eMemory 4Q23 Earnings Call Q&A Transcript

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Q&A Transcript

1. **The aggressive expansion of Chinese foundries may put severe downward pressure on wafer prices. How will this affect your company?**
   >> Our OTP technology is now a standard for applications, like Driver, PMIC, and various sensors, in mature processes. As foundries expand, the need to license our technology is expected to boost our licensing revenue. While the industry faces oversupply and pricing pressures due to foundry expansion, the effect it has on our company will be offset by the increase in royalties per wafer as existing customers move to more advanced processes.

   In order to survive, existing foundries are focusing on developing specialty processes with high value-add, such as MTP, embedded flash, and PUF, as is happening now. Our royalties for MTP and PUF-based are much higher than OTP. Furthermore, the increasing contribution from the higher wafer prices of advanced nodes leads us to believe that average royalties per wafer will continue to rise.

   Foundry expansions in Europe, the US, and Japan are driving the need for local production by large customers in the future. Deploying our IPs simultaneously in foundries across each region will facilitate convenient adoption for customers, driving increased usage and expanding our business across diverse customers and applications.

2. **Will cost constraints push your customers to use eFuse, which is free of charge, to reduce expenses?**
   >> Many of our customers developed their first-generation products using foundry's eFuse. However, in response to competitive pressures and the need for improving cost and performance, they transition to our IPs. Our OTP offers improved yield and reduced chip area compared to eFuse and enables customers to protect their intellectual property (i.e. algorithms) stored in the chip. The success of these has led to the continued adoption of our IPs in subsequent generations of products.

3. **Over the past year, discussions about the slowdown of Moore's Law have become more prevalent. Will this affect your rate of improvement in foundry penetration? Considering that many IP replacements occur during process upgrades, could the deceleration of Moore's Law potentially have a negative impact on your company?**
   >> Since 2014, we've been developing IPs for technologies below 16nm. Typically, the foundry provides in-house eFuse for the initial customers for the most leading processes. After the process stabilizes, third-party IPs, like ours, are permitted for technology verification, often occurring after the first batch of customers has entered mass production. This means that 3rd party providers like us need to wait for those migrating from the previous generation to adopt our technology.

As Moore's Law slows down, the launch time for the next generation extends, creating a longer interval time like current 2nm and 3nm. This year, once we successfully verified 3nm, we still can catch customers seeking the most advanced process. Overall, this is positive for us.

Moreover, they are always customers migrating to more advanced process node, such as moving from 7nm to 5nm or 16/12nm to 7nm. As long as we have completed process verification, there will still be many opportunities for customer adoption. Even with mature processes, these opportunities remain unaffected by the slowdown or changes in Moore's Law.

4. **In Charles' talk, he mentioned that your IPs play an important role in memory. Since memory is a huge market, how are you progressing in this area?**
   >> Our DRAM royalties will increase significantly, driven by the increase in production of existing customers and new customers' ramping up production.

5. **You mentioned a customer moving to a different process in Q1. Could you provide details on the specific application associated with this migration?**
   >> It is mainly a major OLED DDI customer switching from 40nm to 28nm, leading to a temporary decrease in 40nm shipments. However, as 28nm and other new process applications begin production, royalties will soon increase.

6. **The chairman recently introduced the concept of production capacity, highlighting the increasing number of foundries capacity will increase your total addressable market. Since you have been actively establishing our technology platform in these newly built facilities, can they directly transform to our royalties in the future?**
   >> Yes, our total addressable market will increase as the world expands foundry capacity and moves toward more advanced technology. Our technology coverage in each foundry will increase as more technology process develop and more fabs are established. With each generation of technology, there is a need for continuity to move to the next generation, therefore our technologies increasingly available in each foundry. Historically, our royalty income for each foundry have experienced an upward trend. Consequently, as the number of fabs and technology platforms increases, we anticipate a corresponding growth in License fees, NRE, Usage, and Royalties.

7. **How much do you spend on R&D?**
   >> Over 70% of our expenses are allocated to R&D. These expenses are mainly comprised of employee salaries, software, other equipment, as well as application and maintenance costs related to patents.

   Our R&D expenses are mostly sustained by our partners, a key factor contributing to our high operating margin. The high costs associated with testing and qualification, including foundry shuttle, mask, test chip and more, are fully covered by our foundry partners. They not only cover these costs, but also pay us license fee. A similar arrangement exists with technology partners.

8. **In the past 10 years, your employees have increased by an average of 5% each year, while your revenue increased by an average of 20%. Additionally, your company also managed to develop many technologies. Why is this the case? Is the goal of increasing staff in the future still the same?**

   >> The first main reason why we can keep developing new technologies but managed to keep our employee headcount relatively the same is because our IP is reusable. Once we qualify our IPs on the foundry platforms and register it on our IP library, customers can use our IPs anytime unless they require customization. This means that our R&D team can always focus on developing the new technologies and on the more advanced nodes. The other main reason is because of our unique business model, since 70-80% of revenue is contributed by royalty. A royalty-based business drives revenue as more customers adopts our IPs without increasing the employee headcount.

   In the future, our hiring plan will mainly revolve around advanced process projects and special projects such as NeoFlash, RRAM, and Security. We will maintain a similar hiring pace.

9. **The foreign exchange losses in the fourth quarter of last year seemed to have some impact on your earning. How do you plan to address this matter?**

   >> Our largest foundry partners have suggested paying royalties in Taiwanese dollars based on the exchange rate at the payment date and time. Other customers directly pay us in US dollars. We deduct necessary fees, convert the amount to NT dollars, and keep the remaining sum in US dollar time deposits to gain higher interest compared to put in NT dollar. The foreign exchange losses incurred in December will be partially offset this quarter as the NT dollar deprecated early in the year. We will review our currency accordingly.

10. **You mentioned that existing customer applications are moving to more advanced process nodes. Which applications have experienced the migration to advanced nodes?**

    >> Taking OLED for example, the main process node in recent years has been 40nm. However, this year marks a significant move towards 28nm production, with future plans for development in 16/17nm. In the case of PMIC for smartphones, which were previously mainly in 8-inch, some will move to 55nm production. Similarly, TV SoC used to be in 12/14nm. One of our customers took the lead to move to 6nm to gain the market share from 12/14nm players. These transitions are all driven by the need for customers to incorporate additional features, achieving faster speeds, and reducing power consumption to enhance product competitiveness.

11. **Is there any progress on SRAM repair?**

    >> Multiple customers are working with us, and we are collaborating with the EDA tool company to incorporate our OTP into their SRAM compiler to facilitate customers' adoption.

12. What kind of advantages does eMemory have in developing RRAM and MRAM?

>> Our strengths lie in our strong circuit design and device development team. With years of accumulated design experience, numerous patents, and a profound understanding of customer needs, we excel in quickly assisting foundries in customizing specifications for RRAM/MRAM. Our expertise extends to designing IPs tailored to meet customer requirements, and we are able to quickly complete qualification on foundry processes so that customers can use our IPs in their designs and move towards mass production. We have already completed verification at major foundries, and customers have begun to adopt our IPs in their chip designs. Currently, we are moving towards advanced processes.

13. Is it possible for customers to simultaneously use different technologies from your company? How do you charge royalty in that case?

>> Our customers do have many products that simultaneously utilize different technologies from our company, such as OTP+PUF, OTP+MTP or MTP+MTP, to meet their specific product functionality design requirements. When a product uses multiple of our technologies, we will charge relevant royalties for each different technology, respectively.

14. Lately, there has been instances of M&A in Taiwan semiconductor industry. Have you considered expanding your technology portfolio through M&A to expedite your growth? If yes, what technologies or IP products are under consideration? If not, could you provide more insight into the reason behind this decision?

>> Our company has many groundbreaking NVM inventions and technologies that surpass those of other companies globally. As long as we continue to develop these inventions and technologies along our roadmap, we can accelerate our growth rate. Currently, acquiring other companies is not under consideration.

15. eMemory has been working on MTP for a long time. What is the reason behind MTP's slower takeoff? Why do you believe that MTP is now entering its growth phase?

>> The reason MTP faced slower adoption is because in terms of memory cell architecture and peripheral circuits, MTP is more complex. The complexity at a fundamental physical level results in a longer lead time between technology development and customer production. To develop the best solutions, the MTP technology specifications need to align with customer ICs, and the MTP technology itself should offer cost-effectiveness and competitive advantages over external alternatives. However, each alteration in IP specification requires re-qualification and development with foundry process technologies, typically taking a few years before achieving significant customer volume shipments.

Moreover, scenarios where multiple rewrites and embedding are imperative, alternative solutions with higher specifications and maturity, such as eFlash, are available. To choose MTP, there must be a compelling reason, such as cost considerations or challenges in integrating eFlash into specialty processes like HV/BCD.

However, MTP is gradually gaining momentum due to the shift in customer and market application demands towards embedded MTP solutions. This shift aims to enhance in-house chips in terms of both functionality and cost-effectiveness. Various mainstream requiring MTP are progressively increasing. Notable examples include DDR5 SPD, which require 100K re-write times, making embedded EEPROM necessary. The enhanced complexity of the new SPD features makes external EEPROM unsuitable, and eFlash is less fitting from a cost perspective, thereby providing a favorable entry point for MTP. Other applications, such as e-paper drivers, are leaning towards MTP due to the need for regular adjustments in more complex panels.

16. Will you benefit from the 12nm project between Intel and UMC?
>> UMC is our second largest foundry customer. We also licensed our technology to Intel 3nm in Q4 last year and will keep up with their technology development in the most leading processes. We are optimistic about the cooperation between the two customers.

17. Samsung is your largest end-chip customer. Does Samsung's S24 mobile phone use your IPs? Will their memory-related products also include your IPs?
>> Currently, our IPs are adopted in ISP, OLED DDI. In the future, more applications will also adopt our IPs, such as PMIC. Memory-related has already adopted our technologies for the DDR5 module-related chips (in SPD hub and PMIC). In addition, we are developing embedded memory-related technologies in their foundries, which will gradually move its way into more products.

18. What security problems does NeoPUF solutions solve? If not NeoPUF, then what is the alternative? Why will NeoPUF be increasingly adopted in the future?
>> eMemory's NeoPUF solutions leverages the unique physically unclonable variations that occur in the silicon manufacturing process to solve multiple security issues such as:

1. Device Authentication: NeoPUF generates a unique identifier for each device based on its inherent physical unclonable variations. This unique identifier can be used for device authentication, ensuring that only legitimate devices are authorized to access a system or network.
2. Key Generation: NeoPUF can be used to generate private keys that are unique to each device, to enhance the security of cryptographic protocols, such as encryption and digital signatures.
3. Anti-Counterfeiting: The uniqueness of the NeoPUF can be used to detect counterfeit or cloned devices. By verifying the password stored in NeoPUF during the authentication process, it becomes challenging for attackers to replicate the device's identity.
4. Anti-Tampering: NeoPUF generates a private key and public key pair, enabling the signature function to prevent files from being tampered with.
5. Random Number Generation: The inherent unpredictability of NeoPUF can be used to generate random numbers, which are crucial for various security applications, including cryptographic protocols and secure communications.

If the chip does not use PUF, random numbers must be generated by a random number generator (TRNG). However, TRNG relies on the competition between two identical circuits to generate random numbers, resulting in several problems. First, the randomness will be insufficient, and the generated random numbers may not be unique. Second, the method for generating random numbers is easily influenced by surrounding variables such as temperature, voltage, and noise, leading to inconsistent results.