Micron Technology (MU) / 25 Sep 24 / 2024 Q4 Earnings call transcript

Company Profile

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Karl Ackerman	analyst
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Christopher Caso	analyst
Harsh Kumar	analyst
Mehdi Hosseini	analyst
Brian Chin	analyst

Operator

Thank you for standing by, and welcome to Micron's Post-Earnings Analyst Call. [Operator Instructions] As a reminder, today's program is being recorded. And now I'd like to introduce your host for today's program, Satya Kumar, Investor Relations. Please go ahead, sir.

Satya Kumar

Yes. Thanks, Jonathan. And thank you, and welcome to Micron Technology's Fiscal Fourth Quarter 2024 Post-Earnings Analyst Call.

On the call with me today are Sumit Sadana, Micron's Chief Business Officer; Manish Bhatia, EVP of Global Operations; and Mark Murphy, our CFO.

As a reminder, the matters we're discussing today include forward-looking statements regarding market demand and supply, market trends and drivers, and our expected results and guidance and other matters. These forward-looking statements are subject to risks and uncertainties that may cause actual results to differ materially from statements made today. We refer you to documents that we have filed with the SEC, including our most recent Form 10-Q and upcoming Form 10-Q -- 10-K for a discussion of risks that may affect our results.

Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, levels of activity, performance and achievements.

We are under no duty to update any of the forward-looking statements to conform these statements to actual results. We can now open the call up to Q&A.

Operator

And our first question comes from the line of Karl Ackerman from BNP.

Karl Ackerman

Two questions, if I may.

First, from a demand perspective, you indicated that server will continue to become a growing area of revenue growth as PC and smartphone demand remains mixed near term. I was curious if you could discuss your assumptions for server unit growth in fiscal '25. And as you address that question, is your high-capacity DRAM DIMMs, such as 128-gigabyte, only used in AI servers? Or is it balanced across traditional servers that you've indicated are going through a product cycle refresh?

Sumit Sadana

Yes.

In terms of -- Karl, in terms of the server mix, we do expect that the traditional server will continue to improve in terms of the tone of the demand and will grow because the applications that -- and the software that IT departments across large companies have been running, that software deployment continues.

You can see the growth in the application software industry.

So general purpose server g[Print]n can be compressed only so much, has been compressed quite a bit over the last couple of years.

So we do expect this year, there will be some modest unit growth in general purpose servers and it will continue into next year. And then, of course, the growth in AI servers is expected to be strong this year, strong next year. We don't see any kind of change in that expectation that we have provided over the last couple of quarters.

For 2025, definitely, that momentum in AI continues. And of course, we have a lot of improvement in our competitive positioning in the server arena.

We have spoken extensively about that.

We have HBM growth in AI servers.

Of course, we have high-cap DIMMs that you mentioned. These 128-gigabyte DIMMs do get used in both AI servers as well as traditional servers. But predominantly, their use is in AI servers because they are more expensive on a per bit basis than 64-gigabyte DIMM. Consequently, they tend to get used more in AI servers, both on the training as well as inferencing side and we expect that to continue.

Karl Ackerman

I appreciate that. If I could sneak in 1 more. I would just -- hoping you could clarify your comments on inventory. Obviously, inventory rose $300 million as you maintain discipline around supply. Are you suggesting that fiscal Q4 remains the peak dollar value of inventory as PC and smartphone demand begins to improve in the first half of the year?

Mark Murphy

Karl, it's Mark. We don't typically give dollar estimates because clearly, what happens with our forecasts, we're modulating builds and building.

We have raw materials and WIP and so forth.

Our -- so we tend to focus on providing you a DIO number. We did think that on a dollar and DIO basis, that would be elevated going into '25. And what we will see, we believe, is inventory days improving through '25 and particularly in the second half of our fiscal year as our fiscal year is more second half weighted on volumes.

Now of course, the business is getting larger, so on a dollar basis, there won't be the same degree of change. But on the DIO, we do see improvement through the year, particularly in the back half of the year.

Operator

And our next question comes from the line of Harlan Sur from JPMorgan.

Harlan Sur

Congrats on the strong overall operational execution.

On the better DRAM good shipment outlook in November up sequentially versus prior view of flat to up slightly, how much of that is better-than-expected yield improvements in HBM, right? Because we know your AI customers are supply constrained on HBM3E.

So any better yield and resulting supply unlock would be consumed right away, right? So is part of the better bit shipment outlook this quarter due to better HBM supply unlock versus your prior expectations?

Manish Bhatia

Maybe I'll answer Harlan just on the HBM ramp and then Sumit, you can answer on some of the other drivers of the guidance for DRAM. But our yield ramp is continuing to be strong. We feel good about where we are with our yields on HBM. We were able to achieve our goal for fiscal Q4 and are in terms of shipping several hundred million dollars' worth of revenue. And we said that these were both quarters, F Q3 and F Q4 were at gross margins that were above our -- the rest of the DRAM products.

So we feel like we've executed well on this ramp, and we continue to look forward to being able to support this multibillion-dollar business opportunity for us in fiscal year '25.

So we feel good about where we are with HBM. And I'll let Sumit talk about some of the other demand drivers of the strengthened since our last public comments at some conferences earlier this year.

Sumit Sadana

Yes. Thanks, Manish.

So in terms of demand, definitely, the strength in the data center is driving upside to what we had prior communicated on the F Q1 trajectory on DRAM shipments. And we continue to see really strong demand from the data center. Demand is coming from both the cloud and enterprise AI servers as well as traditional server origin.

Harlan Sur

Okay, perfect. And then maybe just a follow-up. There's been so much noise in the market around excess supply for more lagging-edge DDR for DRAM. I mean, the Micron team is a part of your CapEx, capacity optimization initiatives over the past 12 months, has really been focused, right, on converting lagging-edge capacity to leading-edge capacity? On top of that, the team has been focused on sort of more value-added solutions, right? So I assume that all of this has translated to less DDR4 output as well. But can you guys just level set us, like what percentage of your DRAM bit shipments are DDR4 today? And where do you expect that mix to be exiting this calendar year?

Sumit Sadana

Yes.

So we don't provide percent of bits that are DDR4 or 5, but I can just provide some color that DDR4 shipments continue to fall as a percent of our overall DRAM bit shipments over the last year and looking ahead will again fall into next year because more and more of our mix is shifting towards DDR5 over time. It's shifting towards LP5 that we are now shipping to the data center. We had mentioned that Micron is a pioneer in the use of low-power DRAM in

the data center, so LP5 in the data center itself is going to become a very significant product category for us and we are leadership in the industry. It's a very important product opportunity for us.

So when we drive more of the shipments there as well, it further reduces the mix of DDR4 and LP4 as part of the overall number. And then, of course, we have mentioned to you multiple times about HBM mix increasing every quarter and getting to fairly high levels of our mix. And when we think about the overall bit mix of HBM and then the over 3:1 trade ratio on the wafer mix, you can imagine that, that also constrains the overall mix of the wafers that are going towards DDR4 and other lagging technology products.

Manish Bhatia

And just to your question on the transitions and what we've been doing, we've talked about.

I think I've mentioned in the past that our 1-beta node is actually optimized for DDR5 and LP5, also has HBM on it as well.

So as we've been converting to 1-beta and we said even in the prepared remarks that we're continuing to increase our mix of 1-beta as we move forward here in fiscal '25.

So you can kind of see that, that is supportive of the comments Sumit made in terms of those high-value applications, DDR5, LP5, HBM are moving -- growing in our supply capability to serve those markets.

Mark Murphy

Yes. And I would -- Harlan, maybe just to add, our inventory values, most of that is leading-edge as we've defined it.

So that, through the year, we need that inventory to help with that transition that Manish mentioned as we bridge to increasing 1-beta capacity.

Operator

And our next question comes from the line of Aaron Rakers from Wells Fargo.

Aaron Rakers

Just building on the prior question from Harlan. We've talked a lot about the industry, about the trade ratio, the 3:1.

As you guys move to the 12-high stack and you talked about the confidence moving towards HBM4 and 4E, I'm curious on how you see the evolution of that trade ratio. Do you think it actually -- does it ever go down because yields improve? Or is there a propensity to see that maybe even increase as we think about HBM4 and beyond? I'm curious as to how you're -- how that's evolved, how you thought about that? And I have a quick follow-up as well.

Manish Bhatia

Sure, Aaron.

So we have talked about how HBM3E will have a 3:1 trade ratio, and that is made up of primarily factors of the die size growth. HBM die size is larger than standard products in the same node in order to be able to provide the high-bandwidth capability and performance capability that HBM -- that defines HBM. And we have -- and also, based on the yields in the -- throughout the process and particularly the assembly process.

So you can assume that the 12-high will have maybe a slightly higher trade ratio than 8-high. And we've said also that as we move towards HBM4, we see that trade ratio increasing as well.

We haven't really commented beyond that, but you can kind of imagine that as the performance gap between the HBM standard at the time and the standard products of LP and DDR, as the performance gap between those widens, then that's what's the biggest driver in terms of the trade ratio because the more and more of the die size is dedicated to providing high-bandwidth capability on the die that's differentiated in HBM versus standard DDR and LP products.

Aaron Rakers

Yes, that's very helpful. And then just a quick follow-up. I know you've given some framework around CapEx and the guidance for the first fiscal quarter. I'm just curious, Mark, as we think about the CapEx trajectory, is there things with, as you look forward, that make CapEx more back half weighted relative to past years? Any kind of trajectory of how you're thinking about the CapEx spend relative to what we've seen in the last few years as far as the cadence through the fiscal year?

Mark Murphy

No, Aaron, at this time, we've given quite a bit on CapEx for this fiscal year '25. We indicated that would be up meaningfully. We gave $3.5 billion for the first quarter. We've given that we expect full year estimate of mid-30s percent of revenue.

So we'll provide more through the year. We can provide a bit more color on the nature of that CapEx. I mean, the overwhelming majority in '25 is to support HBM CapEx as well as facility construction, back end and R&D. WFE was down in both '22 to '23 then down again in '24 or down from '22 to '23 then down again in '24. We do expect WFE to be up a bit, increase in '25. But we'll remain disciplined on WFE and just to manage overall supply growth, maintain stable bit share as we say.

Operator

And our next question comes from the line of Chris Caso from Wolfe Research.

Christopher Caso

The first question is about any potential impact from some of the China capacity that we've seen added. And naturally, that's on the lower end of the market and you've said that you are -- it's becoming a smaller percentage of your business. But is that causing some disruption in what you're seeing now? And is that having any meaningful impact for you now? And then perhaps a few, if that becomes a smaller part of revenue next year, does it become a smaller impact if there is any impact now?

Sumit Sadana

Yes, Chris, so in terms of China supply, yes, there has been China supply in the market. It's primarily limited to China-oriented, China-headquartered customers who are using some of that supply or attempting to use it and generally focused on the product categories that have lower performance associated with them, so DDR4, LP4 on the DRAM side and some of the lower-end products on the NAND side, especially in mobile and consumer SSD type of product categories.

Our focus has been to really have flat share on a global basis for DRAM and NAND, and within that, focus on the higher profit pools of the industry. And we have made significant progress on that strategy. And you can see that in action now because we are in the midst of what is the best product cycle that we have had in the history of Micron. We're gaining share in all of the big high-profit portions of the product portfolio of the industry.

We have HBM share gains happening, really robust share in high-cap DIMMs, pioneering leaders in LP5 in the data center, data center SSDs at record share levels.

So you can see how the portion of the business that's exposed to those kinds of trends in China are really becoming smaller as a percent of our revenue over time.

Christopher Caso

Right. That's helpful. I guess as a follow-up, just kind of wrapping up on your CapEx comments and you've provided a lot of detail, obviously. But it is -- I guess what you've said in the past is basically that the amount of bit growth or the CapEx that's oriented towards bit growth is actually really small. This is mainly technology transitions. And as you migrate out to the next nodes, that you're -- I guess, in some cases in the past, you've actually been reducing capacity on that. Is the view as you go into '25 that there's no meaningful increase in bit capacity even as you migrate to some of these more advanced nodes in support of HBM?

Manish Bhatia

So Chris, we had talked about, in the last few calls and throughout fiscal '24, about this capital-efficient approach that we were taking to continuing technology conversions, for example, previous question, trying to convert more towards 1-beta, which is a D5 and LP5-optimized node from older nodes in an efficient way where we utilize some of the equipment that was for the prior nodes and reduce wafer capacity structurally.

So I think that's sort of what you're referring to. Net, we do get bit growth capability still because there is still bit growth capability provided by the new technology. But it's not as much as it would have been if we had maintained the same wafer capacity, right? So that's sort of the put and take is the wafer capacity comes down, new technology provides more bit growth and that we still do get some -- get bit growth. It's just not as much as it would have been. And we believe this is something that's there throughout the industry, not just us, but both DRAM and NAND have had structural wafer capacity reductions in the industry since peak levels in 2022. And we're still going to be growing bit share long term in line with the demand that we see, and taking into account things like the HBM trade ratio, which it makes it more difficult to -- sort of a headwind to bit growth because as the mix of wafers moving towards HBM grows, the bit capability for the given amount of wafer capacity is lower.

Operator

And our next question comes from the line of Harsh Kumar from Piper Sandler.

Harsh Kumar

First of all, congratulations. It seems like you guys are doing a good job with the turn in the cycle. Maybe a question for Sumit or Mark. I wanted to understand your visibility. Wanted to just -- we get this question a lot from our investors. Wanted to kind of understand maybe either the dynamics of a typical contract, how long it is, whether it's for a particular generation or even beyond. Or if you don't want to get that specific, maybe you could talk about your design engagements with the larger customer, the handful that make GPUs? What kind of visibility do you have either with the contracts for supply or even your design contracts? And then I had a follow-up.

Sumit Sadana

Yes.

So in terms of the kind of agreements that we do with customers on this front, we have a couple of different types. We -- obviously, when we do LTAs or long-term agreements, they are focused on the next calendar year typically.

And so it goes January to December of 2025, in this case, and we tend to have visibility to the breakdown of bits in DRAM and NAND by quarter. Typically, we work with our customers to figure out what kind of products they are in advance. And we get an understanding of that based on the product type, what kind of node these bits are going to be manufactured in so we can translate that to our manufacturing operation's demand signal.

Now when it comes to HBM -- by the way, before we talk about HBM, so these tend to be mainly volume agreements that get negotiated for price on a monthly or quarterly basis depending on the customer. And that pricing gets negotiated over time as we go through the fiscal and calendar year. When it comes to HBM, the agreements are different and the terms are different, the visibility is longer and we tend to have -- these agreements do have pricing already concluded for all of calendar '24 and '25. And the thing that is obviously different for HBM and also for LPDRAM that's going into the data center is we have very deep engagements with our customers on their R&D, the road map that they're working on, whether it's GPUs or ASIC accelerators that they're designing, requires multiyear outlook on the road map, requires alignment on specs, alignment on features and functionality. When it comes to LP, what kind of capability on the RAS site they need, reliability, availability and serviceability that we design in and lead the industry on that.

So these are like all multiyear engagements on the R&D front. And that is what gives us the confidence when we make the statements that we feel we'll have leadership in HBM4 and HBM4E as well. And as it gets to 4E, then we even talk to them about customization that is going to be happening in 4E where certain kinds of IP a customer may want to embed in our HBM product and then it becomes very different than a regular standard product. And when it becomes different than a standard product, then it comes with very different terms in terms of the business arrangement that we have. And that is part of what we say that this growth of the data center, ultimately, growth of AI is going to create opportunities to transform the business model of the industry over time as well.

So that's sort of a window into how those engagements happen.

Harsh Kumar

This is super useful.

So another 1 is a follow-up.

Another 1 that we get is there's this fear that we hear from some of our clients and investors that the third competitor will suddenly wake up and just get into the game. I suspect from what you're saying, it's not that easy that this customer, the third customer would have to get in line, get some share in.

You would have your own share contracted out.

So you're probably not likely to get surprised, or am I mistaken in this assumption?

Sumit Sadana

I mean, we do have an expectation that ultimately, all 3 of the large DRAM suppliers will be able to supply HBM.

Our goal is to have the best HBM on the planet with the best performance, the best functionality and features and specs.

I think it is really remarkable that a 12-high product from Micron can have 20% lower power than an 8-high product from the nearest competitor. And that kind of power savings directly helps with saving of data center power needs because next to the processor, the DRAM is a huge part of what happens to the power consumption in the data center.

So it's not just about our share. It's also about how the share can -- how Micron's products can actually be leveraged for end-to-end advantage for our customers. And consequently, we have seen very high demand for our product and we feel confident that we'll be able to ramp. I mean, all of the ramp that we have for '25 is really limited by the supply and the rate and pace at which it can be brought to market because we definitely have a lot of demand for this industry-leading product.

Now as you look past that, obviously, there is always competition and we are not afraid of competition.

And so we plan for our supply to ensure that it's in sync with the demand. And when we look at the industry model for supply and demand, we are capturing in that model what portion of the demand is HBM, what portion of the demand is non-HBM? And as we have discussed in the prior call as well today, that the non-HBM portion of the industry is being compressed by the growth in HBM, and overall bit growth can be brought online only at a certain rate and pace, especially when HBM is so capital-intensive to bring up so much volume so fast for the whole industry.

And so we do feel that the mix changes will happen, but we'll be able to manage them well because the aggregate level of supply-demand ought to be in a healthy place based on our outlook for how 2025 fiscal and calendar year is likely to evolve.

Operator

And our next question comes from the line of Mehdi Hosseini from Susquehanna.

Mehdi Hosseini

It's actually Mehdi Hosseini. I just have a couple of follow-up questions. All the good questions have been asked. Mark, given your OpEx increase of 15% and the fact that you're sold out for HBM and HBM also accounting for a higher mix of your capacity, do you -- what is your confidence level in operating margin expanding throughout '25? And I have a couple of other follow-ups.

Mark Murphy

Yes, Mehdi, we're guiding 1 quarter at a time. We did provide color on the industry or on the year and the market environment.

As it relates to the year and maybe to help you with some view on the year, we do see a healthy supply-demand balance and a constructive environment to help with our financial profitability through the year. We said we expect a significant revenue record and improved profitability. We've said today that our volumes in the year would be second half weighted, which is important for a number of things, including our drawdown of inventories and our timing on node transition and output from that. Maybe 1 additional comment. Keep in mind that in the second quarter, it tends to be a seasonally weaker quarter for us, our second fiscal quarter, which would be the calendar first quarter, tends to be a weaker quarter for the industry, so something to keep in mind. But overall, a year fiscal '25 with increasing volumes, second half fiscal year weighted, healthy supply-demand environment, executing really well on the product road maps and increasing mix of HBM, high-capacity DIMMs, LP, data center SSD and then a broadening of demand through the year from what has been very strong AI data center to broader traditional and then other markets.

Mehdi Hosseini

So you feel pretty good for at least fiscal year '25? You just don't want to set a bar and be accountable to that bar, but you feel pretty good? Is that a fair way of summarizing everything you said?

Mark Murphy

We've given some positive indications for the year, and we're vigilant at all times about our cost structure, about our cost performance, about the discipline of our capital spend and maintaining stable bit share. And we think we're doing a good job of executing well and managing the risks in the business.

Mehdi Hosseini

Got it. And then a question for Manish. Everyone is focused on back-end yield associated with HBM and TSV. But can you help me understand how your front-end yield compares to competitors? And the same thing for the back-end of HBM facility.

So kind of if this could help us to better evaluate how well Micron is executed, so if you could just break it up between the front end and back end and how it's compared to the peers, that would be great.

Manish Bhatia

Well, I won't comment specifically, Mehdi, on competitors, but I will tell you that, and we have made comments on this before, we have made significant investments into what we call smart manufacturing and artificial intelligence for many years now. And we focus those in manufacturing, both between technology development and manufacturing and at that interface as we ramp new nodes so that our yield ramps, and we have given some color on this in the past.

Our yield ramps continue node-over-node to be faster than prior nodes and more predictable and achieve higher mature levels as we move forward.

So I think you can rest assured that all of those structural capabilities, we feel Micron is very, very well positioned. And we are utilizing -- this is all the latest techniques and, in fact, many of the equipment vendors that we talk to tell us that we are leading in smart manufacturing utilization of these techniques to be able to improve efficiency in the fab as well as yield performance and quality performance.

So I think I feel good about that. And I already on the -- previously on the call, I think it was -- was it Harlan who asked about yields on HBM? And I just continue to reiterate, we feel good about where they are. We feel good about where they're going and being able to support the HBM opportunity we have ahead.

Mehdi Hosseini

But I guess I was asking specifically for any kind of qualitative color comparing front and the back end, not overall yield.

Manish Bhatia

Yes.

I think that we -- I'm not going to sort of comment specifically about our period but I think we have very good yields, right? And I think I feel good about where they are for both the front end and the back end. And you're kind of asking about back end, I'll say, across our back-end product lines across the board, I feel like we have very, very good manufacturing capability, both from assembly but also test capability. A lot of the yield capability that we have is -- comes from our customized development of our own tester equipment and tester hardware, which allows us to be able to have lower-cost test equipment as well as equipment solutions and testing solutions that are specifically tuned to our products. In many ways, we design our tester hardware in line with our product design so that we're able to test more efficiently and with better fidelity such that we can improve yields while we're improving outgoing quality as well.

So I feel like we have very, very strong capabilities in both front-end yields as well as back-end yields, and on back end, both in assembly as well as in test.

Operator

And our next question comes from the line of Brian Chin from Stifel.

Brian Chin

Congratulations on the results and execution. Maybe related to something that was just discussed a moment ago. This is our modeling. We've modeled the February quarter revenue kind of sideways relative to November for some of the reasons that were stated around seasonality and kind of this -- some inventories maybe that had built up in consumer. Maybe just to deconstruct that a little bit, when you think about seasonality, Mark, can you define what that looks like in the February quarter from a bit shipment standpoint? And then in terms of the portfolio mix, which kind of works in the company's favor in the November quarter driving some of that sequential growth, why would it not be -- why would that mix effect not be similar in the February quarter relative to November?

Mark Murphy

Yes.

Let me start and then maybe Sumit can add on this. Brian, we're not going to guide to the second quarter, and I understand the interest and learning about our view on that quarter. But right now, just the contours of the year, we see strong data center demand through this first half of the year, fiscal year, and then through the year, that AI-related server demand continuing to be strong. And then it's broadening out. We're seeing traditional server volumes increase now and other markets see that broadening out. And as I mentioned earlier, our volumes we see being heavier weighted in the second half of the fiscal year. And there will be some favorable, as you say, because some of these high-performance markets here that are strong. There is continued favorable mix growth through the year.

As we ramp HBM, we've given enough markers on that profile but also high-capacity DIMMs, LP and data center SSD which continue to grow.

So I think, Sumit, anything to add?

Sumit Sadana

Yes.

I think Mark provided the important relevant color. The only thing I'll mention is the second quarter, like Mark said, we're not providing any guidance but just in terms of how you think about it. Definitely, the ramp of our higher-margin data center products will continue throughout the year, so the second quarter will get benefit from that. But it is also, as Mark said, a quarter where there is seasonality of C Q1 that is part of our F Q2. And also, we mentioned this point in our prepared remarks about the PC OEMs and, to a lesser extent, smartphone OEMs working to get their inventory to a healthier place by spring of 2025, which again encapsulates the F Q2 time frame.

So those are some of the things to keep in mind, which is what leads us to that second half of fiscal year '25, second half of calendar '25 should be strong broadening of demand drivers, AI PC, AI smartphone, mix improvements helping on top of the full year fiscal and calendar '25 data center robust demand continuing.

Brian Chin

Okay, great. That's actually super helpful. And maybe just a very quick follow-up. But from a timing standpoint, when roughly does your 12-high 3E product need to be qualified by in order to be on track with your HBM production and shipment schedule that you've communicated?

Sumit Sadana

Yes.

So our HBM 8-high continues to ship in volume, and we are working very closely with our customers to figure out what their plans for switching to 12-high are based on, of course, the qualifications but more importantly, the readiness of their products to leverage 12-high and the readiness of the ecosystem to ramp 12-high because 12-high, obviously more complex product than 8-high so will go through its own yield ramp. And our expectation is that we are going to be in -- we are going to be selling this product in volume starting in early part of calendar '25. And then throughout 2025, every quarter, the mix of 12-high will keep increasing, and the second half of calendar '25, you'll have a very large mix of 12-high. And in order to support that, obviously, we provide samples to customers ahead of time. We go through a call process. And we have mentioned that production-ready 12-high samples have been provided to our customers. And we provided you some of the expectations we have of our industry leadership of that 12-high product with the 20% lower power consumption versus other 8-high products.

So we feel really good about our 12-high, and it should constitute the majority of our sales in the second half of calendar '25, assuming our customers make the transitions on the time lines that they are currently expecting.

Manish Bhatia

We feel good about where we are with the 12-high Sumit mentioned. We've started sampling with customers who are getting feedback and learning to be able to prepare for that ramp that Sumit mentioned that will start in early calendar year '25.

Operator

And this does conclude the question-and-answer session as well as today's program. Thank you, ladies and gentlemen, for your participation.

You may now disconnect. Good day.