As part of developing new chip assembly process technologies in EuroPAT-MASIP, the project partners Fraunhofer EMFT, Besi, EVG, Amkor Technology, and Semilab have innovated a new self-alignment process of chips on a wafer in close cooperation.

1. At Fraunhofer EMFT, a technology was developed to automatically align chips on a 200mm transfer wafer using hydrophilic/hydrophobic properties. Besi transferred that unique technology to a production machine where the dies are attached to the wafer without additional machine alignment technology, significantly speeding up assembly.

2. These chips are transferred from the 200mm transfer wafer onto an industrial standard 300mm production wafer by EVG. In this step, the wafer is flipped upside down (flip chip) and attached to a thermal adhesive tape.

3. On this 300 mm production wafer, the empty outer ring is populated with additional chips with a Besi machine using a standard pick-and-place process.

4. The chip filled wafer is molded in plastic by Amkor Technology under pressure and at high temperature. The chips are now protected.

5. The chips are released from the carrier wafer by releasing the thermal adhesive tape.

6. Finally, Semilab inspects all chips with IR inspection technology to validate chip alignment.

Next development steps

EuroPAT-MASIP

Future developments focus on the potential of self-alignment with multi-die handling tools to significantly increase UPH and on improving accuracy using accurately shaped plasma-diced dies.

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