

Theme: Functional Material

Subject : Premold Leadframe Substrates for MEMS Sensor Packaging

Introduction

Most of the basic package structure of MEMS (Micro-electro-mechanical Systems) sensors requiring access to surrounding environment such as pressure sensor, humidity sensor and microphone is metal can package, and typically PCB(printed circuit board)s are used as the substrate. We believe using leadframe as the substrate for such MEMS sensor package has certain merits over PCB substrates.

The goal of this research project is to verify the feasibility of implementing a premolded leadframe substrate suitable for MEMS sensor packages. We would like to check the manufacturability of a single layer premolded substrate meeting the requirements regarding substrate thickness level, the formation of through hole of about 300 um, the fabrication of cavity on the bottom side, the metallization of pad for wire bonding and soldering. In addition, we would like to evaluate assembly issues with the proto-type leadframe substrates.

Scope

In order to verify the idea of using a premold leadframe substrate, the project has to cover the assessment on the manufacturability of the premold leadframe substrate and the subsequent assembly issues including:

- Design review on the manufacturability of the leadframe substrate.
- Verification of manufacturability of the leadframe substrate
- Supply of the prototype leadframe substrate for assembly test
- Preliminary assembly test report with the prototype substrate

Research questions

We are interested in the following research questions. These questions are not exhaustive but different research questions are open to discuss with research partners.

- Is it feasible to manufacture single layer premold substrates meeting the requirements - such as flat surface between Cu leadframe and premold, substrate thickness range from 130 ~300 um, formation of through-hole of about 300 um diameter, fabrication of about 1 mm diameter cavity on the bottom side with depth being 1/2 of the substrate thickness, and metallization on pad for wire bonding & soldering, and side seal-ring area - for MEMS sensor package?

Expected Deliverables

- Feasibility report on manufacturability of the single layer premold lead frame substrates for MEMS sensor package
- Prototype substrates for assembly tests
- Assembly tests report with the prototype substrates