**FILE NOTE**

|  |  |
| --- | --- |
| **Date:** | 26/02/2024 |
| **Created by:** | DY |
| **Subject:** | TSMC 2023 Report Summary |
| **Exchange Rate:** | USD 1 to TWD 31.1 Assumption |

**Summary:**

TSMC’s mission: To be the trusted technology and capacity provider for the global logic IC industry for years to come.

Current Drivers: AI, Datacentres, Self-driving Automobiles

High-end Products: N3E entered volume production in the fourth quarter of 2023

Revenue Growth: Expected to grow at 15-20% CAGR over the next several years

**Financials**

EPS: TWD 9.21

ROE: 28.1%

Revenues: USD 69.30 billion, NTD 2161.74 billions

Operating Cash Flow: USD 39.93 billions, NTD 1241.97 billions

Capital Expenditures:

* USD 30.4 billion in 2023 (lower than forecasted at USD 32 billion)
* Forecasted to be between USD 28 billion and US 32 billion in 2024
  + Most of this will be used for 3-nanometer and 2-nanometer capacity
* Previously was 50% capital intensity in 2021, then 47% in 2022, and 43% in 2023
* Capital Intensity of around 35% in 2024
* Forecasted, capital intensity of 30% in next several years

Gross Margin:

* Expected to be 53% and higher over the long term
* Lower in 2024, as N3 dilution, 3-4% lower, and as N5 transitions into N3
* Short term hit

Operating Margin: Expected to be between 40% and 42%

**Financial Health**

Cash Balance: TWD 1.47 trillion

Cash and Marketable Securities of TWD 1.7 trillion or USD 55 billion

Financial Ratios:

* Accounts Receivable days decreased 4 days to 31 days
* Days of Inventory also declined 11 days to 85 days (primarily due to higher 3nm wafer shipments)

**Revenue Breakdown:**

* HPC, 43%
* Smartphone, 38%
* IoT, 8%
* Automotive, 6%

**Wafer Revenue Breakdown**

* 3-nanometer, 6% in 2023
  + 15% in Q4
* 5-nanometer, 33% in 2023
  + 35% in Q4
* 7-nanometer, 19% in 2023
  + 17% in Q4

Advanced Technologies (7-nanometer and below) accounted for **58% in 2023, up from 53% in 2022**

Advanced Technologies accounted for **67% in Q4** of 2023

**AI Data Centers:**

* AI data center value in semiconductors is very small
* At TSMC, AI data centers have a CAGR of 50%
* In 2027, estimated high teens of revenue from AI application processes

**Mature Nodes:**

\*notes; there may be too much capacity built for mature nodes, (lower profitability for 7-nanometer and higher)

**Technology Investment:**

* TSMC correctly invests in the right technologies every single time, (high-NA EUV) why?
* TSMC works with the customers to give the best transistor technology and most power efficient at a reasonable cost, this pushes TSMC to make the right decision, because often the customer will steer them in the right direction
* Almost everyone worked with TSMC on 2-nanometer, except one.

**Expansion Plans:**

* Specialty technology fab in Kumamoto
  + 12 and 16-nanometer and 22 and 28-nanometer
  + Volume production by Q4 2024
* Arizona
  + US government tax credits and incentives
  + On track for volume production of 4-nanometer process technologies in 1H of 2025
* Plan to build specialty technology fabs in Dresden, Germany
  + Focus on automotive and industrial applications
  + Fab construction begins in Q4 2024
* Expanding Tainan Science Park
  + Expanding 3-nanometer capacity
  + N2 volume production start of 2025
* To support N2, plan to build in Hsinchu and Kaohsiung Science Parks
* Taichung Science Park
  + Approval process

\*to note; initial costs of overseas fabs are higher than built in Taiwan

**Intel’s Chips notes and C.C. Wei comments:**

* Intel’s 2-nanometer is equivalent to TSMC’s N3P, however it is yet to reach volume production.
* If Intel’s 2-nanometer chip is on schedule, TSMC’s 3-nanometer, will have had 3 years of volume production.
* Intel is a customer of TSMC
* IDM optimised their technology for their own product, whereas TSMC as a foundry, optimise technology for customers’ products

**Rationale:**

* TSMC is still the clear leader in the market, everyone needs chips
* Every company chooses to work with TSMC, hence TSMC will be privy to the best in demand technologies, capital will be allocated to the right investments every time
* Stock prices over the long-term mirror that of ROIC, TSMC has a ROIC of 28.1%
* It is rare that a company always has investments to deploy capital at the same ROIC, etc. banks; hence they return it in dividends. TSMC is a true compounding machine.
* Lower Gross Margins from N3 Dilution only impacts short term, and Gross Margins are expected to return to 53%+
* While other companies build low profitability mature node fabs, TSMC’s margins will remain high as it is always at the forefront of technology

|  |  |  |
| --- | --- | --- |
|  | Lower Base Case 2029 | Higher Base Case 2029 |
| Revenue | USD 139.39 billion | USD 172.44 billion |
| Operating Income | USD 55.75 billion | 72.43 billion |

\* 15-20% Revenue Growth

\* 40%-42% Operating Income Margins