China Technology Sector

2H24F outlook – recovery in good shape

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- **Demand continues to recover for smartphones and PCs**
- **Automotive and industrial weakening; eyeing 2H24F stabilization**
- **Top picks: Will Semi (603501 CH), AAC Tech (2018 HK), and Maxscend (300782 CH)**

Top picks: Will Semi and AAC Tech. Consumer demand has been in a gradual recovery since 2H23, though industrial and auto demand remains soft. Performance within China's technology sector continued to diverge in 1Q24. Leading smartphone supply-chain names and AI-names have had better stock performances YTD while smartphone and PC demand has been recovering, a trend likely to continue in 2H24F. We are positive towards leading names like Will Semi (603501 CH, O/P), which stand to benefit from momentum behind CIS and progress in high-end products. We also like AAC Tech (2018 HK, O/P), now reaping the rewards of a turnaround in optic business profit while its PM business continues to benefit from a key domestic customer. Finally, we like Maxscend (300782 CH, O/P) for its module contribution and progress in new products.

Smartphone supply chain: prefer Android to Apple. Global smartphone shipments were up 11.8% YoY in 1Q24 thanks to refreshed models from vendors and stabilization in the macro economy. The smartphone market continued its recovery, but there are worrying signs that the trend is slowing. Our channel checks indicate demand was largely flat in 2Q24F. We expect global smartphone shipments to achieve low-single-digit percent growth in 2024F helped by normalized inventory, device replacement needs, and the AI trend. China smartphone shipments increased 6% YoY to 69m in 1Q24. Honor had the largest market share of 17% thanks to new product releases and channel competitiveness. Huawei continued its return push with its Pura 70 series launch, which has the potential to accelerate specification upgrades. We expect China's smartphone shipments to grow c.5% in 2024F. We still prefer Android supply chain players in light of Android's replacement cycle and further specification upgrades driven by Huawei. Key suppliers to the Android camp are now seeing more upside potential, including Will Semi (603501 CH), AAC (2018 HK), Maxscend (300782 CH), Sunny Optical (2382 HK), and BYD Electronic (285 HK).

Stable recovery in PCs while auto electronics slows. Global PC shipments increased by a slight 1.6% YoY to 59.8m in 1Q24, putting an end to eight quarters of consecutive YoY declines. Though modest, even a modicum of growth suggests PC demand continues to recover across segments, with purchases likely to accelerate throughout the year driven by the Windows 11 refresh and the push for AI-capable PCs. Channel inventory has been at a healthy level for almost two quarters now. The current PC installed base, having grown large and old, represents a significant opportunity for refreshment. The wider introduction of AI-capable PCs ("AI PCs") in 2H24F has the potential to drive market demand, likely delivering a new innovative PC feature after years of stagnant innovation. We expect the PC market to continue to recover in the remainder of the year, leading to c.5% YoY shipment growth by the end of 2024F. Automotive electronics demand has been slowing since 2Q23 due to downstream inventory digestion. We believe this trend will persist in what remains of 2024F.

Semiconductor market in an adjustment period. According to WSTS, global semiconductor sales recorded 16% YoY growth in Mar, marking the seventh consecutive month of YoY growth since Sep 2023. The performance of downstream applications diverged, with smartphone-related applications recovering while industrial and automotive applications remained weak as inventory digestion took place. Weakness in industrial is affecting power devices, analog IC, and MCU players. Channel inventory for PCs and smartphones, the two largest market segments, is quite healthy as demand has recovered, albeit slowly. In 1Q24, smartphone chip names generally delivered solid results. For example, revenue at Will Semi was up 30% YoY. Management is positive towards the 2024F CIS market. Maxscend generated 67% YoY growth in revenue as module product contribution increased to 41%. By contrast, inventory levels for automotive and industrials are still high. We expect them to return to normal levels by late-2H24F as electrification continues to drive semiconductor content over the next decade.

Foundry utilization and ASP under pressure; equipment vendor sales strong. Some foundries saw their capacity utilization rates (UTR) recover in the last two quarters, while others continued to suffer underutilization. TSMC saw UTR improve sequentially for four consecutive quarters, driven by demand from HPC and AI-related products. UTR at SMIC and Hua Hong also recovered due to the strength of consumer-related products. Demand for the 22/28/40nm process at most foundries remains robust, mainly for RF, WiFi, IoT SoC, and driver ICs. Some players will continue to lower prices to gain market share and ensure a sufficient utilization rate, which will result in ASP pressure across the industry. In 2H24F, most foundries are likely to see UTR improve on stronger smartphones, PCs, consumer devices, and healthier inventory within the industrial segment. Semiconductor production equipment (SPE) vendors generally delivered stable revenue growth and profitability in 1Q24, with sufficient orders-on-hand to support growth for the next few quarters. We now forecast the global SPE market to grow by a low-single-digit percentage in 2024F.

Slowing telecom investment. The three Chinese telcos have lower capex budgets for 2024, with a greater proportion allocated to computing power and data center construction, resulting in lower investment in telecom equipment. Telcos' migrating from 5G NSA to SA are now slowing down, which will cool demand for optical fiber and cable. In addition, pricing pressure continues, clouding the outlook for equipment vendors. Increasing broadband penetration could benefit optical cable vendors, while increasing FTTR (fiber-to-the-room) penetration is likely to drive up demand for communication terminals. We suggest a wait-and-see strategy for network deployment.

Risks to our view: (1) A further slowdown in the consumer recovery, (2) worse-than-expected overcapacity in semiconductors, (3) further delays in the PC replacement cycle, and (4) more intense competition.

China technology sector companies key metrics

Company	Stock Code	CCBIS rating‡	Share price* (LC)	Market cap (US$ m)	EPS growth (%) 2024F	EPS growth (%) 2025F	P/E (x) 2024F	P/E (x) 2025F	P/B (x) 2024F	P/B (x) 2025F	Dividend yield (%) 2024F
Hardware & electronics											
Xiaomi	1810 HK	Outperform	19.44	62,161	(47.9)	11.5	44.0	39.5	2.5	2.4	0.0
Lenovo	992 HK	Outperform	11.42	18,151	(43.0)	26.0	20.2	16.0	2.8	2.4	1.7
LuxShare	002475 CH	Outperform	32.86	32,589	15.3	25.4	18.7	14.9	3.5	2.9	0.5
Goertek	002241 CH	Neutral	17.09	8,069	128.2	16.9	23.4	20.1	1.8	1.7	1.3
Sunny Optical	2382 HK	Outperform	44.65	6,264	100.3	38.5	18.5	13.3	1.7	1.5	0.9
LensTech	300433 CH	Outperform	15.27	10,514	13.1	25.4	22.3	17.8	1.6	1.5	1.8
Shennan Circuits	002916 CH	Outperform	91.53	6,486	15.2	16.6	29.2	25.0	3.3	3.0	1.0
DSBJ	002384 CH	Outperform	16.42	3,879	25.1	23.0	11.4	9.2	1.4	1.2	0.9
BYD Elec	285 HK	Outperform	34.05	9,831	22.2	25.3	13.8	11.0	2.3	1.9	1.9
AAC Tech	2018 HK	Outperform	25.10	3,855	70.1	20.9	19.6	16.2	1.1	1.0	0.7
Q Tech	1478 HK	Neutral	3.94	598	223.9	60.0	14.7	9.2	0.8	0.7	0.0
ZTE Corp – H	763 HK	Outperform	17.22	16,960	10.9	8.6	7.1	6.6	1.0	0.9	4.0
ZTE Corp – A	000063 CH	Outperform	27.48	16,960	10.9	8.6	12.7	11.7	1.8	1.6	1.2
YOFC – H	6869 HK	Outperform	8.98	1,873	(36.8)	7.9	7.5	6.9	0.5	0.4	5.4
YOFC – A	601869 CH	Neutral	26.16	1,873	(36.8)	7.9	24.2	22.4	1.7	1.6	1.6
Average – Hardware Electronics							**19.1**	**16.0**	**1.8**	**1.6**	**1.5**
Semiconductor											
Will Semi	603501 CH	Outperform	98.00	16,462	411.9	41.8	40.8	28.7	4.9	4.3	0.2
GigaDevice	603986 CH	Neutral	82.53	7,605	653.8	47.8	45.5	30.8	3.4	3.1	0.7
Wingtech	600745 CH	Outperform	31.17	5,352	8.5	17.6	8.6	7.3	0.9	0.9	0.9
StarPower	603290 CH	Outperform	132.32	3,126	17.5	28.6	21.1	16.4	3.1	2.7	1.0
SG Micro	300661 CH	Neutral	73.80	4,795	113.4	21.9	58.3	47.9	7.9	7.1	0.7
Silan	600460 CH	Neutral	18.73	4,306	N/A	34.0	36.5	27.3	2.4	2.2	0.4
Maxscend	300782 CH	Outperform	89.19	6,578	27.1	40.9	33.4	23.7	4.3	3.7	0.3
SMIC – H	981 HK	Outperform	16.08	23,850	(65.6)	137.8	52.8	22.2	0.8	0.8	0.0
SMIC – A	688981 CH	Outperform	42.27	23,850	(65.6)	137.8	154.8	65.1	2.3	2.3	0.0
Hua Hong	1347 HK	Outperform	19.22	5,059	(54.9)	91.7	32.2	15.2	0.7	0.6	0.0
NAURA Tech	002371 CH	Outperform	293.16	21,506	24.0	33.5	32.2	24.1	5.4	4.5	0.3
AMEC	688012 CH	Outperform	133.65	11,450	13.8	20.2	40.7	33.9	4.2	3.8	0.4
ASMPT	522 HK	Outperform	91.80	4,876	82.2	40.2	29.2	20.8	2.3	2.1	1.7
Average – Semiconductor							**45.1**	**27.9**	**3.3**	**2.9**	**0.5**

‡ CCBIS ratings: Outperform, Neutral, Underperform, Not Rated
** Price as at close on 22 May 2024 (local currency)*
*** Lenovo fiscal year end in Mar, calendar 2023/2024F corespond to FY24F/FY25F of Lenovo,*
Source: Refinitiv, CCBIS estimates

中国科技行业

2H24F 展望：复苏状况良好

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- **智能手机和 PC 需求持续恢复**
- **汽车和工业领域持续转弱；预计 2024F 下半年趋于稳定**
- **首选：韦尔股份 (603501 CH)，瑞声科技 (2018 HK)，卓胜微 (300782 CH)**

首选韦尔股份、瑞声科技。自 2023 年下半年以来，消费需求逐渐复苏，但工业和汽车需求仍然疲软。中国科技板块在 2024 年第一季度的表现仍然分化。智能手机供应链龙头公司、人工智能相关标的今年迄今的股票表现较好。智能手机和个人电脑（PC）需求一直在复苏，并且趋势将持续到 2024 下半年。我们看好韦尔股份（603501 CH，优于大市），因其将受益于 CIS 的乐观前景以及其高端产品的顺利进展；同时看好瑞声科技（2018 HK，优于大市），因其光学业务有望扭亏为盈，精密结构件业务则受益于国内重要客户；我们还看好卓胜微（300782 CH，优于大市），因其不断模块收入贡献提升和新产品的顺利进展。

智能手机供应链：更偏好安卓。得益于厂商更新机型以及宏观经济企稳，2024 年一季度全球智能手机出货量同比增长 11.8%。智能手机市场继续复苏，但有迹象表明趋势正在放缓。我们的渠道调查显示，2024 年第二季度的需求基本持平。我们预计 2024 年全球智能手机出货量将实现低个位数增长，这主要得益于库存水平正常化、设备更换需求和人工智能趋势。2024 年第一季度中国智能手机出货量同比增长 6%至 6,900 万部。凭借积极的新品发布和渠道竞争力，荣耀以 17%的市场份额位居第一。华为继续其回归进程，推出 Pura 70 系列，有望加速规格升级。我们预计 2024 年中国智能手机出货量将增长约 5%。鉴于安卓的更新换代周期以及华为推动的进一步规格升级，我们仍然看好安卓供应链厂商。安卓阵营的主要供应商现在能看到了更多的上涨潜力，包括韦尔股份（603501 CH）、瑞声科技（2018 HK）、卓胜微（300782 CH）、舜宇光学（2382 HK）和比亚迪电子（285 HK）。

PC 平稳复苏继续；汽车电子持续转弱。2024 年一季度全球个人电脑出货量同比小幅增长 1.6%至 5,980 万台，结束了连续八个季度同比下滑的局面。虽然增幅不大，但表明各细分市场的 PC 需求正在持续复苏，在 Windows 11 更新和支持 AI 的 PC（AI PC）推动下，预计全年采购将继续加速。渠道库存在这一两个季度以来一直处于健康水平。当前的 PC 安装基数庞大且陈旧，为更新换代创造了巨大的机会，尤其是对企业用户而言。2024 年下半年更广泛地引入具有人工智能功能的 AI PC 也将有可能推动市场需求，有望在多年的创新停滞之后提供新的 PC 功能创新。因此，我们预计 PC 市场今年将继续复苏，2024 年出货量同比增长约 5%。由于下游库存调整，汽车电子需求自 2023 年二季度以来一直在转弱。我们认为这一趋势将在 2024 年的大部分时间持续。

半导体行业正处于调整期。据 WSTS 统计，3 月份全球半导体销售额同比增长 16%，为 2023 年 9 月以来连续 7 年同比增长。下游应用表现分化：智能手机相关应用持续复苏，工业和汽车应用因库存消化持续疲软。工业领域的疲软正在影响功率器件、模拟芯片和 MCU 厂商。个人电脑和智能手机这两个最大的细分市场的渠道库存目前相当健康，需求正在逐步恢复，虽然缓慢。2024 年一季度，智能手机芯片厂商普遍取得了可观的业绩。例如，韦尔股份的收入同比增长 30%，管理层对 2024 年 CIS 市场持乐观态度。卓胜微营收同比增长 67%，其中模组产品占比提升至 41%。相比之下，汽车和工业相关的库存水平仍然很高。我们预计，随着电气化在未来十年继续推动半导体内容的发展，库存将在 2024 年下半年恢复到正常水平。

晶圆代工厂产能利用率和平均售价仍面临压力；设备供应商销售强劲。一些代工厂的产能利用率（UTR）在过去两个季度有所回升，而另一些代工厂则继续面临利用率不足的问题。台积电的 UTR 连续四个季度持续改善，主要受到 HPC 和 AI 相关产品需求的推动。得益于消费相关产品的订单，中芯国际和华虹的 UTR 也有所恢复。大多数代工厂的 22/28/40nm 工艺需求仍然强劲，主要因射频、WiFi、物联网 SoC 和驱动 IC。一些企业也会继续降低价格来获得市场份额并确保足够的利用率，这将导致整个行业的平均售价面临压力。展望 2024 下半年，在智能手机、PC、消费类产品走强，以及工业领域库存更健康的帮助下，大多数代工厂的 UTR 可能会逐渐改善。半导体生产设备（SPE）厂商在 2024 年第一季度普遍实现了稳定的收入增长和盈利能力，在手订单充足，支持未来几个季度的增长。我们现在预测 2024 年全球 SPE 市场将以低个位数百分比增长。

电信投资继续趋缓。中国三大电信运营商 2024 年的资本支出预算均较 2023 年更低，更多部分将分配在算力和数据中心建设上，从而导致电信设备投资降低。运营商从 5G NSA 向 SA 的迁移速度目前正在放缓，这将降低对光纤和光缆的需求。此外，价格压力持续存在，这给设备供应商的前景蒙上阴影。宽带普及率的提高可能会让光缆供应商受益，并且 FTTR（光纤到房间）普及率的提高也将推动对通信终端的需求。尽管如此，我们建议等待并密切监控网络部署情况。

风险：(1)消费复苏进一步放缓；(2) 半导体行业供给过剩情况比预期严重；(3) PC 换机周期进一步延后；以及 (4) 竞争加剧。

中国科技行业主要指标股

公司	股票代码	建银国际评级‡	股价* (交易货币)	市值 (美元 百万)	每股收益增速 (%) 2024F	每股收益增速 (%) 2025F	市盈率 (倍) 2024F	市盈率 (倍) 2025F	市净率 (倍) 2024F	市净率 (倍) 2025F	股息收益率 (%) 2024F
电子硬件											
小米集团	1810 HK	优于大市	19.44	62,161	(47.9)	11.5	44.0	39.5	2.5	2.4	0.0
联想集团	992 HK	优于大市	11.42	18,151	(43.0)	26.0	20.2	16.0	2.8	2.4	1.7
立讯精密	002475 CH	优于大市	32.86	32,589	15.3	25.4	18.7	14.9	3.5	2.9	0.5
歌尔股份	002241 CH	中性	17.09	8,069	128.2	16.9	23.4	20.1	1.8	1.7	1.3
舜宇光学	2382 HK	优于大市	44.65	6,264	100.3	38.5	18.5	13.3	1.7	1.5	0.9
蓝思科技	300433 CH	优于大市	15.27	10,514	13.1	25.4	22.3	17.8	1.6	1.5	1.8
深南电路	002916 CH	优于大市	91.53	6,486	15.2	16.6	29.2	25.0	3.3	3.0	1.0
东山精密	002384 CH	优于大市	16.42	3,879	25.1	23.0	11.4	9.2	1.4	1.2	0.9
比亚迪电子	285 HK	优于大市	34.05	9,831	22.2	25.3	13.8	11.0	2.3	1.9	1.9
瑞声科技	2018 HK	优于大市	25.10	3,855	70.1	20.9	19.6	16.2	1.1	1.0	0.7
丘钛科技	1478 HK	中性	3.94	598	223.9	60.0	14.7	9.2	0.8	0.7	0.0
中兴通讯 – H	763 HK	优于大市	17.22	16,960	10.9	8.6	7.1	6.6	1.0	0.9	4.0
中兴通讯 – A	000063 CH	优于大市	27.48	16,960	10.9	8.6	12.7	11.7	1.8	1.6	1.2
长飞光纤 – H	6869 HK	优于大市	8.98	1,873	(36.8)	7.9	7.5	6.9	0.5	0.4	5.4
长飞光纤 – A	601869 CH	中性	26.16	1,873	(36.8)	7.9	24.2	22.4	1.7	1.6	1.6
均值 – 电子硬件							**19.1**	**16.0**	**1.8**	**1.6**	**1.5**
半导体											
韦尔股份	603501 CH	优于大市	98.00	16,462	411.9	41.8	40.8	28.7	4.9	4.3	0.2
兆易创新	603986 CH	中性	82.53	7,605	653.8	47.8	45.5	30.8	3.4	3.1	0.7
闻泰科技	600745 CH	优于大市	31.17	5,352	8.5	17.6	8.6	7.3	0.9	0.9	0.9
斯达半导	603290 CH	优于大市	132.32	3,126	17.5	28.6	21.1	16.4	3.1	2.7	1.0
圣邦股份	300661 CH	中性	73.80	4,795	113.4	21.9	58.3	47.9	7.9	7.1	0.7
士兰微	600460 CH	中性	18.73	4,306	N/A	34.0	36.5	27.3	2.4	2.2	0.4
卓胜微	300782 CH	优于大市	89.19	6,578	27.1	40.9	33.4	23.7	4.3	3.7	0.3
中芯国际 – H	981 HK	优于大市	16.08	23,850	(65.6)	137.8	52.8	22.2	0.8	0.8	0.0
中芯国际 – A	688981 CH	优于大市	42.27	23,850	(65.6)	137.8	154.8	65.1	2.3	2.3	0.0
华虹半导体	1347 HK	优于大市	19.22	5,059	(54.9)	91.7	32.2	15.2	0.7	0.6	0.0
北方华创	002371 CH	优于大市	293.16	21,506	24.0	33.5	32.2	24.1	5.4	4.5	0.3
中微公司	688012 CH	优于大市	133.65	11,450	13.8	20.2	40.7	33.9	4.2	3.8	0.4
ASMPT	522 HK	优于大市	91.80	4,876	82.2	40.2	29.2	20.8	2.3	2.1	1.7
均值 – 半导体							**45.1**	**27.9**	**3.3**	**2.9**	**0.5**

‡ *建银国际评级：优于大市（Outperform），中性（Neutral），弱于大市（Underperform），未评级（Not Rated）*

* *股价为 2024 年 5 月 22 日收市价（交易货币）*

** *联想集团财年以 3 月结束，日历年 2023/2024F 对应联想 24F/25F 财年*

资料来源：Refinitiv，建银国际证券预测

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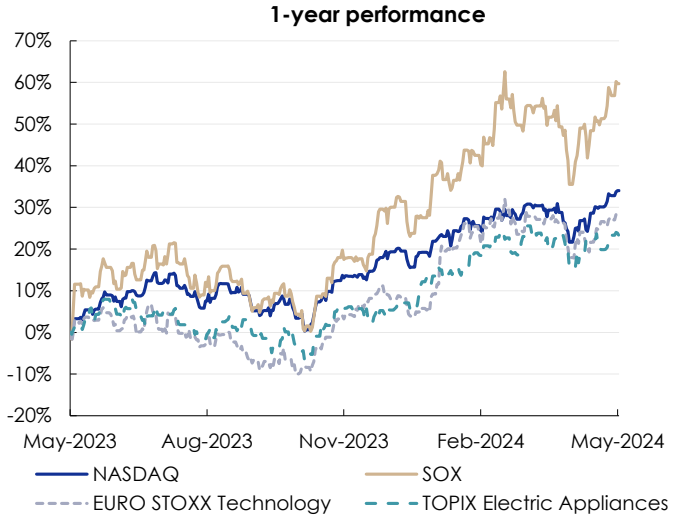
MARKET PERFORMANCE SNAPSHOT

Indexes:

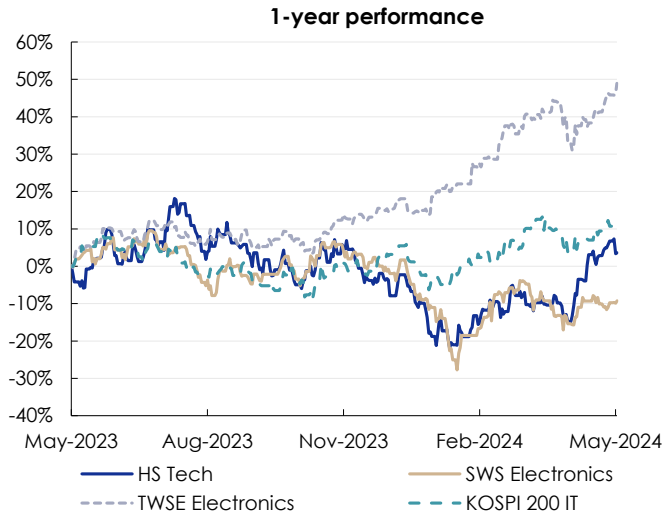
- **NASDAQ**: NASDAQ Composite Index (proxy of US-listed tech stocks);
- **SOX**: Philadelphia Semiconductor Index (proxy of US-listed semiconductor stocks);
- **EURO STOXX Technology**: EURO STOXX Technology Index (proxy of EU listed tech stocks);
- **TOPIX Electric Appliances**: Tokyo Stock Exchange TOPIX Electric Appliances Index (proxy of Japan listed tech stocks)
- **HS Tech**: Hang Seng TECH Index (proxy of Hong Kong listed tech stocks);
- **SWS Electronics:** 申万一级行业指数 – 电子 (proxy of China A-share listed tech stocks)
- **TWSE Electronics**: Taiwan Stock Exchange Electronics Index (proxy of Taiwan-listed tech stocks;
- **KOSPI 200 IT:** Korean stock exchange KOSPI 200 IT (proxy of South Korea listed tech stocks)

Tech index performances (US, Europe, Japan) – 1Y



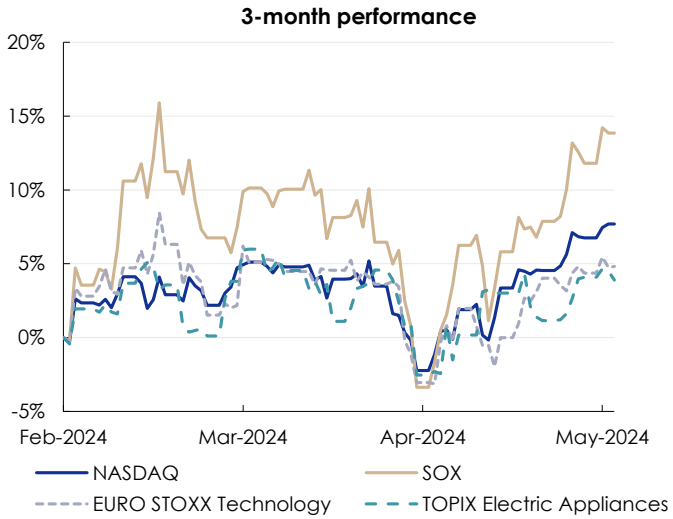
Source: Refinitiv, iFinD, CCBIS; as of 22 May 2024

Tech index performances (Greater China, Korea) – 1Y



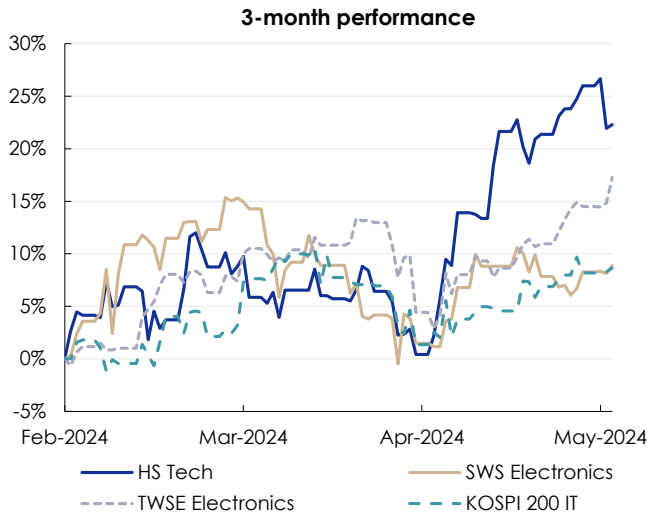
Source: Refinitiv, iFinD, CCBIS; as of 22 May 2024

Tech index performances (US, Europe, Japan) – 3M



Source: Refinitiv, iFinD, CCBIS; as of 22 May 2024

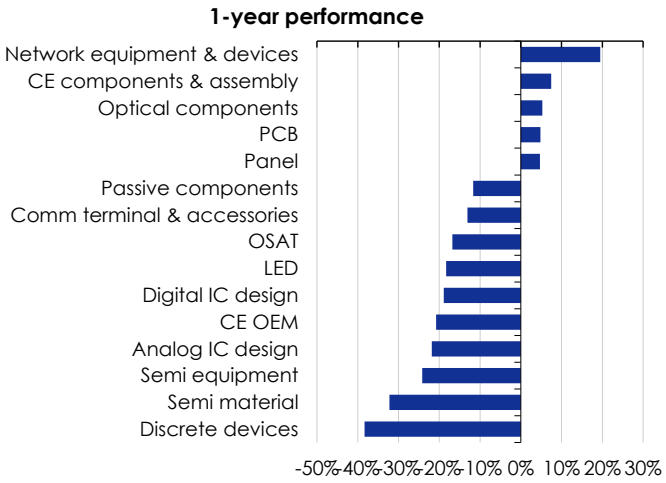
Tech index performances (Greater China, Korea) – 3M



Source: Refinitiv, iFinD, CCBIS; as of 22 May 2024

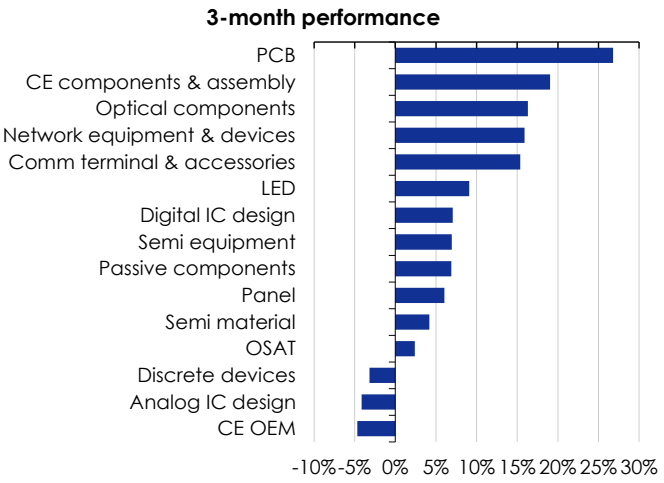
SWS industry indexes – level 3: 申万三级行业指数 (selective of technology, electronics, semiconductor, and telecom equipment).

SWS industry indexes performance – level 3 (1 year)



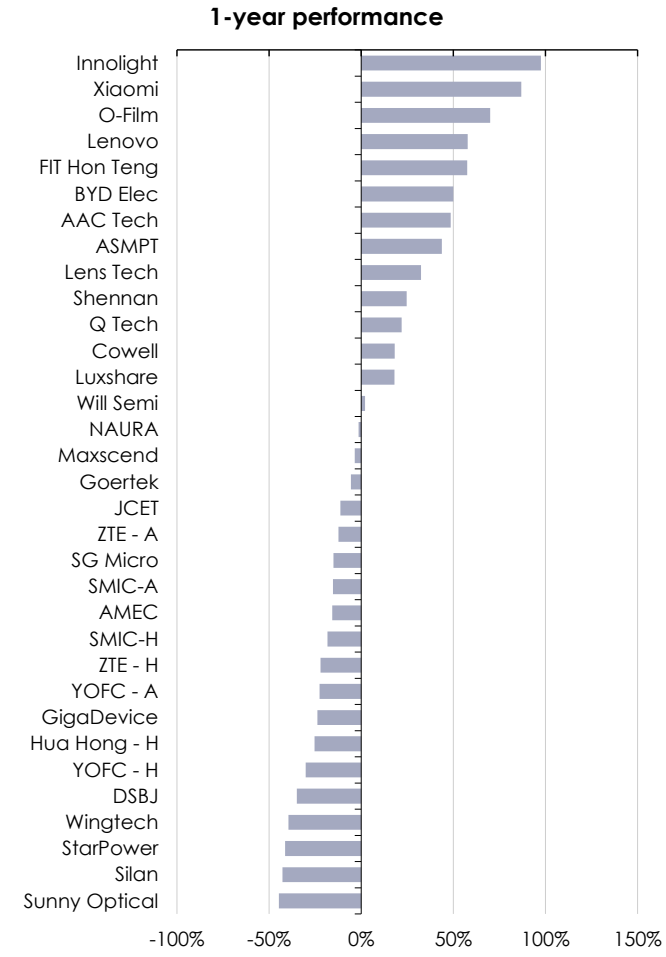
Source: iFinD, CCBIS; as of 22 May 2024

SWS industry indexes performance – level 3 (3 month)



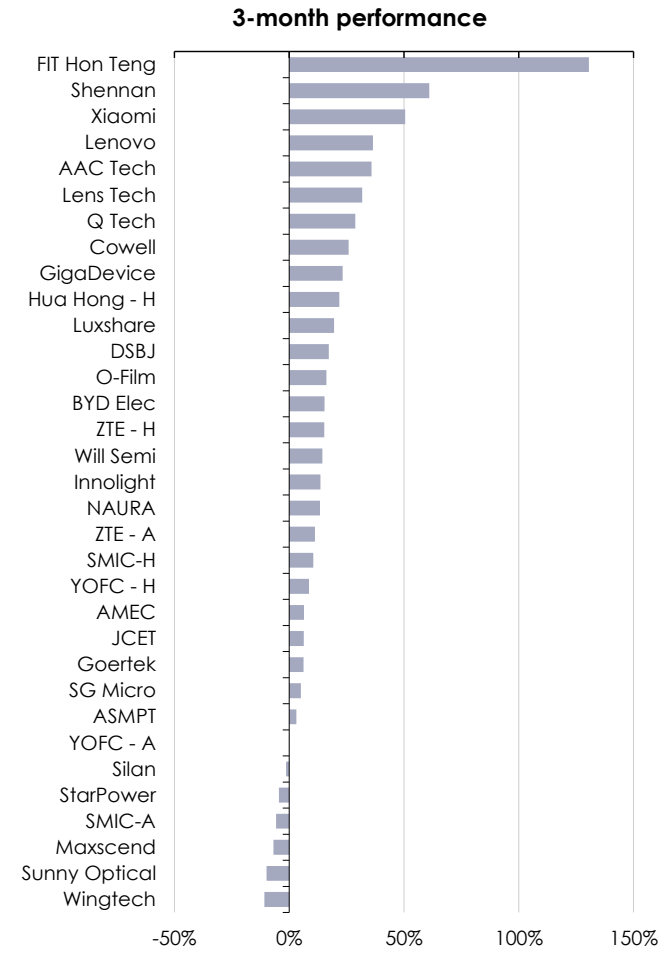
Source: iFinD, CCBIS; as of 22 May 2024

Price performance of selective HK & China stocks – 1Y



Source: iFinD, CCBIS; as of 22 May 2024

Price performance of selective HK & China stocks – 3M



Source: iFinD, CCBIS; as of 22 May 2024

TECHNOLOGY COMPANIES 1Q24 RESULTS SUMMARY

China technology companies 1Q24 results recap (smartphone & hardware and telecom)

Company	Stock code	CCBIS rating*	Results period	Results date	Revenue YoY (%)	Net profit YoY (%)	Rev/NP vs B'berg consensus	CCBI 24/25F earnings est. change (%)	2024F outlook
Smartphone and hardware									
LuxShare	002475 CH	O	1Q24	24 Apr	4.9	22.5	Below/ below	(6.4)/(4.6)	Continuing market share gains; automotive and communications in the fast lane
GoerTek	002241 CH	N	1Q24	24 Apr	(19.9)	257.5	Below/ below	N/A	TWS earbuds and smart speaker the drags; volume shipments of XR and smart game consoles
Sunny Optical	2382 HK	O	Apr shipment	10 May	N/A	N/A	N/A	N/A	Apr YoY: HLS +6%, VLS +15%, CCM -1%; Apr QoQ: HLS -10%, VLS +6%, CCM +9%
Lens Tech	300433 CH	O	1Q24	23 Apr	57.5	379.0	Above/ below	0.2/16.3	NEV business enjoying strong growth; vertical integration continues; progress in new products
DSBJ	002384 CH	O	1Q24	24 Apr	18.9	(38.7)	Above/ below	N/A	Stable PFC growth; automotive products to outperform next year
BYD Elec	285 HK	O	1Q24	29 Apr	38.3	33.0	N/A	N/A	Market share gains to continue; JBL acquisition adds value
Q Tech	1478 HK	N	Apr shipment	9 May	N/A	N/A	N/A	N/A	Apr YoY: CCM +39%, FPM -13%; Apr QoQ: CCM +10%, FPM +8%
									(Note: FY24F for Lenovo)
Telecom and PCB									
ZTE	763 HK/ 000063 CH	O/O	1Q24	25 Apr	4.9	3.7	Above/ above	0.0/0.0	Growth in the overseas carrier business; FTTR offers further upside
YOFC	6869 HK/ 601869 CH	O/N	1Q24	29 Apr	(25.3)	(76.0)	Below/ below	N/A	ASP under pressure; G.654E to drive demand
Shennan Circuits	6002916 CH	O	1Q24	15 Apr	42.2	83.9	Above/ above	N/A	Auto PCB the growth driver; new factory ramp-up on track
Smartphone and hardware (Not Rated)									
BOE Tech	000725 CH		1Q24	29 Apr	20.8	297.8	N/A	N/A	N/A
Transsion	688036 CH		1Q24	24 Apr	88.1	210.3	N/A	N/A	N/A
O-film	002456 CH		1Q24	29 Apr	72.3	104.4	N/A	N/A	N/A
Sunway	300136 CH		1Q24	23 Apr	7.0	4.5	N/A	N/A	N/A
Everwin	300115 CH		1Q24	22 Apr	31.0	Turn profit	N/A	N/A	N/A
FIT Hon Teng	6088 HK		1Q24	9 May	12.0	Turn profit	N/A	N/A	N/A
Telecom and PCB (Not Rated)									
Shengyi	600183 CH		1Q24	26 Apr	17.8	58.3	N/A	N/A	N/A
WUS	002463 CH		1Q24	22 Apr	38.3	157.0	N/A	N/A	N/A
Eoptolink	300502 CH		1Q24	22 Apr	85.4	201.0	N/A	N/A	N/A
Huagong	000988 CH		1Q24	25 Apr	(18.6)	(5.9)	N/A	N/A	N/A
TFC	300394 CH		1Q24	23 Apr	155.0	202.7	N/A	N/A	N/A
AcceLink	002281 CH		1Q24	25 Apr	1.8	(24.2)	N/A	N/A	N/A
Broadex	300548 CH		1Q24	26 Apr	(38.5)	(99.9)	N/A	N/A	N/A
China Mobile	941 HK		1Q24	22 Apr	5.2	5.5	N/A	N/A	N/A
China Telecom	728 HK		1Q24	23 Apr	3.8	7.7	N/A	N/A	N/A
China Unicom	762 HK		1Q24	19 Apr	2.3	8.9	N/A	N/A	N/A

** CCBIS ratings: O = Outperform, N = Neutral, U = Underperform, NR = Not Rated*
Source: Company, Bloomberg, CCBIS estimates

China technology companies 1Q24 results recap (semiconductor)

Company	Stock code	CCBIS rating*	Results period	Results date	Revenue YoY (%)	Net profit YoY (%)	Rev/NP vs B'berg consensus	CCBI 24/25F earnings est. change (%)	2024F outlook
Semi fabless and IDM									
Will Semi	603501 CH	O	1Q24	26 Apr	30.2	180.5	Below/ in line	11.2/(8.8)	Smartphone CIS outlook positive; market share gains; analog progressing well
Wingtech	600745 CH	O	1Q24	22 Apr	12.6	(68.8)	N/A	N/A	Automotive in the fast lane
GigaDevice	603986 CH	N	1Q24	19 Apr	21.3	36.5	Above/ above	(3.9)/(1.2)	Memory market gradually recovering; ASP of NOR stabilizing; MCU market hits bottom
StarPower	603290 CH	O	1Q24	29 Apr	3.2	(21.1)	Below/ below	(0.0)/1.1	New energy slows and industrial control remains soft
SG Micro	300661 CH	N	1Q24	26 Apr	42.0	80.0	Above/ above	(9.2)/(17.9)	Consumer saw a gradual recovery, industrial weakness persists
Silan	600460 CH	N	1Q24	29 Apr	19.3	Turn loss	Below/ below	(0.2)/0.9	IGBT growth continues; SiC the next chapter
Maxscend	300782 CH	O	1Q24	28 Apr	67.2	69.8	Below/ below	(14.7)/(5.5)	Module contribution increasing; margin pressure from fab ramp up
Semi foundry and equipment									
SMIC	981 HK/ 688981 CH	O/O	1Q24	9 May	19.7	(68.9)	Above/ in line	11.8/32.2	Utilization rate and ASP under pressure; capacity expansion on track;
Hua Hong	1347 HK	O	1Q24	9 May	(27.1)	(79.1)	Below/ above	0.0/0.1	Consumer-related products recovering; 2H24F to have better outlook
NAURA	002371 CH	O	1Q24	29 Apr	51.4	90.4	Above/ above	13.0/24.0	Robust equipment sales; increasing advanced process contribution
AMEC	688012 CH	O	1Q24	25 Apr	31.2	(9.5)	Below/ below	10.5/12.8	Strong growth in etching; broadening product offering; increasing advanced process contribution
ASMPT	522 HK	O	1Q24	24 Apr	(19.9)	(43.4)	In line/ above	(0.4)/(1.1)	TCB and HB customer acquisition progressing well; SMT stabilizing
Semi fabless and IDM (Not Rated)									
Sanan Opto	600703 CH		1Q24	26 Apr	22.3	(44.4)	N/A	N/A	N/A
Unigroup	002049 CH		1Q24	25 Apr	(26.2)	(47.4)	N/A	N/A	N/A
CR Micro	688396 CH		1Q24	25 Apr	(9.8)	(91.3)	N/A	N/A	N/A
Montage	688008 CH		1Q24	25 Apr	75.7	1,032.9	N/A	N/A	N/A
3PEAK	688536 CH		1Q24	29 Apr	(34.9)	Turn loss	N/A	N/A	N/A
Longsys	301308 CH		1Q24	21 Apr	200.5	236.9	N/A	N/A	N/A
Amlogic	688099 CH		1Q24	29 Apr	33.2	319.1	N/A	N/A	N/A
Biwin	688525 CH		1Q24	29 Apr	305.8	233.0	N/A	N/A	N/A
Goodix	603160 CH		1Q24	25 Apr	44.4	Turn profit	N/A	N/A	N/A
Anlogic	688107 CH		1Q24	26 Apr	(24.3)	Loss widen	N/A	N/A	N/A
NCE Power	605111 CH		1Q24	29 Apr	(0.5)	54.1	N/A	N/A	N/A
Puya Semi	688766 CH		1Q24	28 Apr	98.5	Turn profit	N/A	N/A	N/A
Chipsea	688595 CH		1Q24	26 Apr	145.4	Loss less	N/A	N/A	N/A
Hygon	688041 CH		1Q24	25 Apr	37.1	20.5	N/A	N/A	N/A
Semi foundry and equipment (Not Rated)									
JCET	600584 CH		1Q24	24 Apr	16.8	23.0	N/A	N/A	N/A
Huatian	002185 CH		1Q24	28 Apr	38.7	153.6	N/A	N/A	N/A
TongFu	002156 CH		1Q24	26 Apr	13.8	2,064.0	N/A	N/A	N/A
ACMR SH	688082 CH		1Q24	26 Apr	49.6	(38.8)	N/A	N/A	N/A
Piotech	688072 CH		1Q24	29 Apr	17.3	(80.5)	N/A	N/A	N/A
Hwatsing	688120 CH		1Q24	26 Apr	10.4	4.3	N/A	N/A	N/A
Kingsemi	688037 CH		1Q24	26 Apr	(15.3)	(75.7)	N/A	N/A	N/A
ACMR	ACMR US		1Q24	8 May	105.0	144.0	N/A	N/A	N/A
Empyrean	301269 CH		1Q24	28 Apr	33.6	(63.8)	N/A	N/A	N/A
Primarius	688206 CH		1Q24	26 Apr	28.0	Loss widen	N/A	N/A	N/A
Cambricon	688256 CH		1Q24	29 Apr	(65.9)	Loss less	N/A	N/A	N/A
VeriSilicon	688521 CH		1Q24	26 Apr	(41.0)	Loss widen	N/A	N/A	N/A

** CCBIS ratings: O = Outperform, N = Neutral, U = Underperform, NR = Not Rated*
Source: Company, Bloomberg, CCBIS estimates

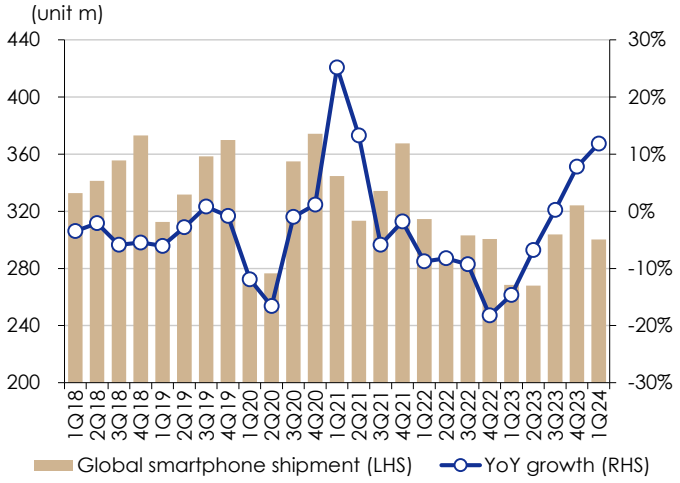
END-DEMAND: SMARTPHONES AND PCS IN RECOVERY

Smartphones recovering; Android to outperform Android in 2024F

Global smartphone shipments were up 11.8% YoY to 300m in 1Q24 (2023: 3.4% YoY decline), marking the third consecutive quarter of YoY growth after eight earlier consecutive quarters of decline, according to IDC. We attribute such steady growth to refreshed models from vendors and stabilization taking place in emerging market economies. Meanwhile, on a QoQ basis, smartphone shipments suffered a 7.4% decline in 1Q24. The smartphone market continued its recovery in the quarter, yet there are worrying signs the trend is losing steam. Our channel checks indicate demand has been largely flat in 2Q24F. We expect global smartphone shipments to achieve low-single-digit percent growth in 2024F, helped by normalized inventory, device replacement needs, and the AI trend.

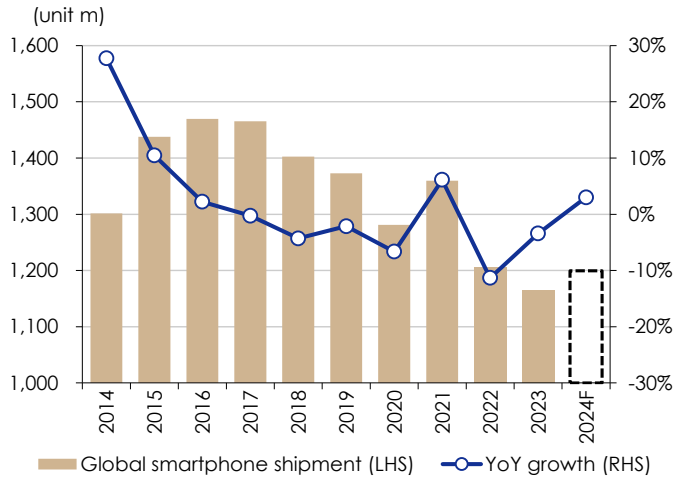
We expect global smartphone shipments to generate low-single-digit percentage growth in 2024F

Global smartphone quarterly shipments



Source: IDC, Bloomberg, CCBIS

Global smartphone shipment forecasts

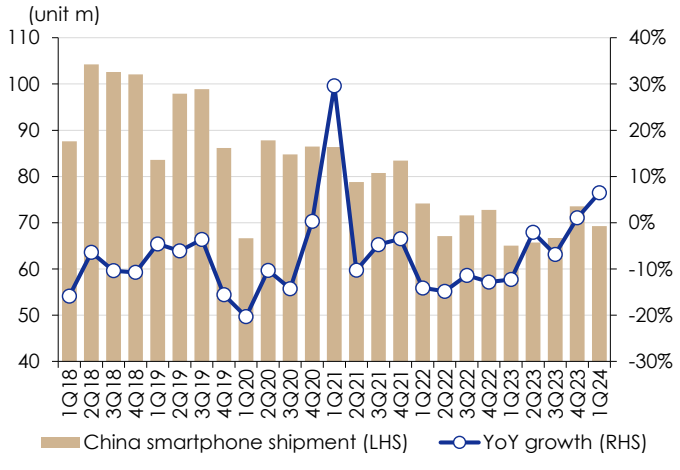


Source: IDC Bloomberg, CCBIS estimates

China smartphone shipments saw a 6% YoY increase to 69m in 1Q24 (2023: 5% YoY decline), according to IDC. On a QoQ basis, smartphone shipments declined 6% in 1Q24. Honor had the largest market share of 17% thanks to new product releases and channel competitiveness. Huawei continues to roll out its Pura 70 series launched in 1Q24, which could accelerate specification upgrades. With this in mind, we forecast c.5% growth in China's smartphone shipments in 2024F.

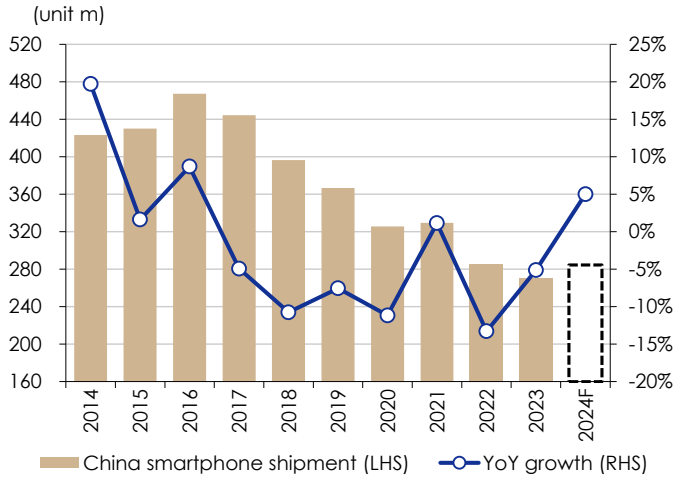
We expect China's smartphone shipments to grow c.5% in 2024F

China smartphone quarterly shipments



Source: IDC, Bloomberg, CCBIS

China smartphone shipment forecasts

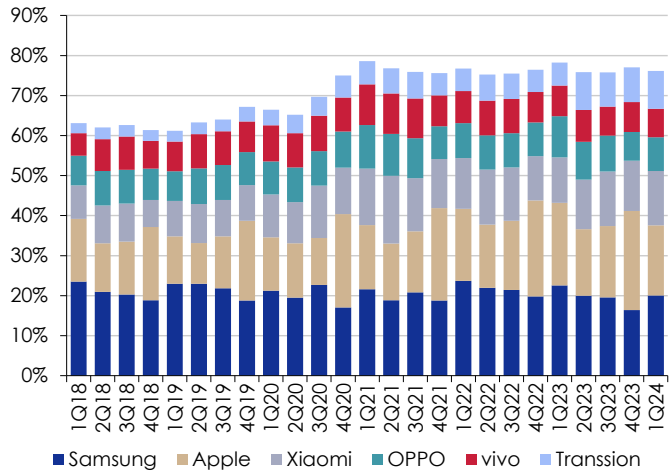


Source: IDC Bloomberg, CCBIS estimates

Android to see meaningful improvement in 2024F. According to IDC, global Android smartphone shipments increased 16% YoY in 1Q24 (2023: a 5% YoY decline). Android was weaker than iPhone last year, mainly due to soft demand, a limited number of new launches since 2022, and channel inventory digestion. By the end of 3Q23, inventory in most markets had returned to healthy levels. We saw good performances from the high-end Android market since then, while the mid-to-low-end market was relatively weak. In 2024F, with Huawei's return, Honor continues increasing market share. A new AI-capable phone is stimulating interest. We expect Android to generate mid-single-digit growth, sufficient to outperform the iPhone. Meanwhile, as foldable phones become more affordable, the segment could see increasing demand in the event of a recovery in consumer sentiment.

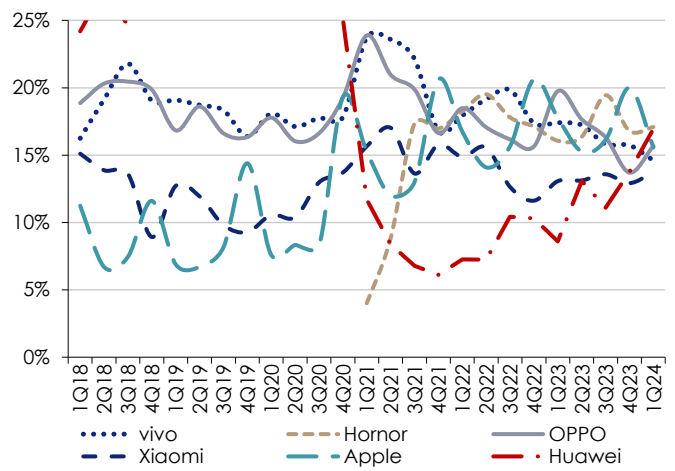
We expect global Android shipments to have mid-single-digit growth in 2024F, outperforming iPhones

Global smartphone shipment share by brand



Source: IDC, Bloomberg, CCBIS

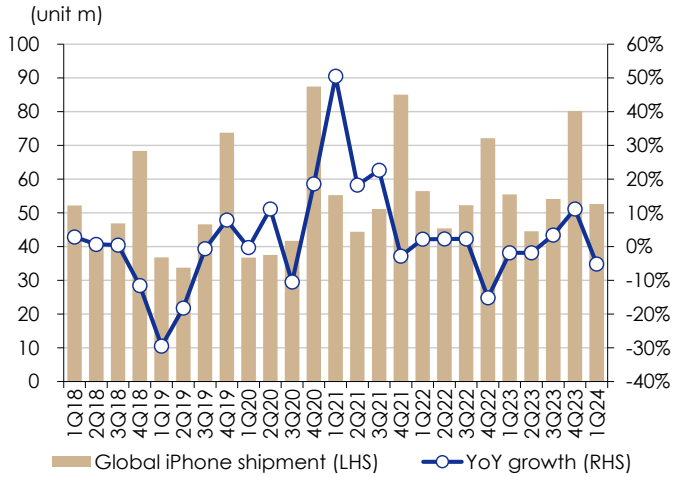
China smartphone market share by brand



Source: IDC, Bloomberg, CCBIS

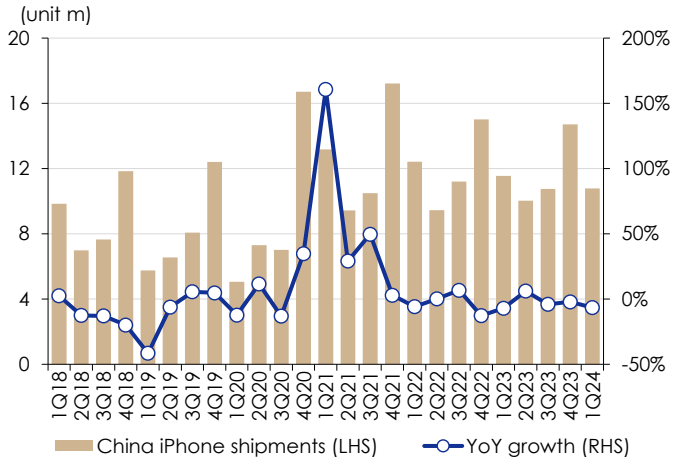
Apple iPhone limited upgrade. In Sep 2023, Apple launched its new iPhone series, the iPhone 15. Specifications were for the most part in line with expectations. New features were limited. The lack of upgrades had a negative effect on shipments, albeit mitigated by a promotion push that entailed lowering prices for old models. Global iPhone shipments declined 5.1% YoY to 53m units in 1Q24 (2023: up 3.5% YoY). The China market underperformed the global market with a 6.6% YoY decline in 1Q24. For 2024F, upgrades are expected to focus one AI feature in the new iOS 18 to be released on WWDC24 in Jun. Spatial video support cameras supporting Vision Pro are also anticipated.

Global iPhone quarterly shipments



Source: IDC, Bloomberg, CCBIS

China iPhone quarterly shipments



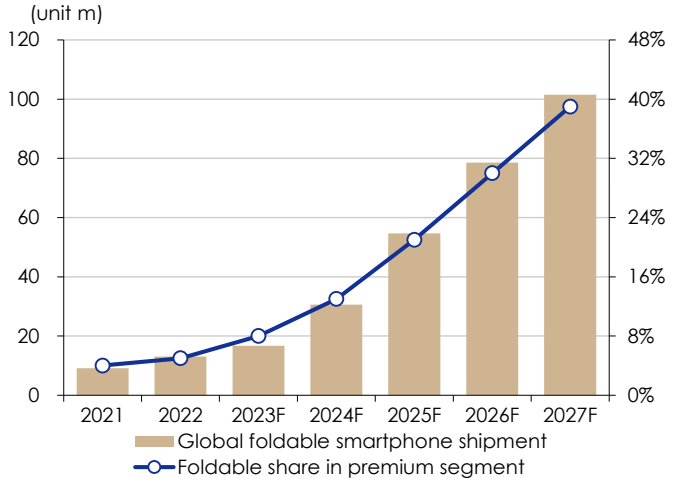
Source: IDC, Bloomberg, CCBIS

Foldable phones becoming an important market segment. With the development of technology of foldable display panels, growth in foldable phones in the last two years has begun to take off. Most Android smartphone vendors have launched foldable models. According to Counterpoint, the global foldable smartphone market will grow 27% YoY to 16.7m in 2023, with the foldable share in the premium segment reaching 8%, up from c.5% in 2022. The driving force behind this growth comes from a combination of bigger screens, falling prices, and new designs. In the long-term, we believe foldable phones will be a considerable market segment, with a market share of the premium market approaching 40% in the next five years. Currently, Samsung has the highest market share, taking up over half of the market. In the next few years, we expect Huawei to grab a greater share of the market.

Foldable smartphone penetration

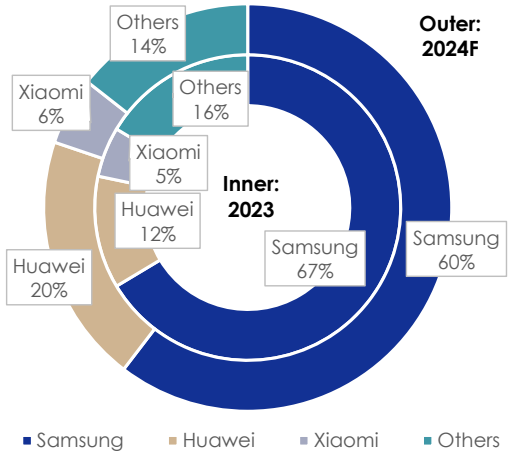
The China market accounted approximately 50% of total global foldable smartphones. Chinese Android vendors, including Huawei, Xiaomi, Honor, OPPO, and vivo, have all launched and have begun promoting new foldable models. In 3Q23, the top-six vendors (Huawei, Samsung, Honor, OPPO, vivo, Xiaomi) took up 99% of the foldable market share in China, according to Counterpoint.

Global foldable smartphone forecasts



Source: Counterpoint, CCBIS

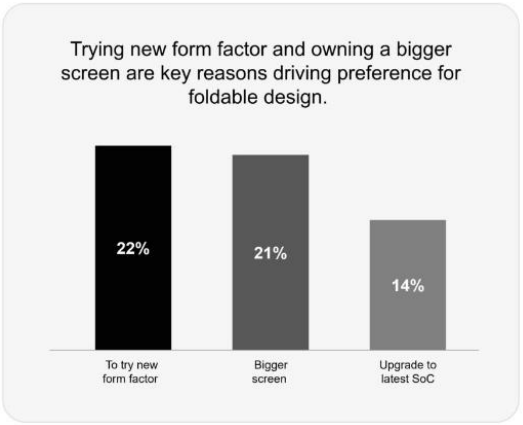
Global foldable smartphone market share

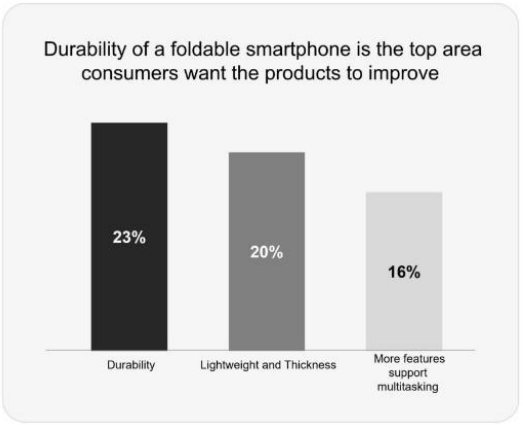


Source: TrendForce, CCBIS

Durability is still the main factor limiting foldable smartphone development. Due to the unique shape of the device, the foldable OLED display panel and hinge are the most vulnerable parts. Despite significant improvements since the introduction of foldable phones years ago, its durability is still a concern among customers.

Foldable smartphone models in 2023





Source: Counterpoint, CCBIS

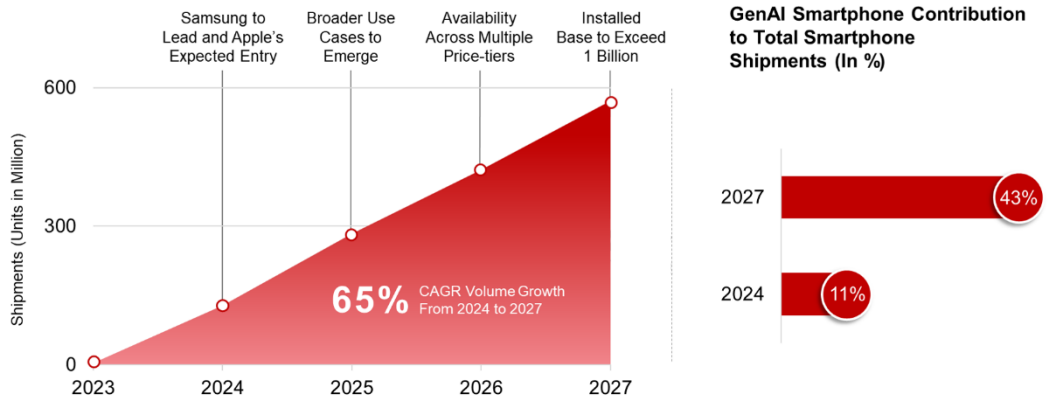
AI-capable smartphones enter the market. Broadly speaking, smartphones embraced AI technology earlier than PCs. Siri is a prime example. However, LLM and other Generative AI (GenAI) models on-device will require a different computing platform and software capabilities. Similar to AI PCs, the definition of "AI smartphone" (or "AI-capable smartphones", "AI-enabled smartphones") is still not quite unified, and the development is at a very early stage. Canalys defines an AI smartphone as a smartphone with:

- SoC that includes a dedicated unit (e.g., Qualcomm Hexagon, MediaTek APU, Google TPU) to accelerate AI-related tasks;
- The ability to run LLMs (e.g., Google Gemini, Samsung Gauss) and other generative AI models (e.g., Stable Diffusion) on-device;
- LLM inference performance on-device faster than the average adult's reading speed, equating to 10 tokens per second;
- Image generation ability on-device AI of less than two seconds.

Thanks to rapidly developing generative AI, more related applications have emerged. Smartphones are an important tool to integrate GenAI with hardware because they are: (1) portable, facilitating user stickiness; (2) have a huge user base, with over 1.1b smartphone shipments every year; (3) linked to various ecosystems, especially to other devices (e.g., Apple, Huawei, Samsung).

Counterpoint expects 11% of smartphone shipments in 2024F will be AI-capable smartphones. This penetration is set to increase rapidly to 43% by 2027F. Samsung's S24 launch heralded the new era, as it came equipped with several built-in AI features. In 1Q24, Samsung launched the Galaxy S24 and shipped 13.5m units, equivalent to 35% YoY growth compared with the previous generation of phones.

Global GenAI smartphone shipment forecast



Source: Counterpoint, CCBIS

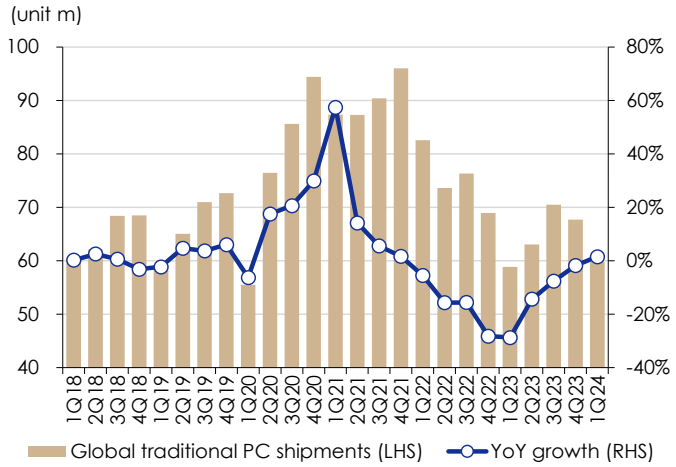
PCs to continue to recover in 2024F; tablets hit bottom

Global traditional PC (desktops, notebooks, workstations) shipments increased 1.6% YoY to 59.8m in 1Q24 (2023: a 13.7% YoY decline) according to IDC, which put an end to eight quarters of consecutive YoY declines. Even modest growth indicates the PC demand recovery across segments is sustaining, with purchases expected to continue to accelerate throughout the year, driven by the Windows 11 refresh and the AI-capable PC push. On a QoQ basis, PC shipments were down 11.7%. Channel inventory has been at a healthy level for close to two quarters. As the current PC installed base is large and old, it represents an opportunity for refreshment. The wider introduction of AI-capable PCs (or "AI PCs") in 2H24F could also drive market demand, likely resulting in a new innovative PC feature after years of stagnant innovation. Therefore, we expect the PC market to continue to recover, with c.5% YoY shipment growth in 2024F.

We expect global traditional PC shipments to grow c.5% in 2024F

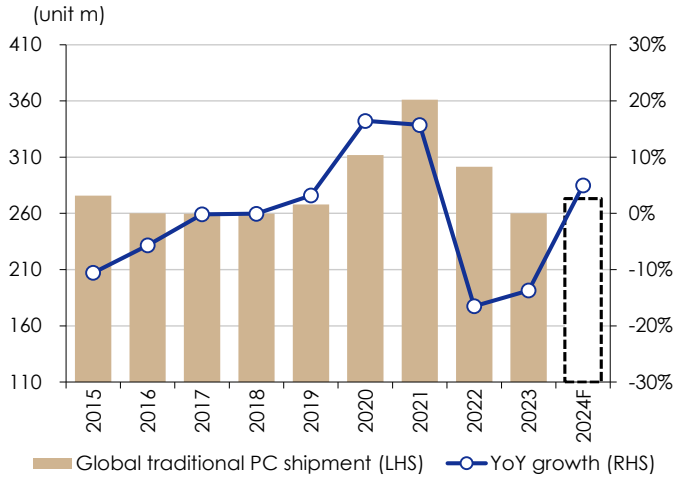
We expect the commercial PC segment to outperform consumer PC aided by device replacement demand from businesses. The commercial segment was weak last year as enterprises delayed their purchases. Looking ahead, the move to remote and hybrid work environments is underway so device purchases from companies and institutes are likely to return by mid-2024F, driving a commercial PC recovery. Support for Windows 10 is slated to end in 2025, which will also drive a commercial refresh.

Global traditional PC quarterly shipments



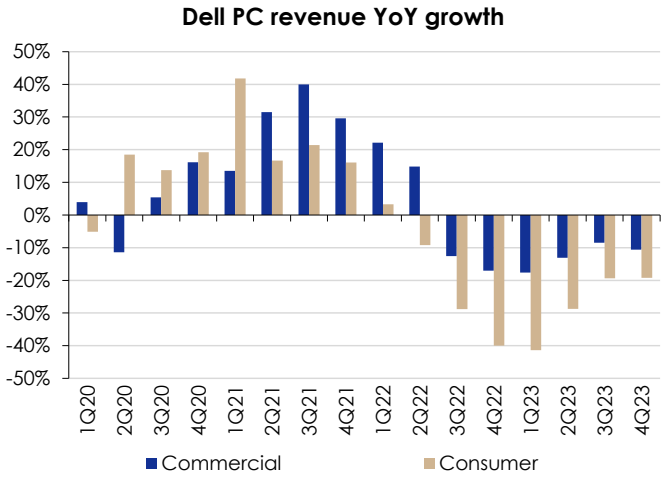
Source: IDC, Bloomberg, CCBIS

Global traditional PC shipments forecast



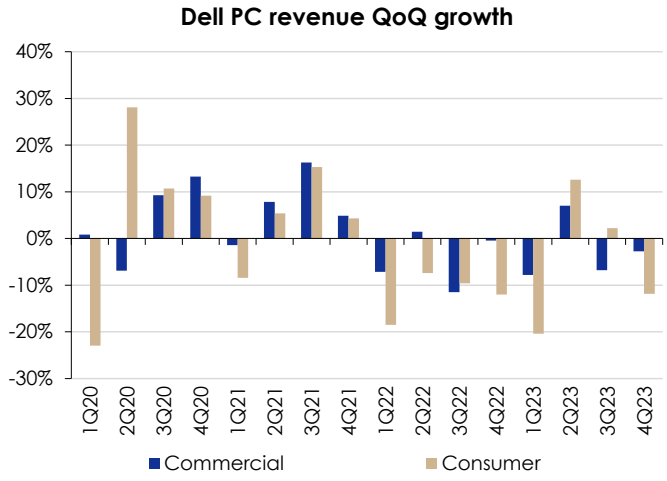
Source: IDC, Bloomberg, CCBIS

Dell PC – revenue YoY growth by segment



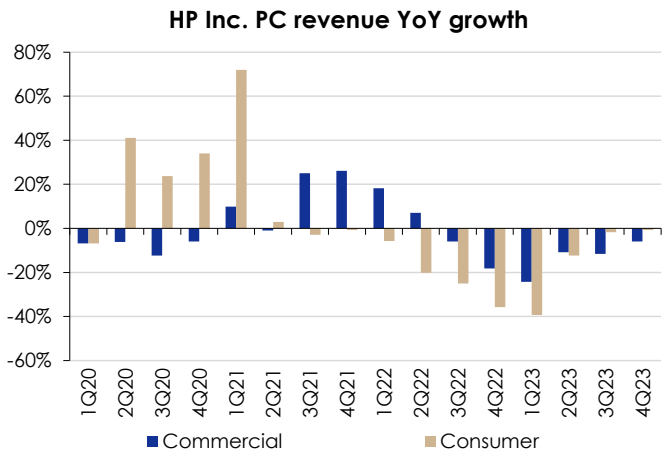
Source: Company data, CCBIS

Dell PC – revenue QoQ growth by segment



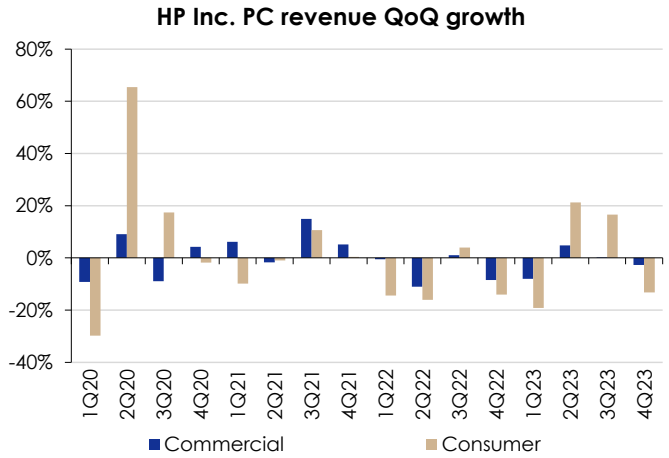
Source: Company data, CCBIS

HP Inc. – PC revenue YoY growth by segment



Source: Company data, CCBIS

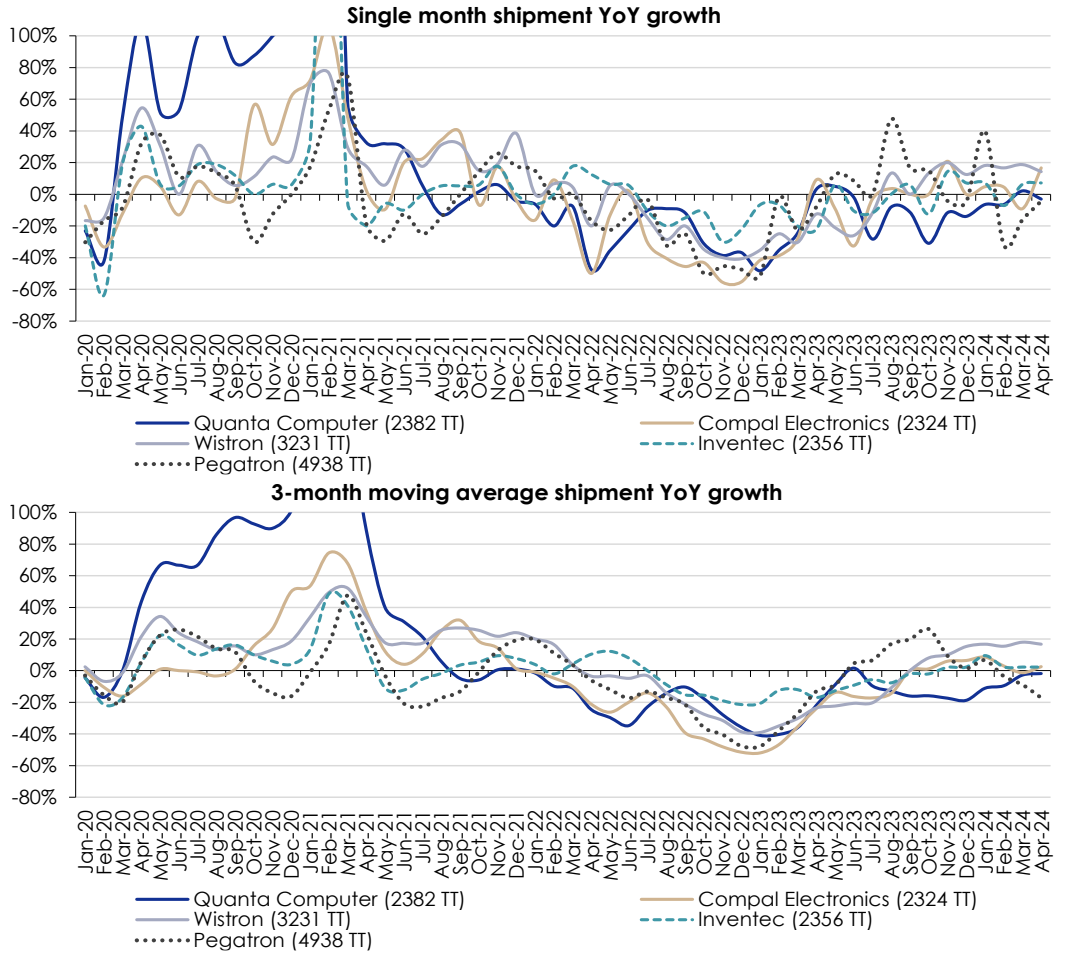
HP Inc. – PC revenue QoQ growth by segment



Source: Company data, CCBIS

Taiwanese ODMs had a mixed shipment YoY growth performance in the past months. Hurt by Mac sales weakness, Quanta suffered YoY declines until Mar a time when most other ODMs had a YoY increase. The three-month moving average (3MMA) shipment YoY trend indicates the market is undergoing a gradual recovery.

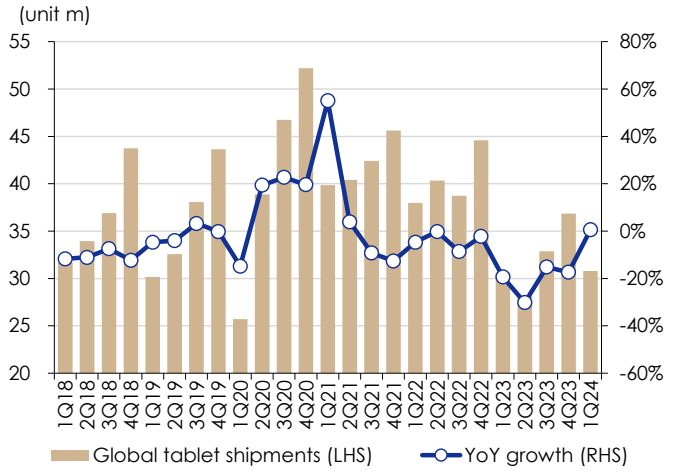
Taiwan ODMs monthly notebook shipment YoY growth rate (single month & 3MMA)



Note: The surge in 2020 was driven by hybrid working arrangements necessitated by the pandemic
Source: Company data, CCBIS; as of Apr 2024

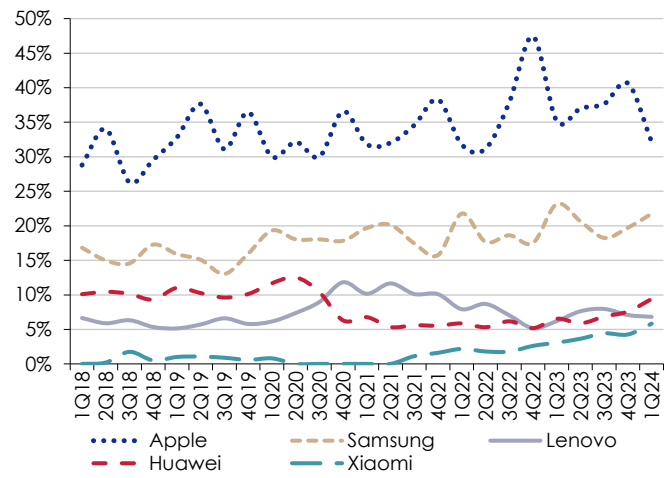
Global tablet shipments saw a slight increase of 0.6% in 1Q24 (2023: 20.5% YoY decline). On a QoQ basis, shipments were down 16.4% due to seasonality. The start of 2024 was positive for the tablet industry, marking an end to 10 consecutive quarters of YoY shipment declines. This likely indicates the market has hit the bottom, with a pickup in demand likely in 2024F. Xiaomi's tablet shipments grew particularly fast, vaulting Xiaomi into the top-five globally in 1Q24 with a market share of 6%. In the long-term, the refresh cycle of the education segment and growth in use cases may drive the market; however, until then, we are cautious towards the tablet market.

Global tablet quarterly shipments



Source: IDC, Bloomberg, CCBIS

Global tablet market share



Source: IDC, Bloomberg, CCBIS

AI-capable PC a focus of 2024F

As the prevalence of generative AI tools continues to grow, businesses and consumers have embraced AI features to augment their productivity and user experience. In order to stay in step with this trend, PCs, which play a central role in modern work and daily life, are poised to undergo advancements in both software and hardware. Modifications to PCs are aimed at enabling them to better integrate and harness the power of AI.

AI PC (or "AI-capable PC", "AI-enabled PC") have recently stepped into the spotlight. Currently, the industry lacks a clear definition of AI PCs. Broadly speaking, AI PCs refer to computer devices that possess generative AI capabilities. Generative AI models like ChatGPT rely on cloud platforms for computational processing. With AI PCs, users can perform AI computations directly on the device without relying on cloud services.

Lenovo believes AI PCs possess the following characteristics:

- Able to run compressed and performance-optimized LLM (large language model);
- Stronger computing power, supporting heterogeneous computing including CPUs, GPUs, and NPUs;
- Large storage capacity capable of accommodating personal lifelong data and forming personal knowledge repositories to fuel learning, training, inference, and optimization of personal LLM;
- Natural language interaction, even interaction through voice and gestures;
- Enhanced security and privacy protection.

AI chipsets are essential to AI PCs. AI enabled chipsets are not a new story. In 4Q20, Apple introduced AI integration in its M1 Neural Engine. By 2Q23, Apple had emerged as the first PC manufacturer fully capable of AI, with the upcoming M3 series and Intel's exit from Mac products. Qualcomm enhanced the AI capabilities of its ARM-based 8cx Gen3 chipset, aiming to establish a stronger market presence. Its 2024 upgrade will feature Nuvia architecture and Windows Copilot integration.

In the x86 space, AMD took the lead in AI offerings with the "Phoenix" Ryzen 7040 series in 2Q23, earlier than Intel's Meteor Lake debut. This move encouraged early adoption of AMD's technology among PC OEMs, capitalizing on market momentum. The anticipated 8050 series from AMD in 2H24F promises further AI enhancements. Despite its late entry, Intel emphasized AI by incorporating the Movidius VPU into its Meteor Lake range. Leveraging its market dominance, we expect Intel's strategy to drive significant AI-PC adoption starting in 2024F.

AI-capable PC processor at a glance

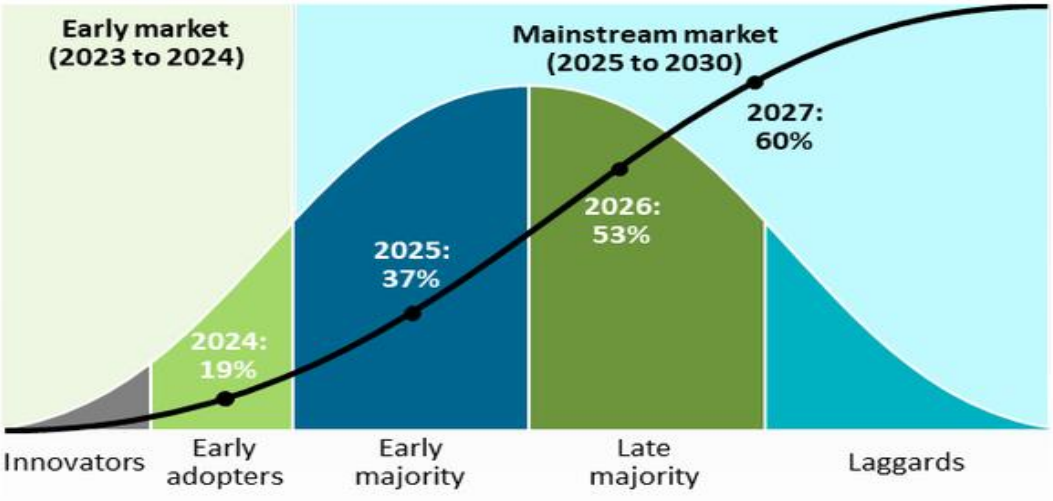
	Apple	Qualcomm	Apple	AMD	Apple	Intel	Qualcomm	AMD
Model	M1	8cx Gen3	M2	Ryzen 7040	M3	Meteor Lake	8cx Gen4	Ryzen 8050
Launch time	4Q20	4Q21	4Q21	2Q23	4Q23	4Q23	1H24 (Exp.)	2H24 (Exp.)
Process	TSMC N5	TSMC N5	TSMC N5P	TSMC N4	TSMC N3	Intel 4	TSMC N4	TSMC N4
AI architecture	Neural engine	Hexagon	Neural engine	Ryzen AI	Neural engine	Movidius VPU	Hexagon	Ryzen AI
AI power	11 TOPS	29 TOPS	15.8 TOPS	10 TOPS	35 TOPS	34 TOPS	>40 TOPS (Exp.)	c.40 TOPS (Exp.)

Source: Company data, Canalys, CCBIS estimates

Vendors with substantial shipment volume are considering developing their own processors using ARM or RISC-V architecture. Although this approach entails higher initial costs, it offers optimized performance, power efficiency, and enhanced security. Over time, as shipment volume increases, this strategy can lead to cost reductions, providing vendors with greater resilience and ownership over their technology.

Adoption rate to reach 60% by 2027F. According to Canalys, less than 10% of PCs sold in 2023 so far are AI-capable. Expecting increasing integration of AI tools in commercial and productivity software, along with Windows upgrades, the market for AI-capable PCs is poised for significant expansion in the next five years. According to Canalys, by 2027, AI-capable PC penetration will be over 60%, having achieved a CAGR of 94% in 2022-2026F.

Global AI-enabled PC adoption curve by Canalys



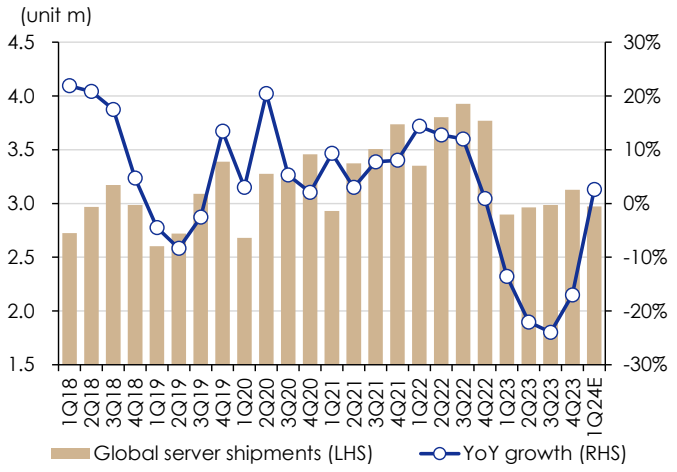
Source: Canalys, CCBIS

We suggest closely monitoring AI PC product progress by leading PC vendors, including Lenovo, HP, and Dell. We expect Lenovo's first AI PC product to be launched in 2H24F and HP's first AI PC product to be launched in 2H24F. We also look for AI-enabled processor upgrades by leading chip providers, including Intel (x86), AMD (x86, ARM), Qualcomm (ARM), and Apple (ARM).

Server market set to grow in 2024F

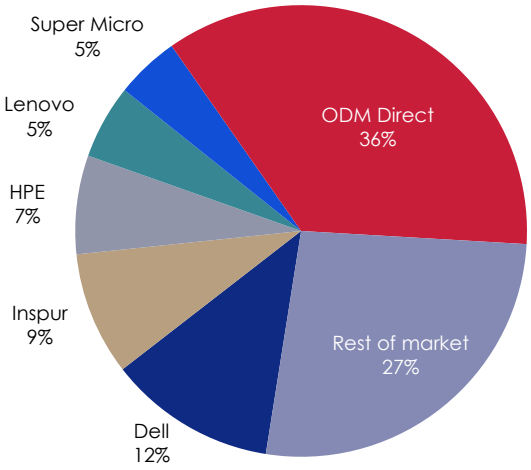
Due to global economic uncertainty, supply disruptions and US restrictions, IT system investments have been slowing, affecting server demand. According to IDC, global server shipments declined 19% in 2023, with four consecutive quarters of decline. The server market was relatively resilient as IT infrastructure has evolved from a nice-to-have or added-value to a mission-critical investment for most organizations. But with global inflation, server OEMs and CSPs revamped their strategies, resulting in cutbacks in both shipments and production plans. 1Q24 showed signs of recovery, with shipment estimated to back to YoY growth (by our estimate). For 2024F, TrendForce forecast 2% YoY growth in overall server shipments globally. AI server shipments from ODMs are expected to be robust, with both growth rate and market share of AI servers in double-digits, according to TrendForce.

Global server shipments



Source: IDC, Bloomberg, CCBIS estimate

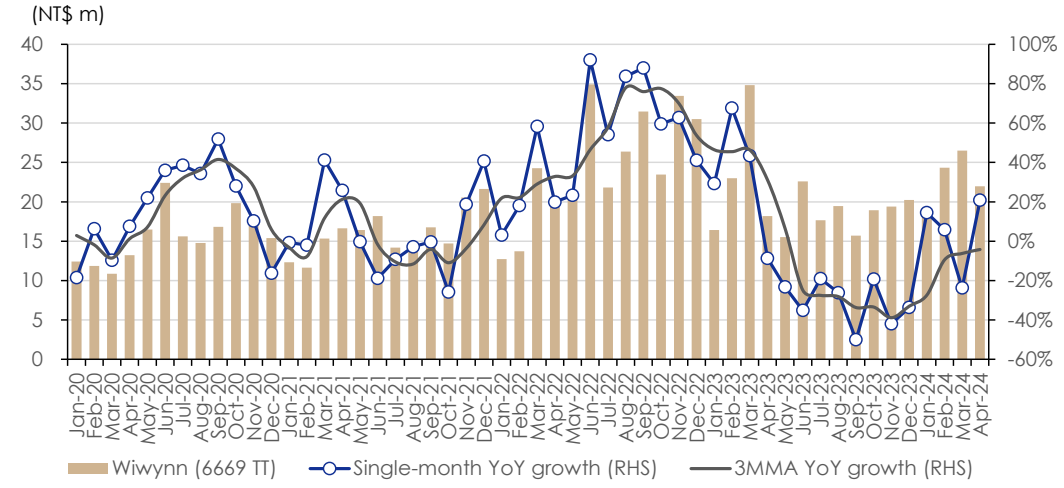
Global server market share by shipment (2023)



Source: IDC, Bloomberg, CCBIS

In Apr 2023, monthly revenue of Wiwynn (6669 TT, Not Rated, a leading ODM supplier of Hyperscale Data Center and Cloud Infrastructure based in Taiwan) recorded 20.8% YoY growth (4M24: a 0.9% YoY decline, vs a 17.4% decline in 2023). If looking at the three-month moving average YoY trend, the revenue decline has been narrowing since Sep 2023. Wiwynn management has been positive on the server market, especially for AI servers, and expects an increasing AI server percentage to drive company performance.

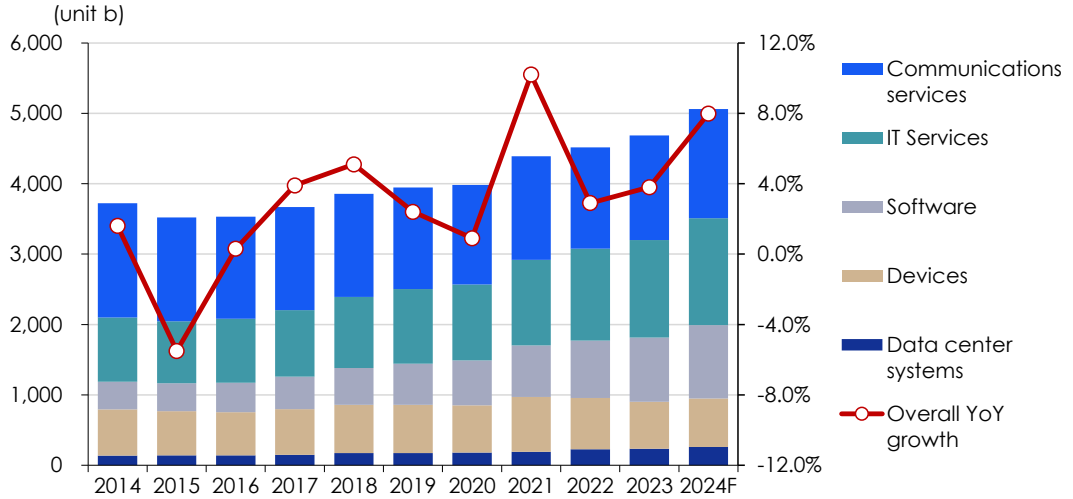
Wiwynn (6669 TT) – monthly revenue trend



Source: Company data, CCBIS; 3MMA → 3-month moving average

Global IT spending, according Gartner, was US$4.7t in 2023, up 3.8% and expected to grow 8.0% YoY in 2024F. Data center spending grew 4% in 2023, and is expected to see notable 10% YoY growth in 2024F. The generative AI wave has been driving this segment growth, as LLM requires a vast amount of data storage. Devices spending suffered a 9.1% decline in 2023. The replacement cycle of PCs and phones are expected to drive this segment back to growth in 2024F, with a 3.6% YoY growth expected.

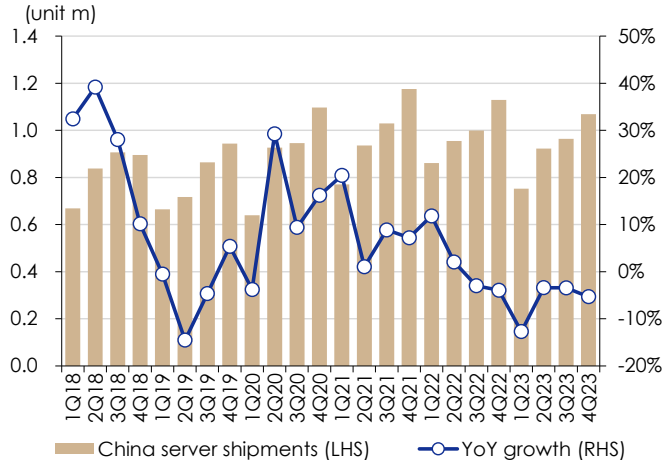
Global IT spending forecast



Source: Gartner, CCBIS

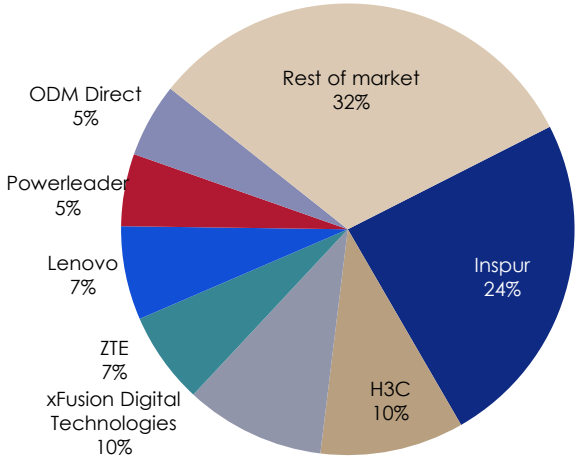
China server shipments, according to IDC, declined 6% YoY in 2023, with 8% and 4% declines in 1H23 and 2H23, respectively. Data growth is driving demand for computing power. Servers, the core component of digital infrastructure, are the cornerstone of the digital transformation and development of the digital economy. In the near-term, China's server market may be hurt by US export restrictions on AI-related chipsets. But in the long-term, demand looks promising. We believe that the future of digital infrastructure will evolve from traditional cloud-to-end deployment of the past to a new computing architecture with cloud-edge-device collaboration everywhere. Software-defined data centers have become one of the principal means by which enterprises can reduce costs and increase efficiency. The software-defined storage (SDS) and hyperconverged systems (HCI) markets have also achieved significant growth.

China market server shipments



Source: IDC, Bloomberg, CCBIS

China server market share by shipments (2023)



Source: IDC, Bloomberg, CCBIS

VR/AR to have a better year

According to Wellsenn XR (a research institute focusing on VR/AR market data and supply chain), global VR headset shipments experienced a decline of 24% YoY to 7.53m in 2023, marking another year of shipment declines. Gaming-based VR demand was sluggish in 2023 due to the long device refreshment cycle and a lack of content innovation. We attribute the slow development of the VR market to: (1) bulky and expensive hardware, and (2) limited available content and applications. With the development and adoption of more advanced chipsets and memory, lighter-weight pancake lenses and micro-OLED displays, devices gradually become lighter and less-bulky. But computing power, battery life, and limited application scenarios continue to limit growth in VR devices. Wellsenn XR forecasts global VR headset shipment growth of 12% YoY in 2024F, and a 41% CAGR up to 2027F.

Wellsenn XR: Global VR headset shipments was down 24% YoY in 2023;

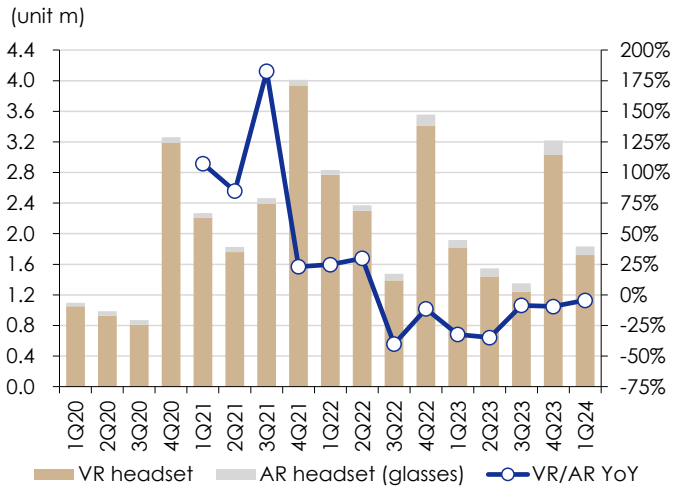
2023-27F growth CAGR to reach 41%

AR headset (or glasses) shipments, on the other hand, grew 38% YoY to 510k units in 2023, driven by video-entertainment related products, according to Wellsenn XR. In total, global VR/AR shipments were down 22% YoY in 2023. AR glasses are now in development, and represent only 6% of the total VR/AR market in 2023. Similar to VR, AR glasses have battery-life and display quality issues. Current mainstream display technology for AR are Birdbath (better display quality, yet thicker and heavier) and optical waveguide (lighter and thinner, yet low display and color quality). Wellsenn XR forecasts global AR shipments will increase 29% in 2024F, and generate a 77% CAGR up to 2027F.

Wellsenn XR: Global AR glasses shipments was up 38% YoY in 2023;

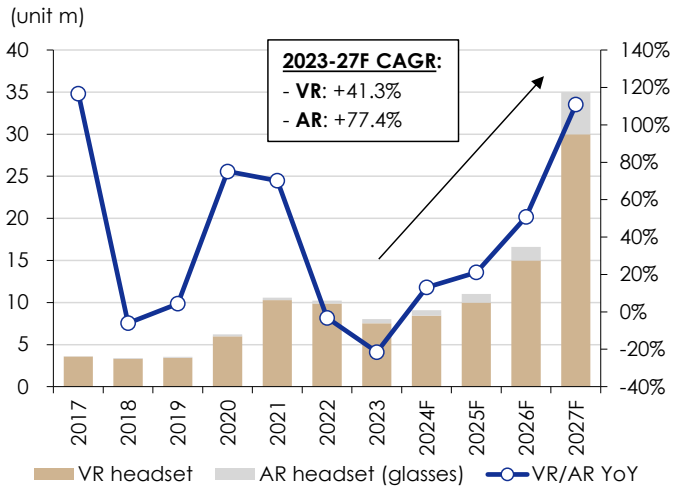
2023-27F growth CAGR to reach 77%

Global VR/AR headset quarterly shipments



Source: Wellsenn XR, CCBIS

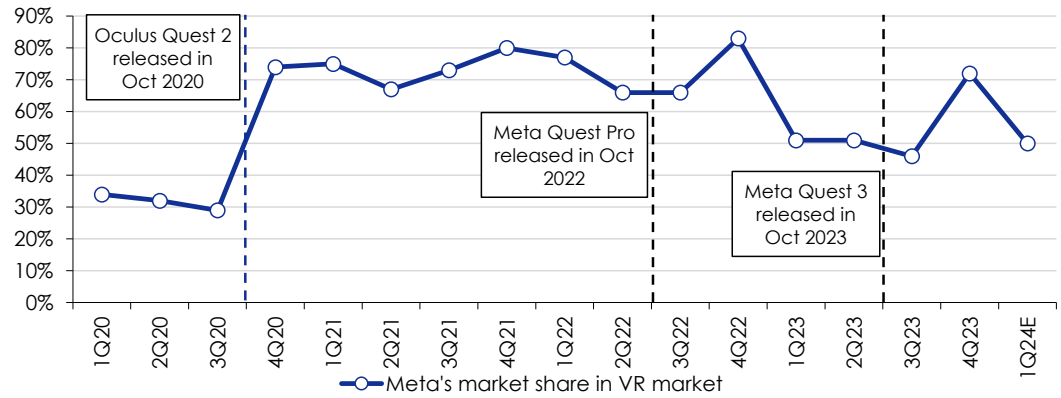
Global VR/AR shipment forecasts by Wellsenn XR



Source: Wellsenn XR, CCBIS

Meta is still the absolute leader of the VR market. Currently Meta holds the lead in the VR market and with a dominant position, with a shipment market share of over 70% in 2023.

Meta's market share in VR market (including Oculus)



Source: Counterpoint, VRCompare, CCBIS

Meta Quest latest products comparison

	Oculus Rift S	Oculus Quest	Oculus Quest 2	Meta Quest Pro	Meta Quest 3
					
Release date	21 May 2019	21 May 2019	13 Oct 2020	25 Oct 2022	10 Oct 2023
Category	VR, PC-powered	VR, standalone	VR, standalone	MR, standalone	VR, standalone
Weight	590g	571g	503g	722g	515g
Display	LCD	OLED	LCD	LCD	LCD
Resolution	1280 x 1440	1440 x 1600	1832 x 1920	1800 x 1920	2064 x 2208
Refresh rate	80 Hz	72 Hz	120 Hz	90/72 Hz	120 Hz
Optic Lens	Fresnel	Fresnel	Fresnel	Pancake	Pancake
Field of view (FoV)	H 88°, V 88°	H 93°, V 93°	H 97°, V 93°	H 106°, V 96°	H 110°, V 96°
Chipset	–	Snapdragon 835	Snapdragon XR2	Snapdragon XR2+	Snapdragon XR2 Gen2
GPU	–	Adreno 540	Adreno 650	Adreno 650	Adreno 740
Storage	–	64/128GB	128/256GB	256GB	128GB up
RAM	–	4GB	6GB	12GB, LPDDR5	8GB
Tracking	Inside-out 6DoF	Inside-out 6DoF	Inside-out 6DoF	Inside-out 6DoF	Inside-out 6DoF
Controller	Two, 6DoF	Two, 6DoF	Two, 6DoF	Two, 6DoF	Two
Platform	Oculus Home	Oculus Home	Oculus Home	Meta Quest	Meta Quest
Battery	–	3,648 mAh, 3-hours life	3,640 mAh, 3-hours life	2-hours life	2.2 hours life
Eye tracking	No	No	No	Yes	No
Price	US$399 up	US$399 up	US$399 up	US$1,500 up	US$499 up

Source: Meta, VRCompare, CCBIS

For the next generation of VR headsets, no information has been released. If we look back, Meta released the original Quest in 2019 and quickly followed it up with the Quest 2 in 2020. While the Quest Pro arrived in 2022, the Quest 3 did not show up until 2023. The Connect conference held annually by Meta will be important to monitor. We believe Meta will focus on AR glasses this year, before announcing a successor to its VR product.

Apple vision Pro will not have large volume. Apple announced its first XR product, the Apple Vision Pro, at its annual WWDC23 event on 6 Jun 2023. The product has been available since 2 Feb 2024, but only in the US market. It is expected to be available globally in 2Q24F. According to Wellsenn XR, Apple shipped around 290k units of its Vision Pro in 1Q24. Though pre-sale demand was robust, orders have been scaled back before the product could be made available outside the US, suggesting falling demand. Part of the problem may be the high price of the product at US$3,499 up, as well as general shortcomings of VR products, such as their heavy weight, low battery life, limited application, and so on.

To realize spatial complicated computing functions, computing power and sensors are essential. Apple's M2 silicon chip help with computing and handling multitasking, along with a new R1 silicon chip proprietary to the headset. Sensors inside and outside the headset work to track eyesight, control input, and also help virtual elements display in the real world, including casting shadows in the world around the wearer, changing angles when one moves around, or disappearing/fading when someone walks in and out of frame.

As for cost, according to Wellsenn XR, total BOM cost of Apple's Vision Pro is estimated to be around US$1,500, of which computing and memory chips represent c.17%, display panels take up c.49%, optical components take up c.5%, sensors take up c.8%, structural parts, acoustics and battery take up c.13%, and assembly takes up c.9%. The successor of the Vision Pro is expected to be a lower-priced product.

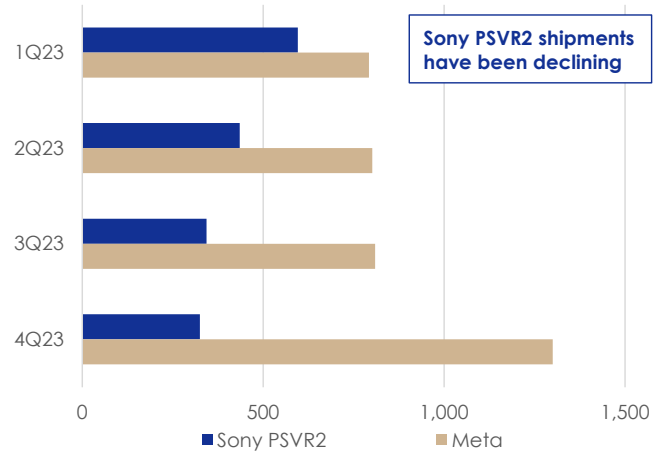
Originally, Apple had a shipment target for its VR product of 700-800k units in 2024F. This target has been lowered to 400-450k units (versus Meta's VR shipments of c.540m in 2023). We believe the total shipment number for the Apple Vision Pro will not be high enough to take a significant market share in 2024F; moreover, the next generation product is not yet ready for release.

Apple Vision Pro target to ship around 400-450k in 2024F

Sony is losing market share. Sony released its first VR device, the PSVR, in 2016, priced at US$399. The device has an OLED screen, 90Hz refresh rate, and 6DoF. A PSVR can only be used with Sony's game console, the PlayStation. After Sony launched the PS5 in 2020 and announced the PSVR2 in Feb 2021, the PSVR2 was released in Feb 2023, priced at US$550 and up. The device improves the VR experience on the PS5. PSVR2 headsets feature OLED screens with a 2000 x 2040 resolution per eye, HDR display, and a 110-degree field of view (FOV).

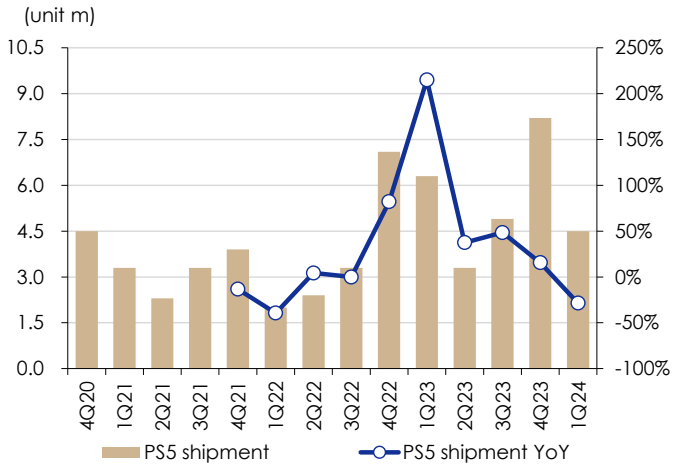
However, PSVR2 shipments have been declining since the device's release. Market share has declined to a low-teen percentage (from over 30% in 1Q23 according to Counterpoint). This is probably due to the relatively higher price of the PSVR2, and limited application scenarios (limited solely to gaming).

Sony PSVR2 shipment vs Meta ('000 units)



Source: IDC, CCBIS

PlayStation 5 (PS5) global shipment

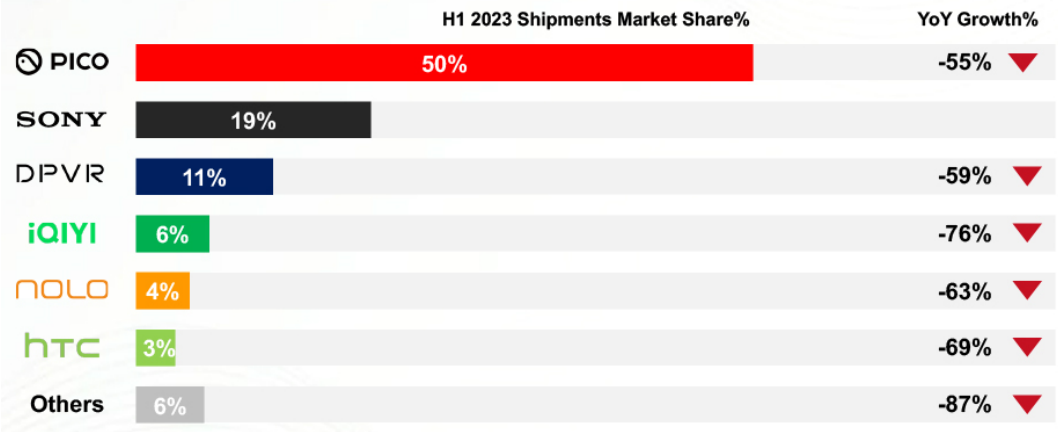


Source: Sony, CCBIS

PICO is the absolute leader in the China market. PICO Technology (小鸟看看) was founded in 2015 in Beijing. It is primarily engaged in VR development (headsets, content, and applications). Headquartered in Beijing, the company has R&D centers and divisions in Qingdao, Japan, and North America. On 29 Aug 2021, PICO Technology announced that it was acquired by ByteDance, and merged into its VR business line.

In China, PICO had the absolute leading position, with around 50% market share in 1H23 (versus 43% in 2022 according to Counterpoint). PICO and DPVR (大朋), two local OEMs, both have sound reputations and meaningful market shares. Among them, PICO has higher overall quality and more high-end models, while DPVR has lower prices, and focuses on the education and enterprises market.

China VR headset market share in 1H23



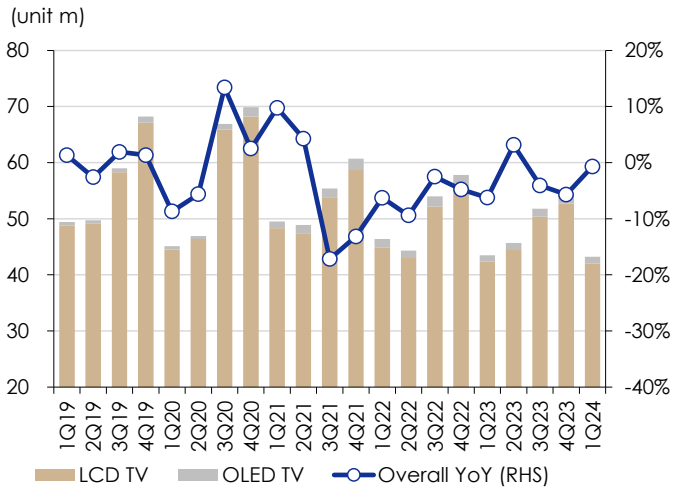
Source: Counterpoint, CCBIS

TV and smart home devices demand uncertain for 2024F

TV market has been declining

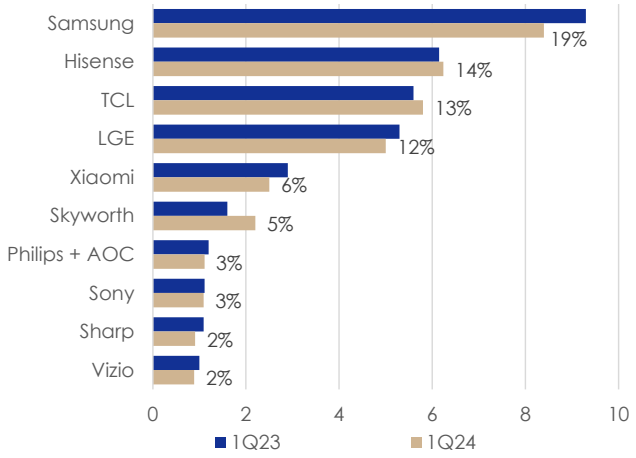
The global TV market has been declining since 3Q21 (except for 2Q23, which saw a slight increase), according to AVC Revo. In 1Q24, global TV shipments suffered a slight 0.8% YoY decline, with OLED TV shipments increasing 6% YoY. Currently, LCD TVs account for over 97% of the total market due to the technological maturity of large-size LCD display panels and their price advantage over OLED panels. Samsung still takes up the largest market share, but shipments from Samsung have been on the decline due to demand weakness, sales suspensions in some markets, competition from Chinese peers, and display panel price increases. Hisense and TCL, ranked second and third, both had shipment increases YoY. Hisense maintained its leading position in China and in the Japanese market, while TCL has a leading market share in North America.

Global TV quarterly shipments



Source: AVC Revo, CCBIS

TV shipments by vendors (m units) and market share



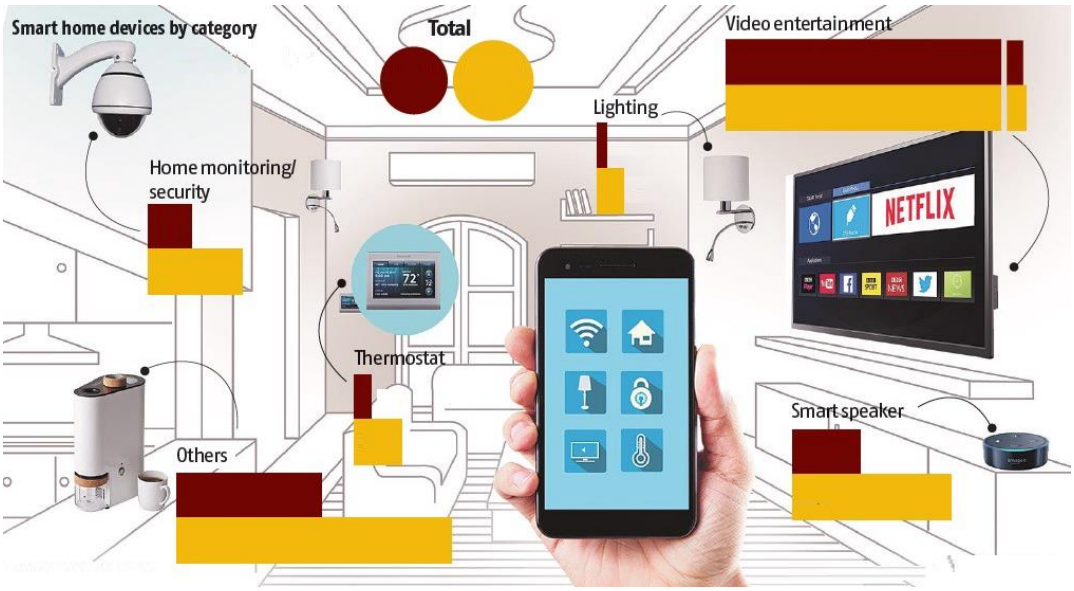
Source: AVC Revo, CCBIS

We expect a mild increase in global TV shipments in 2024F

For 2024F, LG Electronic expects uncertainties to remain, though demand for OLED TVs is expected to gradually improve and overall demand is expected to pick up starting from 2H24F. Samsung expects overall TV market demand to recover gradually in 2024F, but macro and geopolitical uncertainties are likely to persist. We expect several global sporting events in 2024F to boost demand while global TV shipments enjoy a mild increase in 2024F.

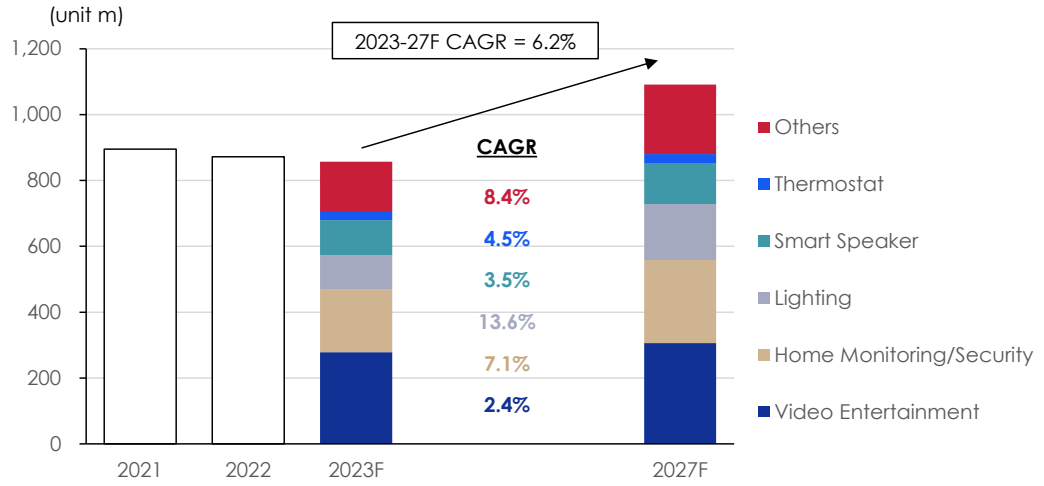
Smart home devices consist of a wide range of products. IDC categorizes these devices into six categories: video entertainment, home monitoring & security, lighting, smart speakers, thermostats, and other. Total shipments of smart home devices has been declining, mainly due to poor consumer sentiment and a lack of meaningful upgrades. IDC expect a 6% CAGR for 2023-2027. Apart from smart speakers and video entertainment devices, other smart home categories such as lighting, thermostats, and home monitoring & security devices are expected to witness high growth over the next few years, helped by rising consumer awareness of smart home devices globally, as well as rise in emerging market demand.

IDC categories of smart home devices



Source: IDC, CCBIS

Global shipments of smart home devices



Source: IDC, CCBIS

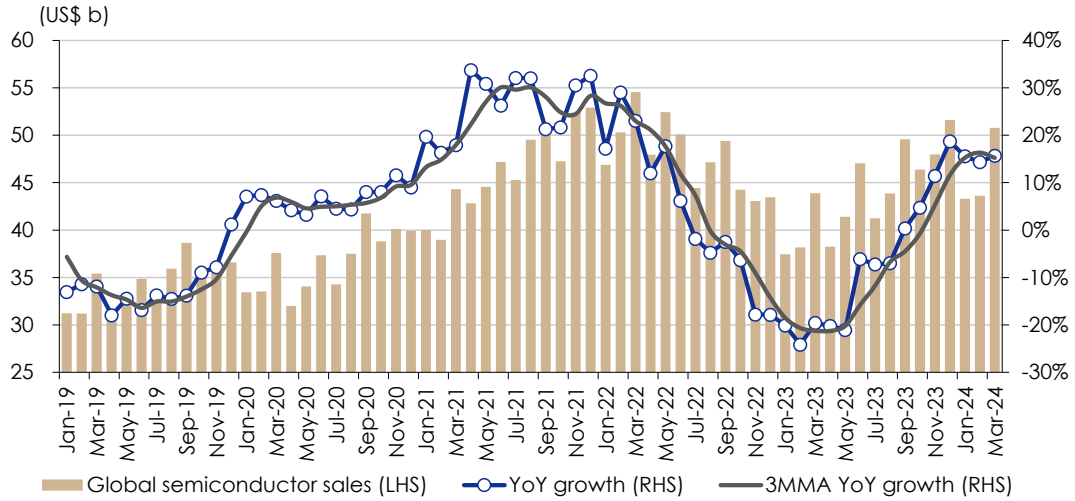
SEMICONDUCTOR MARKET DYNAMICS

Semiconductor market at the bottom

Global semiconductor market has been growing

According to World Semiconductor Trade Statistics (WSTS), global semiconductor sales recorded 16% YoY growth in Mar 2024, marking the seventh month of consecutive YoY growth since Sep 2023. The performance of downstream applications has diverged, as smartphone-related applications have continued to recover while industrial and automotive applications remain weak as inventory digestion takes place. Overcapacity issues persist, hurting the performance of foundries and IDM. Meanwhile, weakness in industrial is affecting power devices, analog IC, and MCU players.

Global semiconductor market monthly sales

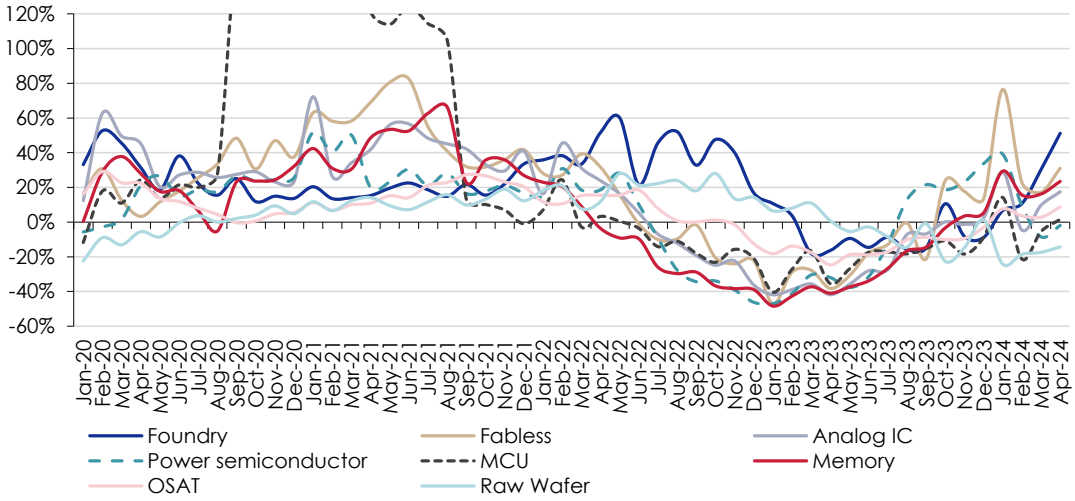


Source: WSTS, CCBIS; as of March 2024; 3MMA → 3-month moving average

Monthly revenue data of Taiwan-listed companies shows signs of recovery of overall market; some segments still in adjustment

According to monthly revenue data from Taiwan-listed companies, fabless, foundry, analog IC, memory, OSAT saw YoY growth in Apr 2023, driven by HPC, consumer electronics smartphone, RF, etc. Foundries saw the greatest increase, with 51% YoY growth driven by TSMC (HPC, smartphone) and Win Semi (RF, smartphone). Power, MCU and raw wafer segments are still declining due to high channel inventory and anemic demand in automotive and industrial. Monthly data indicates a gradual recovery by the semiconductor industry, though certain market segments will need more time.

Monthly revenue YoY growth summary of Taiwan-listed companies

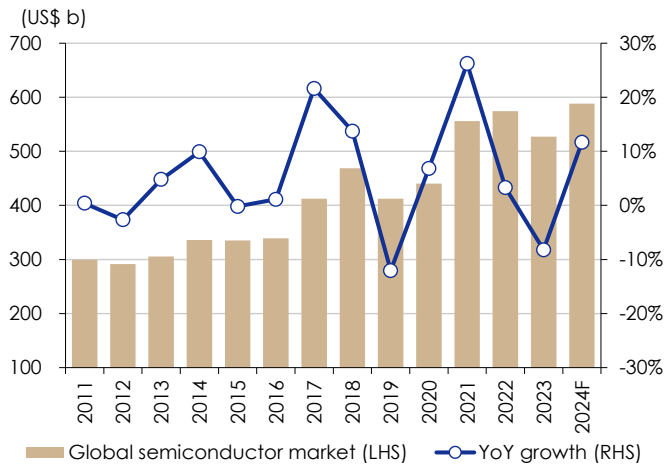


Source: Company data, CCBIS; as of October 2023

The latest forecast update by WSTS indicates that the global semiconductor market declined 8.2% YoY in 2023 to US$527b, and is expected to grow 11.7% YoY in 2024F, reaching US$588b. The same cyclical pattern appears in the integrated circuits (IC) market, which accounted for 81% of the total semi market in 2023.

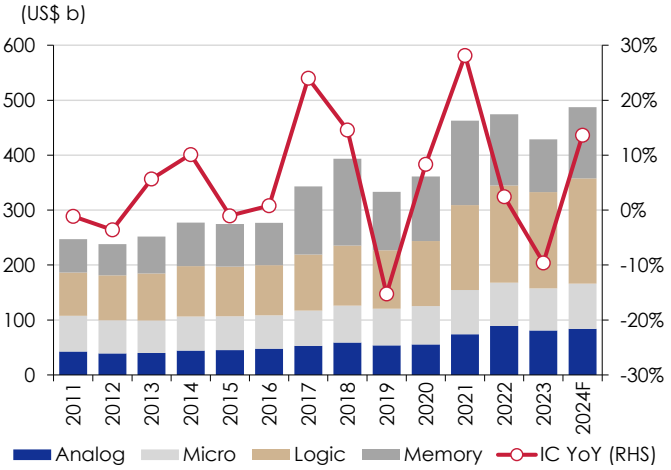
WSTS forecast: global semiconductor market to grow 11.7% in 2024F

Global semiconductor market forecasts



Source: WSTS, CCBIS

Global IC market forecasts

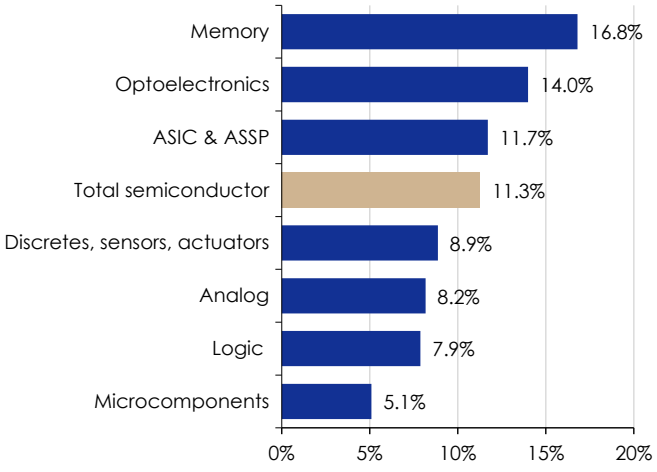


Source: WSTS, CCBIS

From the perspective of product categories, IDC forecasts memory will have the highest growth CAGR up until 2027F, driven by HBM demand and GenAI demand for data storage. Optoelectronics is expected to generate the second-highest growth CAGR, driven by silicon photonics on high-speed communication demand. ASIC & ASSP are expected to have higher than average CAGR, driven by storage, RF, analog-related, and communication-related ASICs. From the perspective of downstream demand, computing and wireless communications are among the fastest growing fields.

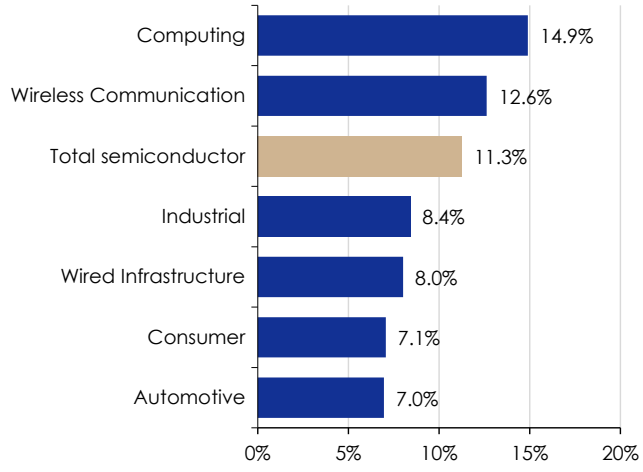
Rapid long-term growth in computing and wireless comm.

Market CAGR forecast for 2023-2027F (by product)



Source: IDC, CCBIS

Market CAGR forecast for 2023-2027F (by downstream)



Source: IDC, CCBIS

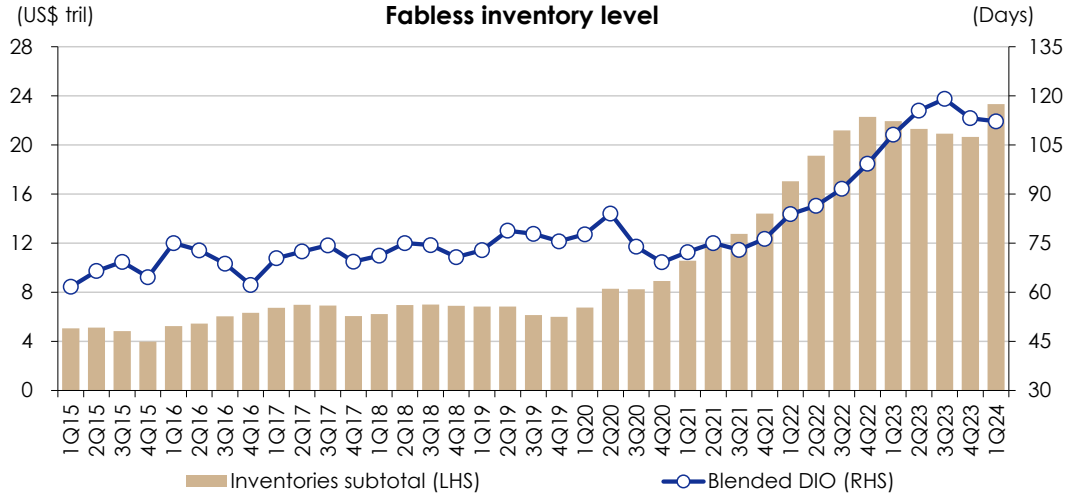
Divergent inventory

PC and smartphone inventory around healthy levels; auto and industrial inventory digestion to continue

After the long semiconductor upcycle of the past two years and disruptions to the global supply chain, inventory levels is still trending up. After quarters of inventory corrections in the smartphone and PC supply chains, overall inventory levels have gradually come down. We expect capex spending budgets for 2024F at most foundries and IDMs to increase, accelerating capacity expansion. PC- and smartphone-related product inventory is now at a healthy level, but industrial and automotive product inventory remains high. We expect inventory digestion of automotive- and industrial-related products to continue towards 3Q24F.

Most fabless players have saw DIO (inventory days) trend down for two quarters. Qualcomm, saw DIO decline QoQ in 1Q24, with DIO down 147 days. MediaTek, Novatek, and Realtek saw a sharp fall in DIO QoQ. Blended DIO of major fabless players reached 112 days in 1Q24 (versus 108/113 days in 1Q23/4Q23), representing a slight YoY increase of 4%. Companies in our assessment included Qualcomm, Broadcom, MediaTek, NVIDIA, AMD, Marvell, Novatek, and Realtek.

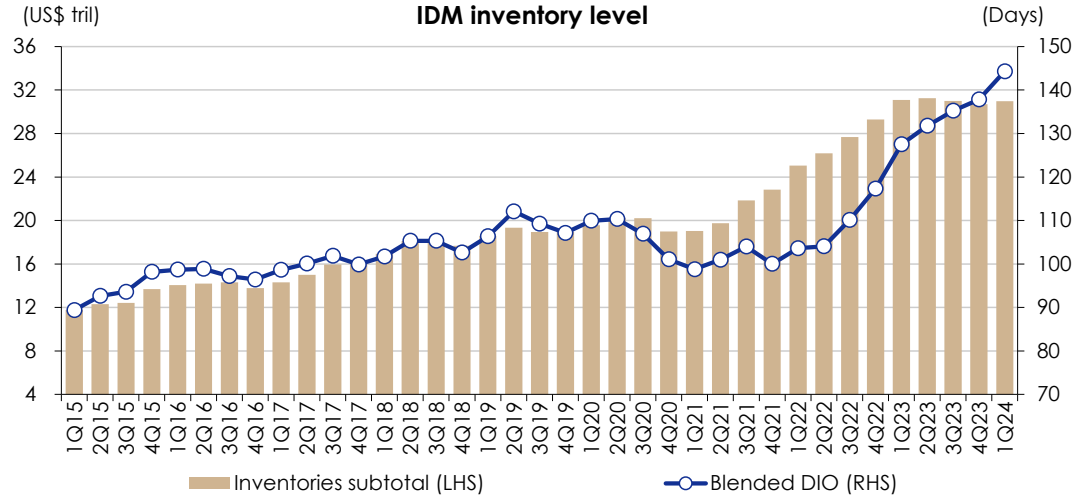
Fabless player inventory levels and inventory days



Source: Company data, CCBIS estimates

IDM players, mainly specializing in analog, MCU, and power semi, had relatively stable inventory levels in the past, yet they are facing increasing DIO. Intel, similar to AMD and NVIDIA insofar as they are PC supply chain names, saw DIO still increasing, but have shown signs of stablizing. Almost all Power, analog, and MCU names exhibited increasing DIO in 1Q24. Analog player Texas Instruments saw DIO increase to 205 days in 1Q24 (versus 155 and 190 days in 1Q23/4Q23). STMicroelectronics, Infineon, Renesas, NXP, ON Semi, and Microchip also saw DIO increase despite their leading automotive penetration. Blended DIO of major IDM players reached 144 days in 1Q24 (versus 127/138 days in 1Q23/4Q23), representing a YoY increase of 13%. Companies in our calculation included Intel, Texas Instruments, Infineon, STMicroelectronics, Renesas, NXP, ON Semi, Analog Devices, and Microchip.

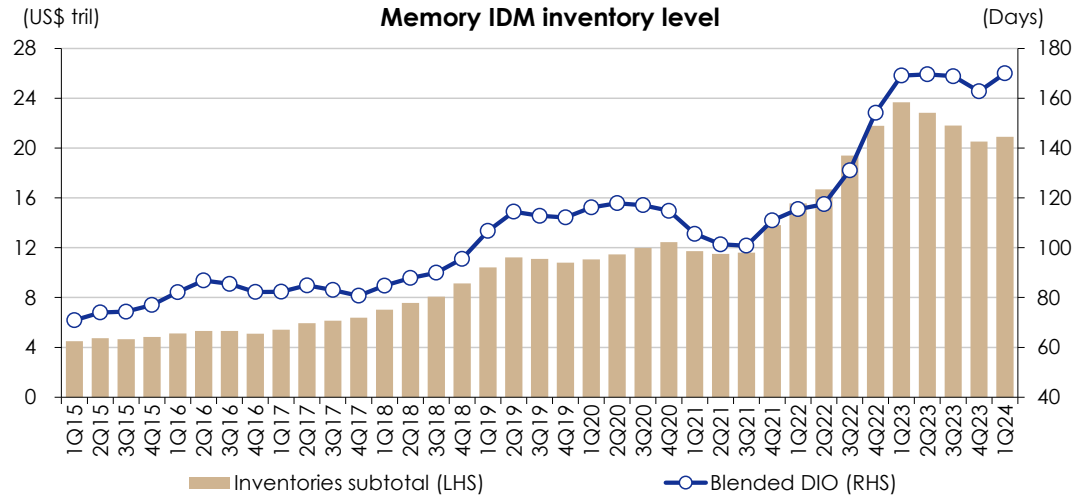
IDM player inventory levels and inventory days



Source: Company data, CCBIS estimates

The global memory market has been recovering since late-2023 thanks to production control of vendors (easing supply-demand imbalance situation), and strong demand for HBM. Helped by production control and increasing penetration of HBM and other high-end products, leading DRAM vendors saw ASP increasing in 1Q24. NAND flash also had ASP uptick in 1Q24 at most leading players. Inventory levels in memory IDMs are now largely at the same level as they were in 1Q24. Macronix, on the other hand, saw DIO increase to 254 days in 1Q24. Blended DIO was 170 days in 1Q24 (versus 169/163 days in 1Q23/4Q23), a slight 1% YoY increase. Companies in our calculation included SK Hynix, Micron, Winbond, Nanya Technology, and Macronix.

Memory IDM player inventory levels and inventory days



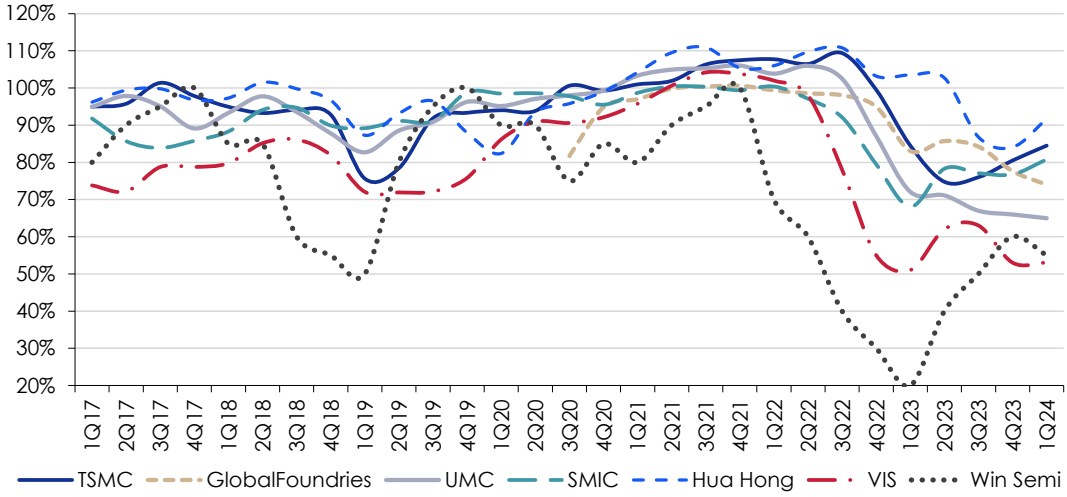
Source: Company data, CCBIS estimates

Foundry capacity utilization under pressure

Capacity utilization rates to gradually improve in 2H24F.

Some foundries saw capacity utilization rate (UTR) recovered in the last two quarters while others continued to suffer under-utilization. TSMC saw UTR improve sequentially for four consecutive quarters, driven by demand from HPC and AI related products. SMIC and Hua Hong also saw UTR recover thanks to consumer-related products. Demand for the 22/28/40nm process at most foundries remains robust, mainly for RF, WiFi, IoT SoC, and driver ICs. Some players will continue to lower prices in a bid to gain market share and ensure a sufficient utilization rate, which will result in ASP pressure across the industry. In 2H24F, most foundries are likely to see UTR gradually improve, aided by stronger smartphones, PCs, consumer devices, and healthier inventory within the industrial segment.

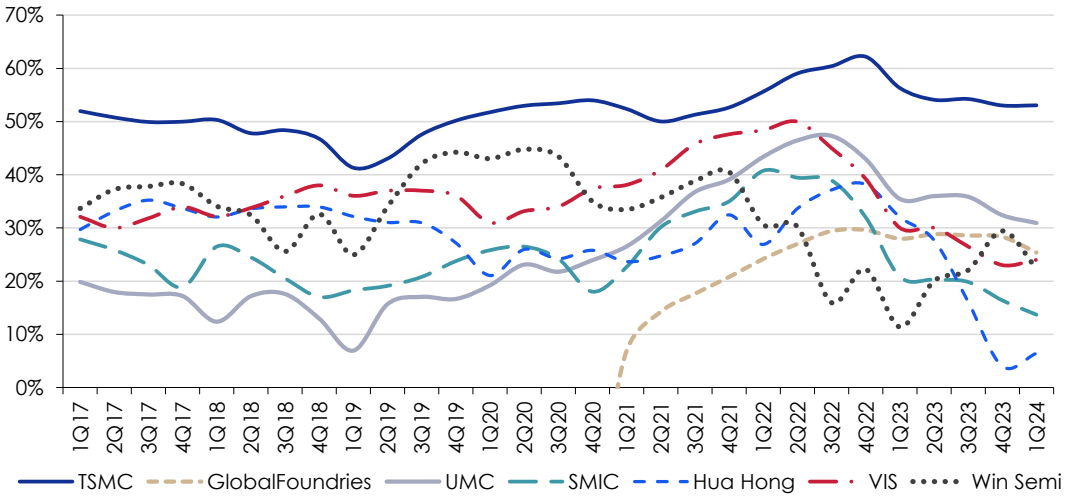
Capacity utilization rate of major pure-play foundries



Source: Company data, CCBIS estimates

Stable utilization rates benefit gross margin. In 1Q24, most foundries saw gross margin decline as a result of the UTR and ASP downtrend. Hua Hong, on the other hand, saw gross margin rise with along recovering UTR.

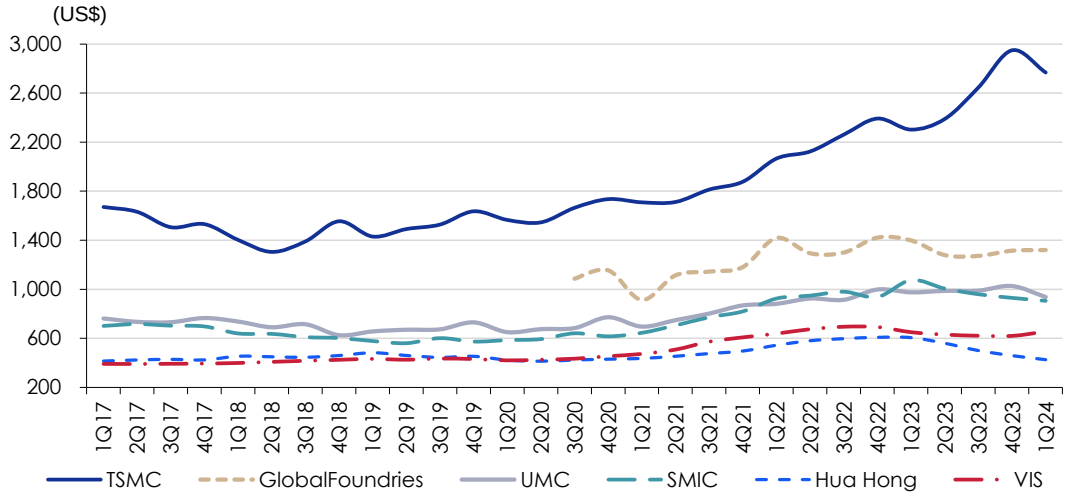
Gross margin of major pure-play foundries



Source: Company data, Bloomberg, CCBIS

In 1Q24, most foundries saw blended ASP decline sequentially. An exception was GlobalFoundries, which had stable blended ASP, and VIS, who saw ASP increase on strong demand for driver ICs. Global 8-inch production lines are facing low utilization at almost all foundries due to poor analog and power product sales. We estimate overall utilization of global 8-inch lines of between 50% and 70%. By contrast, demand for 22/28/40nm processes (on 12-inch) remains robust. In 2H24F, we expect most foundries to see ASP stabilize, with an uptick on a QoQ basis.

Blended wafer ASP (in US$) of major pure-play foundries (US$ per 8-inch equivalent wafers)



Source: Company data, CCBIS estimates

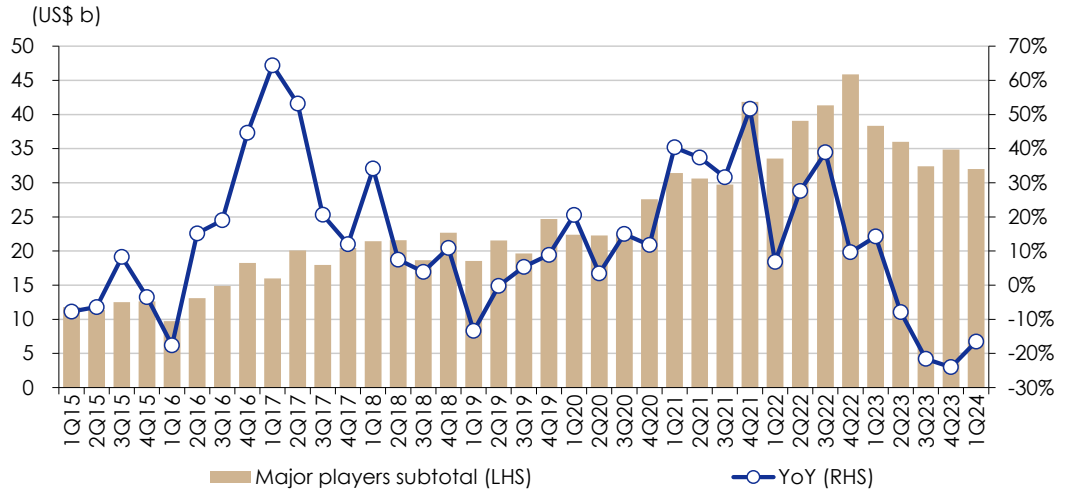
In view of recovering demand for smartphones, PCs, and consumer products in 2H24F along with industrial inventory digestion, we expect foundry utilization rates to gradually improve in 1H24F. Once ASP stabilizes, we expect gross margin to improve sequentially in 2H24F.

Semiconductor capital spending decelerating

Following rapid expansion over the last three years, semiconductor capital spending came down in 2023. With a more balanced supply-demand situation and recovering demand from smartphones, PCs, and consumer products, we expect semiconductor capex to increase in 2024F.

Semiconductor capex trend. In 1Q24, total capex at the global major IDMs, foundries and OSAT players declined 16% YoY in US dollar terms. Of all these segments, it was the pure-play foundries and memory IDMs that exhibited the sharpest declines.

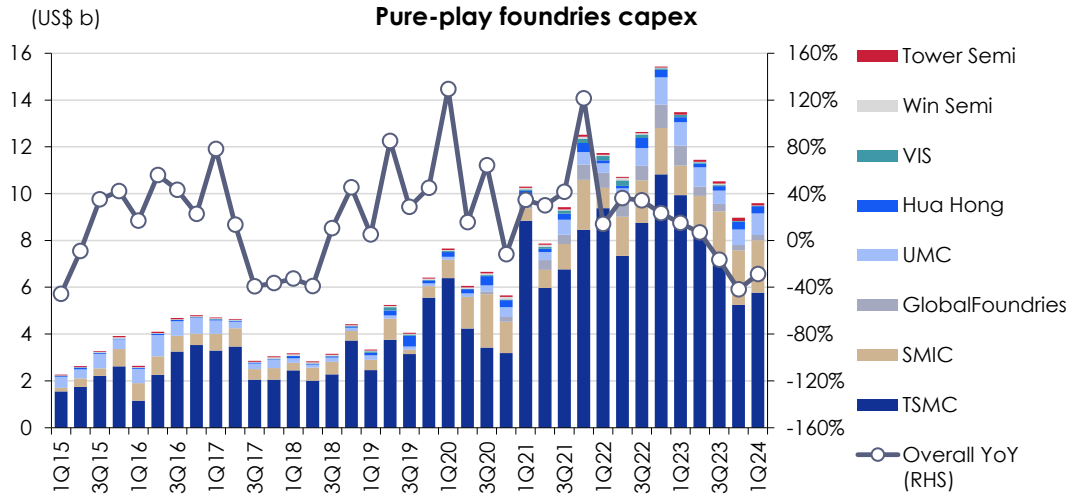
Capex trend of global major semiconductor players (IDMs + foundries + OSATs)



Source: Company data, CCBIS

Overall capex at the major **pure-play foundries** declined 29% YoY in 1Q24 in US dollar terms. Due to industry-wide low utilization issues, most foundries slowed down their capacity expansion plans. SMIC and Hua Hong, on the other hand, saw capex increase. Their domestic capacity expansion has been faster-than-expected.

Capex trend of the global major pure-play foundries

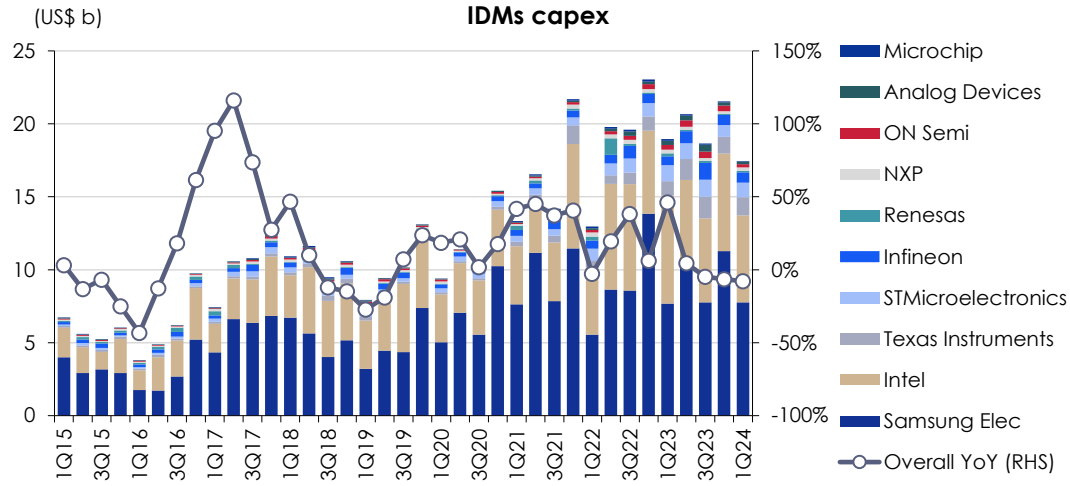


Source: Company data, CCBIS

Overall capex at the major pure-play foundries declined 29% YoY in 1Q24 in US dollar terms

Overall capex at the major **IDM players** declined 8% YoY in 1Q24 in US dollar terms. Most power semi players are spending capex on SiC capacity expansion as SiC chips are still in short supply. We expect this trend to continue in 2H24F.

Capex trend of the global major IDM players

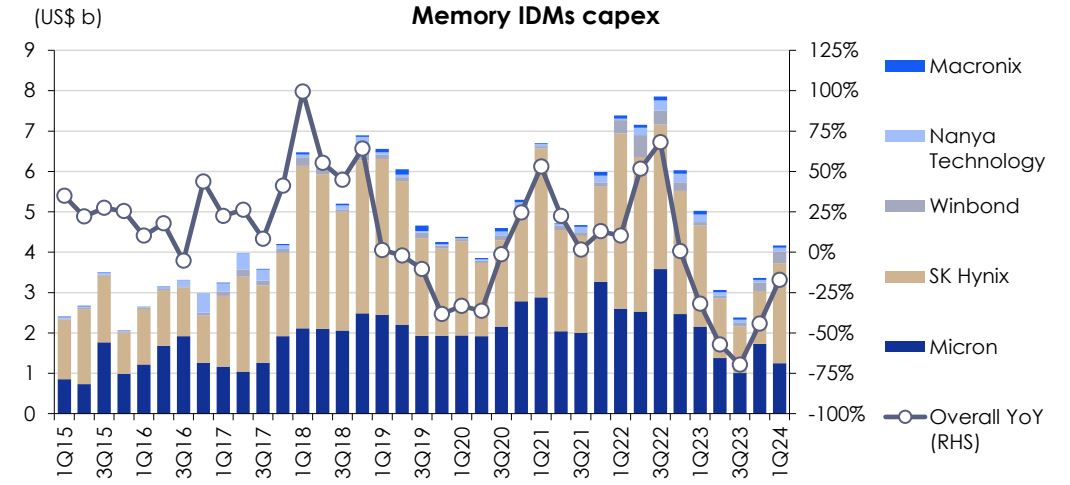


Source: Company data, CCBIS

Overall capex at the major IDM players declined 8% YoY in 1Q24 in US dollar terms

Overall capex of the major **memory IDMs** declined 17% YoY in 1Q24 in US dollar terms due to the supply-demand imbalance. The market situation is now healthier than it was months before. With demand gradually recovering, we expect the production cut rate to continue to decline. Major memory IDMs have higher capex budgets for 2024F than they did for 2023.

Capex trend of the global major memory IDMs

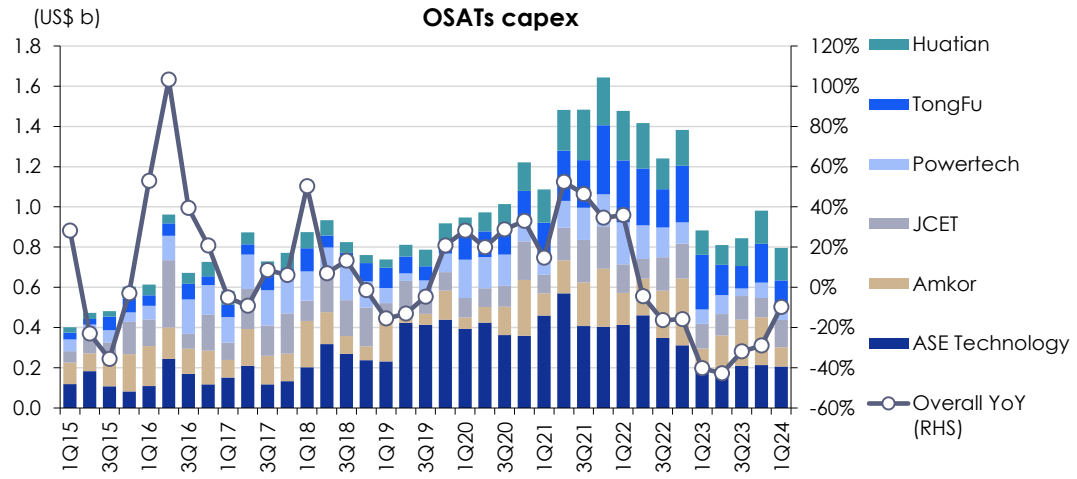


Source: Company data, CCBIS

Overall capex of the major memory IDMs declined 17% YoY in 1Q24 in US dollar terms

Overall capex of the major OSAT players declined 10% YoY in 1Q24 in US dollar terms. The decline has been narrowing, which we take as a sign of improving utilization rates. Driven by increasing penetration of advanced packaging, we look for utilization at the OSATs to improve earlier than it does at the foundries.

Capex trend of the major global OSAT players



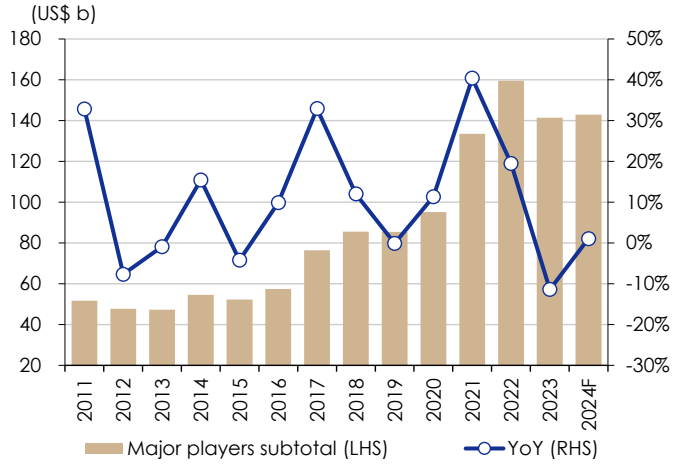
Source: Company data, CCBIS

Overall capex at the major OSAT players declined 10% YoY in 1Q24 in US dollar terms

Equipment vendors look forward to growth in 2024F. Semi equipment vendors are upstream suppliers to semiconductor manufacturing, packaging, and testing. Thus, semi equipment vendor sales are highly correlated to semi capex. Many companies have flat or slight higher capex budgets for 2024F compared with 2023. SK Hynix, for example, expects higher capex in 2024F than it had in 2023. Based on company expectations, we expect global semiconductor capex of the major players (foundry, IDM, OSAT) to grow 1% YoY in 2024F. Given the high correlation between the semi capex trend and the trend in equipment sales, we expect the global semiconductor production equipment (SPE) market to grow by a low-single-digit percentage YoY in 2024F.

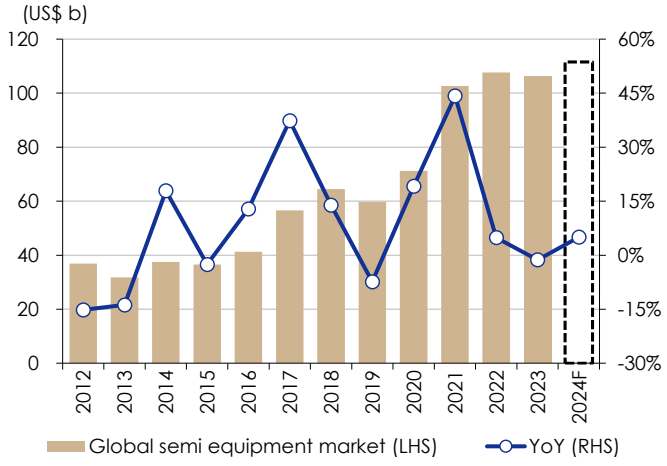
We expect the global semi production equipment market to grow low-single-digit % in 2024F

Capex at the major semiconductor players



Source: Company data, Bloomberg, CCBIS estimates

Global semiconductor equipment market sales



Source: SEMI, CCBIS estimate

Given the increasing severity of export restrictions from the US, Japan, and Europe on Chinese semiconductor equipment, domestic equipment vendors are justifiably anticipating market share gains in the next few years. Among these, NAURA (002371 CH, Outperform) has the most comprehensive product offering and, as a result, is positioned to benefit from domestic capacity expansion in IC, memory, and power devices. AMEC (688012 CH, Outperform) has the most advanced etching equipment and MOCVD products in China. It also plays an important role in semi equipment localization. Other leading players in China include ACM Research (ACMR US, Not Rated, cleaning and furnace equipment), Piotech (688072 CH, Not Rated, deposition equipment), E-Town Semi (heat treatment, etching equipment), and Kingsemi (688037 CH, Not Rated, cleaning, stripping, coating/developing equipment).

Another important upstream tool for semiconductors is electronic design automation, more commonly known as EDA, a category of software tool for designing electronic systems such as integrated circuits and printed circuit boards. EDA is part of a design flow that chip designers use to design and analyze semiconductor chips. Since a modern semiconductor chip can have billions of components, EDA tools are essential to their design. The global EDA market is dominated by Synopsys, Cadence, and Mentor Graphics, which together take up a 70% share of the market. Domestic players are falling behind in technology, though some have shown potential, including Empyrean (华大九天, 301269 CH, Not Rated), Primarius Technologies (概伦电子, 688206 CH, Not Rated), X-EPIC (芯华章), and Amedac (全芯智造).

Domestic major semiconductor equipment company product offerings

Equipment category	NAURA Tech	AMEC	ACM Research	Piotech	King Semi	E-Town Semi	SMEE	Hwatsing Technology
Heat Treatment								
- Oxidation/annealing	✓		✓			✓		
- RTP						✓		
Lithography							✓	
Etching								
- Plasma etching	✓	✓				✓		
• ICP etching	✓	✓				✓		
• CCP etching	✓	✓				✓		
- Silicon etch	✓	✓						
- Metal etch	✓							
- Dielectric etch	✓	✓						
Ion implants								
Deposition								
- PVD	✓							
- CVD (excl. MOCVD)	✓	✓	✓	✓				
- MOCVD		✓						
- ALD	✓			✓				
CMP								✓
Cleaning	✓		✓		✓			
Stripping	✓		✓		✓	✓		
Coating/development			✓		✓			
Testing								

Source: Company data, CCBIS

China semi equipment companies 5-year CAGR vs self-sufficiency rate in 2027F sensitivity analysis

China semi equipment market growth 5-year CAGR (2022-2027F)	Self-sufficiency rate in 2027F										
	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%
0%	-4.3%	-0.7%	2.4%	5.1%	7.6%	9.9%	12.1%	14.0%	15.9%	17.6%	19.2%
1%	-3.3%	0.3%	3.4%	6.2%	8.7%	11.0%	13.2%	15.2%	17.0%	18.8%	20.4%
2%	-2.4%	1.2%	4.4%	7.2%	9.8%	12.1%	14.3%	16.3%	18.2%	19.9%	21.6%
3%	-1.4%	2.2%	5.4%	8.3%	10.9%	13.2%	15.4%	17.4%	19.3%	21.1%	22.8%
4%	-0.5%	3.2%	6.5%	9.3%	12.0%	14.3%	16.5%	18.6%	20.5%	22.3%	24.0%
5%	0.5%	4.2%	7.5%	10.4%	13.0%	**15.4%**	17.7%	19.7%	21.7%	23.5%	25.2%
6%	1.5%	5.2%	8.5%	11.5%	14.1%	16.5%	18.8%	20.9%	22.8%	24.6%	26.4%
7%	2.4%	6.2%	9.5%	12.5%	15.2%	17.6%	19.9%	22.0%	24.0%	25.8%	27.6%
8%	3.4%	7.2%	10.6%	13.6%	16.3%	18.7%	21.0%	23.1%	25.1%	27.0%	28.8%
9%	4.3%	8.2%	11.6%	14.6%	17.3%	19.8%	22.1%	24.3%	26.3%	28.2%	30.0%
10%	5.3%	9.2%	12.6%	15.7%	18.4%	20.9%	23.3%	25.4%	27.4%	29.4%	31.1%

Source: CCBIS estimates

Analog, power, MCU pricing pressure persists

The easing of industry chipset shortage has led to a more balanced supply-demand situation in power semi. Automotive, high-end power devices, high-end logic and analog lead times continue to come down as prices have for-the-most-part stabilized. Capacity expansion plans of including Infineon, STMicroelectronics, ON Semi and other leading automotive semi and power semi players in 2024F will be mainly for SiC, as SiC chips and devices are now in short supply.

According to Future Electronics, by 1Q24, lead times for most power device products continue to trend down, a sign of a deteriorating supply-demand dynamic. Prices have stabilized. Our channel check indicates that low-power products have shown signs of a pricing increase, but pricing for high-power devices (including IGBT and super-junction) continues to fall.

Power device lead times and price trends (1Q24)

Category	Company	Lead time (week)	Lead time trend	Pricing trend
IGBT	ON Semi + Fairchild	12-52	↘	↔
	Infineon	14-52	↘	↔
	IXYS	50-54	↔	↔
	Microchip + Microsemi	22-46	↘	↔
	STMicroelectronics	12-52	↘	↔
MOSFET, high-voltage	Infineon	10-32	↘	↔
	IXYS	50-54	↔	↔
	MCC	14-28	↔	↔
	Microchip + Microsemi	22-50	↘	↔
	ON Semi + Fairchild	12-40	↘	↔
	ROHM	16-20	↘	↔
	STMicroelectronics	14-40	↘	↔
	Vishay	10-26	↘	↔
MOSFET, low-voltage	Diodes Incorporated	8-16	↘	**SMA**
	Infineon	10-36	↘	**SMA**
	MCC	12-22	↘	↔
	Nexperia (Wingtech)	6-20	↘	**SMA**
	ON Semi + Fairchild	12-40	↘	**SMA**
	STMicroelectronics	50-54	↘	↔
	Vishay	16-52	↘	↔
Wide bandgap MOSFET	Infineon	18-40	↔	↔
	Littelfuse	42-52	↔	↔
	Microchip + Microsemi	24-36	↔	↔
	ON Semi	26-52	↔	↔
	ROHM	20-32	↔	↔
	STMicroelectronics	42-52	↔	↔

Note: ↗increase, ↘ decrease, ↔ stable, SMA means selective market adjustments;
Source: Future Electronics, CCBIS

Most analog product lead times have stabilized, though some are trending up; mainly sensors. Prices of most products have been stable. With active price adjustments from leading players such as Texas Instruments, we expect analog to come under pricing pressure in the coming quarters.

Analog IC lead times and price trends (1Q24)

Category	Company	Lead time (week)	Lead time trend	Pricing trend
Sensors	Bosch	6-12	↔	↔
	Infineon	4-26	↔	↔
	Melexis	12-60	↗	↔
	NXP	16-52	↔	↔
	ON Semi	18-52	↔	**SMA**
	Panasonic	16-26	↗	↔
	STMicroelectronics	12-20	↔	↔
	Vishay	24-52	↗	↔
Signal chain	Microchip	4-10	↔	↔
	ON Semi	10-20	↔	↔
	Renesas	24-36	↔	↔
	STMicroelectronics	10-20	↔	↔
Multi-source	Diodes Incorporated	10-20	↔	↔
	ON Semi	10-28	↔	↔
	STMicroelectronics	10-20	↔	↔
Analog/power for automotive	Infineon	36-45	↘	↔
	NXP	20-30	↘	↔
	STMicroelectronics	30-40	↘	↔

Note: ↗increase, ↘ decrease, ↔ stable; SMA means selective market adjustments;
Source: Future Electronics, CCBIS

In terms of MCUs, most categories and vendors saw lead times continue to trend down while prices remained stable. Automotive product lead times and prices both held steady. Competition in the MCU industry continues to heat up while pricing has been trending down for mid-to-low end products. We expect MCU pricing pressure to last for at least another two quarters.

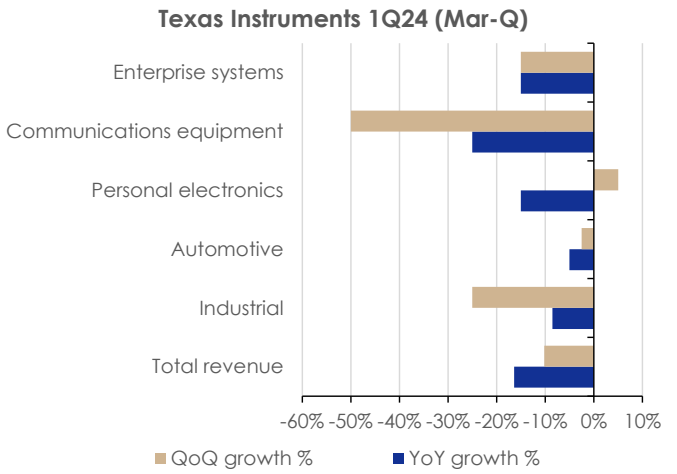
MCU lead times and price trend (3Q23)

Category	Company	Lead time (week)	Lead time trend	Pricing trend
MCU, 32-bit	Cypress (Infineon)	10-52	↘	↔
	Microchip	4-18	↘	↔
	NXP	13-39	↘	↔
	Renesas	18	↘	↔
	STMicroelectronics	10-12	↘	↔
MCU, 8-bit	Cypress (Infineon)	10-14	↘	↔
	Microchip	4-12	↘	↔
	NXP	13-39	↘	↔
	Renesas	12-18	↘	↔
	STMicroelectronics	10-24	↘	↔
	Zilog	24-39	↔	↔
MCU, automotive	Infineon	Allocation	↔	↔
	NXP	18-52	↘	↔
	Renesas	45	↔	↔
	STMicroelectronics	40-52	↔	↔

Note: ↗ increase, ↘ decrease, ↔ stable; allocation means in shortage
Source: Future Electronics, CCBIS

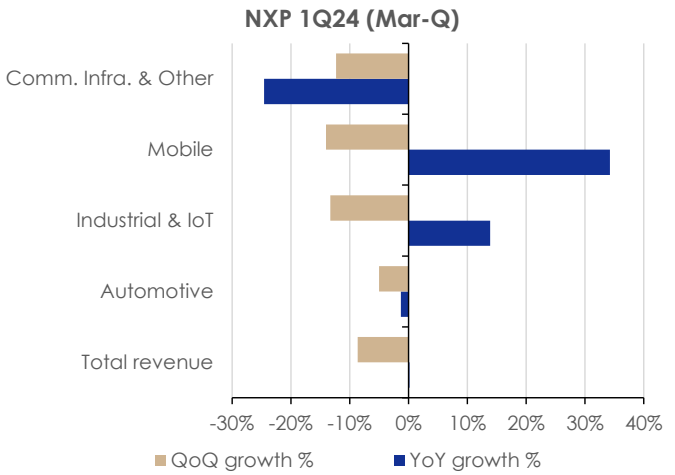
In terms of downstream applications, automotive generally suffered a YoY and QoQ decline due to high channel inventory and waning demand. Industrial continues to lose steam on falling demand. Texas Instruments saw personal electronics QoQ improved in 1Q24. NXP had sales from mobile applications increasing YoY in 1Q24. We expect consumer electronics improvement to continue in 2H24F.

Texas Instruments sales growth by downstream



Source: Company data, CCBIS estimates

NXP sales growth by downstream



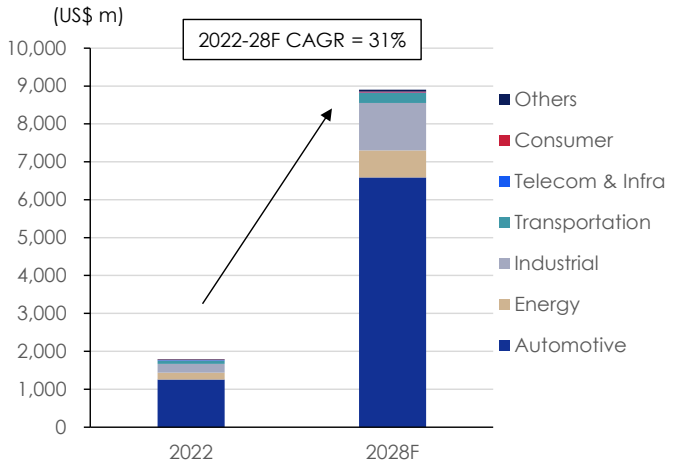
Source: Company data, CCBIS

We expect continued pressure on the analog, power and MCU segment, as inventory digestion is expected to last for the next two-to-three quarters. Automotive is still growing; however, given current elevated inventory levels, we expect growth to slow. High-end power devices, including IGBT and high-voltage MOSFET, are now in supply-demand balance, so pricing pressure can be expected. Our channel checks reveal that SiC chips and devices are still in severe shortage. Most leading power semi players are expanding capacity in SiC. We believe SiC would be the key competitive area for power semi players in the next few years.

We expect continued pressure on the analog, power and MCU segments

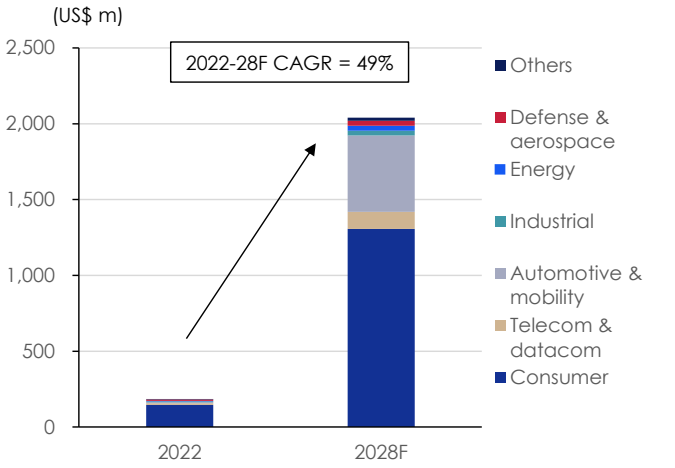
SiC will be the key competitive area

SiC power devices market size



Source: Yole Group, CCBIS

GaN power devices market size

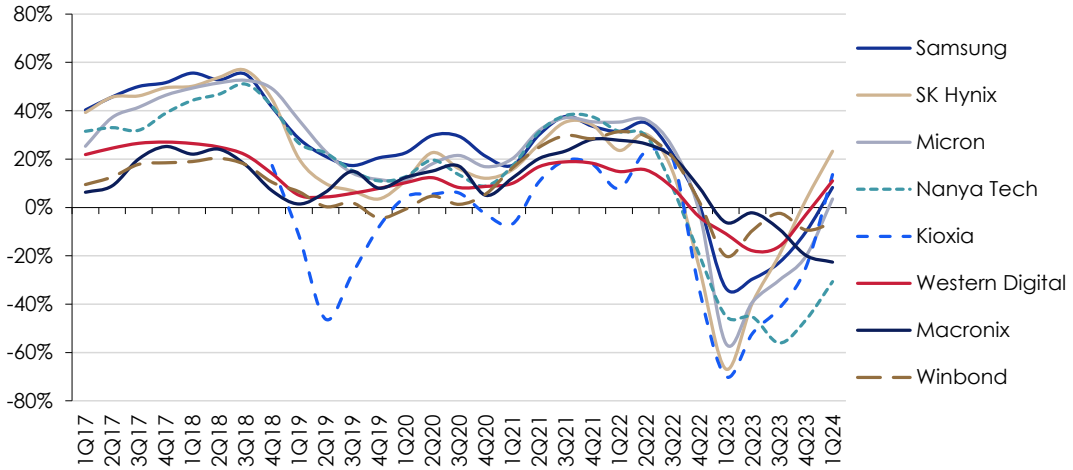


Source: Yole Group, CCBIS

Memory market bottoming out

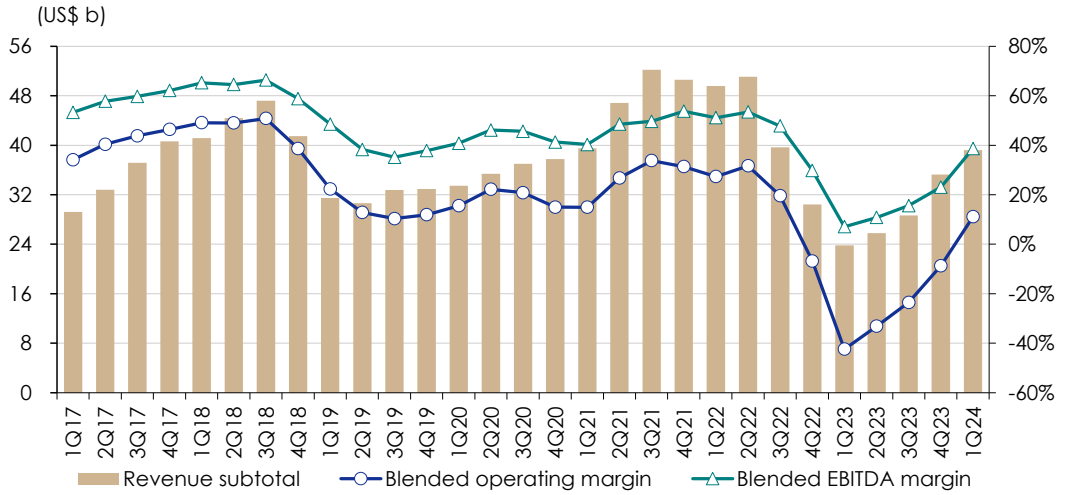
In 1Q24, most major memory players saw profit turnaround at the operating level, helped by active production controls of vendors (eased ASP pressure), recovering demand in smartphones, PCs, and consumer electronics, and strong demand for AI related products. Subtotal revenue at the major players grew 65% YoY in 1Q24 (2023: a 34% YoY decline), with blended operating profit margin (OPM) of 11.1% (versus an operating loss margin of 42.4%/8.7% in 1Q23/4Q23). Meanwhile, DRAM and 3D NAND product prices have stabilized after several months of rebounds. Generative AI continues to stimulate shipments and ASP. We expect the performance of memory players to continue improving sequentially in 2H24F.

Operating margins of the global major memory chip players



Note: Samsung OPM of the DS segment; Winbond OPM of memory business
Source: Company data, CCBIS estimates

Performance summary of the global major memory players

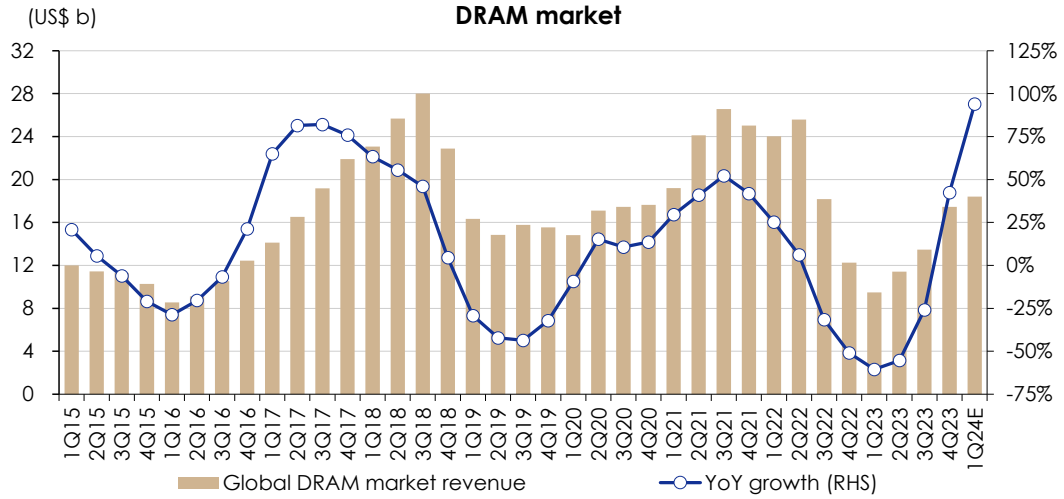


Note: Companies include Samsung, SK Hynix, Micron, Nanya, Kioxia, Western Digital, Macronix, and Winbond
Source: Company data, CCBIS estimates

The global memory market has been recovering since 4Q23. DRAM and NAND Flash, the two largest memory markets, saw ASP and bit shipment growth in last a few months.

According to our estimate, the global **DRAM market** enjoyed sales growth of over 90% in 1Q24 (2023: a 35% YoY decline), to reach US$18.4b. This represents the second consecutive quarter of YoY growth. On a QoQ basis, market sales grew 5%, representing a fourth consecutive quarter of QoQ increase. Continued production cuts from leading suppliers has led to ASP rebounds in the past months. Samsung saw purchasing demand continue to increase, but lower pricing is possible for legacy products. In light of the increasing percentage of high-end products including HBM, DDR5, LPDDR5X, we expect industry ASP continue to increase.

Global DRAM market trend



Source: TrendForce, CCBIS estimates

Most leading DRAM suppliers had shipment declines or slight upticks QoQ in 1Q24, due to seasonality. Samsung and SK Hynix managed strong quarterly growth of ASP of nearly 20% and over 20%, respectively, mainly thanks their DDR5 and HBM, both with high ASP rising sales. Micron and Nanya Technology also had ASP upticks thanks to rebounding demand in consumer electronics. The oversupply situation will continue to improve over time, and we expect leading vendors to ease off of production cuts. New applications, including generative AI training and automotive will boost demand for some segments including HBM.

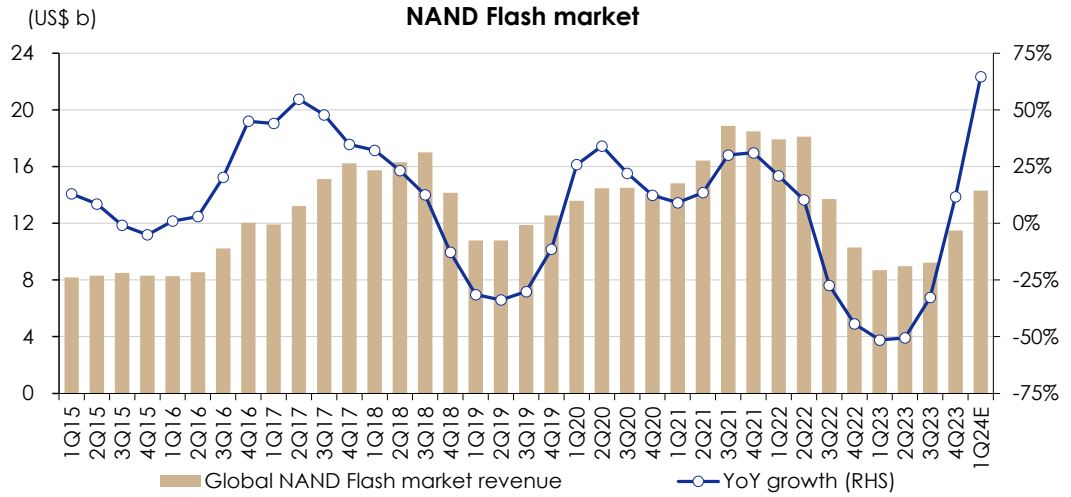
DRAM bit shipments and ASP QoQ trend of leading players

	1Q23	2Q23	3Q23	4Q23	1Q24
Samsung					
Bit shipments QoQ	↓ double digit %	↑ mid-teens %	↑ c.10%	↑ mid-30%	↓ mid-teens %
ASP QoQ	↓ low-to-mid teens %	↓ mid-to-high-single digit %	↑ mid-single digit %	↑ just into double-digit %	↑ nearly 20%
SK Hynix					
Bit shipments QoQ	↓ around 20%	↑ mid-30s %	↑ c.20%	↑ low-single digit %	↓ mid-teens %
ASP QoQ	↓ high-teens %	↑ high-single digit %	↑ c.10%	↑ high-teens %	↑ over 20%
Micron					
Bit shipments QoQ	↑ mid-teens %	↑ 10% range	↑ mid-teens %	↑ low-20% range	↑ low-single digit %
ASP QoQ	↓ around 20%	↓ around 10%	↓ high-single digit %	↑ slow-single digit %	↑ high-teens %
Nanya Tech					
Bit shipments QoQ	↓ high-single digit %	↑ mid-teens %	↑ high-teens %	↑ low-teens %	↑ low-single digit %
ASP QoQ	↓ high-single digit %	↓ mid-single digit %	↓ high-single digit %	↑ low-single digit %	↑ high-single digit %

Source: Company data, CCBIS

The global **NAND flash market** (by our estimates) had strong 65% YoY growth in 1Q24, or a 25% QoQ increase (2023: down 36% YoY). NAND Flash ASP, which had been on the decline since 4Q21, saw ASP turnaround in 4Q23 with a nearly 10% uptick. Helped by production cuts at major players coupled with increasing demand, the NAND flash contract price has been increasing since 3Q23, and is expected to increase another 15-20% in 2Q24F, according to TrendForce.

Global NAND flash market trend



Source: TrendForce, CCBIS

Almost all leading NAND flash suppliers saw ASP QoQ increase in 1Q24. Samsung and Western Digital had bit shipment declines in the low-single digits and by c.15%, respectively. The NAND flash contract price increased 23-28% QoQ in 1Q24, according to TrendFroce. Considering enterprises across many sectors have had to scale back their capital expenditure plans, and given the improved demand situation in most downstream areas, we expect the NAND flash market to continue recovering with strong YoY growth in 2024F.

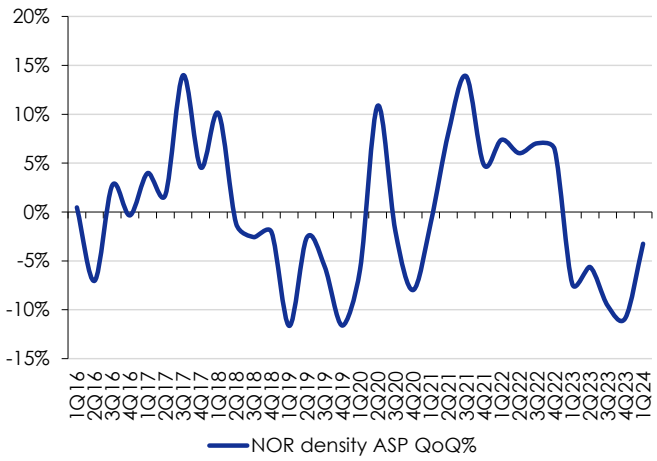
NAND flash bit shipment and ASP QoQ trend of the leading players

	1Q23	2Q23	3Q23	4Q23	1Q24
Samsung					
Bit shipments QoQ	↑ low-single digit %	↑ mid-single digit %	↓ low-single digit %	↑ mid-30%	↓ low-single digit %
ASP QoQ	↓ high-teen %	↓ mid-to-high single digit %	↑ high-single digit %	↑ high-single digit %	↑ low-30%
SK Group					
Bit shipments QoQ	↓ mid-teen %	↑ around 50%	↑ mid-single digit %	↓ low-single digit %	Remains flat
ASP QoQ	↓ around 10%	↓ around 10%	↓ slightly	↑ over 40%	↑ over 30%
Kioxia					
Bit shipments QoQ	↑ mid-teen %	↑ mid-teens %	↓ low-teens %	Remains flat	↑ high-single digit %
ASP QoQ	↓ high-20s %	↓ mid-single digit %	↑ high-single digit %	↑ low-teens %	↑ high-teens %
Western Digital					
Bit shipments QoQ	↓ 14%	↑ 15%	↑ 26%	↓ 2%	↓ 15%
ASP QoQ	↓ 10%	↓ 6%	↓ 10%	↑ 10%	↑ 18%
Micron					
Bit shipments QoQ	↑ mid-to-high-single digit %	↑ upper 30% range	↑ over 40% range	↓ mid-teens %	↓ low-single digit %
ASP QoQ	↓ mid-20s %	↓ mid-teens %	↓ mid-teens %	↑ around 20%	↑ over 30%

Source: Company data, CCBIS

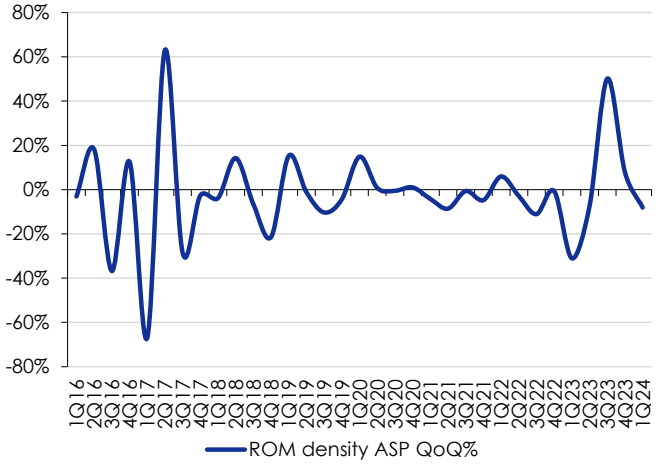
NOR flash and EEPROM have been relatively stable. Macronix saw NOR flash product density ASP continue to decline in 1Q24, though the decline has been narrowing. GigaDevice also saw NOR Flash pricing come under pressure with no prospect of a price increase. EEPROM has been stable; moreover, we its ASP to remain stable as overseas players turn their backs on this relatively small market.

Macronix NOR flash density ASP QoQ growth



Source: Company data, CCBIS

Macronix ROM density ASP QoQ growth

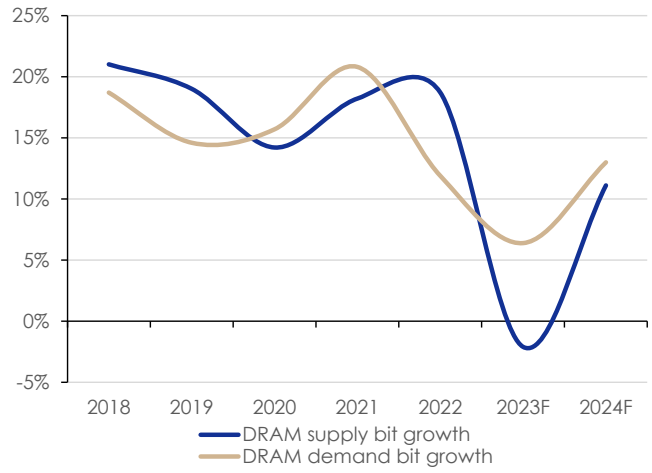


Source: Company data, CCBIS

DRAM and NAND Flash spot prices have been increasing since 3Q23 thanks to vendor production cuts and a rebound in demand. Recently, some products have seen prices stabilize. With demand improving, a higher percentage of high-end products being sold, and the supply-demand dynamic more balanced, we expect pricing to continue to rise before trending down in 4Q24F. TrendForce expects the DRAM contract price to increase 13-18% QoQ in 2Q24F against an increase of c.20% in 1Q24.

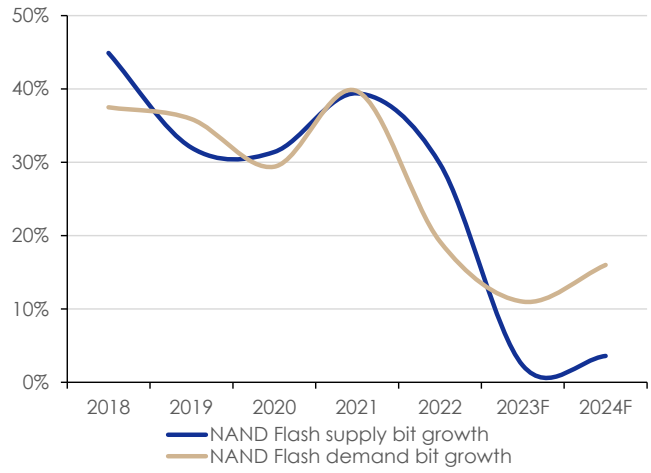
TrendFroce expects the NAND flash contract price to grow 15-20% QoQ in 2Q24F versus a 23-28% increase in 1Q24. As the supply-demand dynamic is now more balanced, we expect vendors to tap the breaks on their production cuts. Along with the improving supply-demand balance, we believe memory prices will stabilize, before trending down starting in 4Q24F.

DRAM supply and demand bit growth forecast



Source: TrendForce, CCBIS

NAND flash supply and demand bit growth forecast



Source: TrendForce, CCBIS

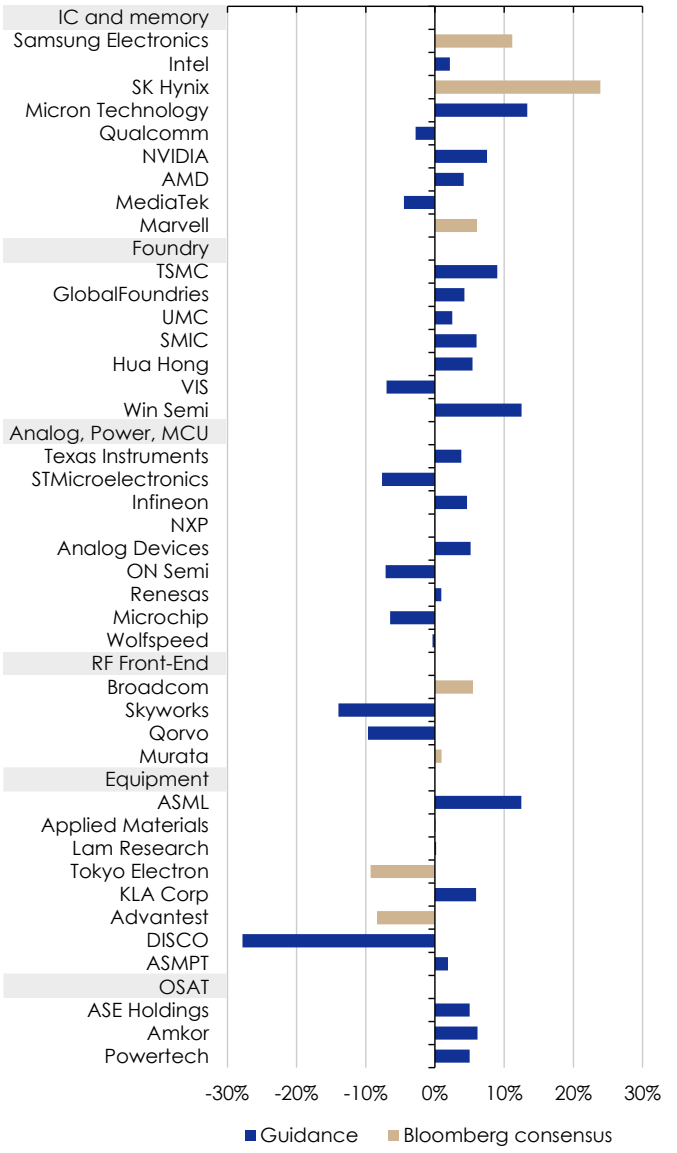
Guidance of major semiconductor players

2Q24F revenue growth rate implied by revenue guidance of major semi players (or midpoint)

	Stock code	Fiscal year end	Reported 4Q23 QoQ (%)	Reported 1Q24 QoQ (%)	Guidance 2Q24F QoQ (%)	Reported 4Q23 YoY (%)	Reported 1Q24 YoY (%)	Guidance 2Q24F YoY (%)
IC and memory								
Samsung Electronics	005930 KS	Dec	31.9	6.7	N/A	8.1	68.5	N/A
Intel	INTC US	Dec	8.8	(17.4)	2.2	9.7	8.6	0.4
SK Hynix	000660 KS	Dec	24.7	9.9	N/A	47.4	144.3	N/A
Micron Technology	MU US	Aug	17.9	23.2	13.3	15.7	57.7	75.9
Qualcomm	QCOM US	Sep	14.2	(4.7)	(2.8)	6.7	1.1	8.7
NVIDIA	NVDA US	Jan	22.0	17.8	7.5	265.3	262.1	107.3
AMD	AMD US	Sep	6.3	(11.3)	4.1	10.2	2.2	6.4
MediaTek	2454 TT	Dec	17.7	3.0	(4.5)	19.7	39.5	29.9
Marvell	MRVL US	Jan	0.6	N/A	N/A	0.6	N/A	N/A
Foundry								
TSMC	2330 TT	Dec	14.4	(5.3)	9.0	0.0	16.5	34.3
GlobalFoundries	GFS US	Dec	0.1	(16.5)	4.3	(11.8)	(15.9)	(12.5)
UMC	2303 TT	Dec	(3.7)	(0.6)	2.5	(19.0)	0.8	(0.5)
SMIC	981 HK	Dec	3.6	4.3	6.0	3.5	19.7	18.9
Hua Hong	1347 HK	Dec	(19.9)	1.0	5.4	(27.7)	(27.1)	(23.2)
VIS	5347 TT	Dec	(8.4)	(0.4)	(7.0)	1.1	17.7	(9.1)
Win Semi	3105 TT	Dec	16.9	(8.8)	12.5	37.9	55.3	26.7
Power, analog, MCU								
Texas Instruments	TXN US	Dec	(10.0)	(10.2)	3.8	(12.7)	(16.4)	(16.1)
STMicroelectronics	STMPA FP	Dec	(3.4)	(19.1)	(7.6)	(3.2)	(18.4)	(26.0)
Infineon	IFX GR	Sep	(10.8)	(1.9)	4.6	(6.3)	(11.8)	(7.1)
NXP	NXPI US	Dec	(0.3)	(8.6)	0.0	3.3	0.2	(5.3)
Analog Devices	ADI US	Oct	(7.5)	(14.1)	5.1	(22.7)	(33.8)	(26.2)
ON Semi	ON US	Dec	(7.5)	(7.7)	(7.1)	(4.1)	(4.9)	(17.4)
Renesas	6723 JP	Dec	(4.6)	(2.8)	0.9	(7.5)	(2.2)	(3.7)
Microchip	MCHP US	Mar	(21.7)	(24.9)	(6.5)	(18.6)	(40.4)	(45.8)
Wolfspeed	WOLF US	Jun	5.6	(3.7	(0.3)	(3.6)	(12.2)	(15.2)
RF front-end								
Broadcom	AVGO US	Oct	28.7	N/A	N/A	34.2	N/A	N/A
Skyworks	SWKS US	Sep	(1.4)	(12.9)	(14.0)	(9.6)	(9.3)	(16.0)
Qorvo	QRVO US	Mar	(2.7)	(12.4)	(9.7	44.5	48.7	30.5
Murata	6981 JP	Mar	(0.7)	(11.2)	N/A	4.9	12.3	N/A
Equipment								
ASML	ASML NA	Dec	8.5	(26.9)	12.5	12.6	(21.6)	(13.8)
Applied Materials	AMAT US	Oct	(0.2)	(0.9)	0.1	(0.5)	0.2	3.5
Lam Research	LRCX US	Jun	7.9	0.9	0.2	(28.8)	(2.0)	18.5
Tokyo Electron	8035 JP	Mar	8.4	18.0	N/A	(0.9)	(2.0)	N/A
KLA Corp	KLAC US	Jun	3.7	(5.1)	5.9	(16.7)	(3.0)	6.2
Advantest	6857 JP	Mar	14.6	2.0	N/A	(3.5)	(7.9)	N/A
DISCO	6146 JP	Mar	6.5	35.5	(27.8)	17.0	32.0	39.4
ASMPT	522 HK	Dec	(2.0)	(7.8)	1.9	(21.4)	(19.9)	(18.0)
OSAT								
ASE Holdings	3711 TT	Dec	(2.2)	(9.8)	5.0	(12.9)	0.5	1.7
Amkor	AMKR US	Dec	(3.8)	(22.0)	6.1	(8.1)	(7.2)	(0.5)
Powertech	6239 TT	Dec	3.2	(3.7)	5.0	3.4	16.4	11.8

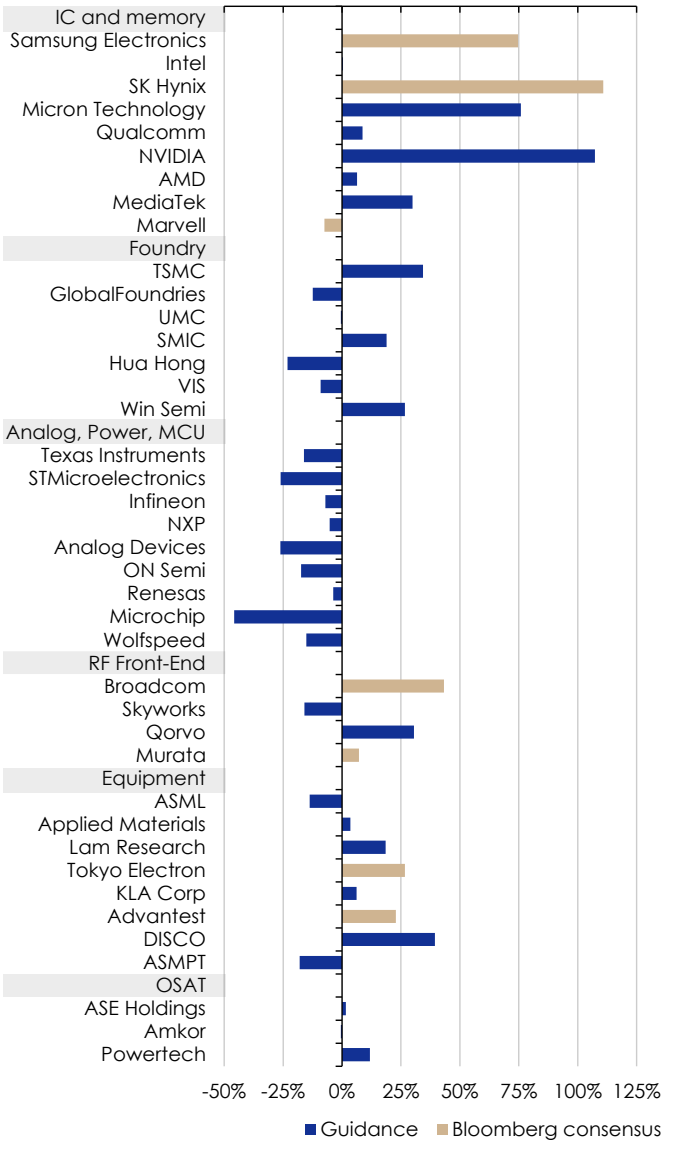
Note: Calendar quarters above; corresponding fiscal quarters for those with non-Dec FY-end
Source: Company data, CCBIS

2Q24F revenue guidance QoQ growth rate (or midpoint)



Source: Company data, CCBIS

2Q24F revenue guidance YoY growth rate (or midpoint)



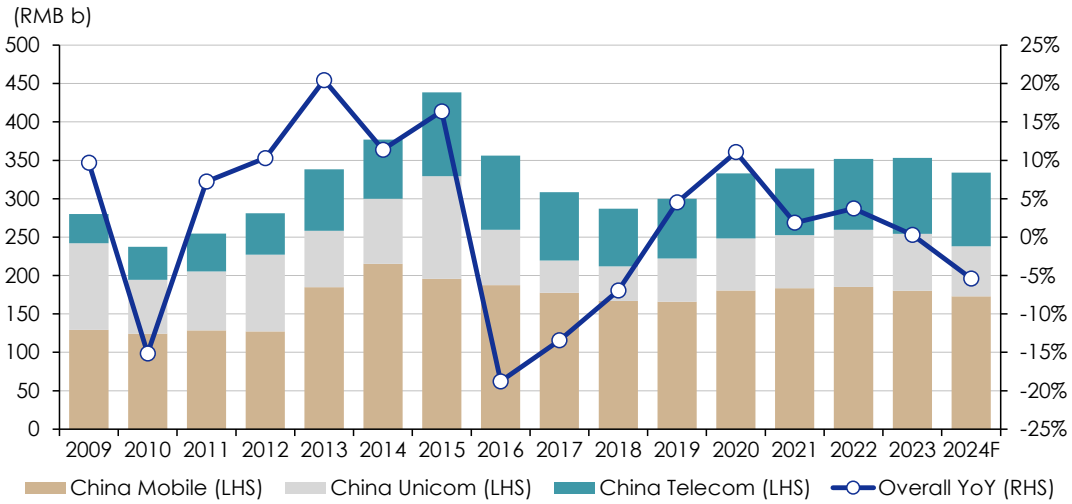
Source: Company data, CCBIS

TELECOM INVESTMENT CONTINUES TO SLOW

The three Chinese telcos, China Mobile, China Unicom, China Telecom, have capex budget for 2024F that are lower than those for 2023. China Mobile expect capex for 2024F to decrease by 4% YoY, and 27% of the investment will be related to computing power (versus 22% in 2023). 5G construction is to account for 40% of capex (versus 52%/49% in 2022/2023). China Telecom expects capex to come down by 3% in 2024F relative to 2023, with computing power capex accounting for 19% of total capex. China Unicom also expect capex to decline 12% in 2024F.

According to MIIT, the total number of 5G base stations (BTS) in China reached 3.647m by end-Mar 2024, accounting for 31% of total base station, with 270k net added YTD. Capex budgets of the three telcos amount to RMB334b in 2024F (China Mobile: RMB173b, China Unicom: c.RMB65b, China Telecom: RMB96b).

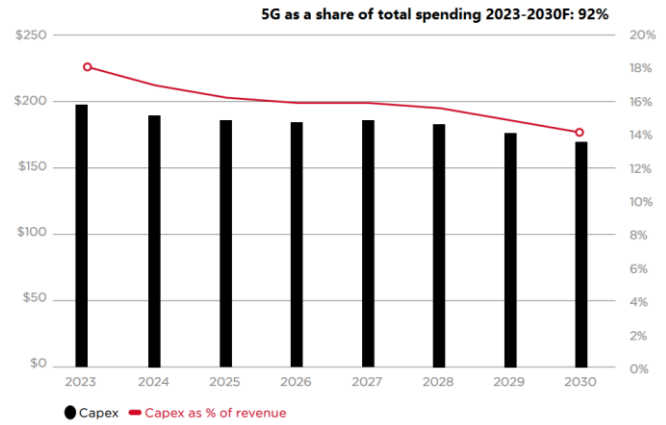
Chinese telcos capex trend



Source: Company data, CCBIS; 2024F figures are telcos' budgets

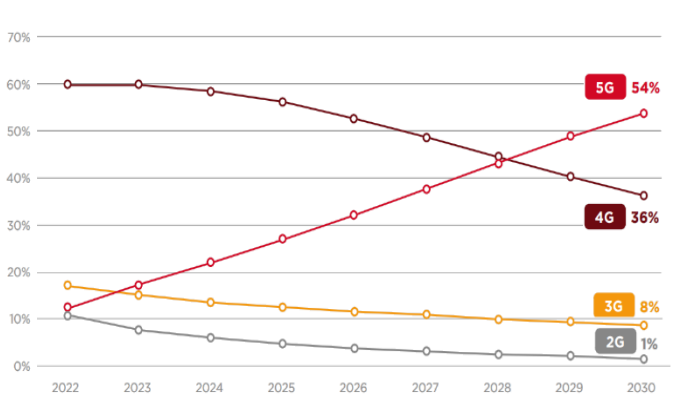
On the demand side, the total number of package users of the three telcos amounted to 1,402m by the end of Apr 2024, representing a 29k net add YTD. The China 5G handset penetration rate reached over 80% (CAICT data).

Global telco capex forecast (2023-2030, US$ b)



Source: GSMA, CCBIS

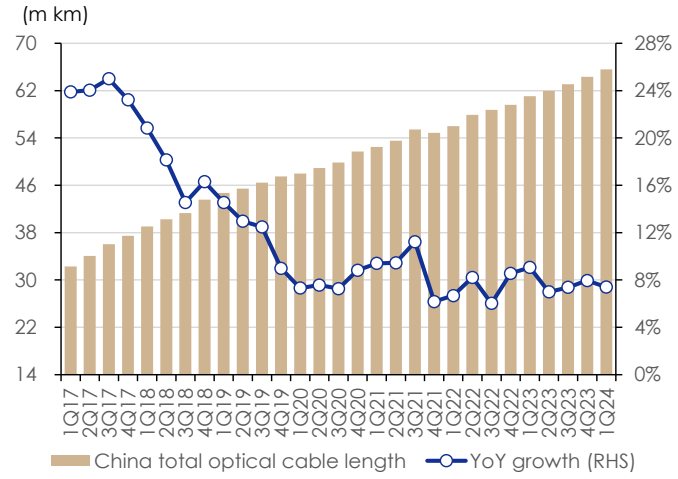
5G to account for 54% of mobile connections in 2030F



Source: GSMA, CCBIS

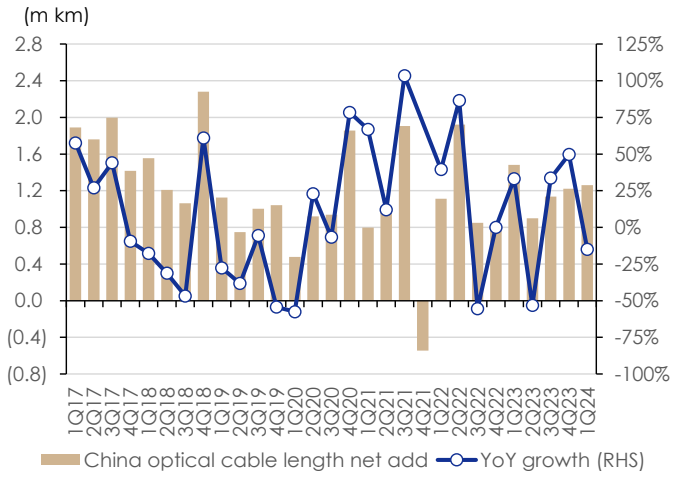
Telcos' migrating from 5G NSA (non-standalone, sharing core network with 4G) to 5G SA (standalone, exclusive core network) are now slowing down, which will dampen demand for optical fiber and cable. In addition, pricing pressure has persisted, clouding the outlook for equipment vendors. Increasing broadband penetration, especially 1,000M broadband, could potentially benefit optical cable vendors, and increasing FTTR (fiber-to-the-room) penetration will also drive up demand for home communication terminals. We suggest wait-and-see approach to network deployment.

China total optical cable length



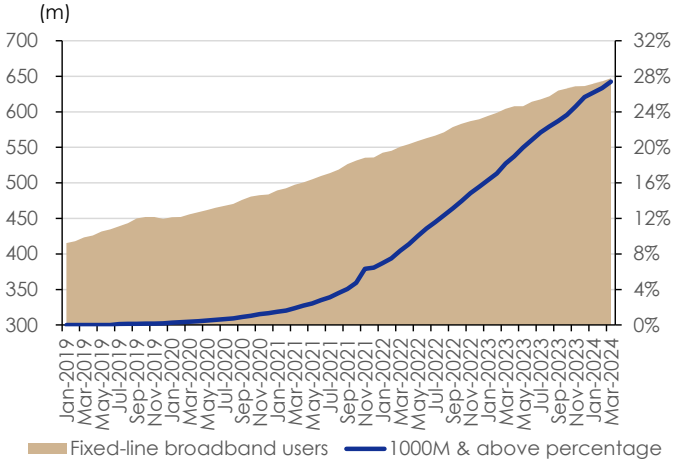
Source: MIIT, CCBS

China total optical cable length net add



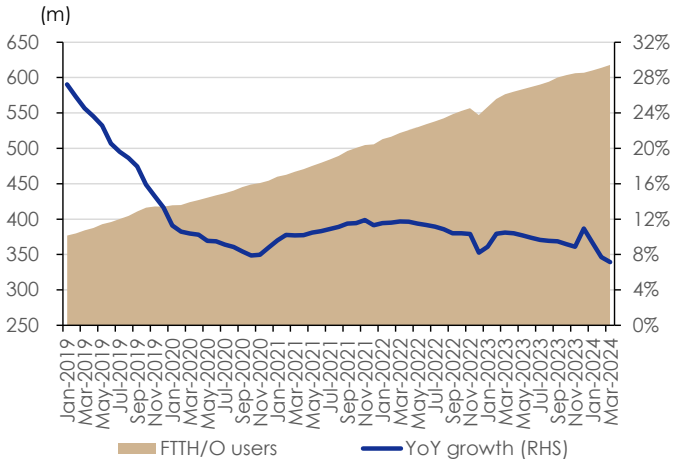
Source: MIIT, CCBS

China fixed-line broadband users



Source: MIIT, CCBIS estimates; as of Mar 2024

China FTTH/O users



** FTTH/O → fiber to the home/office*
Source: MIIT, CCBIS estimates; as of Mar 2024

GLOBAL TECHNOLOGY COMPANY RESULTS RECAP

The following is an overview of the 1Q24 results (or corresponding fiscal period) of the world's major technology firms.

Global technology company results recap

Company	Results period	Results date	1Q24F Guidance	1Q24 Results	1Q24 vs consensus	Details	2Q24F Guidance	Management analysis and outlook
Electronics								
Apple (AAPL US) (Sep FY-end)	**2Q FY24**	2 May 2024	Revenue YoY flat GPM: 46.0-47.0% Opex: US$14.3-14.5b	**Revenue: US$90.753b** **- YoY -4.3%, QoQ +24.1%** **Gross margin: 46.6%** **Opex: US$14.371b** **FD EPS: US$1.53** **- YoY +0.2%, QoQ -29.8%**	Revenue: in line GP margin: in line FD EPS: above	**iPhone** sales US$45.963b, -10.5% YoY **Mac** sales US$7.451b, +3.9% YoY **iPad** sales US$5.559b -16.7% YoY **Wearables, others** sales US$7.913b, -9.6% YoY **Services** sales US$23.867b, +14.2% YoY	Revenue YoY low-single digit growth; GPM: 45.5-46.5% Opex: US$14.3-14.5b	• iPhone sales decline partially offset by Mac growth, which driven by M3-powered MacBook Air; • Vision Pro, over half of global top-100 companies have purchased Vision Pro; • 2Q FY24F: expect FX to negatively impact 2.5ppts on sales YoY growth;
LG Electronics (066570 KS) (Dec FY-end)	**1Q24**	25 Apr 2024	Revenue: n.a. Secure sound levels of profitability on an annual basis	**Revenue: KRW21.096t** **- YoY +3.3%, QoQ -8.7%** **Gross margin: 25.5%** **OP margin: 6.3% (-1.0ppt YoY)** **Net profit: KRW585.4b** **- YoY +7.1%, QoQ turn profit**	Revenue: in line GP margin: above Op profit: in line Net profit: below	H&A: KRW8.61t, +7.2% YoY, +28.8% QoQ, OPM 10.9% HE: KRW3.49t, +4.2% YoY, -15.9% QoQ, OPM 3.8% VS: KRW2.66t, +11.5% YoY, +2.7% QoQ, OPM 2.0% BS: KRW1.58t, +6.5% YoY, +24.2% QoQ, OPM 0.8%	Revenue: to grow YoY Improve profitability YoY on back of leverage effect, more contribution in operating profit from high-profit businesses, and cost stabilization	• Home appliances demand to show gradual growth centered around emerging markets, but competition is expected to intensify with geopolitical instability and delayed recovery of demand in advanced market; • Demand for OLED TV to gradual improve; • Global IT demand similar level to last year
Sony (6758 JP) (Mar FY-end)	**4Q FY23**	14 May 2024	N/A	**Revenue: JPY3.481t** **- YoY +14%** **Adj. OP margin: 6.5%** **Adj. net profit: JPY189.0b** **- YoY +34%**	Revenue: above Op profit: above Net profit: above	**G&NS**: JPY1,097.3b, +2% YoY, 32% mix, OPM 9.7% **Music**: JPY429.9b, +23% YoY, 12% mix, OPM 16.6% **Pictures**: JPY406.7b, +13% YoY, 12% mix, OPM 7.5% **ET&S**: JPY532.7b, +8% YoY, 15% mix, OPM -1.2% **I&SS**: JPY398.5b, +14% YoY, 11% mix, OPM 8.7% **Financial**: JPY672.9b, +43 YoY, 19% mix, OPM 3.9%	N/A	• Full-year FY24F guidance: revenue of JPY12.31t, operating margin of 10.4%, adj EBITDA margin of 15.7%; • PS5 sales was 4.5m units in 4Q FY23, and 20.8m units for FY23; PS5 hardware cumulative sales since launch reached 59.2m units; • Expect PS5 sales to be around 18m units for FY24F;
Largan (3008 TT) (Dec FY-end)	**1Q24**	11 Apr 2024	N/A	**Revenue: NT$11.313b** **- YoY: +23.8%, QoQ +36.7%** **Gross margin: 49.2%** **Net profit: NT$6.111b** **- YoY +85.8%, QoQ +23.1%**	Revenue: below GP margin: in line Net profit: above	1Q24 lens shipment breakdown: 8MP: 0-10%;10MP: 40-50%; >20MP: 20-30%; others 20-30%	N/A	• Shipment momentum in Apr and May largely flat with Mar; Jun visibility low; • Limited camera upgrade from customers in 1Q24; • Momentum will be better in 2H24F as most upgrades will be in 3Q and 4Q
Hon Hai (2317 TT) (Dec FY-end)	**1Q24**	14 May 2024	Revenue: down YoY, significantly down QoQ - Consumer: significantly down YoY and QoQ - Cloud: strong up YoY; flat QoQ - Computing: flat YoY, significantly down QoQ - Components: up YoY, significantly down QoQ	**Revenue: NT$1,324b** **- YoY -9%, QoQ -29%** **Gross margin: 6.32% (+28 bps YoY)** **OP margin: 2.78% (+0.5 bps YoY)** **NG FD EPS: NT$1.59** **- YoY +72%, QoQ -59%**	Revenue: below GP margin: above EPS: below	**Smart consumer electronics products** (consumer) revenue: 48% mix, down significantly YoY and QoQ; **Cloud and networking products** (cloud) revenue: 28% mix, up YoY, flat QoQ; **Computing produts** (computing) revenue: 18% mix, flat YoY, significantly down QoQ; **Components and other products** (components): 6% mix, up YoY, significantly down QoQ;	Revenue: up YoY and QoQ - Consumer: flat YoY and QoQ - Cloud: strong up YoY and QoQ - Computing: strong up YoY and QoQ - Components: strong up YoY and QoQ	• Full year 2024 revenue outlook: total revenue up YoY, consumer flat YoY, cloud strong up YoY, computing flat YoY, components strong up YoY; • Collabrating with automakers and tier-1 companies on hybrid virtual automotive platform; • SiC wafer fab received automotive certification and continues expansion; SiC module plan under construction, planned to start production in Q3;
Cisco Systems (CSCO US) (Jul FY-end)	**3Q FY24**	15 May 2024	Revenue: US$12.1-12.3b NG GP margin: 66%-67% NG OP margin: 33.5%-34.5% NG EPS: US$0.84-0.86	**Revenue: US$12.7b** **- YoY: -13%** **NG GP margin: 68.3%** **NG OP margin: 34.2%** **NG Net income: US$3.6b (-14% YoY)** **NG EPS: US$0.88 (-12% YoY)**	Revenue: in line GP margin: above OP margin: below EPS: above	Product sales: US$9.024b, -19% YoY, 71% mix - Networking: sales US$6.522b, -27% YoY - Security: sales US$1.304b, +36% YoY - Collaboration: sales US$987m, flat YoY - Observability: sales US$211m, +27% YoY Services sales: US$3.678b, +6% YoY, 29% mix	Revenue: US$13.4-13.6b NG GP margin: 66.5%-67.5% NG OP margin: 31.5%-32.5% NG EPS: US$0.84-0.86	• FY23F full year guidance: revenue US$53.6-53.8b, NG EPS US$3.69-3.71 • Seen product order growth in two of largest product portfolios, data center switching and campus switching, as well as product order growth in security and collaboration; • Telco and cable customer demand remains muted worldwide;

***LG Electronics**: H&A → Home appliance & Air solutions, HE → Home Entertainment, VS → Vehicle component solution, BS → Business solutions*
***Sony**: G&NS → Game & Network Services, ET&S → Entertainment, Technology & Services, I&SS → Imaging & Sensing Solutions*
***Dell Technologies**: CSG → Client Solutions Group, ISG → Infrastructure Solutions Group*
Source: Company data, Bloomberg, CCBIS

Global technology company results recap (continued)

Company	Results period	Results date	1Q24F Guidance	1Q24 Results	1Q24 vs consensus	Details	2Q24F Guidance	Management analysis and outlook
Foundry								
TSMC (2330 TT) (Dec FY-end)	**1Q24**	18 Apr 2024	Revenue: US$18.0-18.8b - Midpoint: YoY +10%, QoQ -6% FX US$/NT$: 31.10 Gross margin: 52-54% OP margin: 40-42%	**Revenue: NT$592.64b (US$18.87b)** **- In NT$: YoY +16.5%, QoQ -5.3%** **- In US$: YoY +12.9%, QoQ -3.8%** **Gross margin: 53.1%** **OP margin: 42.0%** **EPS: NT$8.70, +8.9% YoY, -5.5% QoQ**	Revenue: in line GP margin: in line OP margin: above EPS: above	Smartphone -16% QoQ; HPC +3% QoQ; IoT +5% QoQ; Automotive 0% QoQ; DCE +33% QoQ, other -8% Revenue mix: 3nm 9%, 5nm 37%, 7nm 19%, 16nm 9%, 28nm 8%, 40/45nm 5%, 65nm 4%, 90nm 1% Shipments: 3.030m 12"-equivalent wafers (YoY -6.1%, QoQ +2.5%)	Revenue: US$19.6-20.4b - Midpoint: YoY +34%, QoQ +9% FX US$/NT$: 32.30 Gross margin: 51-53% OP margin: 40-42%	• Expect 2024 semi (excl. memory) market to grow 10%, foundry market to grow mid-to-high teens %; • Mature node demand weak; PC and smartphone recovery slow, traditional server flat, automotive inventory in correction, IoT demand also weak; • Long-term AI related sales CAGR 50%; • Japan fab (12/16/22/28nm) expecte volume production in 4Q24F; US fab (advanced node) to volume production in 1H25F on 4nm;
UMC (2303 TT) (Dec FY-end)	**1Q24**	24 Apr 2024	Wafer ship: increase 2-3% QoQ ASP in US$: decrease 5% QoQ Gross margin: ~30% Capacity utilization: low-60% CAPEX for 2024: US$3.3b	**Revenue: NT$54.63b (US$1.71b)** **- In NT$: YoY +0.8%, QoQ -0.6%** **Wafer shipments: +4.5% QoQ** **Blended ASP remained -4.9% QoQ** **Gross margin: 30.9%** **EPS: NT$0.84, -35.9% YoY**	Revenue: above GP margin: above EPS: in line	Revenue contribution from 22/28nm 33% of wafer revenue; 40nm 14%; 65nm 18%; 90nm 10% Wafer shipments: 810m 12"-equivalent wafers (-0.1% YoY, +4.5% QoQ) Utilization rate: 65%	Wafer ship: increase low-single digit % QoQ ASP in US$: remain firm QoQ Gross margin: ~30% Capacity utilization: mid-60% CAPEX for 2024: US$3.3b	• Communications (RF, network IC) and PC product (OCD control, WiFi, TDDI) and consumer demand stable; automotive and industrial in inventory adjustment, and expect to return to normal in 2H24F; • 22/28nm strong (OLED DDIC, WiFi, ISP); 12nm FinFET cooperation with Intel, expect 2026F for trial production;
GlobalFoundries (GFS US) (Dec FY-end)	**1Q24**	7 May 2024	Revenue: US$1.500-1.540b - Midpoint YoY -17%, QoQ -18% NG gross margin: c.24.0% NG OP margin: c.9.9% NG NP margin: c.8.4% NG FD EPS: US$0.18-0.28	**Revenue: US$1.549b** **- YoY -16%, QoQ -16%** **NG gross margin: 26.1%** **NG OP margin: 12.1%** **NG EBITDA margin: 37.2%** **EPS: US$0.31**	Revenue: in line GP margin: above EBITDA: above EPS: above	Smart mobile devices: US$680m, YoY -2%, QoQ -11% Comm. & Datacenter: US$120m, YoY -66%, QoQ -17% Home and Industrial IoT: US$309m, YoY -19%, QoQ -24% Automotive: US$266m, YoY +48%, QoQ -16% Wafer shipments: 463k 12"-equiv (-9% YoY, -16% QoQ)	Revenue: US$1.590-1.640b - Midpoint YoY -13%, QoQ +4% NG gross margin: c.25.0% NG OP margin: c.11.2% NG NP margin: c.10.0% NG FD EPS: US$0.24-0.34	• Estimate 2Q24F capacity utilization low-to-mid-70% as some core end market undergoing inventory correction • Every 5ppt utilization decline to have 2ppt impact on GPM • Extended L-T agreement with Infineon with a focus on 40nm auto MCU in power management and connectivity; • Capex budget for 2024F: US$700m;
VIS (5347 TT) (Dec FY-end)	**1Q24**	30 Apr 2024	Wafer shipment: down 6-8% QoQ Blended ASP: flat QoQ Gross margin: 21-23%	**Revenue: NT$9.633b** **- YoY +17.7%, QoQ -0.4%** **Gross margin: 24.0% (+1.0ppt QoQ)** **OP margin: 12.8% (+3.1ppt QoQ)** **FD EPS: NT$0.77**	Revenue: above GP margin: above EPS: above	Revenue contribution of 0.18um and below was 59% Revenue contribution: Driver IC (large) 19%, Driver IC (small) 11%, power management 65%, other 5% Wafer shipment: 469k 8"-equiv. wafers (-4% QoQ) Utilization rate around 50%	Wafer shipment: increase 17-19% QoQ Blended ASP: down 2-4% QoQ Gross margin: 25-27%	• Expect annual capacity to increase of 1% YoY to 3.381m in 2024F; • Capex budget for 2024F: NT$3.8b (60% for fab 5, 40% for others)
Win Semi (3105 TT) (Dec FY-end)	**1Q24**	26 Apr 2024	Revenue: decline low-teens % QoQ Gross marign: around the level of mid-20s%	**Revenue: NT$4.442b** **- YoY +55%, QoQ -9%** **Gross margin: 22.4% (-7.0ppt QoQ)** **OP margin: 4.1% (-9.0ppt QoQ)** **Net profit: NT$407m** **- YoY turnaround, QoQ +6%**	Revenue: above GP margin: below EPS: above	Revenue contribution: Cellular 45-50%, Infrastraucture 20-25%, WiFi 10-15%, others 15%; Capacity utilization down to 55% (from 60% last Q) Capex for the quarter was NT$303m	Revenue: increase low-teens % QoQ Gross marign: around the level of mid-20s%	• Industry has moved from the trough; • 2024F expected to be driven by 5G handset penetration increase, WiFi 6E to WiFi 7 transition, AI driven optical comm., Satellite comm., automotive LiDAR, etc.; • 2024F capex budget: around NT$3.0b;
IC IDM								
Intel (INTC US) (Dec FY-end)	**1Q24**	25 Apr 2024	Revenue: US$12.2-13.2b - Midpoint YoY +8%, QoQ -17% NG gross margin: c.44.5% NG FD EPS: c.US$0.13 - YoY: turn profit	**Revenue: US$12.7b** **- YoY +9%, QoQ -17%** **NG gross margin: 45.1% (+6.7ppt YoY)** **NG FD EPS: US$0.18** **- YoY turn profit, QoQ -67%**	Revenue: in line GP margin: above Net profit: above FD EPS: above	**CCG**: +31% YoY to US$2.5b, OPM 35.1% (+4.8ppt QoQ) **DCAI**: -108% YoY to US$3.0b, OPM 15.9% (+5.2ppt QoQ) **NEX**: -8% YoY to US$1.4b, OPM 13.5% (+6.1ppt QoQ) **Mobileye**: -48% YoY to US$239m, OPM -28.5% (QoQ turn loss) **Altera**: -58% YoY to US$342, OPM -11.4% (QoQ turn loss) **Intel Foundry**: -10% YoY to US$4.4b, OPM -56.6% (loss widened QoQ)	Revenue: US$12.5-13.5b - Midpoint YoY flat, QoQ +2% NG gross margin: c.43.5% NG FD EPS: c.US$0.10	• Expect Gaudi to generate US$500m revenue in 2H24F; • 5 nodes in 4 years: Intel 7 done; Intel 4 production ramping; Intel 3 (production ready in 4Q23); • Intel 20A product Arrow Lake to launch this year; Intel 18A to start production preperation in 2H24F; • Target to become global number 2 in 2023F
Samsung Electronics (005930 KS) (Dec FY-end)	**1Q24**	30 Apr 2024	N/A	**Revenue: KRW71.92t** **- YoY +13%, QoQ +6%** **GP margin: 36.2% (+4.2ppt QoQ)** **OP margin: 9.2% (+5.0ppt QoQ)** **EPS: KRW975**	Revenue: in line GP margin: above OP margin: above EPS: above	DX: sales KRW47.29t (YoY +1%, QoQ +20%) - VD/DA: sales KRW13.48t (YoY -4%, QoQ -5%) - VD: sales KRW7.23t (YoY -3%, QoQ -14%) - MX/Network: sales KRW33.53t (YoY +5%, QoQ +34%) - MX: sales KRW32.79t (YoY +7%, QoQ +36%) DS: sales KRW23.14t (YoY 68%, QoQ +7%) - Memory: sales KRW17.49t (YoY +96%, QoQ +11%) SDC: sales KRW5.39t (YoY -19%, QoQ -44%)	N/A	• Overall memory demand strong, prices continued to rise; • Demand to grow, strong for server and storage; PC and mobile also strong thans to expansion on AI devices; • Expect foundry sales to rebound and reach double digit growth; mass production of GAA 3nm 2nd generation process and maturity of 2nm tech within the year • Grow display panel revenue by increasing capacity

***Intel**: CCG → Client Computing Group, DCAI → Datacenter and AI Group, NEX → Network and Edge Group, AXG → Accelerated Computing System and Graphics Group, IFS: Intel Foundry Services*
***Samsung**: DX → Device experience, DS → Device solutions (semiconductor), SDC → Samsung display Co, VD/DA → virtual display/display appliances, MX → Mobile experience*
Source: Company data, Bloomberg, CCBIS

Global technology company results recap (continued)

Company	Results period	Results date	1Q24F Guidance	1Q24 Results	1Q24 vs consensus	Details	2Q24F Guidance	Management analysis and outlook
Memory IDM								
SK Hynix (000660 KS) (Dec FY-end)	**1Q24**	25 Apr 2024	N/A	**Revenue: KRW12.430t** **- YoY +144%, QoQ +10%** **Gross margin: 39%(+19ppt QoQ)** **Operating margin: 23%(+20ppt QoQ)** **EBITDA margin: 49%(+17ppt QoQ)** **Net profit: KRW2.788t** **- QoQ turn profit**	Revenue: above Op profit: above EBITDA: above Net profit: above	**DRAM**: 61% revenue mix; bit shipments decreased mid-teens % QoQ; ASP increased over 20% QoQ; **NAND Flash**: 35% revenue mix; bit shipments was flat QoQ; ASP increased over 30% QoQ	N/A	• Memory market is entering into full recovery cycle with ongoing strength of AI demand; • 2Q24F: DRAM bit growth to be mid-teens % increase QoQ; NAND flash bit growth to be flat QoQ; • PC: recovery expected from 2H driven by enterprise; • Mobile: soft demand except for some flagship models which have new AI functions; • Server: ongoing strength of AI servers as generative AI tech advances; shifting from training to inference;
Micron (MU US) (Aug FY-end)	**2Q FY24**	20 Mar 2024	Revenue: US$5.30b ± 200m - Midpoint YoY +44%, QoQ +12% NG GPM: 13.0% ± 1.5% NG FD EPS: loss of US$0.28 ± 0.07	**Revenue: US$5.824b** **- YoY +57.7%, QoQ +23.2%** **NG gross margin: 20%** **NG OP margin: 4%** **NG FD EPS: US$0.42** **- QoQ turn profit**	Revenue: above GP margin: above OP margin: above EPS: above	**DRAM**: 71% of total sales; YoY +53%, QoQ +21%; bit shipments increased in low-single-digit % QoQ, ASP increased high-teens % QoQ **NAND Flash**: 27% of total sales: YoY +77%, QoQ +27%; bit shipments decreased low-single-digit % QoQ, ASP increased over 30% QoQ **CNBU**: YoY +59%, QoQ +26%; **MBU**: YoY +69%, QoQ +24%; **SBU**: YoY +79%, QoQ +39%; **EBU**: YoY +28%, QoQ +7%	Revenue: US$6.60b ± 200m - Midpoint YoY +76%, QoQ +13% NG GPM: 26.5% ± 1.5% NG FD EPS: US$0.45 ± 0.07	• 2023 look back: industry bit demand growth in low double-digit %, NAND bit demand growth in low-20% range; • 2024F industry bit demand growth to be near the L-T CAGR for DRAM, and around mid-teens % for NAND; • Over the medium term, expect bit demand growth CAGRs of mid-teens in DRAM, and low-20% for NAND • 2024F industry supply growth to be below demand for both DRAM and NAND
Kioxia (Not listed) (Mar FY-end)	**4Q FY23**	15 May 2024	N/A	**Revenue: JPY322.1b** **- YoY +31.4%, QoQ +22.9%** **OP margin: 13.6%** **- QoQ turn profit** **Net profit: JPY10.3b** **- QoQ turn profit**	N/A	Bit shipment: increased by high-single-digit % QoQ ASP (JPY-based): increased by high-teens % QoQ ASP (US$-based): increased around 20% QoQ Operating profit and net profit turnaround to profit backed by ASP increases and resulting decrease of loss on valuation on inventory	N/A	• Supply-demand balance continues to improve and prices have beeng rising, due to growing demand and flash memory manufacturers controling production; • Demand for PCs and smartphones is recovering by normalization of customer inventories and replacement demand is expected; memory content rising; • Demand for data center and enterprise to recover in 2H
Western Digital (WDC US) (Jun FY-end)	**3Q FY24**	25 Apr 2024	Revenue: US$3.20-3.40b NG gross margin: 22-24% NG FD EPS: loss of US$0.10 to profit of US$0.20	**Revenue: US$3.457b** **- YoY +23%, QoQ +14%** **NG gross margin: 29.3%** **NG FD EPS: US$0.63** **- QoQ turn profit**	Revenue: above GP margin: above EPS: above	Flash: bit shipments decreased 15% QoQ; blended ASP increased 18% QoQ Hard Drive: exabyte shipments increased 41% QoQ, ASP per drive was US$145 (up QoQ) Sales by end market: Cloud +29% YoY, +45% QoQ; Client +20% YoY, +5% QoQ; Consumer +17% YoY, -13% QoQ	Revenue: US$3.60-3.80b NG gross margin: 32%-34% NG FD EPS: US$0.90-1.20	• Demand growth to exceed supply growth in next couple of quarters; • Initiated mass production of QLC-based client SSD; • Initiated sampling of high-performance PCI Gen5 BiCS6 based eSSD
Nanya Technoogy (2408 TT) (Dec FY-end)	**1Q24**	10 Apr 2024	N/A	**Revenue: NT$9.503b** **- YoY +47.9%, QoQ +9.2%** **Gross margin: -2.9%** **OP margin: -30.7%** **Net loss: loss of NT$1.209b** **- QoQ loss narrowed**	Revenue: below GP margin: below OP margin: below Net profit: above	Bit shipments: increased low-single-digit % QoQ (increased low-50%s YoY) ASP: increased high-single-digit % QoQ (decreased high-single digits % YoY)	N/A	• DRAM price expected to grow in 2024F as demands for AI servers, HBM and DDR5 increase; • DRAM supply: suppliers increase capex mainly for HBM; • Server demand: expected to increase significantly as AI ahd high-end servers drive DDR5 and high-densigty; • Mobile demand: phone sales recovered in China; • PC demand: AI PC launch may contribute to DRAM
Macronix (2337 TT) (Dec FY-end)	**1Q24**	30 Apr 2024	N/A	**Revenue: NT$5.760b** **- YoY -18.9%, QoQ -0.8%** **Gross margin: 19.8%(-5.3ppt YoY)** **OP margin: -22.6%** **Net loss: loss of NT$1.079b** **- YoY loss widened**	Revenue: in line GP margin: below EPS: below	**NAND flash** sales: -6% YoY, +33% QoQ, 12% mix; **NOR flash** sales: -7% YoY, +8% QoQ, 61% mix; **ROM** sales: -51% YoY, -27% QoQ, 18% mix; **FBG** (foundry business group) sales: +10% YoY, +16% QoQ, 9% mix;	N/A	• ROM density shipment declined 20% QoQ, implied ASP down 8% QoQ; customer demand patterns for games might be similar to past years; • NOR flash density shipment grew 6% QoQ, implied ASP down 3% QoQ; inventory restocking from the application such as server and storage; order-in gradually recovers;

Micron: CNBU → Computer and network, MBU → Mobile, CBU → Storage, EBU → Embedded;
Source: Company data, Bloomberg, CCBIS

Global technology company results recap (continued)

Company	Results period	Results date	1Q24F Guidance	1Q24 Results	1Q24 vs consensus	Details	2Q24F Guidance	Management analysis and outlook
IC design house								
Qualcomm (QCOM US) (Sep FY-end)	**2Q FY24**	1 May 2024	Revenue: US$8.9-9.7b - Mid: YoY +17%, QoQ +10% QCT revenue: US$7.6-8.2b NG FD EPS: US$2.20-2.40	**NG revenue: US$9.386b** **- YoY +1.3%, QoQ +5.4%** **NG net income: US$3.101b** **NG FD EPS: US$2.44** **- YoY +13.4%, QoQ -11.2%**	Revenue: in line GP margin: above Net profit: above FD EPS: above	**QCT revenue**: +1% YoY to US$8.026b **- Handset**: +1% YoY to US$6.180b **- Automotive**: +35% YoY to US$603m **- IoT**: -11% YoY to US$1.243b **QTL revenue**: +2% YoY to US$1.318b	Revenue: US$8.8-9.6b - Mid: YoY +9%, QoQ -2% QCT revenue: US$7.5-8.1b NG FD EPS: US$2.15-2.35	• Handset driven by Android handset recovery from Chinese OEMs; 3QFY24 to decline due to lack of flagship models; • Expect global smartphone shipment to be flat to slightly up YoY in 2024F; 5G handset expected to grow high-single-digit to low-double digit YoY in 2024F
AMD (AMD US) (Dec FY-end)	**1Q24**	30 Apr 2024	Revenue: US$5.4b ± 300m - Midpoint: YoY +1%, QoQ -12% NG gross margin: c.52%	**Revenue: US$5.473b** **- YoY +2.2%, QoQ -11.3%** **NG gross margin: 52.3%** **NG FD EPS: US$0.62** **- YoY +2.6%, QoQ -19.4%**	Revenue: in line GP margin: in line Net profit: above FD EPS: in line	**Data center**: US$2.337b, YoY +80%, QoQ +2%, OPM 23% **Client**: US$1.368b, YoY +85%, QoQ -6%, OPM 6% **Gaming**: US$922m, YoY -48%, QoQ -33%, OPM 16% **Embedded**: US$846m, YoY -46%, QoQ -20%, OPM 40%	Revenue: US$5.7b ± 300m - Midpoint: YoY +6%, QoQ +4% NG gross margin: c.53%	• AMD Instinct GPU sales strong; • Expect 2Q24F Datacenter QoQ double-digit growth; Client growth YoY and QoQ, Embedded QoQ flat; • Seen early sign of enterprise demand recovery;
NVIDIA (NVDA US) (Jan FY-end)	**1Q FY25**	22 May 2024	Revenue: US$24.00b ± 2% - Midpt: YoY +234%, QoQ +9% NG GPM: 77% ± 0.5ppt	**Revenue: US$26.044b** **- YoY +262%, QoQ +18%** **NG gross margin: 78.9%** **NG FD EPS: US$6.12** **- YoY +461%, QoQ +19%**	Revenue: above GP margin: above FD EPS: above	**Datacenter**: US$22.563b (87% mix, YoY +426%, QoQ +23%) **Gaming**: US$2.647b (10% mix, YoY +18%, QoQ -8%) **Pro Visual**: US$427m (2% mix, YoY +45%, QoQ +62%) **Auto**: US$329m (1% mix, YoY +11%, QoQ +17%)	Revenue: US$28.00b ± 2% - Midpt: YoY +107%, QoQ +8% NG GPM: 75.5% ± 0.5ppt	• HPC to drive globa datacenter installed base double in the next 5 years; • Beyond cloud service providers, GenAI has expanded to consumer internet companies and enterprises; • A 10-fo-1 stock split announced, ex-div date 10 Jun 2024
MediaTek (2454 TT) (Dec FY-end)	**1Q24**	26 Apr 2024	Revenue: NT$121.8-129.6b - Mid: YoY +31%, QoQ -3% Gross margin: 47% ±1.5ppt Opex ratio: 28% ±2ppt	**Revenue: NT$133.458b** **- YoY +39.5%, QoQ +3.0%** **Gross margin: 52.4%** **FD EPS: NT$19.85 (+86.6% YoY)**	Revenue: above GP margin: above FD EPS: above	**Mobile phone**: +84% YoY, -2% QoQ (61% mix) **Smart edge platforms**: +2% YoY, +16% QoQ (34% mix) **Power IC**: +1% YoY, -13% QoQ (5% mix)	Revenue: NT$121.4-133.5b - Mid: YoY +30%, QoQ -5% Gross margin: 47% ±1.5ppt Opex ratio: 30% ±2ppt	• Benefited from better-than-expected smartphone, broadband, TV customers re-stocking momentum; • Expecting global smartphone shipment to have low-single-digit growth in 2024F to 1.2b (5G portion low-60%)
RF Front-End								
Skyworks Solutions (SWKS US) (Sep FY-end)	**2Q FY24**	30 Apr 2024	Revenue: US$1.02-1.07b - Midpoint: YoY -4%, QoQ -13% NG FD EPS: c.US$1.52	**Revenue: US$1.046b** **- YoY -9%, QoQ -13%** **NG gross margin: 45.0%** **NG FD EPS: US$1.55**	Revenue: in line GP margin: below FD EPS: in line	**Mobile** market: around 66% mix, QoQ -19%; weaker than common seasonality, mainly due to weaker demand; **Broad** markets: around 34% mix, QoQ +1%; IoT market recovering; WiFi 6E and 7 upgrade cycle coming; Wireless infrastructure still soft; automotive and industrial also under going adjustments;	Revenue: US$900m ± 2% - Midpoint: YoY -16%, QoQ -14% NG FD EPS: c.US$1.21	• Expect 2Q24F mobile business QoQ decline 20-25% due to ongoing inventory digestion; ASP under pressure; • Expanded WiFi design win pipeline with Cisco's enterprise access point, Linksys tri-band mesh router, and TP-Link's tri-band gaming router;
Qorvo (QRVO US) (Mar FY-end)	**4Q FY24**	1 May 2024	Revenue: US$925m ± 25m - Midpoint: YoY +46%, QoQ -14% NG gross margin: c.42% NG FD EPS: c..US$1.20	**Revenue: US$941m** **- YoY +48.7%, QoQ -12.4%** **NG gross margin: 42.5%** **NG FD EPS: US$1.39**	Revenue: in line GP margin: above FD EPS: above	**ACG**: US$653.6m, +56.5% YoY, 69% mix, OPM of 20.5% **HPA**: US$164.6m, +23.7% YoY, 17% mix, OPM of 19.1% **CSG**: US$122.8m, +49.9% YoY, 13% mix, OPM of -12.4%	Revenue: US$850m ± 25m - Midpoint: YoY +31%, QoQ -10% NG gross margin: 40-41% NG FD EPS: c..US$0.60-0.80	• Expect ACG to down high-single-digit QoQ, mainly due to seasonality of the major customer; • Expect HPA to decline low-double-digit QoQ; • Cooperate with LuxShare; sold two packaging & testing fabs (Beijing and Dezhou, Shandong) to LuxShare
Murata (6981 JP) (Mar FY-end)	**4Q FY23**	26 Apr 2024	Revenue: JPY370.3b - YoY +7%, QoQ -16% OP margin: 14.8% Net income: JPY50.4b	**Revenue: JPY390.4b** **- YoY +12.3%, QoQ -11.2%** **OP margin: 0.1% (OP JPY0.3b)** **Net income: JPY6.3b** **- YoY -79.7%, QoQ -87.2%**	Revenue: in line Net profit: below EPS: below	Capacitor: JPY189.0b, YoY +18.5%, QoQ -0.5%; Inductor & EMI filter: JPY44.8b, YoY +21.7%, QoQ -7.1%; High-frequency device and communications module: JPY93.6b, YoY +12.4%, QoQ -28.5%; Battery & power: JPY36.7b, YoY -17.3%, QoQ +0.0%; Functional device: JPY23.5b, YoY +12.4%, QoQ +3.1%;	1Q FY24: no quarterly guidance 1H FY24: - Revenue: JPY852.0b, +5% YoY - OP margin: 18.1% - Net income: JPY120.0b	• FY2024F full-year projections; sales of JPY1,700b (+3.6% YoY), OPM of 17.6%, net profit of JPY235b (+30.0% YoY); • Demand projections: smartphones unit to +3% to 1.18m in FY24 (from 1.14m in FY23), therein 5G smartphones to +17% to 770m (from 660m); PC unit to +2% to 370m (from 360m); vehicle unit to be flat at 90m;

***Qorvo**: ACG → Advanced Cellular Group, HPA → High performance analog, CSG → Connectivity and sensors*
Source: Company data, Bloomberg, CCBIS

Global technology company results recap (continued)

Company	Results period	Results date	1Q24F Guidance	1Q24 Results	1Q24 vs consensus	Details	2Q24F Guidance	Management analysis and outlook
Power, analog, MCU								
Texas Instruments (TXN US) (Dec FY-end)	**1Q24**	23 Apr 2024	Revenue: US$3.45-3.75b - Midpoint: YoY -18%, QoQ -12% FD EPS: US$0.96-1.16	**Revenue: US$3.661b** **- YoY -16.4%, QoQ -10.2%** **Gross margin: 57.2%** **FD EPS: US$1.20** **- YoY -35.3%, QoQ -19.5%**	Revenue: in line GP margin: above FD EPS: above	**Analog**: -14% YoY (77% mix), OPM 35.5% **Embedded Processing**: -22% YoY (18% mix), OPM 16.1% **QoQ by end market**: industrial down 8-9%; automotive down 4-6%; personal electronics down 14-16%; comm equipment down ~25%; enterprise system up 14-16%	Revenue: US$3.65-3.95b - Midpoint: YoY -16%, QoQ +4% FD EPS: US$1.05-1.25	• Industrial market inventory adjustment near end; • Competition from in China market become more intense; • Recovery in personal electronics start earlier, industrial recovery starts from short-cycle products;
Analog Devices (ADI US) (Oct FY-end)	**2Q FY24**	22 May 2024	Revenue: US$2.10b ± 100m - Midpoint: YoY -36%, QoQ -14% Adj OP margin: 37.0% ± 0.1ppt Adj EPS: US$1.26 ± 0.1	**Revenue: US$2.159b** **- YoY -34%, QoQ -14%** **Adj gross margin: 66.7%** **Adj OP margin: 39.0%** **Adj EPS: US$1.40** **- YoY -51%, QoQ -19%**	Revenue: in line GP margin: in line EPS: below	**Industrial**: US$1.015b, YoY -44%, QoQ -15% **Automotive**: US$658m, YoY -10%, QoQ -11% **Communications**: US$241m, YoY -45%, QoQ -21% **Consumer**: US$245m, YoY -9%, QoQ -11%	Revenue: US$2.27b ± 100m - Midpoint: YoY -26%, QoQ +5% Adj OP margin: 40.0% ± 0.1ppt Adj EPS: US$1.50 ± 0.1	• In longer term, data processin gis shifiting from cloud to the edge, thanks to emerging applications that include Industry 4.0, energy system, EV, advanced connectivity, etc • Expect 2024F capex to be ~US$700m (maintained)
Infineon (IFX GR) (Sep FY-end)	**2Q FY24**	7 May 2024	Revenue: around EUR3.6b - YoY: -12.6% - QoQ: -2.8% Segment result margin: c.18%	**Revenue: EUR3.632b** **- YoY -12%, QoQ -2%** **Segment result margin: 19.5%** **Adj Gross margin: 41.1%** **Net profit: EUR394m** **- YoY -52%, QoQ -33%**	Revenue: in line GP margin: above EPS: above	**ATV**: sales EUR2.078b (YoY 0%, QoQ 0%), segment result margin 24.6% (YoY -6.5ppt, QoQ -2.5ppt) **GIP**: sales EUR469m (YoY -16%, QoQ -4%), segment result margin 19.0% (YoY -13.4ppt, QoQ -7.7ppt) **PSS**: sales EUR713m (YoY -33%, QoQ +2%), segment result margin 9.0% (YoY -3.9ppt, QoQ -12.3ppt) **CSS**: sales EUR371m (YoY -33%, QoQ +2%), segment result margin 11.3% (YoY -16.9ppt, QoQ +1.1ppt)	Revenue: around EUR3.8b - YoY: -7.1% - QoQ: +4.6% Segment result margin: high-teens percentage range	• FY24F outlook: revenue in EUR15.1b (± 400m); ATV growth expected to be in low-to-mid single-digit % range; GIP decline low-teens % YoY; PSS decline high-teens %, and CSS decline low twenties %; • EV demand remains strong in China; • SiC revenue expected to grow 20% (previewly +50% to EUR750m) in FY24F, of which 50% will be industrial, 45% automotive, and 5% PSS;
ON Semi (ON US) (Dec FY-end)	**1Q24**	29 Apr 2024	Revenue: US$1.8-1.9b - Midpoint: YoY -6%, QoQ -8% NG gross margin: 44.5%-46.5% NG FD EPS: US$0.98-1.10	**Revenue: US$1.863b** **- YoY -4.9%, QoQ -7.7%** **NG gross margin: 45.9%** **NG FD EPS: US$1.08** **- YoY -9.2%, QoQ -13.6%**	Revenue: in line GP margin: in line FD EPS: above	**PSG** sales: YoY +2%, QoQ -9% **ASG** sales: YoY -6%, QoQ -6% **ISG** sales: YoY -18%, QoQ -5% Vehicle electrification revenue grew ~60% YoY	Revenue: US$1.68-1.78b - Midpoint: YoY -17%, QoQ -7% NG gross margin: 44.2%-46.2% NG FD EPS: US$0.86-0.98	• SiC revenue grow offset decline in Si-based power devices; • Expect SiC capacity to continue increase, but less than previously expected; • Expect SiC revenue to be as twice as market growth;
NXP Semiconductors (NXPI US) (Dec FY-end)	**1Q24**	29 Apr 2024	Revenue: US$3.125b ± 100m - YoY: flat at midpoint - QoQ: -9% at midpoint NG GPM: 57.5-58.5% NG OP margin: 32.9-34.8%	**Revenue: US$3.126b** **- YoY flat, QoQ -8%** **NG gross margin: 58.2%** **NG OP margin: 34.5%** **NG FD EPS: US$3.24**	Revenue: in line GP margin: in line FD EPS: in line	**Automotive** sales YoY -1%, QoQ -5% (58% mix) **Industrial and IoT** sales YoY +14%, QoQ -13% (18% mix) **Mobile** sales YoY +34%, QoQ -14% (11% mix) **Comm. Infra. and other**: YoY -25%, QoQ -12% (13% mix)	Revenue: US$3.125b ± 100m - YoY: -5% at midpoint - QoQ: flat at midpoint NG GPM: 58.0-59.0% NG OP margin: 33.1-35.0%	• 2021-2024F CAGR: total sales 8-12%, automotive 9-14%, Industrial & IoT 9-14%, Mobile 8-10%, Comm Infra & other 2-6%; capital intensity 6-8%
STMicroelectronics (STMPA FP) (Dec FY-end)	**1Q24**	25 Apr 2024	Revenue: US$3.6b - YoY: -15.2%, ±3.5ppt - QoQ: -15.9%, ±3.5ppt Gross margin: 42.3%, ±2.0ppt	**Revenue: US$3.465b** **- YoY -18.4%, QoQ -19.1%** **Gross margin: 41.7%** **FD EPS: US$0.54** **- YoY -50.9%, QoQ -52.6%**	Revenue: below GP margin: below FD EPS: below	**AM&S** sales -13% YoY, -14% QoQ (35% mix), OPM 15.2% **P&D** sales -10% YoY, -15% QoQ (24% mix), OPM 16.8% **MCU** sales -34% YoY, -25% QoQ (27% mix), OPM 19.5%; **D&RF** sales -2% YoY, -24% QoQ (14% mix), OPM 31.6%	Revenue: US$3.2b - YoY: -26.0%, ±3.5ppt - QoQ: -7.6%, ±3.5ppt Gross margin: 40.0%, ±2.0ppt	• Automotive slowing down; industrial to bottom at 2Q24F • 2024F: AM&S to decline c.10%, with analog increase a lot, MEMS decline; P&D to slightly down mid-single-digit %, with discrete devices down significantly; automotive MCU decline to narrow; D&RF to down 10%, mainly ADAS
Renesas (6723 JP) (Dec FY-end)	**1Q24**	25 Apr 2024	Revenue: JPY345b ± 7.5b - YoY: -4.1% (±2.1ppt) - QoQ: -4.7% (±2.1ppt) NG gross margin: 55.0% NG OP margin: 30.0%	**Revenue: JPY351.8b** **- YoY -2.2%, QoQ -2.8%** **NG gross margin: 56.7%** **NG OP margin: 32.3%** **NG Net profit: JPY105.9b**	Revenue: in line GP margin: above Net profit: below	**Automotive**: sales JPY178.2b (YoY +11.9%, QoQ +3.6%), GP margin 52.4%, OP margin 32.2% **Industrial, Infrastructure & IoT**: sales JPY171.6b (YoY -13.3%, QoQ -8.6%), GP margin 61.6%, OP margin 32.5% Utilization rate: just under 60% (8-inch > 12-inch > 6-inch)	Revenue: JPY355b ± 7.5b - YoY: -3.7% (±2.0ppt) - QoQ: +0.9% (±2.1ppt) NG gross margin: 55.5% NG OP margin: 30.5%	• Expect slight increase in automotive and a slight decrease in industrial, infrastructure, and IoT; • AI-related demand is coming in very strongly, but not yet a large portion for Renesas; • Expect utilization rate to have slight increae in 2Q24;
Wolfspeed (WOLF US) (Jun FY-end)	**3Q FY24**	1 May 2024	Revenue: US$185-215m - Midpoint YoY -13%, QoQ -4% NG net loss: US$71-87m NG EPS: loss of US$0.57-0.69	**Revenue: US$200.7m** **- YoY: +4.2%, QoQ -3.7%** **NG gross margin: 11.2%** **NG Net loss: US$148.9m** **NG FD EPS: loss US$1.18**	Revenue: in line GP margin: below FD EPS: below	Mohawk Valley fab ramp up, more than doubling revenue sequentially, reaching more than 16% wafer start utilization in Apr Power products sales: US$102.1 (+1% YoY, 50.9% mix) Materials products sales: US$98.6 (+8% YoY, 49.1% mix)	Revenue: US$185-215m - Midpoint YoY -15%, QoQ flat NG net loss: US$91-109m NG EPS: loss of US$0.72-0.86	• Target to achieve 20% wafer start utilization in Jun • JP factory in construction; total capacity will 10x once completed; expect start production in 2H24F

***Infineon**: ATV → Automotive; IPC → Industrial power control; PSS → Power & sensor systems; CCS → Connected secure systems*
***ON Semi**: PSG → Power Solutions Group; ASG → Advanced Solutions group; ISG → Intelligent Sensing Group Intelligent Sensing Group*
***STMicroelectronics**:ADG → Automotive and Discrete Group; AMS → Analog, MEMS and Sensors group; MDG → Microcontrollers and Digital ICs Group*
Source: Company data, Bloomberg, CCBIS

Global technology company results recap (continued)

Company	Results period	Results date	1Q24F Guidance	1Q24 Results	1Q24 vs consensus	Details	2Q24F Guidance	Management analysis and outlook
Equipment vendor								
ASML (ASML NA) (Dec FY-end)	**1Q24**	17 Apr 2024	Revenue: EUR5.0-5.5b - Midpoint: YoY -22%, QoQ -27% Gross margin: 48%-49% R&D cost: c.EUR1.07b SG&A cost: c.EUR300m	**Revenue: EUR5.290b** **- YoY: -21.6%, QoQ -26.9%** **Gross margin: 51.0%** **Net income: EUR1.224b** **- YoY -37.4%, QoQ -40.2%**	Revenue: above GP margin: above Net profit: above	Lithography systems sold: 70 units (EUV 11, ArFi 20, ArFdry 4, KrF 25, i-line 10) Net bookings: EUR3.6b (vs EUR9.2b in 4Q23), including EUV bookings of EUR656m Net system sales: EUV 46%, ArFi 39%, ArFdry 3%, KrF 8%, i-line 1% Net system sales: logic 63%, memory 37%	Revenue: EUR5.7-6.2b - Midpoint: YoY -14%, QoQ +13% Gross margin: 50%-51% R&D cost: c.EUR1.07b SG&A cost: c.EUR295m	• Full-year 2024F: expect sales flat to 2023; slightly lower gross margin; • Long-term target: reach annual revenue of EUR30-40b in 2025 with gross margin of 54-56%; reach annual revenue of EUR44-60b with gross margin of 56-60%; • ASML has shipped the first high-NA EUV EXE:5000 to Intel, and epxect to recognize revenue for 2 in 2024F; • Expect 2024F to be transition year
Lam Research (LRCX US) (Jun FY-end)	**3Q FY24**	24 Apr 2024	Revenue: US$3.7b ± 300m - Midpoint: YoY -4%, QoQ 2% NG gross margin: 48.0% ± 1ppt NG OPM: 29.5% ± 1ppt NG FD PES: US$7.25 ± 0.75	**Revenue: US$3.793b** **- YoY -2.0%, QoQ +0.9%** **NG gross margin: 48.7%** **NG OP margin: 30.3%** **NG FD EPS: US$7.79** **- YoY +11.4%, QoQ +3.6%**	Revenue: in line GP margin: in line FD EPS: above	System sales: US$2.396b, YoY -6.2%, QoQ +4.2% Customer Support: US$1.398b, YoY -13.4%, QoQ +4.2% System revenue mix: NVM 21%, DRAM 23%, Foundry 44%, Logic and others 12% (memory total 44%) System revenue mix: China 42%, Taiwan 9%, Korea 24%, US 6%, Japan 9%, Europe 5%, SEA 5%	Revenue: US$3.8b ± 300m - Midpoint: YoY +18%, QoQ +0% NG gross margin: 47.5% ± 1ppt NG OPM: 29.5% ± 1ppt NG FD PES: US$7.50 ± 0.75	• CY2024F WFE projected in mid US$90b; • NAND: growth driven by technology upgrades; increasing utilization an early sign of strong set-up in CY2025F; • DRAM: strong demand with investment tied to HBM and sustained investment in China; • Foundry/logic: growth led by leading-edge investments offset in part by mature node declines outside China;
Applied Materials (AMAT US) (Oct FY-end)	**2Q FY24**	16 May 2024	Revenue: US$6.50b ± 400m - Midpoint YoY -2%, QoQ -3% - Semi revenue: c.US$4.80b - Services revenue: c.US$1.50b - Display&adjacent: c.US$150m NG gross margin: c.47.3% NG OPEX: c.US$1.235b NG EPS: US$1.97 ± 0.18	**Revenue: US$6.646b** **- YoY +0.2%, QoQ -0.9%** **- Semi: US$4.901b (-1.5% YoY)** **- Services: US$1.530b (+7.1% YoY)** **- Display: US$179m (+6.5% YoY)** **NG gross margin: 47.5%** **NG FD EPS: US$2.09** **- YoY +4.4%, QoQ -2.0%**	Revenue: in line GP margin: in line FD EPS: above	**Semiconductor systems**: sales US$4.901b, YoY -1.5% **Applied global services**: sales US$1.530b, YoY +7.1% **Display & adjacent markets**: US$179m, YoY +6.5% Number 1 in DRAM process equipment; number 1 in HBM materials engineering; number 1 in advanced packaging;	Revenue: US$6.65b ± 400m - Midpoint YoY +4%, QoQ +0% - Semi revenue: c.US$4.80b - Services revenue: c.US$1.57b - Display&adjacent: c.US$245m NG gross margin: c.47.0% NG OPEX: c.US$1.26b NG EPS: US$2.01 ± 0.18	• Expect over US$2.5b revenue from GAA nodes in CY24, with potential to more than double in CY25; • ICAPS (IoT, Comm, Auto, Power, Sensors) segment to remain key driver of foundry-logic business;; • Server ~3/4 of materials engineering steps in HBM packaging; now expect HBM packaging revenue to grow ~6x in FY24F to over US$600m;
KLA Corporation (KLAC US) (Jun FY-end)	**3Q FY24**	25 Apr 2024	Revenue: US$2.30b ± 125m - Mid: YoY -5.5%, QoQ -7.5% NG gross margin: 61.5% ± 1% NG FD EPS: US$5.26 ± 0.60	**Revenue: US$2.360b** **- YoY -3.0%, QoQ -5.1%** **NG gross margin: 59.8%** **NG OP margin: 36.8%** **NG FD EPS: US$5.26**	Revenue: in line GP margin: in line FD EPS: above	Sales from semi process control: YoY -3.5%, QoQ -4.5%, 89% of total Sales from specialty semi process: YoY +1.7%, QoQ -12.9%, 6% of total Sales from PCB, display & compo inspection: YoY +1.1%, QoQ -6.7%, 6% of total	Revenue: US$2.50b ± 125m - Mid: YoY +6.2%, QoQ +5.9% NG gross margin: 61.5% ± 1% NG FD EPS: US$6.07 ± 0.60	• Expect semiconductor process control revenue by end market: foundry/logic 82%, memory 18% (within which DRAM 78%, NAND 22%); • KLA market share in process control market was >56% in 2023, resulting in a >4x market share lead over the nearest competitor;
Tokyo Electron (8035 JP) (Mar FY-end)	**4Q FY24**	10 May 2024	Revenue: - JPY1,010b for 2H FY24F - JPY547b for 4Q FY24F (imply) Net income: - JPY202.5b for 2H FY24F	**Revenue: JP547.2b** **- YoY -2.0%, QoQ +18.0%** **Gross margin: 46.8% (-1.1ppt QoQ)** **OP margin: 26.5% (-2.1ppt QoQ)** **Net profit: JPY124.9 (+23.1% QoQ)**	Revenue: in line GP margin: above FD EPS: above	SPE: new equipment sales: JPY417.0b, YoY -3%, QoQ +18%, among which 30% from DRAM, 7% from NVM, 63% from Logic foundry and others	1Q FY25: no quarterly guidance; 1H FY25: - Rev JPY1,000b (+22% YoY) - GPM 45.4% - Net profit JPY185.0b	• FY25F guidance: sales of JPY2,200b (+20% YoY), GPM of 46.5% (+1.1ppt YoY), and NP of JPY445b (+22% YoY); • WFE market expected to be US$100b in CY2024F; WFE expected to have double-digit growth in CY2025F
Advantest (6857 JP) (Mar FY-end)	**4Q FY23**	26 Apr 2024	4Q FY23 guidance implied by FY23 guidance: - Rev JPY129.3b - OP margin 17.7% - Net profit JPY17.4b	**Revenue: JP135.8b** **- YoY -7.9%, QoQ +1.9%** **Gross margin: 51.3% (+0.7ppt QoQ)** **OP margin: 14.4% (-5.7ppt QoQ)** **Net profit: JPY15.2b** **- YoY -50.5%, QoQ -28.6% QoQ**	Revenue: above GP margin: above Net profit: below	**Semi & component test system**: sales JPY91.5b, YoY -17%, QoQ +4%, revenue mix 67%; **Mechatronics systme**: sales JPY16.8b, YoY -5%, QoQ +13%, revenue mix 12%; **Service, support & other**: sales JPY27.5b, YoY +45%, QoQ -8%, revenue mix 20%;	1Q FY24: no quarterly guidance; FY24: - Rev JPY525.0b (+7.9% YoY) - OP margin 17.1% - Net profit JPY67.0b (+7.6% YoY)	• Advantest market share in 2023: 59% for SoC testers (~US$3.3b market size), and 56% for memory testers (~US$1.1b market size); 58% overall; • 2024F tester market outlook: expect SoC tester market be US$2.9-3.2b, and memory tester market to be US$1.4-1.7b

Source: Company data, Bloomberg, CCBIS

VALUATIONS

Greater China Technology sector forward P/E

Source: Bloomberg, CCBIS; as of 22 May 2024

Greater China Technology sector forward P/B

Source: Bloomberg, CCBIS; as of 22 May 2024

Greater China Semiconductor sector forward P/E

Source: Bloomberg, CCBIS; as of 22 May 2024

Greater China Semiconductor sector forward P/B

Source: Bloomberg, CCBIS; as of 22 May 2024

China Telecom sector forward P/E

Source: Bloomberg, CCBIS; as of 22 May 2024

China Telecom sector forward EV/EBITDA

Source: Bloomberg, CCBIS; as of 22 May 2024

China smartphone value chain companies

Company	Stock code	CCBIS rating‡	Share price* (LC)	Market cap (US$ m)	EPS growth (%) 2024F	EPS growth (%) 2025F	P/E (x) 2024F	P/E (x) 2025F	P/B (x) 2024F	P/B (x) 2025F	Dividend yield (%) 2024F
Handset brands											
Xiaomi	1810 HK	Outperform	19.44	62,161	(47.9)	11.5	44.0	39.5	2.5	2.4	0.0
ZTE Corp – H	763 HK	Outperform	17.22	16,960	10.9	8.6	7.1	6.6	1.0	0.9	2.7
ZTE Corp – A	000063 CH	Outperform	27.48	16,960	10.9	8.6	12.7	11.7	1.8	1.6	1.6
Lenovo	992 HK	Outperform	11.42	18,151	(43.0)	26.0	20.2	16.0	2.8	2.4	1.7
Transsion	688036 CH	Not Rated	137.73	15,349	23.9	19.2	17.5	14.6	4.9	4.0	3.0
Average – handset brands							**20.3**	**17.7**	**2.6**	**2.3**	**1.8**
Handset components											
Mediatek	2454 TT	Not Rated	1,185.00	58,734	34.3	13.9	19.3	17.0	4.6	4.3	4.8
LuxShare Precision	002475 CH	Outperform	32.86	32,589	15.3	25.4	18.7	14.9	3.5	2.9	0.5
Largan Precision	3008 TT	Not Rated	2,230.00	9,224	20.9	3.4	13.7	13.2	1.7	1.5	3.5
GoerTek	002241 CH	Neutral	17.09	8,069	128.2	16.9	23.4	20.1	1.8	1.7	1.3
Sunny Optical	2382 HK	Outperform	44.65	6,264	100.3	38.5	18.5	13.3	1.7	1.5	0.9
Lens Technology	300433 CH	Outperform	15.27	10,514	13.1	25.4	22.3	17.8	1.6	1.5	1.8
Lite-On Technology	2301 TT	Not Rated	103.50	7,530	(7.6)	12.7	16.8	14.9	2.7	2.6	4.4
BYD Electronic	285 HK	Outperform	34.05	9,831	22.2	25.3	13.8	11.0	2.3	1.9	1.9
Catcher	2474 TT	Not Rated	230.50	4,860	(11.9)	(9.6)	14.6	16.2	0.9	1.0	4.3
O-Film Group	002456 CH	Not Rated	8.33	3,750	N/A	44.6	39.0	27.0	5.9	5.0	0.0
DSBJ	002384 CH	Outperform	16.42	3,879	25.1	23.0	11.4	9.2	1.4	1.2	0.9
FTC	2354 TT	Not Rated	63.60	2,788	N/A	2.1	22.1	21.6	0.6	0.6	2.4
AAC Tech	2018 HK	Outperform	25.10	3,855	70.1	20.9	19.6	16.2	1.1	1.0	0.7
Sunway	300136 CH	Not Rated	19.14	2,559	12.1	29.4	22.8	17.6	2.4	2.1	0.6
Everwin Precision	300115 CH	Not Rated	10.99	1,828	326.2	26.6	18.9	14.9	1.2	1.1	0.4
Cowell	1415 HK	Not Rated	21.75	2,378	74.9	75.0	23.0	13.2	4.6	3.4	0.0
GSEO	3406 TT	Not Rated	518.00	1,810	30.8	(1.1)	15.4	15.5	2.5	2.2	2.6
FIT Hon Teng	6088 HK	Not Rated	2.19	2,046	104.9	31.0	6.7	5.1	0.8	0.7	0.0
Merry Electronics	2439 TT	Not Rated	123.00	840	29.3	14.8	15.5	13.5	1.9	N/A	N/A
FIH Mobile	2038 HK	Not Rated	0.80	808	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q Technology	1478 HK	Neutral	3.94	598	223.9	60.0	14.7	9.2	0.8	0.7	0.0
TPK	3673 TT	Not Rated	38.30	483	N/A	57.0	27.4	17.5	0.4	0.4	1.6
Tongda Group	698 HK	Not Rated	0.09	107	53.3	26.1	3.7	3.0	N/A	N/A	N/A
Average – handset components							**18.2**	**14.6**	**2.1**	**1.9**	**1.6**
Domestic PCB vendors											
Unimicron	3037 TT	Not Rated	182.50	8,626	8.6	70.2	21.1	12.4	2.8	2.4	1.8
Wus Printed Circuits	002463 CH	Not Rated	32.08	8,481	55.1	24.1	27.0	21.7	5.4	4.6	1.4
Shengyi Tech	600183 CH	Not Rated	20.33	6,642	40.8	27.8	26.7	20.9	3.1	2.9	2.3
Shennan Circuits	002916 CH	Outperform	91.53	6,486	15.2	16.6	29.2	25.0	3.3	3.0	1.0
Kinwong	603228 CH	Not Rated	26.10	3,036	9.8	20.3	18.6	15.4	2.3	2.1	N/A
Zhen Ding Tech	4958 TT	Not Rated	116.00	3,405	35.1	28.2	12.9	10.1	1.0	0.9	3.4
Average – PCB							**19.7**	**15.2**	**2.3**	**2.0**	**1.2**

‡ CCBIS ratings: Outperform, Neutral, Underperform, Not Rated
** Price as at close on 22 May 2024 (local currency)*
*** Lenovo fiscal year end in Mar, calendar 2023/2024F corespond to FY24F/FY25F of Lenovo,*
Source: Refinitiv, CCBIS estimates

China semiconductor supply chain valuation comparison

Company	Stock code	CCBIS rating‡	Share price* (LC)	Market cap (US$ m)	EPS growth (%) 2024F	EPS growth (%) 2025F	P/E (x) 2024F	P/E (x) 2025F	P/B (x) 2024F	P/B (x) 2025F	Div. yield (%) 2024F
Foundry players											
TSMC	2330 TT	Not Rated	864.00	694,430	22.6	25.0	22.1	17.7	5.4	4.4	1.6
SMIC – H	981 HK	Outperform	16.08	23,850	(65.6)	137.8	52.8	22.2	0.8	0.8	0.0
SMIC – A	688981 CH	Outperform	42.27	23,850	(65.6)	137.8	154.8	65.1	2.3	2.3	0.0
UMC	2303 TT	Not Rated	55.00	21,355	(19.2)	18.7	14.2	12.0	1.9	1.8	5.0
Vanguard	5347 TT	Not Rated	101.00	5,130	5.8	28.6	25.7	20.0	3.5	3.4	4.1
Hua Hong Semi	1347 HK	Outperform	19.22	5,059	(54.9)	91.7	32.2	15.2	0.7	0.6	0.0
Win Semi	3105 TT	Not Rated	142.50	1,872	N/A	53.2	29.3	19.1	1.7	1.6	1.5
Average – foundry							**47.3**	**24.5**	**2.3**	**2.1**	**1.8**
Fabless											
MediaTek	2454 TT	Not Rated	1,185.00	58,734	34.3	13.9	19.3	17.0	4.6	4.3	4.8
Will Semi	603501 CH	Outperform	98.00	16,462	411.9	41.8	40.8	28.7	4.9	4.3	0.2
Unigroup Guoxin	002049 CH	Not Rated	57.50	6,750	(12.8)	20.0	19.1	15.9	3.5	2.9	0.5
GigaDevice	603986 CH	Neutral	82.53	7,605	653.8	47.8	45.5	30.8	3.4	3.1	0.7
StarPower	603290 CH	Outperform	132.32	3,126	17.5	28.6	21.1	16.4	3.1	2.7	1.0
Maxscend Micro	300782 CH	Outperform	89.19	6,578	27.1	40.9	33.4	23.7	4.3	3.7	0.3
Montage Techno	688008 CH	Not Rated	51.27	8,086	155.1	57.8	44.6	28.3	5.2	4.6	0.9
SG Micro	300661 CH	Neutral	73.80	4,795	113.4	21.9	58.3	47.9	7.9	7.1	0.7
Novatek	3034 TT	Not Rated	614.00	11,579	(4.1)	14.0	16.9	14.8	5.2	4.5	5.1
Realtek	2379 TT	Not Rated	537.00	8,535	52.4	22.3	19.7	16.1	5.5	5.0	4.0
Amlogic	688099 CH	Not Rated	58.39	3,375	18.4	38.1	30.8	22.3	4.0	3.5	1.0
Average – fabless							**31.8**	**23.8**	**4.7**	**4.2**	**1.7**
IDM											
Sanan Opto	600703 CH	Not Rated	12.83	8,844	312.7	31.4	40.7	31.0	1.6	1.6	0.8
Wingtech	600745 CH	Outperform	31.17	5,352	8.5	17.6	8.6	7.3	0.9	0.9	0.9
CR Micro	688396 CH	Not Rated	38.35	7,013	(15.0)	31.8	34.8	26.4	2.2	2.1	0.5
Silan	600460 CH	Neutral	18.73	4,306	N/A	34.0	36.5	27.3	2.4	2.2	0.4
Silergy Corp	6415 TT	Not Rated	439.00	5,237	147.4	107.6	70.0	33.7	5.2	4.6	0.5
Nanya Tech	2408 TT	Not Rated	64.60	6,203	N/A	479.7	65.9	11.4	1.2	1.1	1.5
Winbond	2344 TT	Not Rated	25.85	3,349	N/A	121.0	26.8	12.1	1.1	1.0	2.0
Kinsus	3189 TT	Not Rated	94.80	1,335	N/M	76.7	22.8	12.9	1.2	1.1	1.9
Average – IDM							**38.3**	**20.3**	**2.0**	**1.8**	**1.0**
OSAT											
ASE Tech	3711 TT	Not Rated	155.50	21,168	26.2	39.3	17.3	12.4	2.1	1.9	3.8
JCET	600584 CH	Not Rated	26.03	6,436	42.0	31.6	21.6	16.4	1.7	1.5	0.6
Huatian Micro	002185 CH	Not Rated	8.35	3,697	85.6	70.1	59.4	34.9	1.7	1.6	0.3
Tongfu Micro	002156 CH	Not Rated	21.09	4,420	423.0	56.7	35.6	22.7	2.2	2.0	0.5
Powertech	6239 TT	Not Rated	174.00	4,094	5.2	25.9	16.0	12.7	2.2	2.1	3.9
Average – OSAT							**30.0**	**19.8**	**2.0**	**1.8**	**1.8**
Equipment vendors											
NAURA Tech	002371 CH	Outperform	293.16	21,506	24.0	33.5	32.2	24.1	5.4	4.5	0.3
AMEC	688012 CH	Outperform	133.65	11,450	13.8	20.2	40.7	33.9	4.2	3.8	0.4
Piotech	688072 CH	Not Rated	184.13	4,788	47.1	39.0	41.6	29.9	6.5	5.4	0.4
ASMPT	522 HK	Outperform	91.80	4,876	82.2	40.2	29.2	20.8	2.3	2.1	1.7
Huafeng	688200 CH	Not Rated	107.03	2,002	17.7	34.0	40.1	29.9	4.0	3.6	0.7
Kingsemi	688037 CH	Not Rated	91.67	1,746	11.9	51.1	39.4	26.1	4.7	4.0	0.6
ACM Research	ACMR US	Not Rated	22.63	1,403	25.7	7.7	13.0	12.1	0.9	0.8	0.0
Average – equipment							**33.7**	**25.3**	**4.0**	**3.5**	**0.6**

‡ *CCBIS ratings: Outperform, Neutral, Underperform, Not Rated*
* *Price as at close on 22 May 2024 (local currency)*
Source: Refinitiv, CCBIS estimates

Telecom equipment companies valuation comparison

Company	Stock code	CCBIS rating‡	Share price* (LC)	Market cap (US$ m)	EPS growth (%) 2024F	EPS growth (%) 2025F	P/E (x) 2024F	P/E (x) 2025F	EV/EBITDA (x) 2024F	EV/EBITDA (x) 2025F	Div. yield (%) 2024F
Domestic optical fibre vendors											
Zhongtian Tech	600522 CH	Not Rated	14.50	6,838	8.7	18.4	12.7	10.7	8.2	7.0	2.3
Hengtong	600487 CH	Not Rated	14.90	5,078	18.4	16.6	14.3	12.2	10.6	9.1	1.1
FiberHome	600498 CH	Not Rated	16.70	2,735	62.3	21.5	29.2	24.0	19.0	16.9	1.1
YOFC – H	6869 HK	Outperform	8.98	1,873	(36.8)	7.9	7.5	6.9	10.3	9.5	4.0
YOFC – A	601869 CH	Neutral	26.16	1,873	(36.8)	7.9	24.2	22.4	11.7	10.8	1.2
Shenzhen SDG	000070 CH	Not Rated	5.51	685	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Average – domestic fiber							**17.6**	**15.3**	**11.9**	**10.7**	**1.9**
Overseas optical fibre vendors											
Shin-Etsu	4063 JP	Not Rated	5,832.00	75,474	(23.5)	10.0	21.5	19.5	10.5	9.6	1.7
Corning Inc.	GLW US	Not Rated	36.58	31,335	10.4	16.1	19.4	16.7	10.0	9.3	3.1
Prysmian	PRY IM	Not Rated	57.78	17,343	1.2	16.5	20.5	17.6	11.0	9.7	1.3
Fujikura	5803 JP	Not Rated	3,015.00	5,766	3.7	12.8	18.2	16.2	10.6	9.4	1.6
Average – overseas fiber							**19.9**	**17.5**	**10.5**	**9.5**	**1.9**
Domestic telecom equipment											
China Tower	788 HK	Not Rated	0.97	21,876	10.0	20.4	13.5	11.2	3.4	3.3	5.0
ZTE Corp – H	763 HK	Outperform	17.22	16,960	10.9	8.6	7.1	6.6	5.7	5.3	3.0
ZTE Corp – A	000063 CH	Outperform	27.48	16,960	10.9	8.6	12.7	11.7	6.4	6.1	1.7
CCS	552 HK	Not Rated	3.79	3,363	7.1	6.4	6.0	5.6	0.3	0.3	7.3
Hytera	002583 CH	Not Rated	4.26	1,070	30.4	36.7	14.2	10.4	8.3	7.2	N/A
Comba	2342 HK	Not Rated	0.68	241	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Average – domestic equipment							**10.7**	**9.1**	**4.8**	**4.4**	**4.2**
Overseas telecom equipment											
Cisco	CSCO US	Not Rated	47.43	191,094	(2.7)	(3.8)	12.8	13.3	10.2	10.1	3.3
Ericsson	ERIC-B SS	Not Rated	63.94	20,073	37.9	17.1	12.6	10.8	6.9	6.1	4.2
Nokia	NOKIA FH	Not Rated	3.64	22,199	22.5	(3.4)	10.6	10.9	5.2	5.1	3.8
Ciena	CIEN US	Not Rated	49.56	7,167	(14.6)	38.5	21.8	15.8	12.7	10.1	0.0
Average – overseas equipment							**14.4**	**12.7**	**8.7**	**7.9**	**2.8**
Domestic telecom operators											
China Mobile	941 HK	Not Rated	73.70	205,987	4.2	5.8	9.9	9.4	3.0	2.9	7.4
China Telecom	728 HK	Not Rated	4.44	72,036	8.5	8.1	10.7	9.9	3.1	3.0	6.7
China Unicom	762 HK	Not Rated	6.23	24,425	13.6	10.1	8.0	7.2	1.5	1.5	7.2
Average – domestic telco							**9.5**	**8.9**	**2.5**	**2.5**	**7.1**
Domestic optical module											
HG Tech	000988 CH	Not Rated	31.59	4,389	28.5	29.0	23.8	18.5	22.1	16.8	0.9
Innolight	300308 CH	Outperform	173.17	19,217	9.3	0.0	88.5	20.8	63.7	17.1	0.1
Eoptolink	300502 CH	Not Rated	88.65	8,695	133.9	43.4	41.6	29.0	31.7	22.2	0.4
Accelink	002281 CH	Not Rated	36.44	3,999	32.4	22.2	37.2	30.5	26.6	22.2	0.6
TFC	300394 CH	Not Rated	136.60	7,467	88.9	39.5	41.6	29.8	32.1	23.7	1.1
Broadex Tech	300548 CH	Not Rated	22.53	893	12.2	21.7	28.0	23.0	31.5	27.2	0.8
Average – optical module							**43.4**	**25.3**	**34.6**	**21.5**	**0.6**

‡ CCBIS ratings: Outperform, Neutral, Underperform, Not Rated
** Price as at close on 22 May 2024 (local currency)*
Source: Refinitiv, CCBIS estimates

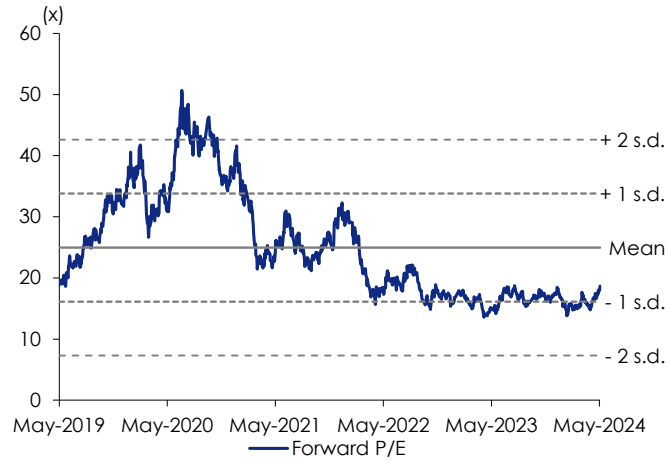
Xiaomi (1810 HK) forward P/E cycle

Source: Bloomberg, CCBIS estimates

Lenovo (992 HK) forward P/E cycle

Source: Bloomberg, CCBIS estimates

LuxShare (002475 CH) forward P/E cycle



Source: Bloomberg, CCBIS estimates

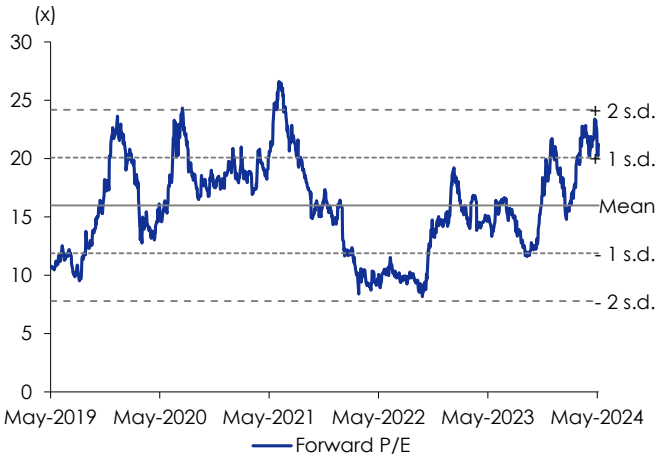
Goertek (002241 CH) forward P/E cycle

Source: Bloomberg, CCBIS estimates

LensTech (300433 CH) forward P/E cycle

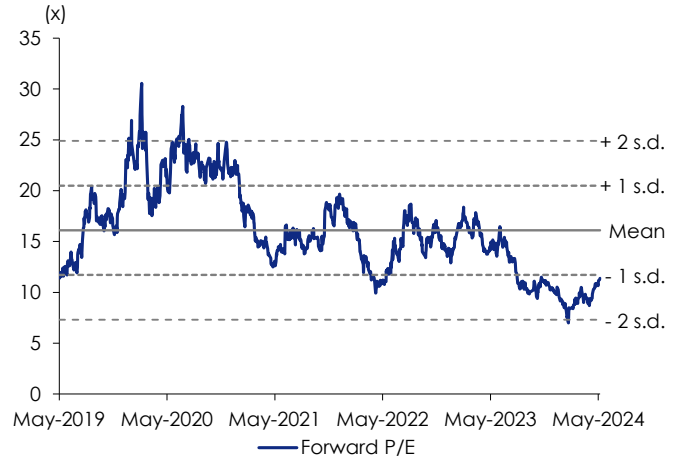
Source: Bloomberg, CCBIS estimates

AAC Tech (2018 HK) forward P/E cycle



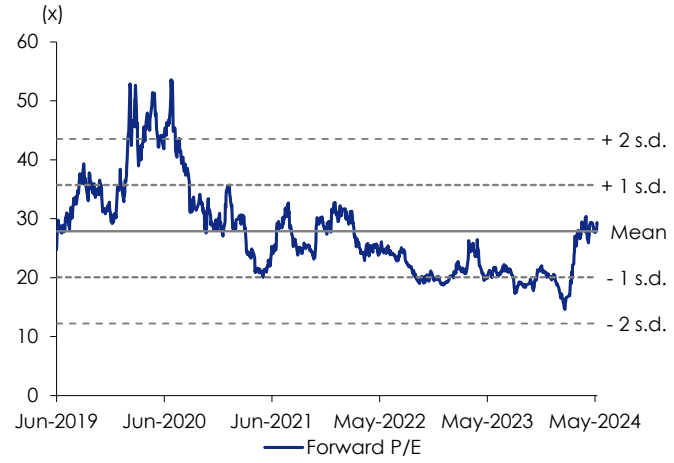
Source: Bloomberg, CCBIS estimates

Dongshan Precision (002384 CH) forward P/E cycle



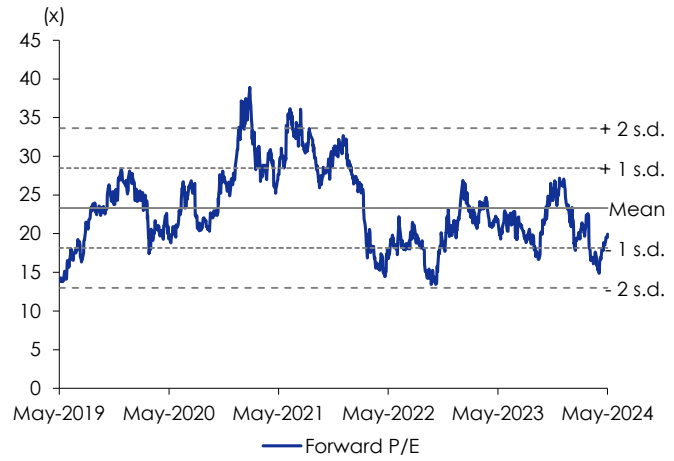
Source: Bloomberg, CCBIS estimates

Shennan Circuits (002916 CH) forward P/E cycle



Source: Bloomberg, CCBIS estimates

Sunny Optical (2382 HK) forward P/E cycle



Source: Bloomberg, CCBIS estimates

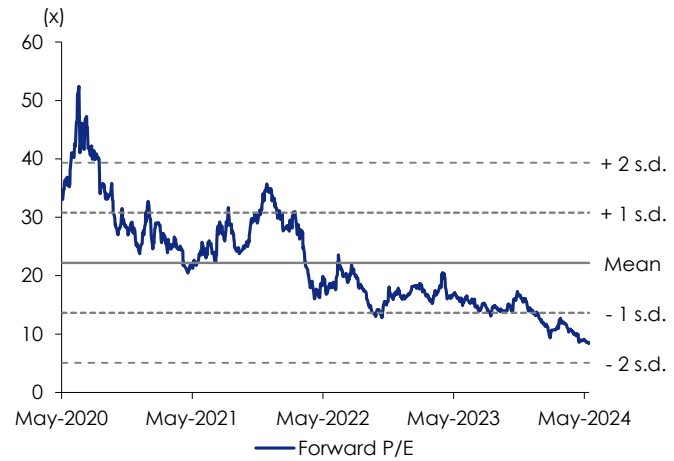
Q Tech (1478 HK) forward P/E cycle

Source: Bloomberg, CCBIS estimates

BYD Electronic (285 HK) forward P/E cycle

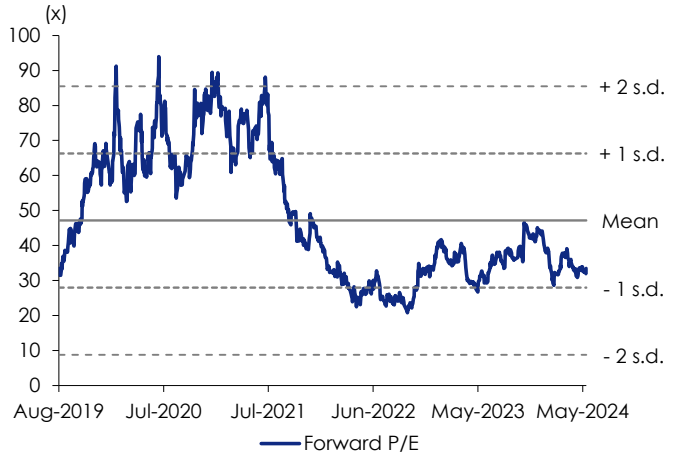
Source: Bloomberg, CCBIS estimates

Wingtech (600745 CH) forward P/E cycle



Source: Bloomberg, CCBIS estimates

Maxscend (300782 CH) forward P/E cycle



Source: Bloomberg, CCBIS estimates

Will Semi (603501 CH) forward P/E cycle

Source: Bloomberg, CCBIS estimates

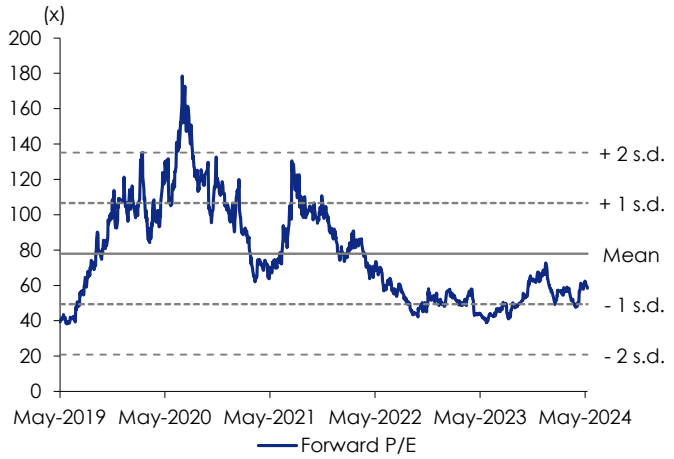
StarPower (603290 CH) forward P/E cycle

Source: Bloomberg, CCBIS estimates

Silan (600460 CH) forward P/E cycle

Source: Bloomberg, CCBIS estimates

SG Micro (300661 CH) forward P/E cycle

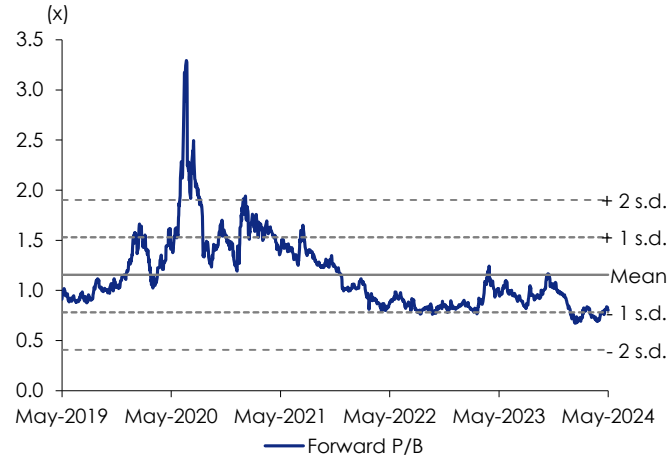


Source: Bloomberg, CCBIS estimates

GigaDevice (603986 CH) forward P/E cycle

Source: Bloomberg, CCBIS estimates

SMIC – H (981 HK) forward P/B cycle

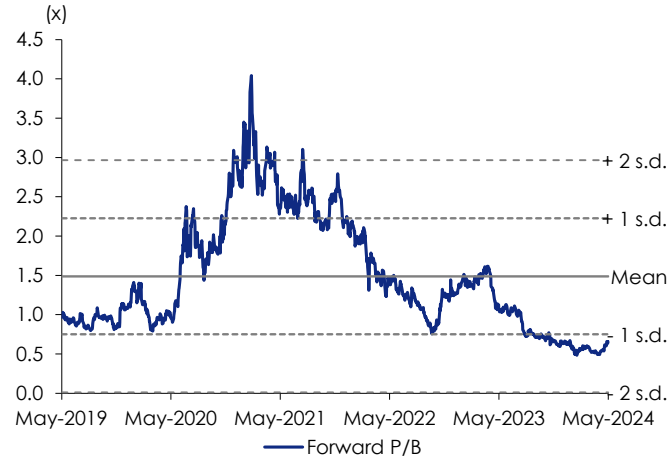


Source: Bloomberg, CCBIS estimates

SMIC – A (688981 CH) forward P/B cycle

Source: Bloomberg, CCBIS estimates

Hua Hong Semi (1347 HK) forward P/B cycle

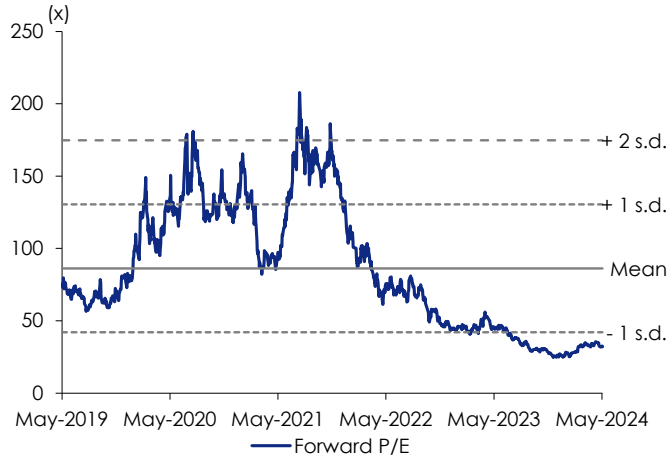


Source: Bloomberg, CCBIS estimates

ASMPT (522 HK) forward P/B cycle

Source: Bloomberg, CCBIS estimates

NAURA Tech (002371 CH) forward P/E cycle



Source: Bloomberg, CCBIS estimates

AMEC (688012 CH) forward P/E cycle

Source: Bloomberg, CCBIS estimates

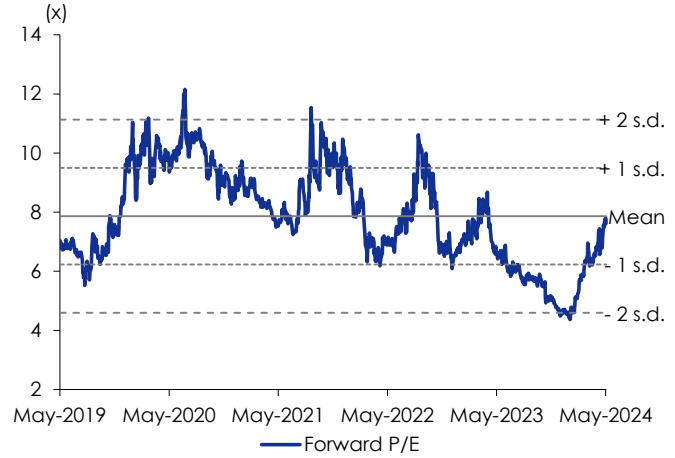
ZTE – H (763 HK) forward P/E cycle

Source: Bloomberg, CCBIS estimates

ZTE – A (000063 HK) forward P/E cycle

Source: Bloomberg, CCBIS estimates

YOFC – H (6869 HK) forward P/E cycle



Source: Bloomberg, CCBIS estimates

YOFC – A (601869 HK) forward P/E cycle

Source: Bloomberg, CCBIS estimates

Rating definitions:

Outperform (O) – expected return > 10% over the next twelve months
Neutral (N) – expected return between -10% and 10% over the next twelve months
Underperform (U) – expected return < -10% over the next twelve months

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