

Chapter 2: Silicon and Wafers

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CITE AS Sharma, Yashvardhan. "Silicon and Wafers." *Chip Supply Chain: How AI Chips Are Made*. Edition of 20 October 2026. <https://chipsupplychain.org/silicon-and-wafers/>

CHAPTER

02

STAGE 2 OF 15

Silicon and Wafers

Firms based in Japan, Taiwan, Germany and South Korea make most 300 mm wafers used for advanced chips. China makes most polysilicon, almost all of it for solar cells.

IN PLAIN TERMS

Every chip is built on a wafer, a thin round slice of silicon about 30 centimeters across that carries hundreds of chips at once. Making one starts with quartz rock, which is silicon bound to oxygen ¹². The silicon is refined until metal impurities are no more than a few parts per billion ¹³. It is then melted, and a small seed crystal is lowered to the surface and drawn slowly back up. The melt freezes onto the seed as one long cylinder, a single crystal with its atoms lined up in one unbroken pattern from end to end. Saws cut the cylinder into discs, and each disc is polished to a mirror finish and made extremely flat across its whole face ¹³. In 2025 the top five wafer makers served around 75 percent of the world market, and none of them is American or Chinese ⁶.

¹² Mineral Commodity Summaries 2026: Silicon. U.S. Geological Survey · 5 February 2026 [\[A\]](#)
pubs.usgs.gov/periodicals/mcs2026/mcs2026-silicon.pdf

¹³ SUMCO, production processes page. SUMCO · Accessed 9 September 2026 [\[A\]](#) www.sumcosi.com/english/products/process/

⁶ Investor Presentation: Foundation of Digital Life. Siltronic · April 2026 · p. 6 [\[A\]](#)
www.siltronic.com/fileadmin/investorrelations/2026/Q1/20260429_Siltronic_InvestorPresentation_.pdf#page=6

IN SHORT

Japanese companies held 53 percent of the world's silicon wafer sales in 2023, by a Fuji Keizai survey that Japan's trade ministry reproduced ¹⁸. Firms based in Taiwan, South Korea and Europe held most of the rest ¹⁸. China's largest maker of 300 mm wafers, Eswin, says it ranked sixth in the world with about 7.7 percent of global 300 mm shipments in the first half of 2026 ⁹. Chips also need electronic-grade polysilicon, the raw material for wafers, and none of the five major suppliers of it that the German wafer maker Siltronic named for 2025 is Chinese ²³.

GlobalWafers of Taiwan opened a \$3.5 billion plant in Texas in May 2025, the first production line of its kind built in the United States in over twenty years ²⁴. US Presidential Proclamation 11052 sets a minimum import price of \$100 per kilogram for polysilicon ingots and wafers from 4 December 2026 ²².

18 METI, Semiconductor and digital industry strategy: future direction (半導体・デジタル産業戦略の今後の方向性), 23 December 2025. Ministry of Economy, Trade and Industry (Japan) · 23 December 2025 · p. 8 [A](http://www.meti.go.jp/policy/mono_info_service/joho/conference/semicon_digital/0014/handeji14-4.pdf#page=8)
www.meti.go.jp/policy/mono_info_service/joho/conference/semicon_digital/0014/handeji14-4.pdf#page=8

9 西安奕斯伟材料科技股份有限公司2026年半年度报告. CNINFO · 25 August 2026 · p. 18 [A](http://static.cninfo.com.cn/finalpage/2026-08-26/1225503057.PDF#page=18)
static.cninfo.com.cn/finalpage/2026-08-26/1225503057.PDF#page=18

23 Investor Presentation: Foundation of Digital Life. Siltronic · April 2026 · p. 5 [A](http://www.siltronic.com/fileadmin/investorrelations/2026/Q1/20260429_Siltronic_InvestorPresentation_.pdf#page=5)
www.siltronic.com/fileadmin/investorrelations/2026/Q1/20260429_Siltronic_InvestorPresentation_.pdf#page=5

24 GlobalWafers America Officially Opens for Business. GlobalWafers · 15 May 2025 [A](http://www.sas-globalwafers.com/en/gwc_news_en_20250516/)
www.sas-globalwafers.com/en/gwc_news_en_20250516/

22 Adjusting Imports of Polysilicon and Its Derivatives Into the United States. Federal Register (Executive Office of the President) · 11 August 2026 [A](http://www.federalregister.gov/documents/2026/08/11/2026-16400/adjusting-imports-of-polysilicon-and-its-derivatives-into-the-united-states)
www.federalregister.gov/documents/2026/08/11/2026-16400/adjusting-imports-of-polysilicon-and-its-derivatives-into-the-united-states

CHOKEPOINT CARD		HIGH CONCENTRATION
		MODERATELY HARD TO SUBSTITUTE
CONCENTRATION	SUBSTITUTABILITY	
High	Moderate	PRICE OR MARKET SIZE
	Several firms already make 300 mm wafers that fabs have approved, but customers have to test and approve a new wafer plant before they buy from it ¹ .	\$11.4bn world wafer market in 2025, on 12,973 million square inches shipped ²
WHO LEADS	JP Shin-Etsu Handotai Its parent's electronics materials segment, wafers included, had ¥1,015.7bn of sales in the year to March 2026³ JP SUMCO ¥409,670m of net sales in 2025⁴ TW GlobalWafers NT\$60.6bn revenue in 2025⁵ KR SK Siltron One of the top five wafer makers by revenue in the first three quarters of 2025⁶ DE Siltronic €1,346.7m revenue in 2025⁷	
WHERE IT IS MADE	JP Japan Shin-Etsu and SUMCO crystal growth and polishing TW Taiwan GlobalWafers headquarters and plants DE Germany Siltronic plants in Burghausen and Freiberg, and Wacker semiconductor-grade polysilicon KR South Korea SK Siltron US United States Hemlock polysilicon in Michigan, and GlobalWafers plants in Sherman, Texas and St Peters, Missouri	
WHY SUBSTITUTION IS POSSIBLE	Losing one of the top five wafer makers leaves four, and a new wafer plant can still be built ⁶ . Customer approval of a new plant is called qualification ¹ . Siltronic completed key customer qualifications at its new Singapore fab in July 2025 ¹ .	
WHERE CHINA STANDS		WHERE THE US STANDS
China made about 93 percent of the world's polysilicon in 2023, an estimated 98 percent of it solar-grade ⁸ . Eswin, mainland China's largest maker of 300 mm wafers, says it had about 7.7 percent of world 300 mm shipments in the first half of 2026 ⁹ .		None of the five largest wafer makers in 2025 was American ⁶ . GlobalWafers of Taiwan won CHIPS awards of up to \$406 million in December 2024 for wafer plants in Texas and Missouri ¹⁰ .
1 Investor Presentation: Foundation of Digital Life. Siltronic · April 2026 · p. 12 A www.siltronic.com/fileadmin/investorrelations/2026/Q1/20260429_Siltronic_InvestorPresentation_.pdf#page=12 2 SEMI Reports 2025 Annual Worldwide Silicon Wafer Shipments and Revenue Results. PR Newswire · 10 February 2026 A www.prnewswire.com/news-releases/semi-reports-2025-annual-worldwide-silicon-wafer-shipments-and-revenue-results-302683028.html 3 Consolidated Financial Results for the Fiscal Year Ended March 31, 2026. Shin-Etsu Chemical · 27 April 2026 · p. 6 A www.shinetsu.co.jp/wp-content/uploads/2025/07/20260428_con_E.pdf#page=6 4 Notice of Convocation of the 27th Ordinary General Meeting of Shareholders. SUMCO · 6 March 2026 · p. 24 A www.sumcosi.com/english/pdf/ir/library/shareholders/27/pdf/nc_e_27.pdf#page=24 5 GlobalWafers Reports Full Year 2025 Results. GlobalWafers · 3 March 2026 A www.sas-globalwafers.com/en/gwc_news_en_20260303/ 6 Investor Presentation: Foundation of Digital Life. Siltronic · April 2026 · p. 6 A www.siltronic.com/fileadmin/investorrelations/2026/Q1/20260429_Siltronic_InvestorPresentation_.pdf#page=6 7 Siltronic AG: Robust business performance in 2025 demonstrates resilience despite challenging conditions. Siltronic · 27 August 2026 A www.siltronic.com/en/press/press-releases/siltronic-ag-robust-business-performance-in-2025-demonstrates-resilience-despite-		

The world market for silicon wafers was \$11.4 billion in 2025, on 12,973 million square inches shipped ². That is a small fraction of Nvidia's data center revenue, which reached \$193.7 billion in the fiscal year to 25 January 2026 ¹¹.

How it works

Silicon starts as quartzite, a rock that is silicon bound to oxygen. An arc furnace melts it with carbon, and the carbon takes the oxygen away as gas, leaving rough silicon metal. Refiners turn the metal into a gas, trichlorosilane, and distill it, because the impurities boil at other temperatures and separate out.

In the next step, the Siemens process, the clean gas flows over silicon filaments heated inside a bell jar. On the hot surface the gas breaks apart and its silicon settles onto the filaments. Over days the filaments thicken into gray rods of polysilicon. Everything downstream is made from those rods. Polysilicon comes in two ultra-high-purity grades, one for semiconductors and one for solar cells, and chips use the semiconductor grade ¹².

A grower melts the polysilicon at about 1,420 degrees Celsius, hotter than lava, and pulls a single crystal out of it by the Czochralski method ¹³. The grower lowers a small seed crystal on the end of a rod to the surface of the melt and draws it back up, slowly turning. Silicon freezes onto the seed in the seed's own atomic pattern, and a cylinder, the ingot, grows beneath it. The pull starts with a thin neck so that flaws from the seed's first contact with the melt stay in the neck and never reach the ingot. Boron or phosphorus stirred into the melt, a step called doping, sets how readily the wafer conducts and whether negative or positive charges carry its current.

A wire saw, a web of fine wire running through abrasive, slices the ingot into discs. The maker then laps each disc, grinding both faces flat between rotating plates. It etches off the damaged surface with chemicals, then polishes the disc to a mirror with colloidal silica, a slurry of silica particles far too small to see. Almost every step throws material away.

challenging-conditions.html

6 **Investor Presentation: Foundation of Digital Life.** Siltronic · April 2026 · p. 6 [A](https://www.siltronic.com/fileadmin/investorrelations/2026/Q1/20260429_Siltronic_InvestorPresentation_.pdf#page=6)

1 **Investor Presentation: Foundation of Digital Life.** Siltronic · April 2026 · p. 12 [A](https://www.siltronic.com/fileadmin/investorrelations/2026/Q1/20260429_Siltronic_InvestorPresentation_.pdf#page=12)

8 **2023 Minerals Yearbook: China (advance release).** U.S. Geological Survey · February 2026 · p. 7 [A](https://pubs.usgs.gov/myb/vol3/2023/myb3-2023-china.pdf#page=7)

9 **西安奕斯伟材料科技股份有限公司2026年半年度报告.** CNINFO · 25 August 2026 · p. 18 [A](https://static.cninfo.com.cn/finalpage/2026-08-26/1225503057.PDF#page=18)

10 **Biden-Harris Administration Announces CHIPS Incentives Awards with GlobalWafers to Support Domestic Production of Silicon Wafers.** NIST · 17 December 2024 [A](https://www.nist.gov/news-events/news/2024/12/biden-harris-administration-announces-chips-incentives-awards-globalwafers)

2 **SEMI Reports 2025 Annual Worldwide Silicon Wafer Shipments and Revenue Results.** PR Newswire · 10 February 2026 [A](https://www.prnewswire.com/news-releases/semi-reports-2025-annual-worldwide-silicon-wafer-shipments-and-revenue-results-302683028.html)

11 **NVIDIA Announces Financial Results for Fourth Quarter and Fiscal 2026.** Nvidia · 25 February 2026 [A](https://nvidianews.nvidia.com/news/nvidia-announces-financial-results-for-fourth-quarter-and-fiscal-2026)

12 **Mineral Commodity Summaries 2026: Silicon.** U.S. Geological Survey · 5 February 2026 [A](https://pubs.usgs.gov/periodicals/mcs2026/mcs2026-silicon.pdf)

13 **SUMCO, production processes page.** SUMCO · Accessed 9 September 2026 [A](https://www.sumcosi.com/english/products/process/)

Epitaxial wafers get one more layer of near-perfect silicon, grown on top at about 1,200 degrees Celsius ¹³. That is still hot enough to glow orange.

Variants and trade-offs

Polished versus epitaxial

A polished wafer is a doped single crystal polished to a mirror finish ¹³. An epitaxial wafer is a polished wafer with a thin layer of single-crystal silicon grown on top ¹³. The transistors are built in that layer, so flaws in it can make them leak current. SUMCO says an epitaxial wafer suits customers who need a near-perfect crystal or layers that differ in electrical resistance ¹³. SEMI, the industry association, credits the 2025 rise in shipments to AI-driven demand for advanced epitaxial wafers for logic chips and polished wafers for high-bandwidth memory ².

Silicon on insulator

In a silicon-on-insulator (SOI) wafer, a buried layer of oxide, which is glass, separates a thin working layer of silicon from the bulk beneath. Soitec says nearly all SOI wafers sold worldwide are made with its Smart Cut process ¹⁴. Soitec's SOI product lines include RF-SOI for radio chips and fully depleted SOI (FD-SOI), and its markets run from mobile communications to cloud AI ¹⁴. But SEMI tied the AI-driven growth in logic chips to advanced epitaxial wafers ².

Who makes it

The Center for Security and Emerging Technology (CSET) at Georgetown University named five key wafer firms in a January 2021 brief ¹⁵. They were Shin-Etsu and SUMCO of Japan, GlobalWafers of Taiwan, Siltronic of Germany and SK Siltron of South Korea ¹⁵. CSET also listed nine Chinese-owned producers, among them Zhonghuan, Simgui, ZingSEMI and Finland's Okmetic, but said they generated little revenue in comparison ¹⁵.

As of 2018, five Chinese firms were making or planning 300 mm wafers ¹⁶. In its October 2025 listing prospectus, Eswin, a Chinese wafer maker, counts seven

¹³ SUMCO, production processes page. SUMCO · Accessed 9 September 2026 [\[A\] www.sumcosi.com/english/products/process/](https://www.sumcosi.com/english/products/process/)

² SEMI Reports 2025 Annual Worldwide Silicon Wafer Shipments and Revenue Results. PR Newswire · 10 February 2026 [\[A\]](https://www.prnewswire.com/news-releases/semi-reports-2025-annual-worldwide-silicon-wafer-shipments-and-revenue-results-302683028.html)

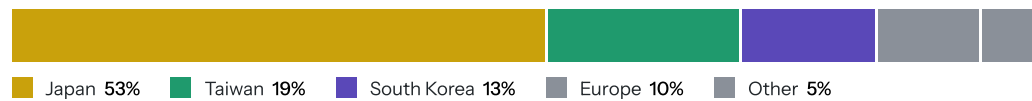
¹⁴ Soitec, key figures. Soitec · Accessed 9 September 2026 [\[A\] www.soitec.com/home/group](https://www.soitec.com/home/group)

¹⁵ The Semiconductor Supply Chain - Issue Brief. Center for Security and Emerging Technology (CSET) · 21 January 2021 · p. 55 [\[A\]](https://cset.georgetown.edu/wp-content/uploads/The-Semiconductor-Supply-Chain-Issue-Brief-1.pdf#page=55)

¹⁶ The Semiconductor Supply Chain - Issue Brief. Center for Security and Emerging Technology (CSET) · 21 January 2021 · p. 57 [\[A\]](https://cset.georgetown.edu/wp-content/uploads/The-Semiconductor-Supply-Chain-Issue-Brief-1.pdf#page=57)

Chinese firms, itself included, making 300 mm wafers at scale ¹⁷. Their combined capacity was 2.94 million wafers a month at the end of 2024 ¹⁷.

Silicon wafer sales by supplier headquarters, 2023. Japan held 53%, and the source shows no separate share for China or the United States %



Source: METI, December 2025, from Fuji Keizai data (2023); Japan's and Europe's shares are printed, the others are read off METI's chart

The chart shows shares of 2023 sales from a survey by Fuji Keizai, a Japanese research firm ¹⁸. Japan's Ministry of Economy, Trade and Industry reproduced the figures in a December 2025 strategy deck ¹⁸. The ministry's chart of the Fuji Keizai survey prints only Japan's 53 percent, so the other shares are read off it ¹⁸. An earlier page of the ministry's deck prints Europe's share in the same Fuji Keizai survey as 10 percent ¹⁹. The chart gives no separate share to Chinese or US companies ¹⁸.

Siltronic's April 2026 investor presentation says the top five wafer makers serve around 75 percent of the market, based on revenue in the first three quarters of 2025 ⁶. It names the five as Shin-Etsu, SUMCO, GlobalWafers, SK Siltron and Siltronic itself ⁶.

The wafer makers' 2025 results show strong AI demand and weak demand for chips made on older, mature nodes.

- **Shin-Etsu.** Shin-Etsu Chemical's electronics materials segment, which includes its wafer business, sold ¥1,015.7 billion in the year to March 2026, up 9 percent

¹⁷ 西安奕材首次公开发行股票并在科创板上市招股说明书. CNINFO · 22 October 2025 · p. 138 [\[A\]](https://static.cninfo.com.cn/finalpage/2025-10-22/1224723727.PDF#page=138)

¹⁸ METI, Semiconductor and digital industry strategy: future direction (半導体・デジタル産業戦略の今後の方向性), 23 December 2025. Ministry of Economy, Trade and Industry (Japan) · 23 December 2025 · p. 8 [\[A\]](https://www.meti.go.jp/policy/mono_info_service/joho/conference/semicon_digital/0014/handeji14-4.pdf#page=8)

¹⁹ METI, Semiconductor and digital industry strategy: future direction (半導体・デジタル産業戦略の今後の方向性), 23 December 2025. Ministry of Economy, Trade and Industry (Japan) · 23 December 2025 · p. 4 [\[A\]](https://www.meti.go.jp/policy/mono_info_service/joho/conference/semicon_digital/0014/handeji14-4.pdf#page=4)

⁶ Investor Presentation: Foundation of Digital Life. Siltronic · April 2026 · p. 6 [\[A\]](https://www.siltronic.com/fileadmin/investorrelations/2026/Q1/20260429_Siltronic_InvestorPresentation_.pdf#page=6)

³. AI-related demand stayed strong and demand in other sectors began to rise, lifting sales of silicon wafers, photoresist and photomask blanks³. The segment also sells rare earth magnets and other materials, and the results release does not break out wafer sales²⁰. So the figure cannot be compared with the wafer revenue of the other firms listed.

- **SUMCO.** Sold ¥409,670 million and still lost ¥11,751 million, as operating profit fell from ¥36,924 million to ¥1,342 million²¹. In the same year it added leading-edge 300 mm capacity and reorganized production of 200 mm and smaller wafers, where demand stayed weak⁴.
- **Siltronic.** Lost €77.9 million on €1,346.7 million of sales while investing €369.1 million, with its new Singapore fab as the focus⁷.
- **GlobalWafers.** NT\$60.6 billion of revenue, down 3.24 percent in local currency⁵.

Worldwide, the wafer area shipped rose 5.8 percent in 2025, but revenue fell 1.2 percent². SEMI attributes the softer revenue mostly to traditional chip applications, where demand and pricing had yet to improve².

China made 1.50 million metric tons of polysilicon, the raw material, in 2023, about 93 percent of world output⁸. Solar-grade material was an estimated 98 percent of that output and electronic-grade 2 percent⁸. The Commerce Department found in 2026 that semiconductor-grade polysilicon makes up only 2.4 percent of global production, a split close to China's²². These figures alone do not show whether Chinese polysilicon goes into chips.

3 Consolidated Financial Results for the Fiscal Year Ended March 31, 2026. Shin-Etsu Chemical · 27 April 2026 · p. 6 [\[A\]](http://www.shinetsu.co.jp/wp-content/uploads/2025/07/20260428_con_E.pdf#page=6)

20 Consolidated Financial Results for the Fiscal Year Ended March 31, 2026. Shin-Etsu Chemical · 27 April 2026 · p. 20 [\[A\]](http://www.shinetsu.co.jp/wp-content/uploads/2025/07/20260428_con_E.pdf#page=20)

21 Notice of Convocation of the 27th Ordinary General Meeting of Shareholders. SUMCO · 6 March 2026 · p. 26 [\[A\]](http://www.sumcosi.com/english/pdf/ir/library/shareholders/27/pdf/nc_e_27.pdf#page=26)

4 Notice of Convocation of the 27th Ordinary General Meeting of Shareholders. SUMCO · 6 March 2026 · p. 24 [\[A\]](http://www.sumcosi.com/english/pdf/ir/library/shareholders/27/pdf/nc_e_27.pdf#page=24)

7 Siltronic AG: Robust business performance in 2025 demonstrates resilience despite challenging conditions. Siltronic · 27 August 2026 [\[A\]](http://www.siltronic.com/en/press/press-releases/siltronic-ag-robust-business-performance-in-2025-demonstrates-resilience-despite-challenging-conditions.html)

5 GlobalWafers Reports Full Year 2025 Results. GlobalWafers · 3 March 2026 [\[A\]](http://www.sas-globalwafers.com/en/gwc_news_en_20260303/)

2 SEMI Reports 2025 Annual Worldwide Silicon Wafer Shipments and Revenue Results. PR Newswire · 10 February 2026 [\[A\]](http://www.prnewswire.com/news-releases/semi-reports-2025-annual-worldwide-silicon-wafer-shipments-and-revenue-results-302683028.html)

8 2023 Minerals Yearbook: China (advance release). U.S. Geological Survey · February 2026 · p. 7 [\[A\]](http://pubs.usgs.gov/myb/vol3/2023/myb3-2023-china.pdf#page=7)

22 Adjusting Imports of Polysilicon and Its Derivatives Into the United States. Federal Register (Executive Office of the President) · 11 August 2026 [\[A\]](http://www.federalregister.gov/documents/2026/08/11/2026-16400/adjusting-imports-of-polysilicon-and-its-derivatives-into-the-united-states)

China's polysilicon output by grade, 2023. China made 1.50 million metric tons that year, about 93% of world output %



Source: USGS Minerals Yearbook, China, 2023

Siltronic put the 2025 market for electronic-grade silicon at \$1.4 billion, with five major suppliers, none of them Chinese: Wacker, Hemlock, OCI, Tokuyama and Mitsubishi ²³.

Siltronic of Germany describes itself as the only Western-based maker among the top five wafer makers, based on revenue in the first three quarters of 2025 ⁶. GlobalWafers opened a \$3.5 billion plant in Sherman, Texas in May 2025, the first production line of its kind built in the United States in over twenty years ²⁴. The same day it announced another \$4 billion for phases three and four in Sherman ²⁴. The US government had awarded it up to \$406 million under the CHIPS incentives program for wafer plants in Texas and Missouri ¹⁰.

Presidential Proclamation 11052, signed 6 August 2026, sets a minimum import price of \$100 per kilogram for polysilicon ingots and wafers from 4 December 2026 ²². From the same date it adds an extra 15 percent duty on imported ingots and other listed products made from polysilicon ²². A September 2026 Commerce rule meant to stop stockpiling before the duties start lists tariff code 3818.00.0040 among the products it covers ²⁵. That code covers round, doped, single-crystal silicon wafers ²⁶.

Commerce may approve plans to build US polysilicon, ingot, wafer or solar cell plants whose construction starts by 20 January 2029 ²². Firms with approved plans

²³ Investor Presentation: Foundation of Digital Life. Siltronic · April 2026 · p. 5 [\[A\]](#)

www.siltronic.com/fileadmin/investorrelations/2026/Q1/20260429_Siltronic_InvestorPresentation_.pdf#page=5

⁶ Investor Presentation: Foundation of Digital Life. Siltronic · April 2026 · p. 6 [\[A\]](#)

www.siltronic.com/fileadmin/investorrelations/2026/Q1/20260429_Siltronic_InvestorPresentation_.pdf#page=6

²⁴ GlobalWafers America Officially Opens for Business. GlobalWafers · 15 May 2025 [\[A\]](#) [www.sas-](https://www.sas-globalwafers.com/en/gwc_news_en_20250516/)

[globalwafers.com/en/gwc_news_en_20250516/](https://www.sas-globalwafers.com/en/gwc_news_en_20250516/)

¹⁰ Biden-Harris Administration Announces CHIPS Incentives Awards with GlobalWafers to Support Domestic Production of Silicon Wafers. NIST · 17 December 2024 [\[A\]](#) [www.nist.gov/news-events/news/2024/12/biden-harris-administration-announces-chips-](https://www.nist.gov/news-events/news/2024/12/biden-harris-administration-announces-chips-incentives-awards-globalwafers)

[incentives-awards-globalwafers](https://www.nist.gov/news-events/news/2024/12/biden-harris-administration-announces-chips-incentives-awards-globalwafers)

²² Adjusting Imports of Polysilicon and Its Derivatives Into the United States. Federal Register (Executive Office of the President) · 11 August 2026 [\[A\]](#) [www.federalregister.gov/documents/2026/08/11/2026-16400/adjusting-imports-of-polysilicon-and-its-derivatives-](https://www.federalregister.gov/documents/2026/08/11/2026-16400/adjusting-imports-of-polysilicon-and-its-derivatives-into-the-united-states)

[into-the-united-states](https://www.federalregister.gov/documents/2026/08/11/2026-16400/adjusting-imports-of-polysilicon-and-its-derivatives-into-the-united-states)

²⁵ Measures To Restrict Stockpiling of Polysilicon and Polysilicon Derivatives Under Proclamation 11052. Federal Register (Commerce Department; Industry and Security Bureau) · 24 September 2026 [\[A\]](#)

[www.federalregister.gov/documents/2026/09/24/2026-19537/measures-to-restrict-stockpiling-of-polysilicon-and-polysilicon-derivatives-under-](https://www.federalregister.gov/documents/2026/09/24/2026-19537/measures-to-restrict-stockpiling-of-polysilicon-and-polysilicon-derivatives-under-proclamation-11052)

[proclamation-11052](https://www.federalregister.gov/documents/2026/09/24/2026-19537/measures-to-restrict-stockpiling-of-polysilicon-and-polysilicon-derivatives-under-proclamation-11052)

²⁶ Harmonized Tariff Schedule, heading 3818.00.00. U.S. International Trade Commission · Accessed 9 September 2026 [\[A\]](#)

hts.usitc.gov/search?query=3818.00.00

can import equipment and some of those products without the new duties ²².

The chokepoint

China makes most of the world's polysilicon, but in 2019 its firms had only a small share of the wafer market. As of 2019 Chinese firms held under 5 percent of the wafer market and under 1 percent of the 300 mm market ¹⁵. As of 2018, Chinese producers made 12 percent of the wafers for Chinese-headquartered 300 mm fabs, against 18 percent for 100 to 200 mm fabs ²⁷.

Eswin, mainland China's largest maker of 300 mm wafers, says it ranked sixth in the world with about 7.7 percent of global 300 mm shipments in the first half of 2026 ⁹. Its October 2025 Shanghai listing prospectus, drawing on SEMI data, estimates that the five largest makers shipped 79.08 percent of 300 mm wafers in 2024 ²⁸. It puts Eswin at 6.01 percent and all other makers at 14.91 percent ²⁸.

Making the smoothest, high-purity 300 mm wafers takes considerable know-how that is hard to write down ¹⁶. Customers have to qualify a new wafer plant before they buy from it, and Siltronic completed key customer qualifications at its new Singapore fab in July 2025 ¹.

In SEMI figures from November 2020 cited by CSET, 99.7 percent of world fab capacity at 45 nm and below used 300 mm wafers ¹⁶. SEMI estimated that 300 mm wafers made up about 78.8 percent of all wafer area shipped worldwide in 2025, according to Eswin's 2025 annual report summary ²⁹.

The last increase in wafer size, to 300 mm, happened in 2002 ³⁰. Bigger discs make printing, or photolithography, a bigger share of the processing cost ³⁰. A 2013 University of Texas lecture cited by CSET put photolithography at half the cost of

22 Adjusting Imports of Polysilicon and Its Derivatives Into the United States. Federal Register (Executive Office of the President) · 11 August 2026 [\[A\] www.federalregister.gov/documents/2026/08/11/2026-16400/adjusting-imports-of-polysilicon-and-its-derivatives-into-the-united-states](https://www.federalregister.gov/documents/2026/08/11/2026-16400/adjusting-imports-of-polysilicon-and-its-derivatives-into-the-united-states)

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processing a 300 mm wafer, against a quarter for a 150 mm one ³⁰. Wafers are still produced in diameters of up to 300 mm ².

Some GPU dies fill the whole area a lithography tool can print in one exposure. One fatal defect on such a die ruins far more silicon than one on a small chip. Extreme-ultraviolet printing also stays in focus over only a tiny range of heights (see Lithography), so the disc has to be flat at every point. SEMI's wafer group says the move to sub-3nm processes is raising requirements for wafer quality and consistency ².

FOUR THINGS TO REMEMBER

- Every chip starts on a wafer, a polished disc of pure silicon about 30 centimeters across.
- The top five wafer makers, in Japan, Taiwan, Germany and South Korea, served around 75 percent of the market in 2025.
- Customers have to test and approve a new wafer plant before they buy from it.
- China makes most of the world's polysilicon, but none of the five major suppliers of electronic-grade silicon, the grade chips need, is Chinese.

Made by **Yashvardhan Sharma** with Claude. Corrections and questions: contact@chipsupplychain.org.

UPDATED 20 OCTOBER 2026

A company filings, governments, standards bodies, universities and research institutions; **B** SemiAnalysis, Reuters, the Financial Times and Nikkei Asia.

HOW TO CITE THIS CHAPTER

Sharma, Yashvardhan. "Silicon and Wafers." Chip Supply Chain: How AI Chips Are Made. Edition of 20 October 2026. <https://chipsupplychain.org/silicon-and-wafers/>

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@misc{chipsupplychain2026siliconandwafers,  
  title      = {Silicon and Wafers},  
  author     = {Sharma, Yashvardhan},  
  howpublished = {Chip Supply Chain: How AI Chips Are Made},  
  year       = {2026},  
  month      = {October},  
  note       = {Edition of 20 October 2026},  
  url        = {https://chipsupplychain.org/silicon-and-wafers/}  
}
```