

The Balance of DRAM Demand and Supply in 2006

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The approach

There are no significant reasons to believe 2006 demand will deviate much from current norm of 45% growth. There is also no reason to believe technology advancement pace will change – three years per node. Three years per node translates into annual 28% die growth per wafer. This leaves annual wafer capacity growth to 13% to maintain status quo.

I focus on checking if we will see 13% wafer capacity growth in 2006.

World total DRAM capacity in 2005

The following iSuppli report indicates 1H 2005 DRAM shipment amount is at \$11.3 billion. A surprise to me. Apparently I have been immersed in the daily routine for too long.

A major portion of DRAM is commodity. 110 nm is supposed to be the mainstream technology in 2005. Let's take IFX Gemini as a reference product. At 600 gross die, 80% yield and \$2.5 a piece, an 8" wafer generates \$1200.

$\$11.3 \text{ billion} / \$1200 / 6 = 1.57 \text{ million wafer a month}$. Thirteen percent would mean 200K wafers. Has the industry added or will be adding so much capacity? Let's count one by one.

Hynix regains No. 2 ranking as DRAM supplier, says iSuppli

Posted: 04 Aug 2005

Preliminary Ranking of Top-10 DRAM Suppliers in Q2, 2005
(Sales in millions of U.S. dollars)

Q2 Rank	Q1 Rank	Company	Q2 Revenue	Q1 Revenue	Percent Change	Q2 Market Share
1	1	Samsung	\$1,749	\$2,043	-14%	30.6%
2	3	Hynix	\$939	\$1,083	-13%	16.4%
3	2	Micron	\$840	\$1,100	-24%	14.7%
4	4	Infineon	\$774	\$790	-2%	13.5%
5	5	Elpida	\$397	\$443	-10%	6.9%
6	6	Nanya	\$325	\$333	-2%	5.7%
7	7	Powerchip	\$291	\$329	-12%	5.1%
8	8	ProMos	\$194	\$250	-22%	3.4%
9	10	Winbond	\$43	\$34	26%	0.8%
10	NA	ISSI	\$36	\$21	76%	0.6%
		Others	\$127	\$148		2.2%
		Total	\$5,715	\$6,574	-13%	100.0%

Source: iSuppli Corp.

Although global shipments of DRAM megabytes increased sequentially by 15 percent the second quarter, the increase was wiped out by a 25 percent decline in average selling prices, said iSuppli.

According to iSuppli, Hynix's rise up the ranks was notable because the company has converted a significant portion of its DRAM manufacturing capacity to NAND flash memory production. Hynix benefited from a faster-than-expected ramp up of production at its new M-10 300mm wafer production line, said iSuppli.

Capacity addition or capacity expansion plan by each vendor

I searched through EE Times, none of the top four vendors announced in 2005 any DRAM capacity expansion plan. Interesting the rest five all had some announcements. Announcements of Powerchip and Nanya were without a schedule. To my best knowledge they have not started construction yet. Contribution to 2006 is unlikely. News of ProMos, Elpida and Inotera are copied below.

The summed addition, including Winbond, is no more than 60K 12" a month, which translates to 144K 8" equivalent, smaller than 200K.

Furthermore, Samsung needs to divert about 30K 8" capacity to support iPod Nano.

ProMOS to ramp up capacity at 12-inch wafer fab

Posted: 17 May 2005

ProMOS Technologies Inc. has revealed capacity expansion plans for its 12-inch wafer fab located in the Central Taiwan Science Park (CTSP).

According to Chairman M.L. Chen, monthly capacity for the company's 12-inch wafers would be increased by 10,000 as expansion plans are carried out in full force in the third quarter of next year. Chen adds that capacity expectations for the segment will likely reach 40,000 units from a forecasted 30,000 units next year. Together with its other wafer fab, the company's monthly capacity will reach 60,000 by the end of next year.

ProMOS' facilities in CTSP will be concentrating its production on DRAM and its 8in fab in Hsinchu will partially offer wafer services.

Elpida invests in production equipment for 300mm facility

Posted: 14 Mar 2005

DRAM supplier Elpida Memory Inc. and Hiroshima Elpida Memory Inc., a wholly-owned subsidiary of Elpida, disclosed the first phase of investment in manufacturing equipment for its second 300mm wafer fabrication facility, E300-Fab2. The facility is expected to produce a proposed capacity of 15,000 wafers per month by the first quarter of 2006, and gradually increase production output to 60,000 wafers per month.

Inotera, Infineon ramp 90nm DRAM production

Posted: 03 Jun 2005

Inotera Memories Inc., the joint venture between Infineon Technologies AG and Nanya Technology Corp., is beginning a transition to 90nm DRAM manufacturing, and Infineon has already moved 5 percent of its production over to 90nm, Infineon said.

Infineon (Munich, Germany) said that, together with Nanya (Taoyuan, Taiwan), it has qualified the jointly-developed 90-nanometer DRAM technology and that both companies have qualified 90nm memory products at major customers including Intel Corp.

By the end of May Infineon had converted about 5 percent of its DRAM production from 110nm to 90nm, the company said. Inotera Memories, the Taiwan-based manufacturing joint venture of Infineon and Nanya is starting the 90nm transition now, it added.

"With the qualification of advanced DRAM products on 90nm process technology we have

achieved a major milestone towards product and technology leadership and increased DRAM manufacturing productivity," said Andreas von Zitzewitz, head of Infineon's memory products business group, in a statement.

The first product to receive customer qualification is a 512Mb DDR SDRAM. The extension of the portfolio with a 512Mb DDR2 SDRAM is expected in the second half of 2005, with a variety of other products including 256Mb DDR2 and 1Gb DDR2 SDRAMs to follow.

The 90nm process is based on the use of 193nm wavelength lithography, as was the 110nm process, Infineon said. The strategic development alliance between Infineon and Nanya also covers the next technology node with 70nm structures.

A check on Semi Equipment industry

Equipment sales in 2006 decline 12%.

SEMI says 2004 global semiconductor equipment sales reach \$37.1B

Posted: 14 Mar 2005

Worldwide sales of semiconductor manufacturing equipment totaled \$37.08 billion in 2004, representing a year-over-year increase of 67.1 percent based from SEMI's "Worldwide Semiconductor Equipment Market Statistics (SEMS)" report.

According to the report, Japan, the largest world market grew 49 percent to about \$8.3 billion. The Taiwan market region grew the most in 2004, rising 166 percent to \$7.8 billion. The region also surpassed North America to become the second largest equipment market behind Japan. The rest of world region, which aggregates Singapore, Malaysia, Philippines, other areas of Southeast Asia and smaller global markets, grew 114 percent and the market in China increased 132 percent. South Korea, which led world growth in 2003 with a 91 percent expansion in equipment spending, increased an additional 45 percent in 2004. Equipment markets in Europe and North America increased 35 percent and 23 percent respectively in 2004.

Meanwhile, the global wafer processing equipment market segment grew 73 percent; the assembly and packaging segment grew 47 percent, the total test equipment sales increased 55 percent.

The worldwide SEMS report is a compilation of data submitted by members of SEMI and the Semiconductor Equipment Association of Japan (SEAJ).

Global equipment sales tumble, says SEMI

Posted: 26 Aug 2005

Global semiconductor industry association SEMI reported that worldwide semiconductor manufacturing equipment billings reached \$7.58 billion the second quarter of 2005, 19 percent lower than the previous quarter and 21 percent below a year ago.

The data, gathered in cooperation with the Semiconductor Equipment Association of Japan (SEAJ) from more than 150 global equipment companies, reflect the downturn in the semiconductor equipment market following a robust 2004.

Global semiconductor equipment sales reached \$16.9 billion in the first half of 2005, 10 percent below the first half of 2004, according to SEMI. Equipment sales decreased sequentially in all major global regions except Taiwan, and fell year-to-year in all regions except Korea. The following table shows the data.

Global semiconductor equipment sales					
In millions of U.S. dollars					
Region	Q2 2005	Q1 2005	Q2 2004	Quarter to quarter (percent change)	Year over Year (percent change)
Europe	799	909	878	-12	-9
China	236	326	900	-27	-74
Japan	1,584	2,114	1,955	-25	-19
North America	1,400	1,561	1,420	-10	-1
Korea	1,241	2,283	1,112	-46	+12
Taiwan	1,619	1,423	1,677	+14	-3
Rest of world	696	708	1,630	-2	-57
Total	7,576	9,325	9,572	-19	-21
Source: SEMI/SEAJ, Aug. 2005					

"The year-to-date performance is consistent with the recent SEMI member consensus survey that indicated expectations for worldwide equipment sales to reach about **\$33 billion this year** following the very strong equipment sales in 2004," said Stanley Myers, president and chief executive of SEMI, in a statement.

Gartner: Semi equipment capex to fall 12 percent in 2005

Posted: 07 Oct 2005

Despite strong demand in some consumer electronics segments, global semiconductor capital equipment spending is expected to fall 11.6 percent in 2005, according to market research firm Gartner Inc.

"While end user demand is still strong in some product areas, such as memory capacity in response to surging demand for flash devices, it is not enough to push the equipment market into any significant growth for either 2005 or 2006," said Bob Johnson, research vice president for Gartner's

semiconductor manufacturing and design research group, in a statement.

Global wafer fab equipment spending is projected to decline 9.5 percent in 2005. This market is forecast to decline in 2006 as well and return to positive growth in 2007.

As semiconductor manufacturers trimmed production levels in response to excess inventories, utilization rates bottomed in the first quarter of 2005, but will rise to a 2005 peak in the third quarter. But a combination of additional capacity coming online and seasonal production variations will drop utilization rates the fourth quarter of 2005 and the first quarter of 2006.

Burned by capital equipment overspending in the past, equipment makers remain in a cautious mode, which Johnson believes will serve them well in the long run.

"What is encouraging about this down cycle is how rapidly semiconductor manufacturers responded to increasing inventories last year and lowering utilization rates this year," Johnson said. "While new capacity additions are in synch with anticipated demand, end market growth for semiconductors is expected to be modest for the next few years, so we expect a similarly modest up-cycle for equipment."

One bright spot has been the packaging and assembly equipment market. According to Gartner, that sector was forecast in July to fall 16.5 percent, but is now expected to fall 14.9 percent. Also showing resiliency is the automated test equipment (ATE) market. While Gartner expects that sector to decline 21 percent this year, the firm noted that ATE spending has picked up in the second half of the year.

Gartner expects the ATE market to grow 25 percent in 2006, beginning a recovery that will last several years.