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Laser assisted Wafer Level Packaging for MEMS

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Abstract

The paper will describe new technologies in microelectronic packaging, especially 3-dimensional applications using laser assisted equipment. The emphasis is first a method of fluxless placement and reflow of solder balls of different alloys and diameters, second a new process development –a new laser assisted bonding method for wafer to wafer packaging will be presented.

Standard stencil printing technology is not capable of providing the requested solder volume for 3-dimensional and MEMS packages. Therefore other technologies have to be used. The ball placement method is a reliable technology which is optimal for these packages. The process and equipment for production environments will be described in detail and the advantages will be shown in comparison to conventional methods.

A new bonding method for the wafer to wafer packaging will be presented as well, the process of the mechanical and electrical connection by using a new laser bonding technology will be shown. The complete process steps of this wafer to wafer connection, from first wafer pad metalization, and last sawing of the hermetic sealed stacked wafer will be presented.

Keywords: Ball placement, fluxless, laser reflow, ball sizes of 80µm, leadfree, wafer pad metalization, wafer to wafer bonding, hermetic sealing, stacked wafer, sawing of stacked wafers