



Memory sector

Samsung announces further DRAM production cuts

Overweight • Maintained

Key message

Samsung (KR) intends to step up DRAM production cuts to 30% in 4Q23F, which we believe will push up the spot and contract prices of DDR4. Investors should engage related stocks at current levels.

Event

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Impact

Samsung to expand DRAM output cuts to ensure price hikes for DDR4. Samsung intends to step up DRAM production cuts, mainly DDR4, to 30% by 4Q23F, up from 20% and 25% in 2Q-3Q23, due to: (1) further deterioration of total server demand since August, which we think will extend to 2024F with demand for general server likely to be flattish next year given cannibalization by AI server; (2) increased memory procurement by Android smartphone makers since September as iPhone has been banned by the Chinese public sector, although volume growth is insufficient to make up for the shortfall in server demand; (3) module houses, including retail-oriented and industrial-oriented, have completed inventory restocking to the 15-20 weeks target after purchases in 2Q-3Q23; (4) reallocation of production capacity, in which Samsung aims to boost wafer start volume at the new P3L fab to 50k pieces per month by 4Q23F to service unfulfilled demand for DDR5; this has to come with production cuts in DDR4 so that the firm can reduce total bit output and bring inventory level to less than 10 weeks by end-4Q23F in order to reverse declines in DDR4 prices; and (5) continued cash outflows for 1Ynm node. We trim 2023-24F DRAM bit supply to 2% decline and 10% growth, respectively.

Reduced supply of DRAM & NAND flash will stimulate downstream procurement, supply reduction far from over. Since Samsung's announcement to cut production of NAND flash further in September, we note that purchase inquiries from retail-oriented module houses have rebounded, which in turn should accelerate inventory turnover and push up prices of SSD module. Likewise, we believe inquiries from DRAM module houses will also pick up, resulting in higher prices. We anticipate that SK Hynix (KR) and Micron (US) will step up production cuts of NAND flash as well to 30% in 4Q23F from 3Q23's 25%, likely strengthening downstream procurement.

Stocks for Action

We believe memory prices will rebound across the board on reduced supply. Investors should engage related stocks at current levels.

Risks

Slower-than-expected production node migration; weakening market demand.

Stock valuations

Ticker	Company	Revenue contribution of related products(%)	Market cap (US\$m)	Price (NT\$)	Rating	Target price (NT\$)	Upside/downside(%)	EPS (NT\$)		
								2022	2023F	2024F
2408 TT	Nanya Technology	DRAM(100)	6,798	70.00	OP	85	21	4.72	(1.75)	2.81
2344 TT	Winbond	DRAM(29)	3,406	27.30	NR	N.A.	N.A.	3.25	0.18	2.04
3260 TT	ADATA	DRAM module(45)	770	90.80	NR	N.A.	N.A.	3.12	2.72	4.09

Source: Bloomberg; KGI Research

Figure 1: Overview of DRAM supply & demand, and pricing outlook

%	2023				2024				2022	2023	2024
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q			
DRAM											
Bit supply growth									19	(2)	10
Wafer output YoY growth									7	(15)	13
Wafer output QoQ/YoY growth (kwpm)	(84)	(201)	(2)	8	45	111	133	99	99	(237)	174
Bit demand growth									12	6	12
Sufficiency rate	113	105	95	86	94	93	99	102	108	99	97
DDR4 8Gb contract price QoQ growth	(18)	(22)	(3)	5	10	20	10	10			

Source: TrendForce; KGI Research

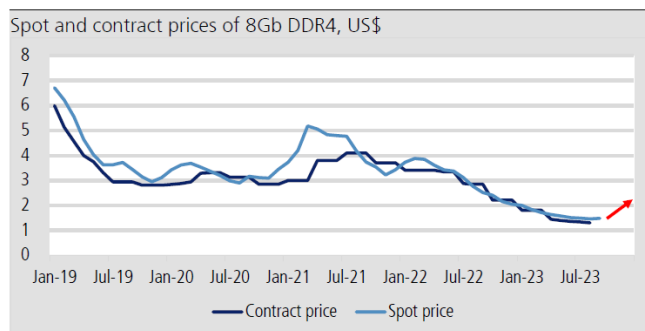
DRAM supply to keep falling

Following the price hikes of DDR5 in 3Q23, we expect the spot and contract prices of DDR4 will also pivot to an upturn in 4Q23F, and even with prices rising again, we expect DRAM makers to maintain output cuts in 1H24F, as:

(1) the main purpose of upcoming output cuts by manufacturers is to reduce inventories, which we don't believe will return to the optimal level of 5-7 weeks before end-2Q24F; and

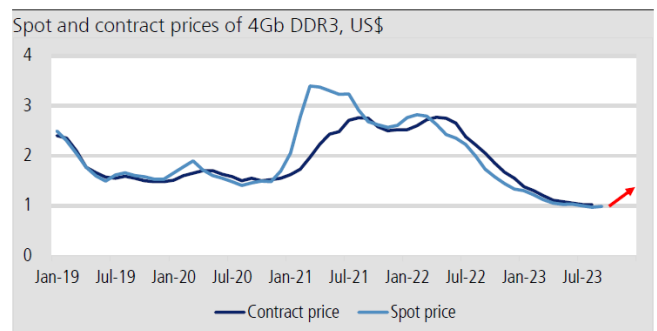
(2) we estimate total capex by memory makers will decline 33% YoY in 2023F, followed by only 20-30% growth in 2024F. The capex growth of SK Hynix in 2024F should be the highest, while Micron's capex growth could fall short of peer average, primarily because the two have very different plans to invest in high bandwidth memory (HBM). In the meantime, investment in DDR4 node migration and capacity expansion has remained limited, and thus manufacturers are unable to keep reducing production costs of legacy nodes, and have to wait until more significant product price hikes in 2H24F to turn profitable and resume capacity utilization.

Figure 2: Spot prices of DDR4 rebound from September, and contract price is expected to rebound from 4Q23



Source: TrendForce; KGI Research

Figure 3: Spot prices of DDR3 rebound from September



Source: TrendForce; KGI Research

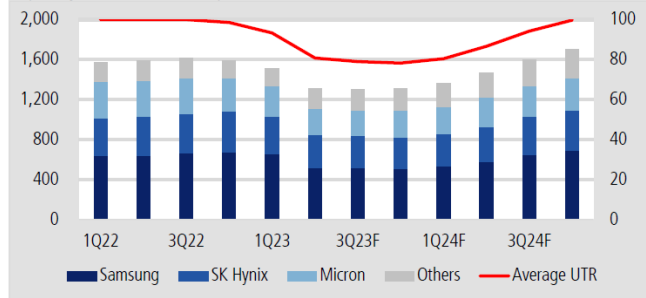
Figure 4: Inventories of DRAM makers & downstream consumers

week	Healthy level	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23F	4Q23F	1Q24F	2Q24F
Hyperscaler	7-8	Destock 7-9	Restock 7-8	Destock 10-12	Destock 11-13	Destock 9-13	Destock 8-10	De>restock 7-9	Restock	Restock	Restock
Smartphone	5-6	Destock 7-9	Destock 7-9	Destock 7-9	Destock 6-8	Destock 5-7	Destock 5-7	De>restock 8-10	Restock	Restock	Restock
PC OEM	5-6	De>restock 8-10	Destock 10-14	Destock 10-14	Destock 10-14	Destock 9-13	Destock 8-11	De>restock 12-14	Restock	Restock	Restock
Module house	5-6	De>restock 8-10	Destock 7-9	Destock 9-11	Destock 8-11	Destock 9-13	Restock 9-20	Restock 12-22	Restock 15-22	Restock	Restock
DRAM maker	4-5	5-7	8-10	12-13	15	14-17	12-14	10-12	8-9	Less	Less

Source: TrendForce; KGI Research

Figure 5: DRAM makers commenced production cuts in 3Q22 and have since gradually expanded cuts quarterly

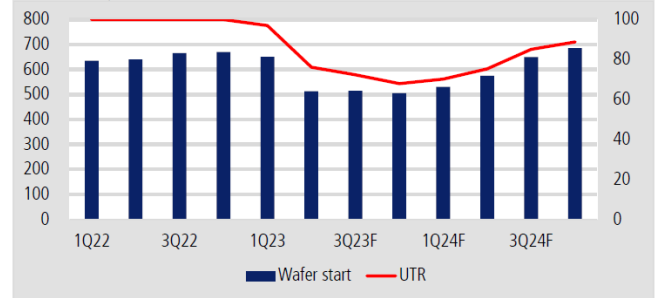
Wafer start volume of DRAM producers, '000 pieces/month (LHS); average capacity utilization rate, percent (RHS)



Source: TrendForce; KGI Research

Figure 6: Samsung started to cut DRAM production from 1Q23 and has since gradually expanded cuts quarterly

Samsung DRAM wafer start volume, '000 pieces/month (LHS); capacity utilization, percent (RHS)



Source: TrendForce; KGI Research

Figure 7: Overview of DRAM producers' 2016-24 annual production capacity outlook

(k piece/month)	2016	2017	2018	2019	2020	2021	2022	2023F	2024F
Capacity	962	1,066	1,191	1,298	1,364	1,495	1,594	1,357	1,532
Samsung	336	305	415	463	495	584	653	546	610
SK Hynix	255	310	325	349	344	356	393	337	366
Micron	245	320	310	341	349	355	353	272	299
Nanya	60	60	65	71	71	71	68	54	58
Winbond	17	21	26	27	27	26	22	25	27
Powerchip	49	50	50	49	44	47	43	27	35
CXMT	0	0	0	0	31	50	54	86	127
JHICC	0	0	0	0	3	6	9	10	10
YoY growth		104	125	107	66	131	99	(237)	174
Samsung		(31)	110	48	33	89	69	(107)	64
SK Hynix		56	15	24	(5)	12	37	(56)	29
Micron		75	(10)	31	8	6	(2)	(81)	27
Nanya		0	5	6	(0)	0	(3)	(14)	4
Winbond		4	5	1	1	(1)	(4)	3	2
Powerchip		1	0	(2)	(4)	3	(4)	(16)	8
CXMT		0	0	0	31	19	4	33	41
JHICC		0	0	0	3	3	3	1	0

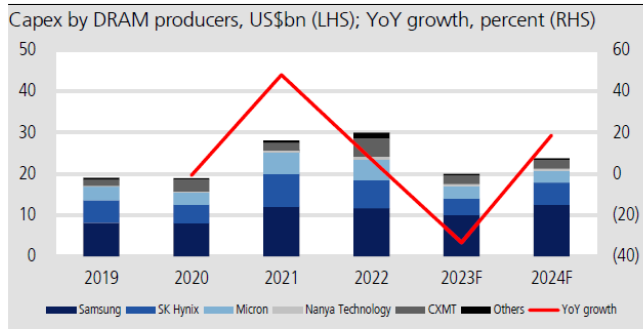
Source: TrendForce; KGI Research

Figure 8: Overview of DRAM producers' 1Q22-4Q24 quarterly production capacity outlook

	2022				2023				2024			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Total wafer output (k)	1,575	1,591	1,614	1,591	1,507	1,306	1,304	1,312	1,357	1,468	1,601	1,700
Samsung	635	640	665	670	651	513	515	505	530	575	650	685
SK Hynix	380	390	390	410	378	333	318	318	328	353	378	403
Micron	360	360	360	333	303	260	260	265	265	295	310	325
Nanya	71	71	71	60	53	58	54	52	53	55	60	65
Winbond	24	23	21	17	21	25	27	28	26	26	27	29
Powerchip	47	47	43	34	26	26	27	29	32	33	36	38
CXMT	50	52	55	57	65	81	93	105	113	121	130	145
JHICC	8	8	9	10	10	10	10	10	10	10	10	10
QoQ growth	22	16	23	(23)	(84)	(201)	(2)	8	45	111	133	99
Samsung	10	5	25	5	(19)	(138)	2	(10)	25	45	75	35
SK Hynix	10	10	0	20	(32)	(45)	(15)	0	10	25	25	25
Micron	5	0	0	(27)	(30)	(43)	0	5	0	30	15	15
Nanya	0	0	0	(11)	(7)	5	(4)	(2)	1	2	5	5
Winbond	(3)	(1)	(2)	(4)	4	4	2	1	(2)	0	1	2
Powerchip	(1)	0	(4)	(9)	(8)	0	1	2	3	1	3	2
CXMT	0	2	3	2	8	16	12	12	8	8	9	15
JHICC	1	0	1	1	0	0	0	0	0	0	0	0

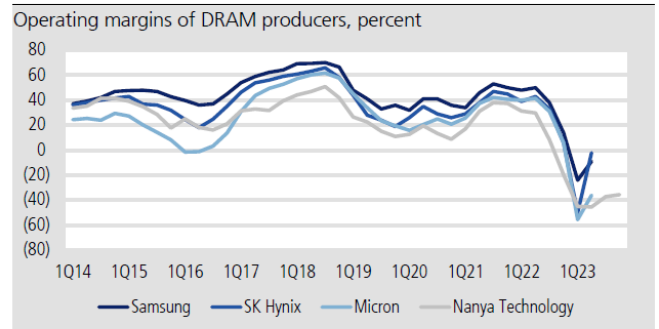
Source: TrendForce; KGI Research

Figure 9: DRAM producers to reduce capex in 2023F, followed by moderate capex growth in 2024F



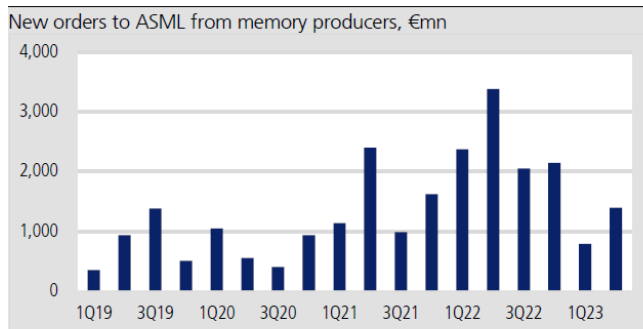
Source: TrendForce; KGI Research

Figure 10: All DRAM producers are suffering operating losses



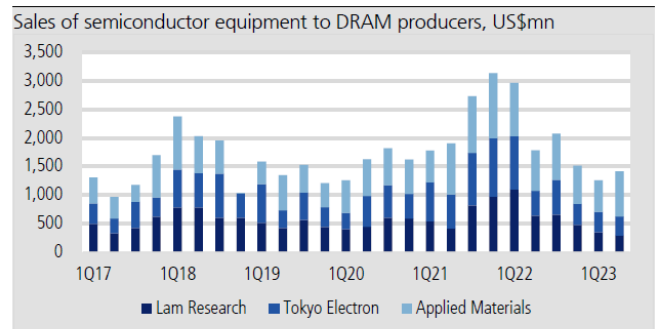
Source: TrendForce; KGI Research

Figure 11: ASML's orders from memory producers grew 77% QoQ in 2Q23, mainly on clients based in China



Source: Company data; KGI Research

Figure 12: Vendors of semiconductor equipment have seen sales from DRAM clients increased 13% QoQ in 2Q23



Source: Company data; KGI Research

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