AzTE Arizona Technology Enterprises

www.azte.com

Method for Creating and Packaging 3-Dimensional Stacks of Biochips Containing Microelectro-Mechanical Systems

AzTE Case # M10-062AL

Inventors

Jemmy Sutanto
Associate Research Scientist
School of Biological and Health Systems Engineering - Bioengineering
Arizona State University

Jitendran Muthuswamy
Associate Professor
School of Biological and Health Systems Engineering - Bioengineering
Arizona State University

Invention Description

This invention contains the following distinct novelties:

1. The ability to **perform flip-chip based electronic packaging** for a die that contains mechanical and electrically active **MEMS (Micro Electromechanical System)** structures. Currently, most MEMS packaging technology still use a old-fashioned (Gold or Aluminum) wire-bonding technology which leads to the increase in the overall final package dimensions and cost.
2. The ability to provide a **semi-hermetic sealing technology**, which enables the active mechanical parts of MEMS to be extended outside the die boundary, while simultaneously protecting the inner active MEMS parts against liquid or environmental contamination. Currently, there is no semi-hermetic technology that offers promising sealing performance for MEMS. Traditional hermetic sealing technology is not applicable for MEMS as the fluid used for underfill will flow and freeze the active MEMS parts.
3. Enable **3D (three dimensional) stacking of a combination of MEMS and IC dies** vertically along z-axis. This technology will enable the development of a compact 3D stack of MEMS chips with more functionality than what is currently achievable with existing technology.
4. Enables **MCP (Multiple Chips-in-a-Package)** which includes a combination of IC and MEMS dies together on a single package.

Potential Applications

- Electronics packaging
- MEMS packaging
- Nanotechnology packaging
- Microfluidics packaging
- Packaging of micro or molecular energy harvesting
- Packaging for high density energy storage

Benefits and Advantages

- 3D stacks of moveable microsensors
- Aims to stack up to seven microchips
- High density cluster of microdevices within a small space/volume

Intellectual Property Status:

Patent Pending

Contact

Jack Geltosky, PhD

Senior Vice President

Business Development, Life Sciences

Arizona Technology Enterprises, LLC (AzTE)

P: 480.884.1989

F: 480.884.1984

JGELTOSKY@AZTE.COM

LIFESCIENCES@AZTE.COM