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ABSTRACT

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Abstract

Common solder reflow processes can no longer satisfy the actual requirements in advanced packaging. The packaging of MEMS and optoelectronic components for instance is demanding a fluxless soldering method together with low thermal and mechanical stress to avoid damaging of the sensitive membranes or optical components (like lenses, etc.). Wafer level packaging and chip on flex applications (like LCD drivers, RFID, Smart Cards) need fast and cost-efficient, but also reliable Flip-Chip bumping and assembly processes to fulfil the overall cost and quality targets of these products.

A very flexible heating process is generated by controlling the temperature increase in solid material during impact of a laser pulse of a few milliseconds duration, which allows solder reflow, underfil, ACP and NCP curing, but also selective solder application in 3D-structures.

A high speed solder jetting process (10 balls/s) is achieved by combining this laser heating solution with a placement tool for preformed solder balls (Solder Ball Bumper - SB2). Fluxless, stress-free solder application is now possible by performing the reflow of the solder in a Nitrogen atmosphere. Additionally the solder ball diameter flexibility (80µm – 760µm) and solder alloy flexibility (PbSn, AuSn, lead-free) is high.

This paper will demonstrate the suitability of these new process technologies especially in the field of MEMS packaging. Examples for contactless and fluxless soldering and low stress laser assisted assembly are discussed and process data is shown.

Keywords: Solder Bumping, Flip-Chip Assembly, Advanced Packaging, Contactless, Fluxless
