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Micron ATMP Facility — India's First Semiconductor Clean Room at Sanand

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CURATED & WRITTEN BY

Bharat Choudhary

UPSC Educator & Content Creator ●

linkedin.com/in/epicbharat

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Micron ATMP Facility — India's First Semiconductor Clean Room at Sanand

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✎ WHY IN NEWS

Micron Technology inaugurated India's first advanced memory Assembly, Testing, Marking and Packaging (ATMP) facility at Sanand, Gujarat, on February 28, 2026 — housing the world's largest single semiconductor assembly clean room and delivering its first DRAM module to Dell Technologies.

WHAT IS SEMICONDUCTOR ATMP?

ATMP stands for **Assembly, Testing, Marking and Packaging** — the back-end phase of semiconductor manufacturing:

Assembly: Individual semiconductor dies (chips cut from wafers) are mounted onto substrates or leadframes

Testing: Electrical performance, speed, and defect screening

Marking: Product identification codes and specifications printed/laser-etched

Packaging: Die sealed in protective housing (plastic or ceramic) ready for integration into end products

ATMP is distinct from **front-end fabrication** (wafer manufacturing), which requires even higher-precision equipment. India's first ATMP facility is a stepping stone — eventually India aims for full front-end fabrication (fabs).

MICRON TECHNOLOGY — COMPANY PROFILE

Micron Technology is one of the world's largest semiconductor companies, headquartered in **Boise, Idaho, USA**. It is a leading producer of:

DRAM (Dynamic Random Access Memory) — volatile memory used in computers, servers, smartphones

NAND Flash — non-volatile storage in SSDs, USB drives, smartphones, cameras

Global market position: Among the **top 3 DRAM manufacturers** alongside Samsung (South Korea) and SK Hynix (South Korea).

THE SANAND FACILITY — SCALE AND FEATURES

THE CLEAN ROOM

Floor area: 500,000 square feet (raised-floor clean room) — **world's largest single semiconductor assembly clean room**

Classification: Class 1000 — no more than 1,000 particles (≥0.5 microns) per cubic metre

Air circulation: 120 times per hour (pharmaceutical clean rooms average ~20×/hour)

Custom engineering: Designed for Gujarat's soil conditions and climate (seismic considerations, humidity control)

Human hair width (~70 microns) would be a "massive" contaminant relative to the particles controlled here

MANUFACTURING PROCESS AT SANAND

Semiconductor wafers arrive from Micron's global fabs (USA, Japan, Taiwan, Singapore)

Wafers **thinned** (grinding) to reduce chip height

Wafers **diced** (cut) into individual dies

Dies **mounted** onto substrates/modules

Testing: Electrical performance, burn-in, defect screening

Packaging: DRAM memory modules assembled for end customers

INVESTMENT AND SCALE

Phase 1: Approximately **$825 million** (first clean room, initial production ramp)

Phase 2: Expansion to second clean room; total commitment: **$2.7 billion**

Government support: ~**$1.35 billion** (50% of total, under India Semiconductor Mission ATMP scheme)

Current output: Tens of millions of integrated circuits per year

2027 projection: ~1 billion units annually

First shipment: DRAM module to **Dell Technologies**

Early customers: Dell, Asus, Qualcomm

WORKFORCE

~**1,300 employees**, with nearly half being fresh engineering graduates from Gujarat and neighbouring states

Selected employees underwent **3–6 months hands-on training** at Micron facilities in **Malaysia and Singapore**

Training pipeline: Collaboration with local technical universities for talent pipeline

INDIA'S SEMICONDUCTOR POLICY CONTEXT

INDIA SEMICONDUCTOR MISSION (ISM)

The **India Semiconductor Mission** (under MeitY — Ministry of Electronics and Information Technology) was launched in 2021 with:

₹76,000 crore ($10 billion) outlay for semiconductor and display manufacturing

50% capital subsidy on project costs for approved semiconductor facilities

Three schemes: Semiconductor Fabs, ATMP/OSAT, Compound Semiconductors/Silicon Photonics

Micron's Sanand facility is supported under the **ATMP/OSAT** scheme. The government provided approximately **$1.35 billion** in support (50% of $2.7 billion investment).

OTHER SEMICONDUCTOR PROJECTS APPROVED

Tata Electronics — Semiconductor fab in **Dholera, Gujarat** (TSMC technology partnership; targeting **28 nm process node** — a mature but strategically significant node for many industrial and defence applications)

CG Power (in partnership with **Renesas/Stars Microelectronics**) — ATMP in Sanand; focuses on power and automotive-grade chips

Kaynes Semicon — ATMP in Sanand; specialises in compound semiconductors and sensor packaging

WHY SEMICONDUCTORS MATTER FOR INDIA

India imports nearly **$24 billion** in semiconductors annually

Semiconductors are in every digital device — from smartphones to defence systems

Supply chain disruptions (COVID-19, US-China tensions) exposed India's import dependence

A domestic semiconductor industry creates **high-skill jobs**, reduces import bill, and strengthens national security

GEOPOLITICAL DIMENSION

The global semiconductor industry is intensely geopolitical. The **US CHIPS Act** (2022) allocated $52 billion to bring semiconductor manufacturing back to America. **EU Chips Act** (2023) similarly targets European self-sufficiency. China is spending hundreds of billions to overcome US export controls on advanced chips.

India's position: **Strategically non-aligned** in the semiconductor supply chain — positioned to benefit from "China+1" strategies of US companies relocating production out of China. Micron's Sanand facility is a direct result of this realignment.

UPSC RELEVANCE

ATMP/OSAT, ISM, MeitY, DRAM, NAND, Sanand Gujarat, Micron Technology, India Semiconductor Mission.

MAINS GS-3:

India's electronics manufacturing; semiconductor policy; strategic autonomy in technology; supply chain resilience.

📌 FACTS CORNER — KNOWLEDGEPEDIA

MICRON SANAND FACILITY:

Product type: **DRAM** (volatile) + **NAND Flash** (non-volatile)

Clean room area: **500,000 sq ft** — world's largest single assembly clean room

Class rating: **Class 1000** (1,000 particles/m³ max)

Air circulation: **120× per hour**

Total investment: **$2.7 billion** (2 phases)

Inaugurated by: **PM Narendra Modi**

First customer delivery: **Dell Technologies**

2027 output target: **~1 billion units/year**

Workforce: **~1,300** (many trained in Malaysia/Singapore)

INDIA SEMICONDUCTOR MISSION (ISM):

Outlay: **₹76,000 crore (~$10 billion)**

Ministry: **MeitY** (Ministry of Electronics and IT)

Capital subsidy: **50%** for approved projects

Launched: **2021**

SEMICONDUCTOR TYPES:

DRAM: Dynamic Random Access Memory — volatile; loses data when power off; used in RAM sticks

NAND Flash: Non-volatile; retains data; used in SSDs, phones, USB drives

Wafer → Die → Package: Fab → ATMP → end product

GLOBAL CONTEXT:

US CHIPS Act (2022): **$52 billion** for domestic semiconductor industry

EU Chips Act (2023): Targets 20% global chip share by 2030

India imports: **~$24 billion/year** in semiconductors

Other India semiconductor projects: Tata (Dholera), CG Power (Sanand), Kaynes (Sanand)

OTHER RELEVANT FACTS:

Micron headquarters: **Boise, Idaho, USA**

Top global DRAM makers: Samsung (South Korea), SK Hynix (South Korea), Micron (USA)

OSAT = Outsourced Semiconductor Assembly and Test (equivalent to ATMP)

Human hair = ~70 microns; semiconductor particles must be far smaller to be controlled

"China+1" strategy: Companies diversifying manufacturing away from China

Sources: PIB, MeitY, Micron Technology

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