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CXMT's Potential 4F2 DRAM: Technological Viability and Market Implications

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CXMT (not rated) announced plans to introduce a new generation of DDR5 RDIMM products incorporating its 4F2 DRAM architecture, potentially increasing net dies by ~30% vs. 6F2. However, we view recent market concerns over its potential impact on global DRAM supply as overdone, given that CXMT is developing 4F2 on its legacy node 1y-nm, with mass production unlikely before 2028. We also believe manufacturing costs could be ~10-20% higher due to a potential multi-wafer approach (~2-3 wafers), with the challenges of further node scaling without EUV. We therefore expect the impact on global DRAM supply to remain limited.

CXMT Plans to Introduce 4F2 DRAM Architecture — According to Sina Finance (October 11), CXMT announced plans to introduce a new generation of DDR5 RDIMM products incorporating its $4F^2$ DRAM architecture and hybrid bonding technology by end-2026 (see news). CXMT's proprietary Vertical Surrounding Gate (VSG) transistor is designed to enable this transition by shifting from a horizontal to a vertical channel structure, improving gate control and reducing leakage current as cell dimension shrinks. While CXMT highlighted its technological progress, the company didn't disclose the timing of commercialization, product yields, and mass production timeline for the new products.

What is 4F2 DRAM Architecture? — The $4F^2$ architecture is widely recognized as a next-generation DRAM technology. Currently, the industry standard cell architecture is $6F^2$, where each memory cell occupies an area equivalent to six times the square of the minimum feature size. Compared with $6F^2$, the $4F^2$ could increase memory density by ~30% by reducing the memory cell area from $6F^2$ to $4F^2$.

Implication — We view recent market concerns over global DRAM supply driven by CXMT's $4F^2$ architecture plans as overdone, as the company is developing the technology based on its legacy node 1y-nm, which remains four generations behind leading DRAM suppliers. Given CXMT's likely limited access to advanced EUV equipment (based on export restrictions on EUV lithography systems to China; separately, ASML commented that it had never shipped an EUV machine to China, according to Reuters, 6/19/2026), an option for the company could be to pursue a multi-wafer approach (~2-3 wafers) to implement $4F^2$. Furthermore, the technology seems to remain in the development stage, with mass production unlikely before 2028. Meanwhile, we expect Samsung and Hynix to adopt $4F^2$ on more advanced 1d-nm or 0a-nm nodes using EUV. While $4F^2$ could increase net dies by ~30%, we believe manufacturing costs could also be ~10-20% higher with further scaling down likely requiring EUV. Therefore, we expect CXMT's 4F2 development to have limited impact on global DRAM supply.

See Appendix A-1 for Analyst Certification, Important Disclosures and Research Analyst Affiliations

