

As with all hot topics, there are facts and myths. Five HBM Facts:

- HBM volume is increasing. It was 2% of bits and 11% of revenue. This will grow to approximately 10% of bits over the next 4 years based on current models. The supply growth has to be relatively steady (capacity/designs are HBM specific), but the demand growth will be wildly variable. There are impacts from this supply and demand disconnect.
- HBM cost is ~3x DDR5 Cost (our model is 3.5x but who is counting?). HBM price is ~6x DDR5 Price. Gross margin per wafer, margin per COS, margin per revenue is higher. Due to overhead of HBM specific designs, testing, and manufacturing, Operating margin can be challenging and needs to be managed.
- HBM is stacked, packaged, and tested as a unit before going to customer or their contractor for assembly in CoWoS/Foveros type assembly. The packaging of HBM is typically done by the memory company or their contractor. Some recent “cartoons” seem to show memory chip stacking as part of CoWoS process. It is not.
- In Advanced Datacenter AI systems, Most of the memory bits are still DDR and most of the cost is now processor/HBM module (SemiAnalysis did a very nice presentation on all the details).
- I think everyone would agree that HBM is THE competitive focus of all memory companies. Current APPROXIMATE models show Hynix with 55% share, Samsung with 35% share and Micron with less than 10% share. The battle to change these numbers is on with Micron looking to double its share and Samsung looking to take its historical position at #1. These battles will cause wild fluctuation in market share and pricing and revenue. You have been warned

We have all the numbers on price, cost, revenue and bit volumes. Contact us to discuss more

Mark Webb

www.mkwventures.com

Mark@mkwventures.com

505-681-7614