METHOD AND APPARATUS FOR NONDESTRUCTIVE INSPECTION AND DEFECT DETECTION IN PACKAGED INTEGRATED CIRCUITS

ABSTRACT

A method and apparatus for nondestructive inspection of packaged integrated circuits and defect detection in the integrated circuits. In a scanning acoustic microscopy system , a packaged integrated circuit under test 31 is placed in a tank containing an acoustic transmission medium such as de-ionized water. An acoustic reflector 29 is placed beneath the integrated circuit 31 . A pulse-echo mode transducer 17 is used to scan the area containing the integrated circuit 31 with ultrasonic energy. The reflective signal energy is captured by the transducer 17 and the signals are digitized and stored. A computer system analyzes the reflective signal amplitude, and presents a visual image based on where the reflective signal was strong and where it was weak. In a preferred embodiment the image is presented so that the signal from the reflective plate is shown as a dark region where the reflection was weak or zero. It has been determined that those darkened areas will be areas where the integrated circuit under test has delamination or package cracking defects. The visual display can then be used by an operator, or alternatively the data could be analyzed by computer software in an automated system, to determine whether the packaged integrated circuit device under test contains delamination defects.

Figure 2