X-RAY Inspection Case

Chip Bubble Defect Inspection Report

Applicable Standard:MIL-STD-883-2Y2019
Inspection Date:2025-04-23
Inspected Model:PMEG060V100EPDZ

1.Inspection Purpose

To verify internal bubble defects caused by soldering or encapsulation material issues during the chip packaging process, and to assess whether the device meets the reliabili ty requirements for electronic components as specified in the MIL-STD-883-2Y2019 standard.

2.Inspection Equipment and Parameters

Equipment Model: HT100L X-RAY Non-Destructive Inspection System

Working Principle:X-rays penetrate the die, and imaging is performed based on the de nsity differences of various materials to detect internal bubbles and other defects.

3.Inspection Process and Results

a）Visual Inspection

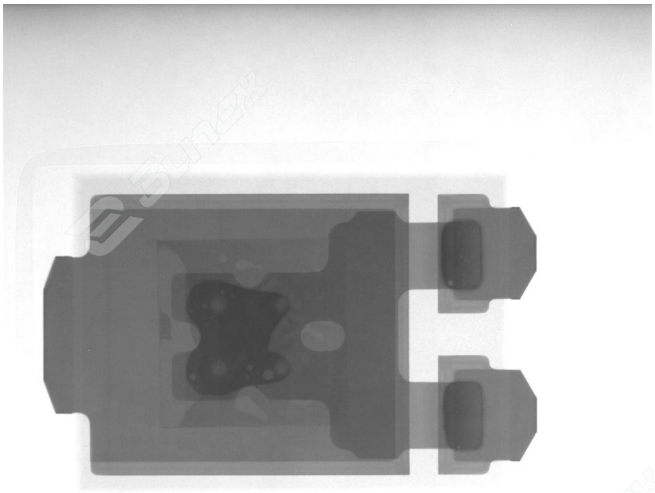
Surface condition: No damage or cracks were observed on the chip package surface.



b）X-Ray Inspection

Bubble distribution:X-ray imaging revealed multiple bubble regions inside the die, with a cumulative area percentage exceeding 10%.

Penetrating defects: Bubbles were distributed vertically through the die, penetrating from one side to the other. This does not meet the standard requirement that “ the area of any single bubble shall not exceed 10% and there shall be no bubbles penetrating the die.”.



Typical defect characteristics:

Location: Concentrated at the die edge area

Size: Individual bubble diameter exceeds 10% of the area.

4.Failure Analysis and Standard Comparison

a）Failure Mode Determination

Process defect: Bubbles were formed due to trapped gas during soldering or insufficie nt curing of the molding compound.

Risk level: According to MIL-STD-883-2Y2019 (3.10.2.2), penetrating bubbles are cl assified as a “ Critical Defect,” which may lead to reduced mechanical strength, ther mal conduction failure, and circuit open.

5.Conclusion

The current batch of chips does not conform to the requirements of MIL-STD-883-2Y 2019 due to internal bubble area exceeding the 10% limit and the presence of penetrat ing defects. It is recommended that these chips be scrapped and that the process steps be traced.