

Scanning Acoustic Microscopy (SAM)

At DELTA we have the “eye” to see defects inside your components nondestructively.

Using SAM changes in materials can be detected.

Services

Microelectronics / Microsystems

Chip / flip chip inspection in general:

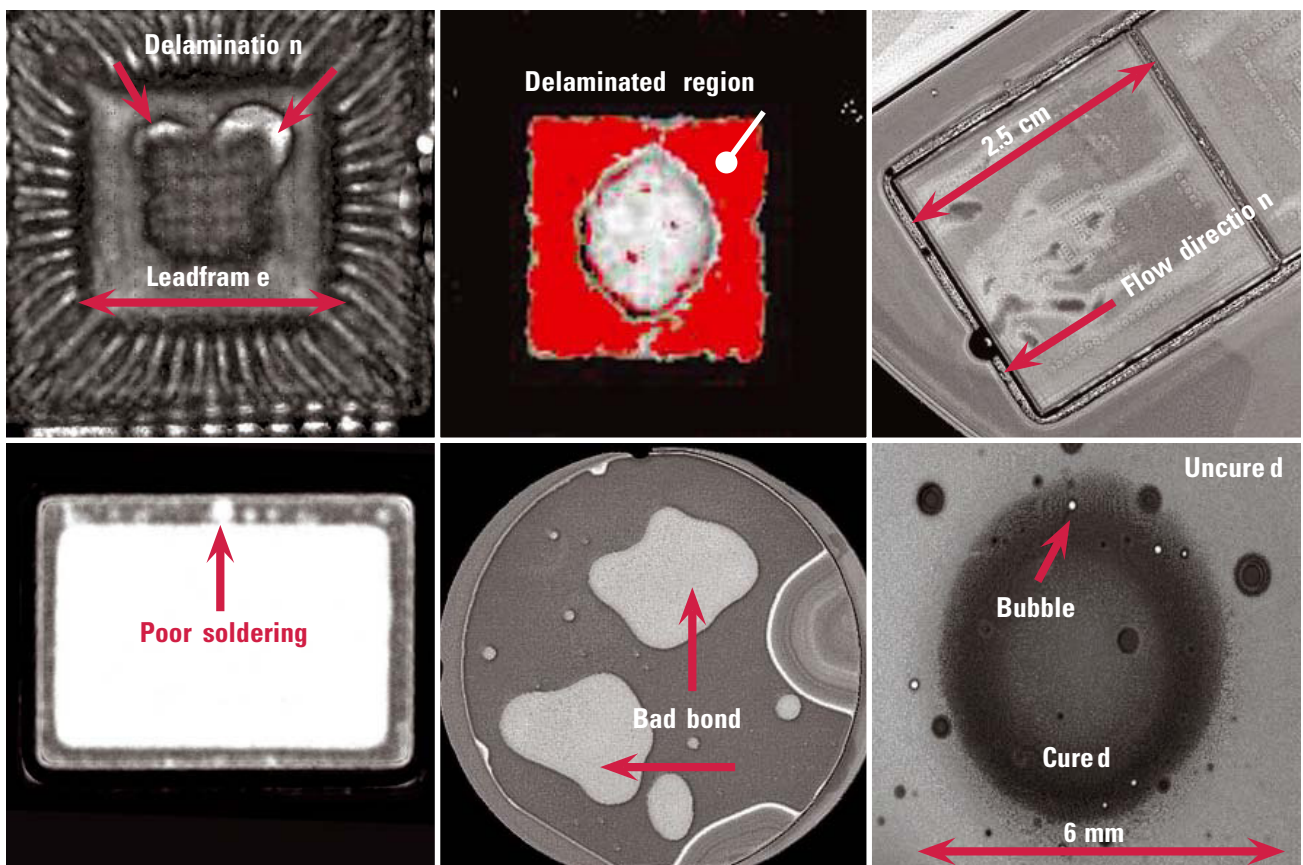
- Underfill flow • BGA • Delamination
- Bubbles • Voids • Cracks • Bond quality: anodic, solder, glue

Materials characterisation

- Velocity of sound
- Stiffness

Other

- Distance measurements
- Degree of adhesive cure



Upper: Encapsulated die on leadframe. Delamination between encapsulating material and leadframe.

Lower: Imperfect lid soldering.

Upper: Backside of chip. Delamination between encapsulating material and leadframe.

Lower: Two imperfectly anodic bonded silicon wafers.

Upper: Inhomogeneous flip chip underfill flow.

Lower: Cured and uncured UV adhesive between two microscope slides.

Technical details

SAM is a Non Destructive Testing (NDT) method for microinspection which functions like a sonar, though using much higher frequencies, MHz - GHz.

Ultrasound is transmitted through a liquid medium, typically water, to the component and its interior where it is reflected by stiffness changes, e.g. between die and leadframe.

SAM can be considered as a supplement to other NDT methods like X-ray inspection, which is also available at DELTA. The contrast in X-ray inspection relies on absorption due to differences in the atomic mass. Bubbles etc. in polymers are for instance not easy to see with X-rays, though they are easy to see with sound.

In SAM resolution and penetration depth depends on frequency (focal spot size), focus position, stiffness and stiffness changes in the materials. High frequency gives high resolution but low penetration depth and vice versa. For best results plane and smooth surfaces are required. With 200 MHz a resolution of 8 μm has been achieved.

Specifications

Following transducers are available:

5 MHz, 10 MHz, 22 MHz, 50 MHz, 110 MHz, 200 MHz

Scan area: 10 cm x 10 cm

Tank size: 5 cm x 15.5 cm x 15.5 cm

Scanner resolution: 1 μm



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