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2.5D and 3D Integrated Circuit Technology Capabilities and Industry Readiness

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The term 3D integrated circuit covers a wide swath of technologies today. It can mean anything from chip stacking to interposers or “2.5D integration”, to TSV’d wafer stacking or even the latest bleeding edge technology push into monolithic 3D devices. No matter which type, with scaling’s advantages rapidly eroding, 3D integrated circuits appear to be gaining traction in the market.

Most designers are cognizant of the numerous possible benefits that can be obtained from advanced 3D integration, including higher density, lower power, and better performance. Perhaps the biggest benefit that separates 3D integration from world of simply More Moore, comes from 3D heterogeneous integration. The fundamental ability offered by 3D integration to separate circuits for implementation in the best suited technology while maintaining thousands or even millions of sub-circuit to sub-circuit interconnects changes fundamental semiconductor capabilities. The market winners need not be only those who can afford new multi-billion dollar investments in next generation lithography and deeper sub-micron technologies. 3D has the potential for reshaping markets. Those who pick the right version or versions of 3D and figure out how to use this new technology can become tomorrow’s market leaders.

There is no doubt 3D technology has shown promise, but it has also plagued early adopters with numerous issues including processing inconsistencies, lack of adequate design tools and most importantly the lack reasonable of a supply chain. The question to be addressed is 3D integration really ready or is it like the infamous EUV lithography technology which has been 2 years away from production for almost 30 years.

The presentation will cover the available 2.5/3D processes and their capabilities, commercially available design tools and the current supply chain situation. The discussion will also review technical successes and failures and why, which, and how 2.5/3D is now ready industry adoption.

Summary

This presentation will cover various 3D integrated circuit technologies, tools, and supply chains discussing the readiness of the technology for volume production. Past successes and failures will be reviewed for lessons learned and examination of what hidden issues might still be lurking.

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