3D TSV technology is expected to reach $4.8B in revenues by 2019, mainly driven by 3D stacked DRAM and followed by 3D Logic/Memory and Wide I/O according to Yole Développement. With 40% share in the DRAM market, Samsung is by far the number 1 player. By introducing 3D TSV stacking in their latest 64GB DDR4, Samsung allows this technology to enter in the main stream.

This registered dual Inline memory module (RDIMM) includes 36 DDR4 DRAM chips (ref. K4AAG045WD), each of which consists of four 4Gb DDR4 DRAM dies (Ref. K4A4G085WD). The chips are manufactured using Samsung’s 20nm process technology and 3D TSV via-middle package technology.

As a result, the new 64GB TSV module performs twice as fast as a 64GB module that uses wire bonding packaging, while consuming approximately half the power.

On the process side, Samsung used a temporary bonding approach using adhesive glue material and copper via-filled using bottom up filling. Also, System Plus paid particular attention in identifying all technical choices made by Samsung on process and equipment (wafer bonding, DRIE via etching, via filling, bumping, underfill...).

The report includes a complete physical analysis and cost estimation of the 3D packaging process, as well as a detailed description of the manufacturing process.
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ANALYSIS PERFORMED WITH OUR COSTING TOOLS 3D PACKAGE COSIM+

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Author:
Romain Fraux
Romain is in charge of costing analyses for MEMS, IC and Advanced Packaging. He has published more than 50 Reverse Costing reports on various MEMS devices including Inertial, Pressure, Microphones or RF Sensors.

Author (Lab):
Yvon Le Goff
Yvon is the laboratory manager. He has deep knowledge in chemical & physical technical analyses. He previously worked for 25 years in Atmel Nantes Laboratory and performs MEMS analyses for more than 8 years.
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<td>The GS66508P is packaged with an innovative embedded die package developed by AT&amp;S.</td>
<td>All the manufacturing steps are realized at the wafer-level. This is the first introduction of a MEMS component with TSV Via-Middle process.</td>
<td>With the mCube approach, the MEMS sensors are fabricated directly on top of IC electronics and connected using TSV in a standard CMOS fabrication facility.</td>
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