

UNITED STATES PATENT & TRADEMARK OFFICE  
BEFORE THE PATENT TRIAL AND APPEAL BOARD  
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SAMSUNG ELECTRONICS CO., LTD. and SAMSUNG  
ELECTRONICS AMERICA, INC.,

Petitioners,

-against-

Case No.:  
IPR 2024-01403  
IPR 2024-01405

HARBOR ISLAND DYNAMIC, LLC,

Patent Owner.

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DATE: June 9, 2025  
TIME: 9:00 a.m.

CROSS EXAMINATION of SCOTT E.  
THOMPSON, Ph.D., taken by the Patent Owner,  
pursuant to a notice, held remotely via  
Zoom Videoconference, before Suzanne  
Pastor, a Notary Public of the State of New  
York.

| Page 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Page 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| <p>1 A P P E A R A N C E S:<br/>(All appearances via Zoom)</p> <p>2</p> <p>3 FABRICANT LLP<br/>Attorneys for the Patent Owner</p> <p>4 411 Theodore Fremd Avenue, #206 South<br/>Rye, New York 10580</p> <p>5 BY: RICHARD COWELL, ESQ.<br/>212.257.5797<br/>rcowell@fabricantllp.com</p> <p>6</p> <p>7 FINNEGAN HEDERSON FARABOW<br/>GARRETT &amp; DUNNER LLP<br/>Attorneys for the Petitioner</p> <p>8 SAMSUNG</p> <p>9 901 New York Avenue, NW<br/>Washington, D.C. 20001</p> <p>10 BY: ALEXANDER E. HARDING, ESQ.<br/>202.408.4324<br/>alexander.harding@finnegan.com</p> <p>11 AND: CHEN ZANG, ESQ.<br/>202.408.4416<br/>chen.zang@finnegan.com</p> <p>12 AND: JOSHUA L. GOLDBERG, ESQ.<br/>202.408.6092<br/>joshua.goldberg@finnegan.com</p> <p>13</p> <p>14</p> <p>15 *</p> <p>16 *</p> <p>17 *</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p> | <p>1 THE REPORTER: Good morning.</p> <p>2 The attorneys participating in this</p> <p>3 deposition acknowledge that I am not</p> <p>4 physically present in the deposition</p> <p>5 room and that I will be reporting</p> <p>6 this deposition remotely.</p> <p>7 They further acknowledge that</p> <p>8 in lieu of an oath administered in</p> <p>9 person, I will place the witness</p> <p>10 under penalty of perjury.</p> <p>11 The parties and their counsel</p> <p>12 consent to this arrangement and waive</p> <p>13 any objections to this manner of</p> <p>14 reporting. Please indicate your</p> <p>15 agreement by stating your name and</p> <p>16 your agreement on the record.</p> <p>17 MR. COWELL: This is Richard</p> <p>18 Cowell, and I agree.</p> <p>19 MR. ZANG: This is Chen Zang</p> <p>20 from Finnegan Henderson for</p> <p>21 petitioner Samsung. Together with me</p> <p>22 is Alex Harding and Josh Goldberg.</p> <p>23 THE REPORTER: Doctor, please</p> <p>24 raise your right hand.</p> <p>25 Do you swear or affirm that the</p> |
| Page 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Page 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>1 testimony you are about to give will</p> <p>2 be the truth, the whole truth, and</p> <p>3 nothing but the truth?</p> <p>4 THE WITNESS: I do.</p> <p>5 THE REPORTER: Thank you.</p> <p>6 All set, counsel.</p> <p>7 MR. COWELL: Thank you.</p> <p>8 CROSS EXAMINATION</p> <p>9 BY MR. COWELL:</p> <p>10 Q. Good morning, Dr. Thompson.</p> <p>11 Can you state your full name</p> <p>12 for the record?</p> <p>13 A. Scott Emmett Thompson.</p> <p>14 Q. Have you ever been deposed</p> <p>15 before?</p> <p>16 A. Yes.</p> <p>17 Q. How many times?</p> <p>18 A. More than ten.</p> <p>19 Q. Less than 20, is that right?</p> <p>20 A. Yes.</p> <p>21 Q. Have you ever testified at</p> <p>22 trial?</p> <p>23 A. Yes.</p> <p>24 Q. How many times?</p> <p>25 A. Four.</p>                                                                                                           | <p>1 Q. And was all the testimony</p> <p>2 between your depositions and trial, were</p> <p>3 those always in patent cases?</p> <p>4 A. I think the testimony was all</p> <p>5 patent cases. Some of the depositions were</p> <p>6 not.</p> <p>7 Q. What were the other high level</p> <p>8 subject matter of the other cases that</p> <p>9 weren't patent cases?</p> <p>10 A. One was a class action lawsuit</p> <p>11 on yields of computer chips.</p> <p>12 Q. Any others that you can think</p> <p>13 of right now?</p> <p>14 A. I think that was the only one</p> <p>15 that was not a patent case.</p> <p>16 Q. Since you've been deposed</p> <p>17 before, I assume you're familiar with the</p> <p>18 process but I'm just going to go over a</p> <p>19 couple of ground rules. Is that all right?</p> <p>20 A. Yes.</p> <p>21 Q. You understand today that I'm</p> <p>22 going to be asking questions and you're</p> <p>23 going to be answering them, is that right?</p> <p>24 A. Yes.</p> <p>25 Q. If at any time you don't</p>                     |

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| <p style="text-align: right;">Page 6</p> <p>1 understand one of my questions, please let<br/>2 me know and I'll try my best to rephrase or<br/>3 clarify it. However, if you do answer my<br/>4 question, I will assume you understood it.<br/>5 Is that fair?<br/>6 A. Yes.<br/>7 Q. From time to time your counsel<br/>8 may object, and that is their right.<br/>9 However, unless they instruct you not to<br/>10 answer, you do need to provide a full<br/>11 answer to my question after the objection.<br/>12 Do you understand that?<br/>13 A. Yes.<br/>14 Q. We'll take breaks periodically.<br/>15 If at any point you would like a break,<br/>16 just let me know. However, if there's a<br/>17 pending question I'm going to ask that you<br/>18 finish your answer before we take the<br/>19 break. Is that fair?<br/>20 A. Yes.<br/>21 Q. Are you on any medications that<br/>22 would prevent you from giving full and<br/>23 truthful testimony today?<br/>24 A. No.<br/>25 Q. Is there any other reason you</p> | <p style="text-align: right;">Page 7</p> <p>1 can't give full and truthful testimony<br/>2 today?<br/>3 A. No.<br/>4 Q. Where are you currently<br/>5 located?<br/>6 A. At Finnegan's office in Reston.<br/>7 Q. Who is with you in the same<br/>8 room as you right now?<br/>9 A. There's three attorneys.<br/>10 Mr. Zang, Mr. Harding and Mr. Goldberg.<br/>11 Q. Do you have any written or<br/>12 electronic materials with you right now?<br/>13 A. I do. I have my iPad with me.<br/>14 It has clean copies of my report and the<br/>15 exhibits.<br/>16 Q. And that's the only materials<br/>17 you have with you?<br/>18 A. Correct. And my iPad is in<br/>19 airplane mode and there's no other<br/>20 information on my iPad.<br/>21 Q. That was my next question, so<br/>22 thank you.<br/>23 Where do you currently work?<br/>24 A. University of Florida.<br/>25 Q. Are you currently teaching</p> |
| <p style="text-align: right;">Page 8</p> <p>1 classes?<br/>2 A. I teach in the fall and spring.<br/>3 This is the summer term so I don't teach in<br/>4 the summer.<br/>5 Q. What classes did you teach in<br/>6 this past spring?<br/>7 A. I taught the future of nano<br/>8 technology. It involves where the<br/>9 technology to make computer chips and AI<br/>10 chips is going.<br/>11 Q. And that was the only class you<br/>12 taught?<br/>13 A. Yes.<br/>14 Q. At your counsel's request,<br/>15 we're going to go sequentially in the IPR.<br/>16 So I'm going to start with IPR 2024-1403,<br/>17 which is on the '673 patent.<br/>18 MR. COWELL: Which counsel will<br/>19 be defending this part?<br/>20 MR. HARDING: That will be me.<br/>21 This is Alex Harding on behalf of the<br/>22 petitioner from Finnegan.<br/>23 Q. Dr. Thompson, are you ready for<br/>24 the 1403?<br/>25 A. Yes.</p>                                                                                                                  | <p style="text-align: right;">Page 9</p> <p>1 Q. Who first hired you to work on<br/>2 IPR 1403?<br/>3 A. I believe it was Mr. Zang.<br/>4 Q. When about was that?<br/>5 A. I would guess six to eight<br/>6 months ago.<br/>7 Q. In the course of your work on<br/>8 IPR 1403, did you yourself conduct a prior<br/>9 art search?<br/>10 A. Yes.<br/>11 Q. When about did you do that?<br/>12 A. Right after I was hired.<br/>13 Q. About how much time did you<br/>14 spend on a prior art search?<br/>15 A. I don't have the exact numbers,<br/>16 but I would say more than 20 hours.<br/>17 Q. Do you consider it a thorough<br/>18 search?<br/>19 MR. HARDING: Objection; form.<br/>20 A. I consider the parts I did<br/>21 thorough, yes.<br/>22 Q. With respect to IPR 1403,<br/>23 there's three prior art references on which<br/>24 you rely, is that right?<br/>25 A. Correct, there's three.</p>     |

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| <p style="text-align: right;">Page 10</p> <p>1 Q. And it's Yin, Y-I-Y, Koshimizu<br/>2 and Norstrom, is that right?<br/>3 A. That's correct.<br/>4 Q. Did you uncover Yin in the<br/>5 course of your own prior art search?<br/>6 A. I don't know. So I believe in<br/>7 the order of documents I sent to the<br/>8 lawyers, maybe 50 prior arts that I found.<br/>9 I probably looked at a couple hundred. I<br/>10 don't know if that's one they found, I<br/>11 found or we both found.<br/>12 Q. What about Koshimizu, did you<br/>13 find that or did the lawyers?<br/>14 A. I'm not a hundred percent sure<br/>15 but I believe we both found that one.<br/>16 Q. And the same question on<br/>17 Norstrom?<br/>18 A. I believe we both found<br/>19 Norstrom also.<br/>20 Q. How did you prepare to testify<br/>21 today on IPR 1403?<br/>22 A. I reviewed my report, the<br/>23 exhibits, and had two meetings with the<br/>24 lawyers.<br/>25 Q. How many hours did you spend</p> | <p style="text-align: right;">Page 11</p> <p>1 preparing for the deposition?<br/>2 A. For both patents, ballpark,<br/>3 about 50 hours.<br/>4 Q. 50 hours, that's covering both<br/>5 proceedings we're going to talk about<br/>6 today, is that right?<br/>7 A. Correct.<br/>8 Q. Do you have your declaration in<br/>9 front of you?<br/>10 A. I do.<br/>11 Q. Your declaration lists three<br/>12 grounds of invalidity, is that right?<br/>13 A. That's correct.<br/>14 Q. Within your declaration you<br/>15 cite to all the evidence supporting your<br/>16 opinion, is that right?<br/>17 A. Correct.<br/>18 Q. I'd like to talk about what<br/>19 you've labeled as ground 2, which is<br/>20 Norstrom.<br/>21 A. Okay.<br/>22 Q. In your opinion, Norstrom<br/>23 participates claims 1, 3, 5, 7, 8, 10, 12<br/>24 and 14 through 16, is that right?<br/>25 A. Correct.</p>                                                                                                |
| <p style="text-align: right;">Page 12</p> <p>1 Q. Do you have Norstrom open in<br/>2 front of you as well?<br/>3 A. I do now.<br/>4 Q. Let's take a look at figure 13<br/>5 (a) of Norstrom.<br/>6 A. Yes, I have 13 (a) in front of<br/>7 me.<br/>8 Q. You're familiar with figure 13<br/>9 (a), right?<br/>10 A. Yes.<br/>11 Q. In fact, you rely on that in<br/>12 your declaration, is that right?<br/>13 A. Yes.<br/>14 Q. Now, figure 13 (a) you agree is<br/>15 a cross-section of one of Norstrom's<br/>16 embodiments, is that right?<br/>17 A. Yes.<br/>18 Q. And it shows numerous features<br/>19 in this cross-section, right?<br/>20 A. Yes.<br/>21 Q. So I just want to go through<br/>22 and ask you a couple of questions about the<br/>23 features here that are shown here in figure<br/>24 13 (a). At the bottom layer there, what is<br/>25 that?</p>                                                                                                                 | <p style="text-align: right;">Page 13</p> <p>1 A. It's a silicon substrate with<br/>2 100 orientation of P type material.<br/>3 Q. Did you say 100 orientation?<br/>4 A. Yes. That's the crystal<br/>5 orientation, correct.<br/>6 Q. What does that mean?<br/>7 A. It means the top of the wafer<br/>8 is on the 100 plane. When you cut a<br/>9 crystal you can cut it on many planes.<br/>10 That's the standard orientation to use.<br/>11 Q. All right, now, right above in<br/>12 the center, right above the silicon layer<br/>13 there is an N+ buried layer. Do you see<br/>14 that?<br/>15 A. I do.<br/>16 Q. That's labeled with 103, is<br/>17 that right?<br/>18 A. Correct.<br/>19 Q. What is an N+ buried layer?<br/>20 A. It's a region opened, in this<br/>21 case silicon, that's very heavily doped<br/>22 with N type material for low resistance to<br/>23 get the current collected for the bipolar<br/>24 device.<br/>25 Q. Right above that, what's the</p> |

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| <p style="text-align: right;">Page 14</p> <p>1 next layer?</p> <p>2 A. It's an epitaxially grown N</p> <p>3 type silicon.</p> <p>4 Q. And that's labeled with 107, is</p> <p>5 that right?</p> <p>6 A. Correct.</p> <p>7 Q. What does it mean epitaxially</p> <p>8 grown N type?</p> <p>9 A. So the N type means it's doped</p> <p>10 with N type dopants for silicon, typically</p> <p>11 that's phosphorus or arsenic. And because</p> <p>12 it's low dope, generally that's grown a</p> <p>13 crystal on a crystal. Epitaxi is a Greek</p> <p>14 word for growing a crystal -- taking the</p> <p>15 form of the existing crystal.</p> <p>16 Q. I think it's the next one going</p> <p>17 up, but the label is to the right. It's</p> <p>18 layer 125. Do you see that?</p> <p>19 A. I do.</p> <p>20 Q. What is layer 125?</p> <p>21 A. It's a silicon oxide layer.</p> <p>22 Q. And what's the purpose of the</p> <p>23 silicon oxide layer?</p> <p>24 A. It has a few purposes. The</p> <p>25 primary purpose is for insulation.</p> | <p style="text-align: right;">Page 15</p> <p>1 Q. The next layer up, this time</p> <p>2 it's to the left, it's cross-hashed and</p> <p>3 it's labeled 131. Do you see that?</p> <p>4 A. I do.</p> <p>5 Q. What is 131?</p> <p>6 A. It appears to be a poly silicon</p> <p>7 layer. No, no, one second. Yes, poly</p> <p>8 silicon layer.</p> <p>9 Q. Why are you saying that?</p> <p>10 A. I'm looking in column 8 of the</p> <p>11 patent, line 6. We're talking about -- you</p> <p>12 said layer -- I'm sorry. The poly silicon</p> <p>13 layer 129 --</p> <p>14 Q. I think you jumped ahead. Just</p> <p>15 to be clear, right now I was asking about</p> <p>16 layer 131.</p> <p>17 A. Okay.</p> <p>18 Q. I believe the answer to that</p> <p>19 question is in the same paragraph. But</p> <p>20 what is layer 131?</p> <p>21 A. The CDB oxide layer.</p> <p>22 Q. What is a CDB oxide layer?</p> <p>23 A. It's an oxide layer that's</p> <p>24 deposited through chemical vapor</p> <p>25 deposition.</p>                                                                                                                        |
| <p style="text-align: right;">Page 16</p> <p>1 Q. And then you jumped ahead but</p> <p>2 right above 131 we have 129. I think you</p> <p>3 just told me that that's a poly silicon</p> <p>4 layer, correct?</p> <p>5 A. I did say that. I'll go back</p> <p>6 to the figure for a second.</p> <p>7 So I'm ready for the next</p> <p>8 question.</p> <p>9 Q. Okay, so we were talking about</p> <p>10 129. And that's the poly silicon layer you</p> <p>11 mentioned a minute ago, right?</p> <p>12 A. No, I think 131 is the poly</p> <p>13 silicon layer.</p> <p>14 Q. Let's clear this up. You can</p> <p>15 turn to paragraph 8, line 13 I think tells</p> <p>16 us both 131 and 129.</p> <p>17 MR. HARDING: Objection; form.</p> <p>18 Q. I apologize, I said paragraph</p> <p>19 8. I meant column 8.</p> <p>20 (Pause.)</p> <p>21 Is there some difficulty, Dr.</p> <p>22 Thompson?</p> <p>23 A. This is not in my report so I'm</p> <p>24 just trying to recall it for now.</p> <p>25 Okay, so is this a question you</p>         | <p style="text-align: right;">Page 17</p> <p>1 want me to answer now?</p> <p>2 Q. We just had a little bit of</p> <p>3 confusion over the last couple of minutes</p> <p>4 so I'm going to re-ask my question now that</p> <p>5 you prepared yourself and we can move on.</p> <p>6 What is layer 131?</p> <p>7 A. In column 8 there it says that</p> <p>8 it's a CDB oxide layer.</p> <p>9 Q. What is layer 129?</p> <p>10 A. In column 9 there it says it's</p> <p>11 a poly silicon layer.</p> <p>12 Q. Do you have any reason to doubt</p> <p>13 the specification's identification of those</p> <p>14 layers?</p> <p>15 A. This is not in my report. I'm</p> <p>16 studying that part of the device for the</p> <p>17 first time. I believe they have a mix-up</p> <p>18 in those labels.</p> <p>19 Q. Why do you believe that?</p> <p>20 A. The base 151 contact comes down</p> <p>21 and touches 131. So that should be a poly</p> <p>22 silicon layer. That extends to the base</p> <p>23 doping inside the epi N-type region. So</p> <p>24 based on the structure, a POSITA would know</p> <p>25 131 should be poly silicon.</p> |

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| <p style="text-align: right;">Page 18</p> <p>1 Q. So you're saying the -- well,<br/>2 before we get to that, you agree with me<br/>3 that column 8 describes 131 as a CDB oxide<br/>4 layer, correct?<br/>5 A. Correct.<br/>6 Q. And if you look at column 9,<br/>7 the bottom paragraph there, it also<br/>8 describes layer 131 as a CDB oxide layer,<br/>9 is that right?<br/>10 A. It does describe it as a CDB<br/>11 oxide layer in column 9 as well, correct.<br/>12 Q. But in your opinion, the<br/>13 specification is incorrect and 131 is<br/>14 actually a poly silicon layer, is that<br/>15 right?<br/>16 MR. HARDING: Objection; form.<br/>17 A. The way I interpret 131 is a<br/>18 poly silicon layer or an oxide layer, it's<br/>19 not relevant to the analysis of the patent<br/>20 in terms of anticipation. I would have to<br/>21 study this more. It's not in the report<br/>22 but it's possible they have a mix-up in the<br/>23 terminology of those two layers. But I<br/>24 would want to study that more before I give<br/>25 you an official opinion on that.</p>                                                           | <p style="text-align: right;">Page 19</p> <p>1 Q. That's because you're only<br/>2 studying this part of the device for the<br/>3 first time right now, is that right?<br/>4 MR. HARDING: Objection; form.<br/>5 A. I'm only studying how this<br/>6 routing is being done from the base<br/>7 contacts at this time. And more<br/>8 traditionally, 131 would be a poly silicon<br/>9 layer.<br/>10 Q. You are familiar with Norstrom,<br/>11 correct? The reference as a whole.<br/>12 A. Yes, I am.<br/>13 Q. How many times would you say<br/>14 you've read Norstrom?<br/>15 A. Six or seven.<br/>16 Q. And you'd agree with me<br/>17 Norstrom describes layer 129 as the poly<br/>18 silicon layer, is that right?<br/>19 A. In column 8 it says 129 is the<br/>20 poly silicon layer, correct.<br/>21 Q. Right, and it says that in<br/>22 several places in column 8, is that right?<br/>23 A. Column 8 specs says that,<br/>24 correct.<br/>25 Q. And the specific again says in</p> |
| <p style="text-align: right;">Page 20</p> <p>1 column 9 in the last paragraph that a thin<br/>2 layer 129 of poly silicon, and then it goes<br/>3 on to characterize layer 129 as the poly<br/>4 silicon layer several times. Do you see<br/>5 that?<br/>6 A. I do. But it's not uncommon to<br/>7 have mix-up of labels on a diagram. A<br/>8 POSITA looking at the structure would<br/>9 understand how routing is being done. It's<br/>10 not relevant for my analysis of the<br/>11 elements, but I believe the intention for<br/>12 the routing was for the base current or<br/>13 voltage to go to 151, then to 131, and then<br/>14 to the silicon substrate itself where the<br/>15 base contact is forming in the substrate.<br/>16 Q. So notwithstanding the<br/>17 specifications discussion, a POSITA would<br/>18 understand what's actually being shown in<br/>19 figure 13 (a), is that right?<br/>20 A. A POSITA would understand this<br/>21 is a standard bipolar device.<br/>22 Q. And there was just a mistake<br/>23 either in the specification or in the<br/>24 figure, is that right?<br/>25 A. The figure is correct. There's</p> | <p style="text-align: right;">Page 21</p> <p>1 mislabeling of the materials for 129 and<br/>2 131 in the specification.<br/>3 Q. Turning back to figure 13 (a),<br/>4 there is a structure at the top left, it's<br/>5 crosshatched. It's labeled 151. What is<br/>6 that?<br/>7 A. You said 151?<br/>8 Q. Yes.<br/>9 A. It's labeled base in the<br/>10 figure.<br/>11 Q. Okay, and to what does that<br/>12 refer?<br/>13 A. So it's a metal contact for the<br/>14 base electrode of the bipolar transistor.<br/>15 Q. And what is 153?<br/>16 A. The metal contact for the<br/>17 emitter electrode.<br/>18 Q. What is 155? And again, we're<br/>19 talking about 13 (a), just so we're<br/>20 oriented correctly.<br/>21 A. It would be a metal contact for<br/>22 the collector electrode.<br/>23 Q. And just under line 55, there's<br/>24 159. What is that?<br/>25 A. It's an N+ collector layer.</p>                                                                                |

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| <p style="text-align: right;">Page 22</p> <p>1 Q. What does that mean, an N+</p> <p>2 collector layer?</p> <p>3 A. It means it's a conductor to</p> <p>4 conduct current using electrons.</p> <p>5 Q. And the specification</p> <p>6 characterizes 159 as the collector contact,</p> <p>7 is that right? And I'm looking at the</p> <p>8 bottom of column 10 but feel free to read</p> <p>9 anywhere else in the patent you need to.</p> <p>10 MR. HARDING: Objection; form.</p> <p>11 A. In the bottom of column 10 it</p> <p>12 says the emitter contact and the collector</p> <p>13 contact 143 and 159 respectively. So yes,</p> <p>14 it's a collector contact.</p> <p>15 Q. What's the difference between</p> <p>16 collector contact 159 and collector contact</p> <p>17 155?</p> <p>18 A. 155 is made out of metal and</p> <p>19 159 is made out of N+ material.</p> <p>20 Q. Turning back to figure 13 (a),</p> <p>21 what is element 157?</p> <p>22 A. 157 is a collector contact</p> <p>23 pole.</p> <p>24 Q. And then what is 119?</p> <p>25 A. 119 are isolating trenches.</p>                                                                                | <p style="text-align: right;">Page 23</p> <p>1 Q. Okay, figure 13 (a) shows two</p> <p>2 isolating trenches?</p> <p>3 MR. HARDING: Objection; form.</p> <p>4 A. Figure 13 (a) is a</p> <p>5 cross-sectional cut, so we're seeing the</p> <p>6 regions where the cut interacted to a</p> <p>7 trench to the right and left of the bipolar</p> <p>8 device.</p> <p>9 Q. I don't think that answered my</p> <p>10 question. Does figure 13 (a) show two</p> <p>11 isolating trenches? Is that right?</p> <p>12 MR. HARDING: Objection; form.</p> <p>13 Asked and answered.</p> <p>14 A. It's showing a cross-sectional</p> <p>15 cut but a bipolar layout that we see in 13</p> <p>16 (c). And so in this one cut you're seeing</p> <p>17 a cross-sectional view for the trench on</p> <p>18 the right of the device and a trench on the</p> <p>19 left of the device.</p> <p>20 Q. Okay, and so the trench on the</p> <p>21 right of the device which is located</p> <p>22 generally under collector 155, do you see</p> <p>23 that?</p> <p>24 MR. HARDING: Objection; form.</p> <p>25 A. So in figure 13 (a) I see,</p> |
| <p style="text-align: right;">Page 24</p> <p>1 again, a cross-sectional cut, and where the</p> <p>2 cut intersects the collector under that cut</p> <p>3 I see a trench labeled 119.</p> <p>4 Q. Right, and I'm just -- that's</p> <p>5 the part of the figure I want you to look</p> <p>6 at for the next few questions. That's all</p> <p>7 I'm trying to say. So looking at the</p> <p>8 trench on the right we can see that that</p> <p>9 trench is located under collector 155,</p> <p>10 right?</p> <p>11 MR. HARDING: Objection; form.</p> <p>12 Mischaracterizes the exhibit.</p> <p>13 A. There's a -- in this</p> <p>14 cross-sectional cut, there's a region 119</p> <p>15 trench which is below the collector metal</p> <p>16 155.</p> <p>17 Q. And the collector metal 155</p> <p>18 extends further to the right than region</p> <p>19 119, is that right?</p> <p>20 A. In this one location the</p> <p>21 collector metal does extend farther left --</p> <p>22 one would understand the purpose of this</p> <p>23 cross-sectional cut is to show the</p> <p>24 features. The placement of the metal is</p> <p>25 going to be controlled by a mask, and</p> | <p style="text-align: right;">Page 25</p> <p>1 that's adjustable based on the mask</p> <p>2 dimensions.</p> <p>3 Q. Okay, I'm going to object to</p> <p>4 that as nonresponsive.</p> <p>5 Sorry, I'm just asking in the</p> <p>6 figure here, we see that collector 155</p> <p>7 extends further to the right than region</p> <p>8 119, is that right?</p> <p>9 MR. HARDING: Objection; asked</p> <p>10 and answered.</p> <p>11 A. As depicted in this</p> <p>12 cross-section, in this one drawing it is</p> <p>13 showing the metal farther to the right in</p> <p>14 the image than the trench. But a POSITA</p> <p>15 would understand that these are items --</p> <p>16 structural items that you can place</p> <p>17 anywhere on the integrated circuit.</p> <p>18 Q. Okay, and in figure 13 (a) we</p> <p>19 can also see that collector 155 extends</p> <p>20 further to the left than trench 119, is</p> <p>21 that right?</p> <p>22 A. In this cross-sectional cut</p> <p>23 it's depicting that the collector metal can</p> <p>24 be farther to the left than the edge of the</p> <p>25 trench 119.</p>     |

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| <p style="text-align: right;">Page 26</p> <p>1 Q. It's also true that the contact<br/>2 hole 157 extends further to the right than<br/>3 the trench 119 as shown in figure 13 (a),<br/>4 is that right?</p> <p>5 MR. HARDING: Objection; form.</p> <p>6 A. By contact hole, if you mean<br/>7 layer 157, there's elements of 157 that are<br/>8 farther to the left in this cross-sectional<br/>9 cut than the trench 119.</p> <p>10 Q. I did mean 157, so I thank you<br/>11 for correcting me on that.</p> <p>12 And element 157 also extends<br/>13 further to the left as shown in figure 13<br/>14 (a) than trench 119, is that right?</p> <p>15 MR. HARDING: Objection; form.</p> <p>16 A. In this cross-sectional cut<br/>17 it's depicting a feature 157, collection<br/>18 contact hole, both farther to the left and<br/>19 farther to the right than the trench 119.</p> <p>20 Q. What's element 121?</p> <p>21 A. 121 is a thin surface layer of<br/>22 silicon oxide.</p> <p>23 Q. Okay, and what is element 123?</p> <p>24 A. 123 is a fill material, and for<br/>25 example, could be silicon oxide. I believe</p>      | <p style="text-align: right;">Page 27</p> <p>1 elsewhere in the spec it says it can be<br/>2 poly silicon, too.</p> <p>3 Q. Let's look at figure 13 (c).<br/>4 A. Okay.</p> <p>5 Q. If you see in figure 13 (c) we<br/>6 have element 131. Do you see that?</p> <p>7 A. I do.</p> <p>8 Q. And is that a base poly<br/>9 silicon?</p> <p>10 A. Yes.</p> <p>11 Q. And that's despite figure 13<br/>12 (a) labelling poly silicon as 129, is that<br/>13 right?</p> <p>14 MR. HARDING: Objection; form.</p> <p>15 A. Right, so this confirms the<br/>16 mislabelling now I think we see in column<br/>17 8. So figure 13 (c) is calling out a poly<br/>18 silicon layer, and like I said when I<br/>19 looked at the cross-section image before,<br/>20 even though the text said 131 was an oxide<br/>21 layer, the cross-sectional makes sense to<br/>22 someone who understands bipolar transistors<br/>23 would know that was a poly silicon layer.</p> <p>24 Q. Okay, so figure 13 (c) confirms<br/>25 to you that the specification is wrong in</p>                                                                                                  |
| <p style="text-align: right;">Page 28</p> <p>1 mislabeling of layers 131 and 129, is that<br/>2 right?</p> <p>3 MR. HARDING: Objection; form.</p> <p>4 A. Well, the figure is saying<br/>5 layer 131 is the base poly silicon layer.<br/>6 But the column A spec said CDB oxide layer.<br/>7 But when you look at the cross-section, one<br/>8 would know it doesn't make sense the CDB<br/>9 oxide layer is there and it's mislabeled<br/>10 and the correct way to read the figure of<br/>11 131 is a poly silicon layer.</p> <p>12 Q. For 13 (c), figure 13 (c) also<br/>13 has element labeled 151 base contact. Do<br/>14 you see that on the left?</p> <p>15 A. I do.</p> <p>16 Q. And does that correspond to the<br/>17 151 base contact we saw in figure 13 (a)?</p> <p>18 A. They're physically the same<br/>19 structure, but we're seeing different views<br/>20 and -- so I wouldn't say they're the --<br/>21 they're describing the same structure but<br/>22 giving different information about the<br/>23 structure.</p> <p>24 Q. Okay, and then element 157 in<br/>25 13 (c) is recess for collector connection.</p> | <p style="text-align: right;">Page 29</p> <p>1 Is that the same as 157 in figure 13 (a)<br/>2 which is called a collector contact hole?</p> <p>3 A. 157 is the same structure in<br/>4 terms of it being the same feature you're<br/>5 fabricating. One is showing a layout view<br/>6 of it and one is showing a cross-sectional<br/>7 view of it.</p> <p>8 Q. There's also an element labeled<br/>9 156 collector contact. What is that?</p> <p>10 A. From the topdown view, 157 is<br/>11 a -- 156 is the collector contact. I don't<br/>12 see anything in the spec that defines it<br/>13 farther.</p> <p>14 Q. Reading this, does 156 equate<br/>15 to the collector contact 155 we see in<br/>16 figure 13 (a)?</p> <p>17 MR. HARDING: Objection; form.</p> <p>18 A. This is not something that's in<br/>19 my report that's relevant to the<br/>20 discussion, but it appears to be a metal<br/>21 layer to cover the collector contacts.<br/>22 Again, it's possible that it's a typo and<br/>23 it should be 155. I don't have it in my<br/>24 report. I don't think it's relevant at all<br/>25 to the features that were related to the</p> |

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| <p style="text-align: right;">Page 30</p> <p>1 claims in the '673 patent. So I'd have to</p> <p>2 study it more, but it appears it's just a</p> <p>3 piece of metal to get the current out of</p> <p>4 the device.</p> <p>5 MR. HARDING: I was just going</p> <p>6 to ask if now would be a good time</p> <p>7 for a bathroom break, Dr. Thompson.</p> <p>8 If you need one, doctor.</p> <p>9 THE WITNESS: That would be</p> <p>10 good.</p> <p>11 MR. COWELL: Sure, let's take</p> <p>12 ten minutes.</p> <p>13 (Whereupon, a short recess was</p> <p>14 taken.)</p> <p>15 BY MR. COWELL:</p> <p>16 Q. Dr. Thompson, welcome back from</p> <p>17 the break.</p> <p>18 A. Thank you.</p> <p>19 Q. We were discussing figure 13</p> <p>20 (c) before your counsel asked for a break.</p> <p>21 There's two labels in figure 13 (c) called</p> <p>22 123 trench. Do you see that?</p> <p>23 A. Correct.</p> <p>24 Q. And in your opinion, those two</p> <p>25 labels define the inward and outward wells</p> | <p style="text-align: right;">Page 31</p> <p>1 of a trench, is that right?</p> <p>2 A. That's correct.</p> <p>3 Q. And that's just one singular</p> <p>4 trench that basically goes around the</p> <p>5 device as shown in the pink area in your</p> <p>6 declaration on page 78. Do I have that</p> <p>7 right?</p> <p>8 A. The trench that surrounds the</p> <p>9 device, which is the common way to isolate</p> <p>10 the bipolar transistor.</p> <p>11 Q. And it's one singular trench,</p> <p>12 is that right?</p> <p>13 MR. HARDING: Objection; asked</p> <p>14 and answered.</p> <p>15 A. It's the trench that surrounds</p> <p>16 the bipolar device.</p> <p>17 Q. I don't think you answered my</p> <p>18 question. Is it one singular trench or a</p> <p>19 combination of trenches?</p> <p>20 MR. HARDING: Objection; form,</p> <p>21 asked and answered.</p> <p>22 A. It's one trench that surrounds</p> <p>23 the device. It's all etched at the same</p> <p>24 time and filled at the same time.</p> <p>25 Q. Thank you, now I understand.</p> |
| <p style="text-align: right;">Page 32</p> <p>1 That's all my questions with</p> <p>2 respect to 1403.</p> <p>3 MR. COWELL: Counsel, if you</p> <p>4 have redirect you should do it now.</p> <p>5 And we can take a break and move on</p> <p>6 to 1405.</p> <p>7 MR. HARDING: We need a break</p> <p>8 now. Would ten minutes be okay?</p> <p>9 MR. COWELL: Sure.</p> <p>10 (Whereupon, a short recess was</p> <p>11 taken.)</p> <p>12 MR. HARDING: We have no</p> <p>13 further questions for Dr. Thompson at</p> <p>14 this time for the 01403.</p> <p>15 MR. COWELL: Okay, then we'll</p> <p>16 move on to 1405.</p> <p>17 MR. HARDING: And my co-counsel</p> <p>18 Chen Zang will be handling the</p> <p>19 objections for this.</p> <p>20 BY MR. COWELL:</p> <p>21 Q. Dr. Thompson, if you don't mind</p> <p>22 would you just close out of your 1403</p> <p>23 materials and open up your 1405 materials.</p> <p>24 A. I'm here.</p> <p>25 Q. Thank you. Give me a moment to</p>                      | <p style="text-align: right;">Page 33</p> <p>1 do the same. So now we're talking about</p> <p>2 IPR 1004.</p> <p>3 Dr. Thompson, you understand</p> <p>4 that that IPR is about U.S. Patent</p> <p>5 9,245,826, is that right?</p> <p>6 A. Correct.</p> <p>7 Q. And do you have your</p> <p>8 declaration for the 1405 --</p> <p>9 A. I do.</p> <p>10 Q. So in 1405 you have asserted</p> <p>11 five grounds of invalidity, is that right?</p> <p>12 A. That's correct.</p> <p>13 Q. And did you yourself uncover</p> <p>14 the prior art that you used in your</p> <p>15 declaration for this IPR?</p> <p>16 A. It was a joint effort.</p> <p>17 Q. Is there any reference that you</p> <p>18 cite to in 1405 for which you can recall</p> <p>19 who discovered it?</p> <p>20 A. I cannot. Again, I sent a fair</p> <p>21 number of references. I would say it was a</p> <p>22 collaborative effort to find the references</p> <p>23 used.</p> <p>24 Q. Were you aware of the Conn</p> <p>25 reference before you worked on this case?</p>                   |

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| <p style="text-align: right;">Page 34</p> <p>1 A. I don't believe I had seen it</p> <p>2 before.</p> <p>3 Q. What about Gambino?</p> <p>4 A. I believe I've seen that</p> <p>5 before.</p> <p>6 Q. Do you know in what context</p> <p>7 you've seen Gambino prior to this case?</p> <p>8 A. Just making integrated</p> <p>9 circuits. It's a pretty common problem to</p> <p>10 have metal delamination from a dicing saw,</p> <p>11 so it would have been in the context of how</p> <p>12 to deal with delamination of the metal</p> <p>13 backside.</p> <p>14 Q. Were you familiar with Torii</p> <p>15 before your work on this case?</p> <p>16 A. I don't believe I've seen Torii</p> <p>17 before the case.</p> <p>18 Q. And were you familiar with Ide</p> <p>19 before you worked on this case?</p> <p>20 A. I had not seen that before this</p> <p>21 case.</p> <p>22 Q. Does your declaration cite all</p> <p>23 the evidence you relied on to arrive at</p> <p>24 your opinions in this case?</p> <p>25 A. It does.</p>                                                                                                                       | <p style="text-align: right;">Page 35</p> <p>1 Q. So let's turn to page 70 of</p> <p>2 your declaration.</p> <p>3 A. I'm on page 70.</p> <p>4 Q. And here you opine that Conn</p> <p>5 discloses the limitation "at least one</p> <p>6 anchor via disposed in at least one corner</p> <p>7 of a semiconductor substrate," is that</p> <p>8 right?</p> <p>9 A. Correct.</p> <p>10 Q. And so if you look on page 71</p> <p>11 of your report you have an annotated</p> <p>12 version of figure 2 of Conn, is that right?</p> <p>13 A. I do.</p> <p>14 Q. How did you determine that the</p> <p>15 anchor vias shown in figure 2 were in the</p> <p>16 corner?</p> <p>17 MR. ZANG: Objection; form.</p> <p>18 A. So I looked at the spec and</p> <p>19 Conn says figure 2 is just -- you can use</p> <p>20 much different densities. So if you look</p> <p>21 at the tightest or most aggressive density</p> <p>22 or grid that you can use, these anchor vias</p> <p>23 can be spaced only 60 micrometers apart.</p> <p>24 So that would put the corner of the grid</p> <p>25 about 60 microns from the die edge for an</p>                                                                                            |
| <p style="text-align: right;">Page 36</p> <p>1 embodiment where the backside metal</p> <p>2 encompasses 90 to approximately 100 percent</p> <p>3 of the die.</p> <p>4 So putting that in perspective,</p> <p>5 60 micrometer is the width of a human hair.</p> <p>6 So Conn is allowing this grid to be a human</p> <p>7 hair away from the corner and under any</p> <p>8 reasonable definition, that would be near</p> <p>9 the corner of the die.</p> <p>10 Q. Where do you cite to that 60</p> <p>11 micron figure in paragraphs 83 and 84 of</p> <p>12 your report?</p> <p>13 A. It's in the spec of Conn. I</p> <p>14 can find that if you'd like. I don't have</p> <p>15 the 60 micron number in this paragraph.</p> <p>16 Q. Okay. Taking a look at your</p> <p>17 annotated figure 2, the dotted lines, you</p> <p>18 drew those, is that right?</p> <p>19 MR. ZANG: Objection to form.</p> <p>20 A. Can you repeat the question?</p> <p>21 Q. Looking at annotated figure 2</p> <p>22 of Conn on page 71 of your report, you drew</p> <p>23 the dotted lines denoting the corners, is</p> <p>24 that right?</p> <p>25 MR. ZANG: Repeat the</p> | <p style="text-align: right;">Page 37</p> <p>1 objection.</p> <p>2 A. The lawyers made the figure,</p> <p>3 but I directed them on how to show what we</p> <p>4 were talking about by a corner. A corner</p> <p>5 is just a point, but the claim language</p> <p>6 allows to be near a corner. So we show a</p> <p>7 rendering of what would be near a corner.</p> <p>8 Q. Did you determine the</p> <p>9 dimensions of those dotted lines?</p> <p>10 MR. ZANG: Objection; form.</p> <p>11 A. This is just an illustration to</p> <p>12 show a grid of anchor vias. But as I said,</p> <p>13 and I want to make the point that they go</p> <p>14 over the entire die in the grid, and this</p> <p>15 figure is showing backside metal can be</p> <p>16 over the entire backside. This is figure 2</p> <p>17 and figure 3. And then with a spacing of</p> <p>18 that grid, one would know that these anchor</p> <p>19 vias can be extremely close to the corner.</p> <p>20 So at least one, two, three -- some number</p> <p>21 of those would be in the corner. That's</p> <p>22 the purpose of this figure.</p> <p>23 MR. COWELL: Objection.</p> <p>24 Nonresponsive.</p> <p>25 Q. My question isn't what's the</p> |

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| <p style="text-align: right;">Page 38</p> <p>1 purpose of this figure. I just want to<br/>2 know where this figure came from. Did you<br/>3 direct -- did you either draw the figure<br/>4 yourself or direct the lawyers to put the<br/>5 dotted lines onto the figure?<br/>6 A. Yeah, we had a discussion on<br/>7 how to convey the image of a corner on an<br/>8 IC with close to 100 percent backside<br/>9 metal.<br/>10 Q. Who determined the dimensions<br/>11 of the dotted lines denoting the corners in<br/>12 this figure?<br/>13 MR. ZANG: Objection to form.<br/>14 A. The dimensions are not in this<br/>15 figure. The dimensions are in Conn's spec<br/>16 where I gave the spacing number.<br/>17 Q. Right, but I'm asking who<br/>18 decided where exactly to put these dotted<br/>19 lines for the corner?<br/>20 A. I signed off on this figure and<br/>21 the image to show the concept of the<br/>22 corner's point, near corner some distance<br/>23 from the corner. That's what I was trying<br/>24 to convey in this figure.<br/>25 Q. Why are the corner boxes, why</p>                                  | <p style="text-align: right;">Page 39</p> <p>1 are they wider than they are tall?<br/>2 MR. ZANG: Objection; form.<br/>3 A. If you notice the silicon<br/>4 substrate here is also not a square, it's a<br/>5 rectangle. And so the corner doesn't have<br/>6 to be an absolute square. And that's what<br/>7 the concept being displayed here is.<br/>8 Q. Before I asked you that<br/>9 question, did you realize that the corner<br/>10 boxes here are wider than they are tall?<br/>11 A. Yes.<br/>12 Q. Within the context of the '826<br/>13 patent, what does "in the corner" mean?<br/>14 MR. ZANG: Objection; form.<br/>15 A. In the context of the patent,<br/>16 the claim says anchor via disposed in at<br/>17 least one corner. So the corner is a point<br/>18 disposed, and at least one corner means<br/>19 near the corner.<br/>20 If I look at figure 2-A of the<br/>21 '826 patent, you see anchor vias 232-A,<br/>22 232-B, and 232-C. None of them are in the<br/>23 absolute corner of the die, so it means<br/>24 near the corner of the die.<br/>25 Q. But for purposes of your</p> |
| <p style="text-align: right;">Page 40</p> <p>1 declaration, you did not have any trouble<br/>2 figuring out whether something was near the<br/>3 corner of the die, is that right?<br/>4 A. For the references I found,<br/>5 they're putting the anchor via very close<br/>6 to the corner. Like I said, Conn envisions<br/>7 it could be just 60 micrometers from the<br/>8 corner. And so I think under any<br/>9 reasonable definition, all the references I<br/>10 found, a POSITA would say they're in the<br/>11 corner, and I didn't need to figure out<br/>12 where the boundary was for how far away<br/>13 from the corner you could be and still be<br/>14 in the corner.<br/>15 Q. What kind of die is Conn<br/>16 talking about when he says the anchor vias<br/>17 can be as little as 60 microns from the<br/>18 edge of the corner?<br/>19 MR. ZANG: Objection; form.<br/>20 A. Conn's talking about the space<br/>21 between one anchor via and another. Conn's<br/>22 approach works with many different size<br/>23 dies.<br/>24 Q. Where does Conn say that an<br/>25 anchor via can be 60 microns from the</p> | <p style="text-align: right;">Page 41</p> <p>1 corner?<br/>2 MR. ZANG: Objection; form.<br/>3 A. I'm in paragraph 35 of Conn.<br/>4 And it says other distribution patterns and<br/>5 irregular distribution patterns are<br/>6 permissible. And then it goes on to say<br/>7 the diameter of the vias can be 30 --<br/>8 between 30 and 150 micrometers. And then<br/>9 it says the distance between the<br/>10 semiconductors is between 60 and 1000<br/>11 micrometers, and these can be on an<br/>12 irregular pattern.<br/>13 So if you have a grid where the<br/>14 vias are spaced just 60 microns apart, some<br/>15 would be pretty close to 60 microns from<br/>16 the corner.<br/>17 Q. Okay, paragraph 35 doesn't talk<br/>18 about the distance between the anchor vias<br/>19 and the periphery of the die, is that<br/>20 right?<br/>21 MR. ZANG: Objection; form.<br/>22 A. Well, he talks about the<br/>23 placement of anchor vias on the die. Conn<br/>24 shows it's in a grid, so a POSITA would<br/>25 understand you have now a grid of these</p>                                      |

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| <p style="text-align: right;">Page 42</p> <p>1 anchor vias over the die and they're just<br/>2 spaced 60 microns apart. And so you're<br/>3 gonna have some that are pretty close to 60<br/>4 microns from the corner.<br/>5 Q. The 60 microns from the corner,<br/>6 that's an inference that you're making?<br/>7 MR. ZANG: Objection; form.<br/>8 A. It's how a POSITA would<br/>9 understand Conn's spec.<br/>10 Q. Now let's move a little bit<br/>11 further. In the next limitation on page 72<br/>12 of your declaration now, this is talking<br/>13 about the backside of a semiconductor<br/>14 substrate. Do you see that?<br/>15 A. Yes, so on page 72 I see the<br/>16 element 1-B and it talks about a backside<br/>17 in that element, correct.<br/>18 Q. What's the backside of a<br/>19 semiconductor substrate?<br/>20 MR. ZANG: Objection; form.<br/>21 A. So the silicon wafer has two<br/>22 sides, but the orientation of that wafer<br/>23 can be any orientation. The backside is<br/>24 the -- let me back up a minute.<br/>25 In the silicon wafer you're</p> | <p style="text-align: right;">Page 43</p> <p>1 fabricating devices on one side of the<br/>2 wafer. And so the side that the device is<br/>3 on is the front side and the side opposite<br/>4 to the side where the devices are is the<br/>5 backside.<br/>6 Q. Is there specifically a ground<br/>7 plane on the backside of a semiconductor<br/>8 substrate?<br/>9 MR. ZANG: Objection; form.<br/>10 A. The backside can be used for<br/>11 many purposes. There can be a ground plane<br/>12 on part of the backside. There doesn't<br/>13 have to be.<br/>14 Q. And when we're talking about<br/>15 backside, the orientation of a particular<br/>16 figure doesn't matter whether something's<br/>17 on the front side or the backside, is that<br/>18 right?<br/>19 MR. ZANG: Objection; form.<br/>20 A. When looking at the --<br/>21 identifying the backside, one would look<br/>22 for the location of the devices first in<br/>23 the wafer and the orientation of the wafer<br/>24 could be up or down and it wouldn't affect<br/>25 what you call backside.</p> |
| <p style="text-align: right;">Page 44</p> <p>1 Q. How do we know that the<br/>2 conducting layer in Conn is on the backside<br/>3 of a semiconductor substrate?<br/>4 MR. ZANG: Objection; form.<br/>5 A. In page 78 of my report I show<br/>6 Conn figure 3 rotated by 180 degrees. Conn<br/>7 allows for a metal layer on both sides of<br/>8 the wafer. And so the backside in Conn can<br/>9 be either where plane 20 is or 30 is.<br/>10 Q. Jump ahead to page 86 your<br/>11 report.<br/>12 A. I'm here.<br/>13 Q. And then -- so that section<br/>14 continues onto page 87 where there's a<br/>15 figure you've put together there. Do you<br/>16 see that figure?<br/>17 A. Are you referring to Conn<br/>18 figure 2 modified?<br/>19 Q. Yes.<br/>20 A. That's at the top of page 86.<br/>21 Q. Right. It's also on page 87.<br/>22 Actually, I want to talk about the one on<br/>23 87, I'm sorry. Just let me know when<br/>24 you're there and ready.<br/>25 A. Okay, I'm on now the figure on</p>                                                                         | <p style="text-align: right;">Page 45</p> <p>1 page 87 of my report.<br/>2 Q. And so at the bottom right hand<br/>3 part of the larger figures it says<br/>4 "detailed view." Do you see that?<br/>5 A. I do.<br/>6 Q. Where did that detailed view<br/>7 come from?<br/>8 MR. ZANG: Objection; form.<br/>9 A. It comes from the spec of Conn<br/>10 where figure 2 is just showing four -- it's<br/>11 showing 12 anchor vias. But he envisions<br/>12 much higher density. And so the spec of<br/>13 Conn is saying you can, as I said earlier,<br/>14 can have much higher density and space<br/>15 these anchor vias 60 micrometers apart on a<br/>16 grid.<br/>17 Q. Are you done with your answer,<br/>18 sir?<br/>19 A. Yes.<br/>20 Q. What does the detailed view<br/>21 represent?<br/>22 A. It's representing a blow-up of<br/>23 the corner where I have a very high density<br/>24 of anchor vias, as Conn teaches.<br/>25 Q. So that's your interpretation</p>                                                                                                 |

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| <p style="text-align: right;">Page 46</p> <p>1 of what would be located in the corner of<br/>2 figure 2 itself.<br/>3 MR. ZANG: Objection; form.<br/>4 Q. Is that right?<br/>5 A. It's showing an embodiment of<br/>6 Conn in the corner -- it's showing<br/>7 embodiment of Conn with a high number of<br/>8 anchor vias. And I'm showing you a region<br/>9 near the corner.<br/>10 Q. Let me take, like, a ten-minute<br/>11 break.<br/>12 MR. ZANG: Okay.<br/>13 (Whereupon, a short recess was<br/>14 taken.)<br/>15 BY MR. COWELL:<br/>16 Q. Dr. Thompson, welcome back.<br/>17 A. Thank you.<br/>18 Q. I want to go back to page 78.<br/>19 You pointed out this figure, figure 3<br/>20 rotated by 180 degrees. Just let me know<br/>21 when you're there.<br/>22 A. So there's two figures on page<br/>23 78, a top one and a bottom one.<br/>24 Q. I'm talking about the bottom<br/>25 one.</p>                                                                                                                                                                                                           | <p style="text-align: right;">Page 47</p> <p>1 A. Okay.<br/>2 Q. So here there's two copper<br/>3 planes on either side of the silicon<br/>4 substrate, is that right?<br/>5 A. The copper plane 20 and copper<br/>6 plane 30 on opposite sides of the<br/>7 substrate.<br/>8 Q. And one of those sides would<br/>9 have some devices on it, is that right?<br/>10 MR. ZANG: Objection; form.<br/>11 A. So there's a silicon substrate.<br/>12 A POSITA would understand that if you're<br/>13 making an integrated circuit you'd have<br/>14 transistors and device elements on one side<br/>15 of that silicon substrate.<br/>16 Q. I'd like to move ahead to<br/>17 ground 2 which starts on page 94 of your<br/>18 declaration.<br/>19 A. I'm here.<br/>20 Q. So you've broken ground 2<br/>21 further into 2-A and 2-B, is that right?<br/>22 A. Yes.<br/>23 Q. Ground 2-A is based on Conn and<br/>24 the knowledge of a POSA, is that right?<br/>25 MR. ZANG: Objection; form.</p>                                                                                                   |
| <p style="text-align: right;">Page 48</p> <p>1 A. It's a single reference<br/>2 obviousness with Conn, and Conn is being<br/>3 modified by the knowledge of a skilled<br/>4 artisan. And it's not using any other<br/>5 prior art in addition to Conn; it's just<br/>6 the knowledge of a skilled artisan.<br/>7 Q. Right, so the basis is Conn<br/>8 plus the knowledge of the skilled artist.<br/>9 MR. ZANG: Objection to form.<br/>10 A. No, it's a single reference<br/>11 obvious using Conn, and I'm saying if --<br/>12 depending on what's argued that active<br/>13 devices on a backside metal are not in<br/>14 Conn, then it would be obvious for a POSITA<br/>15 to add those elements.<br/>16 Q. Based on that POSITA's own<br/>17 knowledge, is that right?<br/>18 MR. ZANG: Objection; form.<br/>19 A. Can you repeat the question?<br/>20 Q. It would be obvious for a<br/>21 POSITA to add those elements based on that<br/>22 POSITA's own knowledge, is that right?<br/>23 MR. ZANG: Same objection.<br/>24 A. So in ground 2-A I show Wang<br/>25 embodiment of Conn because Conn doesn't</p> | <p style="text-align: right;">Page 49</p> <p>1 give an application. I show it for LED,<br/>2 but I don't use Wang in the combination.<br/>3 I'm saying the modification strictly comes<br/>4 from a POSITA's knowledge.<br/>5 Q. Why don't you use Wang as the<br/>6 combination?<br/>7 A. I use it as support because<br/>8 there would be -- this is in the realm of<br/>9 what is obvious to a POSITA with his own<br/>10 knowledge. And I just support that with<br/>11 Wang.<br/>12 So acting devices in integrated<br/>13 circuits have been around for seven years.<br/>14 And the Nobel prize for integrated circuits<br/>15 was awarded for work done in the late<br/>16 1950s. And so an integrated circuit has<br/>17 active devices, has millions to billions of<br/>18 active devices.<br/>19 Q. I guess I'm just confused. I'm<br/>20 reading your opinion here and you talk<br/>21 about Conn and Wang and how they're in the<br/>22 same field of endeavor. And I'm just<br/>23 curious why you didn't combine Wang with<br/>24 Conn.<br/>25 MR. ZANG: Objection; form.</p> |

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| <p style="text-align: right;">Page 50</p> <p>1 A. The modification comes from<br/>2 knowledge from -- well known knowledge from<br/>3 a POSITA.<br/>4 Q. Okay, and so you're using that<br/>5 knowledge of a POSITA to fill in any<br/>6 possible gaps in Conn relating to either<br/>7 backside or active devices, is that right?<br/>8 A. Right, I think Conn doesn't<br/>9 have these gaps. But to the extent someone<br/>10 would argue a backside metal is missing or<br/>11 active device is missing, a POSITA would<br/>12 know based on their knowledge of integrated<br/>13 circuits they would not be missing.<br/>14 Q. And it's only just for those<br/>15 two limited cases that you need to resort<br/>16 to the knowledge of a person of skill in<br/>17 the art, is that right?<br/>18 MR. ZANG: Objection; form.<br/>19 A. If you're looking at my entire<br/>20 report, I believe I -- for different claims<br/>21 I'm at times explaining what a POSITA would<br/>22 know, and sometimes I am supplying this<br/>23 element from a POSITA in other grounds than<br/>24 ground 2.<br/>25 Q. Let's break it down and make it</p> | <p style="text-align: right;">Page 51</p> <p>1 simpler here. For claim 1 you're using the<br/>2 knowledge of a POSITA to potentially fill<br/>3 in the element of backside or active<br/>4 devices even though you yourself believe<br/>5 those are already disclosed in Conn, is<br/>6 that right?<br/>7 A. So on page 95 I point out if<br/>8 HID wants to argue that Conn does not want<br/>9 to explicitly disclose backside metal<br/>10 devices, it would have been obvious for a<br/>11 POSITA to modify Conn with those two<br/>12 elements.<br/>13 Q. Right, and so claim 1, that's<br/>14 what you use the knowledge of a POSITA for,<br/>15 is that right?<br/>16 MR. ZANG: Objection; form.<br/>17 A. I use Conn, again, to the<br/>18 extent backside and active devices are<br/>19 not -- if someone wants to argue they're<br/>20 not present in Conn, I use the knowledge of<br/>21 a POSITA to show that they're obvious.<br/>22 Q. Right, and with respect to<br/>23 claim 1, that's your use of knowledge of a<br/>24 POSITA. Just to make sure I understand the<br/>25 borders of this.</p>            |
| <p style="text-align: right;">Page 52</p> <p>1 A. For claim 1 I'm using knowledge<br/>2 of a POSITA with support from Wang to show<br/>3 that backside metal and active devices<br/>4 would be obvious elements to modify Conn<br/>5 with.<br/>6 Q. I understand, thank you.<br/>7 And claim 11, I believe it is<br/>8 the same two cases you were just telling me<br/>9 plus, on page 99, if there was an order of<br/>10 the steps, you would also fill that.<br/>11 MR. ZANG: Objection; form.<br/>12 A. So on page 99 I do add that it<br/>13 would be obvious that the two steps in<br/>14 relation to the steps 710 and 720, the<br/>15 order of that is obvious to swap that<br/>16 order. That's what I argue on page 99.<br/>17 Q. Right. Please do correct me if<br/>18 I'm wrong, but you only covered what you're<br/>19 using the knowledge of a POSITA for with<br/>20 respect to claims 1 and 11, is that right?<br/>21 MR. ZANG: Objection; form.<br/>22 A. So in ground 2-A I'm using it<br/>23 for claims 1, 2, 4 through 7, 9, 11, 12, 14<br/>24 through 17 and 19.<br/>25 Q. And we get to page 103, and the</p>              | <p style="text-align: right;">Page 53</p> <p>1 remaining limitations are claims 1, 2, 4,<br/>2 5, 7, 9, 11, 12, 14, 15, 17 and 19, you're<br/>3 relying on your anticipation arguments for<br/>4 ground 1, is that right?<br/>5 A. I'm applying the same<br/>6 reasonings in ground 1 for the remaining<br/>7 limitations in the claims listed.<br/>8 Q. Claims 6 and 16 -- let me make<br/>9 it simpler. What are you using the<br/>10 knowledge of a POSITA for in ground 2-A in<br/>11 claims 6 and 16?<br/>12 A. So I'm also using knowledge of<br/>13 a POSITA that the dummy vias can be<br/>14 staggered. I support West, I'm using west<br/>15 as a combination, but Conn talked about<br/>16 different distributions. Didn't have to be<br/>17 a grid and it was known by POSITAs that<br/>18 dummy vias are staggered. So I'm using<br/>19 that on page 103.<br/>20 Q. And then we move ahead to<br/>21 ground 2-B starting on page 106. Now<br/>22 you're adding in applicant admitted prior<br/>23 art for this ground, is that right?<br/>24 MR. ZANG: Objection; form.<br/>25 A. So again, it's a single</p> |

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| <p style="text-align: right;">Page 54</p> <p>1 obviousness for Conn and it's adding in<br/>2 application admitted prior art as<br/>3 background to show what a POSITA would<br/>4 know.<br/>5 Q. On page 106 though you don't<br/>6 argue that Conn discloses the backside<br/>7 metal layer comprising at least one of<br/>8 interface layer, induction layer and a<br/>9 packaging layer, correct? That's not in<br/>10 your Conn anticipation grounds.<br/>11 MR. ZANG: Objection; form.<br/>12 A. What I'm arguing here is it<br/>13 would be obvious for Conn's metal layer to<br/>14 have multiple layers of metal, as was<br/>15 standard in the industry, that a POSITA<br/>16 would know, as even discussed in the '826<br/>17 patent background, that when you put a<br/>18 metal on the wafer, you generally use<br/>19 adhesion layers and other layers other than<br/>20 just the conducting layer.<br/>21 Q. Let's move ahead to ground 3.<br/>22 This is entitled "Gambino-based<br/>23 obviousness," right?<br/>24 A. I see that on page 110 of my<br/>25 report.</p>                                               | <p style="text-align: right;">Page 55</p> <p>1 Q. And you told me earlier this<br/>2 morning that you were familiar, or at least<br/>3 had seen Gambino before your work on this<br/>4 case, is that right?<br/>5 A. I said I believe I have.<br/>6 Q. Have you ever seen an<br/>7 implementation of Gambino that also used<br/>8 anchor vias?<br/>9 MR. ZANG: Objection; form.<br/>10 A. So I have. If you look at<br/>11 Burnham on page 120 in my report, this is<br/>12 from the same group. This is from IBM.<br/>13 They also have a via that protrudes and<br/>14 secures the backside metal. And so it<br/>15 would be common to do multiple process<br/>16 changes to secure the backside metal when<br/>17 delaminating.<br/>18 Like I said, delaminating metal<br/>19 is a very common problem, especially when<br/>20 you single the die, as discussed in '826.<br/>21 Q. Figure 1120 though, that via is<br/>22 connected to active devices on the front<br/>23 side of the substrate?<br/>24 A. I haven't given an opinion on<br/>25 how all the wiring is done in Burnham, but</p>                    |
| <p style="text-align: right;">Page 56</p> <p>1 I'm making the point that they do use<br/>2 anchor vias to secure a backside metal.<br/>3 Q. On page 115 of your report in<br/>4 paragraph 135 you state, "A POSA would have<br/>5 found it obvious to apply Conn's teaching<br/>6 to create anchor vias in Gambino's dummy<br/>7 metal pads, 16-A and/or main backside metal<br/>8 16 to secure them to a substrate and<br/>9 prevent delamination during singulation."<br/>10 Did I read that right?<br/>11 A. You did.<br/>12 Q. How much infringement would you<br/>13 see by including anchor vias in the Gambino<br/>14 device?<br/>15 MR. ZANG: Objection; form.<br/>16 A. It's gonna depend on many<br/>17 factors and the application.<br/>18 Q. What do you mean by that?<br/>19 A. Backside metal delaminates for<br/>20 different reasons. One is, as discussed in<br/>21 the '826, is when you singulate the die but<br/>22 there's many different ways to singulate<br/>23 the die. You can use a diamond saw, you<br/>24 can use a laser cut. Exactly how much<br/>25 improvement you're going to see is going to</p> | <p style="text-align: right;">Page 57</p> <p>1 depend on the application and how it's<br/>2 designed.<br/>3 Q. You'd agree with me adding an<br/>4 additional process step of including anchor<br/>5 vias to Gambino's process would increase<br/>6 the cost, is that right?<br/>7 MR. ZANG: Objection to form.<br/>8 A. I don't agree with that.<br/>9 Q. Why don't you agree with me?<br/>10 A. Because the same anchor via<br/>11 used to connect the dummy pads, that same<br/>12 processing can be used to make the anchor<br/>13 vias for the large metal backside. And so<br/>14 if you share the processing steps for the<br/>15 two applications, there's no increased<br/>16 cost.<br/>17 Q. Where does Gambino disclose<br/>18 using anchor vias to the backside metal?<br/>19 A. Gambino discloses using pattern<br/>20 metal backside, and that improves<br/>21 delamination. What I'm saying is you can<br/>22 use Conn's anchor via to further improve<br/>23 delamination and it integrates into Gambino<br/>24 because he already has two silicon vias.<br/>25 Q. So wouldn't adding the anchor</p> |

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| <p style="text-align: right;">Page 58</p> <p>1 vias to Gambino increase the cost of<br/>2 creating a device?<br/>3 A. It would not.<br/>4 Q. Maybe I misunderstood. A<br/>5 moment ago when I asked you why you didn't<br/>6 agree with my statement you said because<br/>7 the same anchor via used to connect the<br/>8 dummy pads, that same processing can be<br/>9 used to make the anchor vias for the larger<br/>10 metal backside. I'm confused because I<br/>11 believe Gambino does not disclose anchor<br/>12 vias. So can you explain to me where I'm<br/>13 going wrong here?<br/>14 A. If you look at page 116 in my<br/>15 report, I'm proposing a combination Conn's<br/>16 anchor vias are being added to the metal<br/>17 pads, 16-A, in the corner of the die. If<br/>18 you look at that figure, main metal<br/>19 backside, there are little squares in that<br/>20 figure. There's two silicon vias there.<br/>21 So the processing steps for through silicon<br/>22 vias and anchor vias can be shared. Thus<br/>23 Conn's anchor vias can be added with no<br/>24 increased cost.<br/>25 Q. Okay, I understand now, thank</p> | <p style="text-align: right;">Page 59</p> <p>1 you.<br/>2 Let's turn to page 121 of your<br/>3 report.<br/>4 A. Okay.<br/>5 Q. And you have an annotated<br/>6 picture of figure 5 from Gambino. Do you<br/>7 see that?<br/>8 A. I do.<br/>9 Q. And you have listed there dummy<br/>10 metal pad 16-A on the left-hand side. Do<br/>11 you see that?<br/>12 A. Yes.<br/>13 Q. Now, you added that label, is<br/>14 that right?<br/>15 A. Correct.<br/>16 Q. And in fact, that figure 5 does<br/>17 not label any structure as 16-A, is that<br/>18 right?<br/>19 A. That's correct, but it is<br/>20 labeled in Gambino figure 3.<br/>21 Q. And figure 5 of Gambino 22,<br/>22 that's a ground plane, is that right?<br/>23 A. Can you repeat the question?<br/>24 Q. Element 22 of figure 5 of<br/>25 Gambino, that is a ground plane, is that</p> |
| <p style="text-align: right;">Page 60</p> <p>1 right?<br/>2 A. What element number again?<br/>3 Q. 22.<br/>4 A. 22 is the substrate ground<br/>5 plane.<br/>6 MR. COWELL: Why don't we take<br/>7 about a ten-minute break. I might be<br/>8 finishing up.<br/>9 (Whereupon, a short recess was<br/>10 taken.)<br/>11 MR. COWELL: I have no further<br/>12 questions at this time.<br/>13 MR. ZANG: So we have no<br/>14 redirect.<br/>15 MR. COWELL: Then we're done.<br/>16 (Whereupon, at 11:50 a.m. the<br/>17 examination of this witness was<br/>18 concluded.)<br/>19<br/>20<br/>21 ° ° ° °<br/>22<br/>23<br/>24<br/>25</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p style="text-align: right;">Page 61</p> <p style="text-align: center;">D E C L A R A T I O N</p> <p>1<br/>2<br/>3 I hereby certify that having been<br/>4 first duly sworn to testify to the truth, I<br/>5 gave the above testimony.<br/>6<br/>7 I FURTHER CERTIFY that the foregoing<br/>8 transcript is a true and correct transcript<br/>9 of the testimony given by me at the time<br/>10 and place specified hereinbefore.<br/>11<br/>12<br/>13<br/>14 _____<br/>15 SCOTT E. THOMPSON, Ph.D.<br/>16<br/>17<br/>18 Subscribed and sworn to before me<br/>19 this ____ day of _____ 20____.<br/>20<br/>21 _____<br/>22 NOTARY PUBLIC<br/>23<br/>24<br/>25</p>                                                                                                                                                                                 |

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| <div>1 EXHIBITS Page 62</div> <div>2 THOMPSON EXHIBITS</div> <div>3 Exhibit</div> <div>4</div> <div>5</div> <div>6</div> <div>7 INDEX</div> <div>8 EXAMINATION BY PAGE</div> <div>9 Mr. Cowell 4</div> <div>10</div> <div>11</div> <div>12 INFORMATION AND/OR DOCUMENTS REQUESTED</div> <div>13 (None)</div> <div>14</div> <div>15</div> <div>16</div> <div>17</div> <div>18</div> <div>19</div> <div>20</div> <div>21</div> <div>22</div> <div>23</div> <div>24</div> <div>25</div> | <div>1 CERTIFICATE Page 63</div> <div>2</div> <div>3 STATE OF NEW YORK )</div> <div>4 : SS.:</div> <div>5 COUNTY OF DELAWARE )</div> <div>6</div> <div>7 I, SUZANNE PASTOR, a Notary Public</div> <div>8 for and within the State of New York, do</div> <div>9 hereby certify:</div> <div>10 That the witness whose examination is</div> <div>11 hereinbefore set forth was duly sworn and</div> <div>12 that such examination is a true record of</div> <div>13 the testimony given by that witness.</div> <div>14 I further certify that I am not</div> <div>15 related to any of the parties to this</div> <div>16 action by blood or by marriage and that I</div> <div>17 am in no way interested in the outcome of</div> <div>18 this matter.</div> <div>19 IN WITNESS WHEREOF, I have hereunto</div> <div>20 set my hand this day, June 9, 2025.</div> <div>21 <u>Suzanne Pastor</u></div> <div>22 SUZANNE PASTOR</div> <div>23</div> <div>24</div> <div>25</div> |
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