

# Semiconductor WEEK

An Overview of Results and Conclusions From Recent Reports at TechInsights



## Last Week in the Semiconductor Market

Semiconductor sales grew 21% W/W as the industry headed to the Lunar New Year. The IC weather cooled 1°F in Cool conditions. Zooming in on NAND this week, the 13-wk MA is down 40%. TechInsights forecasts NAND sales will reach \$44B in 2023 with a Y/Y decline of 18%.

TechInsights' IC Supply/Demand held in Tight conditions. Foundry moved to Tight conditions with More Moore Foundry continuing to tighten, it went to Tight conditions from Glut conditions four weeks ago. More Than Moore moved to Tight conditions as well. DRAM, NAND, IDM, OSAT, Analog & Power, and Auto IC remain unchanged.

Electronics' Retail Prices are in a bullish rise.

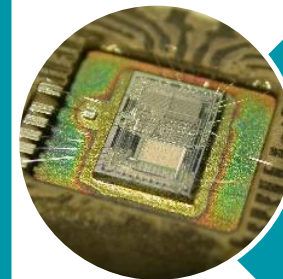
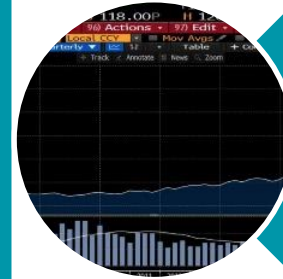


## Strategy & Tactics

SEMI ISS

### Semiconductor Stocks:

- TechInsights' Semiconductor Stock Indices rose this week with Semiconductor, Equipment, and Electronic Materials indices hitting fresh new yearly highs
- Semiconductor Stock Index rose
- Semiconductor Equipment Stock Index increased
- EDA Stock Index grew
- Electronics Materials Stock Index rose this week
  - DNP was this week's biggest winner
- Hottest Stocks: DNP, SkyWater Technology, Western Digital, STMicroelectronics, NVIDIA, and MaxLinear



## Chip Market Research Services

*The semiconductor industry is covered in a blanket of snow*

Order activity for semiconductor equipment decreased to a brisk 49 degrees

Capacity Utilization by Wafer Size

## Chip History Center

**People:** Semiconductor lithography history: **Bill Arnold, Gene Fuller, Phil Ware**, and their views about the future of semiconductor lithography in 2003.



# The Chip Insider's® Graphics File

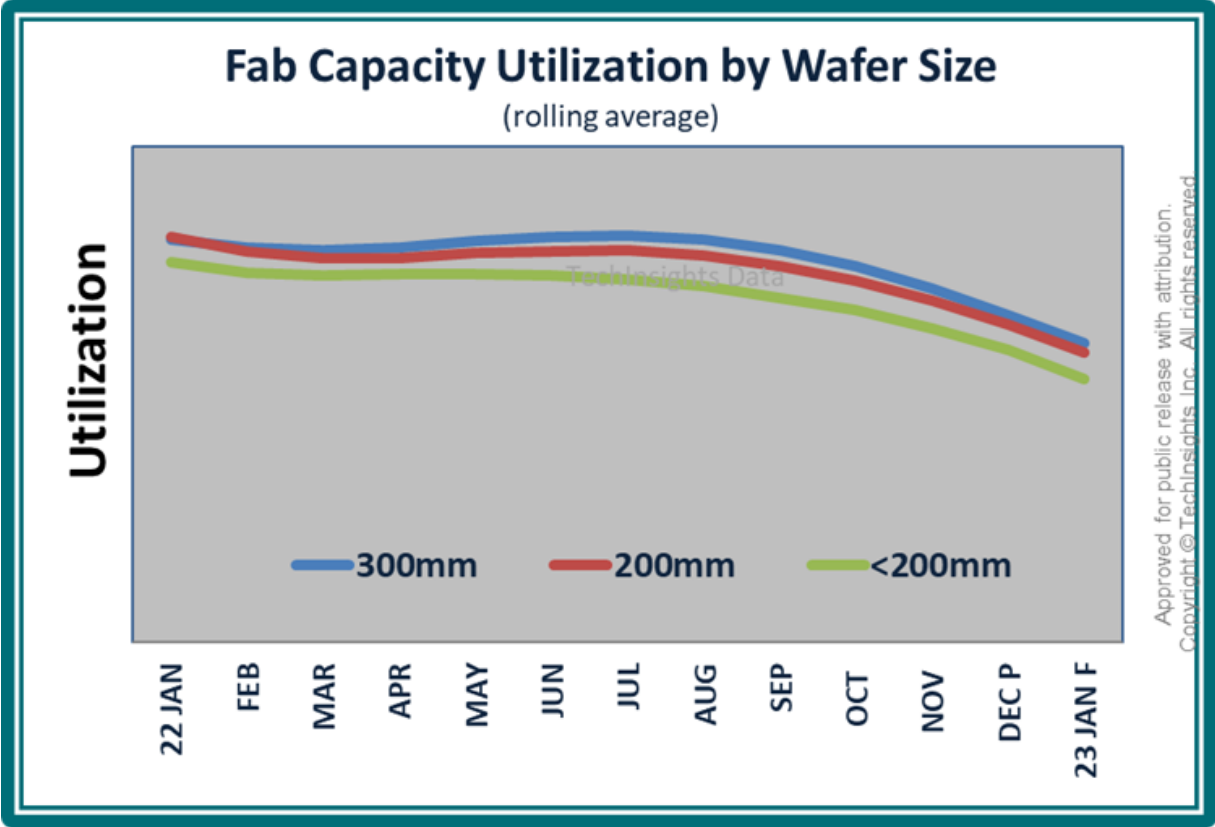
## January 2023

*The semiconductor industry is covered in a blanket of snow*

- Order activity for semiconductor equipment decreased to a brisk 49 degrees
- Memory remains at freezing levels while Subcon/Advanced packaging and Other SOC compute slipped 1 degree
- TechInsights' Chip Price Performance Index continued to lose ground, slipping nearly 2 points

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

# The Chip Insider® Graphics



## Capacity Utilization by Wafer Size

Utilization rates remain high  
across the board

Fab Capacity Utilization by Wafer Size: The chart gives rolling averages for 300mm, 200mm, and smaller silicon wafers

# Workforce Development Solutions

With Ajit Manocha From SEMI



## What the conversation is about

Insights Interview:

- 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.

# Semiconductor Analytics

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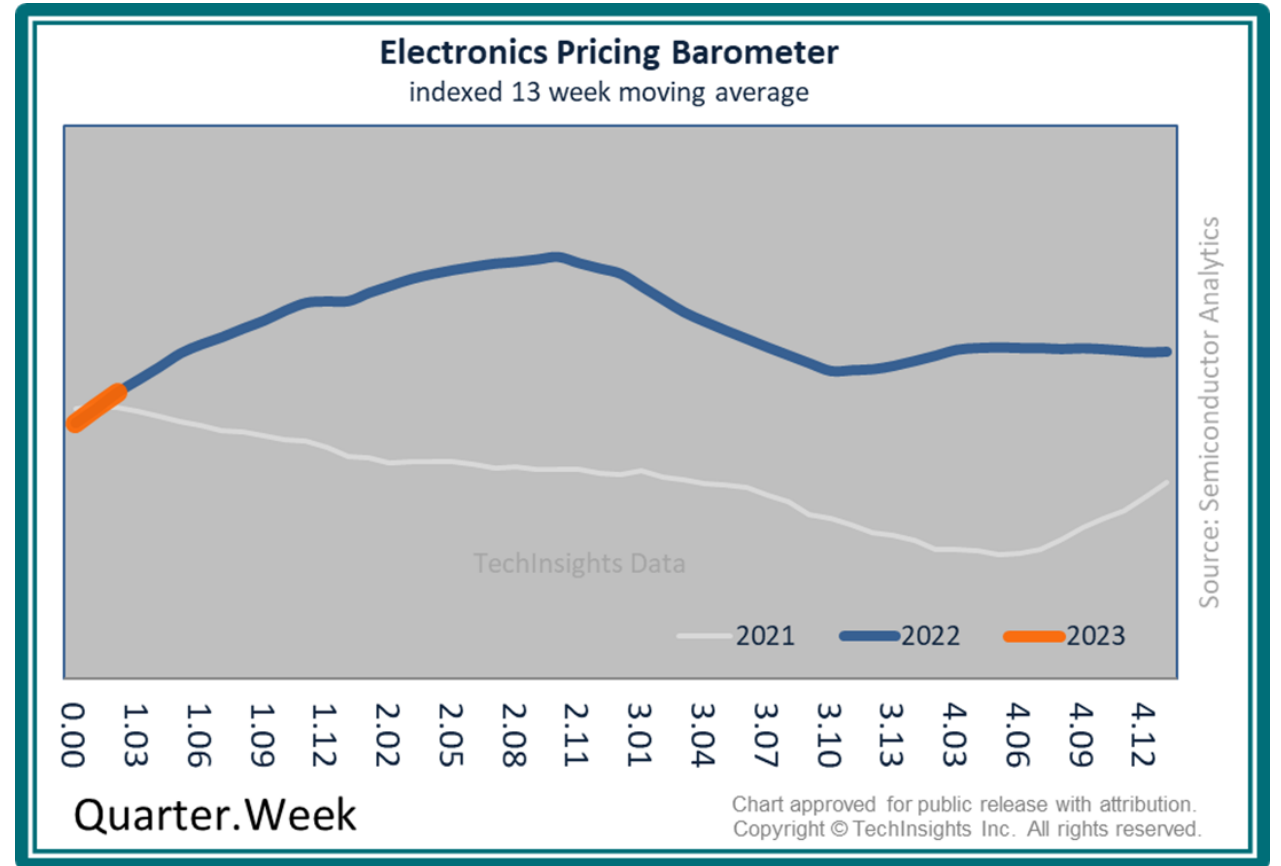




# Electronics Retail Pricing Trends

PC Notebooks Tablets, Smartphones, Cell Phones, Digital Cameras, Appliances, TVs

Electronics'  
Retail Prices  
are in a bullish  
rise.





Dan Hutcheson – Vice Chair  
The Chip Insider

# The Chip Insider®

## Strategy & Tactics

### The Chip Insider's Strategic Forecast

#### Summaries:

SEMI ISS kicked off to a record crowd. This has always been the best conference to find out how the coming year will play out, as its attendees are all senior executives. They come with a read from the first week of the year as to how their sales pros think the year will turn out. They come here to gauge what others are seeing. It wasn't long after the conference got going before everyone began to wonder if the atmospheric river affecting California wasn't a sign ... In the correlation-without-causation category, there used to be a high degree of correlation between the weather and the year's final results back when the conference was held in Spanish Bay, south of Monterey. But rest assured, that correlation has not held since it was moved north. Nevertheless, in the correlation-with-causation category, all of the forecast pros presenting were in uniform agreement: 2023 will be a down year.

The big focus areas at the conference were:

1. The challenge of re-globalization of semiconductor manufacturing
2. How Auto is replacing Smartphone as the highest growth driver
3. Work Force Development (WFD), and ...
4. Sustainability

The first two are business opportunities. The second two are business imperatives. Lack of success here will result in a failure to attain the future opportunities awaiting us. They also put us in a new era, where go-it-alone strategies will not work as well as they did in the 90s and 2000s. SEMI's Ajit Manocha kicked off the conference with an excellent overview defining how some areas can only be addressed by its members and others need to be addressed with the support of SEMI. Clearly WFD and Sustainability need to be addressed with the support of SEMI... A willingness to address issues head on is what attendees like about SEMI ISS, and this year's conference delivered. Here are some to the best presentations on this note...



**People:** Semiconductor lithography history:

[Bill Arnold](#), [Gene Fuller](#), [Phil Ware](#), and their views about the future of semiconductor lithography in 2003. The history of technology development always looks like a clear linear path in retrospect. But it's never clear when you're in the middle of it. These historic videos take you back to 2003, when 193nm immersion was still a concept, 157nm exposure tools were expected to be ready soon, and progress on EUV was extremely difficult.

Here are their, then current, answers to these questions:

[Are Semiconductor Lithography Enhancing Technology options narrowing?](#)

[Will 193nm Immersion lithography work?](#)

[What are the highest Numerical Apertures and k-factors?](#)

[Do design rules make it easier for chip engineers in a semiconductor wafer fab?](#)



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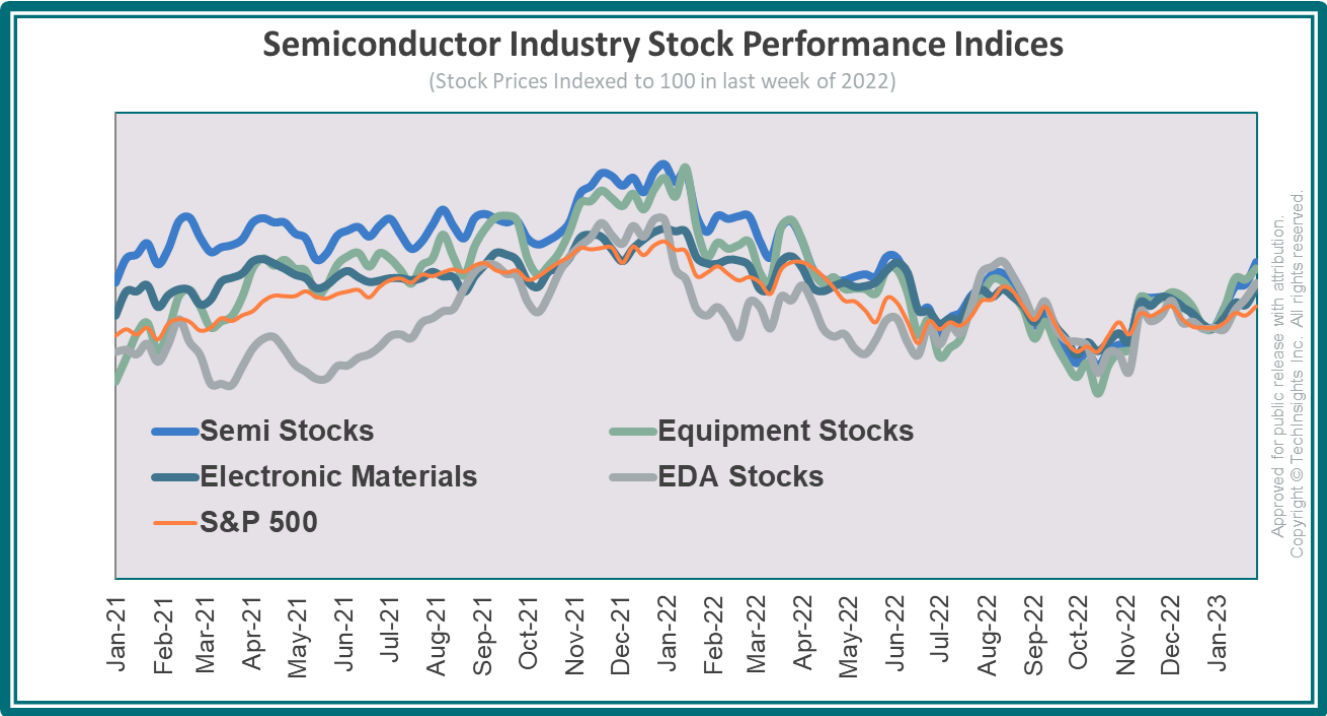
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TechInsights' Stock Indices

Semiconductors +5.4%

Equipment +2.7%

Electronic Materials +4.6%

EDA +4.0%

# Semiconductor Stocks

## Weekly Growth and Forward P/E Ratios by Company

TechInsights' Semiconductor Stock Index rose this week with strong performance from SkyWater Technology, Western Digital, STMicroelectronics, NVIDIA, and MaxLinear.

IDM +8.2%  
Foundry & OSAT +4.6%  
Fabless & Fablite +5.4%

Weekly Gains				1/27/2023		
Semiconductor Stocks		Price Change	Forward P/E	Semiconductor Stocks	Price Change	Forward P/E
<b>IDM</b>				<b>Fab-lite to Fabless</b>		
Intel	INTC	-3.6%	16	AMD	AMD	7.6%
Micron	MU	9.3%	31	Analog Devices	ADI	3.4%
ON Semiconductor	ON	11.2%	15	Broadcom	AVGO	3.5%
Samsung Electronics	005930.KS	4.5%	–	IBM	IBM	-4.8%
SK hynix		4.5%		Infineon	IFNNY PK	9.0%
STMicroelectronics	STM	14.4%	11	MagnaChip Semiconductor	MX	1.0%
Western Digital	WDC	16.9%	12	MaxLinear	MXL	11.7%
<b>Foundry &amp; OSAT</b>				MediaTek	2454.TW	0.0%
Amkor	AMKR	2.3%	10	NVIDIA	NVDA	14.2%
ASE	ASE	3.5%	9	Panasonic	PC	5.6%
GLOBALFOUNDRIES	GFS	4.9%	25	Qualcomm	OCOM	8.5%
	600584.SS			Silicon Laboratories	SLAB	6.9%
JCET	SKYT	0.0%	15	Skyworks	SWKS	7.9%
SkyWater Technology		18.4%	–	Texas Instruments	TXN	1.3%
SMIC	SMI	2.9%	13			
TSMC	TSM	2.5%	13			
UMC	UMC	2.1%	8			

Above Avg

Top 4-6

Top 1-3

# Chip Equipment & Related Stocks

## Weekly Growth and Forward P/E Ratios by Company

Weekly Gains							1/27/2023
Equipment Stocks		Price Change	Forward P/E	Equipment Stocks		Price Change	Forward P/E
Wafer Fab:				Test:			
Applied Materials	AMAT	2.6%	16	Advantest	ATEYY	0.1%	–
ASM International	ASMIY	5.5%	27	Teradyne	TER	6.1%	25
ASML	ASMLY	2.9%	33	FormFactor	FORM	10.5%	31
KLA	KLAC	-3.5%	22				
Lam Research	LRCX	2.2%	17	Assembly:			
Onto Innovation	ONTO	2.5%	–	BESI	BESIY.PK	7.6%	–
Nikon	7731	3.3%	–	Kulicke & Soffa	KLIC	3.9%	14
TEL	8035	2.3%	–	ASM Pacific Technology	0522 HK	3.0%	
Veeco Instruments	VECO	-0.4%	15				

Above Avg

Top 4-6

Top 1-3

TechInsights' Semiconductor Equipment Stock Index continued to increase this week. FormFactor came out on top followed closely by BESI, Teradyne, and ASM International.

WFE +1.9%  
Test +5.6%  
Assembly +4.8%

# Electronic Materials Stocks

Weekly Growth and Forward P/E Ratios by Company

TechInsights' EDA Stock Index grew this week.

TechInsights' Electronic Materials Stock Index was led up by DNP who was this week's biggest winner.

Weekly Gains						1/27/2023	
EDA & Electronic Materials Stocks		Price Change	Forward P/E	EDA & Electronic Materials Stocks		Price Change	Forward P/E
EDA				DNP	7912	19.8%	–
Cadence	CDNS	3.8%	38	DuPont de Nemours	DD	-0.6%	5
Synopsys	SNPS	4.3%	29	JSR	4185	2.8%	–
Ansys	ANSS	4.0%	31	Shin-Etsu	4063	9.0%	–
Electronic Materials				SOITEC	SOI.PA	0.5%	–
BASF	BASFY	0.6%	2	Tokyo Ohka	4186	1.6%	–
Entegris	ENTG	3.0%	23				

Above Avg

Top 4-6

Top 1-3



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							
17-Jun-22	104.7	98.0	105.1	92.4	-7.5%	-10.6%	-8.9%	-3.6%	2	4.0%	-53	-17.3%	21.3%	95.7	-5.8%
24-Jun-22	105.5	102.3	104.7	101.0	0.8%	4.3%	-0.3%	9.3%	41	12.8%	-14	-19.4%	32.2%	101.9	6.4%
01-Jul-22	97.7	92.0	101.3	95.4	-7.3%	-10.1%	-3.3%	-5.6%	3	6.1%	-52	-20.1%	26.2%	99.6	-2.2%
08-Jul-22	102.8	94.4	102.8	100.6	5.2%	2.7%	1.5%	5.5%	47	20.5%	-7	-4.8%	25.3%	101.6	1.9%
15-Jul-22	104.3	97.1	102.6	98.4	1.4%	2.8%	-0.2%	-2.2%	32	10.1%	-21	-9.1%	19.2%	100.6	-0.9%
22-Jul-22	108.9	105.9	108.5	105.8	4.4%	9.1%	5.7%	7.5%	52	66.7%	-3	-8.3%	75.0%	103.2	2.5%
29-Jul-22	111.4	109.4	110.8	115.3	2.4%	3.3%	2.1%	9.0%	39	12.4%	-16	-9.9%	22.3%	107.6	4.3%
05-Aug-22	114.8	113.6	108.7	116.9	3.1%	3.8%	-1.9%	1.5%	47	33.8%	-8	-17.1%	50.9%	108.0	0.4%
12-Aug-22	115.2	112.9	110.9	118.5	0.3%	-0.6%	1.9%	1.3%	33	22.3%	-22	-17.4%	39.7%	111.5	3.3%
19-Aug-22	111.1	109.2	108.7	114.2	-3.6%	-3.3%	-1.9%	-3.6%	9	17.4%	-46	-8.1%	25.5%	110.1	-1.2%
26-Aug-22	106.3	104.9	106.2	108.9	-4.3%	-3.9%	-2.3%	-4.7%	2	1.1%	-53	-17.8%	18.9%	105.7	-4.0%
02-Sep-22	100.6	97.0	101.7	103.0	-5.4%	-7.5%	-4.1%	-5.4%	1	2.1%	-54	-16.1%	18.2%	102.2	-3.3%
09-Sep-22	103.8	101.8	106.4	107.4	3.2%	4.9%	4.6%	4.2%	50	13.1%	-5	-9.5%	22.6%	105.9	3.6%
16-Sep-22	99.3	95.5	100.6	100.0	-4.3%	-6.2%	-5.4%	-6.9%	4	2.3%	-50	-24.2%	26.5%	100.9	-4.8%
23-Sep-22	93.8	90.3	97.1	96.6	-5.5%	-5.5%	-3.5%	-3.4%	3	1.6%	-52	-15.8%	17.4%	96.2	-4.6%
30-Sep-22	90.2	86.3	92.6	96.2	-3.9%	-4.4%	-4.7%	-0.4%	5	4.7%	-49	-11.7%	16.4%	93.4	-2.9%
07-Oct-22	93.5	90.2	96.2	95.0	3.7%	4.6%	3.9%	-1.3%	46	9.8%	-7	-7.8%	17.6%	94.8	1.5%
14-Oct-22	89.2	81.6	93.7	87.5	-4.6%	-9.5%	-2.6%	-7.9%	8	5.8%	-47	-16.1%	21.9%	93.3	-1.6%
21-Oct-22	93.6	89.5	96.2	93.2	4.9%	9.6%	2.8%	6.5%	45	21.9%	-10	-5.2%	27.1%	97.7	4.7%
28-Oct-22	95.3	93.3	98.6	92.8	1.8%	4.3%	2.5%	-0.5%	42	11.5%	-13	-24.7%	36.2%	101.6	4.0%
04-Nov-22	96.2	94.3	96.3	87.8	0.9%	1.0%	-2.4%	-5.3%	32	20.3%	-23	-21.5%	41.8%	98.2	-3.3%
11-Nov-22	107.8	108.4	107.2	104.5	12.1%	15.0%	11.3%	18.9%	53	37.4%	-2	-8.0%	45.4%	104.0	5.9%
18-Nov-22	108.3	107.5	106.2	101.9	0.5%	-0.8%	-0.9%	-2.5%	24	12.4%	-31	-22.2%	34.6%	103.3	-0.7%
25-Nov-22	108.5	108.1	108.7	103.4	0.2%	0.5%	2.4%	1.5%	36	5.6%	-19	-3.8%	9.4%	104.9	1.5%
02-Dec-22	108.7	109.9	108.2	107.6	0.1%	1.7%	-0.5%	4.0%	38	9.2%	-16	-7.5%	16.7%	106.0	1.1%
09-Dec-22	106.9	108.9	105.9	101.4	-1.7%	-0.9%	-2.1%	-5.7%	15	7.2%	-38	-8.5%	15.7%	102.5	-3.4%
16-Dec-22	103.6	105.8	104.1	101.7	-3.1%	-2.9%	-1.7%	0.3%	10	4.0%	-45	-10.6%	14.6%	100.3	-2.1%
23-Dec-22	100.4	100.0	100.9	99.7	-3.1%	-5.4%	-3.1%	-2.0%	3	1.2%	-51	-10.8%	12.0%	100.1	-0.2%
30-Dec-22	100.0	100.0	100.0	100.0	-0.4%	0.0%	-0.9%	0.3%	20	7.9%	-33	-5.3%	13.2%	100.0	-0.1%
06-Jan-23	105.6	105.5	103.1	99.6	5.6%	5.5%	3.1%	-0.4%	46	17.8%	-8	-4.3%	22.1%	101.4	1.4%
13-Jan-23	111.4	113.8	107.1	104.9	5.5%	7.9%	4.0%	5.3%	53	25.3%	-2	-1.6%	26.9%	104.2	2.7%
20-Jan-23	112.2	113.5	106.5	108.1	0.7%	-0.3%	-0.6%	3.0%	27	5.6%	-27	-6.4%	12.0%	103.5	-0.7%
27-Jan-23	118.2	116.6	111.4	112.5	5.4%	2.7%	4.6%	4.0%	48	19.8%	-5	-4.8%	24.6%	106.0	2.5%

# Links to Conference Call Transcripts

## January 27<sup>th</sup>

- [Teradyne, Inc. \(TER\) Q4 2022 Earnings Call Transcript](#)
- [STMicroelectronics NV \(STM\) Q4 2022 Earnings Call Transcript](#)
- [Lam Research Corporation \(LRCX\) Q2 2023 Earnings Call Transcript](#)
- [Texas Instruments Incorporated \(TXN\) Q4 2022 Earnings Call Transcript](#)

## January 20<sup>th</sup> and before

- [NVIDIA Corporation \(NVDA\) 41st Annual J.P. Morgan Healthcare Conference \(Transcript\)](#)
- [Taiwan Semiconductor Manufacturing Company Limited \(TSM\) Q4 2022 Earnings Call Transcript](#)
- [Micron Technology, Inc. \(MU\) J.P. MORGAN 21ST ANNUAL TECH/AUTO FORUM \(Transcript\)](#)
- [Marvell Technology, Inc. \(MRVL\) J.P. Morgan 21st Annual Tech/Auto Forum Conference \(Transcript\)](#)
- [Skyworks Solutions, Inc. \(SWKS\) Presents at J.P. Morgan 21st Annual Tech/Auto Forum \(Transcript\)](#)
- [NVIDIA Corporation \(NVDA\) J.P. Morgan 21st Annual Tech/Auto Forum Conference \(Transcript\)](#)
- [ON Semiconductor Corporation \(ON\) CEO Hassane El-Khoury presents at J.P. Morgan CES Tech/Auto Forum \(Transcript\)](#)
- [Micron Technology, Inc. \(MU\) Q1 2023 Earnings Call Transcript](#)
- [Western Digital Corporation \(WDC\) CEO David Goeckeler Presents at Barclays 2022 Global Technology, Media and Telecommunications Conference \(Transcript\)](#)



## Links to Conference Call Transcripts

- [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](#)
- [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 \(Transcript\)](#)

## Links to Conference Call Transcripts

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



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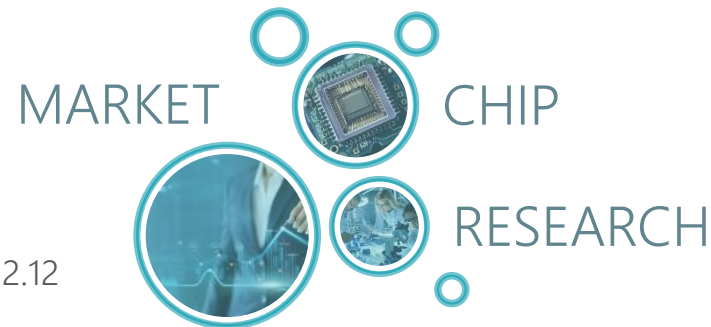
## Chip Market Research Services Uploads

### ForecastPro Module:

- TCI Graphics – V22.12
- Semiconductor Forecast – V22.12
- CapEx Distribution – V22.12
- Electronics & Macroeconomy – V22.12
- Diffusion Rates and Utilization – V22.12
- Long-Term Semi and Eqpt Forecast – V22.12
- Silicon Demand – V22.12
- Advanced Packaging – V22.11
- Packaging Demand – V22.11

### 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:

- 2022 CSS Databases
- 2022 Survey Documents

### Critical Subsystems Uploads:

- Critical Subsystems Forecasts – V22.11
- Device Forecast Summary – V23.1
- Manufacturing Equipment Forecasts – V22.11
- 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
  - Quarterly Report: V22.12
- Device Interface Board Report: V22.08
  - Quarterly Report: V22.12

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