just want to start by getting my
bearings a little bit. So the '872 Patent is in the
context of 3D NAND.

Is that right?

1 Because I don't think we know if 118 is doped or
2 not. And I also disagree because I don't believe
3 we've talked about dead end yet. So we are using a
4 word that we have not discussed.

5 Q. Okay. Well, we can get to that, because
6 you discussed it in your declaration.

7 A. I have. But we have not yet discussed it
8 in my testimony. And it's kind of embedded in a
9 more complicated question.

10 Q. Now, let's go to Figure 2L.

11 A. Hang on a second. I just had something
12 crash. Figure 2L of '872?

13 Q. Yes, Ma'am.

14 A. I have Figure 2L.

15 Q. Does Figure 2L depict a finished device?

16 A. I don't know. Let me check.

17 [Witness reviewed document.]

18 So the only reference to Figure 2L that
19 might clarify that is column 16.

20 "As illustrated in Figure 2L, a contact
21 244 is formed within spacer 242."

22 Then there is a bunch of detailed
23 discussion.

24 "A dummy source structure is formed in the
25 source hole."

1 And a bunch of discussion. There is a
2 discussion of embodiments. There is a discussion of
3 more embodiments. There is a discussion of more
4 embodiments.

5 It's unclear for me, reading this, that
6 whether it is complete or not complete. Is there
7 perhaps a place that you want to reference, that
8 supports one or the other of these points?

9 Q. I'm just looking at, you know, from the
10 perspective of a POSITA, when you look at Figure 2L,
11 is there going to be any additional layers added to
12 the top of that.

13 A. So, it's certainly clear that Figure 2L is
14 further along in the process than Figure 2K. But it
15 is not clear -- in fact, it is perhaps intrinsically
16 clear, that there is more stuff to follow, because
17 many of the additional structures that occur, bit
18 lines in the light do not appear to be shown.

19 However, the patent is not clear if it's
20 describing a partial section of a completed
21 structure, or a structure partway through
22 fabrication.

23 I would have to look at this in some
24 detail to figure it out. Because the way this
25 patent is structured is, they talk about 2L, and

1 then there is like three pages of embodiments. So
2 it's difficult to do this on the fly.

3 Q. So, and Figure 2L, this is in the
4 staircase region 118 that we had talked about
5 earlier. Correct?

6 A. Yes. Figure 2L is in the staircase.

7 Q. And you had testified that you don't know
8 that the substrate portion, 202 and Figure 2L,
9 whether it's doped or not?

10 A. I have not found any language in the
11 patent, sitting here today, to clarify that. You
12 and I clarified the doping in the array region, but
13 there does not appear to be enough information,
14 either way, in the staircase region.

15 Q. Okay.

16 And where is the -- between what two
17 points do the current flow with respect to element
18 244 in 2L?

19 A. Is this in regards to the construction of
20 conductive contact?

21 Q. No. I'm just asking from the perspective
22 as a POSITA, is there two points in which current is
23 flowing from and into 244 and out of 244?

24 A. So 244 is as illustrated, just in
25 Figure 2L. If a POSITA is looking just at Figure 2L

1 and looking just at element 244 without reference to
2 anything else, it would be difficult for a POSITA to
3 understand other potential wiring around 244.

4 Q. So there could be a wire on the top of 244
5 that's not shown in 2L?

6 A. One can speculate there could be all sorts
7 of things. I mean, there could be a layer of silica
8 nitride on top of that too. It's a little unclear
9 to me how we would speculate beyond what the patent
10 has illustrated and described.

11 Q. Now, typically, if you look at Figure 2L,
12 you would expect there to be an inter layer -- a
13 dielectric inner layer -- deposited on top of what
14 you see in Figure 2L. Correct?

15 A. So, Figure 2L shows a 244. And just for
16 the record, 244 is a contact structure. And a -- so
17 a conductive material is in 244.

18 And in 244, it's ambiguous as to it is not
19 clear in that picture what is connected to it,
20 although there is a description elsewhere. So at
21 this point, I mean, we could speculate anything we
22 wanted above that.

23 You know, you asked if we could speculate
24 an ILD layer. We could certainly speculate an ILD
25 layer, but I'm not sure quite where you are going

1 with this question.

2 Q. And then, if you had an ILD layer, then
3 you could have contacts through the ILD layer or --
4 strike that.

5 If you had an ILD layer on top of what you
6 see in Figure 2L, you could have interconnects
7 between the ILD layer and the vertical structure
8 shown in Figure 2L?

9 A. So the patent reads at -- in column 16:

10 "When conductive materials are used to
11 fill dummy source hole 212, e.g. contact 244, the
12 dummy source structure may function as an
13 interconnect to connect 3D memory devices with other
14 peripheral devices."

15 So the patent is clear that this may
16 function as an interconnect. The patent is not
17 clear as to exactly how this could be done.

18 Q. Is there a preferable device shown in
19 Figure 2L?

20 A. No.

21 Q. Where would a preferable device be in
22 Figure 2L, if one were to place a preferable device
23 in 2L?

24 A. Well, you have two choices.

25 ATTORNEY BONNY: Objection. Form.

1 THE WITNESS: You place it underneath the
2 array, or you place it above the array. I
3 suppose you could also place it to the left;
4 and the right; and the top; and the bottom of
5 the array.

6 The peripheral devices in the art these
7 days can be placed on all sides of the
8 structure, above it and below it.

9 ATTORNEY LANG: Okay.

10 BY ATTORNEY LANG:

11 Q. So in Figure 2L, it would either be above
12 it or below 202. Is that correct -- strike that.

13 The peripheral device, if it was in
14 Figure 2L, would be above what you see or, in fact,
15 be below 202?

16 A. Or it could --

17 ATTORNEY BONNY: Objection. Form.

18 THE WITNESS: -- be to the side.

19 BY ATTORNEY LANG:

20 Q. Or to the side?

21 A. Yeah. The patent is clear that you can
22 connect to a peripheral device. But in glancing
23 through the patent, I'm not aware that they
24 specified whether the peripheral device is above, or
25 below, or to the sides.

1 Keep in mind that there is examples of all
2 of these in the art. You know, memory arrays that
3 historically had peripheral devices on the edges.
4 They have had peripheral devices above. And in more
5 recent years, they have had peripheral devices
6 below.

7 So I don't think we can take Figure 2L and
8 assume either above or below, because all of these
9 options are possible in the art.

10 Q. If we go to Figure 3, this kind of
11 summarizes the process for making the general
12 structures described in the '872 Patent. Correct?

13 A. Figure 3. Yes. Figure 3 is the flow
14 chart. That's correct.

15 Q. Okay. And you see in step 304 where it
16 says, "dummy source holes were formed?"

17 A. Yes, I do. 304 states:

18 "From a plurality of dummy channel holes
19 in a plurality of dummy source holes in the
20 staircase structure."

21 That's correct.

22 Q. Okay. And then in step 310, a spacer is
23 formed in the dummy source hole. Correct?

24 A. 310 itself simply says, "form a spacer."
25 That's correct.

REPORTER'S CERTIFICATE

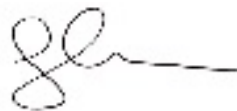
I, GISELLE MITCHELL-MARGERUM, the undersigned, a Registered Professional Reporter, Certified Reporting Instructor, Licensed Court Reporter, and Certified Court Reporter, do hereby certify:

That the witness, KELIN KUHN, before examination was remotely duly sworn to testify to the truth, the whole truth, and nothing but the truth.

That the foregoing deposition was taken remotely stenographically by me on Friday, March 28, 2025, and thereafter was transcribed by me, and that the deposition is a full, true, and complete transcript of the testimony, including questions and answers, and objections, motions and exceptions made by counsel.

That reading and signing was not requested; and that I am neither attorney nor counsel for, nor related to or employed by, any of the parties to the action in which this deposition was taken; and that I have no interest, financial or otherwise, in this case.

IN WITNESS WHEREOF, I have hereunto set my hand this 3rd day of April, 2025.



GISELLE MITCHELL-MARGERUM, RPR, CRI, CCR, LCR, ACCR, CSR
CALIFORNIA CSR 14424

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CERTIFICATE OF DEPONENT

I, KELIN KUHN, hereby certify that I have read the foregoing pages, numbered 1 through 181, of my deposition of testimony taken in these proceedings on Friday, March 28, 2025 and, with the exception of the changes listed on the next page and/or corrections, if any, find them to be a true and accurate transcription thereof.

Signed:
Name: KELIN KUHN
Date:

Case Name: Micron v. YMTC
Witness Name: KELIN KUHN
Date:

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Subscribed and sworn to before

me this date day of month , 2025.

KELIN KUHN