

Semiconductor WEEK:

December 16, 2022

An overview of results and conclusions from recent reports at TechInsights

Chip Market Research Services

The outlook is gloomy as we head into 2023

- Order activity for semiconductor equipment continued to decline, falling to 52 degrees
- Production and Capacity

Semiconductor Analytics

Last Week in the Semiconductor Market:

Semiconductor sales fell further — now at 19% below 2021 — in a seasonal drop. The IC weather cooled 0°F in Cool conditions. Zooming in on Analog & Power this week, the 13-wk MA growth is at 14%. The market is bifurcated, with A&P and Auto in growth, while logic and memory decline. TechInsights forecasts Analog & Power sales will reach \$116B in 2023 with a Y/Y growth of 2%, coming off an increase of 19% in 2022.

TechInsights' IC Supply/Demand continued to loosen. Overall conditions held in tight. More than Moore Foundry weakened. Unchanged were Memory, IDM, More Moore Foundry, OSAT, Auto IC, and Analog & Power. Happy Holidays to all.

SemiWEEK will not be emailed or uploaded December 23rd and December 30th. SemiWEEK will return January 6th.

Chip History Center

People: **Sunlin Chou** on Intel's R&D Pipeline. The history of semiconductor research at **Intel** is discussed in this 2004 conversation

Power, Performance, Cost, and Moore's Law - How Power, Performance, and Cost relate to Moore's Law are discussed in this 2004 conversation with **Sunlin Chou**, who was then Senior VP and GM, Technology & Manufacturing Group at **Intel**

The Chip Insider

Strategy and Tactics: Questions & Answers: The Case for a Mild Slowing. How TSMC took the lead in EUV.

Semiconductor Stocks

- *TechInsights' Semiconductor Stock Indices tumbled this week.*
- *Semiconductor Stock Index tumbled*
- *Semiconductor Equipment Stock Index sunk*
- *EDA Stock Index was led up by Synopsys*
- *Electronics Materials Stock Index fell*
- *Hottest Stocks: JCET, SMIC, Broadcom, Veeco Instruments, Shin-Etsu, and Synopsys.*

TechInsights

Happy Holidays, SemiWEEK will return January 6th



Happy Holidays

*Wishing you all the
Hope, Wonder,
and Joy that the
Season can bring!*

Great Basin National Park,
Nevada. Ref no: NVgb0805_127

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WildPhotons: light life lessons

The Chip Insider[®]'s Graphics File



December 2022

The outlook is gloomy as we head into 2023

- Order activity for semiconductor equipment continued to decline, falling to 52 degrees
- There were some changes to the forecast in November. IC sales and units for 2022 were lowered to 4%
- TechInsights' Chip Price Performance Index extended its decline



This issue contains the latest forecast.

Forecast as of December 2022:	2022	2023
Semi Equipment (\$B):	\$ 136.9	\$ 118.1
Sequential Change	7.9%	-13.7%
Capacity Utilization:	95.0%	84.4%
ICs (\$B):	\$ 513.6	\$ 483.8
Sequential Change	4.3%	-5.8%
IC Units (BU):	409.2	398.2
Sequential Change	3.8%	-2.7%
Electronics (\$B) :	\$ 2,556	\$ 2,453
Sequential Change	-0.7%	-4.1%

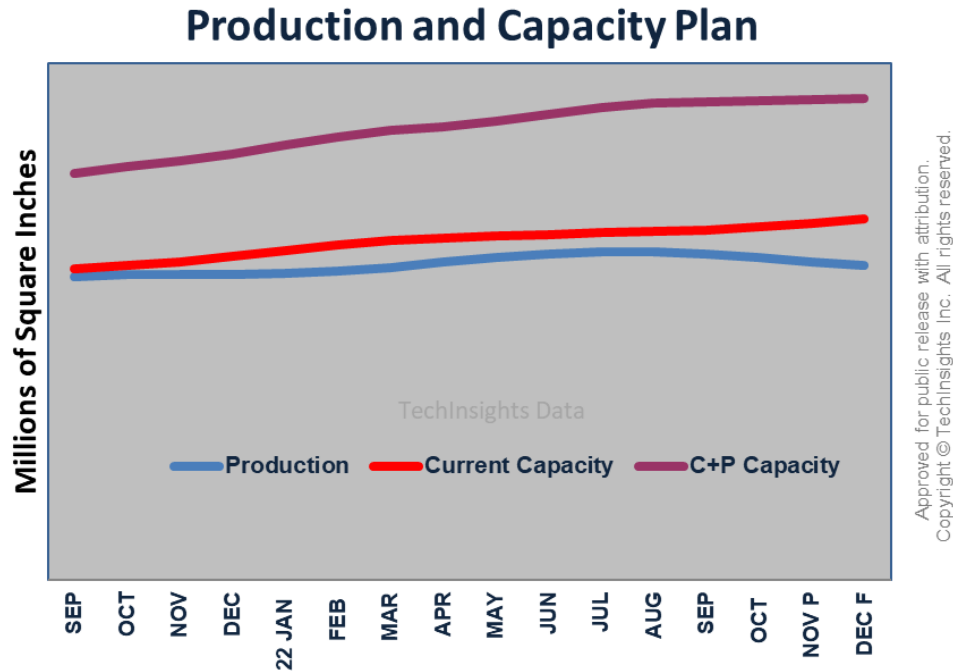
[Contact us to access more details](#)

The Chip Insider® Graphics

Production and Capacity Plan:

- Production is turning lower

Production and Capacity Plan: chart gives rolling averages for semiconductor production, currently active capacity, and current plus planned capacity in millions of square inches of silicon wafers.



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](#)

Semiconductor Analytics

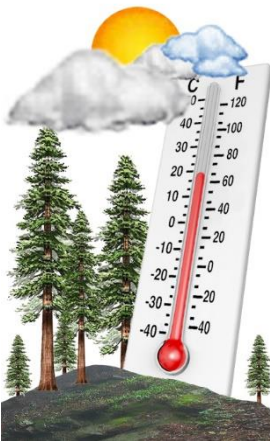
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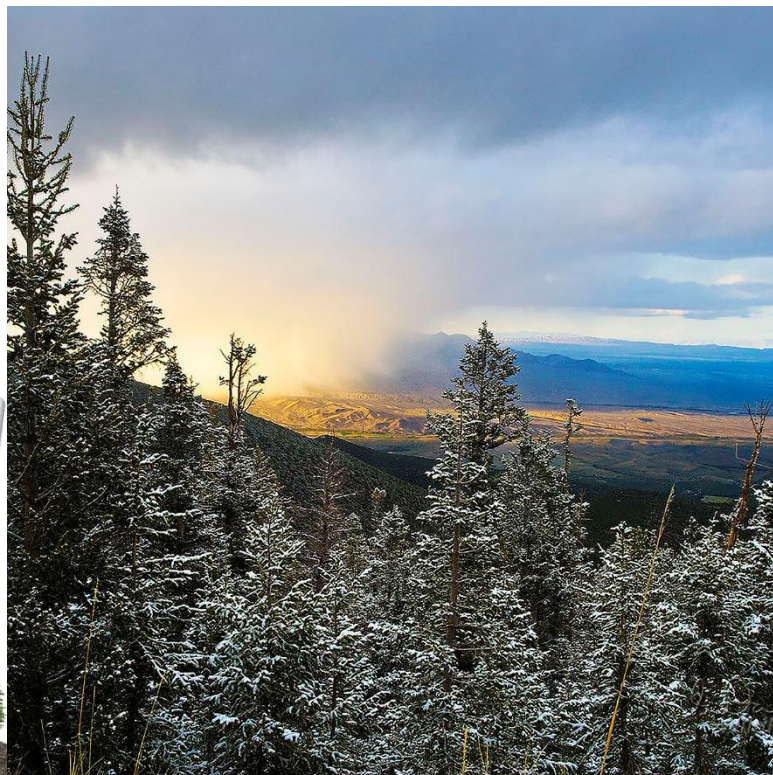
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Happy Holidays to all.



Thank you for supporting us through this last issue of 2022. Semiconductor Analytics will return in January .

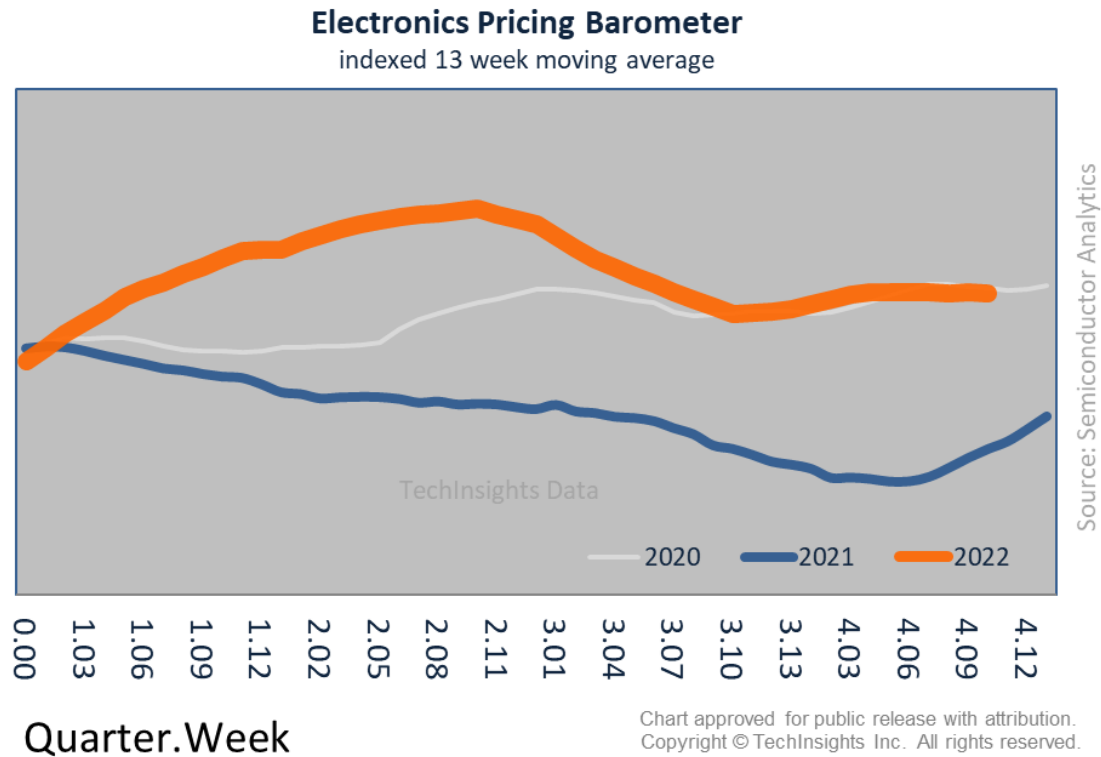


IC Weather Measures Order Activity S/D Measures Pricing Power

Electronics Retail Pricing Trends:

for PC notebooks Tablets Smartphones Cell phones Digital Cameras Appliances TVs

Electronics' Retail
Prices have peaked
before the holidays.



Strategy & Tactics



Strategy and Tactics: Questions & Answers: The Case for a Mild Slowing. How TSMC took the lead in EUV.

Questions & Answers:

The Case for a Mild Slowing in 2023 (2 Dec 2022): Read Dan's article but am confused. Is Dan just offering up a possibility or will TechInsights be changing your 2023 forecast? ... It was a great article so naturally it spurs questions on what it means for us...

How TSMC took the lead in EUV: Hi Dan, One of the more interesting questions of the last decade is how Intel and GF decided not to invest in EUV and TSMC and Samsung did. Imagine you are a fly on the wall at an Intel or GF boardroom, and your staff is using the Cost of Ownership model to decide your next gen Litho tool set...

“Strategy requires a sense of the whole that reveals the significance of respective parts.”

— John Lewis Gaddis

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

TechInsights



People: Sunlin Chou on [Intel's R&D Pipeline](#). The history of semiconductor research at Intel is discussed in this 2004 conversation. Learn how Intel systematically turned research into gold with the approach they developed called the "pipeline." At the core of Sunlin's values is the belief that all problems should be dealt with systematically and this is exactly how he dealt with the issue of reviving Intel's prowess after the 1985 debacle ...

[Power, Performance, Cost, and Moore's Law](#) - How Power, Performance, and Cost relate to Moore's Law are discussed in this 2004 conversation with Sunlin Chou, who was then Senior VP and GM, Technology & Manufacturing Group at Intel. Sunlin discusses how managing these parameters has evolved over time. As semiconductor chips get larger with more transistors it would seem that they would consume more power. Learn why this is not the case here. Topics covered include: How leakage currents can rise faster than drive currents as transistors get smaller. Where the power is being consumed in system. The new issues that were emerging as semiconductors crossed the 100nm barrier.

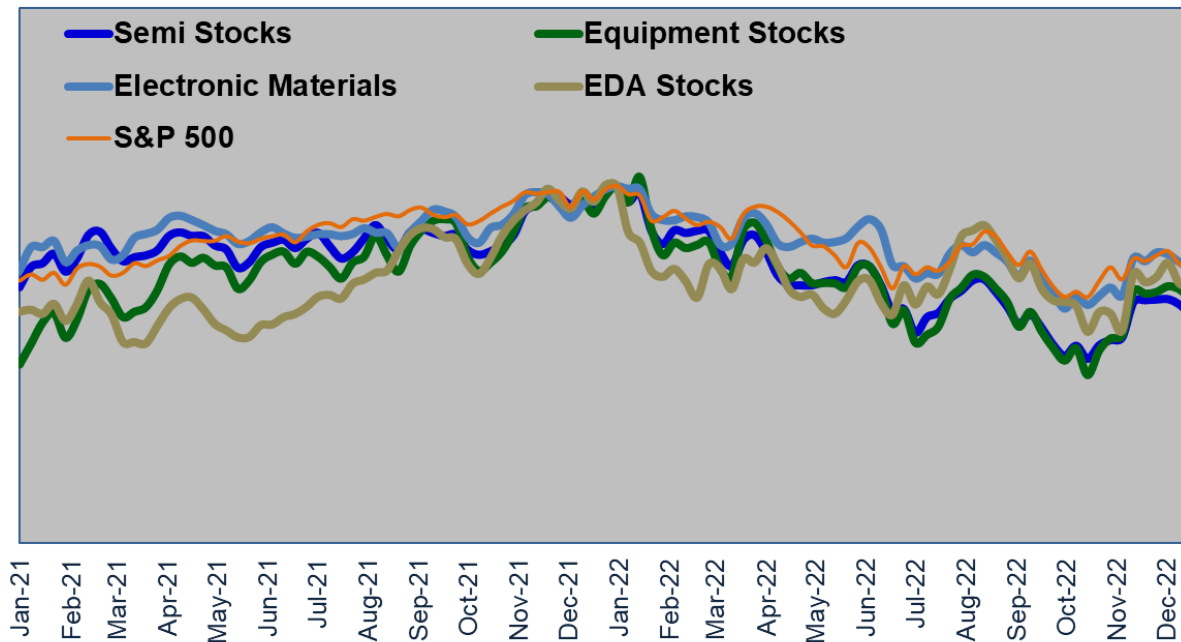
semiStockWEEK:

TechInsights' Semiconductor Stock Indices tumbled this week along with the market after the Federal Reserve raised interest rate again on Wednesday.



Semiconductor Industry Stock Performance Indices

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



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TechInsights' Stock Indices:

Semiconductors -3.1%
Equipment -2.9%
Electronic Materials -1.7%
EDA +0.3%

Semiconductor Stocks:

Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			12/16/2022		
Semiconductor Stocks	Price Change	Forward P/E	Semiconductor Stocks	Price Change	Forward P/E
IDM			Fab-lite to Fabless		
Intel	-4.7%	15	AMD	-4.6%	19
Micron	-5.1%	16	Analog Devices	-1.1%	16
ON Semiconductor	-7.3%	16	Broadcom	2.1%	13
Samsung Electronics	-1.7%	–	IBM	-4.7%	15
SK hynix	-3.1%		Infineon	-4.3%	15
STMicroelectronics	-3.0%	10	MagnaChip Semiconductor	-4.6%	35
Western Digital	-10.6%	9	MaxLinear	-0.8%	9
Foundry & OSAT			MediaTek	-9.5%	–
Amkor	-2.6%	9	NVIDIA	-2.5%	39
ASE	-4.1%	8	Panasonic	-0.2%	12
GLOBALFOUNDRIES	-5.3%	28	Qualcomm	-3.8%	10
JCET	4.0%	14	Silicon Laboratories	-3.1%	39
SkyWater Technology	-10.1%	–	Skyworks	-1.6%	9
SMIC	3.7%	12	Texas Instruments	-2.7%	22
TSMC	-5.5%	14			
UMC	-2.1%	9			

Above Avg

Top 4-6

Top 1-3

TechInsights' Semiconductor Stock Index tumbled this week, JCET was this week's biggest winner followed by SMIC and Broadcom who were also top performers.

IDM -5.1%
Foundry & OSAT -2.7%
Fabless & Fablite -3.0%

AMD^{AMD} Analog Devices^{ADI} Amkor^{AMKR} ASE^{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} Western Digital^{WDC}

Chip Equipment & Related Stocks:

Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			12/16/2022		
Equipment Stocks	Price Change	Forward P/E	Equipment Stocks	Price Change	Forward P/E
Wafer Fab:			Test:		
Applied Materials	-2.4%	16	Advantest	-3.5%	—
ASM International	-5.8%	25	Teradyne	-3.7%	23
ASML	-3.9%	31	FormFactor	0.2%	29
KLA	-2.0%	21			
Lam Research	-1.4%	16	Assembly:		
Onto Innovation	-6.6%	—	BESI	-6.6%	—
Nikon	-0.4%	—	Kulicke & Soffa	0.2%	13
TEL	-4.2%	—	ASM Pacific Technology	-1.3%	
Veeco Instruments	1.7%	14			

Above Avg

Top 4-6

Top 1-3

TechInsights' Semiconductor Equipment Stock Index sunk this week, only Veeco Instruments, FormFactor, and Kulicke & Soffa ended in positive territory.

WFE -2.8%

Test -2.3%

Assembly -2.6%

Applied Materials ^{AMAT} Advantest ^{ATEYY}

ASM International ^{ASMIY}

ASM Lithography ^{ASML} ASM Pacific ^{0522.HK}

BE Semiconductor ^{BESII.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			12/16/2022		
EDA & Electronic Materials Stocks	Price Change	Forward P/E	EDA & Electronic Materials Stocks	Price Change	Forward P/E
EDA			DNP	0.4%	—
Cadence	-0.3%	35	DuPont de Nemours	-1.4%	5
Synopsys	1.0%	28	JSR	-4.1%	—
Ansys	0.2%	29	Shin-Etsu	1.5%	—
Electronic Materials			SOITEC	-1.4%	—
BASF	-3.0%	2	Tokyo Ohka	-0.6%	—
Entegris	-5.0%	20			
			Above Avg	Top 4-6	Top 1-3

TechInsights' EDA Stock Index was led up by Synopsys.

TechInsights' Electronic Materials Stock Index fell this week, Shin-Etsu and DNP came out on top.

Ansys, Inc. ^{ANSS} BASF ^{BASFY}
 Entegris ^{ENTG} 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							
13-May-22	79.0	78.1	87.5	71.4	0.5%	-0.1%	0.2%	-1.6%	28	8.2%	-25	-10.0%	18.2%	84.4	-2.4%
20-May-22	78.6	77.3	88.3	74.5	-0.5%	-1.1%	1.0%	4.3%	22	17.9%	-30	-7.7%	25.6%	81.9	-3.0%
27-May-22	82.3	81.9	90.9	78.7	4.8%	6.0%	2.9%	5.6%	48	30.3%	-7	-7.8%	38.1%	87.2	6.6%
03-Jun-22	82.1	82.0	92.6	78.9	-0.3%	0.1%	1.9%	0.3%	29	7.7%	-26	-4.6%	12.3%	86.2	-1.2%
10-Jun-22	77.8	77.3	90.3	73.8	-5.2%	-5.7%	-2.5%	-6.5%	6	9.7%	-49	-11.9%	21.6%	81.8	-5.1%
17-Jun-22	72.0	69.1	82.3	71.2	-7.5%	-10.6%	-8.9%	-3.6%	2	4.0%	-53	-17.3%	21.3%	77.1	-5.8%
24-Jun-22	72.5	72.1	82.0	77.8	0.8%	4.3%	-0.3%	9.3%	41	12.8%	-14	-19.4%	32.2%	82.1	6.4%
01-Jul-22	67.2	64.9	79.3	73.5	-7.3%	-10.1%	-3.3%	-5.6%	3	6.1%	-52	-20.1%	26.2%	80.3	-2.2%
08-Jul-22	70.7	66.6	80.5	77.5	5.2%	2.7%	1.5%	5.5%	47	20.5%	-7	-4.8%	25.3%	81.8	1.9%
15-Jul-22	71.7	68.5	80.3	75.8	1.4%	2.8%	-0.2%	-2.2%	32	10.1%	-21	-9.1%	19.2%	81.1	-0.9%
22-Jul-22	74.9	74.7	84.9	81.5	4.4%	9.1%	5.7%	7.5%	52	66.7%	-3	-8.3%	75.0%	83.1	2.5%
29-Jul-22	76.6	77.2	86.7	88.8	2.4%	3.3%	2.2%	9.0%	39	12.4%	-16	-9.9%	22.3%	86.7	4.3%
05-Aug-22	79.0	80.1	85.1	90.1	3.1%	3.8%	-1.9%	1.5%	47	33.8%	-8	-17.1%	50.9%	87.0	0.4%
12-Aug-22	79.2	79.6	86.8	91.2	0.3%	-0.6%	1.9%	1.3%	33	22.3%	-22	-17.4%	39.7%	89.8	3.3%
19-Aug-22	76.4	77.0	85.1	88.0	-3.6%	-3.3%	-1.9%	-3.6%	9	17.4%	-46	-8.1%	25.5%	88.7	-1.2%
26-Aug-22	73.1	74.0	83.1	83.9	-4.3%	-3.9%	-2.3%	-4.7%	2	1.1%	-53	-17.8%	18.9%	85.1	-4.0%
02-Sep-22	69.2	68.4	79.6	79.4	-5.4%	-7.5%	-4.1%	-5.4%	1	2.1%	-54	-16.1%	18.2%	82.3	-3.3%
09-Sep-22	71.4	71.8	83.3	82.7	3.2%	4.9%	4.6%	4.2%	50	13.1%	-5	-9.5%	22.6%	85.3	3.6%
16-Sep-22	68.3	67.3	78.8	77.0	-4.3%	-6.2%	-5.4%	-6.9%	4	2.3%	-50	-24.2%	26.5%	81.3	-4.8%
23-Sep-22	64.5	63.7	76.0	74.4	-5.5%	-5.5%	-3.5%	-3.4%	3	1.6%	-52	-15.8%	17.4%	77.5	-4.6%
30-Sep-22	62.0	60.8	72.5	74.1	-3.9%	-4.4%	-4.7%	-0.4%	5	4.7%	-49	-11.7%	16.4%	75.2	-2.9%
07-Oct-22	64.3	63.6	75.3	73.2	3.7%	4.6%	3.9%	-1.3%	46	9.8%	-7	-7.8%	17.6%	76.4	1.5%
14-Oct-22	61.4	57.6	73.3	67.4	-4.6%	-9.5%	-2.6%	-7.9%	8	5.8%	-47	-16.1%	21.9%	75.2	-1.6%
21-Oct-22	64.4	63.1	75.3	71.8	4.9%	9.6%	2.8%	6.5%	45	21.9%	-10	-5.2%	27.1%	78.7	4.7%
28-Oct-22	65.6	65.8	77.2	71.4	1.8%	4.3%	2.5%	-0.5%	42	11.5%	-13	-24.7%	36.2%	81.8	4.0%
04-Nov-22	66.1	66.5	75.4	67.7	0.9%	1.0%	-2.4%	-5.3%	32	20.3%	-23	-21.5%	41.8%	79.1	-3.3%
11-Nov-22	74.1	76.5	83.9	80.5	12.1%	15.0%	11.3%	18.9%	53	37.4%	-2	-8.0%	45.4%	83.8	5.9%
18-Nov-22	74.5	75.8	83.2	78.5	0.5%	-0.8%	-0.9%	-2.5%	24	12.4%	-31	-22.2%	34.6%	83.2	-0.7%
25-Nov-22	74.6	76.2	85.1	79.7	0.2%	0.5%	2.4%	1.5%	36	5.6%	-19	-3.8%	9.4%	84.5	1.5%
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16-Dec-22	71.2	74.6	81.5	78.4	-3.1%	-2.9%	-1.7%	0.3%	10	4.0%	-45	-10.6%	14.6%	80.8	-2.1%

Links to Conference Call Transcripts

December 16th

None this week.

December 9th and before

[Western Digital Corporation \(WDC\) CEO David Goeckeler Presents at Barclays 2022 Global Technology, Media and Telecommunications Conference \(Transcript\)](#)

[Analog Devices, Inc. \(ADI\) Presents at Barclays 2022 Global Technology, Media and Telecommunications Brokers Conference \(Transcript\)](#)

[Marvell Technology, Inc. \(MRVL\) Arete Tech Conference \(Transcript\)](#)

[Western Digital Corporation \(WDC\) UBS Global TMT Conference Transcript](#)

[Advanced Micro Devices, Inc. \(AMD\) Arete Tech Conference \(Transcript\)](#)

[ASML Holding N.V. \(ASML\) Presents at UBS 2022 Global TMT Conference \(Transcript\)](#)

[NXP Semiconductors N.V. \(NXPI\) Presents at Nasdaq 47th Investor Conference \(Transcript\)](#)

[ON Semiconductor Corporation \(ON\) NASDAQ 47th Investor Conference \(Transcript\)](#)

[NVIDIA Corporation \(NVDA\) Management Presents at Arete Tech Conference 2022 Conference \(Transcript\)](#)

[Western Digital Corporation \(WDC\) Arete Tech Conference \(Transcript\)](#)

[Marvell Technology, Inc. \(MRVL\) Q3 2023 Earnings Call Transcript](#)

[DuPont de Nemours, Inc. \(DD\) Presents at Credit Suisse's 10th Annual Global Industrials Brokers Conference \(Transcript\)](#)

[Semtech Corporation \(SMTC\) Q3 2023 Earnings Call Transcript](#)

Links to Conference Call Transcripts

[Synopsys, Inc. \(SNPS\) Q4 2022 Earnings Call Transcript](#)

[NXP Semiconductors N.V. \(NXPI\) 6th Annual Wells Fargo TMT Summit](#)

[Applied Materials, Inc. \(AMAT\) Presents at Wells Fargo 6th Annual TMT Summit Conference \(Transcript\)](#)

[NVIDIA Corporation \(NVDA\) Credit Suisse 26th Annual Technology Conference \(Transcript\)](#)

[Advanced Micro Devices, Inc. \(AMD\) Presents at Wells Fargo 6th Annual 2022 TMT Summit \(Transcript\)](#)

[Intel Corporation \(INTC\) Credit Suisse 26th Annual Technology Conference \(Transcript\)](#)

[Honeywell International Inc. \(HON\) Management Presents at Credit Suisse 10th Annual Global Industrials Conference \(Transcript\)](#)

[Western Digital Corporation \(WDC\) Credit Suisse 26th Annual Technology Conference \(Transcript\)](#)

[Micron Technology, Inc. \(MU\) 6th Annual Wells Fargo TMT Summit Conference \(Transcript\)](#)

[ON Semiconductor Corporation \(ON\) Management Presents At Credit Suisse 26th Annual Technology Conference \(Transcript\)](#)

[Analog Devices, Inc. \(ADI\) Management Presents at Credit Suisse 26th Annual Technology Conference](#)

[NXP Semiconductors N.V. \(NXPI\) Credit Suisse 26th Annual Technology Conference \(Transcript\)](#)

[Qorvo, Inc. \(QRVO\) Presents at 6th Annual Wells Fargo TMT Summit](#)

[Lam Research Corporation \(LRCX\) Presents at Credit Suisse 26th Annual Technology Conference \(Transcript\)](#)

[Texas Instruments Incorporated \(TXN\) Credit Suisse 26th Annual Technology Conference \(Transcript\)](#)

[International Business Machines Corporation \(IBM\) Management Presents at Credit Suisse 26th Annual Technology Conference Call Transcript](#)

Links to Conference Call Transcripts

[Analog Devices Inc. \(ADI\) Q4 2022 Earnings Call Transcript](#)

[Agilent Technologies, Inc. \(A\) Q4 2022 Earnings Call Transcript](#)

[Applied Materials, Inc. \(AMAT\) Q4 2022 Earnings Call Transcript](#)

[Camtek LTD. \(CAMT\) Q3 2022 Earnings Call Transcript](#)

[Kulicke and Soffa Industries, Inc. \(KLIC\) Q4 2022 Earnings Call Transcript](#)

[NVIDIA Corporation \(NVDA\) Q3 2023 Earnings Call Transcript](#)

[Infineon Technologies AG \(IFNNY\) Q4 2022 Earnings Call Transcript](#)

[GLOBALFOUNDRIES Inc. \(GFS\) Q3 2022 Earnings Call Transcript](#)

[Veeco Instruments, Inc. \(VECO\) Q3 2022 Earnings Call Transcript](#)

[Microchip Technology Inc. \(MCHP\) Q2 2023 Earnings Call Transcript](#)

[Skyworks Solutions, Inc. \(SWKS\) Q4 2022 Earnings Call Transcript](#)

[Axcelis Technologies, Inc. \(ACLS\) Q3 2022 Earnings Call Transcript](#)

[MKS Instruments, Inc. \(MKSII\) Q3 2022 Earnings Call Transcript](#)

[Qualcomm Inc. \(QCOM\) Q4 2022 Earnings Call Transcript](#)

[Qorvo, Inc. \(QRVO\) Q2 2023 Earnings Call Transcript](#)

[Magnachip Semiconductor Corporation \(MX\) Q3 2022 Earnings Call Transcript](#)

[Vishay Intertechnology, Inc. \(VSH\) Q3 2022 Earnings Call Transcript](#)

[Entegris, Inc. \(ENTG\) Q3 2022 Earnings Call Transcript](#)

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- [CapEx Distribution – V22.12](#)
- Electronics & Macroeconomy – V22.10
- Diffusion Rates and Utilization – V22.10
- Long-Term Semi and Eqpt Forecast – V22.09
- Silicon Demand – V22.09
- Advanced Packaging – V22.07
- Packaging Demand – V22.06

Equipment Database Module:

- [Scanner & Stepper Shipments – V22.12](#)
- IC Equipment Forecast:
 - Yearly – V22.08
- [WFE Equipment Market Shares:](#)
 - Yearly – V22.05
 - [Quarterly – V22.12](#)
- WFE by Applications – V22.09

Customer Satisfaction Survey Uploads:

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- 2022 Survey Documents

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- [Substrate Processing Equipment Shipments – V22.11](#)
- [Substrate Processing Equipment Installed Base – V22.11](#)
- [Chamber Shipments – V22.11](#)
- Supplier Shares – V22.03

Test Connectivity Reports:

- Test and Burn-In Socket Report : V22.07
 - [Quarterly Report: V22.12](#)
- Probe Card Report: V22.05
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