

SEMICON India 2026 Explained: Why India Wants to Make Its Own Chips

A simple guide for UPSC & HPPSC/HAS aspirants | Friday, 18 September 2026

Introduction

Your phone, the airbag in your car and the debit card in your wallet all have one thing in common: each works because of a tiny chip. For decades, India used these chips but did not make them. SEMICON India 2026 shows how that story is changing. This blog explains it step by step, from what a chip is to why it matters for your exam.

QUICK LOOK: SEMICON INDIA 2026

- **What:** India's largest semiconductor conference and exhibition (5th edition)
- **When & Where:** 17-19 September 2026, Yashobhoomi, New Delhi
- **Inaugurated by:** Prime Minister Narendra Modi
- **Theme:** "Silicon to Systems: Building the Ecosystem"

1. What Exactly Is a Semiconductor?

A semiconductor is a material, usually silicon, that can either allow electricity to flow or stop it, depending on how it is controlled. Engineers use this on-off ability to make microscopic switches called **transistors**. When billions of these switches are packed onto one small piece of silicon, we get a **chip**.

REAL-LIFE EXAMPLE

- **Smartphone:** processor, camera sensor and memory are all chips.
- **Car:** airbags, fuel injection, GPS and reverse camera run on chips.
- **Home:** washing machines, smart TVs and air conditioners use them.
- **Hospitals & defence:** MRI machines, satellites and missiles depend on them.

2. How Is a Chip Made? Three Stages

Chip-making is not one job but three separate jobs, often done by different companies in different countries.

IN SIMPLE WORDS

- **Stage 1 - Design:** Engineers draw the circuit on computers using special software.
- **Stage 2 - Fabrication:** The design is printed onto silicon wafers inside a "fab", a factory cleaner than an operation theatre.
- **Stage 3 - Packaging & Testing:** Wafers are cut into chips, sealed, tested and shipped.

REAL-LIFE EXAMPLE

Apple designs its iPhone chips in the USA, but TSMC manufactures them in Taiwan. The designer and the maker are two different companies.

Where India stands: India is already strong in Stage 1, since global firms such as Intel, Qualcomm and AMD run large design centres here. The weak link has been Stages 2 and 3. That is the gap India is now trying to fill.

3. Why Chips Became a Global Race

During the COVID years, buyers of popular cars and SUVs in India waited months for delivery. Factories had steel, workers and orders — but not enough chips. Countries realised that depending on others for chips is risky. Since the most advanced chips come from a handful of places, chiefly Taiwan, any disruption there can hurt the whole world.

REMEMBER

A chip shortage can stop a car plant, delay a phone launch or slow a defence project. That is why semiconductors are called a **strategic industry**.

4. India's First Win: Mobile Phones

Ten years ago, most phones sold in India were imported. Today India makes **99.2%** of the phones it uses, and in 2025-26 smartphones became **India's single largest export item**, ahead of petroleum products. This success gave India confidence: if we can make the phone, the next step is to make the chip inside it.

5. India Semiconductor Mission: From 1.0 to 2.0

	Semicon India 1.0	Semicon India 2.0
Year	2021	July 2026
Budget	₹76,000 crore	₹1,27,500 crore
Goal	Start the industry and attract the first plants	Grow the complete ecosystem around those plants

IN SIMPLE WORDS

Semicon 2.0 rests on **six pillars**: chip design, equipment and materials, fabs, advanced packaging, research, and talent. In short, India now wants the whole chain, not just a few factories.

Progress so far: 12 projects have been approved across six states, and three of them have started commercial production. Well-known examples include Tata Electronics' fab at Dholera and Micron's packaging unit at Sanand, both in Gujarat.

6. Making Engineers, Not Just Factories

A fab is useless without trained people. India aims to create **85,000 skilled semiconductor engineers** within this decade.

REAL-LIFE EXAMPLE

- Under the **Chips to Startup** programme, college students get the same design software that industry uses.
- Students from 75 institutions have already sent **211 chip designs** for manufacturing.
- The **ChipIN Centre** at C-DAC lets start-ups and colleges share costly tools they could never buy alone.

REMEMBER

An engineering student in a state university can now design a real chip — something possible only in elite labs a decade ago.

7. Pax Silica: India's Chip Partnerships Abroad

India has joined **Pax Silica**, a coalition of the United States and partner nations. Its purpose is to keep the chip supply chain safe — from the minerals dug out of the ground to the AI systems built on top.

IN SIMPLE WORDS

If one country controls a key input, it can use it to pressure others. This is called **economic coercion**. Pax Silica aims to spread supply across trusted partners so no single country holds that power.

8. Inside SEMICON India 2026

Over 600 exhibitors from more than 50 countries have gathered in Delhi, with a student hackathon and a startup showcase alongside. Companies have also announced big plans, such as Applied Materials' \$5 billion India vision. *Note: such announcements are commitments, not money already invested.*

9. The Road Ahead: Challenges

- **Water and power:** fabs need huge volumes of ultra-pure water and electricity that never fails.
- **High cost:** a single advanced fab costs billions of dollars and takes years to build.
- **Import dependence:** most chip-making machines still come from abroad.
- **Technology gap:** India's first fabs make mature chips for cars, appliances and power devices, not the most advanced phone processors.

HIMACHAL PRADESH CONNECTION

- Himachal is not among the six states hosting approved chip projects.

- Its strengths lie elsewhere: surplus hydro power, industrial belts like Baddi-Barotiwala-Nalagarh for component units, and institutes such as IIT Mandi and NIT Hamirpur that can supply design talent.
- Semi-Conductor Laboratory (SCL), Mohali, India's government chip facility, is close to the state's border.

KEY TERMS BOX

Transistor: A tiny electronic switch; the basic building block of a chip.

Wafer: A thin, round slice of silicon on which chips are printed.

Fab: The factory where chips are manufactured.

EDA: Electronic Design Automation — software used to design chips.

OSAT / ATMP: Units that assemble, test and package chips.

Tape-out: The moment a finished design is sent for manufacturing.

Node (nm): Size of chip features; smaller means more powerful.

Exam Angle

Prelims

- SEMICON India 2026: 5th edition, Yashobhoomi, theme "Silicon to Systems".
- Semicon 2.0: ₹1,27,500 crore, six pillars. ChipIN Centre: C-DAC. SCL: Mohali.
- Pax Silica: supply-chain coalition India joined at the India AI Impact Summit 2026.

Mains

- **UPSC GS-III:** industrial policy, Atmanirbhar Bharat, supply-chain resilience, science and technology.
- **UPSC GS-II:** technology diplomacy and India-US cooperation.
- **HPAS GS-III:** emerging technologies and IT policy of HP, energy and hydro power, industrialisation in the State.

PRACTICE QUESTIONS

- **UPSC:** "Semiconductors are a strategic industry." Assess India's progress and challenges in building a chip ecosystem. (250 words)
- **HPAS:** How can Himachal Pradesh contribute to India's semiconductor mission? (200 words)

Conclusion

India learnt to make phones; now it is learning to make what makes phones work. The factories, the engineers and the global partners are coming together. The road is long and costly, but for the first time India is not just buying the future — it is starting to build it.

Sources: PIB Backgrounder "Silicon Dreams" (15 Sept 2026); PMIndia and AIR News (17 Sept 2026).