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Press Release

29.05.2019

IHP presents a new wafer bonding technology for advanced wafer-level packaging at ECTC 2019 in Las Vegas

Low-temperature covalent wafer bonding technologies for developing next-generation communication devices have been successfully processed in cooperation with EV Group (EVG)

Frankfurt (Oder). Scientists of IHP – Innovations for High Performance Microelectronics will present their latest research results on packaging at IEEE 69th Electronic Components and Technology Conference (ECTC) from 28th to 31st of May in Las Vegas. The ECTC is the premier international event that brings together the best in packaging, components and microelectronic systems science, technology and education in an environment of cooperation and technical exchange.

The paper "Al-Al Direct Bonding with Sub-µm Alignment Accuracy for Millimeter Wave SiGe BiCMOS Wafer Level Packaging and Heterogeneous Integration" (Matthias Wietstruck et al.) demonstrates wafer-level Al-Al thermo-compression bonding for advanced wafer-level packaging and heterogeneous integration. The ability to conduct oxide-free aluminum-to-aluminum (Al-Al) direct bonding at low temperature is a unique capability of the EVG ComBond platform. IHP has explored a wafer bonding process with sub-µm alignment accuracy enabling low resistance Al-Al bonding interconnections with mΩ-range contact resistance and low-loss RF interconnects for fine-pitch wafer-to-wafer interconnections. "We developed a high performance mm-wave SiGe BiCMOS Fan-Out Wafer-level packaging platform (FOWLP) based on high-resistive silicon interposer", stated Matthias Wietstruck, groupleader *Heterointegration of Devices and Technologies* at IHP.

Another paper is focused on the the process development for the new Al-Al bonding process: "Optimization of a BEOL Aluminum Deposition Process Enabling Wafer Level Al-Al Thermo-Compression Bonding" (Sebastian Schulze et al.). By detailed analysis and optimization of IHP´s BiCMOS BEOL deposition process, minimum surface roughness for Al-Al thermo-compression bonding is enabled. Therefore the influence of Al-Al wafer bonding process parameters e.g. bonding/annealing temperature was evaluated and low resistance Al-Al bonding interconnections are demonstrated.

Leibniz Gemeinschaft

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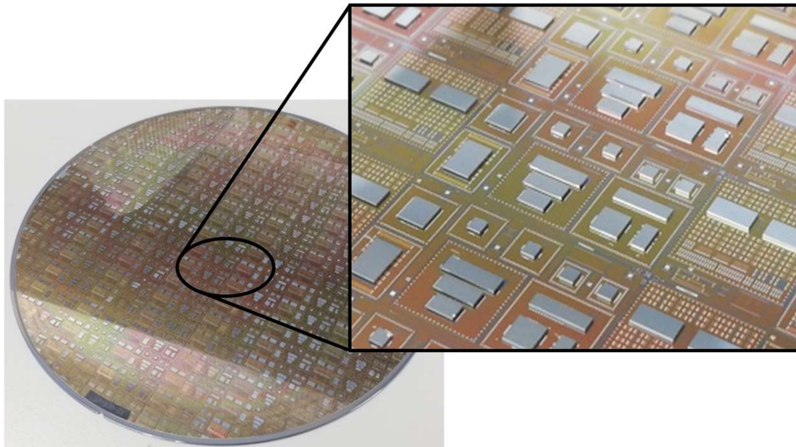

200 mm interposer wafer with bonded silicon chips using the Al-Al wafer bonding process © IHP 2019

Further Information:
ECTC: https://www.ectc.net/index.cfm
EV Group: https://www.evgroup.com

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About IHP:
IHP is an institute of the Leibniz Association and conducts research and development of silicon-based systems and ultrahigh frequency circuits and technologies including new materials. It develops innovative solutions for application areas such as wireless and broadband communication, security, medical technology, industry 4.0, automotive industry, and aerospace. IHP employs approximately 300 people. It operates a pilot line for technological developments and the preparation of high-speed circuits with 0.13/0.25 µm BiCMOS technologies, located in a 1000 m² class 1 cleanroom.

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