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Manz AG: Strategic cooperation in the microelectronics area opens up new prospects in this attractive, future-oriented field

- *New trend in packaging of microchips: fan-out panel level packaging realized using Manz wet-chemical production technology*
- *Strategic partnership ensures access to high-performing, future-oriented technology*
- *First order received from cooperation partners with more than 5 million EUR volume*

Reutlingen, June 28, 2018 – Manz AG, a global high-tech equipment manufacturer with a comprehensive technology portfolio, has started a strategic cooperation in the area of Fan-Out Panel Level Packaging (FOPLP) with one of the most influential microelectronics enterprises in China which is engaged in investment, development and operations management of microelectronics business , and PEP Innovation PTE Ltd, a technology company headquartered in Singapore. The goal is to jointly develop and market this high-performing and future-oriented technology used to package microchips. As part of the cooperation, Manz AG has already received its first order with more than 5 million EUR volume from a joint venture company founded by the cooperation partners.

Microchips are based on silicon wafers, on which chip manufacturers transfer the circuit layout using a photolithographic process. Chips are then encapsulated with an epoxy compound after the production process to protect them and facilitate contacting. This process is called packaging. Fan-out panel level packaging, the newest packaging process, plays a key role as electronic components increasingly become miniaturized even as they offer better performance. In addition to significantly reducing the volume, thickness, weight, and manufacturing costs of packaging while doubling the pin count, the process also has significant positive effects on the thermal conductivity and speed of the components.

Microsystems with these properties form the basis for quick digitization in many different areas of our lives. The number of chips installed in smartphones, for instance, has increased more than tenfold in the past 10 years. The megatrends of electro mobility and autonomous driving, in addition to the driver assistance systems already installed in vehicles today, will cause major leaps in installed chips in the automotive industry. The global electronics industry association SEMI expects to see an increase from currently between 60 and 100 sensors per car to over 200 sensors in 2020.

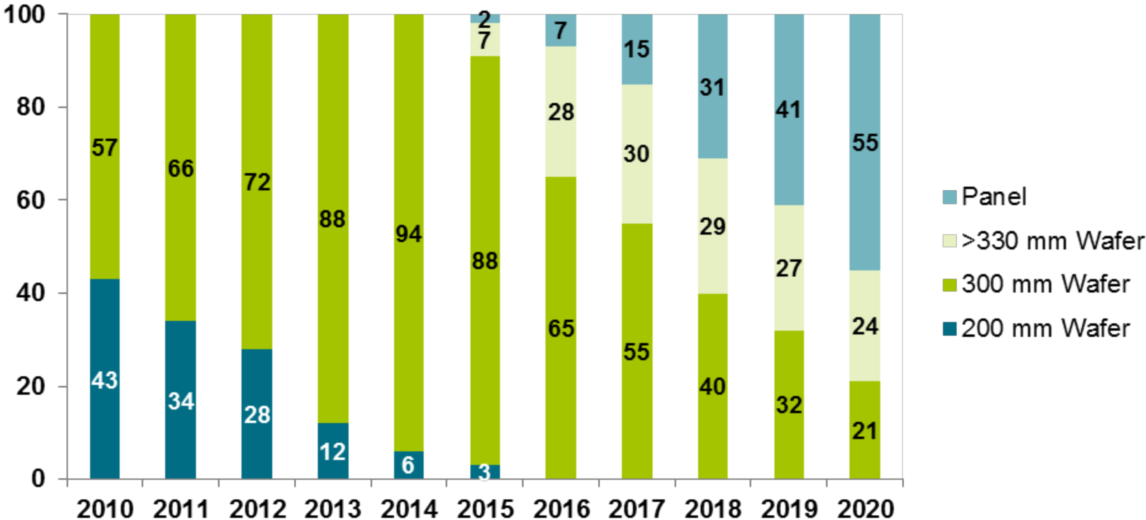
Eckhard Hörner-Marass, CEO of Manz AG, comments: "By entering the market for fan-out panel level packaging, we are securing our access as a high-tech equipment manufacturer to an absolutely future-oriented field in microelectronics. Due to cost and productivity benefits, we are seeing a trend in the semiconductor market towards producing rectangular panel formats using the FOPLP process technology. As a specialist in printed circuit board and display production, we have the technological expertise necessary to establish ourselves as the world's first provider of a fully integrated and automated FOPLP production solution in

cooperation with our strategic partners. Furthermore this project shows the importance of the merger of our previously independent business units Display and PCB early this year, since a close interlocking of the respective competencies is key to success for the FOPLP process."

Robert Lin, Vice President of the Display and PCB segment and General Manager of Manz Taiwan Ltd., adds: "With over 7,500 installed systems and roughly 30 years of experience, Manz is a market leader in Taiwan and China in the area of wet-chemical processes for producing printed circuit boards as well as displays and touch panels of different substrate sizes. Process technology developed for these target groups is now being used in the FOPLP process. We are glad to start working together with our cooperation partners, and will make our contribution to initiate mass production of FOPLP as a pioneer in this growth market."

Development of substrate types used for Fan-Out Packaging until 2020 (in %)

Source: Yole 2015



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Company profile:

Manz AG – passion for efficiency

As a globally leading high-tech equipment manufacturer, Manz AG, based in Reutlingen, Germany, is a pioneer of innovative products in fast-growing markets. Founded in 1987, the company has expertise in five technology sectors: automation, laser processing, and measurement technology, as well as wet chemical and roll-to-roll processes. These technologies are deployed and continuously developed by Manz in three strategic business segments: "Electronics," "Solar," and "Energy Storage."

The company has been listed on the stock exchange in Germany since 2006 and currently develops and manufactures in Germany, China, Taiwan, Slovakia, Hungary, and Italy. It also has sales and service branches in the USA and India. Manz AG currently has around 1,700 employees, about half of which are located in Asia. With its claim "passion for efficiency," Manz makes the following service promise to its customers active in dynamic future-oriented industries: offering production equipment with the highest degree of efficiency and innovation. With Manz AG's comprehensive expertise in the development of new production technologies along with the equipment required for this, the company makes a significant contribution to reducing the production costs for end products and making these accessible to a broad range of buyers around the world.

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