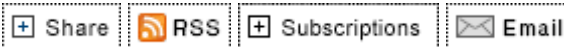


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3D News: Applied / Semitool, TSMC, Ziptronix

November 20, 2009

Applied

By now we have all seen the headlines that Applied Materials has acquired Semitool for ~ \$364MM and will make them part of their Silicon Systems Group.

Phil Garrou Congratulations to both parties. So, Applied has added plating to their portfolio of deposition, planarization and etch equipment.

For anyone who has been a long time reader of PFTLE, this should not come as a surprise. At Semicon West 2008 Applied announced a partnership with Semitool for copper plating [see PFTLE "[3D Integration Stays Hot at Semicon West](#)", 08/13/ 2008] In December 2008 they announced the "Silva" etch system for TSV production which they claimed produced less scalloping than Bosch Etching [see PFTLE, "[Applied on 3D...](#)", 12/17/2008]. After Applied joined the EMC-3D consortium in Feb 2009 they announced a joint effort with Disco on thinning. This past April PFTLE openly proposed that Applied appeared to be positioning to become a "one stop shop" for those interested in 3D IC [see PFTLE "[Samsung 3D Roadmap that Isn't](#)", 04/16/2009].

Last month Applied joined the ITRI Ad-STAC 3D consortia announcing ITRI's selection of the entire suite of Applied equipment for 3D IC fabrication.

Thus, while the acquisition of Semitool was most certainly NOT only for their 3D IC activities , this certainly helps to round out the "one stop shop" scenario. Applied certainly appears to be in the midst of a huge marketing campaign to become a major player in 3D IC.

TSMC

I have no problem pointing you towards others when they report the information that you need to know about 3D IC. Motoyuki Oishi, who has penned some great reports on 3D in Nikkei Electronics Asia, recently reported an important interview with TSMC's Jack Sun who is VP of R&D.

Dr. Sun confirms that they will be (*not have - but will be*) constructing a 300 mm 3D line at Fab 12 in Hsinchu. He admits to "...cost, thermal radiation and design architecture..." issues but is "...confident that we can find solutions to them all". He concludes that they should be able to "...introduce TSV technology into our volume production lines within 2-3 years" For the full interview see ["[Invest in R&D During the Down Times - Jack Sun, TSMC](#)", Nikee electronics Asia, 10/13/ 2009].

In a good news/bad news scenario we are encouraged that a 300 mm line is coming and TSMC has confidence in 3D IC technology, but this appears to be a push back from recent reports of production in early 2011 [see "[TSMC confirms 3D Intent...](#)", 09/18/ 2009.

Ziptronix

PFTLE has discussed the direct oxide bonding and their direct oxide/ metal bonding technologies previously [see: "[3D Startup is Ahead of its Time](#)", Semiconductor Int 10/01/2008; PFTLE "[Opening the Kimono, Ziptronix Gives Details on DBI Process](#)", 10/13/2008; "[Show Me the Copper...](#)" 10/23/2009].

Ziptronix has just announced that they have licensed their DBI® 3D integration technology to Raytheon Vision Systems. Chris Sanders, business Dev Mgr., of Ziptronix indicates that Raytheon's initial focus will be on "...focal plane arrays for air, space and terrestrial applications". CEO Dan Donabedian commented "This license with Raytheon, one of the world's largest military

contractors, certainly validates our IP portfolio. In addition, we see other commercial markets such as image sensors, pico display engines, medical diagnostics and generic applications such as stacked memory and stacked memory on logic taking advantage of the possibilities that 3D IC technology offers..... Ziptronix is involved with a number of companies in these application areas and hopefully will be announcing additional global licenses soon”.

When one looks at the bonding options available, PFTLE has supported the conclusions of EVG [see PFTLE “3D Integration Stays Hot at Semicon West”, 08/13/ 2008] (an EVG update of this summers slide is shown below) i.e. direct oxide bonding is the most accurate and fastest (throughput) solution, while we remain convinced that the industry favors a one step metal-metal bond solution. Ziptronix DBI ®, a hybrid oxide / metal bonding solution, has always purported to meet both these requirements. DBI bonds on the co planar, exposed, oxide surface and then forms the monolithic metal-metal bond (Ni or Cu) later in a less expensive clean room oven. Hopefully Raytheon will soon report results on their scaleup activities.


Comparison of 3D Bonding Processes

2007 Status – 300mm Process

Bonding Method	Process	SmartView® Aligned Post-bond Accuracy		Process Time per Wafer Pair (min)	Process Chambers	Thruput (Bph)
		Today (µm)	Future (µm)			
Cu-Cu	<i>ex situ</i>	1.8 – 2.0 1.0	1.2 0.5 ●	60 – 120	4	2 – 4
BCB	<i>ex situ</i>	1.8 – 2.0	1.2	30 – 60	4	4 – 8
SiO₂	<i>in situ</i>	1.3 – 1.5 0.5	<0.5 0.25	3 – 6 2.5 – 4	1	10 – 20 15 – 24

Improving throughput in progress

No significant interest currently from users



Next week I will be going back to my birthplace, NYC, to take my granddaughters Hannah and Madeline (who live in Texas) to the Thanksgiving Day Parade. I will continue blogging the following week. To all those in the US, have a happy holiday weekend with your families.

For all the latest in 3D IC and advanced packaging technology stay linked to *Perspectives From the Leading Edge*.....

Posted by [Phil Garrou](#) on November 20, 2009 | [Comments \(0\)](#)

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