

Metal Ball Grid Arrays

Application Overview:

Like plastic ball grid array devices, SAM inspection of metal BGAs is also very common. The metal lid may make penetrating the device with X-rays more difficult, however assists in getting high resolution images with SAM systems. Lid seal integrity, die attach and lead finger bond quality are the more common inspection performed.

Package Types:

SuperBGA™, TEBGA™, TBGA™, MBGA™, TapeBGA, FPBGA™

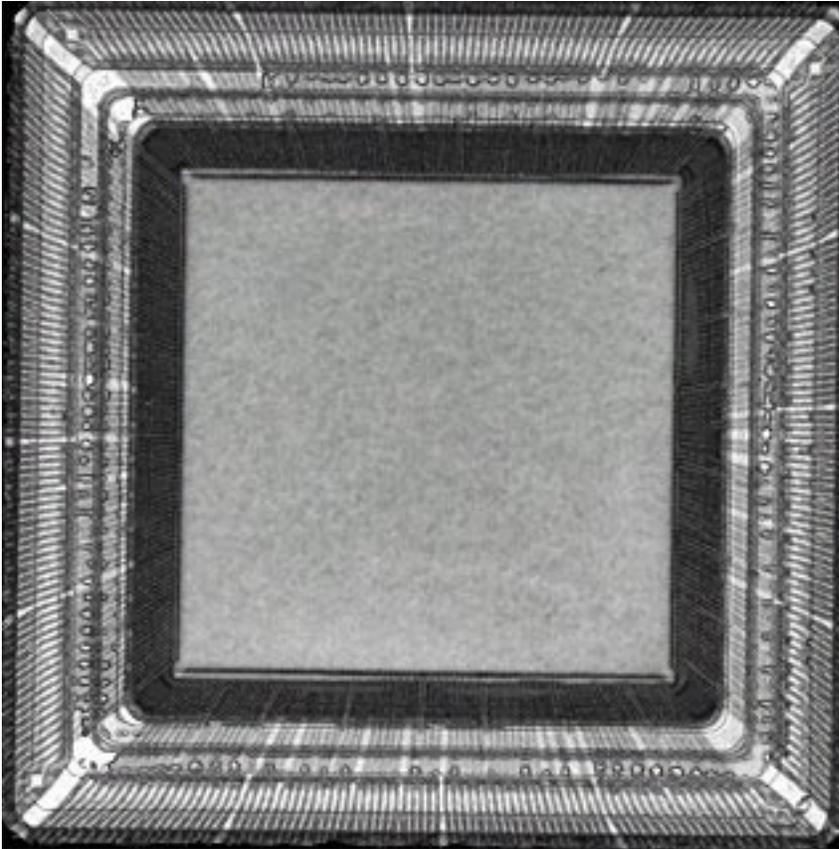
Inspection Standards:

- none -

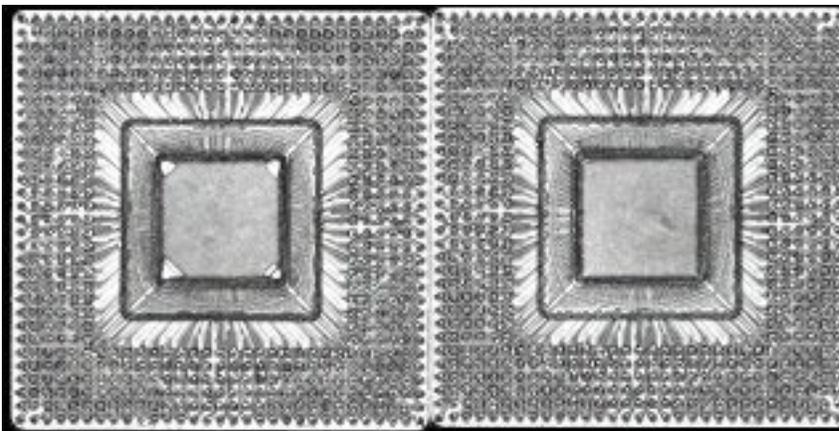
Failure Types Commonly Detected:

- Non-bonded interfaces
- Die tilt or cupping
- Porous die attach
- Die cracks
- Delaminations
- Lack or insufficient die attach
- Molding compound voids
- Package cracks
- Solder mask or “lead finger” disbonding
- Delamination within the substrate
- Encapsulant material characterization

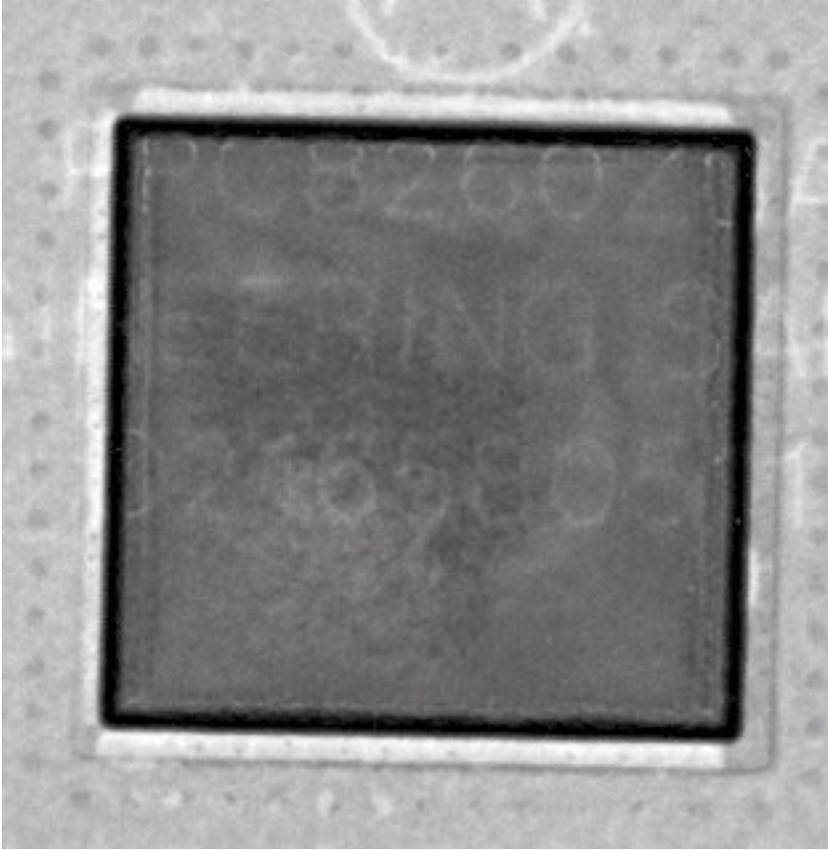
Images:



This is a pulse-echo (reflected) mode image of the encapsulant or back side of a metal BGA package. A 75MHz 6mm focal length transducer was used to create this image. This image displays information regarding the bond quality of the die top and lead finger interfaces. Disbonds between the encapsulant and lead finger areas can be seen. Disbonding in the lead finger area could likely prevent the bond wires from making a proper connection. Not only could infant electrical failure occur, but long term reliability could be impacted as thermal stresses cause the defects to grow.



This is a pulse-echo (reflected) mode image also of the encapsulant or back side of a metal BGA package. A 75MHz 12mm focal length transducer was used to create this image. This image displays information regarding the bond quality of the die top and lead finger interfaces. Bright white areas representing disbonds between the encapsulant and die can be seen. Disbonding on the top of the die will cause the bond wires to not make an adequate electrical connection. Disbonding, noted by the yellow arrow, can also be found between the die attach and heat sink. This disbonding was likely caused by an insufficient amount of attach material, however, improper force in attaching the heat sink could also be a cause.



This is a pulse-echo (reflected) mode image of the top side of a metal BGA package. A 75MHz 12mm focal length transducer was used to create this image. This image displays information regarding the metal heat sink attach quality. Bright white area representing disbonds between the encapsulant and lead finger areas can be seen. Disbonding in the lead finger area could likely prevent the bond wires from making a proper connection.