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Odisha Signs Semiconductor Substrate MoU with Intel and 3D Glass Solutions

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Odisha Signs Semiconductor Substrate MoU with Intel and 3D Glass Solutions

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WHY IN NEWS:

On **May 29, 2026**, the **Government of Odisha** signed a **tripartite MoU** with US-based **Intel** and **3D Glass Solutions (3DGS)** to bring **advanced semiconductor substrate manufacturing** to India — a **key missing link** in the country's chip value chain. The pact complements 3DGS's **~₹2,000 crore Heterogeneous Integration Packaging facility** at **Info Valley, Bhubaneswar** (foundation laid April 2026), which will produce **70,000 glass panels and 13,000 3DHI modules annually**. Union Minister **Ashwini Vaishnaw** (Electronics & IT) announced the deal.

THE SUBSTRATE GAP — WHY IT MATTERS

A **semiconductor substrate** is the **thin board (organic, ceramic, or increasingly glass)** that:

- Holds **multiple chip dies (System-in-Package, SiP)** in a single package.
- Routes electrical signals between them.
- Provides mechanical support, heat dissipation, and external pin connections.

Substrates are the **packaging layer** — the last step before a chip ships to OEMs. Without domestic substrate capability, even Indian fabs would need to import substrates from Taiwan, South Korea, Japan or China.

SUBSTRATE TYPE	CURRENT GLOBAL LEADER	INDIA PRESENCE (PRE-MOU)
Organic (FR-4, BT, ABF)	Taiwan (Unimicron, Ibiden), South Korea (Daeduck)	Limited
Ceramic (LTCC, HTCC)	Japan (Murata, NGK)	Limited
Glass-core substrates	Emerging — Intel, Samsung, NHK Spring	**Now coming via 3DGS-Odisha**
Silicon interposers	TSMC (CoWoS), Samsung (I-Cube)	Nil

Glass substrates are the **next-generation packaging technology** — they enable higher density interconnects (3D Heterogeneous Integration, or **3DHI**), lower power loss, and better thermal performance than organic substrates.

THE MOU — KEY DETAILS

PARAMETER	DETAIL
Signing date	**May 29, 2026**
Parties	**Government of Odisha** + **Intel Corporation (US)** + **3D Glass Solutions (US)**
Location	**Info Valley, Bhubaneswar, Odisha**
Project investment	**~₹2,000 crore** (3DGS Heterogeneous Integration Packaging facility)
Capacity	**70,000 glass panels/year** + **50 million assembled units/year**
3DHI module output	**13,000/year**
Foundation laid	**April 2026**
Union Minister announcing	**Ashwini Vaishnaw** (MeitY)
State champion	Chief Minister **Mohan Charan Majhi**, Odisha
Nodal scheme	**India Semiconductor Mission (ISM)** under MeitY

WHAT IS 3D GLASS SOLUTIONS (3DGS)?

PARAMETER	DETAIL
Founded	2010
HQ	Albuquerque, New Mexico, USA
Specialty	**Photo-Definable Glass (PDG)** substrates — laser-patternable glass for chip packaging
Technology licensee	Sandia National Laboratories (US Dept of Energy lab) — original PDG developer
Customers	US defence (DARPA), AI/ML compute, telecom (5G/6G), aerospace
Why Odisha	State semiconductor policy + strategic Eastern hub away from concentrated Western tech clusters

INDIA'S SEMICONDUCTOR ECOSYSTEM — WHERE THIS FITS

LAYER	INDIAN STATUS (2026)
Design (fabless)	Strong — TSMC's design partner Wipro; Indian unicorns; global design centres (Intel, AMD, Qualcomm, Texas Instruments all have India design teams employing **~125,000+** engineers)
Fabrication (front-end)	**Coming** — Tata-PSMC Dholera (28-nm logic), Tata Sanand (mature node), Micron Sanand (DRAM/NAND), Kaynes Sanand
Compound semiconductors	DRDO-SSPL GaN MMICs (May 2026 milestone)
Substrate / packaging (back-end)	**Coming via this MoU + earlier OSAT approvals** (CG Power-Renesas, Tata-PSMC, Tata-Sanand)
Assembly, Test, Marking, Packaging (ATMP/OSAT)	Multiple approvals; Tata + CG Power lead
Equipment & materials	Largely imported

INDIA SEMICONDUCTOR MISSION (ISM) — RECAP

PARAMETER	DETAIL
Established	**December 15, 2021** (Union Cabinet approval)
Outlay	**₹76,000 crore**
Implementing body	**India Semiconductor Mission (ISM)** under **MeitY** — operates as an independent business division of Digital India Corporation
Schemes	(1) Semiconductor fabs scheme; (2) Display fabs scheme; (3) Compound semiconductors / silicon photonics / sensors / discrete semiconductors / ATMP/OSAT scheme; (4) Design Linked Incentive (DLI) scheme
Approved projects (as of late 2025)	**10+ projects** with ~₹1.6 lakh crore investment (per PIB Year-End Review 2025) — Tata-PSMC Dholera, Tata Sanand, CG Power-Renesas Sanand, Kaynes Sanand, Micron Sanand, others

WHY THIS MOU IS STRATEGIC

SIGNIFICANCE	DETAIL
Closes the back-end gap	India had no domestic substrate capability for advanced packaging
Glass substrates = next-gen	Intel itself is shifting to glass substrates for high-performance chips (announced **September 2023**)
3DHI (3D Heterogeneous Integration)	Future packaging architecture for AI/ML, high-end mobile, automotive
Civil-military dual use	3DGS supplies US DoD/DARPA — same tech can serve Indian defence applications
Odisha emerges as semi hub	First state hosting both **compound semiconductor fab AND 3D glass substrate packaging unit**
Counter to China supply concentration	Global packaging supply is heavily concentrated in Taiwan, China, South Korea — diversification value

ODISHA'S SEMICONDUCTOR PUSH

INITIATIVE	DETAIL
Odisha Semiconductor Manufacturing & Fabless Policy 2023	First state-level policy after Centre's ISM
Info Valley, Bhubaneswar	Designated semiconductor hub; ~1,500 acres
Earlier announcement	RIR Power Electronics compound semiconductor fab (foundation 2024)
State CM	Mohan Charan Majhi (BJP-led govt since June 2024)
Skill ecosystem	IIT Bhubaneswar, IIIT Bhubaneswar, NIT Rourkela, multiple polytechnics

WIDER SIGNIFICANCE

- **Atmanirbhar Bharat for chips** — back-end was the visible gap; this fills part of it.
- **Strategic autonomy** — packaging dependence on Taiwan was a critical chokepoint risk.
- **Make-in-India for AI compute** — glass substrates enable advanced AI packages; India can build GPU/AI-accelerator packaging domestically.
- **State-level competition** — Odisha joins Gujarat, Tamil Nadu, Karnataka, Telangana, Uttar Pradesh in active semiconductor incentivisation.
- **India-US strategic tech partnership** — under **iCET (initiative on Critical and Emerging Technology)** framework launched 2022; semiconductors are a flagship pillar.

WATCHPOINTS

- **Skilled workforce** — packaging needs cleanroom technicians; current pipeline is thin.
- **Materials chain** — glass, photoresists, etch chemicals still largely imported.
- **Geopolitical** — Trump 2.0 US export-controls posture is still being defined; could affect tech transfer.
- **State capacity** — Odisha's track record in tech is shorter than Tamil Nadu's or Karnataka's.
- **IP and Trade Secrets** — 3DGS's PDG technology is patent-protected; freedom-to-operate is well-defined.

WAY FORWARD

- **Compound Semiconductor Mission** — formalise as a separate mission under ISM 2.0.
- **Skill mission** — packaging-specific ITI / NSDC partnerships with Intel + 3DGS.
- **Materials ecosystem** — glass, photoresists, etch chemicals, abrasives — PLI for these as enablers.
- **University R&D centres** — IIT Bhubaneswar / IIT Madras / IIT Bombay packaging research labs.
- **State coordination** — common substrate-packaging skill pool across Odisha-Telangana-Karnataka.

UPSC RELEVANCE

GS Paper 3 — Science & Technology / Indian Economy:

- Achievements of Indians in science & technology; indigenization of technology and developing new technology.
- Effects of liberalization on the economy.
- Awareness in the fields of IT, computers, robotics, AI.

Analytical hooks for Mains:

- Semiconductor sovereignty — back-end vs front-end strategy.
- State-level vs national-level industrial policy.
- iCET (India-US Critical & Emerging Technology) — 2026 stocktake.

FACTS CORNER

MoU date: May 29, 2026.

Parties: Government of Odisha + Intel + 3D Glass Solutions (3DGS).

Site: Info Valley, Bhubaneswar, Odisha.

Project investment: ~₹2,000 crore (3DGS HIP facility).

Capacity: 70,000 glass panels/year + 50 million assembled units/year + 13,000 3DHI modules/year.

3DGS founded: 2010, Albuquerque, New Mexico; originated Photo-Definable Glass technology from Sandia National Labs.

India Semiconductor Mission (ISM): ₹76,000 crore, Cabinet approval December 15, 2021.

Schemes under ISM: (1) Semiconductor Fabs; (2) Display Fabs; (3) Compound semi / OSAT / silicon photonics; (4) Design Linked Incentive (DLI).

Projects approved under ISM (late 2025): 10+ with ~₹1.6 lakh crore investment.

Substrate = packaging layer; glass substrates enable 3DHI (3D Heterogeneous Integration).

Odisha state policy: Semiconductor Manufacturing & Fabless Policy 2023.

Odisha CM: Mohan Charan Majhi.

Union Minister, Electronics & IT: Ashwini Vaishnaw.

iCET (India-US Critical & Emerging Technology): Launched 2022 (NSA-level dialogue).

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Sources: PIB, MeitY, The Hindu

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