

Semiconductor WEEK:

August 12, 2022

An overview of results and conclusions from recent reports at TechInsights

Chip Market Research Services

Still green but clouds loom

- Order activity for semiconductor equipment extended its decline, slipping to 84 degrees
- WFE activity is still holding up well and most WFE suppliers are not seeing any meaningful shift in demand yet
- Fab Capacity Utilization by Node

Semiconductor Analytics

Last Week in the Semiconductor Market:

Zooming in on the semiconductor forecast this week, late reports of Q2 & June data showed a far more rapid deterioration in the memory markets than previous data indicated.

TechInsights lowered its 2022 semiconductor forecast to +8% and 2023 to -2%. Last week, sales dipped -8% below 1Q22 levels, though it was 6% above 2021 levels. The IC weather warmed 0°F. TechInsights' IC Supply/Demand indices improved last week, jumping from Saturated to balanced overall, as conditions were mostly unchanged in a buyer's market. More Moore Foundry rose out of Saturated to Loose levels. More than Moore and Analog & Power jumped from Saturated to Balanced as OSAT reached the same level from Loose. Memory ICs remain in a Glut, while Auto remains in a Shortage.

Customer Satisfaction Survey

White Paper: ASML – Only Five Star WFE Leader

Chip History Center

Texas-California battle over the IC invention: The Integrated Circuit was first implemented on August 28, 1958 by **Jack Kilby** as a heterogeneous IC made up of individual transistors wire-bonded together.

Jack Kilby on the IC invention: The historic video of Jack Kilby's Nobel Prize acceptance speech

The Chip Insider

Strategy and Tactics: Chips and Science Act

Semiconductor Stocks

- *Three of TechInsights' Semiconductor Stock Indices increased this week along with the market*
- *Semiconductor Stock Index was led up by GLOBALFOUNDRIES*
- *Semiconductor Equipment Stock Index slipped*
- *EDA Stock Index was led up by Synopsys and Cadence*
 - *EDA Stock Index hit a fresh new yearly high*
- *Electronics Materials Stock Index was led up by DuPont de Nemours*
- *Hottest Stocks: GLOBALFOUNDRIES, Western Digital, DuPont de Nemours, ON Semiconductor, ASE, and Veeco Instruments*

TechInsights

ASML

Only Five Star WFE Leader

TechInsights Customer Satisfaction Survey 2022





ASML is awarded 10 BEST, THE BEST, and RANKED 1st awards

- ASML, the leading supplier of lithography equipment, earns 5 Stars from customers for the fifth consecutive year
 - earns their best-ever 10 BEST score of 9.37
 - 25th consecutive appearance in the 10 BEST
- Receives highest score of all 10 BEST *Large Suppliers of Chip Making Equipment* in *technical leadership, field engineering support, overall value, and software*
- ASML continues to deliver high levels of performance to support its customers' lithography needs

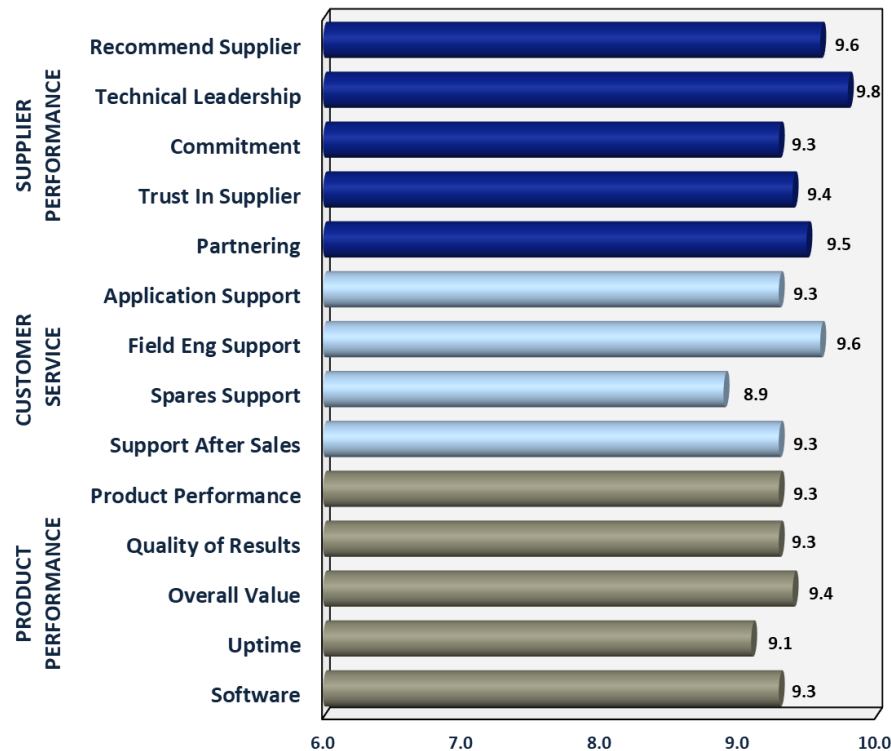
LARGE SUPPLIERS OF CHIP MAKING EQUIPMENT	Rating	TechInsights Stars
Advantest	9.48	★★★★★
ASML	9.37	★★★★★
ASM Pacific Technology	8.84	★★★★★
Edwards	8.45	★★★★★
Teradyne	8.15	★★★★★
Kokusai Electric	7.94	★★★★★
Lam Research	7.88	★★★★★
Tokyo Electron	7.73	★★★★★
Applied Materials	7.70	★★★★★
Hitachi High-Tech	7.63	★★★★★

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How Customers Perceive ASML

- Increases its ratings in 10 categories
 - application support* up 40 basis points
 - technical leadership, trust in supplier, field engineering support, and software* up 30 basis points
 - partnering and quality of results* up 20 basis points
 - commitment, overall value, and uptime* up 10 basis points
- Customers honor ASML with an average rating of 9.5 in *Supplier Performance*
- Highest scores*
 - Technical Leadership*
 - Recommend Supplier*
 - Field Engineering Support*
 - Partnering*
 - Trust In Supplier*
 - Overall Value*

*Listed in order of score, highest to lowest



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**Tech
Insights**

The Chip Insider[®]'s Graphics File

July 2022



Still green but clouds loom

- Order activity for semiconductor equipment extended its decline, slipping to 84 degrees
- All segments trended lower led by Subcon/Adv. Packaging and SOC Computing where temperatures slid more than 4 points
- WFE activity is still holding up well and most WFE suppliers are not seeing any meaningful shift in demand yet
- TechInsights' Chip Price Performance Index continued to flash warning signals as it headed further south



Forecast as of July 2022:	2021	2022
Semi Equipment (\$B):	\$ 126.6	\$ 143.1
Sequential Change	36.6%	13.0%
Capacity Utilization:	97.2%	96.5%
ICs (\$B):	\$ 492.3	\$ 555.8
Sequential Change	27.4%	12.9%
IC Units (BU):	394.2	426.0
Sequential Change	23.7%	8.1%
Electronics (\$B) :	\$ 2,574	\$ 2,732
Sequential Change	18.9%	6.1%

[Contact us to access more details](#)

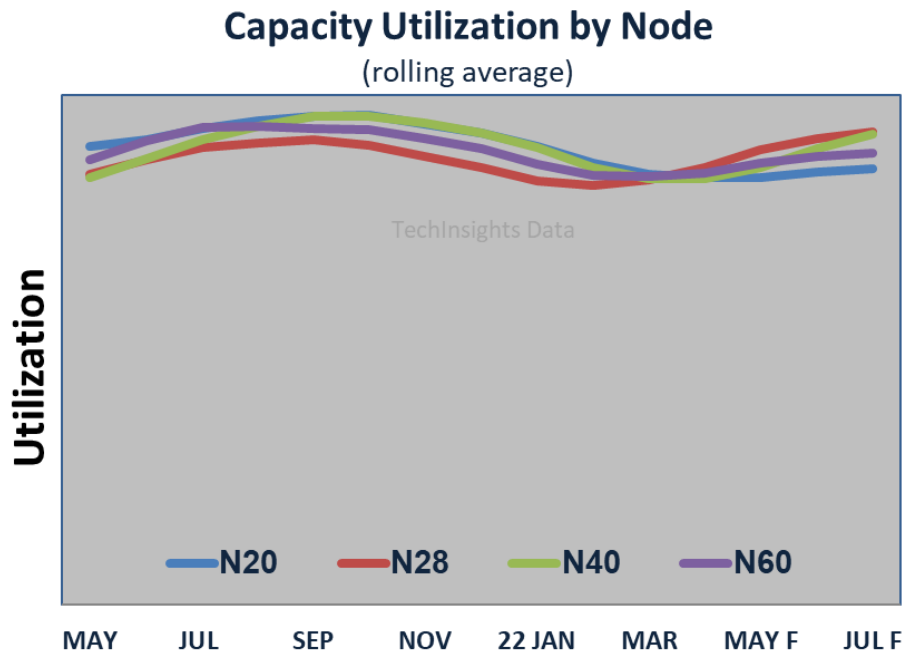
TechInsights

The Chip Insider[®] Graphics

Capacity Utilization by Node:

- Utilization rates remain at high levels

Fab Capacity Utilization by Node: chart gives rolling averages for 20nm 22nm 28nm 32nm 40nm 45nm 60nm 65nm and larger



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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.

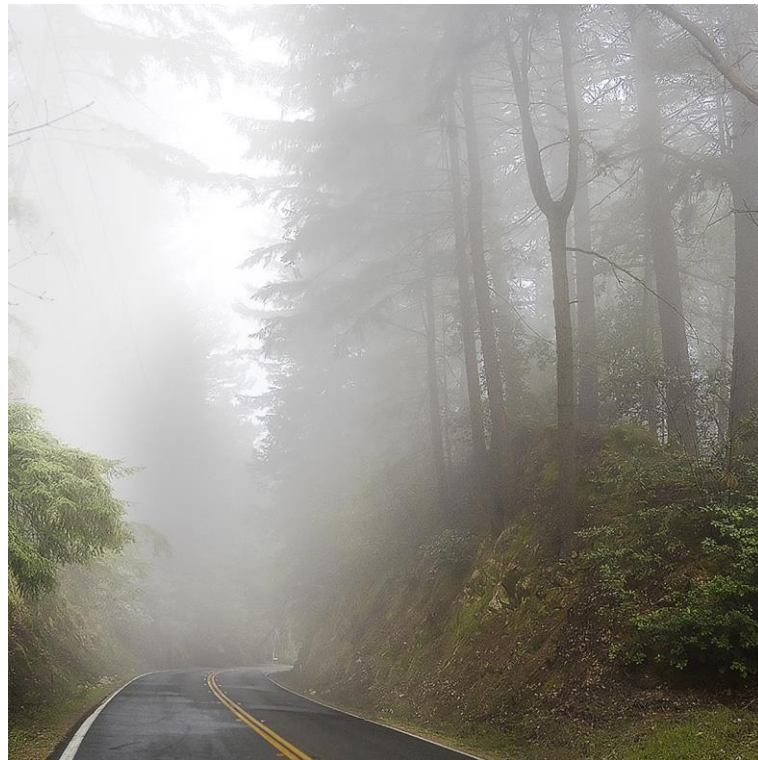
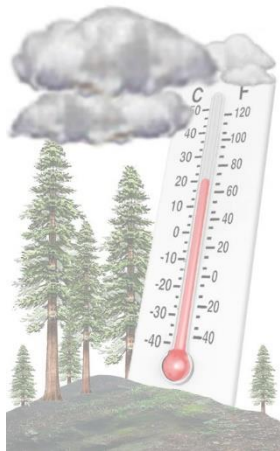
[Click here to watch online](#)

Semiconductor Analytics

Last Week in the Semiconductor Market:

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dipped -8% below 1Q22 levels, though it was 6% above 2021 levels. The IC weather warmed 0°F. TechInsights' IC Supply/Demand indices improved last week, jumping from Saturated to balanced overall, as conditions were mostly unchanged in a buyer's market. More Moore Foundry rose out of Saturated to Loose levels. More than Moore and Analog & Power jumped from Saturated to Balanced as OSAT reached the same level from Loose. Memory ICs remain in a Glut, while Auto remains in a Shortage.

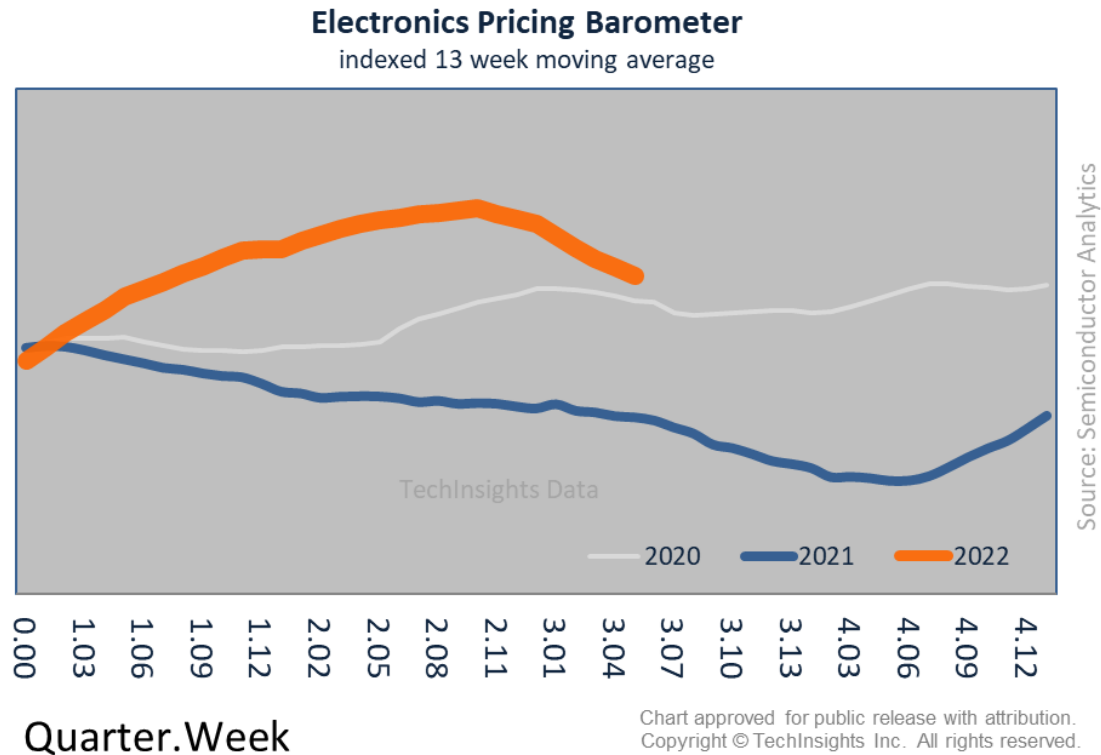


1: Measures Order Activity 2: Measures Pricing Power

Electronics Retail Pricing Trends:

for PC notebooks Tablets Smartphones Cell phones Digital Cameras Appliances TVs

Electronics' Retail Prices continue to decline as demand wanes.



Strategy & Tactics



Strategy and Tactics: Chips and Science Act

Summaries:

What's Happening and What's the Meaning: Chips and Science Act Passed: *I must admit, I had been saying I didn't expect the US Congress to get its act together and pass this bill. You'll recall the \$52B CHIPS act pretty much died. I believe, but can't prove it, Congress was busy playing the violin Andy Grove had sent Michael Boskin – the White House economist who said something along the lines of there not being a real economic difference between computer chips and potato chips... Grove was too polite to ever make this public, leaving it to only be known by a few insiders. What I believe was different this time, can't prove, is that two executives made the difference this time. Stephanie Powers once said, "Unfortunately, sometimes people don't hear you until you scream." Essentially what Pat Gelsinger and Tom Caulfield did was scream with lost jobs and infrastructure... The strategic approach relied on the hypothesis of... The strategic lesson here is ... By the way, what passed was not the CHIPS act, but the lowercase Chips and Science Act.*

It is substantially different, upping funding to \$280B. \$52.7B is going to direct financing of new and expanded chip manufacturing factories... Now the battle starts over who gets the real money.

*"When everything seems to be going against you ...
remember that the airplane takes off against the wind"
— Henry Ford*

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

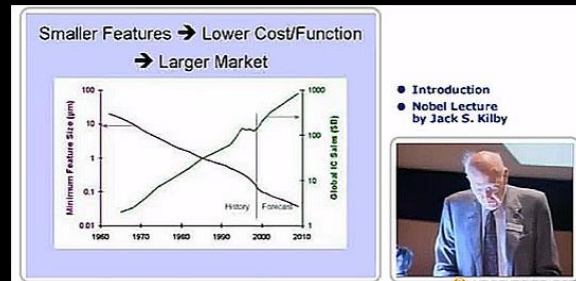
TechInsights



Texas-California battle over the IC invention: The Integrated Circuit was first implemented on August 28, 1958 by Jack Kilby as a heterogeneous IC made up of individual transistors wire-bonded together. Almost 4 months later, to the day, Robert Noyce described a planar IC with lithographically patterned metal interconnect. The two patents were different enough for Texas Instruments and Fairchild Semiconductor to go to war in a courtroom over who really invented it. In this video, Dan Hutcheson has a conversation about the Texas-California battle for who really invented the IC with Wally Rhines who knows it very well, having worked for 21 years at TI, in numerous semiconductor executive management positions.



Jack Kilby on the IC invention: The historic video of Jack Kilby's Nobel Prize acceptance speech on the invention of the Integrated Circuit on 28 August 1958. Also of interest for researchers are links to: Turning Potential into Realities: The Invention of the Integrated Circuit, The Chip that Jack Built, The Jack Kilby papers, Who Invented the IC?



semiStockWEEK:

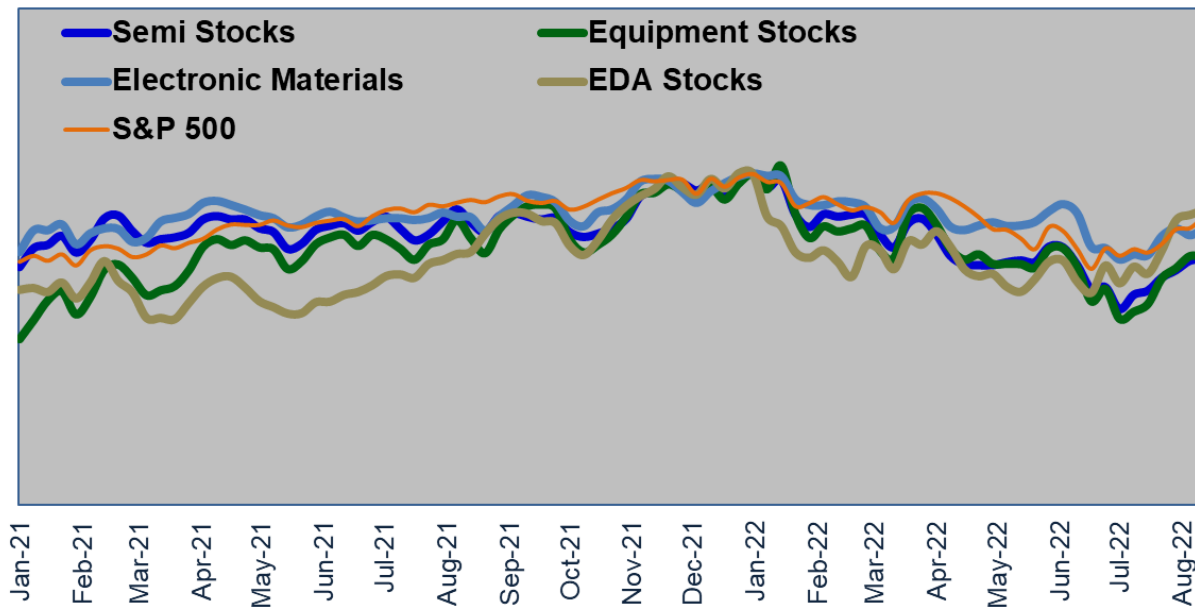
Three of TechInsights' Semiconductor Stock Indices

increased this week along with the market. The Equipment Stock Index slipped while the EDA Stock Index hit a fresh new yearly high.



Semiconductor Industry Stock Performance Indices

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



TechInsights' Stock Indices:

Semiconductors +0.3%

Equipment -0.6%

Electronic Materials +1.9%

EDA +1.3%

Semiconductor Stocks:

Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			8/12/2022		
Semiconductor Stocks	Price Change	Forward P/E	Semiconductor Stocks	Price Change	Forward P/E
IDM			Fab-lite to Fabless		
Intel	2.0%	10	AMD	-1.4%	21
Micron	4.1%	10	Analog Devices	1.1%	18
ON Semiconductor	5.2%	14	Broadcom	1.2%	14
Samsung Electronics	-2.1%	–	IBM	1.1%	13
SK hynix	-5.3%		Infineon	0.1%	14
STMicroelectronics	0.6%	11	MagnaChip Semiconductor	-7.3%	11
Western Digital	7.6%	6	MaxLinear	-2.0%	10
Foundry & OSAT			MediaTek	-4.6%	–
Amkor	0.4%	7	NVIDIA	-1.5%	30
ASE	5.1%	7	Panasonic	2.2%	11
GLOBALFOUNDRIES	22.3%	23	Qualcomm	0.7%	11
JCET	1.5%	15	Silicon Laboratories	-3.6%	36
SkyWater Technology	-17.4%	–	Skyworks	0.7%	9
SMIC	-4.6%	12	Texas Instruments	0.6%	21
TSMC	1.2%	14			
UMC	4.3%	7			

Above Avg

Top 4-6

Top 1-3

TechInsights' Semiconductor Stock Index was led up by GLOBALFOUNDRIES who beat second quarter goals announced in its quarterly earnings report. Western Digital, ON Semiconductor, and ASE also performed well this week.

IDM +1.7%
Foundry & OSAT +1.6%
Fabless & Fablite +-0.9%

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			8/12/2022		
Equipment Stocks	Price Change	Forward P/E	Equipment Stocks	Price Change	Forward P/E
Wafer Fab:			Test:		
Applied Materials	0.7%	13	Advantest	-3.0%	–
ASM International	0.6%	22	Teradyne	3.6%	16
ASML	-0.2%	28	FormFactor	-2.1%	20
KLA	-3.7%	18			
Lam Research	-0.3%	14	Assembly:		
Onto Innovation	-8.0%	–	BESI	3.2%	–
Nikon	2.4%	–	Kulicke & Soffa	-0.8%	8
TEL	-5.0%	–	ASM Pacific Technology	-2.5%	
Veeco Instruments	4.8%	11			

Above Avg

Top 4-6

Top 1-3

TechInsights' Semiconductor Equipment Stock Index slipped this week. Veeco Instruments came out on top who claimed one of the top six stock spots this week.

WFE -1.0%

Test -0.5%

Assembly +0.0%

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			8/12/2022		
EDA & Electronic Materials Stocks	Price Change	Forward P/E	EDA & Electronic Materials Stocks	Price Change	Forward P/E
EDA			DNP	3.9%	—
Cadence	1.2%	41	DuPont de Nemours	6.5%	5
Synopsys	3.0%	39	JSR	4.4%	—
Ansys	-0.3%	33	Shin-Etsu	1.0%	—
Electronic Materials			SOITEC	-0.4%	—
BASF	1.1%	2	Tokyo Ohka	0.1%	—
Entegris	-1.1%	22			
			Above Avg	Top 4-6	Top 1-3

TechInsights' EDA Stock Index was led up by Synopsys and Cadence.

TechInsights' Electronic Materials Stock Index was led up by DuPont de Nemours.

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							
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%
18-Mar-22	87.9	90.3	92.7	83.7	7.1%	13.3%	6.5%	8.8%	53	31.3%	-2	-5.9%	37.2%	93.6	6.2%
25-Mar-22	89.1	91.8	94.0	82.9	1.3%	1.7%	1.3%	-0.9%	36	9.2%	-16	-5.5%	14.7%	95.3	1.8%
01-Apr-22	85.4	87.8	91.5	86.1	-4.2%	-4.3%	-2.6%	3.9%	5	5.0%	-50	-23.1%	28.1%	95.4	0.1%
08-Apr-22	80.1	81.9	87.1	82.3	-6.2%	-6.8%	-4.8%	-4.4%	2	5.5%	-53	-17.6%	23.1%	94.2	-1.3%
15-Apr-22	78.1	79.2	86.4	76.9	-2.5%	-3.3%	-0.9%	-6.6%	6	4.2%	-49	-10.9%	15.1%	92.2	-2.1%
22-Apr-22	77.8	80.5	87.4	75.2	-0.3%	1.6%	1.3%	-2.2%	30	9.3%	-25	-18.8%	28.1%	89.6	-2.8%
29-Apr-22	77.8	78.2	88.2	75.7	0.0%	-2.9%	0.9%	0.7%	22	21.1%	-32	-14.9%	36.0%	86.7	-3.3%
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%

Links to Conference Call Transcripts

August 12th

[Magnachip Semiconductor Corporation \(MX\) CEO YJ Kim on Q2 2022 Results - Earnings Call Transcript](#)

[ACM Research, Inc. \(ACMR\) CEO David Wang on Q2 2022 Results - Earnings Call Transcript](#)

August 5th and before

[Western Digital Corporation \(WDC\) CEO David Goeckeler on Q4 2022 Results - Earnings Call Transcript](#)

[Skyworks Solutions, Inc.'s \(SWKS\) CEO Liam Griffin on Q3 2022 Results - Earnings Call Transcript](#)

[Kulicke and Soffa Industries, Inc. \(KLIC\) CEO Fusen Chen on Q3 2022 Results - Earnings Call Transcript](#)

[Infineon Technologies AG \(IFNNY\) CEO Jochen Hanebeck on Q3 2022 Results - Earnings Call Transcript](#)

[Advanced Energy Industries, Inc. \(AEIS\) CEO Stephen Kelley on Q2 2022 Results - Earnings Call Transcript](#)

[Qorvo, Inc.'s \(QRVO\) CEO Bob Bruggeworth on Q1 2023 Results - Earnings Call Transcript](#)

[Microchip Technology Incorporated's \(MCHP\) CEO Ganesh Moorthy on Q1 2023 Results - Earnings Call Transcript](#)

[Advanced Micro Devices, Inc.'s \(AMD\) CEO Lisa Su on Q2 2022 Results - Earnings Call Transcript](#)

[Cirrus Logic, Inc.'s \(CRUS\) CEO John Forsyth on Q1 2023 Results - Earnings Call Transcript](#)

[Amkor Technology, Inc. \(AMKR\) CEO Giel Rutten on Q2 2022 Results - Earnings Call Transcript](#)

[ON Semiconductor Corporation's \(ON\) CEO Hassane El-Khoury on Q2 2022 Results - Earnings Call Transcript](#)

[SK Hynix, Inc.'s \(HXSCF\) Q2 2022 Results - Earnings Call Transcript](#)

[LG Electronics Inc.'s \(LGEAF\) Q2 2022 Results - Earnings Call Transcript](#)

[STMicroelectronics N.V. \(STM\) CEO Jean-Marc Chery on Q2 2022 Results - Earnings Call Transcript](#)

[ASE Technology Holding Co., Ltd. \(ASX\) Q2 2022 Results - Earnings Call Transcript](#)

[Cohu, Inc. \(COHU\) CEO Luis Müller on Q2 2022 Results - Earnings Call Transcript](#)

Links to Conference Call Transcripts

[KLA Corporation \(KLAC\) CEO Rick Wallace on Q4 2022 Results - Earnings Call Transcript](#)

[MKS Instruments, Inc. \(MKSI\) CEO John Lee on Q2 2022 Results - Earnings Call Transcript](#)

[Samsung Electronics Co., Ltd. \(SSNLF\) Q2 2022 Results - Earnings Call Transcript](#)

[FormFactor, Inc. \(FORM\) CEO Michael Slessor on Q2 2022 Results - Earnings Call Transcript](#)

[Lam Research Corporation \(LRCX\) CEO Tim Archer on Q4 2022 Results - Earnings Call Transcript](#)

[QUALCOMM Incorporated \(QCOM\) CEO Cristiano Amon on Q3 2022 Results - Earnings Call Transcript](#)

[MaxLinear, Inc. \(MXL\) CEO Kishore Seendripu on Q2 2022 Results - Earnings Call Transcript](#)

[Camtek Ltd \(CAMT\) CEO Rafi Amit on Q2 2022 Results - Earnings Call Transcript](#)

[Teradyne, Inc. \(TER\) CEO Mark Jagiela on Q2 2022 Results - Earnings Call Transcript](#)

[United Microelectronics Corporation \(UMC\) Management on Q2 2022 Results - Earnings Call Transcript](#)

[NXP Semiconductors N.V.'s \(NXPI\) CEO Kurt Sievers on Q2 2022 Results - Earnings Call Transcript](#)

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