Probe Bump Structure

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Background:

The drop test is an important part of the reliability test. Currently, despite the fact that bumping process is a mature technology, SnPb solder bumps still remain an issue as excessive stress during the drop test would result in bump cracks, thereby causing problems like open circuit. Therefore, a new design for no-stress bumps becomes an imminent topic. The idea for a probe bump structure is thus born. The conventional SnPb solder bump is shown on the left side of Fig. 1, and the new probe bump structure is shown on the right side of Fig. 1.

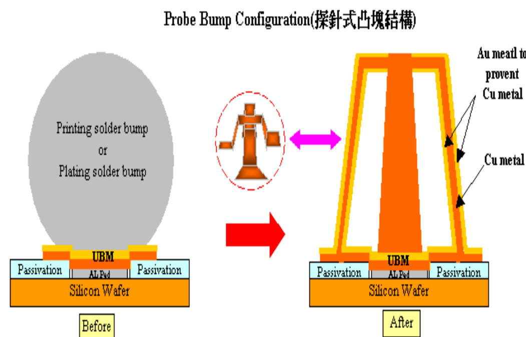

Fig. 1

Summary:

The idea of a probe shape originates from the wafer probe test. The probe bump, functioning like a spring or a cantilever beam, would have sufficient elasticity to reduce the stress. The Au/Cu composition of the probe bump allows easy soldering to pre-solder on a substrate and good electrical connection. The probe bump is also an environment-friendly replacement of the conventional SnPb solder bump, as Pb is a well-known pollutant.

Detailed Description:

The process flow is shown in Fig. 2. First, the Metal 1 layer is sputtered onto the wafer. Then, a PI or dry film is formed on the Al pad after the photo process (coating-exposure–developing -curing). Next, the Metal 2 layer (Au/Cu) is sputtered onto the wafer and the PI or dry film. A second photo process is performed to pattern the Metal 2 layer into cantilever beam shape. At the end, the PI or dry film is stripped off to reveal the probe bump.

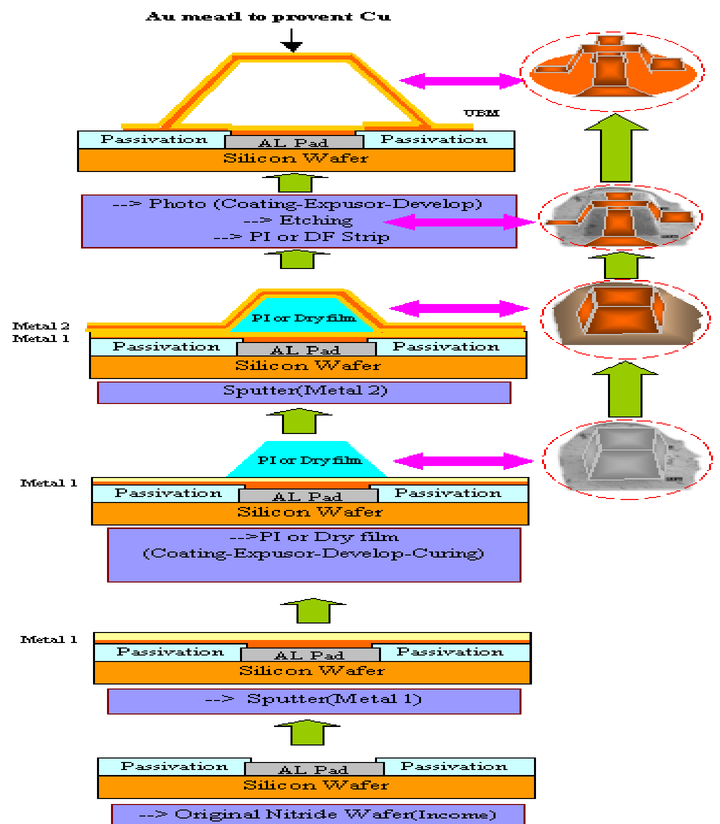

Fig. 2

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