Decapsulation Analysis Case

DMP3098L-7 Chip Analysis

I. Basic Sample Information

Chip Model: DMP3098L-7 (N-channel MOSFET)
Failure Symptom: Abnormal circuit function, drain-to-source short circuit

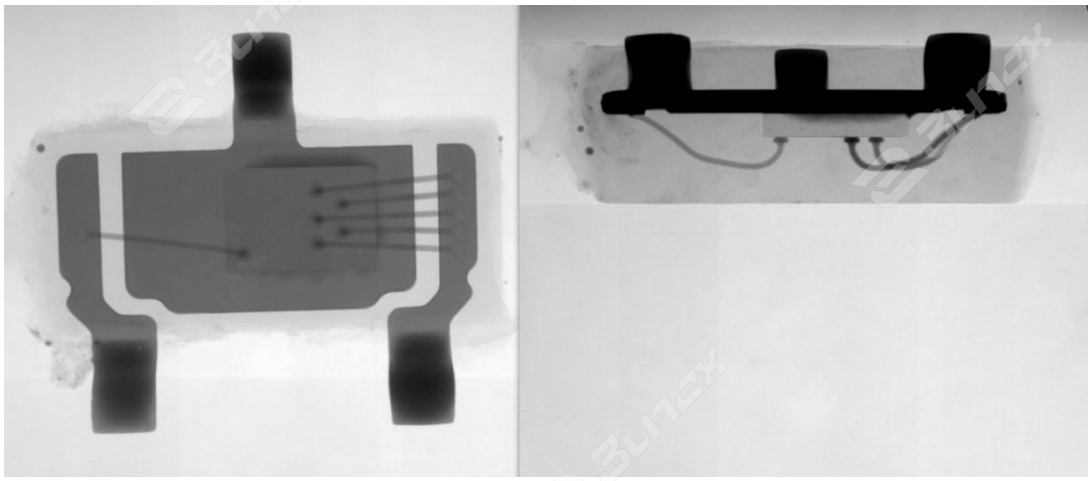
II. Cross-Sectional Inspection Process and Observation Records

a）Visual Inspection

Visual inspection revealed no obvious abnormalities on the sample surface.



b）Non-Destructive Inspection Stage

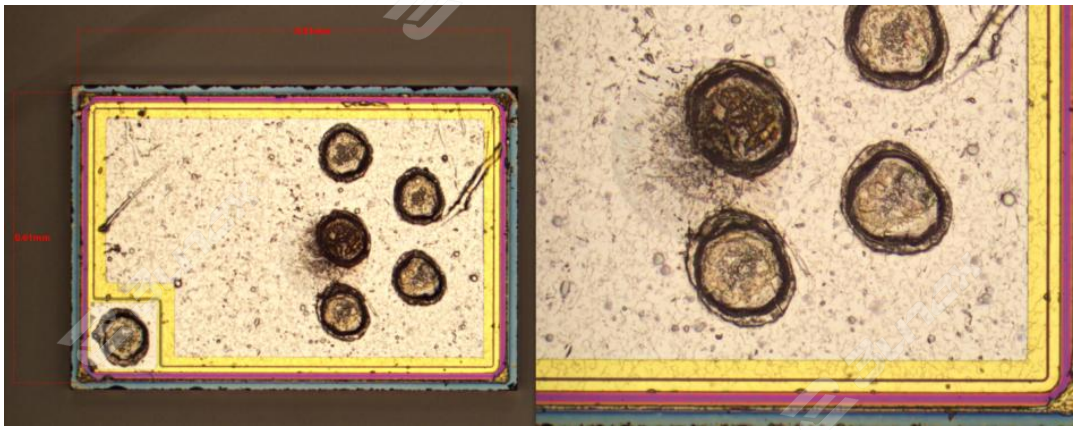


X-ray imaging: No signs of die breakdown were observed; the bonding wires were cle arly intact, and no carbonization was found in the molding compound.

c）Decapsulation Process

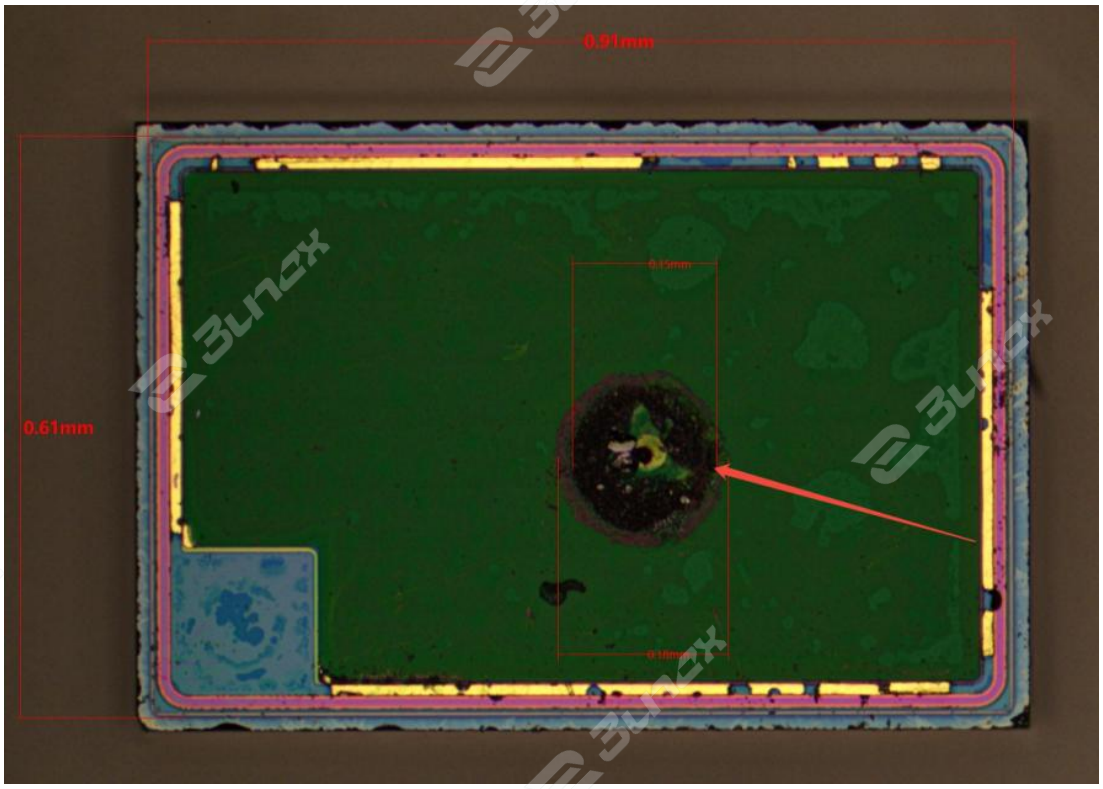
Method: Dual-acid decapsulator (duration: 230s, temperature: 45°C)

Observation: After removing the molding compound, no obvious breakdown marks were observed on the die surface. A circular shadow was only found near the bonding pad area of the source (S) terminal.



d）Dielectric Layer Removal Analysis

Procedure: After removing the metal layer by sulfuric acid heating, clear breakdown marks were revealed



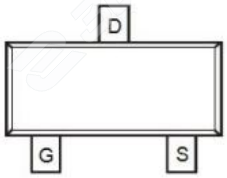
A breakdown crater with a diameter of 150 μm was found at the fourth TM layer (middle position of the source terminal).

III. Failure Deduction

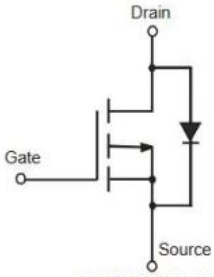
Root cause analysis of EOS breakdown at the TM layer:



Top View



Pin Configuration



EQUIVALENT CIRCUIT

Applied stress: The operating voltage approached the BVdss limit (measured transient peak of 29.7 V for a 30 V device).