MISTRAS
A World of NDT Solutions
Products & Systems Division

Application Brief

Bond Analysis Using UltraWin C-Scan

Current Condition

High power semiconductors require large efficient heat sinks in order to operate reliably and as designed. The heat sink pictured below is a composition of a heat conductive copper face (mates to the semiconductor) and lightweight aluminum vanes. These two materials are bonded together during manufacturing in a soldering process.

A poor bond will cause insufficient thermal coupling resulting in uneven and greatly reduced heat dissipation. Inspection of this type of fabricated part has typically been either a go/no-go "tap" test, subject to significant human interpretation, or fully destructive testing of a very small representative sample of parts. Neither of these existing testing techniques is reliable enough and both have significant cost penalties for the manufacturer.

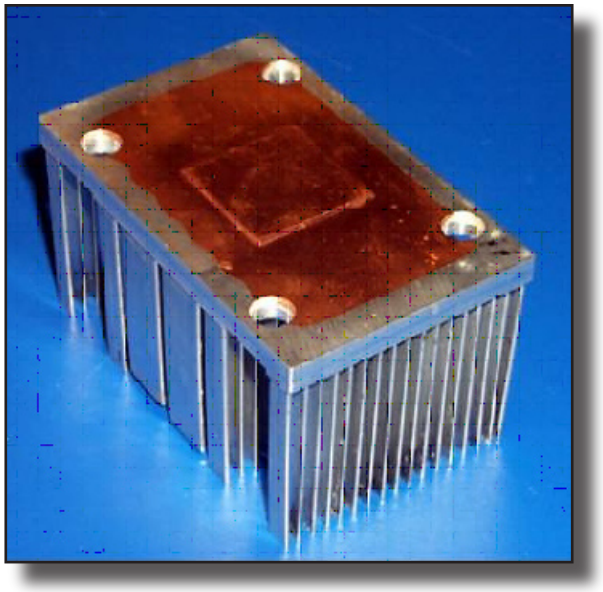

Figure 1: Bi-metallic bonded heat sink

Solution

MISTRAS Products & Systems UltraPAC line of Ultrasonic immersion inspection systems provides an automated, programmable, ultrasonic inspection solution that supplies a 100% scanned image of the internal bonding condition of bi-metallic parts such as the heat sink pictured. With a wide selection of NDT Automation produced Ultrasonic boards and system performance capabilities, we can provide the specific configuration needed for the on-line, nondestructive inspection of a variety of bonded structures.

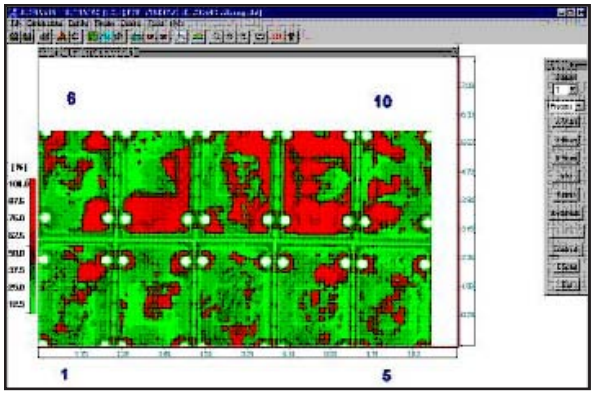

Figure 2: C-Scan image showing bonded (Green) and disbonded (Red) areas

The C-Scan shown in Figure 2 illustrates areas of disbond in 10 samples as high amplitude reflections from the bond line (shown in red). Green areas show a proper solder bond that reflects a low amplitude ultrasonic signal. The scanning resolution used for this image was 0.020 inches (0.5 mm). emissivity and reflectivity. Depending on the magnitude of these quantities, the need for applying a coat of non-reflective paint might be necessary. saving solutions to your challenging inspection needs.

MISTRAS Products & Systems division, is a team of skilled researchers, engineers, technicians and manufacturing personnel dedicated to the development on practical and cost saving solutions to your challenging inspection needs.

For a demonstration or additional information, please contact our Princeton Junction headquarters at 609-716-4000.

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