

GODDARD SPACE FLIGHT CENTER

Test Lab Report Summary

<i>Report Number:</i>	Q10149DPA	<i>Project:</i>	SWIFT
<i>Part Type:</i>	Microcircuit	<i>System:</i>	BAT
<i>Part Number:</i>	AD7564ARS-B	<i>Initiated Date:</i>	05/01/2001
<i>Date Code:</i>	9950	<i>Report Date:</i>	09/04/2001
<i>Manufacturer:</i>	ANALOG DEVICES	<i>Investigator:</i>	C. Greenwell (562)
<i>Generic Number:</i>	AD7564	<i>Requester:</i>	B. Meinhold (562)
<i>Purchase Spec:</i>	Commercial	<i>Approval / Date:</i>	

Step 1: INCOMING INSPECTION

<u>Test</u>	<u>Quantity</u>	<u>Passed</u>	<u>Failed</u>
External Visual	N/A	N/A	N/A
PIND Condition A	N/A	N/A	N/A

Step 2: DESTRUCTIVE PHYSICAL ANALYSIS

Destructive Physical Analysis (DPA) was conducted per GSFC document “Plastic Encapsulated Microcircuit (PEM) Guidelines for Screening and Qualification for Space Applications”, except that cross-section was done without dye penetrant and glassivation integrity testing was not performed.

The devices do not meet the criteria for metallization step coverage per MIL-STD-883, Method 2018.

17. SEM examination revealed what appeared to be rejectable metallization step coverage at contact vias (see Figures 15 and 16). Cross-section examination of SN’s 1 and 2 confirmed these suspicions and revealed a typical thinning at the steps of approximately 60% from the nominal metallization thickness (see Figure 17).

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Part Type: Microcircuit
 Manufacturer: ANALOG DEVICES

Part No: AD7564ARS-B
 Date Code: 9950

Summary of Analysis:

	<i>Serial Number</i>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<i>External Examination</i>						
1. Markings - legibility and correctness _____		A	A	A	A	A
2. Integrity of package seals _____		N/A	N/A	N/A	N/A	N/A
3. Condition of external leads and plating _____		A	A	A	A	A
4. Overall package condition _____		A	A	A	A	A
<i>Radiographic Examination</i>						
5. Die bonding material and die alignment _____		A	A	A	A	A
6. Package seal integrity _____		N/A	N/A	N/A	N/A	N/A
7. Presence of foreign material _____		A	A	A	A	A
8. Lead dress (if revealed) _____		A	A	A	A	A
<i>Acoustic Microscopy Inspection</i>						
9. Condition of material interfaces (delaminations) _____		A	A	A	A	A
10. Condition of molding material (voids, cracks) _____		A	A	A	A	A
<i>Internal Examination (including cross-section)</i>						
11. Presence of foreign material _____		A	A	A	A	A
12. Mechanical condition of die _____		A	A	A	A	A
13. Wire bonds and lead dress _____		N/P	N/P	A	A	A
14. Die bonding material _____		A	A	A	A	A
15. Condition of die surface _____		N/P	N/P	A	A	A
16. Condition of metallization _____		N/P	N/P	A	A	A
17. SEM Examination _____		U*	U*	U*	U*	U*
<i>Bond Strength</i>						
18. Strength _____		N/P	N/P	A	A	A
19. Metallization adherence _____		N/P	N/P	A	A	A
<i>Die Bond Strength</i>						
20. Strength _____		N/P	N/P	N/P	N/P	N/P

SN's 1 and 2 subjected to cross-sectional examination.

(* = Refer to comments, A = acceptable, U = unacceptable, N/A = not applicable, N/P = not performed)

Appended Photographs:

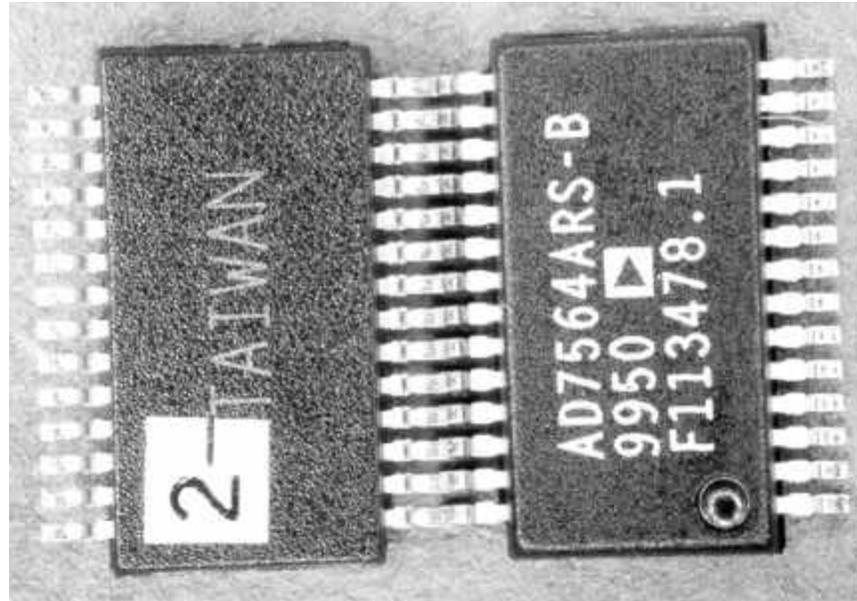


Figure 1. External top and bottom views of the AD7564ARS-B devices. 8X

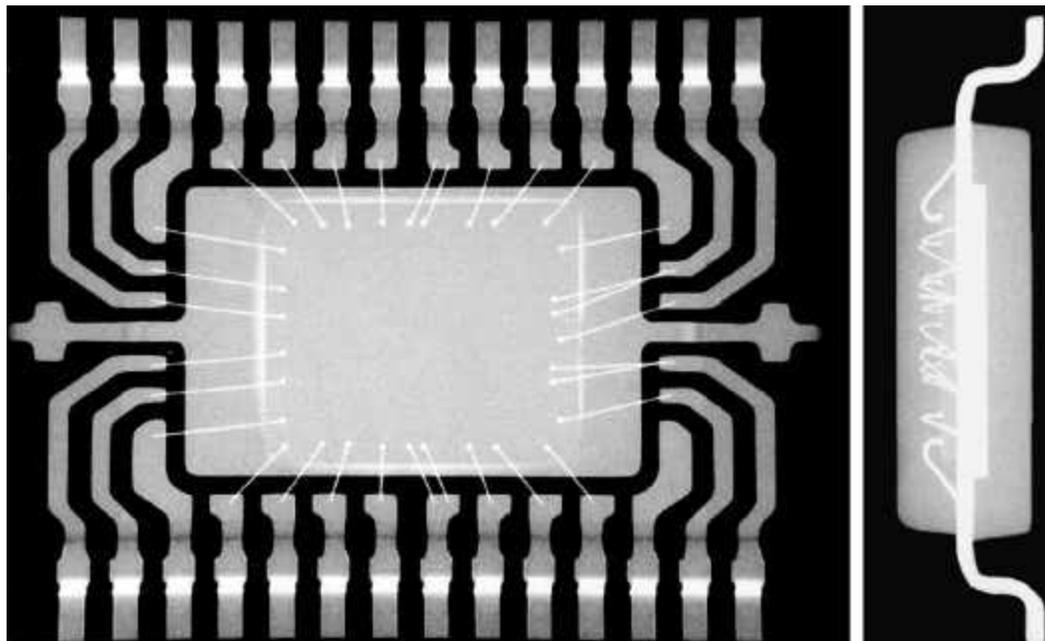


Figure 2. Top and side view radiographic images. 14X

Appended Photographs:

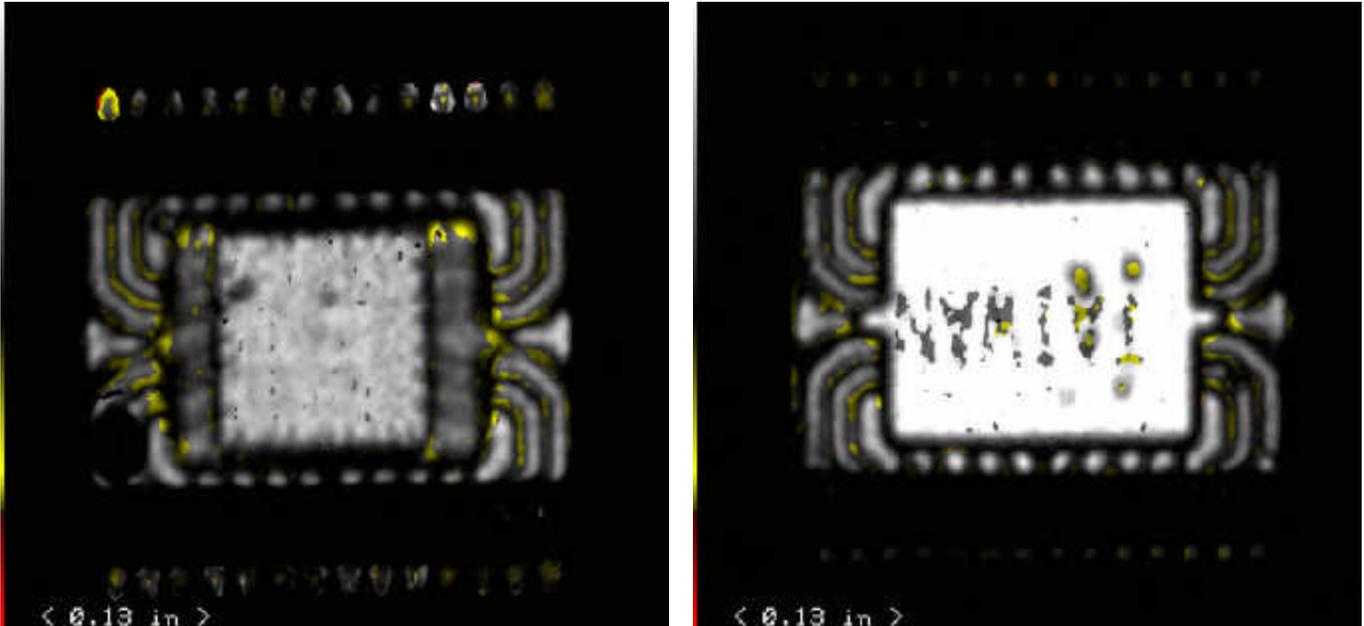


Figure 3. Top (left) and bottom C-SAM images of SN 1.

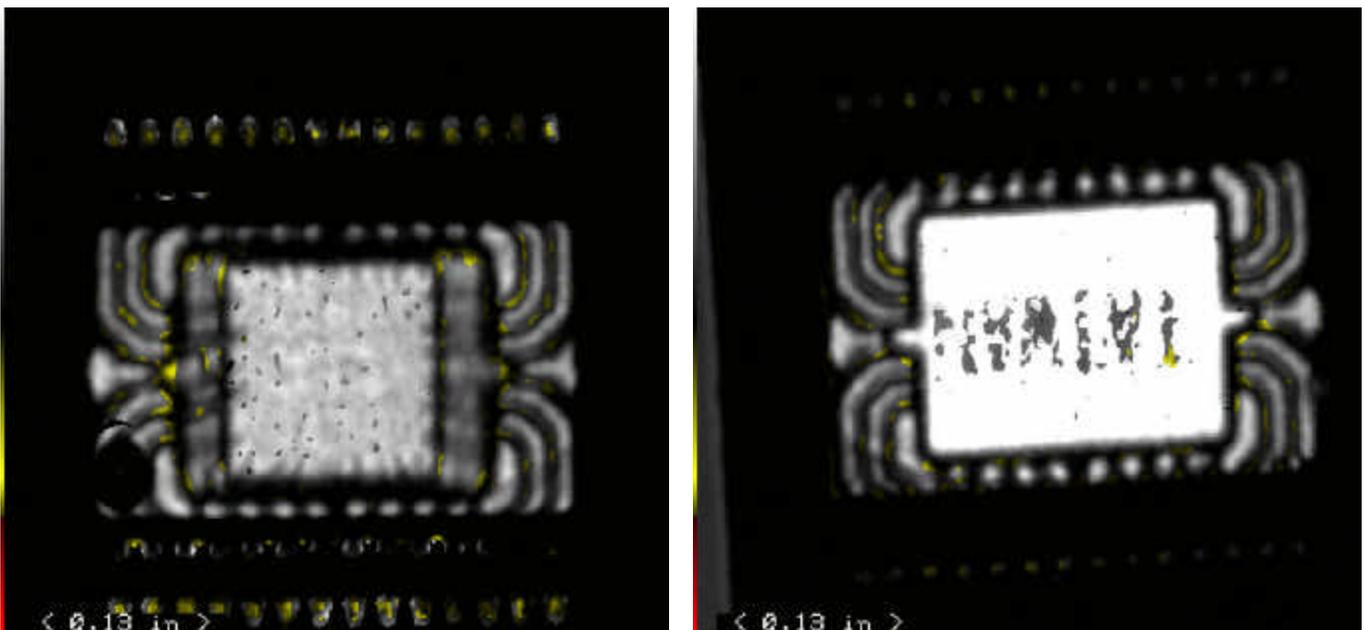


Figure 4. Top (left) and bottom C-SAM images of SN 2.

Appended Photographs:

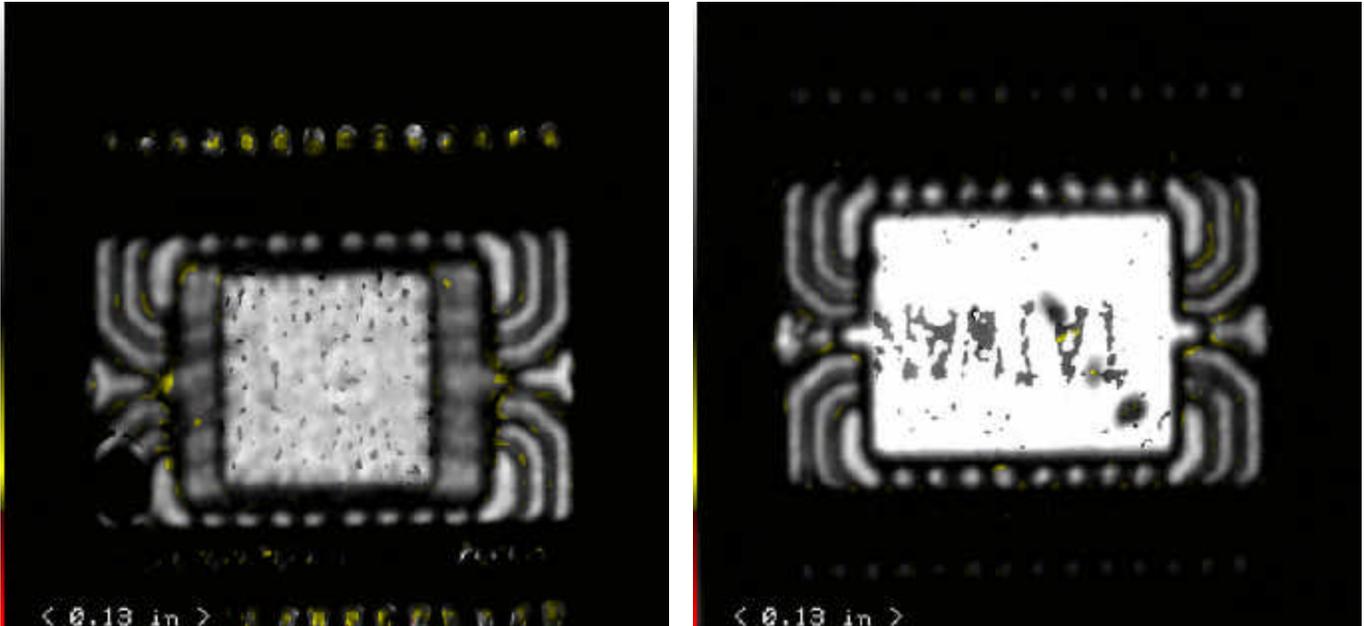


Figure 5. Top (left) and bottom C-SAM images of SN 3.

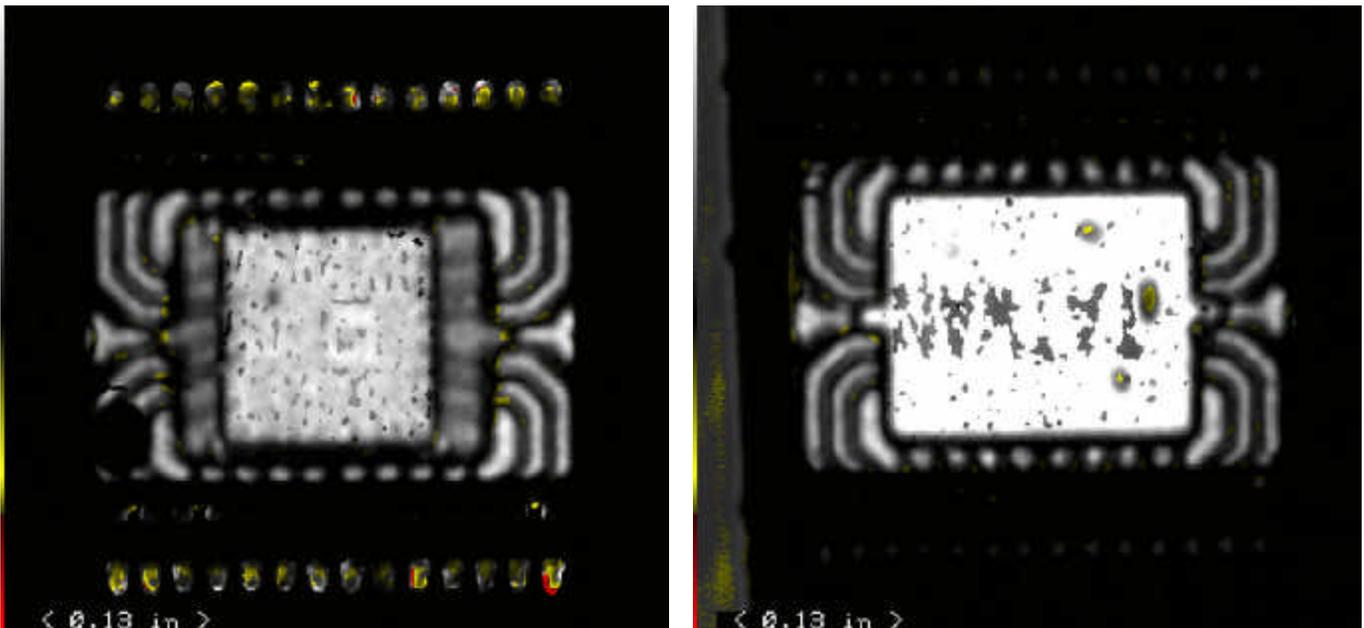


Figure 6. Top (left) and bottom C-SAM images of SN 4.

Appended Photographs:

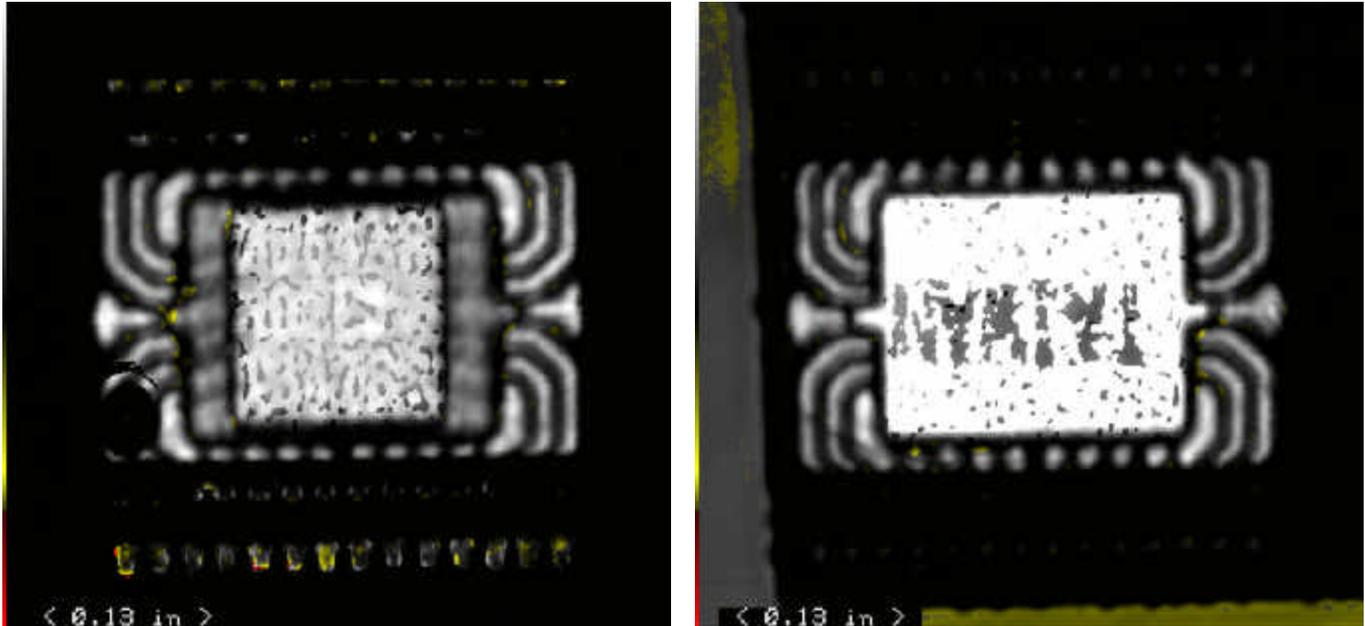


Figure 7. Top (left) and bottom C-SAM images of SN 5.

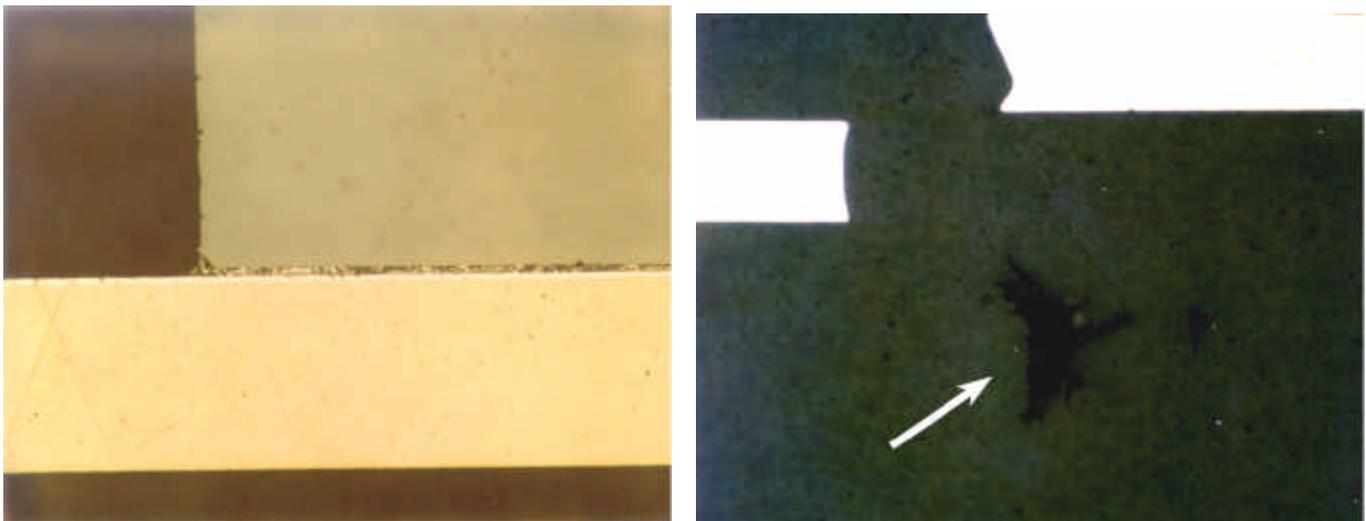


Figure 8. Cross-section images of SN 1. The left image (210X) shows areas of the die attach and interface between the plastic and die paddle. The right image (106X) shows a non-rejectable void in the plastic.

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Microcircuit

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AD7564ARS-B

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ANALOG DEVICES

Date Code:

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Appended Photographs:

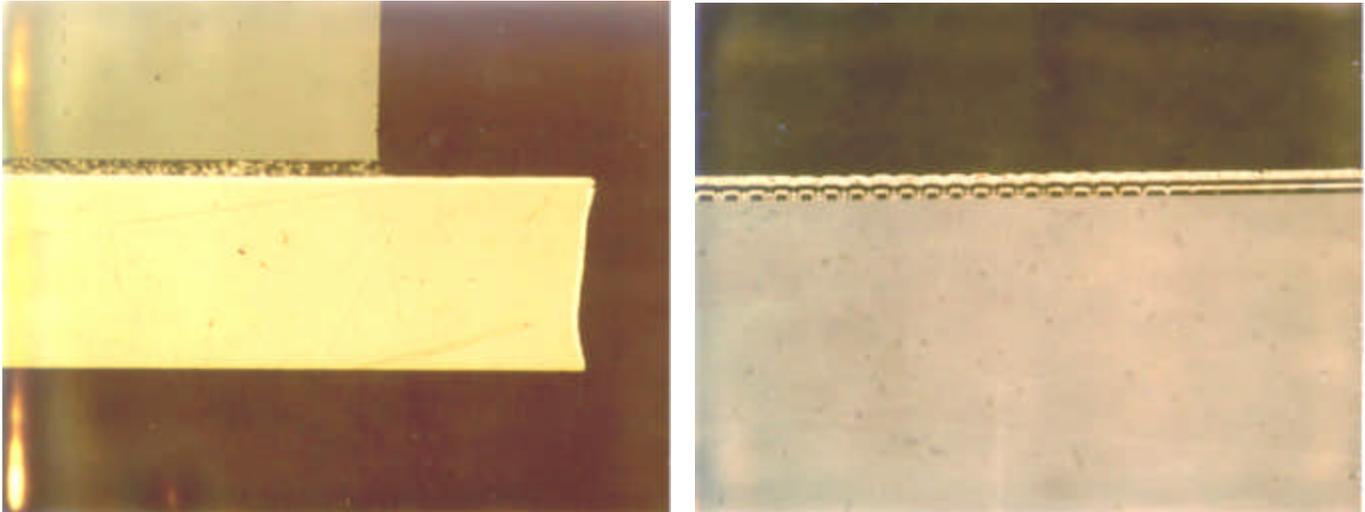


Figure 9. Cross-section images of SN 2. The left image (210X) shows an area of the die and die paddle and the interface between the plastic and these structures. The right image (1070X) shows a row of M1 contact vias on the die. Similar vias were inspected in the SEM and found to exhibit approximately 60% thinning.

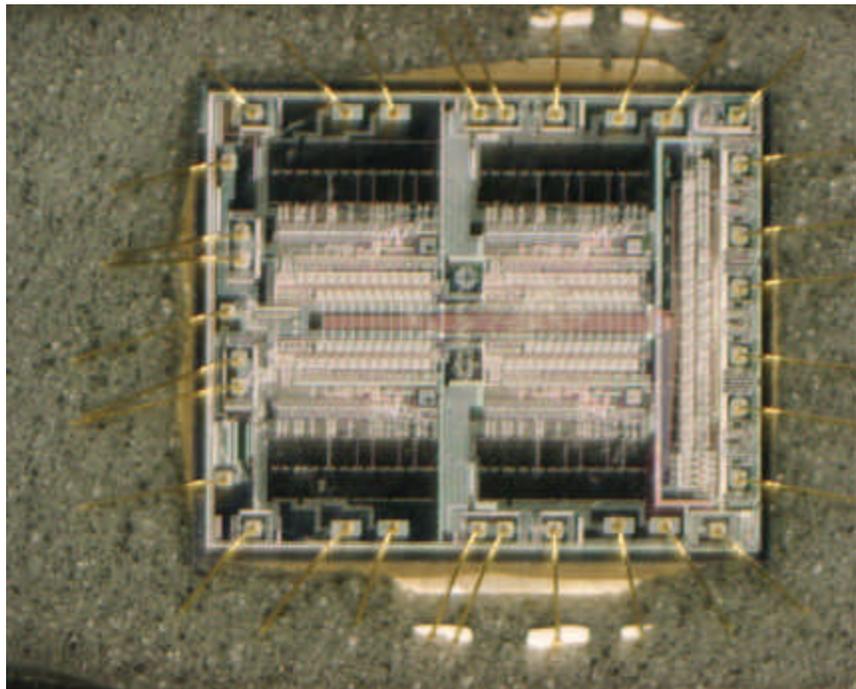


Figure 10. Optical image of SN 4 deprocessed for internal examination.

Appended Photographs:

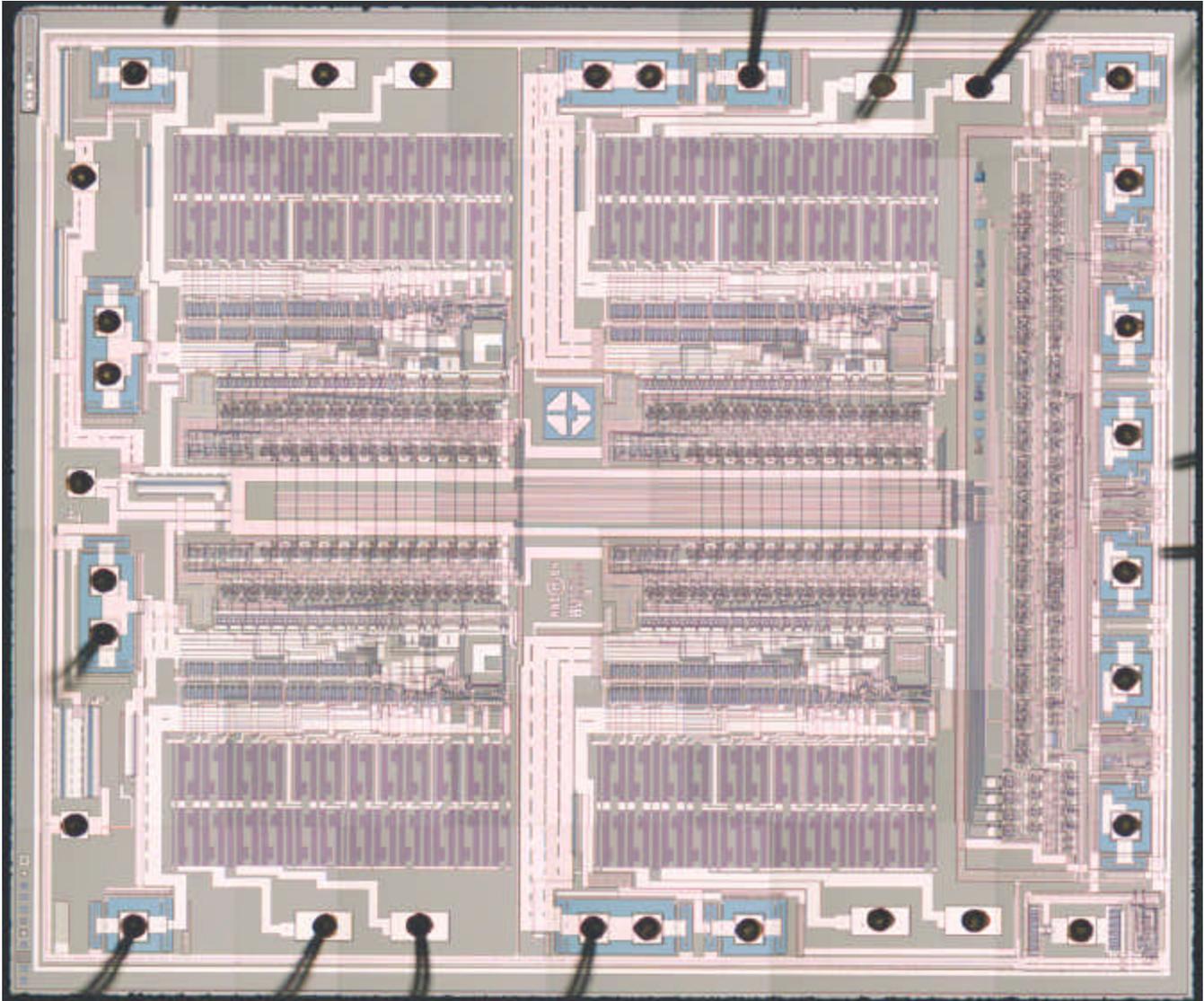


Figure 11. Overall optical micrograph image of SN 5 die. Pin 1 is the center pin along the left edge of the die.

Appended Photographs:

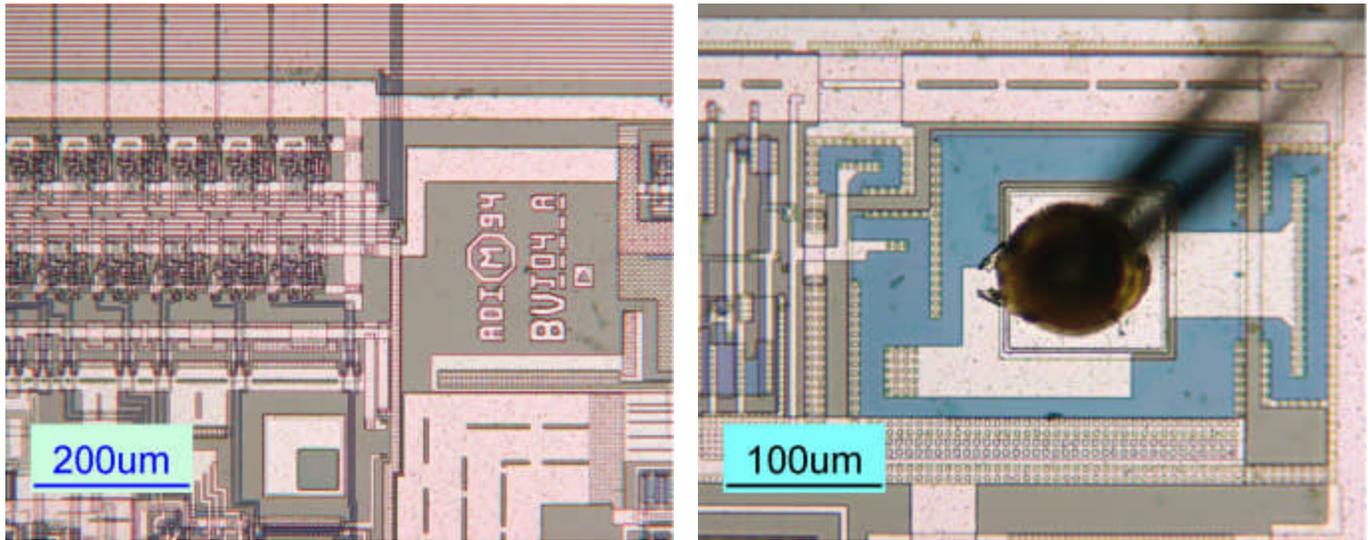


Figure 12. Optical micrograph images show typical features on SN 3 die.

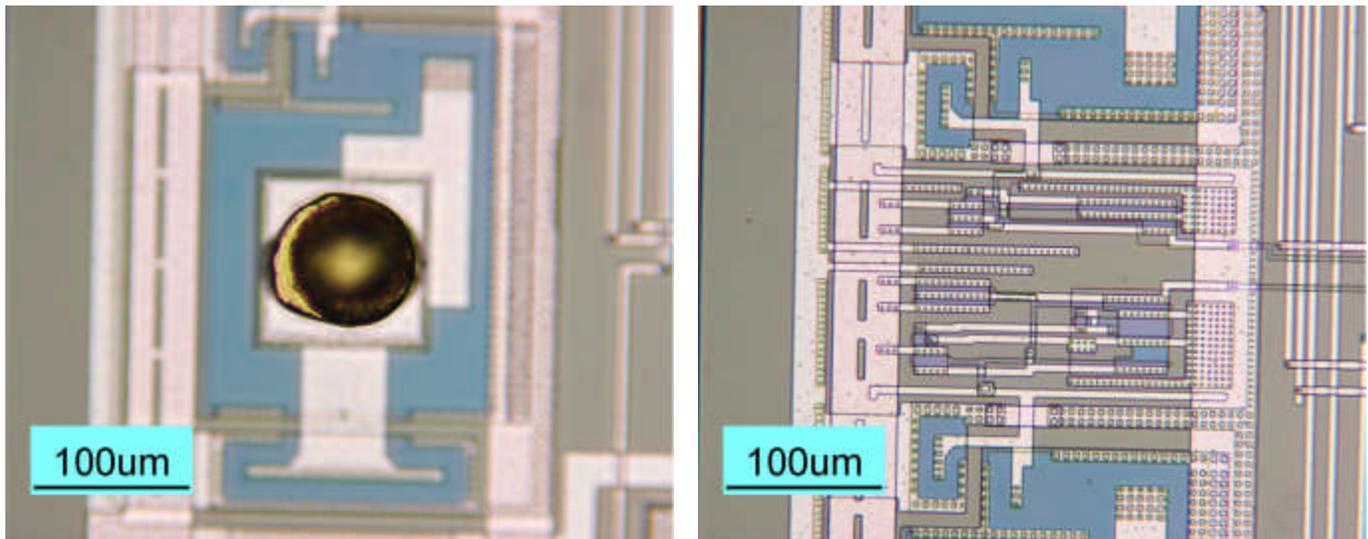


Figure 13. Optical micrograph images of SN 4.

Appended Photographs:

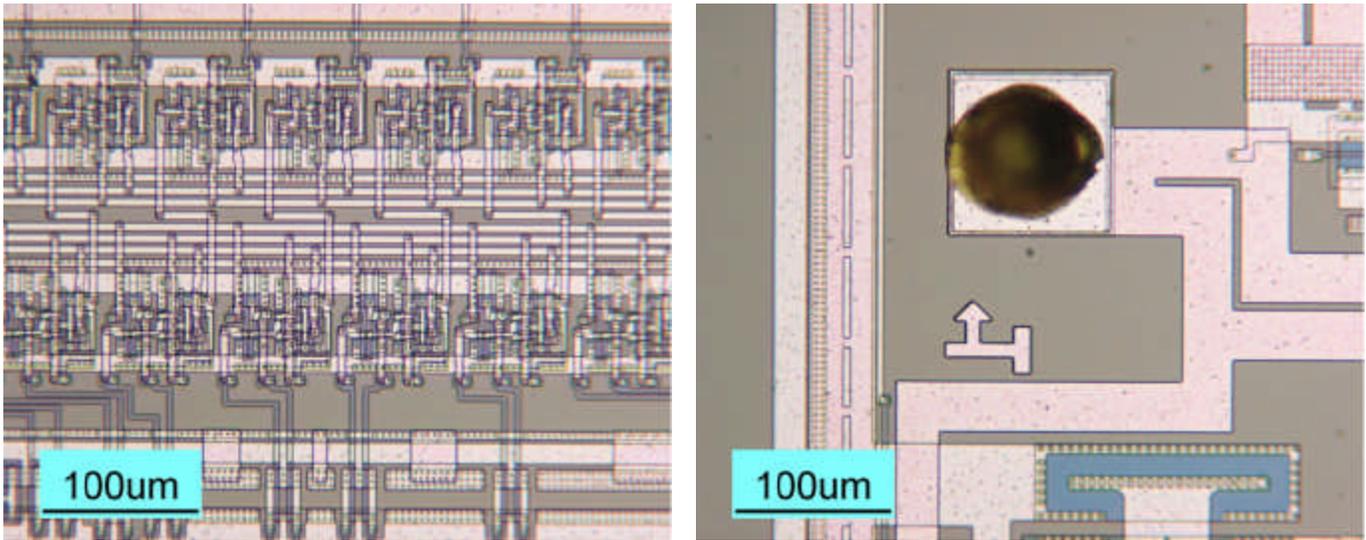


Figure 14. Optical micrograph images of SN 5.

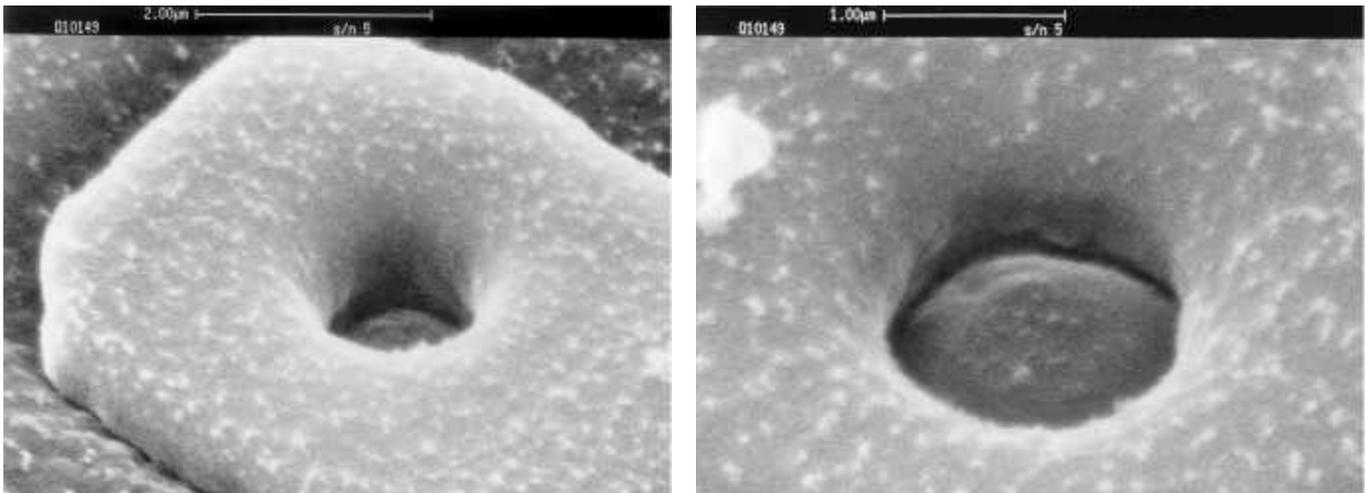


Figure 15. SEM micrographs of SN 5 show suspected rejectable step coverage at vias.

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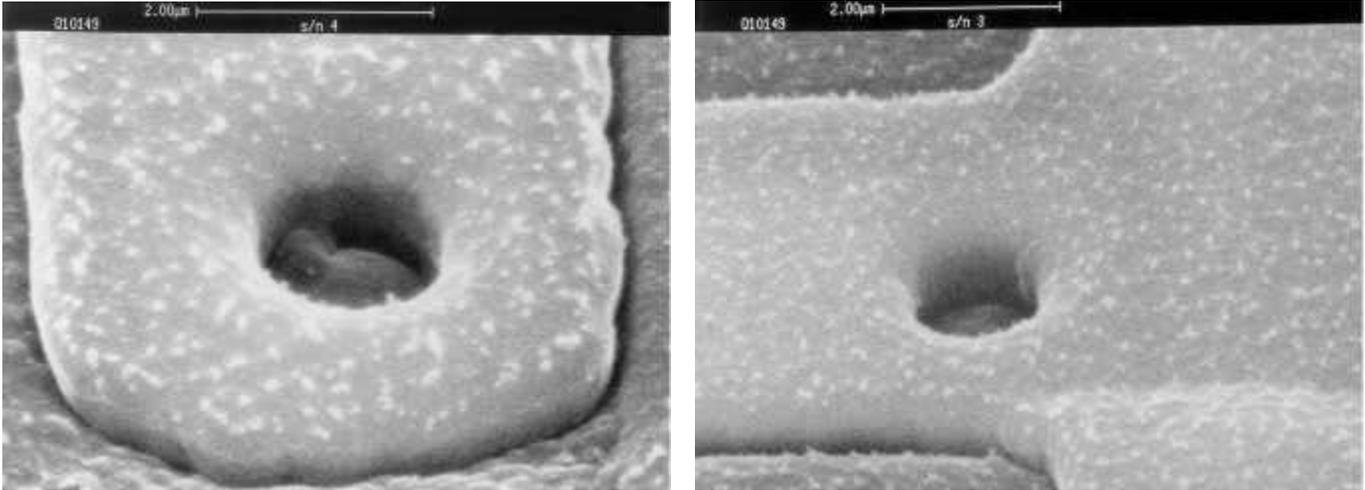


Figure 16. SEM micrographs show similar vias on SN's 4 and 3.

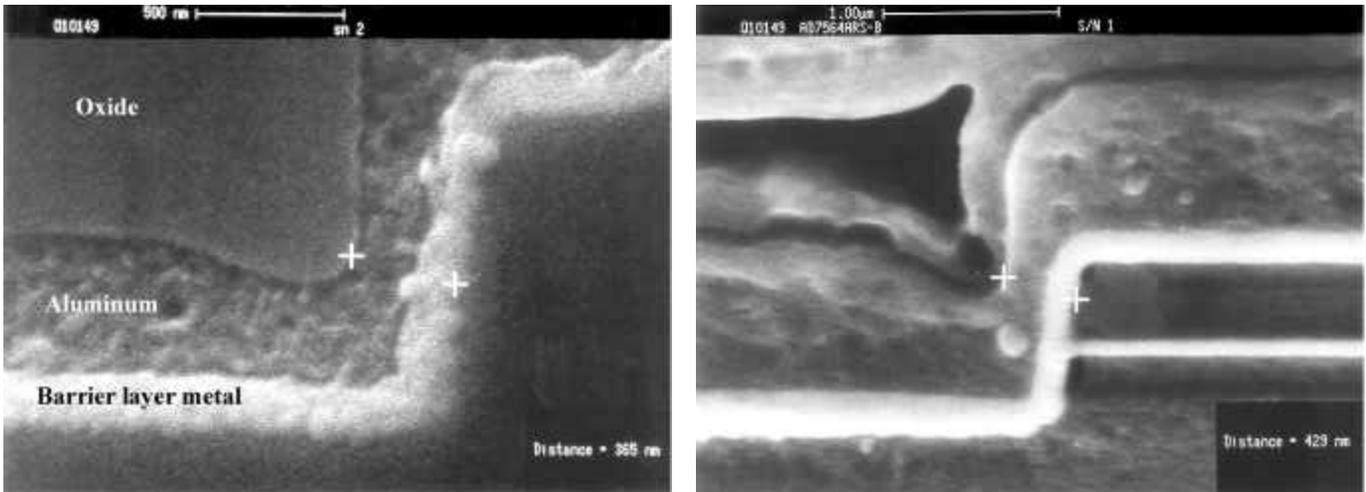


Figure 17. SEM micrographs of cross-sectioned devices SN's 2 and 1 step coverage thinning.