

APTI-EPEEBS (AT&S)

Advanced Packaging Technology Initiative for European Power Efficient Electronic Based Systems

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Projektbeschreibung

siehe Englische Kurzbeschreibung

Abstract

The global electronic industry is currently facing a significant change. Many applications that have been previously solved mechanically deserve for smart electronic solutions today (e.g. electrical vehicle and electrification of cars in general, Industry 4.0, autonomous driving). In addition to this, many new applications are under development that require complex electronic solutions in the up-coming years (e.g. robotics, AI, etc.).

Many of these applications will generate data that have to be processed, stored, communicated and reacted on to. These applications deserve for significant processing power that is performed by the backbone of each electronic device: silicon based processors. Their development, however, is slowing down (Moore's Law no longer applies). It seems that development on silicon-based processors is reaching a physical limit. Every step closer to this limit is causing higher development costs and consequently is slowing down the speed of development. As a consequence digital processors ("More More" devices) loose the dominant role in Electronic Based Systems and "More than Moore"-devices and the combination and interaction of these devices (i.e. "Package") are getting of more importance for all Electronic Based Systems.

All these up-coming and future applications will have one common challenge: massive consumption of electric energy and electric loss. All solutions that are developed in the up-coming years must have a strong focus on energy efficiency and reduction of conversion loss (not effective) of electrical energy. Consequently entirely new possibilities for the packaging industry are required that enable this efficient energy conversion of electric power for existing silicon technology but also for the solutions of the future (esp. GaN and SiC).

Many new functions, improvements and properties can be realized by a proper packaging solution. Packaging of silicon devices was done by via-bond technologies over the last decades. In the past 1-2 decades a number of novel packaging technologies has been developed (Advanced Packaging Technologies) and a novel business was established – the business of Outsourced Semiconductor Assembly and Test business (OSAT business). OSATs are taking over the packaging and testing of silicon components.

Meanwhile Advanced Packaging Technologies are applied for electrical connection and housing of all advanced silicon based electrical components (e.g. processors, converters) and are forming the base for System in Package (SiP) technologies. System in Package combines minimum 2 different components in order to achieve an electronic based (sub-)system or module. These electronic based systems will display the essential corner stones of all electronic devices of the future.

Advanced packaging technologies will solve the power and energy efficient packaging and interconnection of:

-) Power converters and inverter in electronic solutions for electro mobility, communication and industry
-) data communication of the future (e.g. 5 G in mm wave length range)
-) Data processing

Projektpartner

- AT & S Austria Technologie & Systemtechnik Aktiengesellschaft