



FOR IMMEDIATE RELEASE:

The advanced packaging, a wonderful world

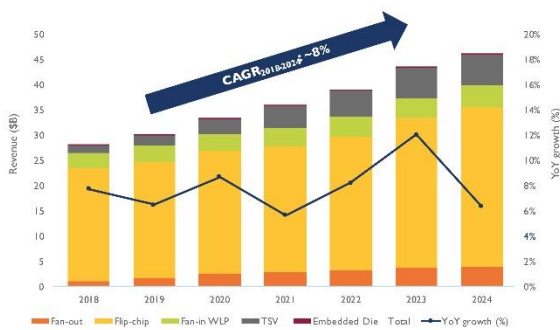
Extracted from: Status of the Advanced Packaging Industry, Yole Développement, 2019

LYON, France – July 8, 2019: The semiconductor industry is at a turning point. The slowdown in CMOS scaling, coupled with escalating costs, has prompted the industry to rely on IC¹ packaging to extend the benefits of the More-than-Moore era. Thus, advanced packaging has entered its most successful period, boosted by widespread needs for better integration; the slowdown of Moore's law; and megatrends in transportation, 5G, consumer, memory & computing, IoT² (and IIoT³), AI⁴, and HPC⁵.

The market research & strategy consulting company, [Yole Développement \(Yole\)](#) releases today its annual technology & market analysis, [Status of the Advanced Packaging Industry](#). This report explores the field of advanced packaging and represents a comprehensive yearly overview of the latest market and technology developments. Yole's analysts propose a review of the drivers for advanced packaging and the latest market dynamics. They also examine packaging technology evolution with the help of short- and long-term roadmaps. This new edition also includes is an analysis of the trends and challenges related to advanced packaging technology, supported by detailed roadmaps for the various packaging platforms.

2018-2024 advanced packaging revenue forecast Split by platform

(Source: Status of the Advanced Packaging Industry 2019 report, Yole Développement, 2019)



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What is the status of the advanced packaging industry? What happened in 2018 and what to expect in 2019 and 2020? What will be the impact of the US-China trade war on semiconductor business & related supply chain? What is the strategy of the leading advanced packaging companies?... Yole's analysts draw up a review of this industry and detail their expectations.

¹ IC: Integrated Circuit

² IoT : Internet of Things

³ IIOT : Industrial Internet Of Things

⁴ AI : Artificial Intelligence

⁵ HPC : High Performance Computing

After experiencing double-digit growth and achieving record revenue in 2017 and 2018, Yole expects a slowdown (negative YoY⁶ growth) in the semiconductor industry for 2019. However, advanced packaging is expected to maintain its growth momentum, with ~ 6% YoY growth. Overall, the advanced packaging market will grow at an 8% CAGR⁷, reaching almost US\$44 billion in 2024. Conversely, during the same period the traditional packaging market will grow at a 2.4% CAGR, and the total IC packaging business will exhibit a 5% CAGR.

The highest revenue CAGRs is expected from 2.5D / 3D TSV⁸ ICs, ED⁹ (in laminate substrate) and Fan-Out, at 26%, 49% and 26% respectively, as high volume products further penetrate the market: Fan-Out in mobile, networking, automotive; 2.5D/3D TSV in AI/ML, HPC, data centers, CIS¹⁰, MEMS/sensors; ED in automotive and medical.

By segment, mobile & consumer constitutes 84% of the total advanced package units shipped in 2018. *“It is expected to grow at 5% CAGR and constitute 72% of the advanced packaging units by 2024,”* confirms **Santosh Kumar, Principal Analyst & Director, Yole Korea**. And he adds: *“Telecom & infrastructure is the fastest growing segment for advanced packaging market by units (almost 28%) and it’ll double its market share from 6% in 2018 to 15% by 2024. In terms of revenue, automotive & transportation segment will increase its share from 9% to 11% in 2024.”*

Amidst an evolving business environment, the semiconductor supply chain is undergoing change at various levels.

Some players have successfully managed to expand into a new business model and significantly impact the IC manufacturing chain, while others have failed to take off. Different players have different motivations to move or expand into new businesses... Status of the Advanced Packaging Industry report provides an impressive analysis of this supply chain, including player positioning and strategy/production per player. In addition to a financial inquiry of the top 25 OSATs, it concludes by providing revenue, wafer, and unit forecasts per packaging platform, along with a review of future production and possible developments during the 2018 – 2024 timeframe.

“To remain competitive, we will see lots of mergers and acquisition activity in the OSAT sector in the coming years”, comments **Favier Shoo, Technology & Market Analyst at Yole**. *“This trends could be observed at various levels. At Yole, we identified some consolidations amongst big players, the merger or acquisition of two midsize players with complementary services offerings and small OSATs being acquired by big*

⁶ YoY : Year to Year

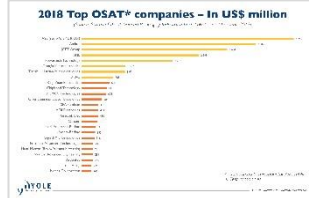
⁷ CAGR : Compound Annual Growth Rate

⁸ TSV : Through Silicon Via

⁹ ED : Embedded Die

¹⁰ CIS : CMOS Image Sensor

players for example. And niche WLP players like Deca Technologies and LB Semicon are strong candidates for acquisition.”



Under this dynamic context, Yole announced last week its annual 25 OSATs ranking, well detailed in Yole’s advanced packaging report: [TOP 25 OSATs ranking: survival of the fittest?](#)

Furthermore, Yole and its partner System Plus Consulting had the opportunity to investigate the new Fan-Out technology developed by Deca Technologies. Both partners identified technical challenges and made the link with current solutions proposed by competitors and status of the market. Key results of their investigations are detailed in a relevant article posted on i-micronews: [New commercialization of Deca’s Fan-Out Technology...](#)

The report, Status of the Advanced Packaging industry is part of an impressive collection of advanced packaging & semiconductor manufacturing reports. A detailed description of these reports is available on [i-micronews.com](#).

ABOUT THE REPORT:

- [Status of the Advanced Packaging Industry](#)

Despite the semiconductor industry slowdown, advanced packaging market is growing at an impressive rate of 8% CAGR between 2018 and 2024. - Produced by Yole Développement

Companies cited in the report:

Altera, Amkor, Analog Devices, Ardentec, Atmel, AOI Electronics, Apple, ARM, ASE, Avago, Broadcom, Carsem, China WLCSP, Chipbond, ChipMOS, Cisco, Cypress Semiconductor, Deca Technologies, Greatek, IC Interconnect, Fairchild, Facebook, Flip Chip International, Formosa, Freescale, Fujitsu, Globalfoundries, Google, Hana Micron, Huawei, Inari Berhad and more ...

About the authors:

- **Santosh Kumar** is currently working as Principal Analyst and Director Packaging, Assembly & Substrates, Yole Korea. Based in Seoul, Santosh is involved in the market, technology and strategic analysis of the microelectronic assembly and packaging technologies. His main interest areas are advanced IC packaging technology including equipment & materials. He is the author of several reports on fan-out / fan-in WLP, flip chip, and 3D/2.5D packaging.

Santosh Kumar received the bachelor and master degree in engineering from the Indian Institute of Technology (IIT), Roorkee and University of Seoul respectively. He has published more than 40 papers in peer reviewed journals and has obtained 2 patents. He has presented and given talks at numerous conferences and technical symposiums related to advanced microelectronics packaging.

- **Favier Shoo** is a Technology and Market Analyst in the Semiconductor & Software division at Yole Développement, part of Yole Group of Companies. Based in Singapore, Favier is engaged in the development of technology & market reports as well as the production of custom consulting.

After spending 7 years at Applied Materials as a Customer-Application-Technologist in advanced packaging marketplace, Favier had developed a deep understanding of the supply chain and core business values. Being knowledgeable in this field, Favier had given trainings and held numerous technical review sessions with industry players. In addition, he had obtained 2 patents.

Prior to that, Favier had worked at REC Solar as a Manufacturing Engineer to maximize production capacity.

Favier holds a Bachelor in Materials Engineering (Hons) and a Minor in Entrepreneurship from Nanyang Technological University (NTU) (Singapore). Favier was also the co-founder of a startup company where he formulated business goals, revenue models and marketing plans.

About other advanced packaging reports:

- [Status of Advanced Substrates](#)

Demands from the new digital age are waking up the sleeping substrate giants.

- [Fan-Out Packaging: Technologies and Market Trends](#)

Samsung and PTI, with panel-level packaging, have entered the Fan-Out battlefield.

- [2.5D / 3D TSV & Wafer-Level Stacking: Technology & Market Updates](#)

2.5D heterogeneous and 3D wafer-level stacking are reshaping the packaging landscape.

ABOUT YOLE DEVELOPPEMENT

Founded in 1998, Yole Développement has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services and well as IP and patent analysis. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole group of companies has expanded to include more than 80 collaborators worldwide covering MEMS and image sensors, Compound Semiconductors, RF Electronics, Solid-state lighting, Displays, software, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics and Batteries & Energy Management. The “More than Moore” market research, technology and strategy consulting company Yole Développement, along with its partners

System Plus Consulting, PISEO and KnowMade, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business. For more information, visit www.yole.fr and follow Yole on [LinkedIn](#) and [Twitter](#).

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