

## New Fabrication Method of Solder Ball for Micro BGA package

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### 1. Introduction

In line with the recent mobile information equipment, electronic microcomponents and their packaging technology are making a key role in hardware product development and production technology. The development of electronic equipment is led by the progress of device packaging technologies. For example BGA and CSP were adopted as soon as the limits of TAB were exceeded by the advent of QFP. Solder ball is a kind of interconnection material which acts as a channel for electric current between die and circuit.(Fig. 1) According to the road map, the 0.3mm ball is expected to use explosively because the high performance micro chip for information is usually packaged by micro BGA.

This study deals with the new fabrication method of small sized solder ball using perturbation principle of two different kinds of interfaces. This technology makes it possible to mass-produce micro BGA graded solder ball in a simple process with low price. It was transferred to the industry and successfully commercialized.

Atomizing equipment which can spray melt to a fine droplet with high rate was newly devised and manufactured. The high quality of solder sphere without any distortions can be successfully obtained with this method where the perturbation of gas/liquid interface breaks up the melt stream extruded out of crucible and the properly heated oil causes melt droplet to reshape to perfect sphere. Fig. 2 and Fig. 3 shows the appearance and microstructure of solder ball made with this method. The size distribution of solder ball in a given condition was plotted in Fig. 4. The width of size distribution should be narrow in order to increase the efficiency of production

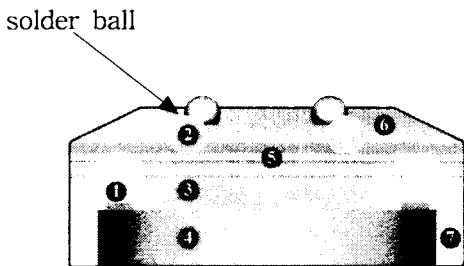


Fig. 1. Schematic view of BGA package

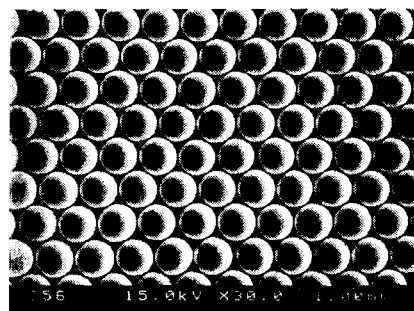


Fig. 2 SEM image of solder ball

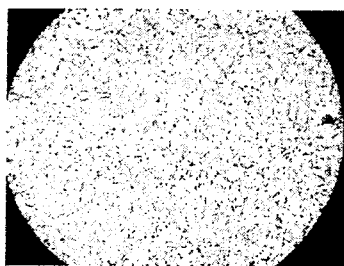


Fig. 3. Microstructure of Sn-37%Pb solder ball

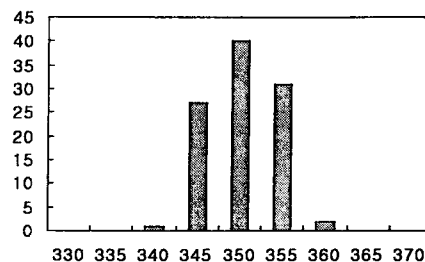


Fig. 4. Size distribution of solder ball