

Semiconductor WEEK:

March 11, 2022

An overview of results and conclusions from recent reports at TechInsights

Chip Market Research Services

The industry soars but carries a tether of caution...

- Order activity for semiconductor equipment slipped half a point as Memory activity fell for the second week in a row
- Capacity Utilization Rates

Semiconductor Analytics

Last Week in the Semiconductor Market:

Semiconductor sales rose above a 13-week MA annual rate of 40% while matching the 34% peak of Dec 2017. The IC weather was mixed, cooling 1°F last week.

Zooming in on Logic this week, 13-wk MA growth has risen into the 30% Y/Y range. Growth is forecast to slow and finish 2022 around +15% Y/Y while reaching \$293B.

TechInsights' IC Supply/Demand indices tightened up last week, with NAND, OSAT, and Analog & Power rising from Tight to Shortage conditions. More Moore Foundry jumped 2 levels from Saturated to Balanced. Unchanged were DRAM, More than Moore Foundry, IDM, and Auto IC. Overall conditions remain Tight, where they have been since 24 Sep 21.

Electronics' Retail Prices continue to soar.

Chip History Center

The lady bug and the microchip... A children's story about microns and nanometers.

What's ALD? A children's story... Did you know that the chip makers routinely make films one atom at a time?

Bunny Suit History in Semiconductor Manufacturing In 1968, standard clean room practices were lax.

The Chip Insider

Strategy and Tactics: Planned Capacity Additions: Is there too much on the books?

Semiconductor Stocks

- *TechInsights' Semiconductor Stock Indices fell further this week and the S&P 500 hit a yearly low*
- *Semiconductor Stock Index sunk*
- *Semiconductor Equipment Stock Index fell*
- *EDA Stock Index plummeted*
- *Electronics Materials Stock Index eked out a gain*
 - *SOITEC, BASF, and CMC Materials came out on top*
- *Hottest Stocks: SOITEC, BASF, Nikon, ASM International, CMC Materials, and Infineon*

TechInsights

The Chip Insider[®]'s Graphics File



February 2022

The industry soars but carries a tether of caution...

- Order activity for semiconductor equipment slipped half a point as Memory activity fell for the second week in a row
- TechInsights' Chip Price Performance Index surged in the first week of March



Forecast as of February 2022:	2021	2022
Semi Equipment (\$B):	\$ 124.0	\$ 149.2
Sequential Change	34.2%	20.3%
Capacity Utilization:	97.2%	96.9%
ICs (\$B):	\$ 492.3	\$ 568.2
Sequential Change	27.4%	15.4%
IC Units (BU):	394.2	439.0
Sequential Change	23.7%	11.4%
Electronics (\$B) :	\$ 2,557	\$ 2,739
Sequential Change	18.1%	7.1%

[Contact us to access more details](#)

TechInsights

Workforce Development Solutions...

with Ajit Manocha of SEMI



What the conversation is about:

- Labor shortages have become the echo pandemic from the ravages COVID has had on the economy.
- This is no truer than in the semiconductor industry, where Workforce Development has long been on the To-Do lists of many.
- Most industry efforts appear to be more about lobbying others to do something about workforce development.
- It's really hard to do something substantive about it but SEMI is.

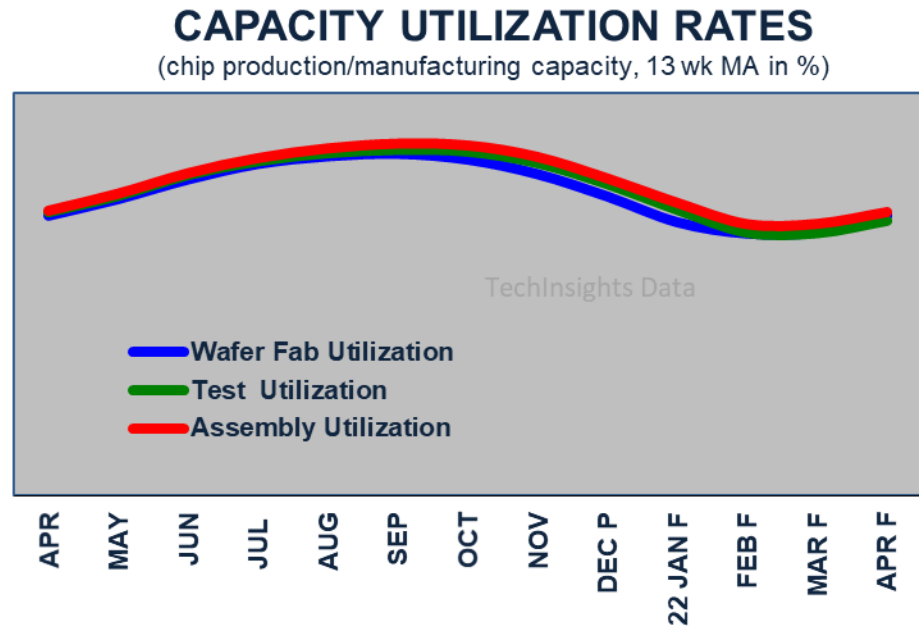
[Click here to watch online](#) or on the weVISION button in VLSI's mobile app

The Chip Insider[®] Graphics

Capacity Utilization Rates:

- Utilization rates peaked in September 2021

Capacity Utilization Rates: chart gives rolling averages for semiconductor wafer fab, test, and assembly



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Semiconductor Analytics

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Electronics' Retail Prices continue to soar.

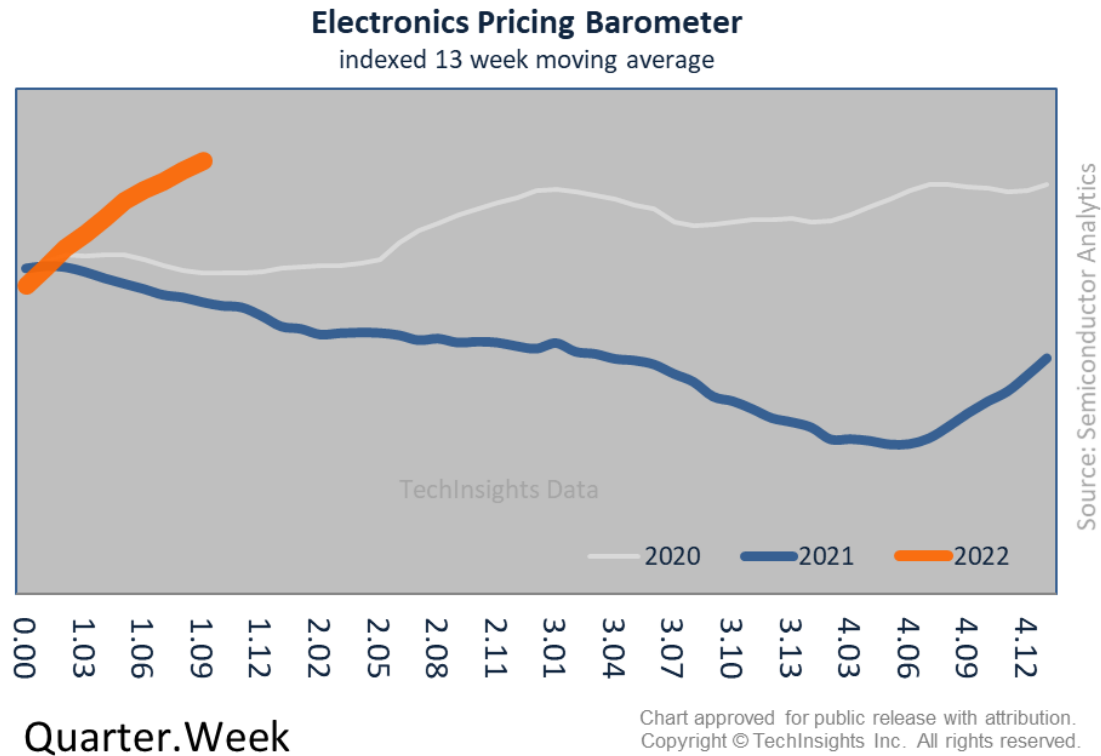


1: Measures Order Activity 2: Measures Pricing Power

Electronics Retail Pricing Trends:

for PC notebooks Tablets Smartphones Cell phones Digital Cameras Appliances TVs

Electronics' Retail
Prices continue to soar.



Innovation in Memory ...

with Scott DeBoer of Micron
Technology



What the conversation is about:

- Scott DeBoer of Micron Technology has a conversation with Dan Hutcheson about what it takes to innovate in Memory today. Scott leads Micron's global technology development and engineering efforts – from silicon design to high-value system solutions.

[Click here to watch online](#) or on the weVISION button in VLSI's mobile app

Strategy & Tactics



Strategy and Tactics: *Planned Capacity Additions: Is there too much on the books?*

Summaries:

Planned Capacity Additions: *Is there too much on the books? That's the question every chip insider has been quietly asking recently. IR pros are being relentlessly hammered by investment analysts who have concluded it must be the case that too much capacity will come on-line in 2022, leading to an evaporation of equipment demand in the second half. Ranking positive year-over-year growth in silicon production from 1996 to 2021 shows this is not as likely as many believe. If you include 2021/22 to calculate the probability of value growth after a growth year in silicon production, the result is a 50:50 chance RPSI will be positive in the following year. Exclude 2021/22, since 22 is a forecast, and there is a 45% chance RPSI will be positive in the following year.*

weVISION Innovation in Memory ... with Scott DeBoer of Micron Technology: *Innovation in semiconductor memory never gets easier, especially when R&D teams have to bring both DRAM and NAND technology to market. Yet Micron's ability to continuously advance has kept it in a leadership position since its founding. Scott DeBoer of Micron Technology has a conversation with Dan Hutcheson about what it takes to innovate in Memory today. Click here [weVISION](#) to view.*
VLSIinsiders: Semiconductor Downturn Horizon 2022 Semiconductor Forecast Memory Technology Forecast – NOW available as downloadable podcasts on the VLSI Smartphone app.

*"The only thing we have to fear is...fear itself —
nameless, unreasoning, unjustified terror which paralyzes
needed efforts to convert retreat into advance"
— Franklin D. Roosevelt's 1933 inaugural address*

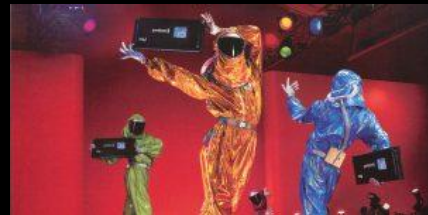
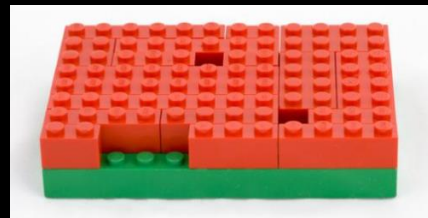
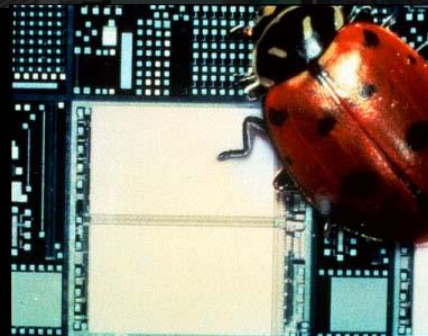
[Contact us to get the full report and more](#)



The lady bug and the microchip ... Little Lil had heard that microchips had things as small as a micrometer and even as small as a handful of nanometers ... A children's story about microns and nanometers that traces Little Lil the ladybug and her journey across a silicon wafer and down into a semiconductor integrated circuit. It was created to help kids get a visual sense out of what micrometers and nanometers are compared to the things they encounter everyday.

What's ALD? A children's story ... Did you know that the chip makers routinely make films one atom at a time? It's called Atomic Layer Deposition. It sounds very complicated, but this story makes it so simple even a child could understand.

Bunny Suit History in Semiconductor Manufacturing In 1968, standard clean room practices were lax. Facilities were kept reasonably clean, but employees wore their own clothes and the environment was not sterile. An early technician remembered "a couple of people.... bringing pizzas in and setting them on top of the diffusion furnaces to keep them warm." Eventually bunny suits that sealed particles in would be required to maintain semiconductor yields. Here's a history of that evolution from Intel



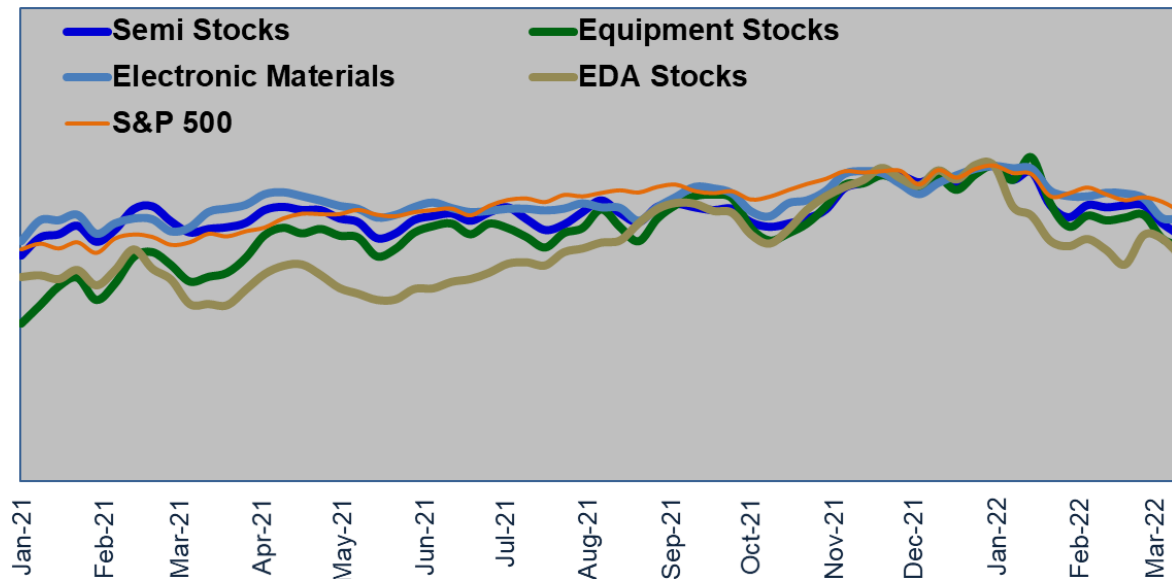
semiStockWEEK:

TechInsights' Semiconductor Stock Indices fell further this week and the S&P 500 hit a yearly low, as inflation rates continue to soar and geopolitical concerns remain.



Semiconductor Industry Stock Performance Indices

(Stock Prices Indexed to 100 in last week of 2021)



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TechInsights' Stock Indices:

Semiconductors -3.7%
Equipment -2.2%
Electronic Materials +0.3%
EDA -5.7%

Memory Market Forecast 2022...

with Jim Handy of Objective Analysis



What the conversation is about:

- In this video conversation, Dan talks with Jim about how 2021 unfolded, how it was different, and what he expects will happen in the markets for DRAM and NAND in 2022. Jim has been one of our most popular guests and is one of the most respected memory analysts in the world.

[Click here to watch online](#) or on the weVISION button in VLSI's mobile app

Semiconductor Stocks:

Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			3/11/2022		
Semiconductor Stocks	Price Change	Forward P/E	Semiconductor Stocks	Price Change	Forward P/E
IDM			Fab-lite to Fabless		
Intel	-4.7%	13	AMD	-3.8%	23
Micron	-11.1%	7	Analog Devices	-5.9%	17
ON Semiconductor	-4.2%	13	Broadcom	-3.0%	16
Samsung Electronics	-2.1%	—	IBM	-2.1%	12
SK hynix	-6.0%		Infineon	0.7%	13
STMicroelectronics	0.2%	11	MagnaChip Semiconductor	-4.9%	12
Western Digital	-9.9%	6	MaxLinear	-2.7%	14
Foundry & OSAT			MediaTek	-6.1%	—
Amkor	-1.4%	8	NVIDIA	-3.6%	34
ASE	-1.4%	9	Panasonic	-3.4%	9
GLOBALFOUNDRIES	-3.7%	22	Qualcomm	-6.1%	13
JCET	-5.5%	16	Silicon Laboratories	-2.0%	43
SkyWater Technology	-4.1%	—	Skyworks	-6.1%	11
SMIC	0.0%	12	Texas Instruments	0.2%	18
TSMC	-3.5%	16			
UMC	-2.7%	9			

Above Avg

Top 4-6

Top 1-3

TechInsights' Semiconductor Stock Index

sunk to yearly lows this week, Infineon came out on top as one of this week's top performers. The only other companies to finish in positive territory were STMicroelectronics, Texas Instruments, and SMIC was flat.

IDM -5.4%

Foundry & OSAT -2.8%

Fabless & Fablite -3.5%

AMD^{AMD} Analog Devices^{ADI} Amkor^{AMKR} ASE^{ASE}
 ASX^{ASX} Broadcom^{AVGO} GLOBALFOUNDRIES^{GFS}
 IBM^{IBM}
 Infineon^{IFNNY.PK} Intel^{INTC} JCET^{600584.SS}
 Micron Technology^{MU} On Semiconductor^{ON}
 Panasonic^{PC} MagnaChip Semiconductor^{MX}
 MaxLinear^{MXL} MediaTek^{2454.TW}
 NVIDIA^{NVDA} Qualcomm^{QCOM}
 Samsung Electronics^{005930.KS} Silicon
 Laboratories^{SLAB} SkyWater Technology^{SKYT}
 Skyworks^{SWKS} SMIC^{SMI}
 STMicroelectronics^{STM} Texas Instruments^{TXN}
 TSMC^{TSM} UMC^{UMC} STMicroelectronics^{STMicroelectronics} Western Digital^{WDC}

Chip Equipment & Related Stocks:

Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			3/11/2022		
Equipment Stocks	Price Change	Forward P/E	Equipment Stocks	Price Change	Forward P/E
Wafer Fab:			Test:		
Applied Materials	-1.7%	13	Advantest	-5.2%	–
ASM International	2.1%	20	Teradyne	-4.4%	17
ASML	-1.4%	26	FormFactor	-1.0%	20
KLA	-2.7%	14			
Lam Research	-8.1%	14	Assembly:		
Onto Innovation	-1.0%	–	BESI	-4.0%	–
Nikon	2.3%	–	Kulicke & Soffa	-0.1%	9
TEL	-3.3%	–	ASM Pacific Technology	-2.5%	
Veeco Instruments	-0.3%	14			

Above Avg

Top 4-6

Top 1-3

TechInsights' Semiconductor Equipment Stock Index also fell to yearly lows this week. Nikon and ASM International were two of the top six stock performers this week and were the only Equipment companies to finish the week in the positive.

WFE -1.6%

Test -3.5%

Assembly -2.2%

Applied Materials ^{AMAT} Advantest ^{ATEYY}
 ASM International ^{ASMIY}
 ASM Lithography ^{ASML} ASM Pacific ^{0522.HK}
 BE Semiconductor ^{BESIY.PK}
 FormFactor ^{FORM} KLA ^{KLAC}
 Kulicke & Soffa ^{KLIC} Lam Research ^{LRCX}
 Onto Innovation ^{ONTO} Nikon ⁷⁷³¹
 Teradyne ^{TER} Tokyo Electron Limited ⁸⁰³⁵
 Veeco ^{VECO}

Electronic Materials Stocks:

Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			3/11/2022		
EDA & Electronic Materials Stocks	Price Change	Forward P/E	EDA & Electronic Materials Stocks	Price Change	Forward P/E
EDA			DNP	-1.4%	—
Cadence	-6.3%	37	DuPont de Nemours	-2.5%	5
Synopsys	-5.0%	34	JSR	-2.8%	—
Ansys	-5.7%	35	Shin-Etsu	0.6%	—
Electronic Materials			SOITEC	9.7%	—
BASF	3.6%	2	Tokyo Ohka	-6.1%	—
CMC Materials	1.4%	21			
			Above Avg	Top 4-6	Top 1-3

TechInsights' EDA Stock Index plummeted this week.

TechInsights' Electronic Materials Stock Index eked out a gain thanks to SOITEC, BASF, and CMC Materials.

Ansys, Inc. ^{ANSS} BASF ^{BASFY}
 CMC Materials ^{CCMP} Cadence ^{CDNS}
 DNP ⁷⁹¹² DuPont ^{DD} JSR ⁴¹⁸⁵
 Shin-Etsu ⁴⁰⁶³ SOITEC ^{SOI.PA}
 Synopsys ^{SNPS} Tokyo Ohka ⁴¹⁸⁶

The Prior Week's Close	TechInsights' Indices of Chip Industry Stocks				Weekly Growth				Companies Up	Max Growth	Companies Down	Min Growth	Range of Growth	S&P 500	S&P 500 Growth
	Semi Stocks	Equipment Stocks	Materials Stocks	EDA Stocks	Semi Stocks	Equipment Stocks	Materials Stocks	EDA Stocks							
06-Aug-21	91.4	88.9	89.6	80.6	3.4%	5.6%	-1.1%	1.9%	46	29.1%	-8	-14.3%	43.4%	93.1	0.9%
13-Aug-21	88.2	84.4	89.4	81.1	-3.5%	-5.0%	-0.1%	0.6%	15	3.7%	-40	-14.0%	17.7%	93.7	0.7%
20-Aug-21	85.9	80.8	86.2	85.5	-2.6%	-4.3%	-3.6%	5.4%	7	8.1%	-48	-13.5%	21.6%	93.2	-0.6%
27-Aug-21	89.7	86.6	89.6	89.0	4.5%	7.1%	4.0%	4.2%	52	36.9%	-2	-4.3%	41.2%	94.6	1.5%
03-Sep-21	90.5	90.0	92.2	90.6	0.8%	4.0%	2.9%	1.7%	33	23.7%	-21	-6.0%	29.7%	95.2	0.6%
10-Sep-21	89.6	92.2	94.7	90.4	-1.0%	2.4%	2.7%	-0.2%	24	11.4%	-29	-8.1%	19.5%	93.5	-1.7%
17-Sep-21	88.9	92.6	94.3	88.6	-0.8%	0.4%	-0.4%	-2.0%	23	5.5%	-30	-6.8%	12.3%	93.0	-0.6%
24-Sep-21	89.2	91.7	93.1	88.1	0.3%	-1.0%	-1.3%	-0.5%	22	5.8%	-30	-5.2%	11.0%	93.5	0.5%
01-Oct-21	85.8	84.2	88.6	82.6	-3.8%	-8.2%	-4.8%	-6.2%	6	4.3%	-48	-14.7%	19.0%	91.4	-2.2%
08-Oct-21	84.7	81.0	87.3	80.3	-1.4%	-3.8%	-1.5%	-2.8%	15	2.9%	-39	-14.3%	17.2%	92.1	0.8%
15-Oct-21	85.5	82.8	90.6	83.9	1.0%	2.2%	3.8%	4.4%	39	8.1%	-14	-11.8%	19.9%	93.8	1.8%
22-Oct-21	86.8	85.3	91.3	88.9	1.5%	3.0%	0.8%	5.9%	40	15.7%	-14	-11.6%	27.3%	95.4	1.6%
29-Oct-21	89.0	89.6	93.7	92.2	2.6%	5.0%	2.6%	3.8%	38	24.6%	-16	-8.3%	32.9%	96.6	1.3%
05-Nov-21	94.4	95.0	98.0	94.6	6.1%	6.1%	4.6%	2.5%	45	30.5%	-8	-29.8%	60.3%	98.6	2.0%
12-Nov-21	95.9	95.5	98.7	96.4	1.5%	0.4%	0.7%	1.9%	31	8.5%	-16	-12.1%	20.6%	98.3	-0.3%
19-Nov-21	98.3	97.5	98.2	99.4	2.6%	2.1%	-0.4%	3.2%	39	12.2%	-16	-16.8%	29.0%	98.6	0.3%
26-Nov-21	97.7	96.0	95.5	96.8	-0.6%	-1.6%	-2.8%	-2.7%	16	11.8%	-39	-9.6%	21.4%	98.6	0.1%
03-Dec-21	95.9	94.5	92.9	95.0	-1.9%	-1.6%	-2.7%	-1.9%	12	6.0%	-44	-11.1%	17.1%	95.2	-3.5%
10-Dec-21	97.5	96.9	95.7	98.8	1.6%	2.6%	3.0%	4.0%	40	13.2%	-15	-7.5%	20.7%	98.9	3.8%
17-Dec-21	94.7	93.8	97.7	96.5	-2.9%	-3.2%	2.1%	-2.3%	12	25.6%	-43	-15.6%	41.2%	96.9	-1.9%
24-Dec-21	98.6	97.7	99.3	100.2	4.1%	4.2%	1.7%	3.8%	50	13.8%	-6	-2.8%	16.6%	99.2	2.3%
31-Dec-21	100.0	100.0	100.0	100.0	1.5%	2.3%	0.7%	-0.2%	44	8.1%	-11	-2.7%	10.8%	100.0	0.9%
07-Jan-22	96.6	96.3	99.4	89.7	-3.4%	-3.7%	-0.6%	-10.3%	10	7.4%	-45	-17.5%	24.9%	98.1	-1.9%
14-Jan-22	98.5	102.0	99.3	87.4	2.0%	5.9%	-0.1%	-2.5%	36	23.7%	-20	-4.9%	28.6%	97.8	-0.3%
21-Jan-22	90.1	90.4	93.8	81.0	-8.5%	-11.4%	-5.6%	-7.3%	3	5.1%	-53	-20.3%	25.4%	92.3	-5.7%
28-Jan-22	87.1	84.5	92.4	79.7	-3.4%	-6.6%	-1.5%	-1.7%	11	5.0%	-45	-21.8%	26.8%	93.0	0.8%
04-Feb-22	90.2	87.3	92.3	81.5	3.5%	3.3%	-0.1%	2.3%	41	17.5%	-13	-4.3%	21.8%	94.4	1.6%
11-Feb-22	89.6	86.1	93.2	78.7	-0.7%	-1.4%	1.0%	-3.4%	20	10.6%	-33	-8.9%	19.5%	92.7	-1.8%
18-Feb-22	90.1	86.8	93.0	75.0	0.6%	0.8%	-0.2%	-4.7%	28	12.2%	-26	-7.0%	19.2%	91.2	-1.6%
25-Feb-22	90.1	87.5	91.9	82.5	0.0%	0.8%	-1.3%	9.9%	30	14.7%	-25	-9.5%	24.2%	92.0	0.8%
04-Mar-22	85.3	81.4	86.8	81.5	-5.3%	-6.9%	-5.5%	-1.2%	7	6.4%	-48	-18.6%	25.0%	90.8	-1.3%
11-Mar-22	82.1	79.7	87.1	76.9	-3.7%	-2.2%	0.3%	-5.7%	9	9.7%	-45	-11.1%	20.8%	88.2	-2.9%

Links to Conference Call Transcripts

March 11th

[Western Digital Corporation \(WDC\) Presents at Morgan Stanley 2022 Technology, Media & Telecom Conference \(Transcript\)](#)

[Cisco Systems, Inc. \(CSCO\) Management Presents at Morgan Stanley Technology, Media and Telecom Conference 2022 Transcript](#)

[International Business Machines Corporation \(IBM\) Management Presents at Morgan Stanley Technology, Media and Telecom Brokers Conference 2022 \[Transcript\]](#)

[Texas Instruments Incorporated \(TXN\) CEO Rich Templeton Presents at Morgan Stanley 2022 Technology, Media & Telecom Conference \(Transcript\)](#)

[IDT Corporation \(IDT\) CEO Shmuel Jonas on Q2 2022 Results - Earnings Call Transcript](#)

[Lam Research Corporation's \(LRCX\) Management Presents at Morgan Stanley Technology, Media and Telecom Conference 2022 \(Transcript\)](#)

[NXP Semiconductors N.V. \(NXPI\) Presents at Morgan Stanley Tech Conference, San Francisco Conference \(Transcript\)](#)

[Intel Corporation \(INTC\) CEO Patrick Gelsinger Presents at Morgan Stanley Technology, Media and Telecom Conference 2022 \(Transcript\)](#)

[NVIDIA Corporation \(NVDA\) Presents at Morgan Stanley 2022 Technology, Media and Telecom Conference \(Transcript\)](#)

[Thermo Fisher Scientific Inc. \(TMO\) CEO Marc Casper on 42nd Annual Cowen Health Care Conference \(Transcript\)](#)

[Qorvo \(QRVO\) CEO, Bob Bruggeworth Presents at Raymond James 43rd Annual Institutional Investors Conference - Company Call Transcript](#)

Links to Conference Call Transcripts

March 4th and before

[Broadcom's \(AVGO\) CEO Hock Tan on Q1 2022 Results - Earnings Call Transcript](#)

[VAT Group AG \(VACNY\) CEO Mike Allison on Q4 2021 Results - Earnings Call Transcript](#)

[Dell Technologies Inc. \(DELL\) Management on Q4 2022 Results - Earnings Call Transcript](#)

[AIXTRON SE \(AIXXF\) CEO Felix Grawert on Q4 2021 Results - Earnings Call Transcript](#)

[ChipMOS TECHNOLOGIES INC. \(IMOS\) Q4 2021 Results - Earnings Call Transcript](#)

[ASM International NV \(ASMIY\) CEO Benjamin Loh on Q4 2021 Results - Earnings Call Transcript](#)

[SkyWater Technology, Inc. \(SKYT\) CEO Thomas Sonderman on Q4 2021 Results - Earnings Call Transcript](#)

[Lenovo Group Limited \(LNVGY\) CEO Yang Yuanqing On Q3 2022 Results - Earnings Call Transcript](#)

[ASM Pacific Technology Limited \(ASMFV\) CEO Robin Gerard Ng on Q4 2021 Results - Earnings Call Transcript](#)

[Agilent Technologies, Inc.'s \(A\) CEO Mike McMullen on Q1 2022 Results - Earnings Call Transcript](#)

[BE Semiconductor Industries N.V. \(BESIY\) CEO Richard Blickman on Q4 2021 Results - Earnings Call Transcript](#)

[Keysight Technologies, Inc. \(KEYS\) CEO Ronald Nersesian on Q1 2022 Results - Earnings Call Transcript](#)

[NVIDIA Corporation's \(NVDA\) CEO Jensen Huang on Q4 2022 Results - Earnings Call Transcript](#)

[Magnachip Semiconductor Corporation \(MX\) CEO YJ Kim on Q4 2021 Results - Earnings Call Transcript](#)

[Synopsys, Inc. \(SNPS\) CEO Aart de Geus on Q1 2022 Results - Earnings Call Transcript](#)

[Veeco Instruments Inc. \(VECO\) CEO Bill Miller on Q4 2021 Results - Earnings Call Transcript](#)

Links to Conference Call Transcripts

[Applied Materials, Inc.'s \(AMAT\) CEO Gary Dickerson on Q1 2022 Results - Earnings Call Transcript](#)
[Analog Devices, Inc. \(ADI\) CEO Vincent Roche on Q1 2022 Results - Earnings Call Transcript](#)
[Cohu, Inc. \(COHU\) CEO Luis Müller on Q4 2021 Results - Earnings Call Transcript](#)
[ASE Technology's \(ASX\) Management on Q4 2021 Results - Earnings Call Transcript](#)
[Advanced Energy Industries, Inc. \(AEIS\) CEO Steve Kelley on Q4 2021 Results - Earnings Call Transcript](#)
[GlobalFoundries Inc. \(GFS\) CEO Tom Caulfield on Q4 2021 Results - Earnings Call Transcript](#)
[Onto Innovation Inc. \(ONTO\) CEO Michael Plisinski on Q4 2021 Results - Earnings Call Transcript](#)
[DuPont de Nemours, Inc. \(DD\) CEO Ed Breen on Q4 2021 Results - Earnings Call Transcript](#)
[ams-OSRAM AG \(AMSSY\) CEO Alex Everke on Q4 2021 Results - Earnings Call Transcript](#)
[Axcelis Technologies, Inc.'s \(ACLS\) CEO Mary Puma on Q4 2021 Results - Earnings Call Transcript](#)
[ON Semiconductor Corporation \(ON\) CEO Hassane El-Khoury on Q4 2021 Results - Earnings Call Transcript](#)
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