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Everything you need to know about the semiconductor memory industry, from legacy technologies to latest innovations.

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Got Memory? Should you Buy or Wait?

Memory manufacturers are facing huge losses due to a massively reduced demand in the consumer electronics market caused by the rising costs of living. However, industrial markets, such as the automotive industry saw a solid growth as supply chains normalized.

We're sure you've asked yourself, what does this mean for prices? Should you buy now or wait?

For consumer electronics products, you probably want to wait to the last minute to get the most capacity for your money. But in most other industries, you actually might be more worried if the current cuts in manufacturing output results in the discontinuation of the memory component that you are currently using.
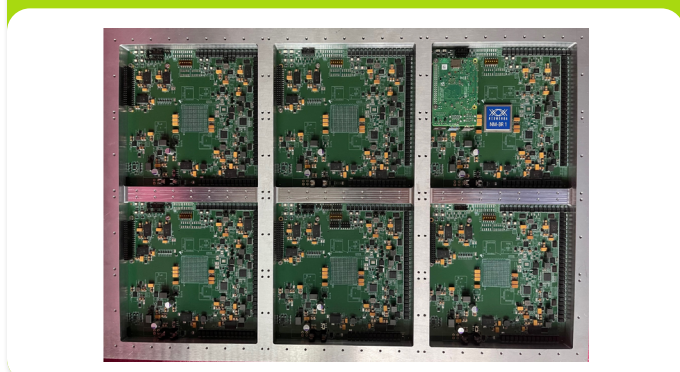
Furthermore, considering that memory devices rarely contribute a large proportion of the overall system or production cost and the volume is also comparatively low, the savings benefit may be minuscule.

Now is the time to find what's right for you! We have the most comprehensive selection of memory products and manufacturers on the planet. Our approach is to understand your application so we can help you find the best memory components and modules for you in terms of technology, availability and longevity. We are looking forward to learning more about your projects. Reach out at sales@memphis.de

Table: Global Ranking of Branded DRAM Manufacturers by Revenue for 4Q22 (Unit US$ Million)

Ranking	Company	Revenue			Market Share	
		4Q22	3Q22	QoQ	4Q22	3Q22
1	Samsung	5,540	7,400	-25.1%	45.1%	40.7%
2	SK hynix	3,398	5,262	-35.2%	27.7%	28.8%
3	Micron	2,829	4,809	-41.2%	23.0%	26.4%
4	Nanya	361	362	-30.0%	2.1%	3.0%
5	Winbond	194	150	-30.3%	0.8%	0.8%
6	PSMC	23	38	-39.5%	0.2%	0.2%
	Others	133	186	-28.5%	1.1%	1.0%
	Total	12,281	18,187	-32.5%	100.0%	100.0%

Note 1: Exchange rates in 3Q22: USD 1 = KRW 1,341; USD 1 = TWD 30.4
Note 2: Exchange rates in 4Q22: USD 1 = KRW 1,359; USD 1 = TWD 31.3
Source: TrendForce, Mar. 2023

Global DRAM Revenue Fell by More Than 30%

According to TrendForce's research, global DRAM revenue fell by 32.5% QoQ to US$12, 281 million for 4Q22. Among the major categories of DRAM products, server DRAM suffered the sharpest price drop in 4Q22. Contract prices of DDR4 and DDR5 server DRAM products registered QoQ drops of 23~28% and 30~35% respectively. The top three DRAM suppliers Samsung, SK hynix, and Micron all posted a significant QoQ drop in revenue for 4Q22. Samsung was the most aggressive in the price competition during the quarter, so it was able to raise shipments despite the general demand slump. What does this mean for production capacity in 2023? Samsung is going to optimize the legacy production lines of Line 15, so this fab will experience a marginal drop in DRAM wafer input. The newly built P3L, which is the focus of Samsung's capacity expansion efforts, has begun pilot production in 1Q23 and will be mainly responsible for driving the growth of the supplier's total DRAM wafer input for this year. SK hynix DRAM capacity utilization rate is projected to slid from 92% in 1Q23 to 82% in 2Q23. Among SK hynix's fab sites, the base in the Chinese city of Wuxi will be making the largest production cut. However, SK hynix maintains its plan to slightly raise production at M16 in South Korea because this fab deploys its advanced DRAM manufacturing process. Micron, it is scaling back production at its operation in Taiwan (OTM) and Hiroshima. Micron's DRAM capacity utilization rate has fallen to 84% and is expected to stay at this level through 2023. Still, Micron has begun mass production with its latest 1beta nm process and plans to roll out production to OMT within 2023.
Read the press release here.

NEUMONDA Technology Completes First Prototype of its Revolutionary IC and DRAM Test Board

We are proud to announce that NEUMONDA Technology, the IP and innovation arm of the NEUMONDA Group, has successfully completed the first prototype of its revolutionary new IC and DRAM test board. If you attended embedded world 2023, you got a preview of the new Rhinoe Tester at our booth. Qualification and testing of DRAM components is one of the most expensive parts in the manufacturing of memory ICs. Due to the size and costs of the equipment, only few companies can afford to implement test capabilities. And those who do, need to test high volumes to recoup the investment, which means that test times need to be short.
However, there are errors in DRAM technology that only arise in longer run times, like for example variable retention time induced errors or signal integrity errors. Testing for several hours or even days can eliminate the risk of costly recalls of failing memories once they are widely deployed.
To solve these pain points, Neumonda Technology was founded in 2021 and has since worked on the development of this test board. The new Rhinoe tester combines the sturdiness of rugged industrial applications with German engineering knowhow. It is significantly smaller than any other test equipment in the market, taking up only a quarter of a square meter, and the weight and invest requirements are about 1000 times lower compared to traditional testers. Plus, it requires about 100 times less energy to operate it. The Rhinoe tester can now put memory ICs through their paces in real life conditions. By simulating the application, we are able to predict much more accurately how well a memory will do in that target system. No one else can do that today, that´s unique.
Read the full press release here.

11 MYTHS

11 Myths about NAND

Think you know all about NAND flash memory? So how about this:
Does adding more layers improve the performance?
From a performance perspective, there´s no inherent benefit to adding more layers to 3D flash memory. In fact, adding more layers to 3D flash memory increases design complexity.
Is adding more layers the only way to reduce cost per gigabyte?
As layer counts continue to increase, it will diminish the reduction in cost per gigabyte that generally results from adding more layers. Fortunately, there are other ways to reduce cost, including boosting the density per layer by increasing the memory hole density per layer; moving the peripheral circuitry, or manufacturing the CMOS circuit in parallel with the memory cell array before being bonded together (CBA); adding more bits per cell, etc. There are a number of different, proprietary ways suppliers can squeeze out costs. 35 years after the invention of NAND, KIOXIA Group, explores 3D flash memory and illuminates some of the misconceptions surrounding this popular technology. Some may surprise you: read here

Intel and SK Hynix Show Two Paths for Flash Memory´s Future

NAND flash-memory manufacturers made the jump from 2D to 3D in the past decade to get beyond the constraints of feature-size reduction. Since then, they have regularly upped storage density by increasing the number of layers of flash cells in a chip, or by increasing the number of bits stored in each cell. Hynix and Intel took those two contrasting paths—Hynix by stacking more layers, Intel by densifying bits.
Intel presented the first three-dimensional NAND flash-memory chip that stores 5 bits of data in each NAND flash cell. That´s one bit more than the 4-bit-per-cell drives that are commercially available today. The 192-layer chip boasts the highest data density yet at 23 gigabits per square millimeter and can store up to 1.67 terabits of data total. Intel says it was able to develop its new 5-bit-per-cell chip because of the floating gate NAND cell technology that stores bits in a conducting layer. Korea´s SK Hynix, meanwhile, has crossed the 300-layer threshold with a 1-Tb NAND flash-memory chip. The chip stores 3 bits per cell (called triple layer cell, or TLC) and has the highest write speed reported yet, at 194 megabytes per second. Samsung previously had the best write throughput at 184 MB/s for a 3 bits per cell NAND flash memory that they presented at the 2021 ISSCC.
Read the full story here.
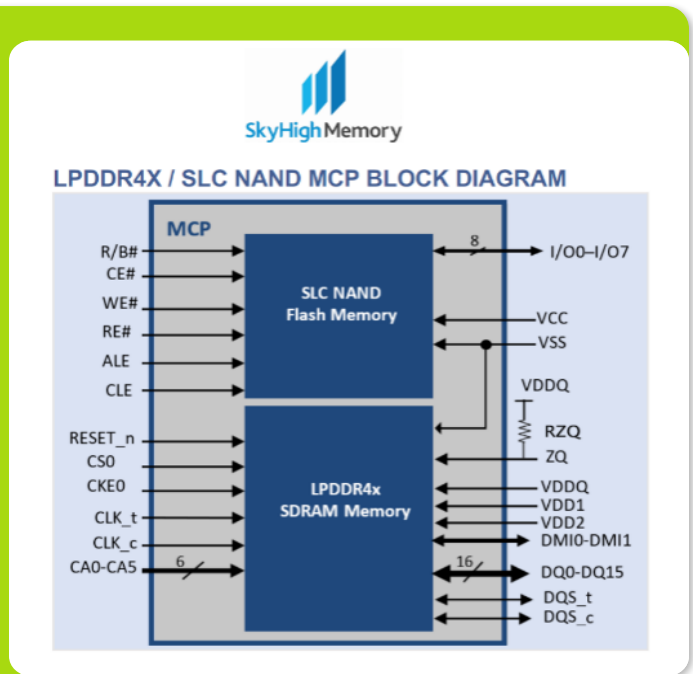
Spotlight: SkyHigh Memory Mult-Chip Package

LPDDR4X / SLC NAND MCP BLOCK DIAGRAM

Do you know SkyHigh Memory's MCP family? The Multi-Chip Package is an integrated solution that stacks SLC NAND and LPDDDR4 memory components and is designed for applications that need high reliability and performance with lower power consumption within a small form factor. These include IoT, healthcare, transportation or automotive applications where the need for computing and date storage at the end node increases. By stacking memories, you save about 50% of space and system costs as you move to a single chip memory solution. And the LPDDR4x technology not only reduces the output driver power by 55% but also reduces the DRAM power consumption by more than 20% compared to the LPDDR3/4 technologies. The SkyHigh MCP family is currently available in densities of 8Gb SLC NAND and 8 Gb LPDDR4x in 149 ball BGA packages.
Find out more here.

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