GODDARD SPACE FLIGHT CENTER

Test Lab Report Summary

Report Number:	Q10172DPA	*Project:*	SWIFT
Part Type:	Microcircuit	*System:*	BAT
Part Number:	OP420GS	*Initiated Date:*	05/01/2001
Date Code:	0044	*Report Date:*	08/14/2001
Manufacturer:	Analog Devices	*Investigator:*	C. Greenwell (562)
Generic Number:	OP420	*Requester:*	B. Meinhold (562)
Purchase Spec:	Commercial	*Approval / Date:*	

Step 1: INCOMING INSPECTION

Test	Quantity	Passed	Failed
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.

No rejectable defects or anomalies were observed during this analysis.

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Summary of Analysis:

Serial Number	I5	I7	J3	J5	J7
External Examination					
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
Radiographic Examination					
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
Acoustic Microscopy Inspection					
9. Condition of material interfaces (delaminations)	A	A	A	A	A
10. Condition of molding material (voids, cracks)	A	A	A	A	A
Internal Examination (including cross-section)					
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	N/P	N/P	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	N/P	N/P	A	A	A
Bond Strength					
I5. Strength	N/P	N/P	A	A	A
19. Metallization adherence	N/P	N/P	A	A	A
Die Bond Strength					
20. Strength	N/P	N/P	N/P	N/P	N/P

SN's I5 and I7 subjected to cross-sectional examination.

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

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Appended Photographs:

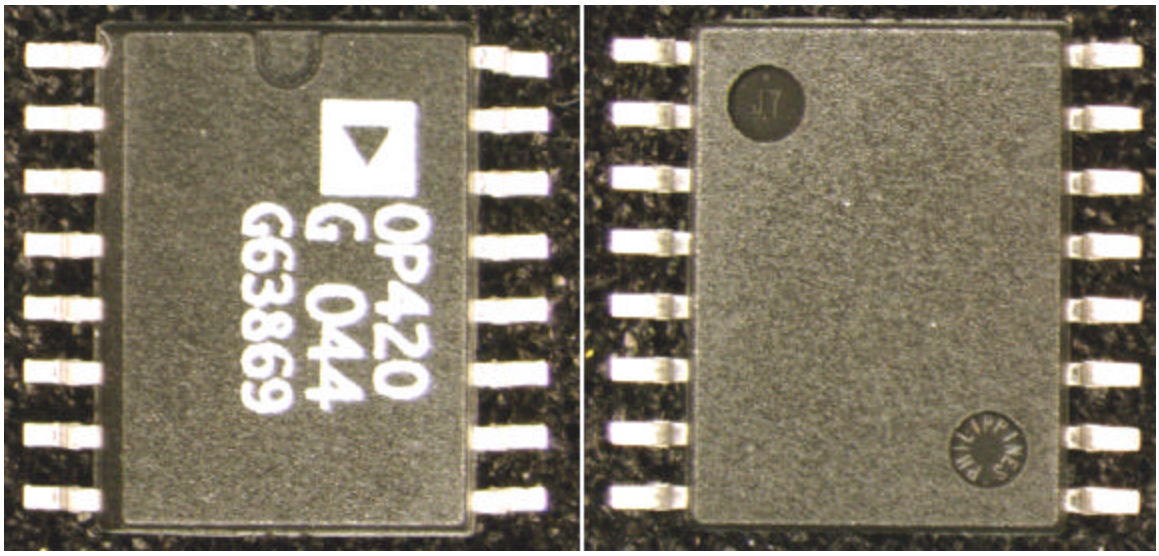

Figure 1. External top and bottom views of the OP420GS devices. Each device had a unique two character alphanumeric code that was used for reference designations during this analysis. 6X

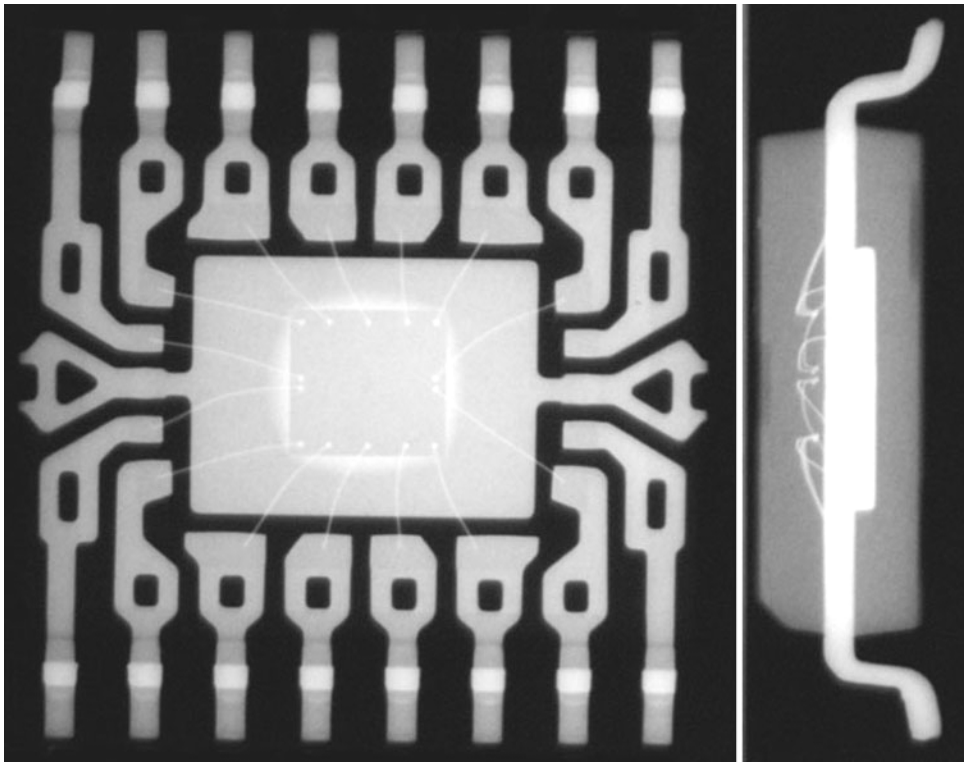

Figure 2. Top and side view radiographic images. 8X

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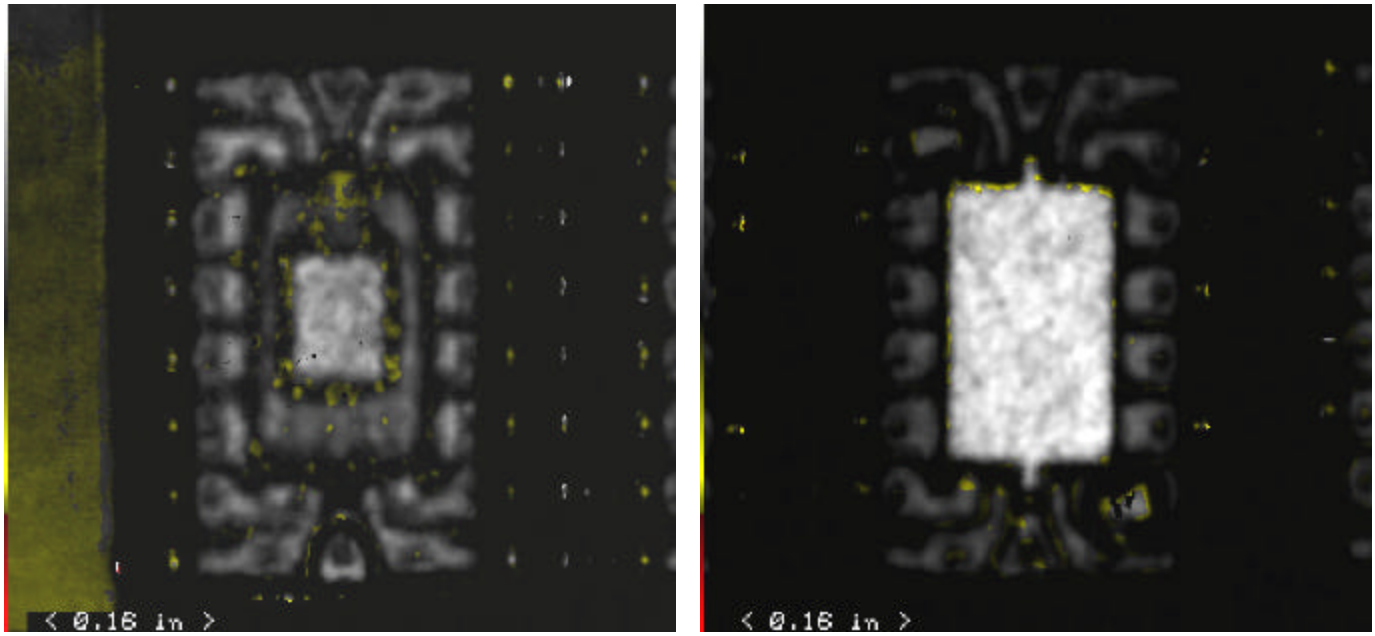

Figure 3. Top (left) and bottom C-SAM images of SN I5.

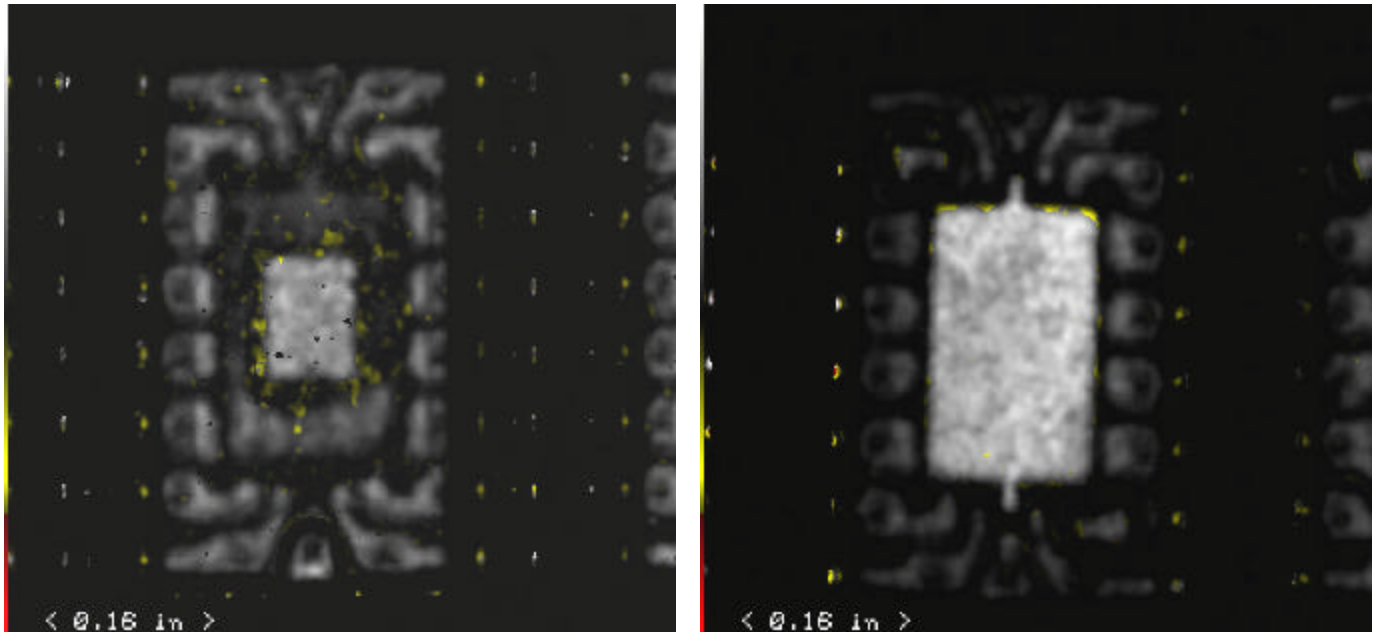

Figure 4. Top (left) and bottom C-SAM images of SN I7.

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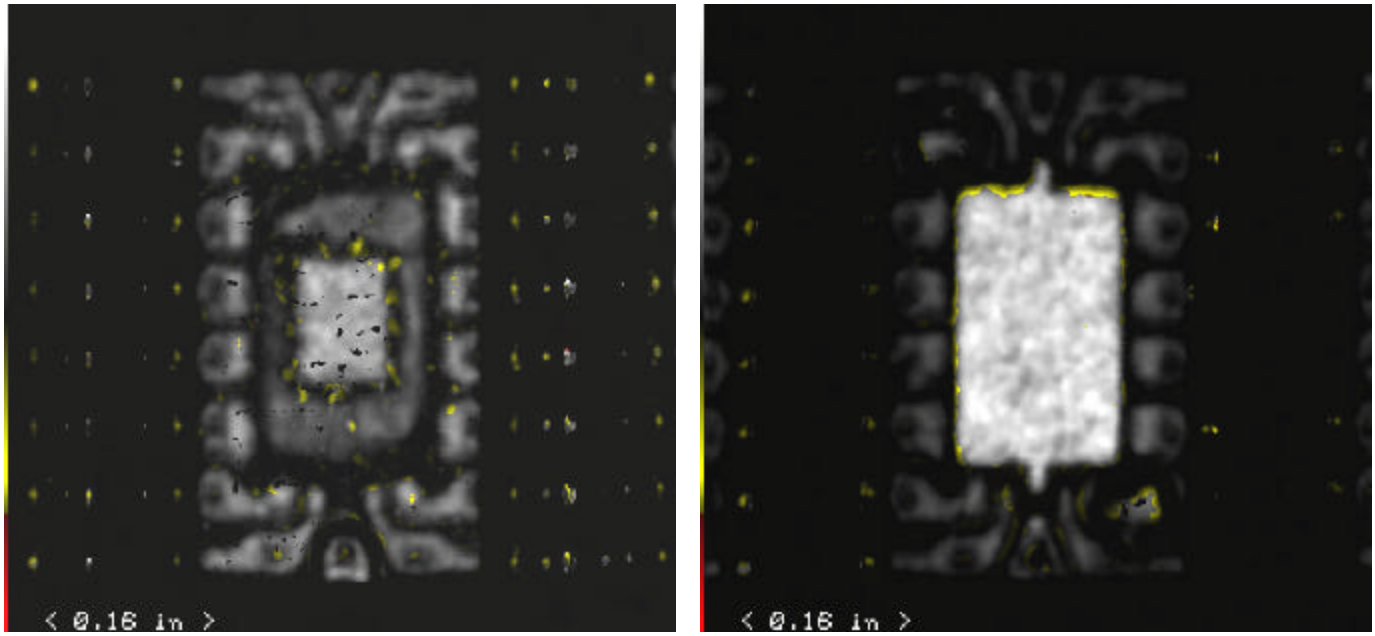

Figure 5. Top (left) and bottom C-SAM images of SN J3.

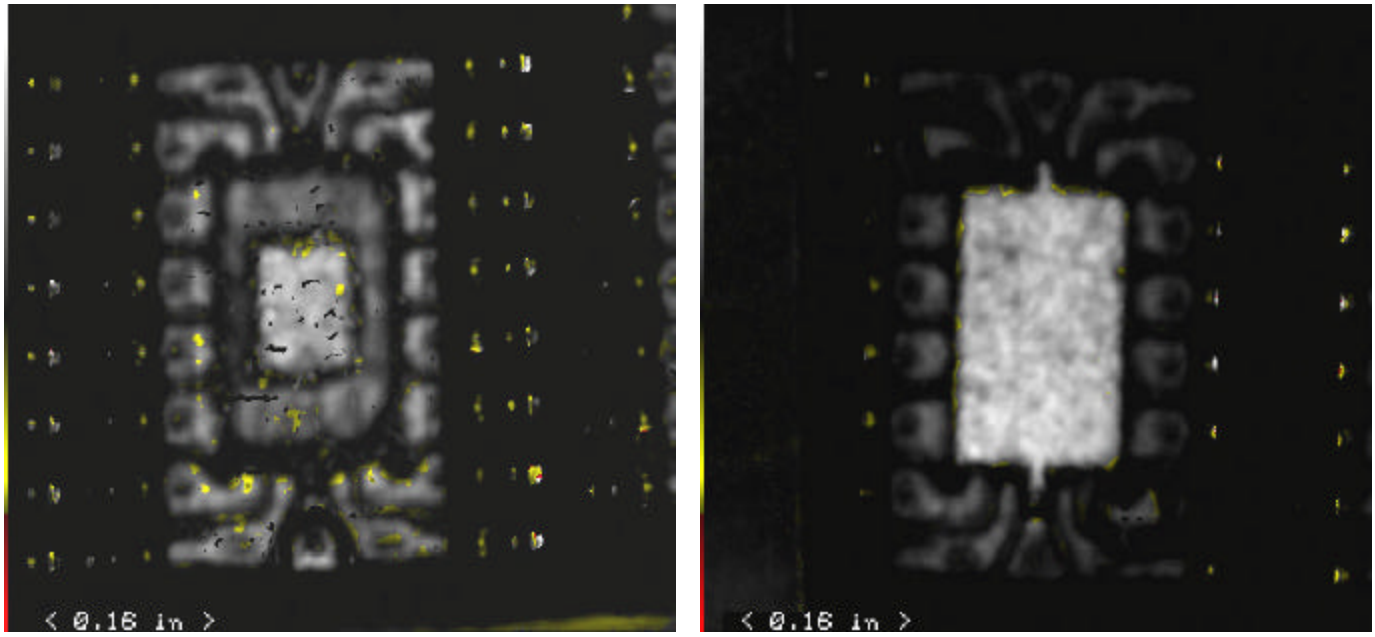

Figure 6. Top (left) and bottom C-SAM images of SN J5.

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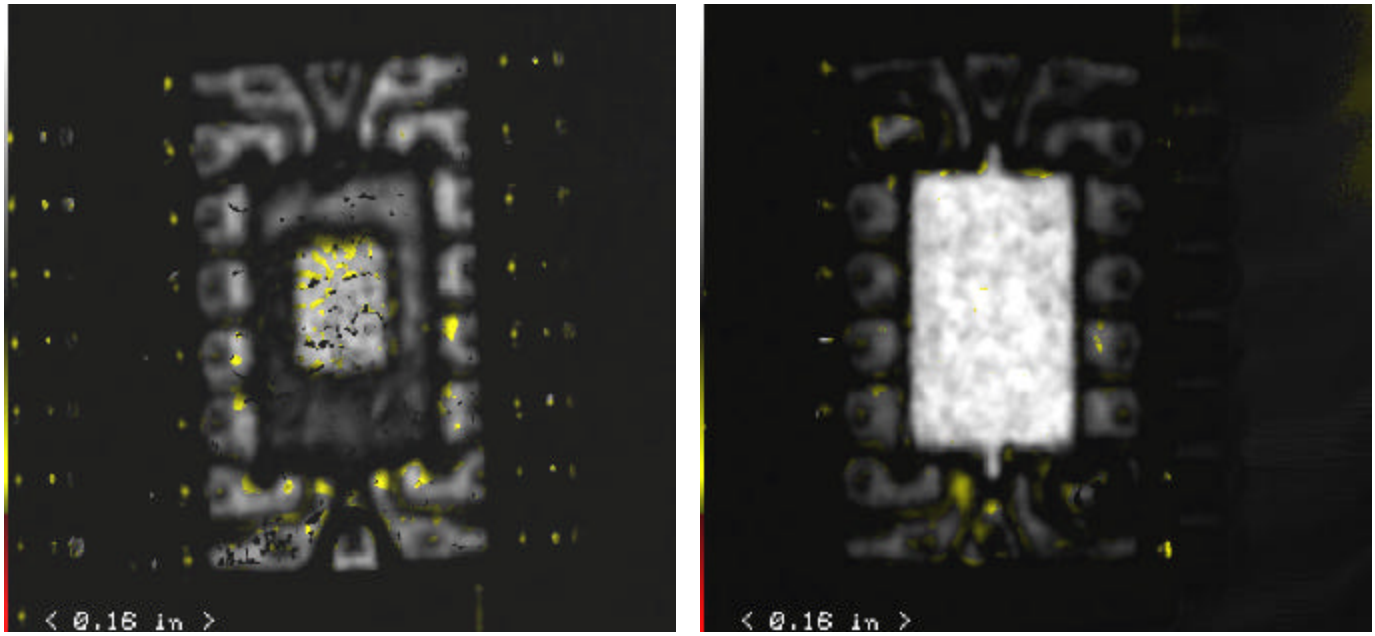

Figure 7. Top (left) and bottom C-SAM images of SN J7.

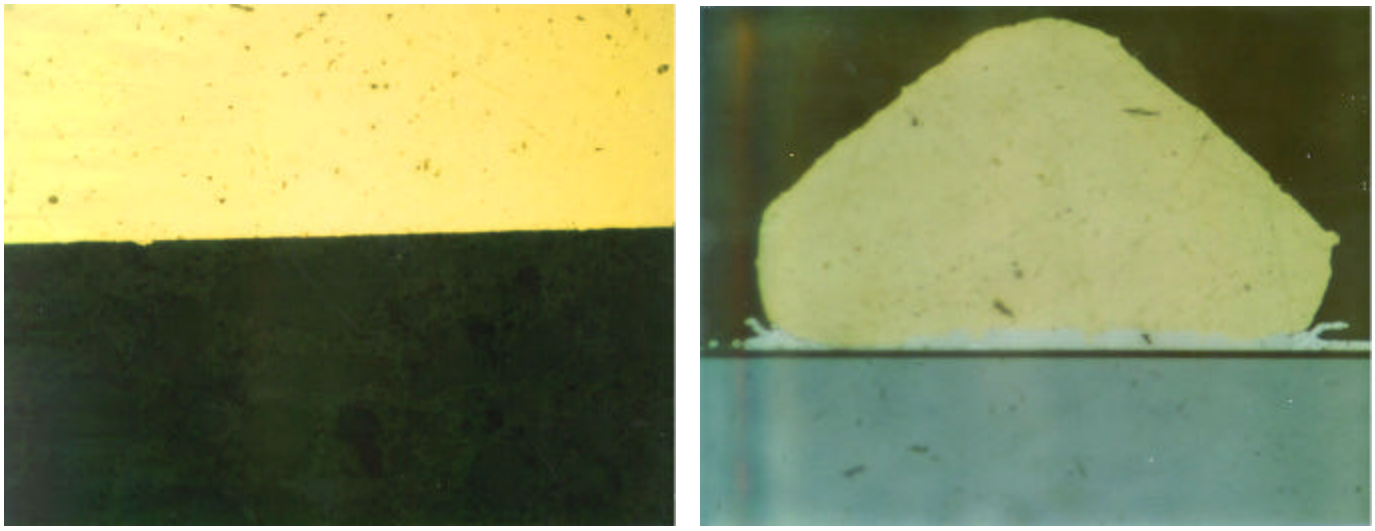

Figure 8. Cross-section images of SN I5. Left ≈ 400X; right ≈ 1000X.

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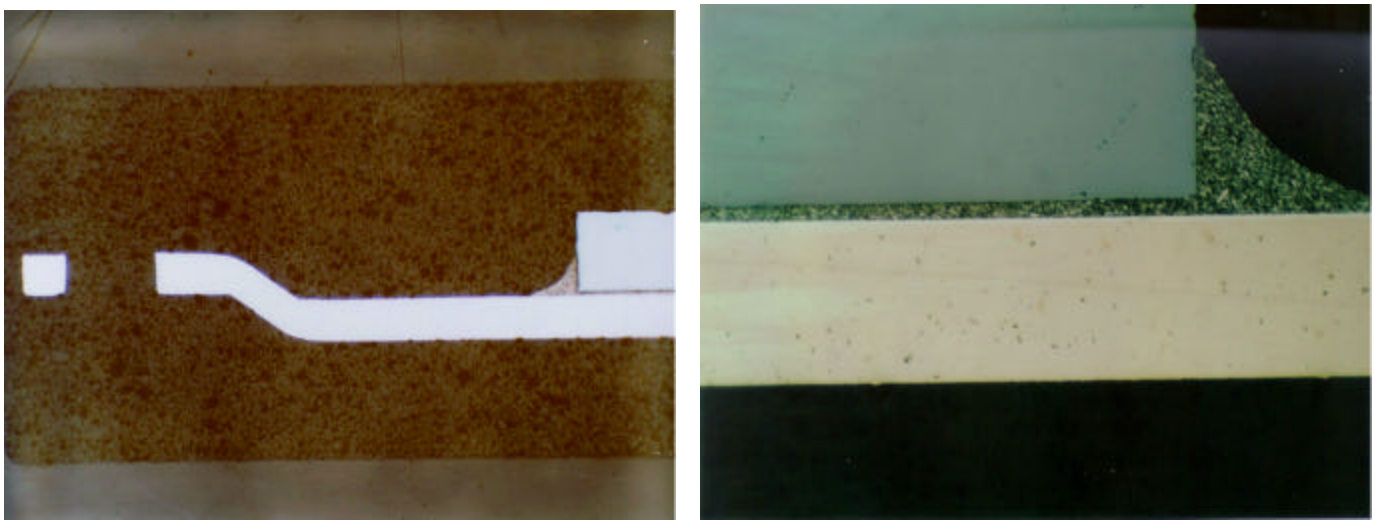

Figure 9. Cross-section images of SN I7. Left ≈ 25X; right ≈ 100X.

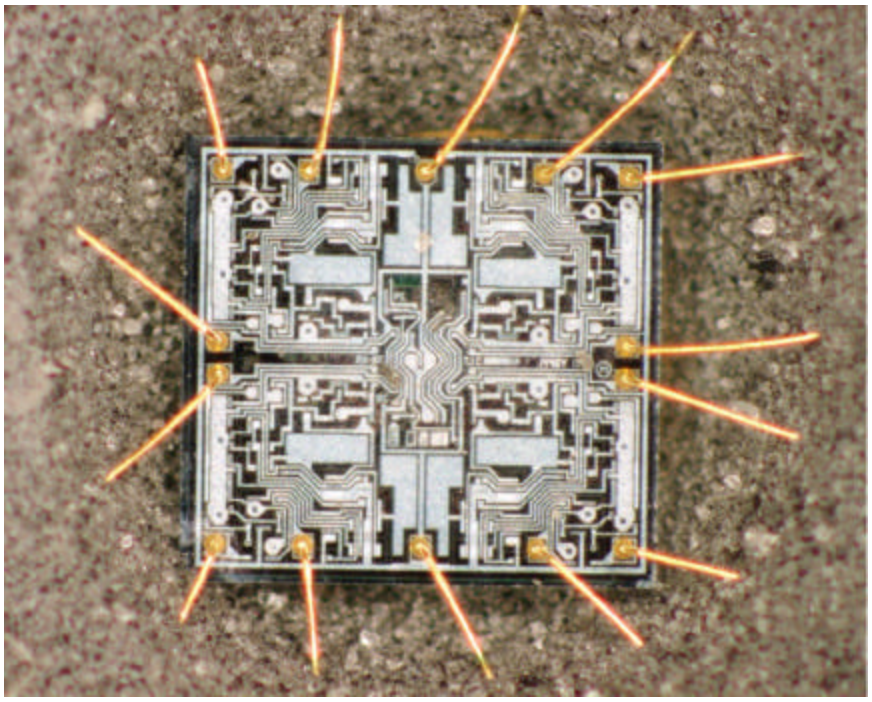

Figure 10. Internal view of SN J3 prepared for internal inspection. ≈ 20X

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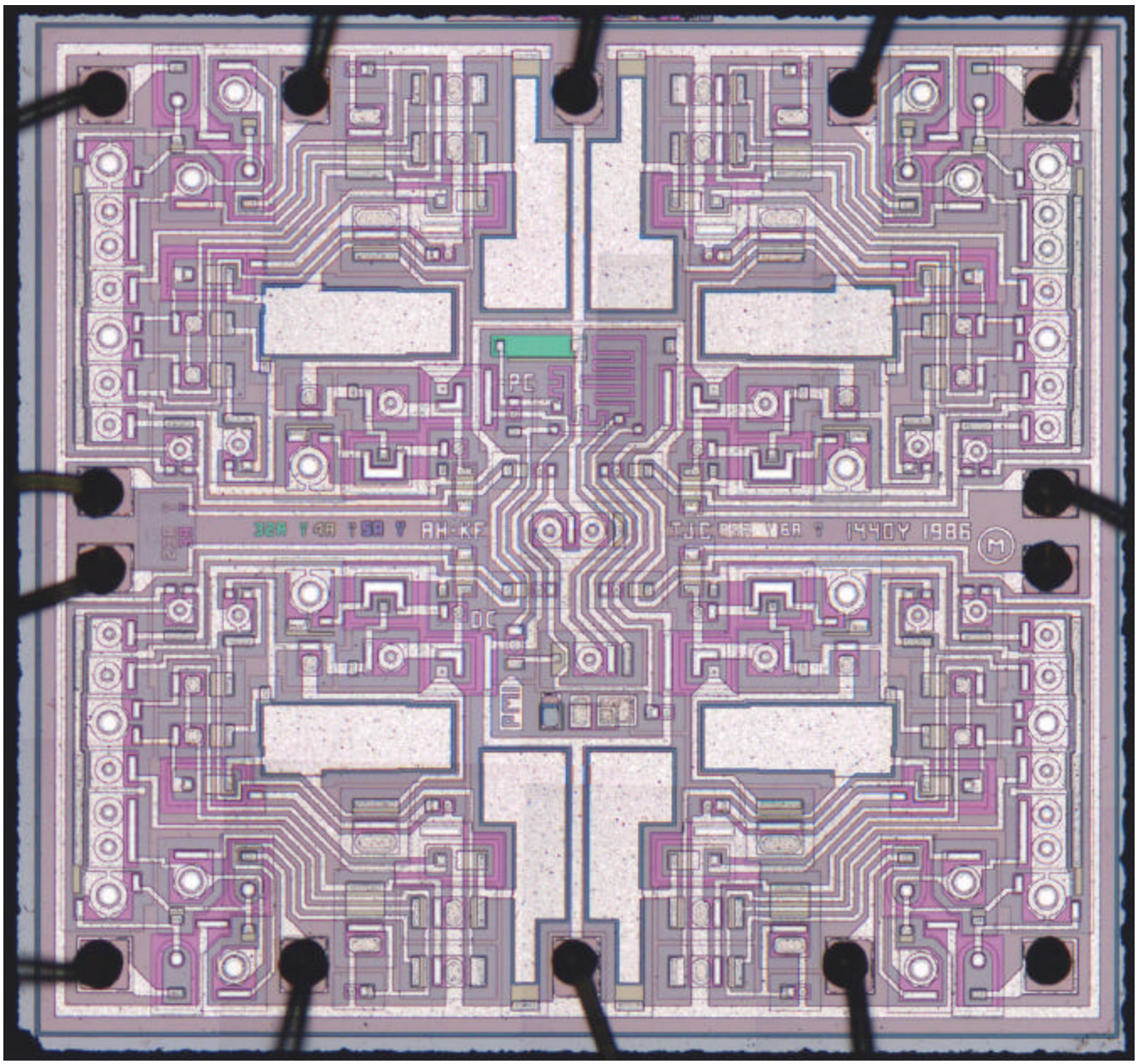

Figure 11. Overall view of SN J3 die.

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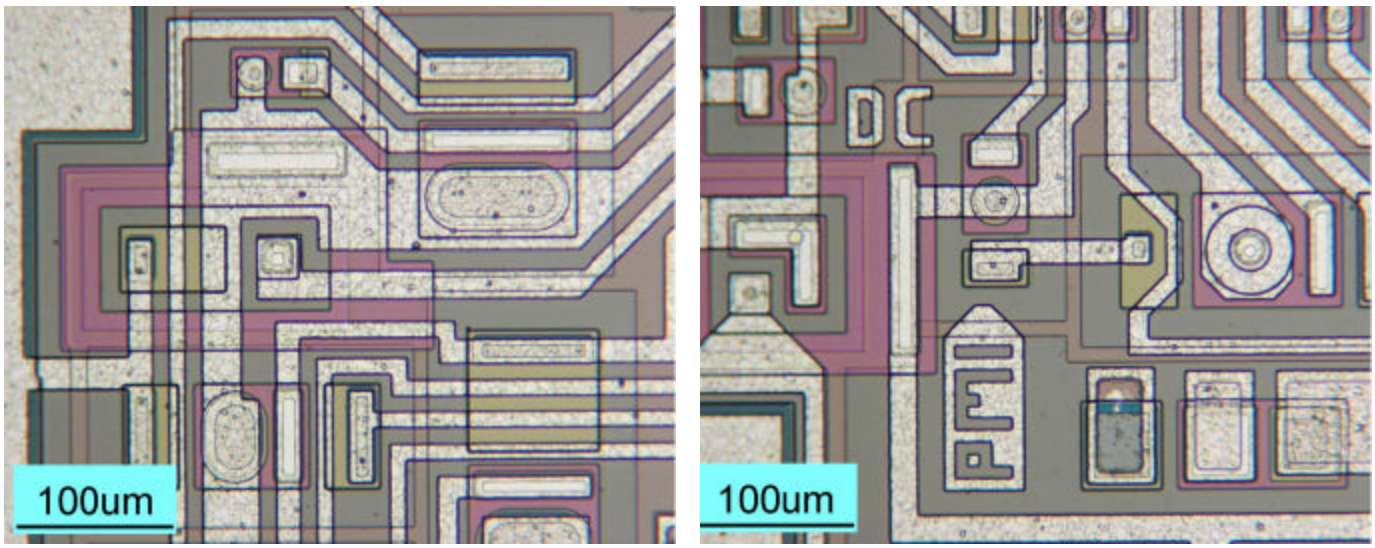

Figure 12. Optical micrograph images show general die features on SN J5.

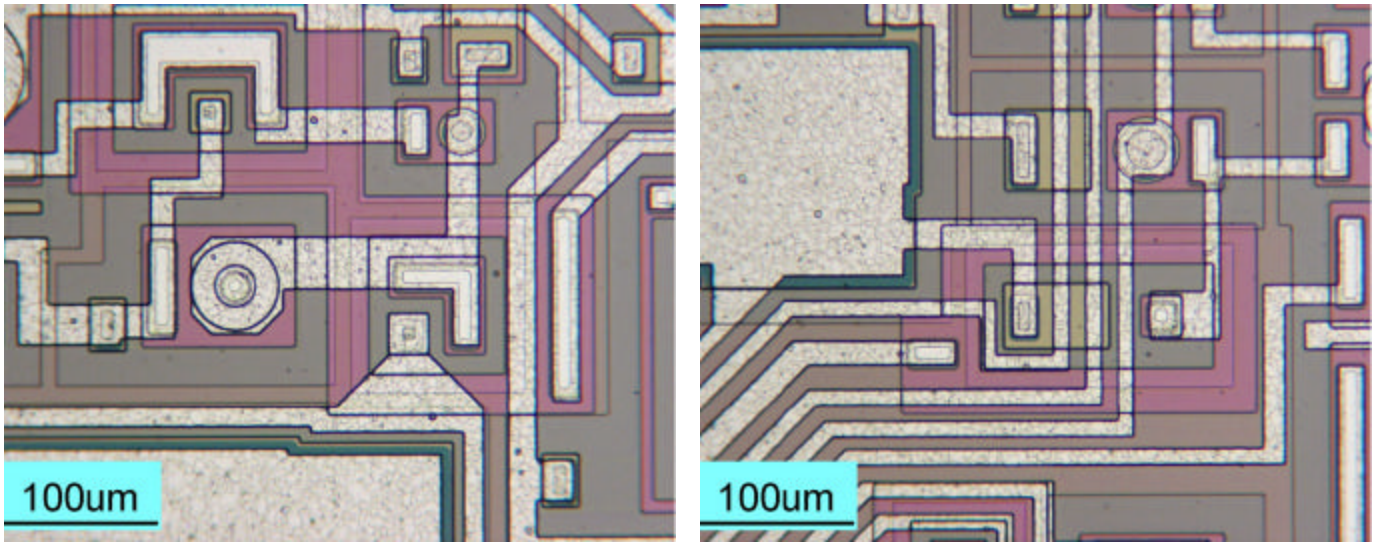

Figure 13. Optical micrograph images show general die features on SN J7.

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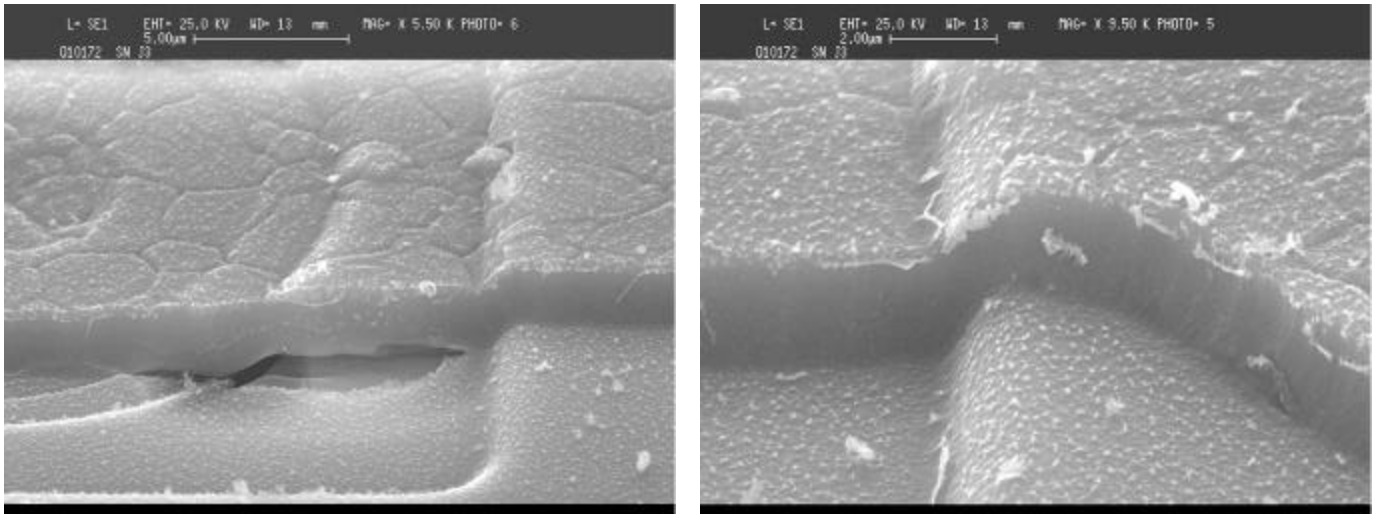

Figure 14. SEM micrographs of SN J3 show excellent step coverage.

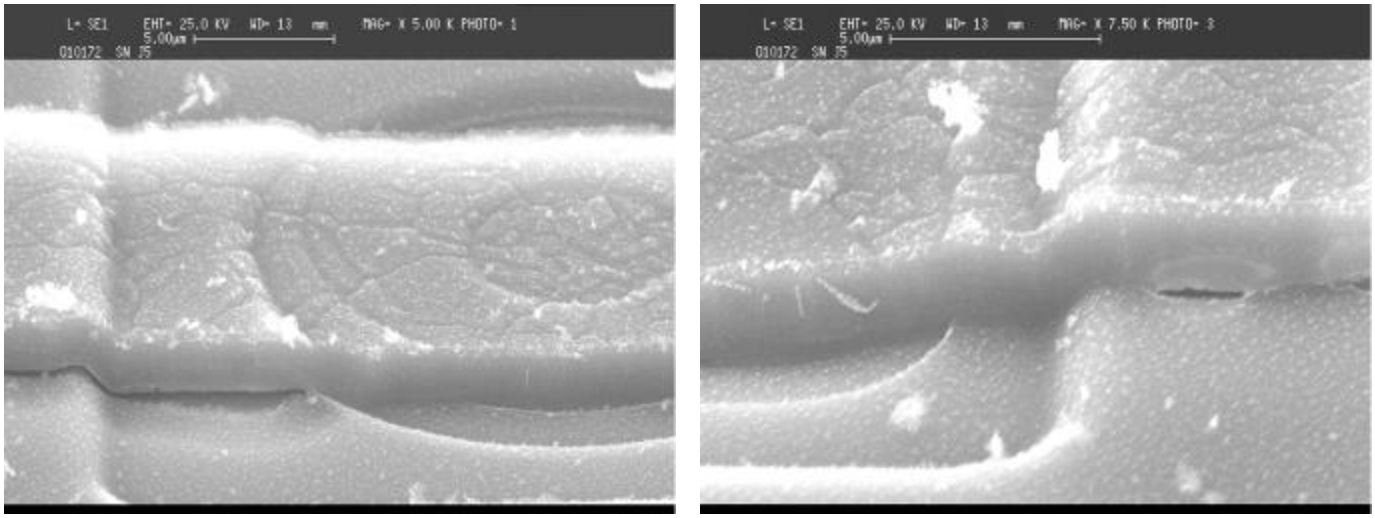

Figure 15. SEM micrographs of SN J5 show excellent step coverage.

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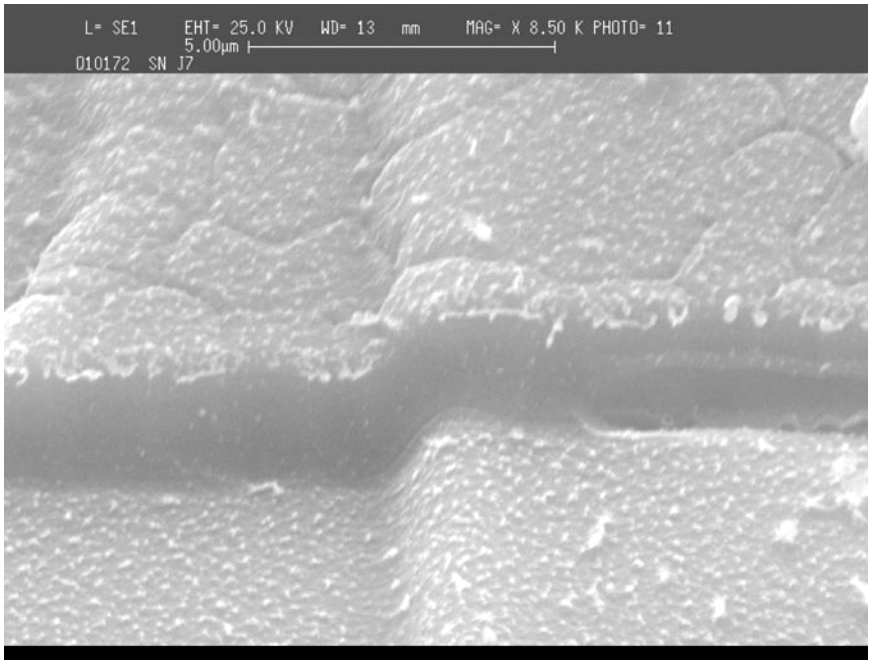

Figure 16. SEM micrograph shows excellent step coverage on SN J7.

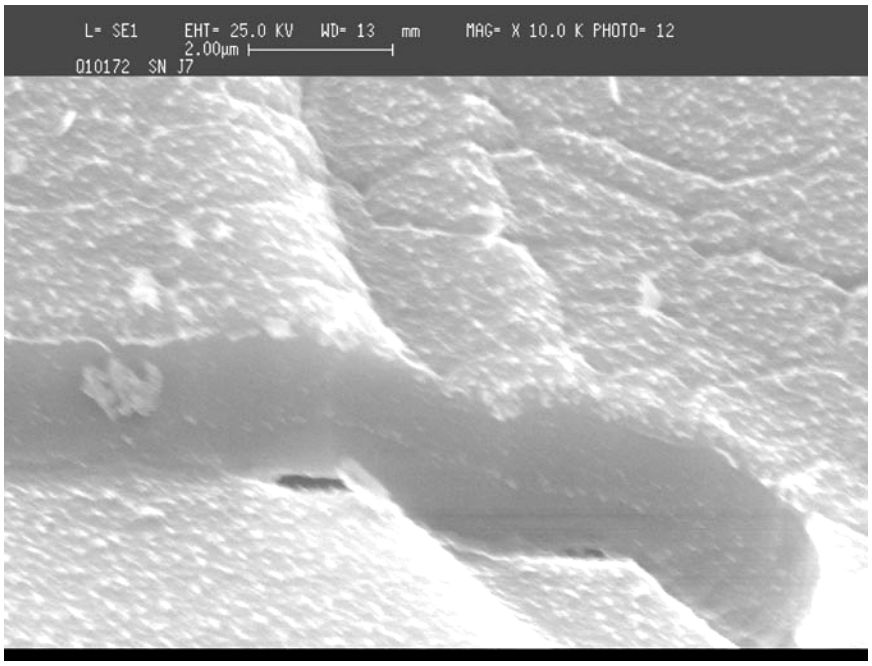

Figure 17. SEM micrograph shows another area of excellent step coverage on SN J7.