### Semiconductor WEEK:

### October 21, 2022

### An overview of results and conclusions from recent reports at TechInsights

### **Chip Market Research Services**

#### Bearish conditions abound

- Order activity for semiconductor equipment extended its decline, slipping to 76 degrees
- Worldwide Chip Making Equipment Markets

#### **Semiconductor Analytics**

#### Last Week in the Semiconductor Market:

Semiconductor sales fell 7% last week, with monthly data updates taking it to 2020 levels. The IC weather cooled by 1°F, in Chilly conditions. Zooming in on forecast updates this week with Jul-Aug data in, the heat map proved more accurate than weekly data. There was a sharp turn in July, as memory fell off a cliff. Semis will reach \$637B in 2022, with Y/Y growth of 6% which drops to -3% in 2023. Techlnsights' IC Supply/Demand metrics remained Balanced for the 3rd week in a row which shows more signs of improvement. NAND crawled back to Balanced and IDM clawed its way to Loose from Saturated. However, Foundry returned to Glut after a brief stint at Saturated, as More Moore took the biggest hit. Analog & Power held at Tight for a second week.

### **Chip History Center**

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.

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.

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

#### **Semiconductor Stocks**

- TechInsights Semiconductor Stock Indices and the S&P 500 jumped this week
- Semiconductor Stock Index was led up by GLOBALFOUNDRIES
- Semiconductor Equipment Stock Index was led up by ASML
  - ASML was this week's biggest winner
- EDA Stock Index soared
- Electronics Materials Stock Index was led up by BASF
  - BASF came out on top
- Hottest Stocks: ASML, BESI, ASM International, Lam Research, GLOBALFOUNDRIES, and ON Semiconductor

**TechInsights** 

# The Chip Insider®'s Graphics File





This issue contains the latest forecast.

### October 2022

#### Bearish conditions abound

- Order activity for semiconductor equipment extended its decline, slipping to 76 degrees
- The 2022 IC forecast was downgraded to 5% from 7% in the previous update due to faster-thanexpected deteriorating conditions in 2H22
- TechInsights' Chip Price Performance Index continued to trend lower

Forecast as of October 2022:	2022	2023			
Semi Equipment (\$B):	\$ 136.9	\$ 118.2			
Sequential Change	7.9%	-13.6%			
Capacity Utilization:	95.4%	89.8%			
ICs (\$B):	\$ 516.2	\$ 486.3			
Sequential Change	4.9%	-5.8%			
IC Units (BU):	412.9	405.9			
Sequential Change	4.7%	-1.7%			
Electronics (\$B):	\$ 2,534	\$ 2,430			
Sequential Change	-1.6%	-4.1%			

#### Contact us to access more details

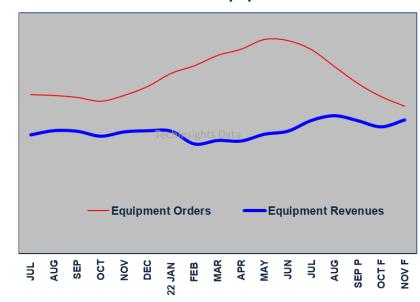
# The Chip Insider® Graphics

# Worldwide Chip Making Equipment Markets

Equipment Orders are falling

Revenues in \$B

#### W.W. Semiconductor Equipment Markets



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Worldwide Chip Making Equipment Markets: Chart shows rolling averages in \$B for semiconductor equipment orders and revenues, contrasted against a 36-month rolling average of revenues



### 2022 SIA AWARDS DINNER THURSDAY, NOVEMBER 17, 2022

SAN JOSE MARRIOTT 301 S MARKET ST, SAN JOSE, CA 95113

SIA Reception: 5-6:30 pm

Dinner, Awards, Keynote: 6:30-8:30 pm After-Dinner Reception: 8:30-10 pm



#### **LIP-BU TAN**

Executive Chairman and Former CEO Cadence Design Systems, Inc. Founder and Chairman Walden International Founding Managing Partner Walden Catalyst Ventures



#### KEYNOTE SPEAKER

### JIM FARLEY

President and CEO of Ford Motor Company





For more information about tickets and sponsorship opportunities please contact Sarah Ravi at <a href="mailto:sravi@semiconductors.org">sravi@semiconductors.org</a>

www.semiconductors.org

# Semiconductor Analytics

### Last Week in the Semiconductor Market:

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IC Weather Measures Order Activity S/D Measures Pricing Power



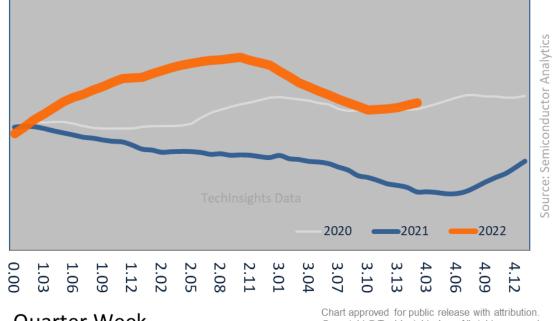
# Electronics Retail Pricing Trends:

for PC notebooks Tablets Smartphones Cell phones Digital Cameras Appliances TVs

## Electronics' Retail Price Down Trend has bottomed.

#### **Electronics Pricing Barometer**

indexed 13 week moving average



Quarter.Week

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### Insights Interview:

# 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.

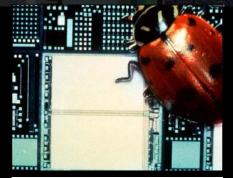
Click here to watch online



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.

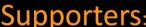
What's ALD? A children's story ... Did you know that the chip makers routinely make films one atom at a time? It's called Atomic Layer Deposition. It sounds very complicated, but this story makes it so simple even a child could understand.

Bunny Suit History in Semiconductor Manufacturing In 1968, standard clean room practices were lax. Facilities were kept reasonably clean, but employees were 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

























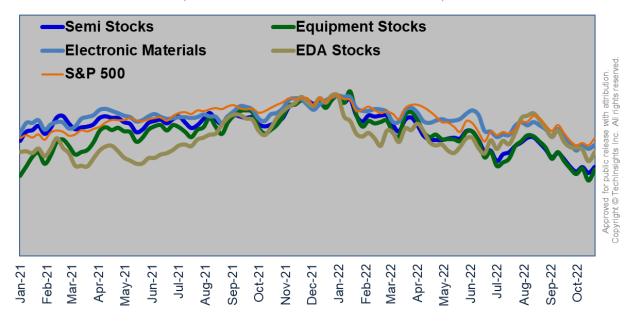
# semiStockVEEK: TechInsights' Semiconductor Stock Indices and the S&P 500

jumped this week as investors believe the it's possibile the Federal Reserve officials may ease aggressive rate increases sooner than anticipated.



### **Semiconductor Industry Stock Performance Indices**

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



#### TechInsights' Stock Indices:

Semiconductors +4.9% Equipment +9.6% Electronic Materials +2.8% EDA +6.5%



## **Semiconductor Stocks:**

# Weekly Growth and Forward P/E Ratios by Company

Weekly Gains 10/21/2022									
Semiconductor Stocks	Price Change	Forward P/E	Semiconductor Stocks	Price Change	Forward P/E				
IDM			Fab-lite to Fabless						
ntel	4.1%	11	AMD	5.1%	14				
Micron	6.3%	13	Analog Devices	7.2%	14				
ON Semiconductor	13.7%	12	Broadcom	5.3%	11				
Samsung Electronics	-0.7%	_	IBM	8.1%	12				
SK hynix	-5.2%		Infineon	9.2%	11				
STMicroelectronics	8.8%	8	MagnaChip Semiconductor	-4.1%	13				
Western Digital	3.4%	6	MaxLinear	4.6%	7				
Foundry & OSAT			MediaTek	-3.1%	_				
Amkor	12.5%	5	NVIDIA	11.0%	26				
ASE	5.4%	5	Panasonic	1.9%	10				
GLOBALFOUNDRIES	15.1%	20	Qualcomm	5.3%	9				
JCET	2.2%	12	Silicon Laboratories	9.0%	24				
SkyWater Technology	13.5%	_	Skyworks	4.3%	7				
SMIC	4.3%	10	Texas Instruments	7.7%	17				
TSMC	-0.2%	13							
UMC	7.2%	6							

TechInsights' Semiconductor Stock Index was led up by GLOBALFOUNDRIES who was awarded \$30 million in federal funding to advance the development and production at GLOBALFOUNDRIES Vermont facility. ON Semiconductor also being a top performer this week.

IDM +4.3% Foundry & OSAT +7.5% Fabless & Fablite -+5.1%

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 SMIC SMI STMicroelectronics STM Texas Instruments TXN TSMC TSM UMCUMC Western Digital WDC



# **Chip Equipment & Related Stocks:**

# Weekly Growth and Forward P/E Ratios by Company

Weekly Gains 10/21/202										
Equipment Stocks	Price Change	Forward P/E	Equipment Stocks	Price Change	Forward P/E					
Wafer Fab:			Test:							
Applied Materials	10.2%	10	Advantest	1.4%	_					
ASM International	18.5%	17	Teradyne	8.3%	14					
ASML	21.9%	19	FormFactor	6.7%	14					
KLA	10.2%	12								
Lam Research	17.3%	10	Assembly:							
Onto Innovation	7.2%	_	BESI	18.7%	_					
Nikon	1.7%	_	Kulicke & Soffa	7.6%	9					
TEL	4.7%	_	ASM Pacific Technology	-1.4%						
Veeco Instruments	7.8%	10								

Above Ava Top 1-3 **TechInsights' Semiconductor Equipment** Stock Index was led up by ASML who was this week's biggest winner. BESI, ASM International, and Lam Research also claiming the top stock spots this week as quarterly earning reports release.

WFE +11.1% Test +5.5% Assembly +8.3%

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 Tokyo Electron Limited 8035 Veeco **VECO** 



## **Electronic Materials Stocks:**

# Weekly Growth and Forward P/E Ratios by Company

Weekly Gains											
EDA & Electronic Materials Stocks	Price Change	Forward P/E	EDA & Electronic Materials Stocks	Price Change	Forward P/E						
EDA			DNP	-0.4%	_						
Cadence	7.4%	32	DuPont de Nemours	6.5%	5						
Synopsys	6.8%	28	JSR	-0.3%	_						
Ansys	5.4%	24	Shin-Etsu	-2.0%	_						
Electronic Materials			SOITEC	4.5%	_						
BASF	9.5%	2	Tokyo Ohka	-0.5%	_						
Entegris	4.7%	16									

Above Avg Top 4-6

Top 1-3

Techlnsights' EDA Stock Index soared.

**TechInsights' Electronic Materials Stock Index** rose this week, BASF and DuPont de
Nemours came out on top.

Ansys, Inc. ANSS BASF BASFY
Entegris ENTG Cadence CDNS DNP 7912
DuPont DD JSR 4185 Shin-Etsu 4063
SOITECSOI.PA Synopsys SNPS Tokyo
Ohka 4186



The Prior	TechInsights' Indices of Chip Industry Stocks				Weekly Growth			npanies Up Growth	wth	nies	wth	r of	200	t) 00	
Week's Close	Semi Stocks	Equipment Stocks	Materials Stocks	EDA Stocks	Semi Stocks	Equipment Stocks	Materials Stocks	EDA Stocks	Companies Up	Мах Gro	<b>Companies</b> <b>Down</b>	Min Growth	Range of Growth	S&P 5	S&P 500 Growth
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%
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%
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# Links to **Conference Call** Transcripts

#### October 21st

BE Semiconductor Industries N.V. (BESIY) Q3 2022 Earnings Call Transcript

Lam Research Corporation (LRCX) Q1 2023 Earnings Call Transcript

#### October 14th and before

Taiwan Semiconductor Manufacturing Company Limited (TSM) Q3 2022 Earnings Call Transcript

Aehr Test Systems (AEHR) Q1 2023 Earnings Call Transcript

Micron Technology, Inc. (MU) Q4 2022 Earnings Call Transcript

Analog Devices Inc. (ADI) 13th Annual U.S. All Stars Conference (Transcript)

<u>Advanced Micro Devices, Inc. (AMD) Goldman Sachs Communacopia + Technology Conference (Transcript)</u>

**QUALCOMM Incorporated (QCOM) Goldman Sachs 2022 Communacopia + Technology Conference (Transcript)** 

NVIDIA Corporation (NVDA) Presents at Goldman Sachs 2022 Communacopia + Technology Conference (Transcript)

NXP Semiconductors N.V. (NXPI) Goldman Sachs 2022 Communacopia + Technology Conference (Transcript)

Western Digital Corporation (WDC) Goldman Sachs Communacopia + Technology Conference Transcript

<u>Applied Materials, Inc. (AMAT) Presents at Goldman Sachs Communacopia + Technology Conference (Transcript)</u>

Western Digital Corporation (WDC) Presents at Evercore ISI 2nd Annual TMT Conference (Transcript)

ON Semiconductor Corporation (ON) Presents at Citi 2022 Global Technology Conference (Transcript)



# Links to **Conference Call** Transcripts

ASML Holding NV (ASML) Citi 2022 Global Technology Conference (Transcript)

International Business Machines Corporation (IBM) Evercore ISI 2nd Annual Technology, Media & Telcom Conference 2022

Call Transcript

Analog Devices Inc. (ADI) 2022 Evercore ISI 2nd Annual Technology, Media & Telcom Conference (Transcript)

Applied Materials, Inc. (AMAT) Presents at Citi 2022 Global Technology Conference (Transcript)

Western Digital Corporation (WDC) Citi 2022 Global Technology Conference

NXP Semiconductors N.V. (NXPI) Presents at 2022 Citi's 2022 Global Technology Conference (Transcript)

<u>Lam Research Corporation (LRCX) Management Presents at Evercore ISI 2nd Annual Technology, Media & Telcom Conference 2022 (Transcript)</u>

Texas Instruments (TXN) Presents at Citigroup 2022 Global Technology Conference - Conference Call Transcript

**Broadcom Inc. (AVGO) Q3 2022 Earnings Call Transcript** 

Micron Technology, Inc. (MU) Presents at Deutsche Bank 2022 Technology Conference (Transcript)

ON Semiconductor Corporation (ON) Deutsche Bank 2022 Technology Conference (Transcript)

Intel Corp (INTC) Deutsche Bank Technology Conference Transcript

Western Digital Corporation (WDC) Deutsche Bank 2022 Technology Conference (Transcript)

NVIDIA Corporation (NVDA) CEO Jensen Huang on Q2 2023 Results - Earnings Call Transcript

Applied Materials, Inc.'s (AMAT) CEO Gary Dickerson on Q3 2022 Results - Earnings Call Transcript

Synopsys, Inc. (SNPS) CEO Aart de Geus on Q3 2022 Results - Earnings Call Transcript



# Links to **Conference Call** Transcripts

Analog Devices Inc. (ADI) CEO Vincent Roche on Q3 2022 Results - Earnings Call Transcript Agilent Technologies, Inc. (A) CEO Mike McMullen on Q3 2022 Results - Earnings Call Transcript SkyWater Technology, Inc. (SKYT) CEO Thomas Sonderman on Q2 2022 Results - Earnings Call Transcript 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 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

# TechInsights recent uploads

### Chip Market Research Services Uploads:

- ForecastPro Module:
  - TCI Graphics V22.10
  - Electronics & Macroeconomy V22.10
  - Diffusion Rates and Utilization V22.10
  - Long-Term Semi and Eqpt Forecast V22.09
  - Silicon Demand V22.09
  - CapEx Distribution V22.09
  - Semiconductor Forecast V22.09
  - Advanced Packaging V22.07
  - Packaging Demand V22.06

#### Equipment Database Module:

- IC Equipment Forecast:
  - Yearly V22.08
- WFE Equipment Market Shares:
  - Yearly V22.05
  - Quarterly V22.09
- Scanner & Stepper Shipments V22.09
- WFE by Applications V22.09

### **Customer Satisfaction Survey Uploads:**

- 2022 CSS Databases
- 2022 Survey Documents

### **Critical Subsystems Uploads:**

- Critical Subsystems Forecasts V22.05
- Device Forecast Summary V22.05
- Manufacturing Equipment Forecasts V22.05
- Substrate Processing Equipment Shipments V22.05
- Substrate Processing Equipment Installed Base V22.05
- Chamber Shipments V22.05
- Supplier Shares V22.03

### **Test Connectivity Reports:**

- Test and Burn-In Socket Report : V21.04
- Probe Card Report: V21.04
- Device Interface Board Report: V20.05



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