

# BE Semiconductor (BESI)

**Category:** Equipment

**Est. Price Per Unit:** ~\$2M per machine

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## What They Do

### Product 101 and Where They Fit into the AI Stack



- BESI is hyper focused on **Die attach technology (80% of revenue)** - specifically Die-to-wafer. Attach methods are required to stick (solder) the chips on the board, or onto other chips.
- The attach methods are evolving:
  - **Standard die attach** (majority of OSATs): soldering or epoxy. BESI plays here as a cash cow, but differentiation is low, and growth is slow.
  - **TCB (Thermocompression Bonding)**: Currently growing; used for current HBM and CoWoS technology to stack chips on top of each other (an H100 HBM chip has 8+ stacks glued together). The TCB method still uses heat to stick components together. This space is competitive with ASMPT and K&S.
  - **Hybrid Bonding**: The main bet with BESI. Makes the dies so flat that the atoms stick together without heat (like how a gecko climbs with static). This technology enables chip on chip stacking required for **CoWoS SoIC (System on Integrated Chips)**. The method can improve bandwidth, reducing the memory wall.
- However, this is difficult technology, and **a single particle of dust can ruin a whole chip**. The rollout of hybrid bonding has been delayed, but the Founder-CEO continues to bet that this is the future.
- **If Hybrid Bonding becomes standardised, BESI will enjoy a near monopoly on the space.**

## Alignment with Overall Thesis

- The memory wall will continue, and bandwidth of the HBM stacks will become important. If BESI can prove that hybrid bonding can be productionised, then they will sell to every fab and memory IDM shell to power the AI demand.
- This also creates tailwinds for inspection companies.

## Business Model, Customers

- Est. \$2M per machine.

## Comments on Team

- **Founder led.** CEO founded company in 1995 and has remained CEO since.

## Early View of Moat Hypothesis

- Definitive leader in hybrid bonding technology with a hyper focused founder bet.

## Why They're Interesting, and Why Now

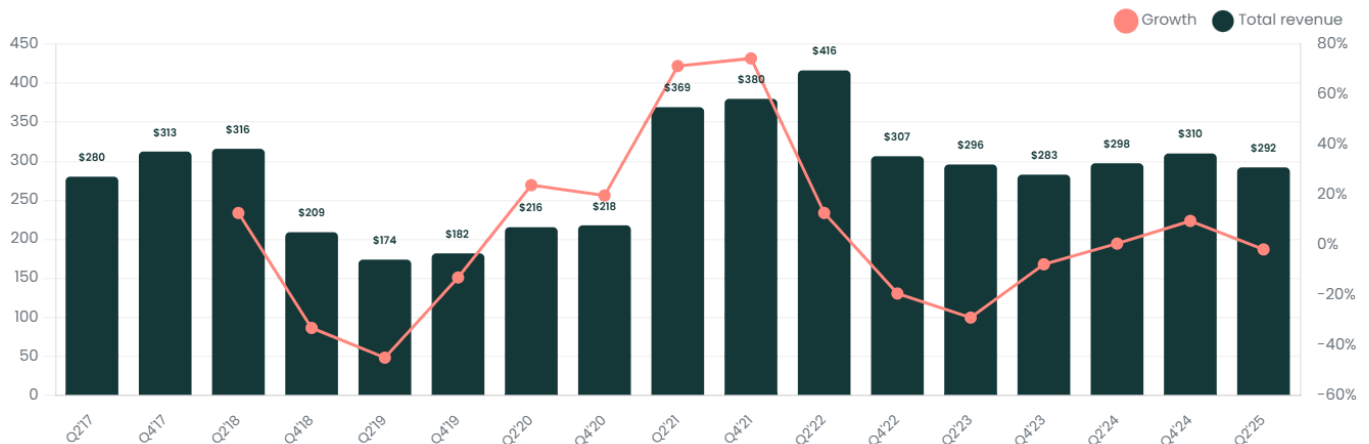
- **JEDEC** (a semiconductor standards committee) had planned to require maximum height limits for HBM. Such limits, with the current stacks, require a shift to hybrid bonding to reduce height.
- However, this standard has been **delayed about 2 years**.
- Nevertheless, this feels like a **near term call option** on advancing the AI stack forward.

## Key Risks

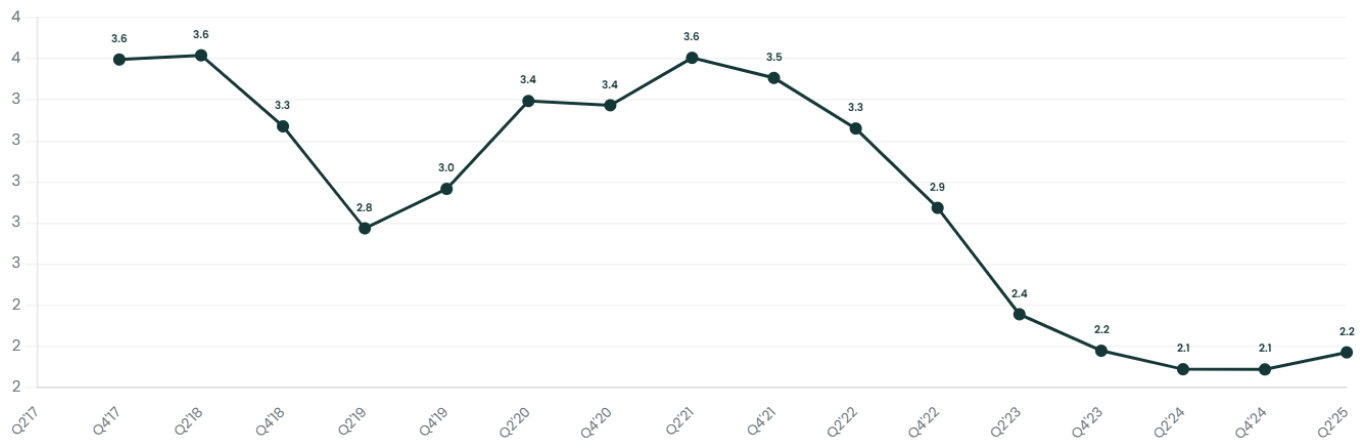
- Hybrid Bonding doesn't take off and BES1 is left to compete in the more competitive TCB space.

## Select Financial Graphs

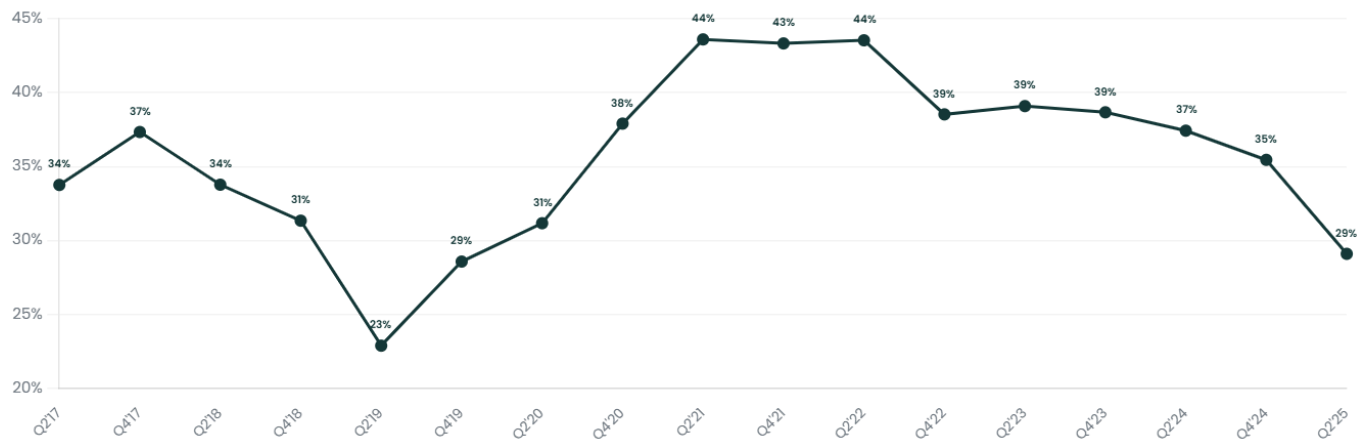
### R1: Total Revenue & YoY Growth



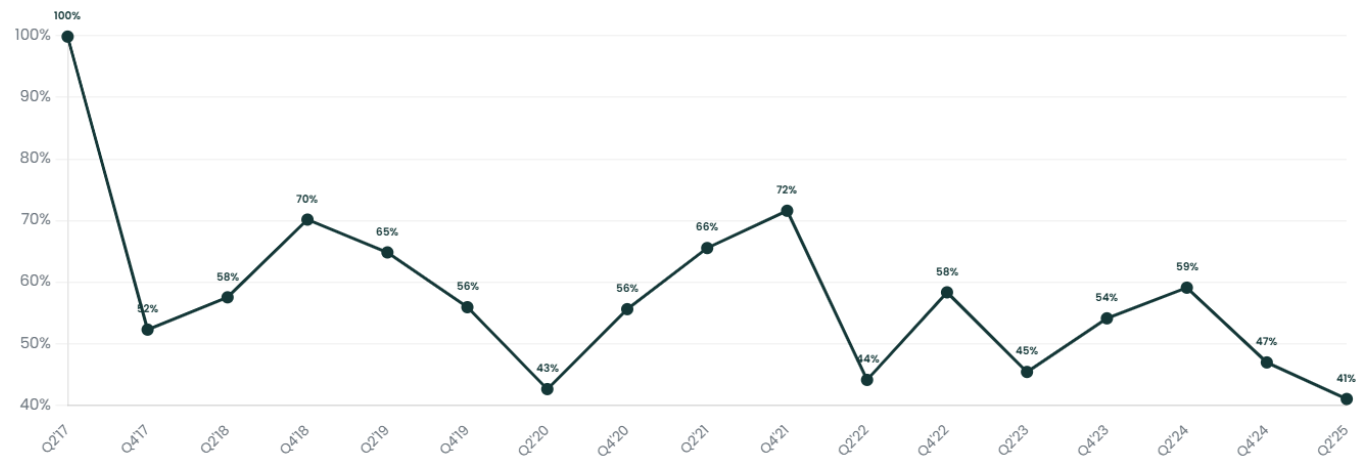
### I1: Inventory Turns



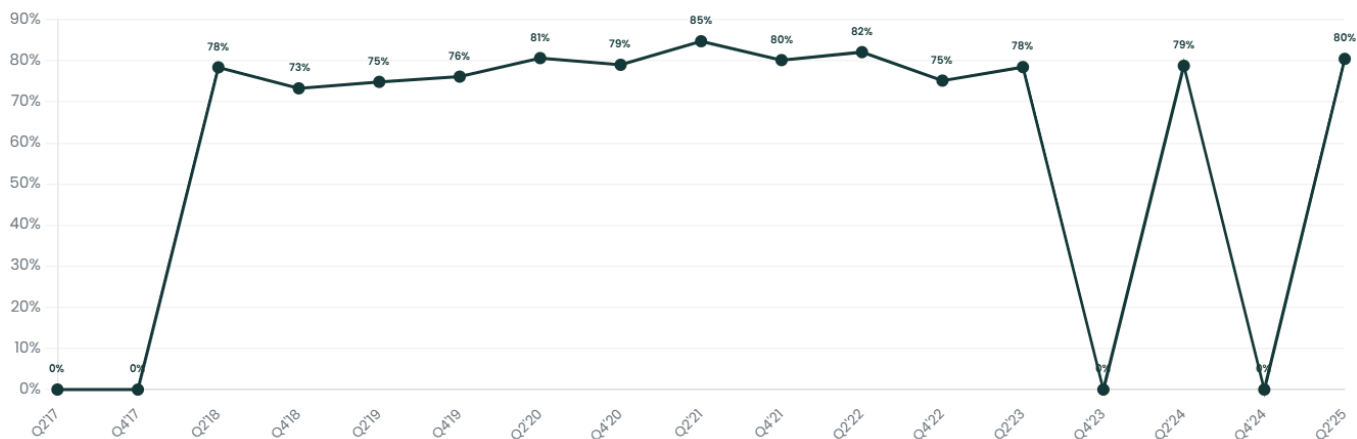
## P4: EBIT Margin



## S3: IDM Orders as % of Revenue



## S4: Die Attach as % of Revenue



## V1: EV/Sales NTM

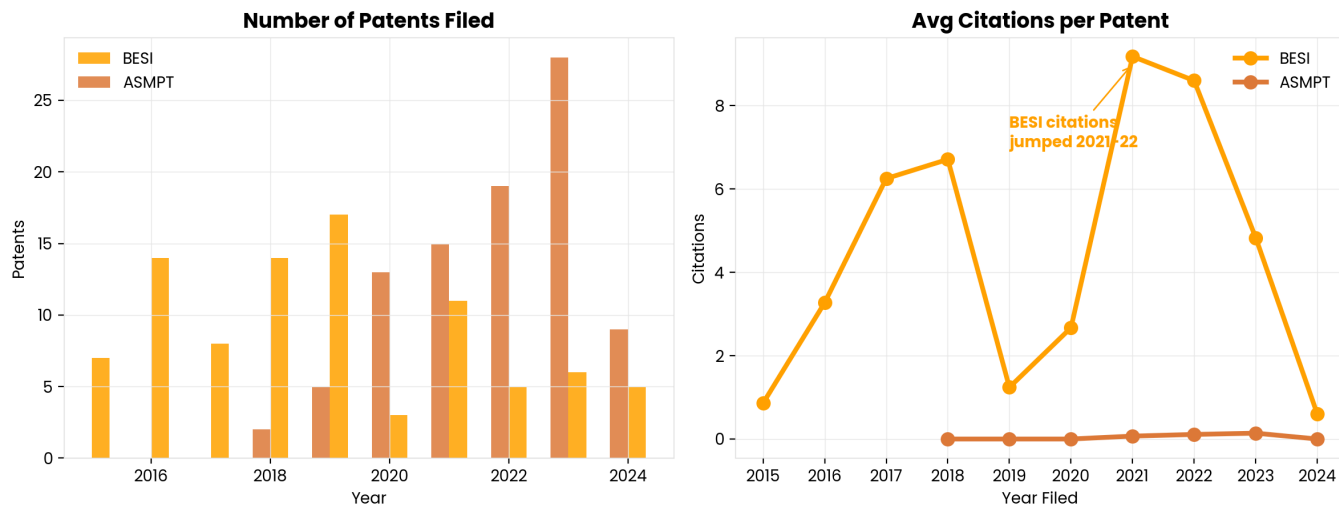


## Patent Analysis

### Bonding Equipment: BESI vs ASMPT

BESI patent citations jumped 2021-22, suggesting increasing relevance of their IP as hybrid bonding approaches production.

#### BONDING EQUIPMENT: BESI vs ASMPT

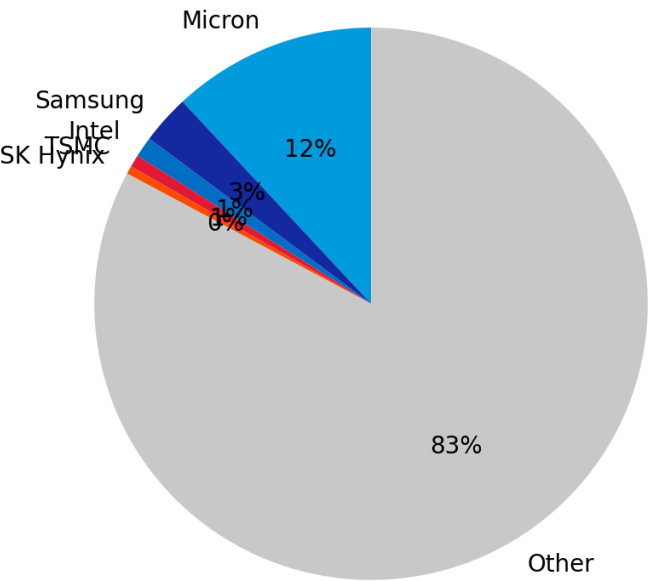


## Who Is Citing BESI Patents?

17.2% of citations come from foundries/IDMs (highest of all companies analysed). Micron is the largest source—suggests strong memory packaging relevance.

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## Interesting Topics to Read

- Hybrid Bonding vs. TCB
- JEDEC HBM height standards