Embedded die in substrate: challenges are still ahead ...

Fan-Out and Embedded Die: Technologies & Market Report

LYON, France – March 3rd, 2015 – “Embedded die in substrate is a promising packaging technology”, comments Yole Développement (Yole) in its latest advanced packaging report entitled “Fan-Out and Embedded Die: Technologies & Market” (Feb. 2015 Edition – Yole Développement). According to Yole’s team, this approach becomes more and more attractive for potential customers because of its numerous advantages. Embedded die in substrate: what are the next steps for the growth?

“The embedding allows a smaller form-factor, and it can be done using a mature manufacturing chain, providing low costs”, explains Jérôme Azemar, Technology & Market Analyst, Advanced Packaging and Manufacturing at Yole Développement. “The approach also offers good thermal performance, high integration capability and low inductance thanks to shorter connections”, he adds.

But these advantages still have to be realistic at high volume manufacturing scales before being able to convince customers. Embedding die in laminate substrates is indeed a promising packaging principle, but it has to overcome several challenges.

One of these challenges is the supply chain. The process is being pushed by printed circuit board manufacturers such as AT&S and can create a new supply chain, bringing new players into the semiconductor industry. This new supply chain comes along with new business models, including packagers, module sellers, IDMs pushing for embedding solutions and R&D laboratories.

One of the supply chain’s main advantages is the usage of a mature and affordable manufacturing chain created initially for PCB...
manufacturing. That achieves low cost technology that would allow easier component integration, with easy access to both sides of the chips. However, a new supply chain brings with it a lack of technical experience with embedding processes and questions about business models that require clarification.

Under the report “Fan-out and Embedded Dies: Technologies & Market Trends”, Jérôme Azemar and the advanced packaging team, analyze the applications that will drive the embedded die market in the future and the potential keys for success.

Single die are the first products currently being sold, demonstrating the technology’s capabilities. They are essentially low I/O applications with easy to embed dies such as DC/DC converters for wireless products. Yole’s expectations are that the technology will show its real potential with more complex systems such as power application SiPs. There, actives and passives will fully benefit from embedded packages thanks to good heat management and low inductance.

Among the technical requirements, one is especially important: pad pitch on the die. In order to reach volume in the mobile/wireless market, pad pitch has to go below 150 μm. Some players, like TDK-EPCOS, claim they already have products with 50 μm pitch.

If technical and logistic objectives like this are achieved, and if an application provides a real boost in terms of initial large volumes, the overall market will be able to grow rapidly in the near future.

Under this new advanced packaging technology & market study, Yole, the More than Moore market research and strategy consulting company gives an overview of players involved in embedded die packages. The company describes the strategies they’re hoping will overcome technical issues such as yield, resolution and reliability and their choices of business model to enter the semiconductor packaging market with.

Under this report, Yole’s analysts also detail the different milestones this technology must pass if it is to reach high volumes, and what room there is for innovations where embedded die could provide clear added value. Yole’s study report highlight the different possibilities under investigation or required by customers to achieve volume manufacturing and sustainability. These include details of technical requirements, multi-sourcing and standardization needs and integration roadmaps.
About Fan-Out and Embedded Die: Technologies & Market Trends report

- **Author:**
  Jérôme Azémar is a member of the Advanced Packaging & Manufacturing team. Upon graduating from INSA Toulouse with a master’s in Microelectronics and Applied Physics, he joined ASML and worked in Veldhoven for three years as an Application Support Engineer, specializing in immersion scanners. During this time he acquired Photolithography skills which he then honed over a two year stint as a Process Engineer at STMicroelectronics. While with ST he developed new processes, co-authored an international publication and worked on metrology structures embedded on reticules before joining Yole Développement in 2013.

- **Companies cited in the report:**

- **Rates:** Euros 5,990.00 (Full report - Multi user license)

For special offers and the price in dollars, please contact David Jourdan (jourdan@yole.fr or +33 472 83 01 90).


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