

## ASE Technology Holding

## Focus on advanced packaging and testing growth despite slower 1Q guidance

Reiterate Rating: BUY | PO: 137.00 TWD | Price: 133.00 TWD

## Raise PO to NT\$137 eyeing business growth

We expect ASE to bottom out in 1Q, and the business should recover more meaningfully in 2H24 thanks to ASE's business expansions in advanced packaging and testing. We lower 2024E earnings by 8% to reflect the lengthier inventory correction in 1Q. Nevertheless, we reiterate Buy, eyeing improving industry fundamentals and ASE's enriching offerings. We raise PO to NT\$137 based on 1.5x average 2024/25E P/B. The 5-6% yield should provide support.

## Expect sequential growth after a slower 1Q

The 4Q net income came in at NT\$9.4bn (EPS NT\$2.1), 14%/7% ahead of our/Street's estimates, thanks to a better ATM gross margin, led by favorable product mix/utility rate, and FX gains. ATM UTR further declined to low- to mid-60% in 4Q as expected, while EMS business was largely in-line, supported by customers' new devices and computing/auto growth. Into 1Q, ASE guided corporate revenue to decline by ~18% QoQ, with gross margin likely dropping to ~15%. ASE sees stronger high-end smartphone demand in China and rush orders on multiple segments. ATM is guided to drop 10% QoQ, with ASP remaining steady in 1Q despite lower shipment.

## Back-end loaded growth by testing &amp; advanced packaging

ASE expects 2024 to be back-end loaded and ATM business to grow 6-10% YoY with faster testing and leading-edge advanced packaging, when we expect EMS to grow 5-10% YoY. ASE guides to raise the equipment capex by 40-50% to ~US\$1.3bn, with 67%/18%/13%/2% for packaging/testing/EMS/material. Most of the packaging capex is for advanced packaging. ASE's leading edge advanced packaging (2.5D, fan-out, on-substrate, etc) business should grow 100% YoY to contribute another US\$250+mn revenue.

| Estimates (Dec) (NT\$)      | 2021A  | 2022A  | 2023E  | 2024E  | 2025E  |
|-----------------------------|--------|--------|--------|--------|--------|
| Net Income (Adjusted - mn)  | 68,658 | 66,840 | 36,476 | 50,367 | 62,887 |
| EPS                         | 14.96  | 15.15  | 7.38   | 10.48  | 13.36  |
| EPS Change (YoY)            | 128.5% | 1.3%   | -51.3% | 42.0%  | 27.4%  |
| Dividend / Share            | 7.00   | 8.81   | 4.50   | 6.50   | 8.20   |
| Free Cash Flow / Share      | 2.52   | 9.19   | 12.70  | 9.82   | 11.97  |
| ADR EPS (US\$)              | 1.07   | 1.02   | 0.472  | 0.670  | 0.854  |
| ADR Dividend / Share (US\$) | 0.501  | 0.591  | 0.288  | 0.415  | 0.524  |
| Valuation (Dec)             |        |        |        |        |        |
| P/E                         | 8.89x  | 8.78x  | 18.02x | 12.69x | 9.95x  |
| Dividend Yield              | 5.26%  | 6.62%  | 3.38%  | 4.89%  | 6.17%  |
| EV / EBITDA*                | 6.13x  | 5.27x  | 7.24x  | 5.93x  | 5.14x  |
| Free Cash Flow Yield*       | 1.86%  | 6.58%  | 9.38%  | 7.36%  | 8.98%  |

\* For full definitions of *IQmethod*<sup>SM</sup> measures, see page 9.

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**Refer to important disclosures on page 10 to 13. Analyst Certification on page 7. Price Objective Basis/Risk on page 7.**

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## Equity

## Key Changes

| (NT\$)           | Previous  | Current   |
|------------------|-----------|-----------|
| Price Obj.       | 130.00    | 137.00    |
| 2023E EPS        | 7.09      | 7.38      |
| 2024E EPS        | 11.37     | 10.48     |
| 2025E EPS        | 13.88     | 13.36     |
| 2023E EBITDA (m) | 98,344.2  | 98,800.8  |
| 2024E EBITDA (m) | 128,365.9 | 120,577.0 |
| 2025E EBITDA (m) | 145,128.1 | 139,118.8 |

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## Stock Data

|                             |                         |
|-----------------------------|-------------------------|
| Price (Common / ADR)        | 133.00 TWD / 9.05 USD   |
| Price Objective             | 137.00 TWD / 9.30 USD   |
| Date Established            | 2-Feb-2024 / 2-Feb-2024 |
| Investment Opinion          | B-1-7 / B-1-7           |
| 52-Week Range               | 99.20 TWD - 138.00 TWD  |
| Market Value (mn)           | 18,631 USD              |
| Market Value (mn)           | 583,127 TWD             |
| Shares Outstanding (mn)     | 4,384.4 / 2,192.2       |
| Average Daily Value (mn)    | 42.51 USD               |
| Free Float                  | 83.4%                   |
| BofA Ticker / Exchange      | XSRI / TAI              |
| BofA Ticker / Exchange      | ASX / NYS               |
| Bloomberg / Reuters         | 3711 TT / 3711.TW       |
| ROE (2023E)                 | 12.3%                   |
| Net Dbt to Eqty (Dec-2022A) | 36.7%                   |

## Exhibit 1: Acronyms

Acronyms and the corresponding full names

| Acronym | Full name                         |
|---------|-----------------------------------|
| AI      | Artificial Intelligence           |
| ATM     | Assembly, Testing, Material       |
| CPU     | Central Processing Unit           |
| EMS     | Electronic Manufacturing Services |
| FX      | Foreign Exchange Rate             |
| UTR     | Utilization Rate                  |

Source: BofA Global Research

# iQprofile<sup>SM</sup> ASE Technology Holding

| Key Income Statement Data (Dec)          | 2021A    | 2022A    | 2023E    | 2024E    | 2025E    |
|--|----------|----------|----------|----------|----------|
| (NT\$ Millions)                          |          |          |          |          |          |
| Sales                                    | 569,997  | 670,873  | 581,914  | 630,375  | 714,129  |
| Gross Profit                             | 110,368  | 134,930  | 91,757   | 113,153  | 137,103  |
| Sell General & Admin Expense             | (27,191) | (30,385) | (25,930) | (26,121) | (29,092) |
| Operating Profit                         | 62,124   | 80,176   | 40,328   | 60,283   | 78,358   |
| Net Interest & Other Income              | 18,210   | 1,450    | 2,272    | 700      | (520)    |
| Associates                               | NA       | NA       | NA       | NA       | NA       |
| Pretax Income                            | 80,334   | 81,626   | 42,600   | 60,983   | 77,838   |
| Tax (expense) / Benefit                  | (14,322) | (16,399) | (9,043)  | (12,683) | (16,281) |
| Net Income (Adjusted)                    | 68,658   | 66,840   | 36,476   | 50,367   | 62,887   |
| Average Fully Diluted Shares Outstanding | 4,344    | 4,219    | 4,351    | 4,351    | 4,351    |

| Key Cash Flow Statement Data            |          |          |          |          |          |
|---|----------|----------|----------|----------|----------|
| Net Income                              | 63,907   | 62,090   | 31,725   | 45,616   | 58,136   |
| Depreciation & Amortization             | 54,524   | 55,452   | 58,473   | 60,294   | 60,761   |
| Change in Working Capital               | (31,743) | (24,162) | 34,117   | (8,182)  | (12,775) |
| Deferred Taxation Charge                | NA       | NA       | NA       | NA       | NA       |
| Other Adjustments, Net                  | (4,955)  | 17,621   | (13,193) | 0        | 0        |
| Cash Flow from Operations               | 81,734   | 111,001  | 111,122  | 97,728   | 106,122  |
| Capital Expenditure                     | (70,906) | (72,640) | (56,434) | (54,834) | (53,780) |
| (Acquisition) / Disposal of Investments | 23,799   | (90)     | 2,662    | (2,155)  | 142      |
| Other Cash Inflow / (Outflow)           | (1,985)  | (1,222)  | 199      | 0        | 0        |
| Cash Flow from Investing                | (49,092) | (73,952) | (53,572) | (56,989) | (53,638) |
| Shares Issue / (Repurchase)             | (2,801)  | 864      | 789      | 0        | 0        |
| Cost of Dividends Paid                  | (18,083) | (29,991) | (37,841) | (19,670) | (28,282) |
| Cash Flow from Financing                | (5,871)  | (62,459) | (54,924) | (34,279) | (37,544) |
| Free Cash Flow                          | 10,828   | 38,361   | 54,688   | 42,894   | 52,343   |
| Net Debt                                | 134,053  | 117,501  | 93,962   | 70,737   | 46,677   |
| Change in Net Debt                      | 1,527    | (9,617)  | (27,601) | (21,069) | (24,203) |

| Key Balance Sheet Data        |         |         |         |         |         |
|-------------------------------|---------|---------|---------|---------|---------|
| Property, Plant & Equipment   | 239,868 | 268,235 | 272,243 | 289,655 | 305,691 |
| Other Non-Current Assets      | 140,709 | 138,467 | 127,155 | 138,249 | 152,405 |
| Trade Receivables             | 115,462 | 114,647 | 99,423  | 105,739 | 117,367 |
| Cash & Equivalents            | 79,007  | 64,866  | 70,329  | 78,944  | 93,743  |
| Other Current Assets          | 97,889  | 120,855 | 92,645  | 102,489 | 108,503 |
| Total Assets                  | 672,934 | 707,068 | 661,796 | 715,075 | 777,709 |
| Long-Term Debt                | 164,310 | 137,799 | 100,225 | 85,692  | 81,408  |
| Other Non-Current Liabilities | 23,063  | 27,083  | 26,026  | 23,276  | 23,276  |
| Short-Term Debt               | 48,749  | 44,567  | 64,066  | 63,989  | 59,012  |
| Other Current Liabilities     | 162,179 | 177,694 | 158,394 | 165,460 | 162,680 |
| Total Liabilities             | 398,302 | 387,143 | 348,712 | 338,418 | 326,375 |
| Total Equity                  | 274,633 | 319,925 | 313,084 | 376,658 | 451,333 |
| Total Equity & Liabilities    | 672,934 | 707,068 | 661,796 | 715,075 | 777,709 |

| iQmethod <sup>SM</sup> - Bus Performance* |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|
| Return On Capital Employed                | 10.7% | 12.4% | 6.3%  | 9.2%  | 10.8% |
| Return On Equity                          | 28.7% | 23.8% | 12.3% | 15.5% | 16.0% |
| Operating Margin                          | 10.9% | 12.0% | 6.9%  | 9.6%  | 11.0% |
| EBITDA Margin                             | 20.5% | 20.2% | 17.0% | 19.1% | 19.5% |

| iQmethod <sup>SM</sup> - Quality of Earnings* |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|
| Cash Realization Ratio                        | 1.2x  | 1.7x  | 3.0x  | 1.9x  | 1.7x  |
| Asset Replacement Ratio                       | 1.4x  | 1.4x  | 1.0x  | 1.0x  | 1.0x  |
| Tax Rate (Reported)                           | 17.8% | 20.1% | 21.2% | 20.8% | 20.9% |
| Net Debt-to-Equity Ratio                      | 48.8% | 36.7% | 30.0% | 18.8% | 10.3% |
| Interest Cover                                | 21.9x | 20.0x | 6.8x  | 11.3x | 16.5x |

## Key Metrics

\* For full definitions of iQmethod<sup>SM</sup> measures, see page 9.

## Company Sector

Semiconductors

## Company Description

Established in 1984 and headquartered in Taiwan, ASE Technology Holding is the no.1 outsourced assembly and testing (OSAT) firm globally, in terms of market share by revenue. ASE acquired Siliconware Precision (SPIL) in 2018, and had acquired USI in 2010, which became its EMS business segment providing synergies in system-level packaging. 2 shares = 1 ADR.

## Investment Rationale

We rate ASE Buy, considering its better operational efficiency after merging with SPIL, and improving pricing power on the back of industry consolidation. We think ASE could maintain its leading position in the Outsourced Semiconductor Assembly and Test (OSAT) universe, owing to its well-established footprints and widespread service offerings.

## Stock Data

|                     |      |
|---------------------|------|
| Shares / ADR        | 2.00 |
| Price to Book Value | 2.0x |

## Key Changes

| (US\$)     | Previous | Current |
|------------|----------|---------|
| Price Obj. | 8.70     | 9.30    |
| 2023E EPS  | 0.45     | 0.47    |
| 2024E EPS  | 0.73     | 0.67    |
| 2025E EPS  | 0.89     | 0.85    |

**Exhibit 2: 4Q23 results review**

4Q came in 14%/7% ahead our/consensus estimates, thanks to better ATM GPM led by favorable product mix/utility rate, and FX gains

| NT\$mnn            | 4Q22A   | 3Q23A   | 4Q23A   | QoQ % | YoY %  | BofAe   | Diff (%) | Consensus | Diff (%) |
|--------------------|---------|---------|---------|-------|--------|---------|----------|-----------|----------|
| Revenue            | 177,417 | 154,167 | 160,581 | 4.2%  | -9.5%  | 159,892 | 0.4%     | 160,517   | 0.0%     |
| Gross profit       | 34,099  | 24,916  | 25,761  | 3.4%  | -24.5% | 24,829  | 3.8%     | 25,161    | 2.4%     |
| Gross margin       | 19.2%   | 16.2%   | 16.0%   |       |        | 15.5%   |          | 15.7%     |          |
| Operating income   | 19,774  | 11,405  | 11,815  | 3.6%  | -40.3% | 11,359  | 4.0%     | 11,811    | 0.0%     |
| Operating margin   | 11.1%   | 7.4%    | 7.4%    |       |        | 7.1%    |          | 7.4%      |          |
| Pretax income      | 20,212  | 12,252  | 12,367  | 0.9%  | -38.8% | 10,827  | 14.2%    | 11,647    | 6.2%     |
| Pretax margin      | 11.4%   | 7.9%    | 7.7%    |       |        | 6.8%    |          | 7.3%      |          |
| Net income         | 15,730  | 8,776   | 9,392   | 7.0%  | -40.3% | 8,188   | 14.7%    | 8,755     | 7.3%     |
| Net margin         | 8.9%    | 5.7%    | 5.8%    |       |        | 5.1%    |          | 5.5%      |          |
| Diluted EPS (NT\$) | 3.48    | 2.00    | 2.14    | 7.0%  | -38.4% | 1.88    | 13.8%    | 2.00      | 7.3%     |

**Source:** BofA Global Research estimates, company data, Bloomberg. Diff = difference.

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**Exhibit 3: 1Q24 operational guidance**

Muted 1Q outlook amid industry headwinds

**1Q24 guidance**

**IC ATM revenue** In NTD terms, flat YoY (or down ~10% QoQ)

**IC ATM GPM** Flat YoY (or 20.1%)

**EMS revenue** In NTD terms, flat YoY (or down ~27% QoQ)

**EMS OPM** Approach 1Q23 level (or 2.3%)

**Source:** Company data

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**Exhibit 4: Earnings estimate changes, 2024-25E**

We lower 2024/25E EPS by 8%/4% to reflect refreshed outlooks

| NT\$bnn          | 2024E |       |         | 2025E |       |         |
|------------------|-------|-------|---------|-------|-------|---------|
|                  | New   | Old   | Diff    | New   | Old   | Diff    |
| Revenue          | 630   | 653   | -3.5%   | 714   | 730   | -2.2%   |
| Gross profit     | 113   | 122   | -7.1%   | 137   | 142   | -3.8%   |
| Gross margin     | 18.0% | 18.6% | -0.7ppt | 19.2% | 19.5% | -0.3ppt |
| Operating income | 60    | 68    | -11.3%  | 78    | 84    | -6.8%   |
| Operating margin | 9.6%  | 10.4% | -0.8ppt | 11.0% | 11.5% | -0.5ppt |
| Pretax income    | 61    | 66    | -7.9%   | 78    | 81    | -3.8%   |
| Pretax margin    | 9.7%  | 10.1% | -0.5ppt | 10.9% | 11.1% | -0.2ppt |
| Net income       | 46    | 49    | -7.7%   | 58    | 60    | -3.7%   |
| Net margin       | 7.2%  | 7.6%  | -0.3ppt | 8.1%  | 8.3%  | -0.1ppt |
| EPS (NT\$)       | 10.5  | 11.4  | -7.8%   | 13.4  | 13.9  | -3.8%   |

**Source:** BofA Global Research estimates

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**Exhibit 5: BofAe versus consensus, 2023-25E**

Our 2024/25E earnings are 4% below/1% above street's consensus

| NT\$bnn       | 2024E |           |         | 2025E |           |         |
|---------------|-------|-----------|---------|-------|-----------|---------|
|               | BofA  | Consensus | Diff    | BofA  | Consensus | Diff    |
| Revenue       | 630   | 659       | -4.4%   | 714   | 725       | -1.6%   |
| Gross profit  | 113   | 121       | -6.7%   | 137   | 144       | -4.8%   |
| Gross margin  | 18.0% | 18.4%     | -0.4ppt | 19.2% | 19.9%     | -0.7ppt |
| Opt income    | 60    | 65        | -7.4%   | 78    | 79        | -0.7%   |
| Opt margin    | 9.6%  | 9.9%      | -0.3ppt | 11.0% | 10.9%     | 0.1ppt  |
| Pretax income | 61    | 63        | -3.4%   | 78    | 76        | 3.0%    |
| Pretax margin | 9.7%  | 9.6%      | 0.1ppt  | 10.9% | 10.4%     | 0.5ppt  |
| Net income    | 46    | 48        | -4.3%   | 58    | 58        | 0.7%    |
| Net margin    | 7.2%  | 7.2%      | 0.0ppt  | 8.1%  | 8.0%      | 0.2ppt  |
| EPS (NT\$)    | 10.5  | 11.0      | -4.3%   | 13.4  | 13.3      | 0.7%    |

**Source:** BofA Global Research estimates, Bloomberg

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**Exhibit 6: Profit & loss, 2022-25E**

Expect ASE's revenue to increase by 8%/13%% YoY in 2024/25

| NT\$mnn; %                      | 1Q23     | 2Q23     | 3Q23     | 4Q23P    | 1Q24E    | 2Q24E    | 3Q24E    | 4Q24E    | 2022     | 2023E    | 2024E    | 2025E    |
|---------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Revenue                         | 130,891  | 136,275  | 154,167  | 160,581  | 131,219  | 139,582  | 173,120  | 186,454  | 670,873  | 581,914  | 630,375  | 714,129  |
| Cost of Sales                   | -111,552 | -114,535 | -129,251 | -134,820 | -111,665 | -115,198 | -140,490 | -149,870 | -535,943 | -490,157 | -517,223 | -577,027 |
| Gross profit                    | 19,339   | 21,741   | 24,916   | 25,761   | 19,554   | 24,385   | 32,630   | 36,584   | 134,930  | 91,757   | 113,153  | 137,103  |
| Operating expense               | -11,644  | -12,329  | -13,510  | -13,946  | -10,942  | -12,294  | -14,425  | -15,209  | -54,754  | -51,429  | -52,870  | -58,745  |
| Operating income                | 7,696    | 9,412    | 11,405   | 11,815   | 8,612    | 12,091   | 18,205   | 21,375   | 80,176   | 40,328   | 60,283   | 78,358   |
| Non-operating Inc/Exp           | 175      | 699      | 847      | 552      | 515      | 546      | 78       | -439     | 1,450    | 2,272    | 700      | -520     |
| Pretax income                   | 7,870    | 10,111   | 12,252   | 12,367   | 9,126    | 12,637   | 18,283   | 20,936   | 81,626   | 42,600   | 60,983   | 77,838   |
| Income tax                      | -1,778   | -1,914   | -2,890   | -2,461   | -1,825   | -2,560   | -4,110   | -4,187   | -16,399  | -9,043   | -12,683  | -16,281  |
| Net income                      | 6,093    | 8,197    | 9,362    | 9,906    | 7,301    | 10,077   | 14,173   | 16,749   | 65,227   | 33,557   | 48,300   | 61,557   |
| Noncontrolling interest         | -276     | -457     | -586     | -514     | -399     | -567     | -799     | -920     | -3,137   | -1,832   | -2,684   | -3,421   |
| Net income (A)                  | 5,817    | 7,740    | 8,776    | 9,392    | 6,902    | 9,510    | 13,375   | 15,829   | 62,090   | 31,725   | 45,616   | 58,136   |
| Diluted EPS (NT\$)              | 1.30     | 1.76     | 2.00     | 2.14     | 1.59     | 2.19     | 3.07     | 3.64     | 15.15    | 7.38     | 10.48    | 13.36    |
| Diluted earnings per ADR (US\$) | 0.21     | 0.29     | 0.32     | 0.34     | 0.25     | 0.35     | 0.49     | 0.58     | 2.51     | 1.22     | 1.74     | 2.22     |
| <b>% of revenue</b>             |          |          |          |          |          |          |          |          |          |          |          |          |
| Gross margin                    | 15%      | 16%      | 16%      | 16%      | 15%      | 17%      | 19%      | 20%      | 20%      | 16%      | 18%      | 19%      |
| Operating margin                | 6%       | 7%       | 7%       | 7%       | 7%       | 9%       | 11%      | 11%      | 12%      | 7%       | 10%      | 11%      |
| Pretax margin                   | 6%       | 7%       | 8%       | 8%       | 7%       | 9%       | 11%      | 11%      | 12%      | 7%       | 10%      | 11%      |
| Net margin                      | 4%       | 6%       | 6%       | 6%       | 5%       | 7%       | 8%       | 8%       | 9%       | 5%       | 7%       | 8%       |
| <b>QoQ growth %</b>             |          |          |          |          |          |          |          |          |          |          |          |          |
| Revenue                         | -26%     | 4%       | 13%      | 4%       | -18%     | 6%       | 24%      | 8%       |          |          |          |          |
| Gross profit                    | -43%     | 12%      | 15%      | 3%       | -24%     | 25%      | 34%      | 12%      |          |          |          |          |
| Operating income                | -61%     | 22%      | 21%      | 4%       | -27%     | 40%      | 51%      | 17%      |          |          |          |          |
| Net income (A)                  | -63%     | 33%      | 13%      | 7%       | -27%     | 38%      | 41%      | 18%      |          |          |          |          |
| <b>YoY growth %</b>             |          |          |          |          |          |          |          |          |          |          |          |          |
| Revenue                         | -9%      | -15%     | -18%     | -9%      | 0%       | 2%       | 12%      | 16%      | 18%      | -13%     | 8%       | 13%      |
| Gross profit                    | -32%     | -37%     | -34%     | -24%     | 1%       | 12%      | 31%      | 42%      | 22%      | -32%     | 23%      | 21%      |
| Operating income                | -52%     | -54%     | -52%     | -40%     | 12%      | 28%      | 60%      | 81%      | 29%      | -50%     | 49%      | 30%      |
| Net income (A)                  | -55%     | -52%     | -50%     | -40%     | 19%      | 23%      | 52%      | 69%      | -3%      | -49%     | 44%      | 27%      |
| EPS                             |          |          |          |          |          |          |          |          | 1%       | -51%     | 42%      | 27%      |

Source: BofA Global Research estimates, company data

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**Exhibit 7: ASE group's revenue by application, 2022-25E**

Expect all segments to grow in 2024/25 off a lower 2023 base

| NT\$mnn; %                          | 1Q23    | 2Q23    | 3Q23    | 4Q23P   | 1Q24E   | 2Q24E   | 3Q24E   | 4Q24E   | 2022    | 2023E   | 2024E   | 2025E   |
|-------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Group revenue by application</b> |         |         |         |         |         |         |         |         |         |         |         |         |
| Communication                       | 56,787  | 57,731  | 67,404  | 74,828  | 57,171  | 61,585  | 77,610  | 85,412  | 306,829 | 256,750 | 281,779 | 316,563 |
| Computer                            | 17,056  | 18,494  | 21,489  | 22,552  | 20,194  | 22,221  | 23,737  | 23,934  | 89,464  | 79,592  | 90,086  | 96,714  |
| Automotive, Consumer & Others       | 57,051  | 60,271  | 65,296  | 63,227  | 53,873  | 55,796  | 71,800  | 77,138  | 274,505 | 245,845 | 258,607 | 300,961 |
| Total                               | 130,893 | 136,497 | 154,189 | 160,608 | 131,238 | 139,602 | 173,147 | 186,484 | 670,797 | 582,187 | 630,472 | 714,238 |
| <b>Revenue %</b>                    |         |         |         |         |         |         |         |         |         |         |         |         |
| Communication                       | 43%     | 42%     | 44%     | 47%     | 44%     | 44%     | 45%     | 46%     | 46%     | 44%     | 45%     | 44%     |
| Computer                            | 13%     | 14%     | 14%     | 14%     | 15%     | 16%     | 14%     | 13%     | 13%     | 14%     | 14%     | 14%     |
| Automotive, Consumer & Others       | 44%     | 44%     | 42%     | 39%     | 41%     | 40%     | 41%     | 41%     | 41%     | 42%     | 41%     | 42%     |
| Total                               | 100%    | 100%    | 100%    | 100%    | 100%    | 100%    | 100%    | 100%    | 100%    | 100%    | 100%    | 100%    |
| <b>Sequential growth %</b>          |         |         |         |         |         |         |         |         |         |         |         |         |
| Communication                       | -30%    | 2%      | 17%     | 11%     | -24%    | 8%      | 26%     | 10%     | 19%     | -16%    | 10%     | 12%     |
| Computer                            | -24%    | 8%      | 16%     | 5%      | -10%    | 10%     | 7%      | 1%      | 28%     | -11%    | 13%     | 7%      |
| Automotive, Consumer & Others       | -22%    | 6%      | 8%      | -3%     | -15%    | 4%      | 29%     | 7%      | 13%     | -10%    | 5%      | 16%     |
| Total                               | -26%    | 4%      | 13%     | 4%      | -18%    | 6%      | 24%     | 8%      | 18%     | -13%    | 8%      | 13%     |

Source: BofA Global Research estimates, company data

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**Exhibit 8: ASE IC ATM earnings model, 2022-25E**

We model 9%/14% YoY growth in ATM's revenue in 2024/25

| NT\$mnn; %               | 1Q23    | 2Q23    | 3Q23    | 4Q23P   | 1Q24E   | 2Q24E   | 3Q24E   | 4Q24E   | 2022     | 2023E    | 2024E    | 2025E    |
|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|
| Revenue                  | 73,319  | 76,108  | 83,684  | 82,004  | 73,742  | 80,435  | 93,237  | 96,954  | 372,176  | 315,115  | 344,367  | 393,463  |
| Cost of Sales            | -58,570 | -59,947 | -65,094 | -62,786 | -58,706 | -61,579 | -68,069 | -68,549 | -266,282 | -246,397 | -256,903 | -286,295 |
| Gross profit             | 14,749  | 16,161  | 18,590  | 19,218  | 15,036  | 18,856  | 25,168  | 28,404  | 105,894  | 68,718   | 87,464   | 107,168  |
| Operating expense        | -8,340  | -8,756  | -9,770  | -10,006 | -7,758  | -9,230  | -10,519 | -11,083 | -39,446  | -36,872  | -38,589  | -42,712  |
| Operating income         | 6,409   | 7,405   | 8,820   | 9,212   | 7,278   | 9,626   | 14,649  | 17,321  | 66,448   | 31,846   | 48,874   | 64,456   |
| Net income               | 6,509   | 7,320   | 8,472   | 8,791   | 7,217   | 9,128   | 13,219  | 15,395  | 59,270   | 31,092   | 44,959   | 57,647   |
| Non-controlling interest | 21      | 23      | 27      | 28      | 23      | 29      | 42      | 49      | 187      | 98       | 142      | 182      |
| Net income (A)           | 6,529   | 7,343   | 8,499   | 8,819   | 7,239   | 9,157   | 13,260  | 15,443  | 59,458   | 31,190   | 45,100   | 57,829   |
| <b>% of revenue</b>      |         |         |         |         |         |         |         |         |          |          |          |          |
| Gross profit             | 20%     | 21%     | 22%     | 23%     | 20%     | 23%     | 27%     | 29%     | 28%      | 22%      | 25%      | 27%      |
| Operating income         | 9%      | 10%     | 11%     | 11%     | 10%     | 12%     | 16%     | 18%     | 18%      | 10%      | 14%      | 16%      |
| Net income               | 9%      | 10%     | 10%     | 11%     | 10%     | 11%     | 14%     | 16%     | 16%      | 10%      | 13%      | 15%      |
| <b>QoQ growth %</b>      |         |         |         |         |         |         |         |         |          |          |          |          |
| Revenue                  | -22%    | 4%      | 10%     | -2%     | -10%    | 9%      | 16%     | 4%      |          |          |          |          |
| Gross profit             | -44%    | 10%     | 15%     | 3%      | -22%    | 25%     | 33%     | 13%     |          |          |          |          |
| Operating income         | -59%    | 16%     | 19%     | 4%      | -21%    | 32%     | 52%     | 18%     |          |          |          |          |
| Net income (A)           | -54%    | 12%     | 16%     | 4%      | -18%    | 26%     | 45%     | 16%     |          |          |          |          |
| <b>YoY growth %</b>      |         |         |         |         |         |         |         |         |          |          |          |          |
| Revenue                  | -13%    | -20%    | -15%    | -13%    | 1%      | 6%      | 11%     | 18%     | 11%      | -15%     | 9%       | 14%      |
| Gross profit             | -36%    | -42%    | -36%    | -27%    | 2%      | 17%     | 35%     | 48%     | 19%      | -35%     | 27%      | 23%      |
| Operating income         | -54%    | -59%    | -53%    | -42%    | 14%     | 30%     | 66%     | 88%     | 24%      | -52%     | 53%      | 32%      |
| Net income (A)           | -49%    | -54%    | -49%    | -38%    | 11%     | 25%     | 56%     | 75%     | 22%      | -48%     | 45%      | 28%      |

Source: BofA Global Research estimates, company data

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**Exhibit 9: ASE EMS earnings model, 2022-25E**

Expect EMS revenue to see 7%/12% YoY growth in 2024/25

| NT\$mnn; %               | 1Q23    | 2Q23    | 3Q23    | 4Q23P   | 1Q24E   | 2Q24E   | 3Q24E   | 4Q24E   | 2022     | 2023E    | 2024E    | 2025E    |
|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|
| Revenue                  | 57,733  | 60,424  | 70,970  | 79,182  | 57,803  | 59,537  | 80,375  | 90,020  | 301,982  | 268,309  | 287,735  | 322,845  |
| Cost of Sales            | -53,166 | -54,785 | -64,500 | -72,496 | -53,236 | -53,940 | -72,820 | -81,738 | -272,951 | -244,947 | -261,735 | -292,492 |
| Gross profit             | 4,567   | 5,639   | 6,470   | 6,686   | 4,566   | 5,596   | 7,555   | 8,282   | 29,031   | 23,362   | 26,000   | 30,353   |
| Operating expense        | -3,242  | -3,550  | -3,703  | -3,887  | -3,262  | -3,365  | -4,011  | -4,251  | -15,075  | -14,382  | -14,889  | -16,279  |
| Operating income         | 1,325   | 2,089   | 2,767   | 2,799   | 1,305   | 2,231   | 3,544   | 4,031   | 13,956   | 8,980    | 11,111   | 14,074   |
| Net income               | 1,202   | 1,836   | 2,398   | 2,425   | 1,185   | 1,954   | 3,043   | 3,447   | 11,990   | 7,861    | 9,630    | 12,088   |
| Non-controlling interest | -290    | -443    | -579    | -585    | -286    | -472    | -735    | -832    | -2,895   | -1,898   | -2,325   | -2,918   |
| Net income (A)           | 912     | 1,393   | 1,819   | 1,840   | 899     | 1,482   | 2,309   | 2,615   | 9,095    | 5,963    | 7,305    | 9,169    |
| <b>% of revenue</b>      |         |         |         |         |         |         |         |         |          |          |          |          |
| Gross profit             | 8%      | 9%      | 9%      | 8%      | 8%      | 9%      | 9%      | 9%      | 10%      | 9%       | 9%       | 9%       |
| Operating income         | 2%      | 3%      | 4%      | 4%      | 2%      | 4%      | 4%      | 4%      | 5%       | 3%       | 4%       | 4%       |
| Net income (A)           | 2%      | 2%      | 3%      | 2%      | 2%      | 2%      | 3%      | 3%      | 3%       | 2%       | 3%       | 3%       |
| <b>QoQ growth %</b>      |         |         |         |         |         |         |         |         |          |          |          |          |
| Revenue                  | -31%    | 5%      | 17%     | 12%     | -27%    | 3%      | 35%     | 12%     |          |          |          |          |
| Gross profit             | -41%    | 23%     | 15%     | 3%      | -32%    | 23%     | 35%     | 10%     |          |          |          |          |
| Operating income         | -67%    | 58%     | 32%     | 1%      | -53%    | 71%     | 59%     | 14%     |          |          |          |          |
| Net income (A)           | -65%    | 53%     | 31%     | 1%      | -51%    | 65%     | 56%     | 13%     |          |          |          |          |
| <b>YoY growth %</b>      |         |         |         |         |         |         |         |         |          |          |          |          |
| Revenue                  | -6%     | -9%     | -22%    | -6%     | 0%      | -1%     | 13%     | 14%     | 26%      | -11%     | 7%       | 12%      |
| Gross profit             | -15%    | -15%    | -30%    | -14%    | 0%      | -1%     | 17%     | 24%     | 35%      | -20%     | 11%      | 17%      |
| Operating income         | -40%    | -22%    | -46%    | -29%    | -2%     | 7%      | 28%     | 44%     | 60%      | -36%     | 24%      | 27%      |
| Net income (A)           | -38%    | -21%    | -45%    | -28%    | -1%     | 6%      | 27%     | 42%     | 57%      | -34%     | 22%      | 26%      |

Source: BofA Global Research estimates, company data

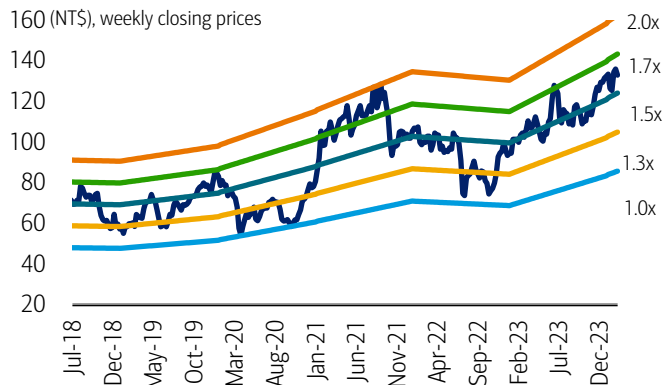
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## PO and valuation discussions

We base our new PO of NT\$137 on 1.5x average 2024/25E P/E. Despite the near-term cyclical headwinds in the low season, we are constructive on ASE's solidified position in advanced packaging space, which is one of the critical technologies in AI era. As such, we apply a higher target 24/25E P/B multiple of 1.5x (1.3x earlier) on ASE this time.

### Exhibit 10: 12-month forward P/B

The stock trades at ~1.6x 2024E P/B

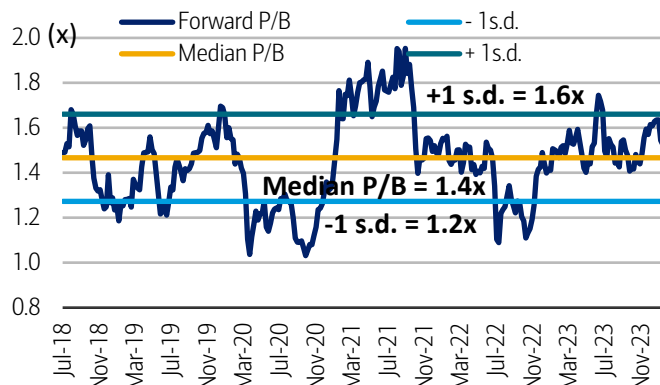


Source: BofA Global Research estimates, Bloomberg

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### Exhibit 11: 12-month forward P/B with +1 to -1 standard deviation

Current P/B (1.6x 2024E) is 1SD above the historical level since 2018



Source: BofA Global Research estimates, Bloomberg

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### Exhibit 12: Valuation comparison

ASE's 2024E P/B is slightly lower than global OSAT peers, while its ROE figure is higher

| Ticker                     | Company   | Share price (LC) | Rating  | Mkt cap (US\$mn) | EPS (LC) |       | PER (X)     |             | PBR (X)    |            | Div. yield (%) |            | ROE (%)     |             | EV/EBITDA  |            |
|----------------------------|-----------|------------------|---------|------------------|----------|-------|-------------|-------------|------------|------------|----------------|------------|-------------|-------------|------------|------------|
|                            |           |                  |         |                  | 2024E    | 2025E | 2024E       | 2025E       | 2024E      | 2025E      | 2024E          | 2025E      | 2024E       | 2025E       | 2024E      | 2025E      |
| <b>China OSAT</b>          |           |                  |         |                  |          |       |             |             |            |            |                |            |             |             |            |            |
| 600584 CH                  | JCET      | 22.7             | BUY     | 5,645            | 1.46     | 1.90  | 15.5        | 11.9        | 1.4        | 1.3        | 0.9            | 0.9        | 9.4         | 11.0        | 6.7        | 5.8        |
| 002156 CH                  | TFME      | 18.7             | NC      | 3,938            | 0.57     | 0.88  | 32.9        | 21.1        | 1.9        | 1.8        | 0.4            | 0.8        | 5.6         | 8.2         | 7.9        | 6.7        |
| 002185 CH                  | TSHT      | 6.5              | NC      | 2,900            | 0.15     | 0.26  | 43.6        | 25.0        | 1.3        | 1.2        | 0.2            | 0.4        | 2.9         | 4.9         | 8.3        | 6.8        |
| 603005 CH                  | WLCSP     | 16.2             | NC      | 1,468            | 0.50     | 0.67  | 32.6        | 24.1        | 2.4        | 2.2        | 0.6            | n.a.       | 6.8         | 8.9         | 14.6       | n.a.       |
| <b>China OSAT average</b>  |           |                  |         |                  |          |       | <b>31.2</b> | <b>20.5</b> | <b>1.7</b> | <b>1.6</b> | <b>0.5</b>     | <b>0.7</b> | <b>6.2</b>  | <b>8.2</b>  | <b>9.4</b> | <b>6.4</b> |
| <b>Global OSAT</b>         |           |                  |         |                  |          |       |             |             |            |            |                |            |             |             |            |            |
| 3711 TT                    | ASE       | 133.0            | BUY     | 18,611           | 10.48    | 13.36 | 12.7        | 10.0        | 1.6        | 1.4        | 4.9            | 6.2        | 15.5        | 16.0        | 5.9        | 5.1        |
| 6239 TT                    | Powertech | 145.5            | Neutral | 3,525            | 10.26    | 11.64 | 14.2        | 12.5        | 1.8        | 1.7        | 4.8            | 5.2        | 13.2        | 13.8        | 4.7        | 4.5        |
| 2449 TT                    | KYEC      | 82.7             | BUY     | 3,227            | 6.40     | 8.08  | 12.9        | 10.2        | 2.4        | 2.1        | 5.1            | 6.3        | 19.7        | 22.1        | 5.4        | 4.7        |
| 6147 TT                    | Chipbond  | 71.4             | NC      | 1,697            | 6.19     | 7.27  | 11.5        | 9.8         | 1.2        | 1.1        | 4.7            | 5.2        | 9.5         | 11.3        | 5.5        | 4.8        |
| 3264 TT                    | Ardentec  | 73.0             | NC      | 1,142            | n.a.     | n.a.  | n.a.        | n.a.        | n.a.       | n.a.       | n.a.           | n.a.       | n.a.        | n.a.        | n.a.       | n.a.       |
| 8150 TT                    | ChipMOS   | 42.3             | NC      | 981              | 3.59     | 5.03  | 11.8        | 8.4         | 1.2        | 1.1        | 4.5            | 6.1        | 11.7        | 13.2        | 4.8        | 4.2        |
| 6257 TT                    | Sigurd    | 66.6             | NC      | 971              | 4.63     | 5.89  | 14.4        | 11.3        | n.a.       | n.a.       | n.a.           | n.a.       | 10.1        | 12.0        | n.a.       | n.a.       |
| AMKR US                    | Amkor     | 31.7             | NC      | 7,781            | 2.00     | 2.89  | 15.8        | 10.9        | 1.8        | 1.6        | 1.1            | 1.2        | 13.1        | 15.2        | 5.6        | 4.4        |
| <b>Global OSAT average</b> |           |                  |         |                  |          |       | <b>13.3</b> | <b>10.5</b> | <b>1.7</b> | <b>1.5</b> | <b>4.2</b>     | <b>5.0</b> | <b>13.3</b> | <b>14.8</b> | <b>5.3</b> | <b>4.6</b> |

Source: BofA Global Research estimates, company data, Bloomberg. NC = not covered

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## Price objective basis & risk

### ASE Technology Holding (XSRIF / ASX)

We value ASE Technology Holding at NT\$137 per share (US\$9.3 for ADR), based on 1.5x 2024/25E average P/B (at mid-end of its historical range), in view of solidified industry position in AI era despite weak industry momentum in the near-term during low season 1Q. We use P/B ratio to value ASE as we believe asset based valuation can more accurately reflect ASE's improvement in its operation, profitability and return following a major acquisition.

Downside risks to our PO are 1) share loss and/or ASP erosion owing to Chinese players' cannibalization and/or ASE's worsening execution, 2) weakening end demand due to uncontrollable matters, such as macro halt and/or geopolitical tensions, 3) regulatory issues that could hinder ASE from generating synergies and benefit its competitors.

## Analyst Certification

I, Brad Lin, hereby certify that the views expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

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### APR - Semiconductor Coverage Cluster

| Investment rating | Company                     | BofA Ticker | Bloomberg symbol | Analyst        |
|-------------------|-----------------------------|-------------|------------------|----------------|
| BUY               | Alchip                      | ALCPF       | 3661 TT          | Mike Yang      |
|                   | ASE Technology Holding      | XSRIF       | 3711 TT          | Brad Lin       |
|                   | ASE Technology Holding -ADR | ASX         | ASX US           | Brad Lin       |
|                   | ASMPT                       | ASMVF       | 522 HK           | Simon Woo, CFA |
|                   | Crystal Clear               | XPPTF       | 300655 CH        | Dai Shen       |
|                   | eMemory                     | XYLWF       | 3529 TT          | Mike Yang      |
|                   | Faraday                     | FDYTF       | 3035 TT          | Mike Yang      |
|                   | Global Unichip Corp.        | GBUHF       | 3443 TT          | Mike Yang      |
|                   |                             |             |                  |                |





**APR - Semiconductor Coverage Cluster**

| <b>Investment rating</b> | <b>Company</b>                           | <b>BofA Ticker</b> | <b>Bloomberg symbol</b> | <b>Analyst</b> |
|--------------------------|--|--------------------|-------------------------|----------------|
|                          | GlobalWafers                             | XWLF               | 6488 TT                 | Brad Lin       |
|                          | Hwatsing Technology                      | XSNIF              | 688120 CH               | Dai Shen       |
|                          | JCET Group Co Ltd                        | XJIEF              | 600584 CH               | Mike Yang      |
|                          | King Yuan Electronics Corp.              | KYUFF              | 2449 TT                 | Angela Huang   |
|                          | Kingsemi                                 | XKSQF              | 688037 CH               | Dai Shen       |
|                          | LX Semicon                               | XLXSF              | 108320 KS               | Simon Woo, CFA |
|                          | Maxscend                                 | XMMSF              | 300782 CH               | Daley Li, CFA  |
|                          | MediaTek                                 | MDTKF              | 2454 TT                 | Brad Lin       |
|                          | Montage Technology                       | XRDF               | 688008 CH               | Daley Li, CFA  |
|                          | Nanya Technology                         | NNYAF              | 2408 TT                 | Simon Woo, CFA |
|                          | Novatek                                  | NVKMF              | 3034 TT                 | Brad Lin       |
|                          | Parade                                   | PRDWF              | 4966 TT                 | Mike Yang      |
|                          | Realtek                                  | RLTKF              | 2379 TT                 | Brad Lin       |
|                          | Samsung Elec -G                          | SSNHZ              | SMSN LI                 | Simon Woo, CFA |
|                          | Samsung Electronics                      | SSNLF              | 005930 KS               | Simon Woo, CFA |
|                          | Samsung Electronics Preferred            | SSNNF              | 005935 KS               | Simon Woo, CFA |
|                          | Silicon Motion                           | SIMO               | SIMO US                 | Simon Woo, CFA |
|                          | SK Hynix                                 | HXSCF              | 000660 KS               | Simon Woo, CFA |
|                          | Taiwan Semiconductor Manufacturing Co.   | TSM                | TSM US                  | Brad Lin       |
|                          | Taiwan Semiconductor Manufacturing Co.   | TSMWF              | 2330 TT                 | Brad Lin       |
|                          | United Microelectronics Corp.            | XUMIF              | 2303 TT                 | Brad Lin       |
|                          | United Microelectronics Corp.            | UMC                | UMC US                  | Brad Lin       |
|                          | Will Semiconductor                       | XXHQF              | 603501 CH               | Dai Shen       |
|                          | Winbond Electronics                      | WBEKF              | 2344 TT                 | Dai Shen       |
|                          | Wonik IPS                                | XRHQF              | 240810 KS               | Simon Woo, CFA |
| <b>NEUTRAL</b>           |  |                    |                         |                |
|                          | ASMedia Technology Inc.                  | XZSFF              | 5269 TT                 | Mike Yang      |
|                          | Aspeed                                   | XLKMF              | 5274 TT                 | Mike Yang      |
|                          | Macronix International                   | MXICF              | 2337 TT                 | Dai Shen       |
|                          | Powertech Technology                     | XPPZF              | 6239 TT                 | Simon Woo, CFA |
|                          | Soulbrain                                | XSBOF              | 357780 KS               | Simon Woo, CFA |
|                          | Vanguard International Semiconductor Co  | VGILF              | 5347 TT                 | Mike Yang      |
| <b>UNDERPERFORM</b>      |  |                    |                         |                |
|                          | GigaDevice                               | XGXIF              | 603986 CH               | Daley Li, CFA  |
|                          | Hangzhou Silan Microelectronics          | XDFRF              | 600460 CH               | Mike Yang      |
|                          | Hua Hong Semi                            | HHUSF              | 1347 HK                 | Mike Yang      |
|                          | Ingenic                                  | XISCF              | 300223 CH               | Dai Shen       |
|                          | Lion Electronics                         | XDHFF              | 605358 CH               | Dai Shen       |
|                          | Phison Electronics                       | PISNF              | 8299 TT                 | Simon Woo, CFA |
|                          | Powerchip Semiconductor Manufacturing Co | XCHPF              | 6770 TT                 | Mike Yang      |
|                          | Shenzhen Goodix                          | XQPLF              | 603160 CH               | Mike Yang      |
|                          | Silegy Corp.                             | SLEGF              | 6415 TT                 | Brad Lin       |
|                          | VeriSilicon                              | XMLZF              | 688521 CH               | Mike Yang      |
|                          | Win Semiconductors                       | XWIF               | 3105 TT                 | Brad Lin       |



## iQmethod<sup>SM</sup> Measures Definitions

### Business Performance

Return On Capital Employed

Return On Equity

Operating Margin

Earnings Growth

Free Cash Flow

### Numerator

NOPAT = (EBIT + Interest Income) × (1 – Tax Rate) + Goodwill Amortization

Net Income

Operating Profit

Expected 5 Year CAGR From Latest Actual

Cash Flow From Operations – Total Capex

### Denominator

Total Assets – Current Liabilities + ST Debt + Accumulated Goodwill

Amortization

Shareholders' Equity

Sales

N/A

N/A

### Quality of Earnings

Cash Realization Ratio

Asset Replacement Ratio

Tax Rate

Net Debt-To-Equity Ratio

Interest Cover

### Numerator

Cash Flow From Operations

Capex

Tax Charge

Net Debt = Total Debt – Cash &amp; Equivalents

EBIT

### Denominator

Net Income

Depreciation

Pre-Tax Income

Total Equity

Interest Expense

### Valuation Toolkit

Price / Earnings Ratio

Price / Book Value

Dividend Yield

Free Cash Flow Yield

Enterprise Value / Sales

### Numerator

Current Share Price

Current Share Price

Annualised Declared Cash Dividend

Cash Flow From Operations – Total Capex

EV = Current Share Price × Current Shares + Minority Equity + Net Debt +

Other LT Liabilities

Enterprise Value

### Denominator

Diluted Earnings Per Share (Basis As Specified)

Shareholders' Equity / Current Basic Shares

Current Share Price

Market Cap = Current Share Price × Current Basic Shares

Sales

Basic EBIT + Depreciation + Amortization

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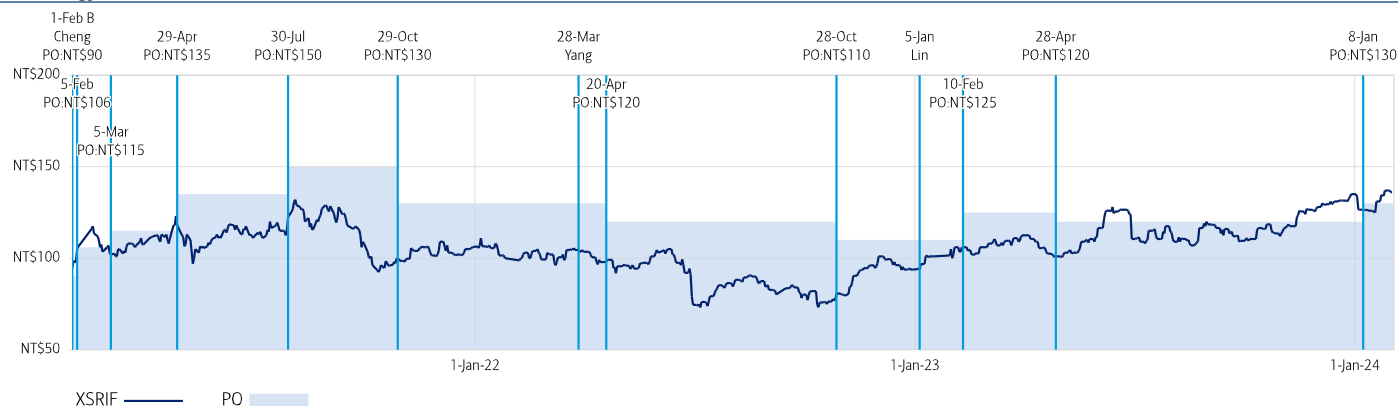
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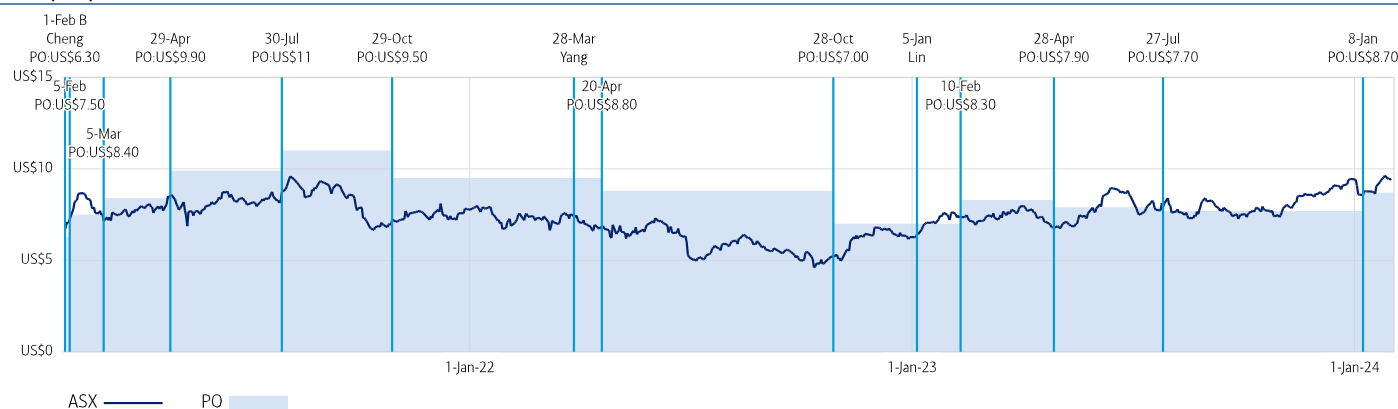
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### ASE Technology (XSRIF) Price Chart



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### ASE -ADR (ASX) Price Chart



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| Coverage Universe | Count | Percent | Inv. Banking Relationships <sup>R1</sup> | Count | Percent |
|-------------------|-------|---------|--|-------|---------|
| Buy               | 215   | 53.09%  | Buy                                      | 111   | 51.63%  |
| Hold              | 97    | 23.95%  | Hold                                     | 45    | 46.39%  |
| Sell              | 93    | 22.96%  | Sell                                     | 24    | 25.81%  |

### Equity Investment Rating Distribution: Global Group (as of 31 Dec 2023)

| Coverage Universe | Count | Percent | Inv. Banking Relationships <sup>R1</sup> | Count | Percent |
|-------------------|-------|---------|--|-------|---------|
| Buy               | 1895  | 53.62%  | Buy                                      | 1083  | 57.15%  |
| Hold              | 832   | 23.54%  | Hold                                     | 454   | 54.57%  |
| Sell              | 807   | 22.84%  | Sell                                     | 383   | 47.46%  |

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|-------------------|---|--|
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