

1 D. Brahmbhatt

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

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6 MACRONIX INTERNATIONAL CO., LTD.,
7 MACRONIX ASIA LIMITED, MACRONIX
8 (HONG KONG) CO., LTD., and
9 MACRONIX AMERICA, INC.,

10 Petitioner,

11 - against -

IPR2014-00105
Patent 6,731,536 B1

12 SPANSION, LLC,

13 Patent Owner.
14 -----x

15 VIDEOTAPED DEPOSITION OF

16 DHAVAL J. BRAHMBHATT

17 New York, New York

18 Tuesday, July 2, 2014

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21
22
23 Reported by:

24 THOMAS A. FERNICOLA, RPR

25 JOB NO. 81809

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1 D. Brahmbhatt
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5
6 July 2, 2014
7 9:02 a.m.
8
9 Videotaped Deposition of DHAVAL J.
10 BRAHMBHATT, held at the Law Offices of Winston &
11 Strawn, LLP, 200 Park Avenue, New York, New York,
12 before Thomas A. Fernicola, a Registered
13 Professional Reporter and Notary Public of the
14 State of New York.
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1 D. Brahmbhatt
2 THE VIDEOGRAPHER: This is the start
3 of tape labeled No. 1 of the videotaped of
4 Dhaval Brahmbhatt in the matter of Macronix
5 International Company, Limited, et al.,
6 versus Spansion, LLC, in the United States
7 Patent and Trademark Office, Before the
8 Patent Trial and Appeal Board, Case No.
9 IPR2014-00105.
10 This deposition is being held at 200
11 Park Avenue, New York, New York, on
12 July 2nd, 2014, at approximately 9:02 a.m.
13 My name is Robert Rinkewich from TSG
14 Reporting, Inc. and I'm the legal video
15 specialist.
16 The court reporter is Tom Fernicola,
17 in association with TSG Reporting, Inc.
18 Will counsel please introduce
19 yourself.
20 MR. BAUGHMAN: J. Steven Baughman,
21 from Ropes & Gray, for Patent Owner.
22 MS. JABIDO: Janice Jabido, Ropes &
23 Gray.
24 MR. MURRAY: This is Michael Murray
25 from Winston & Strawn, for Petitioners.

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1 D. Brahmbhatt
2 A P P E A R A N C E S:
3
4 WINSTON & STRAWN
5 Attorneys for Petitioner
6 200 Park Avenue
7 New York, New York 10166
8 BY: MICHAEL MURRAY, ESQ.
9
10
11 ROPES & GRAY
12 Attorneys for Patent Owner
13 One Metro Center
14 700 12th Street, NW
15 Washington, D.C. 20005
16 BY: J. STEVEN BAUGHMAN, ESQ.
17
18 - and -
19
20 ROPES & GRAY
21 191 North Wacker Drive
22 Chicago, Illinois 60606
23 BY: JANICE JABIDO, ESQ.
24
25 ALSO PRESENT:

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1 D. Brahmbhatt
2 THE VIDEOGRAPHER: Will the court
3 reporter please swear in the witness.
4
5 D H A V A L J. B R A H M B H A T T,
6 called as a witness, having been duly sworn
7 by a Notary Public, was examined and
8 testified as follows:
9 BY THE REPORTER:
10 Q. Please state your full name and
11 address for the record.
12 A. Dhaval J. Brahmbhatt, 25 North 14th
13 Street, Suite 400, San Jose, California 95112.
14 MR. BAUGHMAN: Counsel, just at the
15 outset, I want to state for the record the
16 parties' stipulation that to save time
17 testimony on background issues in this
18 deposition can be used and entered in
19 IPR2014-00108, as well as in this trial
20 proceeding; is that right?
21 MR. MURRAY: Yes. That is right. It
22 will probably be obvious when you finish
23 the background, but maybe if you would just
24 sort of state for the record so we have a
25 clear --

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2 even a slightest change, you had to go through
3 a defined process of approval with the
4 customer.

5 So sometimes the documentation will
6 be determined by that large customer we had,
7 but other than that, we had standard
8 documentation.

9 Q. What kind of standard
10 documentation --

11 A. The company had a documentation
12 department and all these things were properly
13 documented.

14 Q. We've been talking about the example
15 of National Semiconductor.

16 Did you also have documentation at
17 other places you worked?

18 A. Oh, yes. I think, in fact, the first
19 thing I learned when I started at VISHAY
20 Semiconductor, the documentation was actually
21 over there even more strictly enforced. So
22 that was good training to start with.

23 Q. And when you were at Smart Module and
24 you were looking at different semiconductor
25 products from different vendors, how would you

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2 determine as an initial cut what features were
3 in the different products?

4 A. That's a good question. As I
5 mentioned, at Smart Modular, we were doing
6 subsystems, modules or cards, as we called
7 them, memory cards. And the primary component,
8 flash memory was a primary component.

9 And as it turns out in our industry,
10 these things are usually compatible with each
11 other; in other words, when you look at data
12 sheets, people try to, whether you pick from
13 Vendor A, Vendor B, Vendor C, if they're
14 competing in that market with a product that
15 has the same density, then they would come up
16 with data sheets that are compatible.

17 So there are industry acceptable
18 standards, you know, developed by organizations
19 such as jdac and others where these things are
20 standardized; and, therefore, more often than
21 not, you will find data sheets that are quite
22 compatible with each other.

23 Q. And the data sheets would be
24 something you looked at Smart Module or other
25 companies to understand what was in the chips?

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2 A. That would be the primary thing I
3 would look at. And coming from the
4 semiconductor industry, I had also developed
5 data sheets, so I was quite familiar with those
6 documents.

7 Q. I think you testified that at
8 National Semiconductor, one of the changes that
9 was happening for your product line which was
10 successful was introducing higher densities.

11 Can you talk a little bit more about
12 what that means?

13 A. Well, and that happens and that was
14 not unique to National Semiconductor, I should
15 say. Companies, you know, year after year they
16 would come up with new products. Sometimes
17 they would involve just the same density and
18 additional features, but quite often that would
19 involve expanded size of the memory, higher
20 density that was put in.

21 Q. So by that you mean more memory in
22 the same space?

23 A. I don't know if it was the same
24 space. The reason being, the chip size would
25 vary; in other words, as you -- as you come up

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2 with a higher density memory product, there is
3 always a combination of what technology you
4 would use, what cell size you would use.

5 So, as an example, as you go through
6 manufacturing, you are able to, using the same
7 technology, develop a smaller memory set over a
8 period of period of time as you learn, because
9 initially on purpose you make it a little
10 larger so that you are able to at least produce
11 it. And then as you learn more, you get a
12 better handle over manufacturing issues.

13 So sometimes you could introduce a
14 higher density product using the same
15 manufacturing technology, but the cell size may
16 be smaller. Therefore, even though the memory
17 density is higher, the size of the chip may not
18 increase as much. In other words, just because
19 you doubled the number of memory cells, the
20 size of the chip may not increase by the same
21 ratio.

22 Now, that is one aspect. The other
23 one would be that we would deploy a new
24 technology, process technology, and the
25 advanced process technologies then would allow

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2 you to make substantial reduction in the size
3 of the chip, and, therefore, the old ratios
4 will change again. So there were just
5 different factors that would come into play.

6 Q. But you were trying for a smaller
7 size and higher density when that was possible?

8 A. That's common in the industry that
9 people would try to, we call it -- and I've
10 said that somewhere in my report, it's the most
11 expensive real estate in the world. So you try
12 to, as far as possible.

13 But you have to be judicious about
14 it; in other words, there are design rules that
15 have to be followed and the design rules are
16 developed in collaboration by all people
17 involved, you know, processing units, design
18 engineers, manufacturing engineers, all these
19 people, device engineers, they all get together
20 and, you know, agree on what can be done.

21 Q. I think you mentioned earlier that
22 one of the other things you were focusing on
23 were design changes in your product line, was
24 it scribe line structuring?

25 A. I did not mention, but, yes, scribe

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2 lines are also an important aspect of a chip,
3 because you've got this wafer, and then there
4 are multiple copies of the same device that are
5 being produced on one wafer. And they're
6 separated from each other by structures called
7 scribe lines, where you use a diamond saw after
8 the wafer is finished being processed, and then
9 you use a diamond saw to cut through those.

10 And they look like the streets in a
11 city like New York when you look from the top
12 and they run vertical and horizontal, and you
13 use a diamond saw to -- now they are using
14 laser saw, as well. So one way or the other
15 you just cut through that structure called
16 scribe line, as the name suggests, you scribe
17 through it, and then you are able to pick up
18 individual chips that will be then packaged
19 into semiconductor devices that will be then
20 used in systems.

21 Q. And these developments we've been
22 talking about, higher densities, what we just
23 discussed in scribe lines, were those features
24 that were important generally to people
25 designing chips at the time, in your

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2 understanding?

3 A. Can you repeat the question?

4 Q. Yes.

5 So we talked a little bit about some
6 of the design changes you considered at
7 National Semiconductor, looking at trying to
8 get more density on chips; correct, that was
9 one of them?

10 A. Also adding features. I mean, there
11 were a whole bunch of things. Making the chips
12 more manufacturable. I mean, I would be on the
13 test floor. I would be in the manufacturing,
14 you know, facility. I would be going regularly
15 to the packaging facility that we had in those
16 days at Bangkok.

17 So, I mean, a variety of things. And
18 I had the ability to roll up my sleeves and
19 work with the engineers. So it was not just
20 one thing.

21 Q. Were these challenges that people
22 faced in the industry generally?

23 A. Oh, yes, yes. I don't think it was
24 anything unique offered in that sense to me. I
25 think maybe the difference was that this

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2 product line, and probably that's true for many
3 memory products, your profit margins are thin,
4 and you're trying to -- you're trying to
5 squeeze even a fraction of a penny from
6 anywhere you can. So those things are
7 important.

8 Q. So, obviously, losing -- losing chips
9 in the manufacturing process would cost you
10 money; right?

11 A. Oh, yes, yes. So that is part of it.
12 But you could lose chips many different places.
13 For example, you could -- people could steal
14 your stuff. I mean, these things happen.

15 And so, therefore, you know, one of
16 the references we have talked about how to
17 trace lost -- so it's important, but also
18 managing the cost of different steps, how much
19 would you pay for that blank wafer, how much
20 did you pay for packaging that unit, how much
21 did you pay for testing it. Everything else.

22 Q. And you said it's some of the most
23 expensive real estate in the world.

24 So the way you use area on a chip has
25 an impact on cost, as well?