

## US Semiconductors

## Auto semis: NXPI/ON Preview, speedbump ahead though valuations attractive

Price Objective Change

## Weak near-term demand trends for NXPI and ON

Maintain Buy but lower estimates and PO for auto-focused NXPI (top pick) and ON, both reporting the week of Feb-5<sup>th</sup>. Warnings from peers TXN, MCHP and muted EV growth-rates (Tesla) and flattish CY24E vehicle production suggest elevated level of auto (and some industrial) inventory. We cut Q1 estimates hard, though possible some weakness could spread until Q2, with industry recovery more likely in 2H. However, we continue to like auto semis longer-term since: 1) Reasonable "trough" valuation: even with reduced estimates, implied CY24E PE at 18x and CY25E at 13-14x seem compelling relative to prior downcycles (and even more compelling relative to 25-30x CY24E multiples of analog peers TXN/ADI); 2) Longer-term secular content growth drivers: semis represent just ~2-3% of the bill of materials of a car with prospects of much higher value capture as cars adopt more EV/advanced driving capabilities; and 3) Diversification from AI: while much of semis is being driven by AI, we think auto/industrial exposed stocks offer a measure of diversification and hence key parts of 3C's, Cloud, Cars, Complexity thematic approach in semis (see our [year ahead report](#) for more details and top picks).

## NXPI: Top pick but lowering estimates, PO to \$255

The ~30% peak-trough correction in industrial and ~10% correction in auto across peers TXN/ADI/MCHP guide our estimate adjustment process. First, for NXPI: we lower CQ1'24E sales to \$2.9bn (-13% QoQ) from \$3.2bn (-5% QoQ) prior, and below current consensus at \$3.3bn. Recall NXPI had high-level guided Q1 sales to down mid to upper single digit QoQ, so we are now well below that view. Carrying forward Q1 cuts to the full year now places our CY24E sales at \$12.5bn, -5% YoY, with pf-EPS at \$12.19, 16% lower than \$14.47 prior. For CY25E we no model pf-EPS at \$14.65 or 15% lower than \$17.19 prior. Lower PO to \$255 from \$280 prior, on 20x CY25E EV/FCF, higher than 19x prior (historical range 16x-32x), since despite lower EPS, we believe CY24E/25E FCF margins can expand with improvements in working capital (was a drain in CY23E).

## ON: Maintain Buy, lower estimates, PO to \$85

The biggest change in our ON forecast is to its Silicon Carbide (SiC) products which we lower to \$1.1bn from \$1.5bn prior. The new implied 30-40% YoY growth (vs. 60-70% YoY) prior is more in line with peer STMicro that reported earlier today. Excluding SiC, we model ON's auto/industrial sales to decline -10% YoY. We cut Q1 overall sales to \$1.8bn, -10% QoQ, from \$1.93bn prior, including the ~30% peak-trough reduction in ON's industrial sales in line with trends at industrial/analog peers. Overall for CY24E we now model ON's sales at \$7.7bn, -6.5% YoY, with pf-EPS reduced by -15% to \$4.14 from \$4.89 prior, and below consensus at \$4.78. For CY25E we also lower pf-EPS by -9% to \$5.36 from \$5.90 prior. Lower PO to \$85 from \$100, based on 16x CY25E PE, lower than 17x prior due to slower growth, though still in line with ON's 7x-27x trading range. Upside could come from ON's progress towards its 53% I-t GM target (vs. our CY24/25/26E at 44%/47%/48%) and attractive exposure to not only EV but also energy infrastructure, driving I-t EPS power in the \$6-7/sh range.

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Equity  
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Semiconductors

**Vivek Arya**  
Research Analyst  
BofAS  
+1 646 855 1755  
[vivek.arya@bofa.com](mailto:vivek.arya@bofa.com)

**Blake Friedman**  
Research Analyst  
BofAS  
+1 646 556 1850  
[blake.friedman@bofa.com](mailto:blake.friedman@bofa.com)

**Duksan Jang**  
Research Analyst  
BofAS  
+1 646 556 4825  
[duksan.jang@bofa.com](mailto:duksan.jang@bofa.com)

**Lauren Guy**  
Research Analyst  
BofAS  
+1 646 855 4273  
[lauren.guy2@bofa.com](mailto:lauren.guy2@bofa.com)

## Exhibit 1: Price objective changes

Lower POs on Weak near-term demand trends

Ticker	Company	Old	New
NXPI	NXP Semiconductors	\$280	\$255
ON	ON Semiconductor	\$100	\$85

Source: BofA Global Research

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## Glossary:

NXPI: NXP Semiconductor

ON: onsemi

PO: Price Objective

TXN: Texas Instruments

MCHP: Microchip

EV: Electric Vehicle

PE: Price/EPS

ADI: Analog Devices

AI: Artificial Intelligence

EPS: Earnings Per Share

FCF: Free Cash Flow

SiC: Silicon Carbide

GM: Gross Margin

# Summary of Model Changes

## Exhibit 2: NXPI model changes

We take CY24E/25E sales down -8%/-9% each

		Sales (\$mn)				EPS (Non-GAAP, ex-options)		
	Old	NEW	delta		Old	NEW	delta	
Mar-24E	\$3,178	\$2,907	(\$271)		\$3.11	\$2.55	(\$0.56)	
Jun-24E	\$3,321	\$3,037	(\$284)		\$3.44	\$2.86	(\$0.57)	
Sep-24E	\$3,552	\$3,255	(\$297)		\$3.85	\$3.29	(\$0.56)	
Dec-24E	\$3,648	\$3,345	(\$303)		\$4.09	\$3.51	(\$0.58)	
FY24E	\$13,699	\$12,544	(\$1,155)		\$14.47	\$12.19	(\$2.27)	
YoY %	3.4%	-4.9%	-8.4%		3.6%	-11.9%	-15.7%	
Mar-25E	\$3,633	\$3,322	(\$311)		\$4.12	\$3.51	(\$0.61)	
Jun-25E	\$3,691	\$3,373	(\$317)		\$4.19	\$3.56	(\$0.63)	
Sep-25E	\$3,792	\$3,466	(\$326)		\$4.39	\$3.74	(\$0.65)	
Dec-25E	\$3,838	\$3,509	(\$329)		\$4.50	\$3.84	(\$0.66)	
FY25E	\$14,953	\$13,670	(\$1,283)		\$17.19	\$14.65	(\$2.54)	
YoY %	9.2%	9.0%	-8.6%		18.9%	20.1%	-14.8%	

Source: BofA Global Research estimates, company reports

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## Exhibit 3: ON model changes

We tweak CY24E/25E sales down -6%/-4% each

	Sales (\$mn)				EPS (Non-GAAP, incl. options)		
	OLD	NEW	delta	OLD	NEW	delta	
Mar-24E	\$1,929	\$1,807	(\$121)	\$1.08	\$0.90	(\$0.18)	
Jun-24E	\$2,025	\$1,898	(\$127)	\$1.18	\$0.99	(\$0.18)	
Sep-24E	\$2,126	\$1,992	(\$134)	\$1.30	\$1.11	(\$0.19)	
Dec-24E	\$2,135	\$2,000	(\$134)	\$1.33	\$1.13	(\$0.19)	
Dec-24E	\$8,214	\$7,697	(\$517)	\$4.89	\$4.14	(\$0.75)	
YoY%	-0.3%	-6.5%	-6.3%	-4.3%	-18.9%	-15.3%	
Mar-25E	\$2,147	\$2,055	(\$91)	\$1.35	\$1.22	(\$0.13)	
Jun-25E	\$2,212	\$2,118	(\$94)	\$1.42	\$1.29	(\$0.13)	
Sep-25E	\$2,307	\$2,209	(\$97)	\$1.54	\$1.41	(\$0.14)	
Dec-25E	\$2,356	\$2,257	(\$99)	\$1.59	\$1.45	(\$0.14)	
Dec-25E	\$9,021	\$8,640	(\$382)	\$5.90	\$5.36	(\$0.54)	
YoY%	9.8%	12.2%	-4.2%	20.6%	29.4%	-9.1%	

Source: BofA Global Research estimates, company reports

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# S&P Auto Production Forecast

## Exhibit 4: S&P auto production forecast

S&P is forecasting auto production declines of nearly 1% YoY in 2024

Auto Production, S&P	2023Q1	2023Q2	2023Q3	2023Q4	2024Q1	2024Q2	2024Q3	2024Q4	'16	'17	'18	'19	'20	'21	'22	'23	'24E	'25E
<b>Units (mn)</b>																		
China	5.9	6.7	7.5	8.6	6.3	7.2	6.9	8.2	27.1	27.7	26.6	24.4	23.3	24.6	26.2	28.6	28.7	29.9
Europe	4.6	4.7	3.9	4.6	4.4	4.5	4.0	4.5	21.5	22.2	22.0	21.2	16.6	15.9	15.8	17.8	17.4	17.5
North America	3.9	4.1	3.9	3.7	4.0	4.1	3.9	3.8	17.8	17.1	17.0	16.3	13.0	13.0	14.3	15.6	15.8	16.2
RoW	7.0	6.8	7.2	7.0	6.8	6.8	7.1	7.1	26.7	28.1	28.6	27.1	21.7	23.7	26.1	28.0	27.7	28.0
<b>Total</b>	<b>21.4</b>	<b>22.2</b>	<b>22.6</b>	<b>23.9</b>	<b>21.5</b>	<b>22.7</b>	<b>21.9</b>	<b>23.5</b>	<b>93.1</b>	<b>95.2</b>	<b>94.2</b>	<b>89.0</b>	<b>74.6</b>	<b>77.2</b>	<b>82.3</b>	<b>90.1</b>	<b>89.6</b>	<b>91.5</b>
<b>QoQ (%)</b>																		
China	(18.4%)	13.5%	12.6%	14.2%	(26.6%)	14.7%	(4.1%)	18.7%										
Europe	7.4%	0.4%	(15.8%)	17.3%	(3.3%)	1.8%	(11.9%)	12.6%										
North America	9.5%	5.0%	(3.5%)	(5.2%)	6.5%	3.7%	(4.5%)	(3.9%)										
RoW	2.1%	(2.7%)	6.6%	(3.2%)	(3.4%)	1.2%	3.1%	(0.1%)										
<b>Total</b>	<b>(2.4%)</b>	<b>3.8%</b>	<b>1.8%</b>	<b>5.8%</b>	<b>(10.1%)</b>	<b>5.8%</b>	<b>(3.6%)</b>	<b>7.5%</b>										
<b>YoY (%)</b>																		
China	(4.8%)	22.2%	2.5%	19.0%	7.1%	8.3%	(7.8%)	(4.1%)	14.3%	2.4%	(4.0%)	(8.2%)	(4.4%)	5.3%	6.4%	9.4%	0.1%	4.2%
Europe	18.4%	17.2%	8.1%	6.6%	(4.0%)	(2.8%)	1.7%	(2.5%)	2.7%	3.2%	(1.0%)	(3.8%)	(21.7%)	(4.1%)	(0.4%)	12.5%	(2.0%)	0.2%
North America	9.5%	15.1%	8.1%	5.1%	2.2%	1.0%	(0.1%)	1.3%	2.0%	(4.3%)	(0.6%)	(3.8%)	(20.2%)	0.2%	9.6%	9.5%	1.1%	2.3%
RoW	10.7%	12.6%	4.5%	2.5%	(3.0%)	0.9%	(2.4%)	0.8%	(0.0%)	5.5%	1.7%	(5.5%)	(20.0%)	9.3%	10.1%	7.4%	(1.0%)	1.1%
<b>Total</b>	<b>7.2%</b>	<b>16.8%</b>	<b>5.0%</b>	<b>9.1%</b>	<b>0.5%</b>	<b>2.4%</b>	<b>(3.1%)</b>	<b>(1.5%)</b>	<b>4.8%</b>	<b>2.2%</b>	<b>(1.0%)</b>	<b>(5.6%)</b>	<b>(16.1%)</b>	<b>3.5%</b>	<b>6.7%</b>	<b>9.4%</b>	<b>(0.5%)</b>	<b>2.1%</b>

Source: S&P Global

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## Exhibit 5: Stocks mentioned in report

Summary of stocks mentioned in report

BofA Ticker	Bloomberg ticker	Company name	Price	Rating
ADI	ADI US Equity	Analog Devices	\$197.30	B-1-7
MCHP	MCHP US Equity	Microchip	\$89.65	B-1-7
NXPI	NXPI US Equity	NXP Semiconductor	\$220.06	B-1-7
ON	ON US Equity	onsemi	\$72.69	C-1-9
TXN	TXN US Equity	Texas Instruments	\$167.42	B-2-7

Source: Bloomberg, BofA Global Research

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## Price objective basis & risk

### Analog Devices Inc. (ADI)

Our \$225 PO is based on 34x CY2025E EV/FCF, within its historical 15x-33x range, and justified based on ADI's best in class profitability and differentiated/secular comms exposure.

Downside risks to our price objective: 1) Economic downturn, which could reduce demand for automotive, industrial products, impacting gross margins, especially given recent capital expenditures and higher fixed cost footprint. 2) Inability to realize the planned cost synergies from the Maxim combination. 3) Competition from larger vendors, such as TXN, which have lower-cost production facilities.



**Microchip (MCHP)**

We assign a \$105 PO based on 24x our 2025E EV/FCF. This is in line with the comparable peers trading at 16x-27x range and justified due to MCHP's mix of growth, execution, profitability, and leverage, which is in line with/quickly approaching analog peers.

Upside risks to our PO: FCF returns that are the upper end of the peer group, but not fully reflected in the company's multiple which trades at a discount to peers, inflecting/greater FCF growth going forward as MCHP deleverages its balance sheet and accelerates returns to shareholders. Downside risks to our PO: macro headwinds related to trade/COVID-19, increased competition capping any market share gains, tougher compares, GMs approaching the upper end of historical range and long term model

**NXP Semiconductors NV (NXPI)**

Our PO of \$255 is based on 20x 2025E EV/FCF, in line with median diversified auto/industrial compares which trade in a range of 16x-32x CY24E EV/FCF.

Downside risks: 1) Semiconductor cycle risks, 2) Lumpy nature of projects in key identification segment, 3) Some exposure to and growth driven by Apple, which could add volatility, 4) Execution risk surrounding management's capability to reengage following two-year hiatus, 5) Macroeconomic supply/demand disruption.

**onsemi (ON)**

Our PO of \$85 PO is based on 16x 2025E P/E, in line with ON's 7x-27x trading range, in our view justified given improving profitability, though partially offset by the heavier capex required for SiC ramp.

Downside risks to our PO are: 1) Macro/cyclical risks, given high exposure to automotive and industrial markets, make ON susceptible to any potential global trade tensions/tariffs, 2) Prolonged COVID-19 headwinds limiting pace of automotive/industrial recovery, impacting utilization levels, 3) Difficulty in ramping 300mm fabrication facility limiting gross margin improvement, 4) sustained elevated capex levels relative to peers.

**Texas Instruments Inc. (TXN)**

Our \$175 PO is based on 41x CY25E EV/FCF. At high-end of its historical 15x-42x range, which we believe is warranted based on TXN's best in class FCF generation and returns, and based on incremental cash flow from US CHIPS Act grants.

Risks to our price objective: 1) Macro/cyclical risks given high exposure to automotive, industrial, and telco capex markets, also makes TXN susceptible to any potential global trade tensions/tariffs, 2) Increasing capex intensity and higher depreciation burden could be a headwind to gross margins, 3) Increased R&D spending pressure to maintain an edge versus the competition, 4) Inventory cycles and potential double ordering by customers that can often create mismatches between real supply and demand, 5) Exposure to several mature markets such as PC and other consumer.

**Analyst Certification**

I, Vivek Arya, 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.

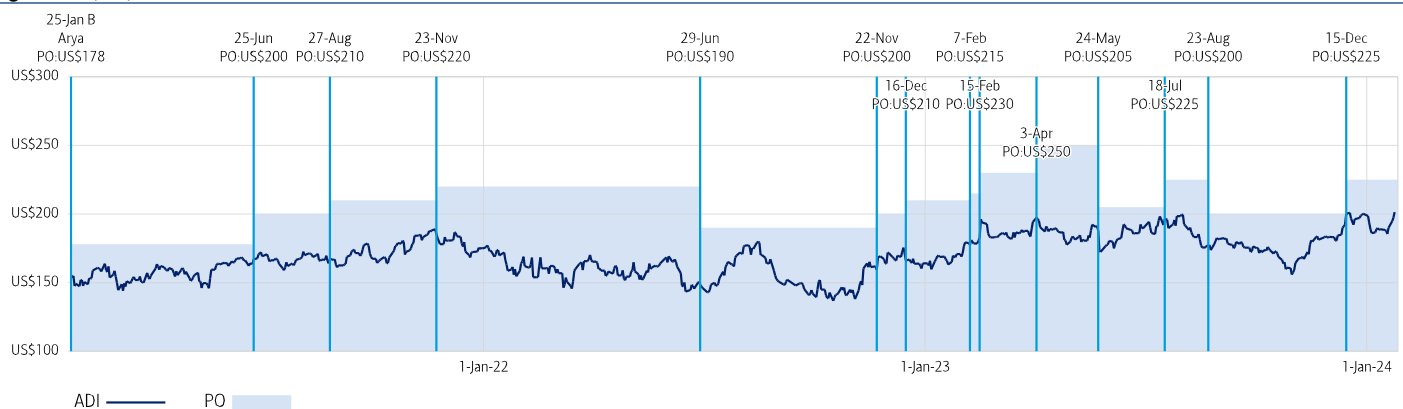
## US - Semiconductors and Semiconductor Capital Equipment Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
<b>BUY</b>				
	Advanced Micro Devices, Inc	AMD	AMD US	Vivek Arya
	Analog Devices Inc.	ADI	ADI US	Vivek Arya
	Applied Materials, Inc.	AMAT	AMAT US	Vivek Arya
	Arm Holdings	ARM	ARM US	Vivek Arya
	Broadcom Inc	AVGO	AVGO US	Vivek Arya
	Cadence	CDNS	CDNS US	Vivek Arya
	Camtek	CAMT	CAMT US	Vivek Arya
	KLA Corporation	KLAC	KLAC US	Vivek Arya
	Lam Research Corp.	LRCX	LRCX US	Vivek Arya
	M/A-Com	MTSI	MTSI US	Vivek Arya
	Marvell Technology Group Ltd.	MRVL	MRVL US	Vivek Arya
	Microchip	MCHP	MCHP US	Vivek Arya
	Micron Technology, Inc	MU	MU US	Vivek Arya
	Nova	NVMI	NVMI US	Vivek Arya
	NVIDIA Corporation	NVDA	NVDA US	Vivek Arya
	NXP Semiconductors NV	NXPI	NXPI US	Vivek Arya
	onsemi	ON	ON US	Vivek Arya
	Synopsys	SNPS	SNPS US	Vivek Arya
<b>NEUTRAL</b>				
	Advanced Energy Industries	AEIS	AEIS US	Duksan Jang
	Allegro MicroSystems	ALGM	ALGM US	Blake Friedman
	Axcelis Technologies	ACLS	ACLS US	Duksan Jang
	Coherent Corp	COHR	COHR US	Vivek Arya
	GlobalFoundries	GFS	GFS US	Vivek Arya
	Intel	INTC	INTC US	Vivek Arya
	Lattice Semiconductor	LSCC	LSCC US	Blake Friedman
	Texas Instruments Inc.	TXN	TXN US	Vivek Arya
<b>UNDERPERFORM</b>				
	Ambarella	AMBA	AMBA US	Vivek Arya
	Credo Technology	CRDO	CRDO US	Vivek Arya
	Lumentum Holdings	LITE	LITE US	Vivek Arya
	Qorvo Inc.	QRVO	QRVO US	Vivek Arya
	Skyworks Solutions, Inc.	SWKS	SWKS US	Vivek Arya
	Teradyne	TER	TER US	Vivek Arya
	Wolfspeed Inc	WOLF	WOLF US	Vivek Arya

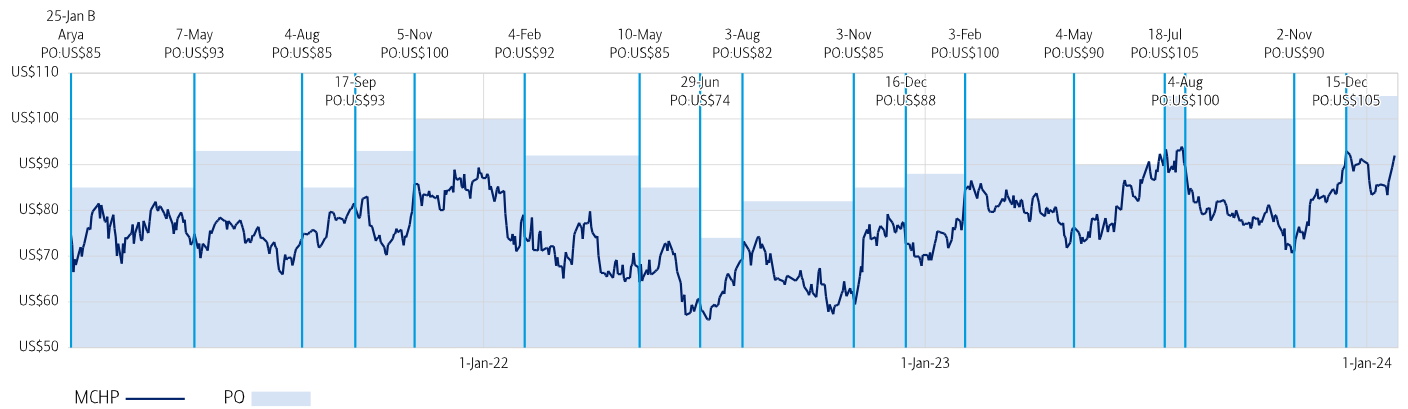
## Disclosures

## Important Disclosures

## Analog Devices (ADI) Price Chart

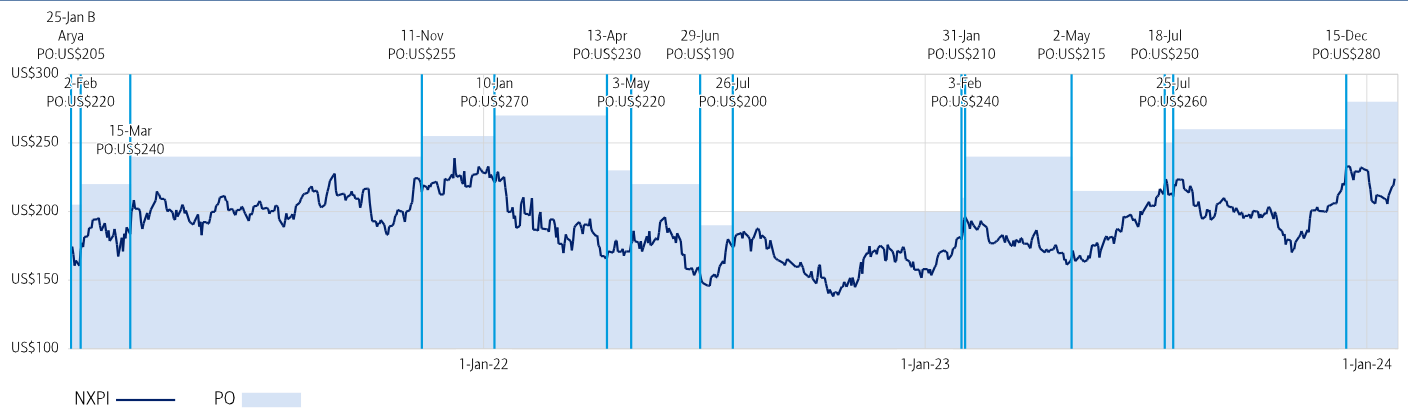


The Investment Opinion System is contained at the end of the report under the heading "Fundamental Equity Opinion Key". Dark grey shading indicates the security is restricted with the opinion suspended. Medium grey shading indicates the security is under review with the opinion withdrawn. Light grey shading indicates the security is not covered. Chart is current as of a date no more than one trading day prior to the date of the report.

**Microchip (MCHP) Price Chart**

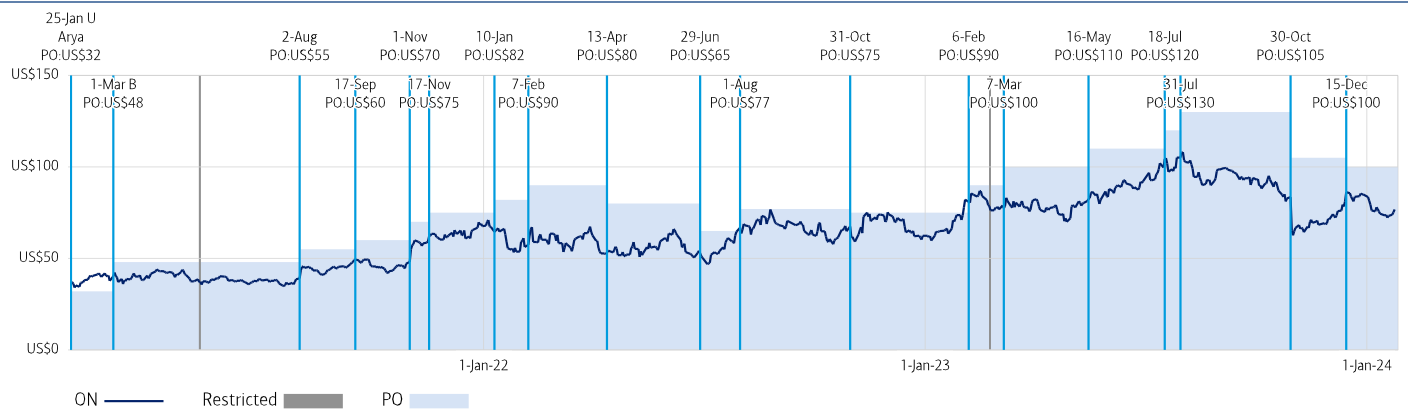
B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

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**NXP Semiconductors (NXPI) Price Chart**

B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

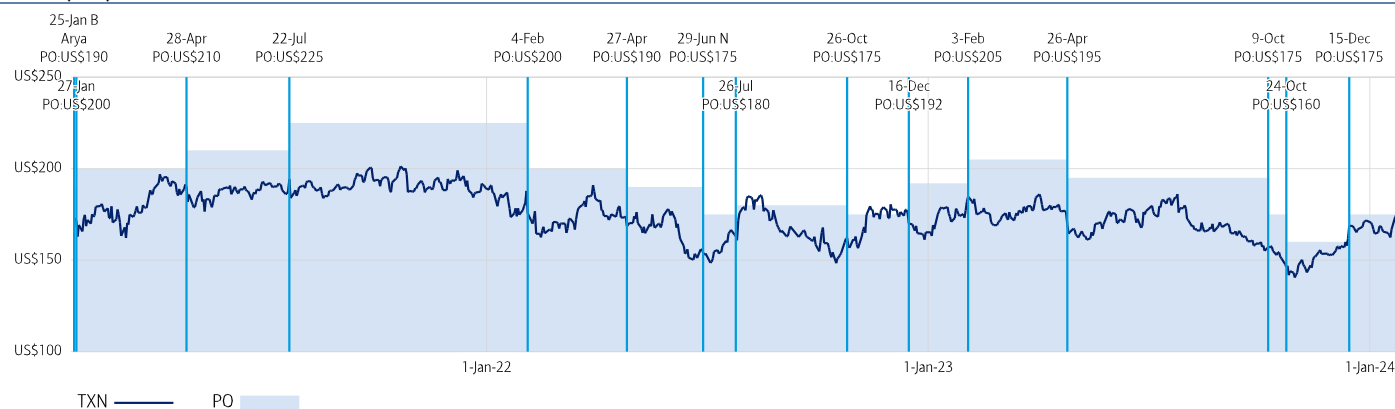
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**ON Semiconductor (ON) Price Chart**

B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

The Investment Opinion System is contained at the end of the report under the heading "Fundamental Equity Opinion Key". Dark grey shading indicates the security is restricted with the opinion suspended. Medium grey shading indicates the security is under review with the opinion withdrawn. Light grey shading indicates the security is not covered. Chart is current as of a date no more than one trading day prior to the date of the report.

## Texas Instr. (TXN) Price Chart



B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

The Investment Opinion System is contained at the end of the report under the heading "Fundamental Equity Opinion Key". Dark grey shading indicates the security is restricted with the opinion suspended. Medium grey shading indicates the security is under review with the opinion withdrawn. Light grey shading indicates the security is not covered. Chart is current as of a date no more than one trading day prior to the date of the report.

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

Coverage Universe	Count	Percent	Inv. Banking Relationships <sup>R1</sup>	Count	Percent
Buy	32	54.24%	Buy	13	40.63%
Hold	11	18.64%	Hold	3	27.27%
Sell	16	27.12%	Sell	4	25.00%

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

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%

<sup>R1</sup> Issuers that were investment banking clients of BofA Securities or one of its affiliates within the past 12 months. For purposes of this Investment Rating Distribution, the coverage universe includes only stocks. A stock rated Neutral is included as a Hold, and a stock rated Underperform is included as a Sell.

**FUNDAMENTAL EQUITY OPINION KEY:** Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. **VOLATILITY RISK RATINGS**, indicators of potential price fluctuation, are: A - Low, B - Medium and C - High. **INVESTMENT RATINGS** reflect the analyst's assessment of both a stock's absolute total return potential as well as its attractiveness for investment relative to other stocks within its Coverage Cluster (defined below). Our investment ratings are: 1 - Buy stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; 2 - Neutral stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and 3 - Underperform stocks are the least attractive stocks in a coverage cluster. An investment rating of 6 (No Rating) indicates that a stock is no longer trading on the basis of fundamentals. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster <sup>R2</sup>
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

<sup>R2</sup> Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

**INCOME RATINGS**, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure), 8 - same/lower (dividend not considered to be secure) and 9 - pays no cash dividend. **Coverage Cluster** is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Global Research report referencing the stock.

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