

Effect of surface roughness and hardness of leadframe on the bondability of gold wedge bonds

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Abstract

Purpose

This paper aims to analyze the effect of surface roughness and hardness of leadframe on the bondability of gold (Au) wedge bond using in situ inspection of laser interferometer and its relationship with the deformation and wire pull strength.

Design/methodology/approach

The in situ inspection of ultrasonic vibration waveform through the changes of vertical axis (y-axis) amplitude of wire bonder capillary was carried out using laser interferometer to analyze the formation of Au wedge bond. The relationship between the changes of ultrasonic waveform of capillary with the deformation and the pull strength was analyzed to evaluate the bondability of Au wedge bonds.

Findings

It was observed that the changes in vertical axis amplitude of ultrasonic vibration waveform of wire bonder capillary can be used to describe the process of bonding formation. The loss of ultrasonic energy was exhibited in ultrasonic vibration waveform of wire bonding on leadframe that has higher value of roughness (leadframe A) as compared to that of leadframe that has lower value of roughness (leadframe B). The lower pull strength obtained by Au wedge bond further confirms the reduction of bond formation because of the higher deformation on leadframe A as compared to that of leadframe B.

Originality/value

The relationship between in situ measurement using laser interferometer with the bondability or deformation and wire pull strength of Au wedge bonds on different surface roughness and hardness of leadframes is still lacking. These findings provide a valuable data in analyzing the bonding mechanisms that can be identified based on the in situ measurement of ultrasonic vibration and the bondability of Au wedge bonds.