

LPKF Delivers First AMP Laser System for Volume Manufacturing of IC Packages to Semiconductor Industry customer

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Functionalization of epoxy mold compounds (EMCs): AMP technology converts passive EMC into an active carrier of electrical functionality.

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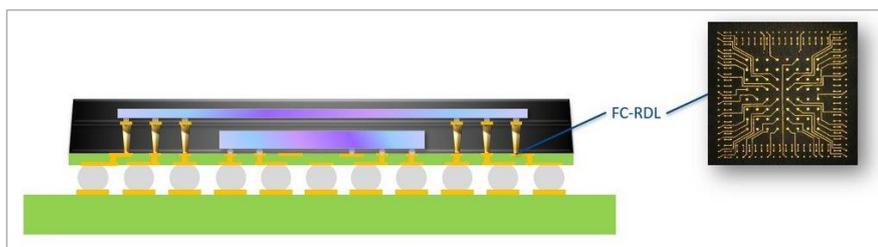


Fig.: Flip-chip (fc) package-on-package (PoP) using AMP

LPKF's Active Mold Packaging (AMP) technology enables electrical circuits directly on the surface and inside the volume of the epoxy mold compound. This contributes to cost and space savings in advanced packaging manufacturing, and to a higher functional density of finished ICs. In addition, AMP helps to reduce power consumption, improves heat dissipation for power applications, enables additive 2L EMC-RDL formation and enables a whole suite of RF applications relevant for use in 5G. Taken together, these key factors contribute to a meaningful advance of the semiconductor industry. Starting now, the advantages made possible by AMP are leveraged by a large OEM manufacturer of integrated circuits in one of its production sites in South-East Asia. Together with LPKF, the company recently installed an LPKF system, which will make the AMP process available for high volume manufacturing in advanced packaging applications.

More than ever, innovative solutions for mounting and connection technology are crucial factors in the semiconductor industry. Functional integration of the kind made possible by AMP technology is another significant step towards this goal. Active Mold Packaging simplifies integrated circuits (ICs) and systems-in-package (SiPs), and it increases value add for the users. When using AMP, the epoxy molding compound (EMC) –

previously used only to protect ICs or SiPs – is converted into an active carrier of electrical functionality. The simple, time-saving, and reliable 2.5D packaging approach of AMP is based on three proven and standardized electronic production technologies: EMC encapsulation, laser processing using laser direct structuring (LDS), and selective metallization of the laser-processed areas with copper.

A new class of epoxy molding compounds (EMCs) has been developed for the laser direct structuring (LDS) process and is available in granulate and tablet form from a selection of well-known suppliers. In addition, this material is well suited for the plating process. In this process, laser direct structuring can reach a resolution range of 25µm for each linewidth and space.

Active Mold Packaging enables direct, electrically conducting connections between active and passive components in an IC or SiP. This shortens electrical path lengths and thus ohmic resistance and inductance.

Target applications of AMP are currently being developed for the 5G technology segment, and also for “beyond 5G” (B5G) – or 6G – RF technologies. They can apply to a wide range of uses: mmWave antennae as antenna-in/on-package (AiP/AoP) modules that operate in ISM bands at e.g. 24 GHz, 61 GHz, and 121 GHz, vehicle radar modules that operate between 76 GHz and 81 GHz, 5G amplifiers, or even EMI shielding. Other applications are package-on-package (PoP), 2L interposers, multi-chip modules (MCMs), thermal management and SiP connections.

About LPKF

LPKF Laser & Electronics AG is a leading provider of laser-based solutions for the technology industry. Laser systems from LPKF are of central importance for the manufacturing of printed circuit boards, microchips, automotive parts, solar modules, and many other components. Founded in 1976, the company has its headquarters in Garbsen near Hanover and operates worldwide through subsidiaries and agencies. Around 20 percent of the workforce is engaged in research and development.