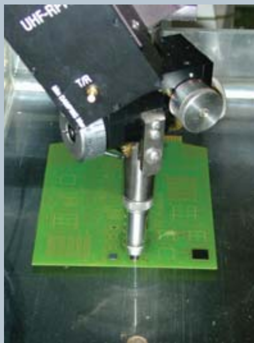
IMOMEC

Institute for Materials Research
University of Hasselt
Associated Lab IMEC

Scanning Acoustic Microscopy

Application area: non-destructive testing of electronic assemblies

Scanning Acoustic Microscopy (SAM) is a non-destructive technique that uses a focused ultrasonic acoustic beam to scan the device under test. Ultrasound waves are transmitted through the device and the reflections from the different interfaces within the material are monitored. From the reflected pulses an image of the inside of the device is constructed.



A large variety of uses for Scanning Acoustic Microscopy can be found in the automotive industry. One of the more common uses of SAM systems in the automotive industry is the inspection of microelectronic devices.

Different components like switches, sensors, power devices, board mounted devices or discrete components can be inspected to perform failure analysis, vendor qualification control, reliability and process control. Different internal device discontinuities like cracks, delaminations and voids are easily spotted using SAM.

System description and specifications

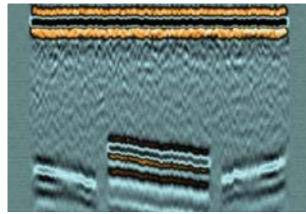
The scanning acoustic microsope at IMOMEC is a high speed, high resolution scanner that is designed primarily for the inspection of microelectronic devices including plastic and ceramic packages, BGAs, Flip Chips, solder joint inspection, etc.

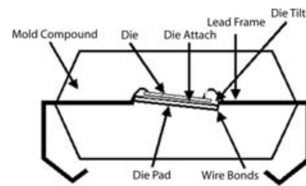
Parameter	Specification
Scan area	6” x 6”
Transducer frequencies	2.5 to 90 MHz
	180/230 MHz Ultra High Frequency transducer
Scan modes	A-scan (point scan)
	B-scan (line scan)
	C-scan (area scan)
Inspection methods	Pulse-echo scanning
	Through transmission scanning

Measurement examples

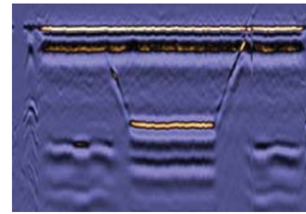
Some typical applications are:

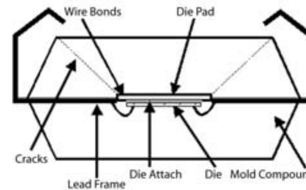
- Electronic plastic package evaluation
- Molding compound evaluation
- Electronic ceramic package evaluation
- Package crack detection
- Chip capacitor and resistor evaluation
- Flip chip bond evaluation
- Die attach evaluation



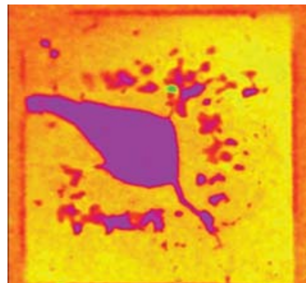


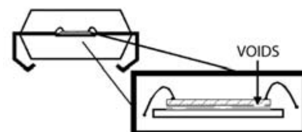
Die and die path tilt after encapsulation



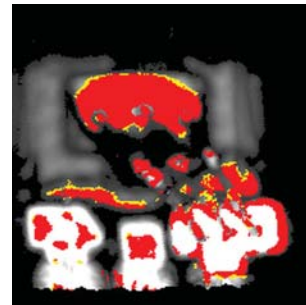


The B-scan image shows popcorn cracks eminating from the die pad edges





Die attach voids in the solder of the die attach



The area in red indicates delamination at the mould compound to die interface in a power MOSFET after 3,000 power cycles.

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