

Failure Analysis Report 241314

Customer: SHANGHAI HENTE ELECTRONIC TECH
 ADI Part Number: ADSP-21571CSWZ-4
 Report Date: 13-Dec-2022

Use Team Approach

Member Type	Name
CQE / ADI Contact	Austin Wu
FA Analyst	Delvin Duncan

Describe the Problem

Customer Failure Site:	Shanghai	Customer Contact Name:	Xuefei Gong
Customer Point of Failure:	Field	Customer Contact Phone:	8613512174402
Customer Part Number:	SF0198	Quantity Returned:	1
Customer Ref Number:	N/A	Failure Analysis Location:	ADWL
Customer Fail Date:	Not Provided	Sample Receipt Date:	09-Nov-2022
Notification Date:	07-Nov-2022	ADI Generic Part Number:	ADSP-21571

Customer Description of Failure:

Shanghai Hente Electronic submitted one ADSP-21571 device with date 2214 for failure analysis. See "Summary of Failure Analysis Results" table below the unit reported failure mode.

Failure Analysis Conclusions

The unit was confirmed a valid ADSP-21571 electrical failure during ATE testing. Test result show the unit's failure stemmed from a downgrade in its SPI performance. However, no anomaly was found during subsequent analysis. As a result, the root cause of failure was not determined.

Summary of Failure Analysis Results

Optical and 2D-Xray inspections found no anomaly. Curve trace analysis showed no anomaly.

The unit was electrically tested (@-40°C and 133°C) using an Automated tester together with the ADSP-21571 production program. Results show the unit failed for "SPI Boot" parameters. Attempts to further isolate the failure via Die inspection and Light emissions were unsuccessful, as no anomaly was found.

Serial Number	Assembly Lot ID	Date Code	Customer Problem Description	Failure Verified	Failure Verification Date	Failure Mechanism
1	5734149.1	2214	The loudspeaker does not output when the car is driving for 100km	Yes	11-Nov-2022	Fmech undetermined

Failure Analysis Procedure and Observations**1. External Visual Inspection**

The external condition of the unit was inspected using a stereo microscope. No anomaly found.



Figure 1: Images showing the units as it was received for analysis.

2. X-ray Analysis

X-Ray inspection was performed to non-destructively examine the unit for gross internal anomalies. No anomaly found.

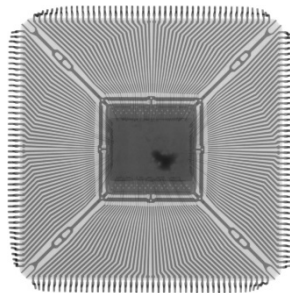


Figure 2: Xray image showing no manufacturing defects.

3. Reconditioning of Leads

The leads of the unit were cleaned and reconditioned to allow for proper socket contact during electrical testing.

4. External Visual Inspection (Post Leads Reconditioning)

The external condition of the unit was reinspected using a stereo microscope.

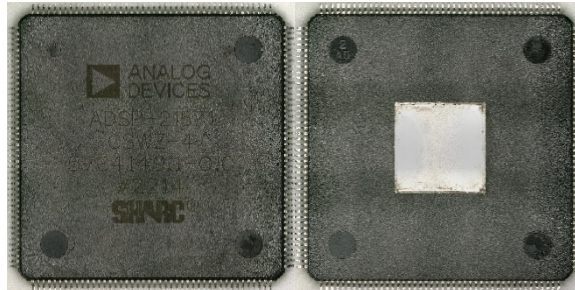


Figure 3: Post reconditioned images

5. ATE

The unit was electrically tested on the Automatic Test Equipment (ATE) using the ADSP-21571 standard production test program. Results showed the unit failed “SPI Boot” related test parameters.

6. Curve Trace

The current and voltage characteristics of the unit were examined using an automated curve trace. No anomaly was found.

7. Laser Decapsulation

The laser decapsulation tool was used to create a cavity in preparation for further decapsulation.

8. Chemical Decapsulation

The unit was decapsulated using chemical techniques to expose the die.

9. Optical Inspection

The unit was inspected using an optical microscope with different illuminations (brightfield, darkfield, Nomarski) to determine the presence of any anomaly. No anomaly found.

10. LEM

Emission Microscopy enables the location of sublayer defects through detection of faint light levels emitted from silicon device structures. These faint light levels arise from recombinant radiation emitted from p-n junctions and from oxides. Photon emission analysis was performed on the returned unit to further isolate the location of the suspected defect, while biasing the unit. No anomaly found.