TSMC 3Q Exceeds on HPC/AI and Smartphone Strength

TSM	7 est.	Taiwan Semi/TSMC		CY24rev:	27%
Qtr:	3Q	Grade:	B	Growth	(qtr-qtr)
Rev:	23,504	Rev:	++	Rev:	12.9%
GM:	57.8%	EPS:	+++	Fcst:	+11+14%
EPS:	$1.94	Fcst:	+++	Div:	$0.625

Taiwan Semiconductor/TSMC *(TSM $200.78 -5.06 at close on 10/18/24)*
3Q Earnings: TSM announced 3Q results above expectations (very) early Thursday due to strength from leading 3/5nm technology to HPC/AI and smartphone applications. Guidance for 4Q reflects continued HPC strength leading management to raise expected revenue growth this year to 30% from slightly above the mid-20% range.

3Q Results: 3Q revenue of $23.5B increased by +13% sequentially (in US$) on strength from leading 3/5nm technology in HPC (High Performance Computing/AI processors) that continued to grow by +11% and accounted for 51% of sales, as well as a return to growth from smartphones at +16% that accounted for 34% of sales. Internet of Things (IoT) grew by +35 for 7% of sales, Automotive was up +6% for 5%, digital consumer electronics (DCE) declined by -19% for 1%, and Others increased by +6% for 2%. Advanced technologies accounted for 69% of total wafer revenue up from 67% last quarter which included 3nm at 20% up from 15%, 5nm at 32% down from 35%, and 7nm remained at 17%. North American customers accounted for 71% (up from 65%) of revenue while China accounted for 11% (vs 16%), Asia Pacific 10%, Japan 5%, and EMEA (Europe, Middle East, and Africa) 3%.

Gross margin increased by 460bps sequentially to 57.8% due to cost reductions and higher capacity utilization that exceeded expectations. Operating margin was 47.5%, net margin was 42.8%, and cap ex was $6.4B.

Technology: Limited comments on technology this quarter, so these comments are repeated from 2Q24.

The 3nm technology family is ramping up quickly and will be a large and long-lasting node. Family members include N3E, N3P and N3X; it is taking a couple quarters longer than N5 and N7 to reach corporate margins amid increasing process complexity; and 5nm resources (tools) are being converted.

Next generation 2nm technology will adopt a nanosheet transistor structure and will offer improvements over N3E of 10-15% in speed or 25-30% in power at >15% in density with volume production in 2025, pulled in from 4Q25. Customer engagements are robust with tape-outs expected to exceed that of the prior two nodes during its first two years, and the margin profile is expected to be better than that of the 3nm node. Subsequent N2P will offer a 5% increase in speed or 5-10% in power for both HPC and smartphones with volume beginning 2H26.

A16 with a backside power rail called SPR (Super Power Rail) for HPC applications will offer improvements over N2P of 8-10% in speed or 15-20% in power and 7-10% in density with volume beginning 2H26.

Mature nodes account for <20% of revenue. 28nm (at 7% 3Q) is expected to support multiple specialty technologies for strategic customers with high yields at corporate average gross margins.

Overseas Fabs: Overseas wafer fabs support customer geographic flexibility amid government support for which management expects to deliver profitable growth to shareholders—despite higher costs of 2-3% margin dilution.

A Japan specialty technology fab in Kumamoto for 12/16nm and 22/28nm technologies opened in February with volume production beginning this quarter. A second specialty fab with partners for 40nm, 12/16nm and 6/7nm technologies to support a strategic customer's consumer, automotive, industrial and HPC applications will begin construction 1Q25 for production late-2027.

In the US, TSMC has plans for three major wafer fabs in Arizona and has secured $6.6B in government CHIPS grants. The first began engineering runs on 4nm in April with volume production expected early-2025. The second will begin production in 2028 on 2/3nm specifically for AI applications. And the third is planned for production at the end of the decade on 2nm or better.

In Europe, a specialty technology fab running 12/16nm and 22/28nm in Dresden, Germany for automotive and industrial applications with joint venture partners broke ground in August for production by the end of 2027.

Previously the company reported Taiwan is expanding 3nm capacity in Tainan Science Park with N2 volume production in 2025, along with multiple fabs on 2nm planned in Hsinchu and Kaohsiung science parks and proposed for Taichung Science Park.

4Q Guidance: 4Q guidance calls for revenue up +11 to +14% to $26.1-26.9B on continued HPC/AI strength in leading 3/5nm technology; gross margin up 20bps to 57-59% due to increasing capacity utilization partially offset by continued dilution of the 3N ramp, higher electricity costs in Taiwan, and the 5N to 3N tool conversion; and operating margin of 46.5-48.5% assuming 32-NTD/USD.

2024 Outlook: Management raised 2024 guidance for company growth to almost 30% from slightly above the mid-20% range in U.S. dollars due to continued strength from AI-processors that include GPUs, AI accelerators and CPUs that are expected to triple this year to revenue in the mid-teens percent. Management re-defined its foundry market sector to include industry back-end operations 2Q24 which more than doubled the TAM to $250B from $115B last year, pegged its share at 28%, and expects to gain share amid +10% growth this year. Cap ex was narrowed to slightly higher than $30B from $30-32B after last year's $30.45B with 70-80% allocated for advanced process technologies, 10-20% for specialty technologies and 10% for advanced packaging, testing and mask making.

No 2025 guidance, but management noted tailwinds including 'pricing to value', a gradual reduction of the 3nm margin ramp dilution, and increasing capacity utilization from healthy sales growth. Headwinds include increasing costs from the growing complexity of leading technology including the 5N to 3N tool conversion and the initial ramp of 2nm, continuing double-digit percentage growth in electricity costs in Taiwan, global expansion into higher-cost regions, overall inflation and possible foreign exchange rate changes that cost 50bps of margin for every 1% move. The long-term gross margin target remains at 53%—or more if capacity utilization is high.

AI processor demand continues to grow and is constrained by back-end CoWoS capacity that continues to more than double annually, and the company is engaging OSATs to assist as it struggles to meet demand.

Fair Valuation: TSM is a wafer foundry juggernaut hoarding most of the sector's market share and even more of its profitability and is well positioned for continued dominance for the foreseeable future. Unfortunately, much of this is already priced into the shares at the current price level, in my opinion. The shares are trading at 8.3-times book value, 11.8-times 2024 expected sales (+27% growth) and 9.4-times 2025 sales (+26%), and 32-times expected 2024 EPS at $6.21per share and 25-times 2025 EPS of $8.03. Nevertheless, there may be room for incremental upside due to persistent strength from AI-processors as the shares advanced by +5.2% last week.

LEGEND

+++	exceeded the high-end of the range
++	above consensus, within the high-end of the range
+	slightly above consensus
o	met consensus
-	slightly below consensus
- -	missed consensus, within the low-end of the range
- - -	missed the low-end of the range

Grade	
A	all +++
B	all +
C	all o/+
D	mixed -/o/+
E	all o/-
F	all -

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