

Semiconductor WEEK:

December 9, 2022

An overview of results and conclusions from recent reports at TechInsights

Chip Market Research Services

It's cold and gloomy

- Order activity for semiconductor equipment continued to decline, falling to 56 degrees
- Capacity Utilization by Wafer Size

Semiconductor Analytics

Last Week in the Semiconductor Market:

Semiconductor sales fell 11% from this time in 2021. The IC weather warmed 0°F in Cool conditions. Zooming in on Logic this week, the 13-wk MA decline is nearly 4%, making this the third week of declines. TechInsights forecast its sales will reach \$266B in 2023 with a Y/Y decline of 5%, coming off an increase of 10% in 2022.

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

Electronics' Retail Prices have peaked before the holidays.

Chip History Center

Intel's Birth May 1968: Robert (Bob) Noyce and Gordon Moore:

The decision that would change the course of semiconductor history.

Intel introduces its first product August 1969: The 3101 SRAM with this press release.

Lam Research AutoEtch 480: the system that built the company. A landmark in the history of equipment and it was one of the first single wafer, load-locked plasma etchers.

The Chip Insider

Strategy and Tactics: The Case for a Mild Slowing in 2023. Semiconductor Cyclicity.

Semiconductor Manufacturing Markets: Foundry & IDM Capital Expenditures

Semiconductor Stocks

- *TechInsights' Semiconductor Stock Indices fell this week.*
- *Semiconductor Stock Index fell*
- *Semiconductor Equipment Stock Index slipped*
- *EDA Stock Index fell*
- *Electronics Materials Stock Index plunged*
- *Hottest Stocks: SMIC, Advantest, SOITEC, GLOBALFOUNDRIES, and KLA*

TechInsights

The Chip Insider[®]'s Graphics File



November 2022

It's cold and gloomy

- Order activity for semiconductor equipment continued to decline, falling to 56 degrees
- Memory is at a chilly 36 degrees and isn't showing any signs of improvement
- Macroeconomic headwinds continue to hurt consumer markets
- TechInsights' Chip Price Performance Index extended its decline

Forecast as of November 2022:	2022	2023
Semi Equipment (\$B):	\$ 136.9	\$ 118.2
Sequential Change	7.9%	-13.6%
Capacity Utilization:	94.9%	84.1%
ICs (\$B):	\$ 515.9	\$ 485.6
Sequential Change	4.8%	-5.9%
IC Units (BU):	412.5	403.7
Sequential Change	4.6%	-2.1%
Electronics (\$B) :	\$ 2,556	\$ 2,453
Sequential Change	-0.7%	-4.1%

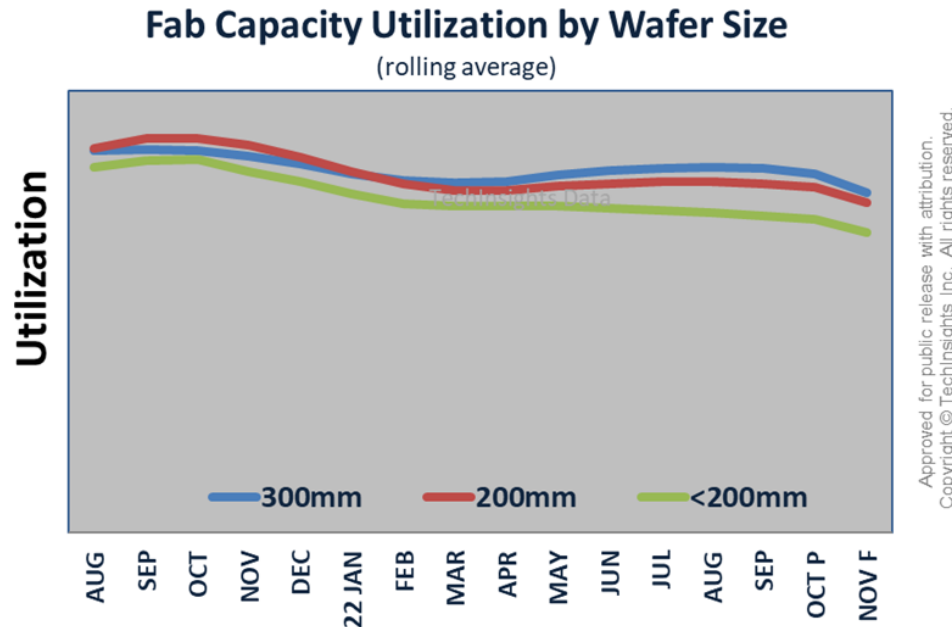
[Contact us to access more details](#)

The Chip Insider[®] Graphics

Capacity Utilization by Wafer Size:

- Utilization rates remain high across the board

Fab Capacity Utilization by Wafer Size: Chart gives rolling averages for 300mm, 200mm, and smaller 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](#)

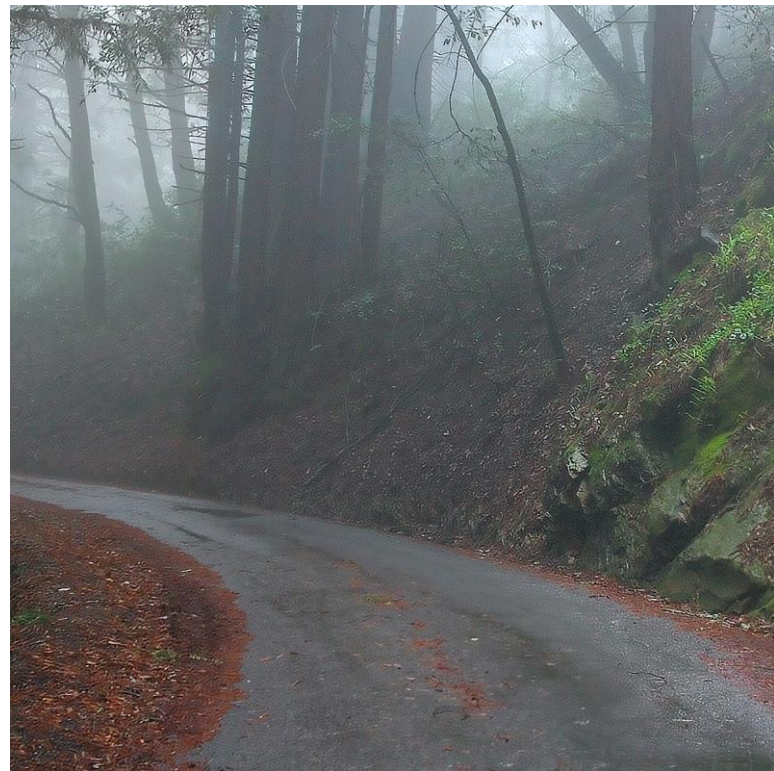
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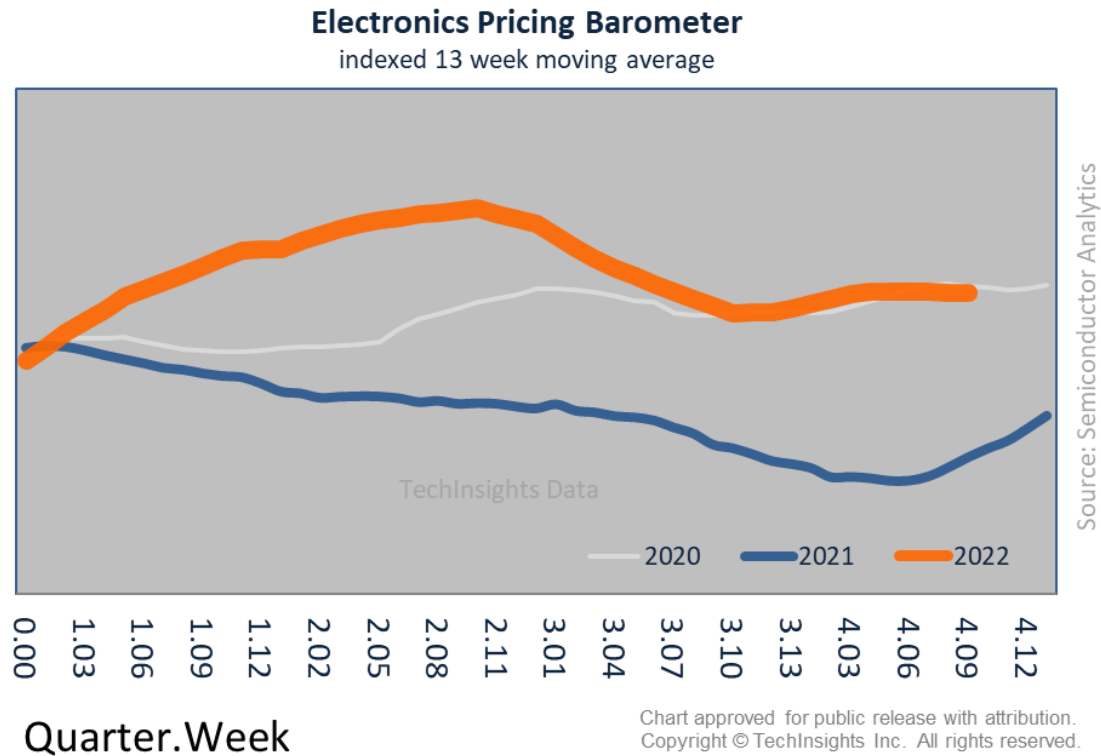


IC Weather Measures Order Activity S/D Measures Pricing Power

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: *The Case for a Mild Slowing in 2023. Semiconductor Cyclical History.*

Summaries:

The Case for a Mild Slowing in 2023: *It is always a red flag whenever there is a wide range of forecasts from forecasters... Current semiconductor forecasts for 2023 are ranging in the negative between low-single digits and -20-plus percent. My personal belief is it will be in the low-single digits with a high potential for an upside surprise. But first, let's review a cyclical history of the semiconductor industry to get a better understanding of why this is the likely case...*

Cyclical History of the Semiconductor Industry: *There have been 13 recessive growth periods since the Integrated Circuit market emerged in 1963. That's an average of one every 4.5 years. There have been 6 since 2000, for an average of 3.7 years. The average semiconductor downturn since 1963 is -8%. For equipment it's -21%. The range has deviated from -56% to +12%...*

The Case for a Mild Slowing in 2023 Continued: *Hopefully, you've read the above to understand why a -20% decline in semiconductor sales is unlikely based on structural changes in the semiconductor industry. While the number of cycles across the decades are relatively few, the magnitude has declined since 2010... Superior inventory control on ... A similar reduction in semiconductor industry volatility can be seen in semiconductor sales, with the notable exception being the 2008-10 Financial Crisis that was really from outside the semiconductor industry's infrastructure. So a classic capacity/inventory cycle was not the cause ... The bottom line is that ... I'm finding it hard to be really negative.*

"If you don't like what's being said, change the conversation"

— Don Draper, Mad Men

"Forecasting is difficult... Especially when it's about the future" — Yogi Berra

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

TechInsights



Intel's Birth May 1968: Robert (Bob) Noyce and Gordon Moore: The decision that would change the course of semiconductor history. It was a sunny California day when two men met at a home on Loyola Drive in Los Altos. It would have looked like any weekend front-yard meet-up. Robert (Bob) Noyce had been mowing his lawn. Gordon Moore had just popped over. Yet it was more than just a simple chat ...

Intel introduces its first product August 1969: The 3101 SRAM with this press release. It was part of Moore's "Goldilocks strategy," to develop three technologies at once. Features included "fast access times of 50 nanoseconds" ... and ... "power dissipation of 6 milliwatts-per-bit." It was priced at \$99.50 each, or a whopping \$1.56 per-bit. This was cutting edge performance, circa 1969 ...

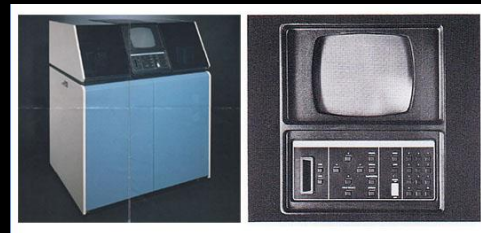
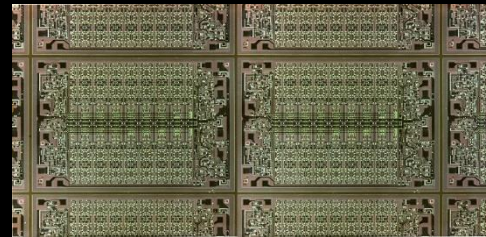
Lam Research AutoEtch 480: the system that built the company. A landmark in the history of equipment and it was one of the first single wafer, load-locked plasma etchers. Its market success proved it was one of the best etchers of the day. Introduced in 1981, just a year after the company's founding, this would be one of the key products to build Lam into a giant in the semiconductor industry. It marked a substantial divergence from what was available at the time. As Lam put it, "AutoEtch 480 has been ...

Intel's Business Plan

~June 1968

The company will engage in research, development, and manufacture and sales of integrated electronic structures to fulfill the needs of electronic systems manufacturers. This will include thin films, thick films, semiconductor devices, and other solid state components used in hybrid and monolithic integrated structures.

A variety of processes will be established, both at a laboratory and production level. These include crystal growth, slicing, lapping,



The Chip Insider®

December 9, 2022

Semiconductor Manufacturing Markets

Foundry & IDM Capital Expenditures

- Changes Since Last Forecast
- Company Focus
- Advanced Logic & Foundry
- DRAM & NAND
- Semiconductor Manufacturing CapEx
- TechInsights' View

WildPhotons: By failing to prepare...



Company Focus

Spending is expected to decline across all major CapEx spenders in 2023 as supply constraints diminish and chipmakers are cutting their capacity investments

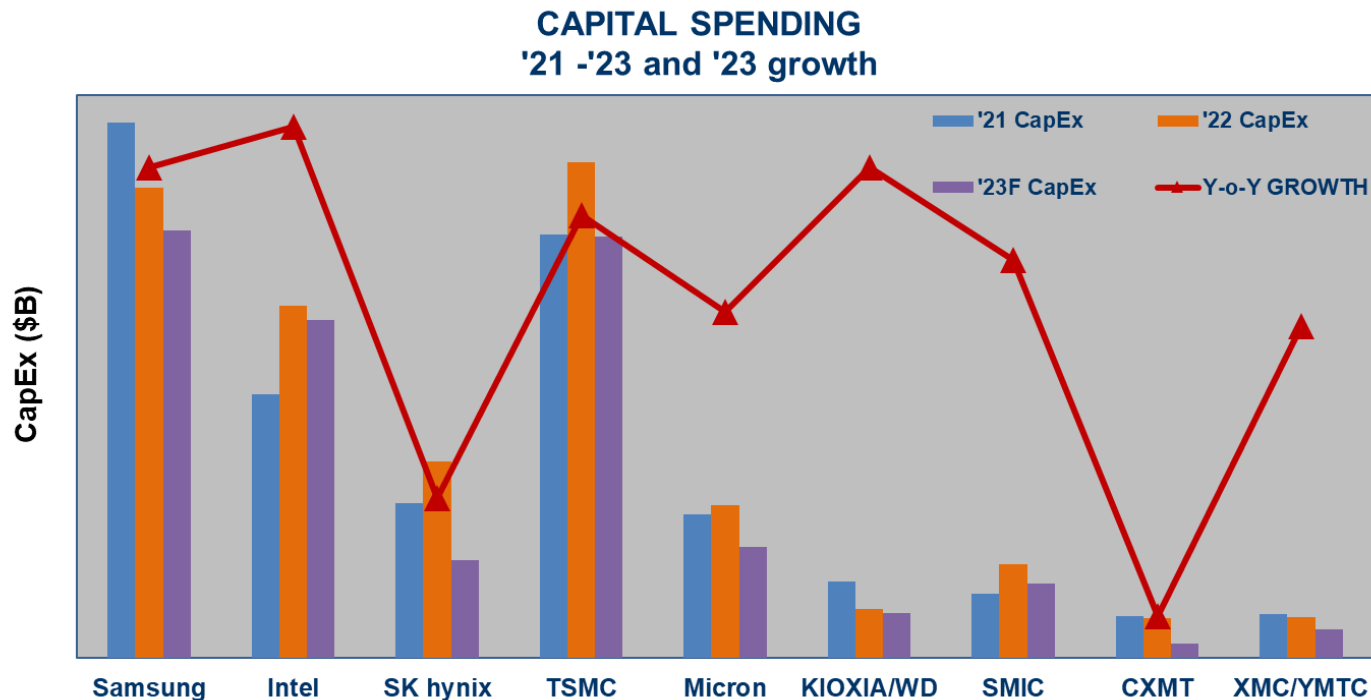


Chart approved for public release with attribution.
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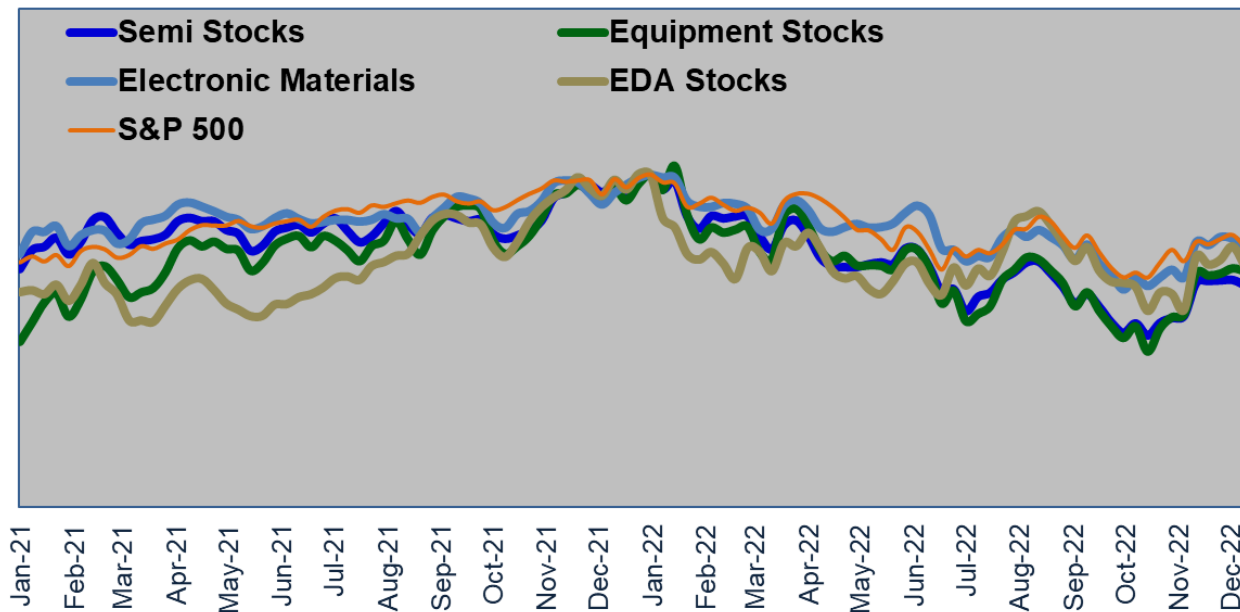
semiStockWEEK:

TechInsights' Semiconductor Stock Indices fell this week along with the market after the release of a new inflation report.



Semiconductor Industry Stock Performance Indices

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



TechInsights' Stock Indices:

Semiconductors -1.7%
Equipment -0.9%
Electronic Materials -2.1%
EDA -5.7%

Semiconductor Stocks:

Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			12/9/2022		
Semiconductor Stocks	Price Change	Forward P/E	Semiconductor Stocks	Price Change	Forward P/E
IDM			Fab-lite to Fabless		
Intel	-4.0%	16	AMD	-8.5%	21
Micron	0.3%	16	Analog Devices	0.0%	16
ON Semiconductor	-3.4%	16	Broadcom	0.7%	13
Samsung Electronics	0.0%	–	IBM	-1.1%	15
SK hynix	-0.5%		Infineon	-3.7%	15
STMicroelectronics	-1.1%	10	MagnaChip Semiconductor	-2.5%	36
Western Digital	0.7%	9	MaxLinear	-4.1%	9
Foundry & OSAT			MediaTek	-1.4%	–
Amkor	-7.0%	10	NVIDIA	0.7%	39
ASE	-1.8%	8	Panasonic	-3.2%	13
GLOBALFOUNDRIES	1.4%	27	Qualcomm	-5.3%	10
JCET	-0.9%	14	Silicon Laboratories	0.1%	39
SkyWater Technology	-6.7%	–	Skyworks	0.6%	8
SMIC	7.2%	12	Texas Instruments	-1.8%	22
TSMC	-0.9%	14			
UMC	-4.0%	9			

Above Avg

Top 4-6

Top 1-3

TechInsights' Semiconductor Stock Index fell this week, SMIC was this week's biggest winner followed by GLOBALFOUNDRIES who was also a top performer this week.

IDM -1.1%
 Foundry & OSAT -1.6%
 Fabless & Fablite -2.1%

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			12/9/2022		
Equipment Stocks	Price Change	Forward P/E	Equipment Stocks	Price Change	Forward P/E
Wafer Fab:			Test:		
Applied Materials	0.6%	16	Advantest	3.5%	–
ASM International	-0.5%	26	Teradyne	-0.3%	24
ASML	-1.3%	31	FormFactor	0.3%	28
KLA	1.0%	21			
Lam Research	-1.9%	16	Assembly:		
Onto Innovation	-4.6%	–	BESI	0.3%	–
Nikon	-2.1%	–	Kulicke & Soffa	-1.5%	13
TEL	-2.2%	–	ASM Pacific Technology	-0.8%	
Veeco Instruments	-3.4%	15			

Above Avg

Top 4-6

Top 1-3

TechInsights' Semiconductor Equipment Stock Index slipped this week despite more than half of the Equipment Companies finishing above the weekly average with Advantest and KLA coming out on top.

WFE -1.6%

Test +1.2%

Assembly -0.7%

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			12/9/2022		
EDA & Electronic Materials Stocks	Price Change	Forward P/E	EDA & Electronic Materials Stocks	Price Change	Forward P/E
EDA			DNP	0.7%	–
Cadence	-5.1%	37	DuPont de Nemours	-3.7%	5
Synopsys	-6.4%	30	JSR	-1.3%	–
Ansys	-5.6%	31	Shin-Etsu	-1.9%	–
Electronic Materials			SOITEC	2.5%	–
BASF	-2.6%	2	Tokyo Ohka	-2.5%	–
Entegris	-7.9%	22			
			Above Avg	Top 4-6	Top 1-3

TechInsights' EDA Stock Index was down for all three stocks this week.

TechInsights' Electronic Materials Stock Index plunged this week with SOITEC and DNP being the only two companies to finish in positive territory.

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							
06-May-22	78.6	78.3	87.3	72.6	0.9%	0.1%	-1.0%	-4.1%	30	12.0%	-25	-11.7%	23.7%	86.5	-0.2%
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%
02-Dec-22	74.7	77.5	84.7	82.8	0.1%	1.7%	-0.5%	4.0%	38	9.2%	-16	-7.5%	16.7%	85.4	1.1%
09-Dec-22	73.5	76.8	82.9	78.1	-1.7%	-0.9%	-2.1%	-5.7%	15	7.2%	-38	-8.5%	15.7%	82.5	-3.4%

Links to Conference Call Transcripts

December 9th

[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 \(Transcript\)](#)

December 2nd and before

[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](#)

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[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](#)

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