The information you need...when you need it ®

FLOW CHART for FAILURE ANALYSIS SERVICES

1. **External Microscopic Examination**

   Optical Microscopy & Scanning Electron Microscopy

   - Electrical leakage due to contamination between leads
   - Fractures in package seam
   - High depth of field imaging
   - Identifying elemental constituents of contamination

2. **Radiography (X-ray) Examination**

   - Viewing device construction prior to de-encapsulation
   - Viewing wire bond integrity
   - Viewing die placement

3. **Electrical Failure Verification**

   Functional & Pin-to-Pin Curve Tracing

   - Verify operation of device
   - Test device to specification
   - Characterize a device
   - Compare to known good device

4. **High Temperature Bake (biased/unbiased)**

   - Identify the presence of mobile ions

5. **De-lid/De-encapsulate**

   Mechanical and/or Chemical

6. **Cross-sectioning**

   Abrasive Disk

   - Package construction
   - Bond wires and die attach
   - Plating thickness and uniformity
   - Junction depths

7. **Internal Microscopic Examination**

   Optical Microscopy & Scanning Electron Microscopy

   - Metallization/Oxide defects
   - Contamination and/or corrosion

8. **Electrical Probing**

   - Localize electrical faults at die level

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9. Voltage Contract Imaging in SEM

- Visualize voltage levels in a semiconductor
- Locate opens, shorts or hot spots

10. Electron Beam Induced Current (EBIC) Imaging in the SEM

- Visual examination of current flow in a semiconductor
- Locate opens or shorts

11. Liquid Crystal Fault Detection

- Thermal characteristic of a semiconductor surface

12. Bond Strength Pull Test

- Verify bond integrity

13. Angle Lapping & Staining

- View semiconductor junctions

14. Metallization Removal

15. Oxide Removal

Chemical
Plasma Etch

16. Other Analytical Techniques

Scanning Auger Microscopy (SAM)

- Corrosion analysis
- Stain identification
- Lifted lead bond evaluation
- Material delamination analysis
- Metal embrittlement evaluation

Secondary Ion Mass Spectrometry (SIMS)

- Location of low level ionic contamination
- Inversion studies
- Doping level investigation

Fourier Transform Infrared Spectroscopy (FTIR)

- Identification of contaminants on micro electronic packages and devices
- Identification of organic stains
- Identification of contaminants in process fluids
- Inspecting for component chemical degradation or decomposition

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