

Systems and Methods for Evaluating Coupled Components

Researchers at the University of South Florida have developed a method to simplify bond quality testing known as Evanescent wave (EW) coupling using sub-wavelength (SW) grating for nondestructive evaluation of 3D MEMS package to substrate bonding.

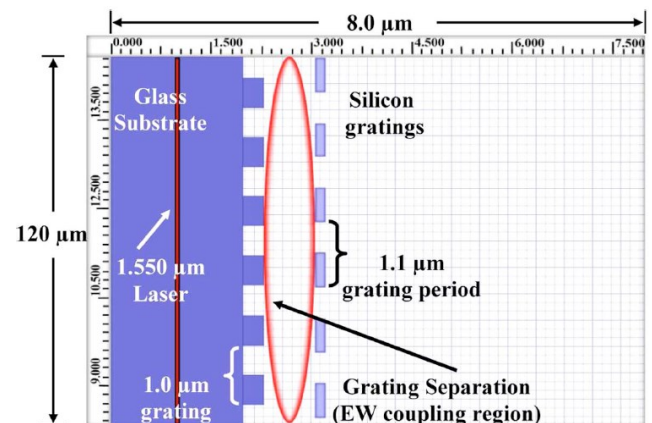
Many methods have been proposed for identification and authentication of IC's. The semiconductor chip is bonded to a silicon substrate as it is desirable to evaluate the integrity of the bond between these components. The evaluation can also be the study of the components when the tampering has occurred. Although there are several techniques proposed to identify any potential tamper to chip, such as using an integrated photo detector, magnetic nanoparticles and optical emission circuitry, there is need for a technique that can help identify either mishandling of the package or the chip.

The researchers at USF have proposed a novel technology that uses the property of light, like diffraction, in order to study the bonding. The light is passed and based on the diffraction the bonding is analyzed. A tamper proof IC packaging technique is developed to detect any damage or alteration made to the semiconductor chip. In order to detect the tamper, the intensity of light is found initially and is compared with the intensity of light at that point to find if there is any difference. The proposed evanescent wave coupling concept is a great method that can be used in IC packaging to determine the bond integrity.

ADVANTAGES:

- Easier grating fabrication
- Allow the detection of nanometer displacements
- Precise measurement
- Anti-tamper configurable

Far-Field Evanescent Wave Propagation Using Coupled Subwavelength Gratings



The Optiwave Simulation Layout