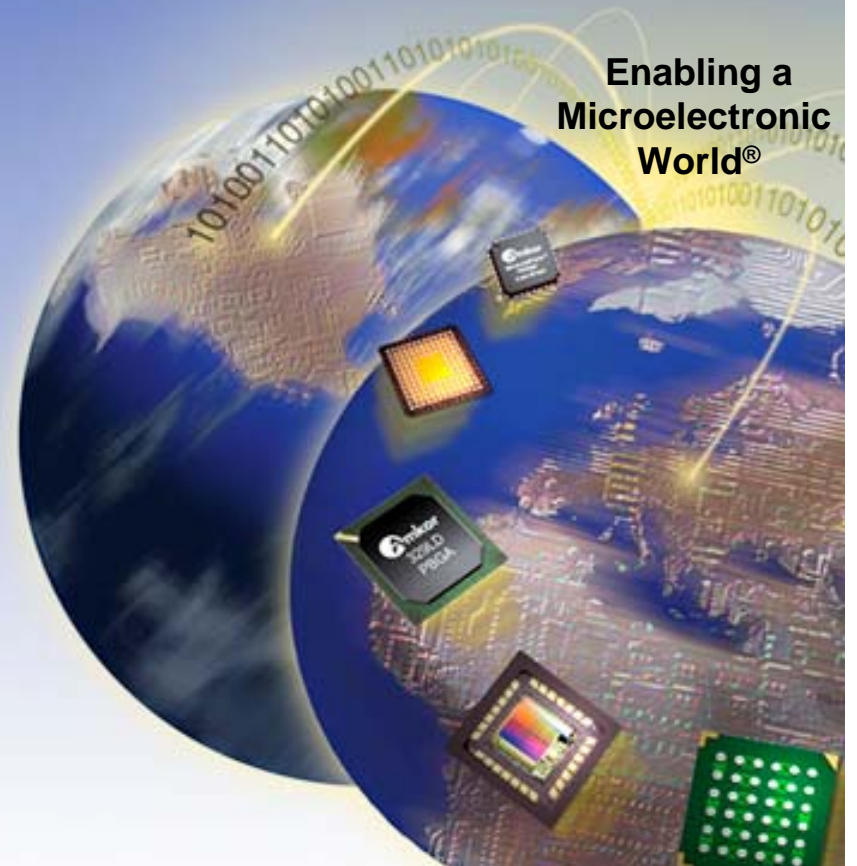


WHISKER TEST DATA

CLF - Development Engineering
Jul 20, 2007

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1.0 DISCLAIMER.

The whisker test procedures identified in this report are used for determining the presence of tin whiskers and are performed by Amkor, pursuant to current industry – accepted JEDEC standards. The whisker test procedures used herein are unproven and may produce Inconclusive results. Amkor makes no representation, warranty or guarantee of any kind with Respect to the field performance, quality or freedom from whisker-related failures, of any Package tested by Amkor using these procedures.

2.0 Package and Material Description

Package	Body Size	Lead Count	Lead Pitch	Lead to Lead Gap	Base Metal	LF Type	LF Thickness
MSSOP	5.3 mm	24L	0.65 mm	NP	C194	Stamped	NP
TSSOP	3x3 mm	8L	0.65 mm	0.35 mm	C7025	Etched	6 mils

3.0 Testing Conditions

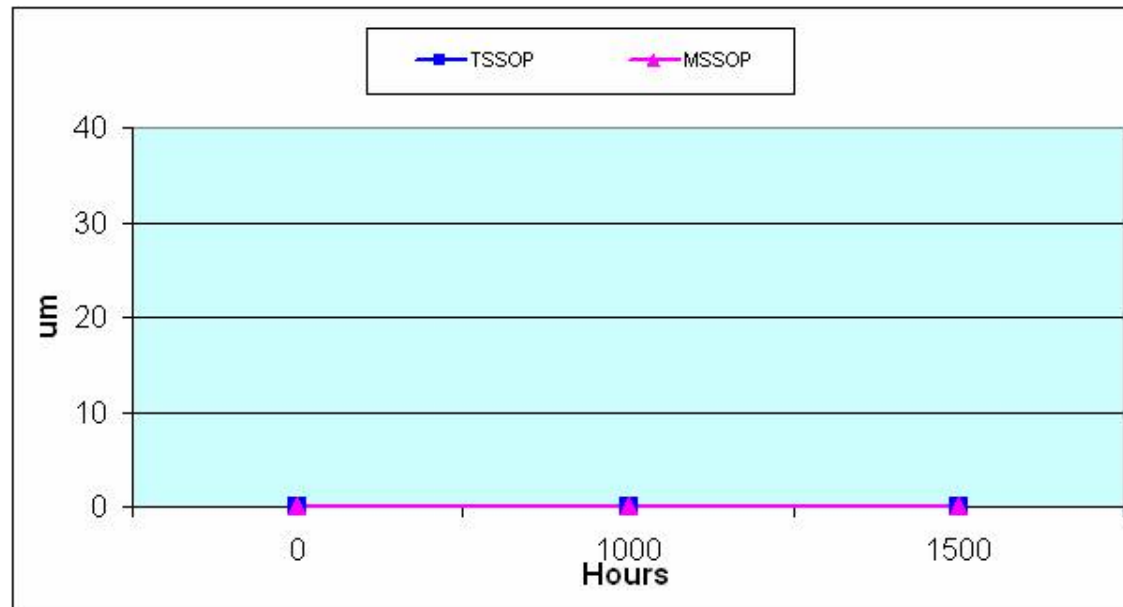
- Ambient Temperature/Humidity Storage : 30°C/60% RH
- High Temperature/Humidity Storage : 60°C/85% RH
- Thermal Cycle : -55°C/+85°C Cycle

TOTAL TESTING SUMMARY (Test Condition & Duration)									
Test #	1	2	3	4	5	6	7	8	9
Precondition	None required	None required	None required	Assembly Simulation @ 215°C	Assembly Simulation @ 255°C	Assembly Simulation @ 215°C	Assembly Simulation @ 255°C	Assembly Simulation @ 215°C	Assembly Simulation @ 255°C
Test Condition	Ambient Temp/ Humidity Storage	High Temp/ Humidity Storage	Thermal Cycle	Ambient Temp/ Humidity Storage	Ambient Temp/ Humidity Storage	High Temp/ Humidity Storage	High Temp/ Humidity Storage	Thermal Cycle	Thermal Cycle
Readpoint	0, 1000 and 1500 hr	0, 1000 and 1500 hr	0 & 500 cyc	0, 1000 and 1500 hr	0, 1000 and 1500 hr	0, 1000 and 1500 hr	0, 1000 and 1500 hr	0 & 500 cyc	0 & 500 cyc

4.0 Whisker Test Result

4.1 Ambient Temperature/Humidity Storage @ 30°C/60% RH - (TH)

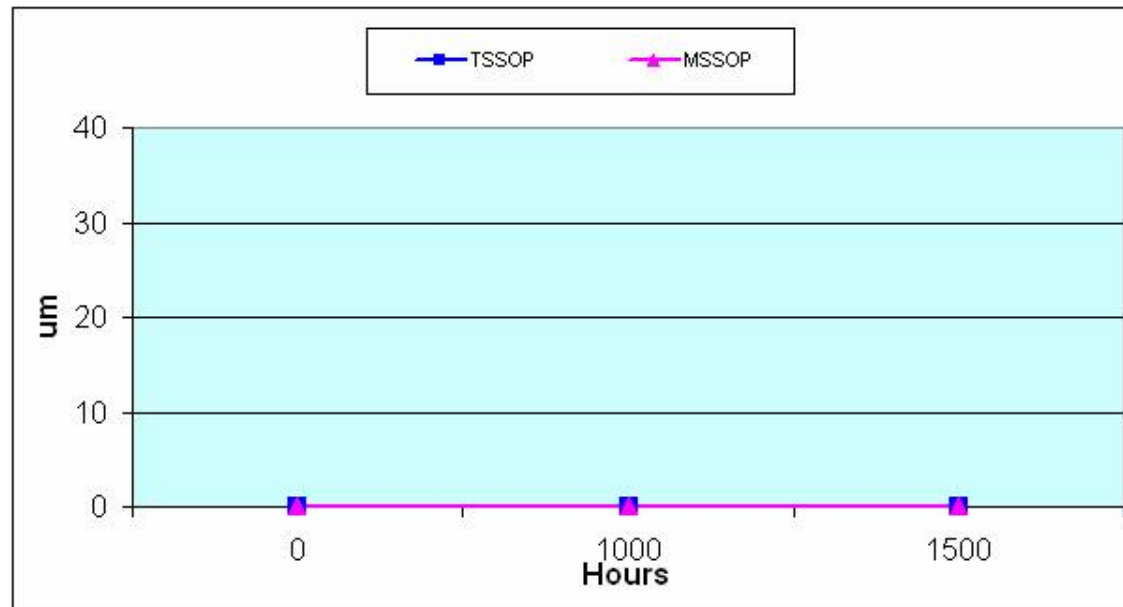
- No Precondition
- with Precon: 1x @ 215°C reflow
- with Precon: 1x @ 255°C reflow



Package	Hours		
	0	1000	1500
TSSOP	0	0	0
MSSOP	0	0	0

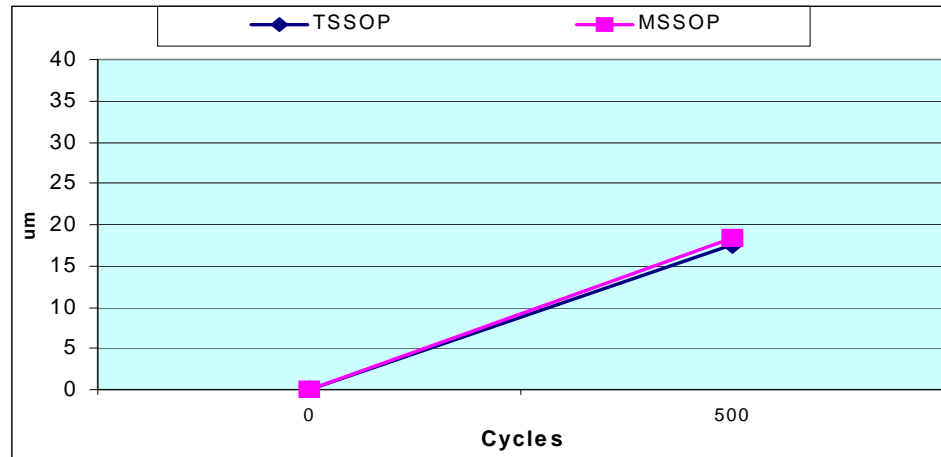
4.2 High Temperature/Humidity Storage @ 60°C/80% RH - (TH)

- No Precondition
- with Precon: 1x @ 215°C reflow
- with Precon: 1x @ 255°C reflow



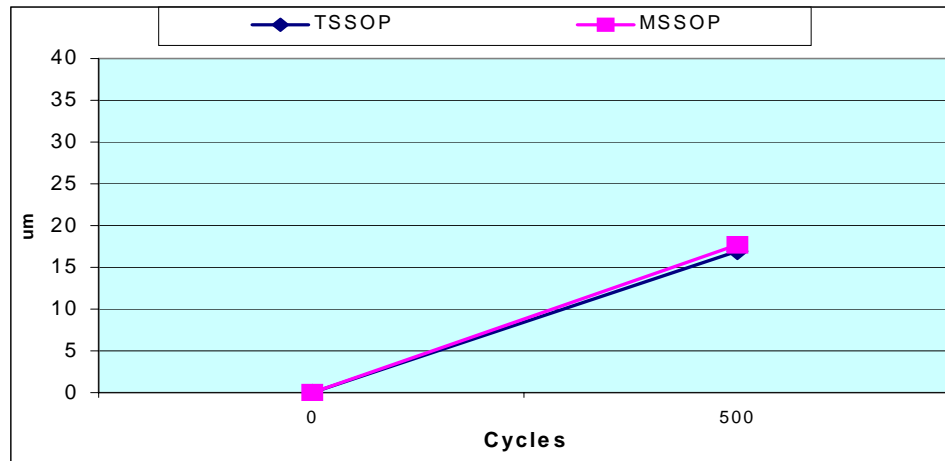
Package	Hours		
	0	1000	1500
TSSOP	0	0	0
MSSOP	0	0	0

4.3 Temperature Cycling @ -55°C/+85°C
No Precondition



Thermal Cycling (-55°C/85°C)		
Package	Cycles	
	0	500
TSSOP	0	17.51
MSSOP	0	18.47

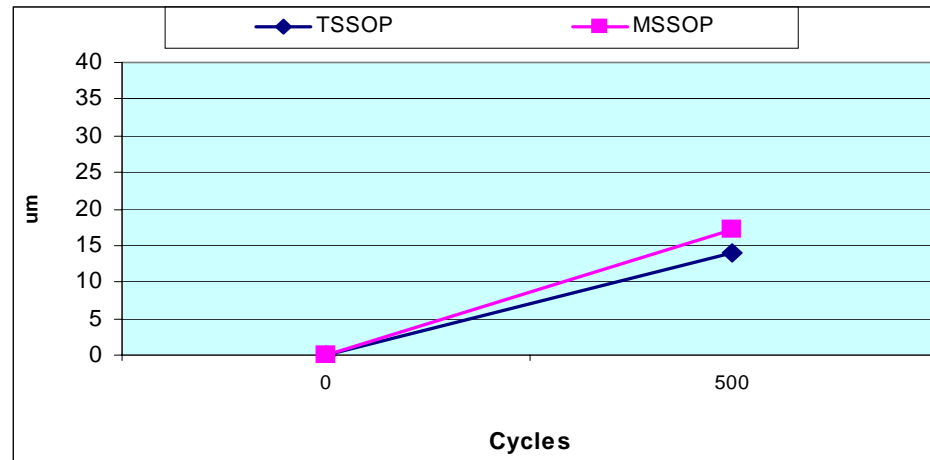
4.5 Temperature Cycling @ -55°C/+85°C
 With precon: 1x @ 215°C Reflow



Thermal Cycling (-55°C/85°C) with 215° Reflow		
Package	Cycles	
	0	500
TSSOP	0	16.89
MSSOP	0	17.74

4.6 Temperature Cycling @ -55°C/+85°C

- With precon: 1x @ 255°C Reflow



Thermal Cycling (-55°C/85°C) with 245° Reflow		
Package	Cycles	
	0	500
TSSOP	0	13.88
MSSOP	0	17.12

6.0 Photo

6.1 Ambient Temperature/Humidity Storage @ 30°C/60% RH - (TH)

- No Precondition
- with Precon: 1x @ 215°C reflow
- with Precon: 1x @ 255°C reflow

Note: No whisker observed at 0, 1000, and 1500 hours soak

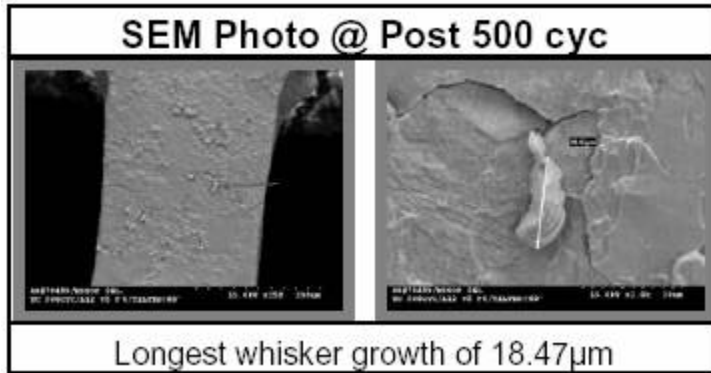
6.2 High Temperature/Humidity Storage @ 60°C/87% RH - (TH)

- No Precondition
- with Precon: 1x @ 215°C reflow
- with Precon: 1x @ 255°C reflow

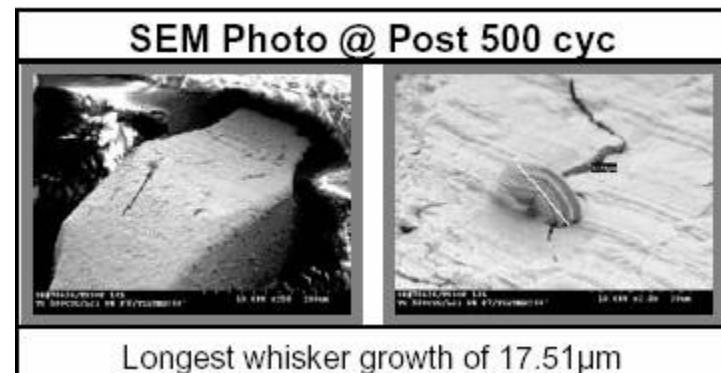
Note: No whisker observed at 0, 1000, and 1500 hours soak

6.3 Temperature Cycling @ -55°C/+85°C Cycles

- No Precondition



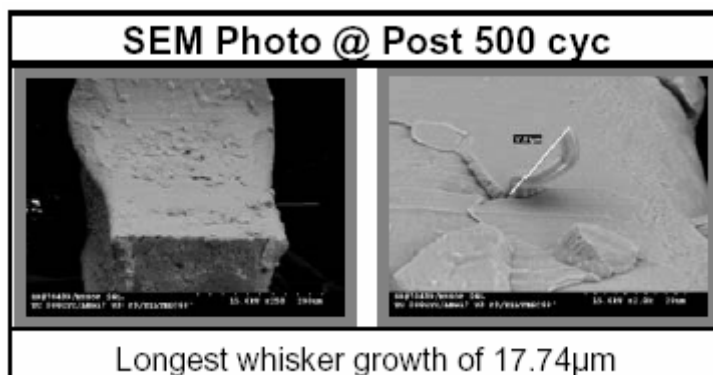
MSSOP



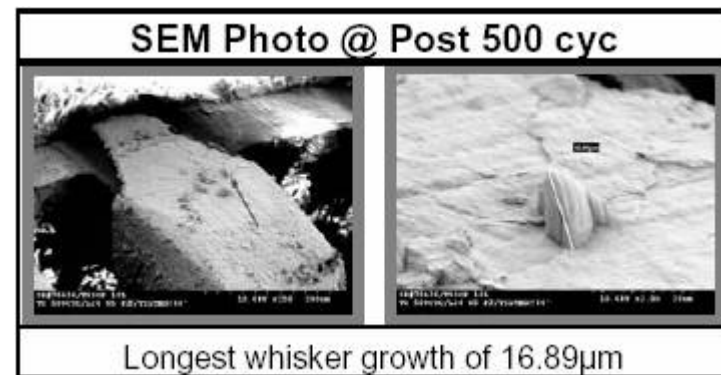
TSSOP

6.4 Temperature Cycling @ -55°C/+85°C Cycles

- With precon: 1x @ 215°C Reflow



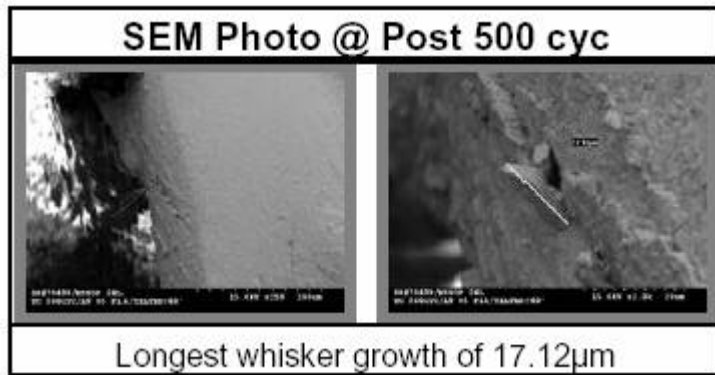
MSSOP



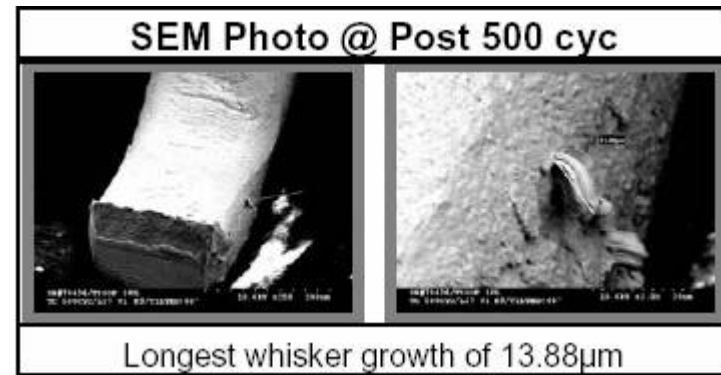
TSSOP

6.5 Temperature Cycling @ -55°C/+85°C Cycles

- With precon: 1x @ 255°C Reflow



MSSOP



TSSOP

WHISKER TEST REPORT (FINAL REPORT)

General Information

Factory	Amkor Technology Philippines – P1
Plating Finish	Matte Sn
Package Type	TSSOP HDLF
Plating Chemistry	ST380
Plating Line	T4B
Post Plating Bake	150°C for 1 hour

Report Date : April 15, 2006
Whisker Test Report # : 20050772

Prepared by : Sonny M. Copon
Reliability Engineer

Checked by : Roque Baliwan
Section Manager, Rel/FA

Approved by : Bernard Baylon
Department Manager, Rel/FA

Distribution List :

Danny Javelosa, Henry Carteciano, Greg Gabriel, Sandra Gonzales, Emy Pelaez-Arcillas, Charlie dela Cruz Jr., Rey Florogo, Leonida Dapula, Rodrigo Amor, Avelette Mamparo, Marilou Tendido, P3RELLAB – ATP KwangBok Yang – WW Corp. PIC Ron Ellenberger, Gi Jung Kim – ATI

WHISKER TEST REPORT (FINAL REPORT)

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WHISKER TEST REPORT (FINAL REPORT)

1. Purpose

1.1. Whisker Test on TSSOP HDLF 8lds (C7025 Base Metal) ST380 Chemistry.

2. Scope: Mark (✓) the scope on the following

Process

New plating process	✓
Modified plating process	

Material

New plating material	
Modified plating material	
Alternate source of material	
Alternate manufacturing site of material	

3. Conclusion

3.1. Total # of lots tested : (3) lot(s)

3.2. Comment :

- 3.2.1. Whisker length measurement method applied for all the whiskers observed was the Radial measurement method. Eighteen (18) terminations per lot per readpoint were SEM inspected and 2 longest whiskers per lot per readpoint were reported. Identified whiskers vary from one readpoint to another since the test objective was to track the longest whisker growth among the samples.
- 3.2.2. Post 500cyc, 1000cyc, & 1500cyc exposure at -55°C/+85°C TC conditions showed whisker growth in all 3 lots. Longest whiskers observed were:
 - TC without precon: comp#3, term#3 with 33.81µm @ 500cyc;
 - TC with 215°C simulated reflow: comp#1, term#4 with 32.44µm @ 1500cyc; and
 - TC with 255°C simulated reflow: comp#3, term#7 with 31.49µm @ 1500cyc.
- 3.2.3. No whisker was observed in all 3 lots after 4000hrs exposure both at 30°C/60%RH and 60°C/87%RH TH conditions.
- 3.2.4. Eight (8) terminations with whiskers, which were all found at the lead tip, have been invalidated after exposure to higher Temperature/Humidity (60°C/87%RH) conditions due to presence of surface corrosion. The invalidation was done per JEDEC Standard JESD201. Other terminations were inspected but no whisker was found. Verification results were detailed at the end of report under Appendix 5.4.3.

WHISKER TEST REPORT (FINAL REPORT)

4. Package / Material Description

4.1. Package

Type	TSSOP HDLF
Body size	4.4 mm
Lead Count	8L
Lead Pitch	0.65 mm
Lead to Lead Gap	0.43 mm

4.2. Material

Lead frame	
Base metal alloy	C7025
Temper (1/2 hard, etc.)	½ hard
Stamped/Etched L/F	Stamped
L/F thickness	0.127 mm
Barrier layer type	N/A
Barrier layer thickness	N/A

4.3. Process Dates

	Lot #1	Lot #2	Lot #3
Plating date/time	5/07/05 / 1500H	5/12/05 / 2125H	5/18/05 / 0900H
Post bake date/time	5/07/05 / 1530H	5/12/05 / 2140H	5/18/05 / 0915H
Simulated reflow date	7/28/05	7/28/05	7/28/05
Board assembly date	N/A	N/A	N/A
30°C/60%RH start date	7/28/05	7/28/05	7/28/05
60°C/87%RH start date	7/28/05	7/28/05	7/28/05
-55°C/85°C start date	7/28/05	7/28/05	7/28/05

5. Attachments

- 5.1. Process Summary
- 5.2. Workmanship Summary
- 5.3. Whisker Test Summary and Photos
- 5.4. Appendix

WHISKER TEST REPORT (FINAL REPORT)

5.1. Process Summary

Lot# : LOT-1

PROCESS	MACHINE/ EQUIPMENT	PARAMETERS		MATERIALS	
Plating	Technic	Descale Temperature	35°C	Descale Solution	Actronal 988
		Belt Speed	65 mm/sec		
		Current Density	125.12 ASF		
		[Sn metal]	54.7 g/l		
		[Bi metal] (if applicable)	N/A		
		Bath Temperature	28°C		
		Bath Impurities			
		• Pb	5.02 ppm		
		• Cu	0.32 ppm		
		• Fe	13.37 ppm		
		• Ni	1.87 ppm		
		• Zn	0.29 ppm		
		• Ag	0.76 ppm		
Post Plating Bake	Yamato	Hold Temperature	150°C		
		Dwell Time	60 minutes		
		Total Cycle Time	120 minutes		
		N ₂ Gas Flow Rate	200 SCFH		
Simulated Reflow @ 215°C	Vitronics	Peak Temperature	217°C		
		Dwell Time > 183°C	85 seconds		
Simulated Reflow @ 255°C	Vitronics	Peak Temperature	260°C		
		Dwell Time > 217°C	75 seconds		

WHISKER TEST REPORT (FINAL REPORT)

Lot# : LOT-2

PROCESS	MACHINE/ EQUIPMENT	PARAMETERS		MATERIALS	
Plating	Technic	Descale Temperature	35°C	Descale Solution	Actronal 988
		Belt Speed	65 mm/sec		
		Current Density	125.12 ASF		
		[Sn metal]	48.7 g/l		
		[Bi metal] (if applicable)	N/A		
		Bath Temperature	28°C		
		Bath Impurities			
		• Pb	5.02 ppm		
		• Cu	0.32 ppm		
		• Fe	13.37 ppm		
		• Ni	1.87 ppm		
		• Zn	0.29 ppm		
		• Ag	0.76 ppm		
Post Plating Bake	Yamato	Hold Temperature	150°C		
		Dwell Time	60 minutes		
		Total Cycle Time	120 minutes		
		N ₂ Gas Flow Rate	200 SCFH		
Simulated Reflow @ 215°C	Vitronics	Peak Temperature	217°C		
		Dwell Time > 183°C	85 seconds		
Simulated Reflow @ 255°C	Vitronics	Peak Temperature	260°C		
		Dwell Time > 217°C	75 seconds		

WHISKER TEST REPORT (FINAL REPORT)

Lot# : LOT-3

PROCESS	MACHINE/ EQUIPMENT	PARAMETERS		MATERIALS	
Plating	Technic	Descale Temperature	35°C	Descale Solution	Actronal 988
		Belt Speed	65 mm/sec		
		Current Density	125.12 ASF		
		[Sn metal]	49.9 g/l		
		[Bi metal] (if applicable)	N/A		
		Bath Temperature	28°C		
		Bath Impurities			
		• Pb	5.02 ppm		
		• Cu	0.32 ppm		
		• Fe	13.37 ppm		
		• Ni	1.87 ppm		
		• Zn	0.29 ppm		
		• Ag	0.76 ppm		
Post Plating Bake	Yamato	Hold Temperature	150°C		
		Dwell Time	60 minutes		
		Total Cycle Time	120 minutes		
		N ₂ Gas Flow Rate	200 SCFH		
Simulated Reflow @ 215°C	Vitronics	Peak Temperature	217°C		
		Dwell Time > 183°C	85 seconds		
Simulated Reflow @ 255°C	Vitronics	Peak Temperature	260°C		
		Dwell Time > 217°C	75 seconds		

WHISKER TEST REPORT (FINAL REPORT)

5.2. Plating Workmanship Summary

Lot# : LOT-1

Process / SPEC No.	Test Item	SPEC # or Criteria	# Failure / S. Size	Test Data			Result
				MAX	MIN	AVG	
001-0530-2011	Visual	001-0322-2595	0/116 units	N/A	N/A	N/A	PASSED
001-0522-2571	Plating thickness	400 – 700µ” (10.0 – 17.5µm)	0/5 strips	558.40	480.40	512.70	PASSED
001-0522-2571	Deposit composition	100% Sn	5 rdgs	N/A	N/A	N/A	100% Sn
001-0234-2057	Carbon content	0.05% max.	N/A	N/A	N/A	N/A	0.01452% wt
	Deposit impurities - Pb	0.1% max.	N/A	N/A	N/A	N/A	0.009%
Stripping method	Grain size range	1-5 µm	N/A	N/A	N/A	N/A	

Lot# : LOT-2

Process / SPEC No.	Test Item	SPEC # or Criteria	# Failure / S. Size	Test Data			Result
				MAX	MIN	AVG	
001-0530-2011	Visual	001-0322-2595	0/116 units	N/A	N/A	N/A	PASSED
001-0522-2571	Plating thickness	400 – 700µ” (10.0 – 17.5µm)	0/5 strips	538.20	470.60	521.80	PASSED
001-0522-2571	Deposit composition	100% Sn	5 rdgs	N/A	N/A	N/A	100% Sn
001-0234-2057	Carbon content	0.05% max.	N/A	N/A	N/A	N/A	0.01452% wt
	Deposit impurities - Pb	0.1% max.	N/A	N/A	N/A	N/A	0.009%
Stripping method	Grain size range	1-5 µm	N/A	N/A	N/A	N/A	

Lot# : LOT-3

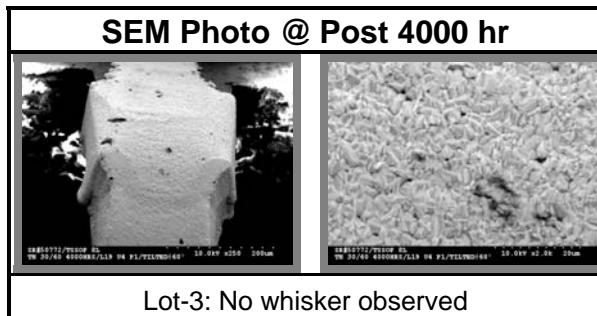
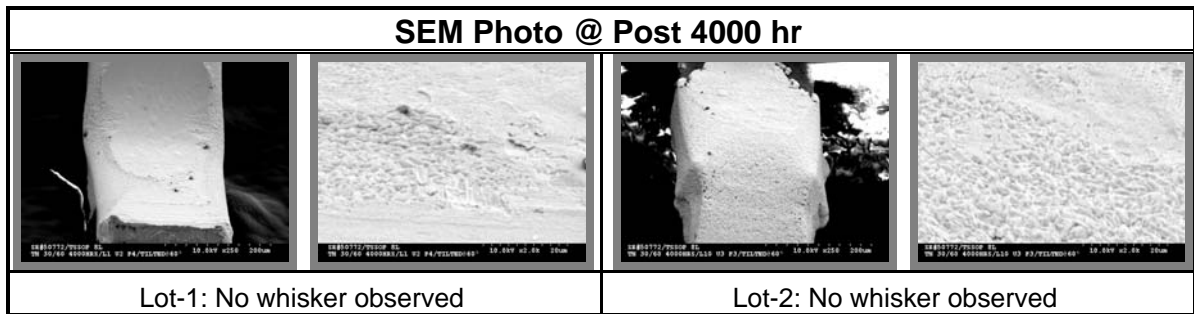
Process / SPEC No.	Test Item	SPEC # or Criteria	# Failure / S. Size	Test Data			Result
				MAX	MIN	AVG	
001-0530-2011	Visual	001-0322-2595	0/116 units	N/A	N/A	N/A	PASSED
001-0522-2571	Plating thickness	400 – 700µ” (10.0 – 17.5µm)	0/5 strips	587.80	406.30	441.80	PASSED
001-0522-2571	Deposit composition	100% Sn	5 rdgs	N/A	N/A	N/A	100% Sn
001-0234-2057	Carbon content	0.05% max.	N/A	N/A	N/A	N/A	0.01452% wt
	Deposit impurities - Pb	0.1% max.	N/A	N/A	N/A	N/A	0.009%
Stripping method	Grain size range	1-5 µm	N/A	N/A	N/A	N/A	

WHISKER TEST REPORT (FINAL REPORT)

5.3. Whisker Test Summary

5.3.1. Ambient Temperature/Humidity (30°C/60%RH)

Lot No.	Component # / Termination #	Readpoints				
		0 hr	1000 hr	2000 hr	3000 hr	4000 hr
Lot-1	Comp # <u>2</u> / Term # <u>4</u>	none	none	none	none	none
Lot-2	Comp # <u>3</u> / Term # <u>3</u>	none	none	none	none	none
Lot-3	Comp # <u>4</u> / Term # <u>1</u>	none	none	none	none	none





WHISKER TEST REPORT (FINAL REPORT)

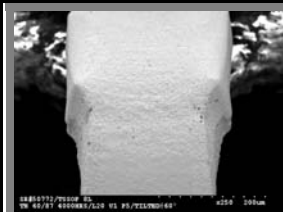
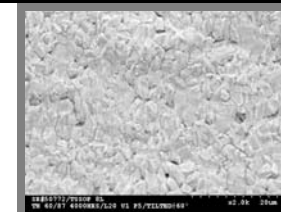
5.3.2. High Temperature/Humidity (60°C/87%RH)

Lot No.	Component # / Termination #	Readpoints				
		0 hr	1000 hr	2000 hr	3000 hr	4000 hr
Lot-1	Comp # <u>1</u> / Term # <u>8</u>	none	none	none	none	none
Lot-2	Comp # <u>2</u> / Term # <u>5</u>	none	none	none	none	none
Lot-3	Comp # <u>1</u> / Term # <u>5</u>	none	none	none	none	none

SEM Photo @ Post 4000 hr

 <p>Lot-1: No whisker observed</p>	 <p>Lot-2: No whisker observed</p>
---	---

SEM Photo @ Post 4000 hr


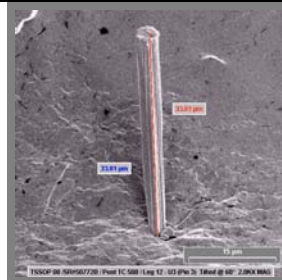
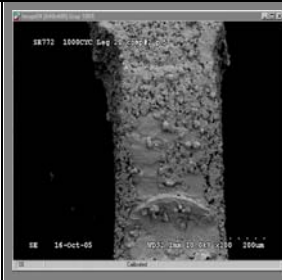

	
<p>Lot-3: No whisker observed</p>	

WHISKER TEST REPORT (FINAL REPORT)

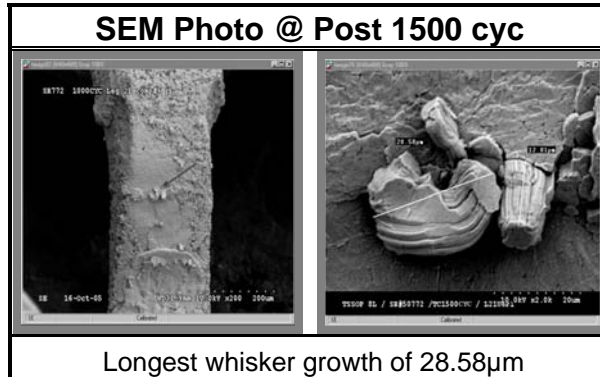
5.3.3. Thermal Cycling (-55/85°C)

Lot No.	Component # / Termination #	Readpoints			
		0 cyc	500 cyc	1000 cyc	1500 cyc
Lot-1	Comp # <u>1</u> / Term # <u>1</u>	none	16.58µm	-	-
	Comp # <u>2</u> / Term # <u>1</u>	none	18.04µm	-	-
	Comp # <u>1</u> / Term # <u>3</u>	none	-	19.09µm	22.83µm
	Comp # <u>6</u> / Term # <u>5</u>	none	-	16.11µm	-
	Comp # <u>3</u> / Term # <u>1</u>	none	-	-	17.13µm
Lot-2	Comp # <u>1</u> / Term # <u>2</u>	none	19.40µm	-	-
	¹ Comp # <u>3</u> / Term # <u>3</u>	none	33.81µm	-	-
	Comp # <u>2</u> / Term # <u>7</u>	none	-	23.58µm	23.87µm
	Comp # <u>3</u> / Term # <u>5</u>	none	-	17.53µm	-
	Comp # <u>4</u> / Term # <u>1</u>	none	-	-	25.68µm
Lot-3	Comp # <u>1</u> / Term # <u>5</u>	none	16.78µm	-	-
	Comp # <u>2</u> / Term # <u>7</u>	none	14.14µm	-	-
	Comp # <u>2</u> / Term # <u>5</u>	none	-	24.63µm	-
	Comp # <u>6</u> / Term # <u>1</u>	none	-	22.00µm	28.58µm
	Comp # <u>1</u> / Term # <u>2</u>	none	-	-	24.89µm

Note 1: Whisker in Lot-2 comp#3 term#3 was lost at 1000cyc readpoint.

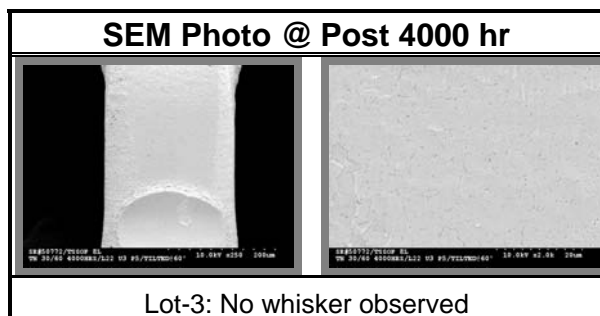
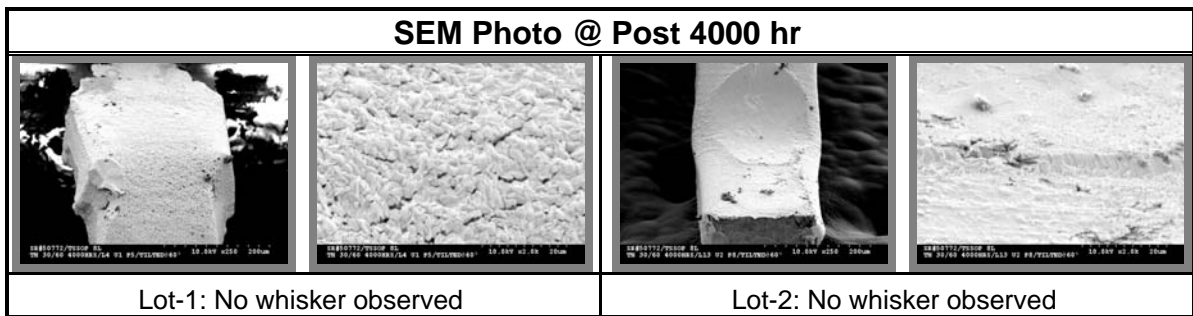
SEM Photo @ Post 500 cyc		SEM Photo @ Post 1000 cyc	
			
Longest whisker growth of 33.81µm		Longest whisker growth of 24.63µm	

WHISKER TEST REPORT (FINAL REPORT)



5.3.4. Ambient Temperature/Humidity (30°C/60%RH) post 215°C simulated reflow

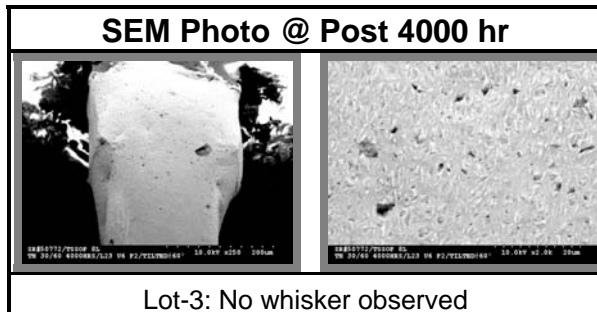
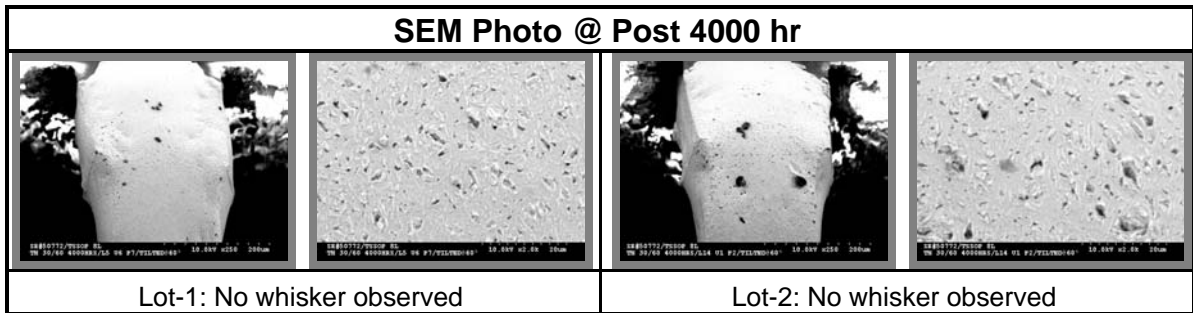
Lot No.	Component # / Termination #	Readpoints				
		0 hr	1000 hr	2000 hr	3000 hr	4000 hr
Lot-1	Comp # <u>1</u> / Term # <u>5</u>	none	none	none	none	none
Lot-2	Comp # <u>2</u> / Term # <u>8</u>	none	none	none	none	none
Lot-3	Comp # <u>3</u> / Term # <u>5</u>	none	none	none	none	none



WHISKER TEST REPORT (FINAL REPORT)

5.3.5. Ambient Temperature/Humidity (30°C/60%RH) post 255°C simulated reflow

Lot No.	Component # / Termination #	Readpoints				
		0 hr	1000 hr	2000 hr	3000 hr	4000 hr
Lot-1	Comp # <u>6</u> / Term # <u>7</u>	none	none	none	none	none
Lot-2	Comp # <u>1</u> / Term # <u>2</u>	none	none	none	none	none
Lot-3	Comp # <u>6</u> / Term # <u>2</u>	none	none	none	none	none

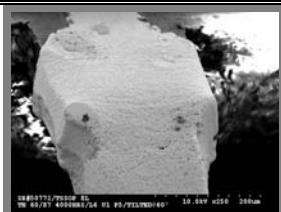
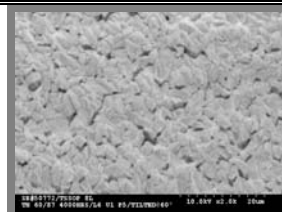

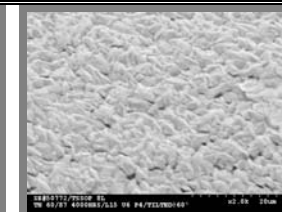


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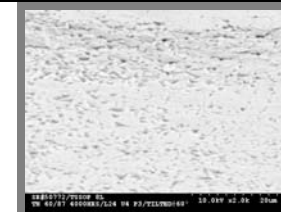
5.3.6. High Temperature/Humidity (60°C/87%RH) post 215°C simulated reflow

Lot No.	Component # / Termination #	Readpoints				
		0 hr	1000 hr	2000 hr	3000 hr	4000 hr
Lot-1	Comp # <u>1</u> / Term # <u>5</u>	none	none	none	none	none
Lot-2	Comp # <u>6</u> / Term # <u>4</u>	none	none	none	none	none
Lot-3	Comp # <u>4</u> / Term # <u>3</u>	none	none	none	none	none

SEM Photo @ Post 4000 hr

			
Lot-1: No whisker observed		Lot-2: No whisker observed	

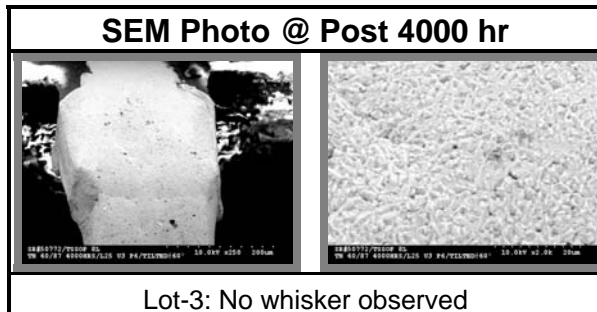
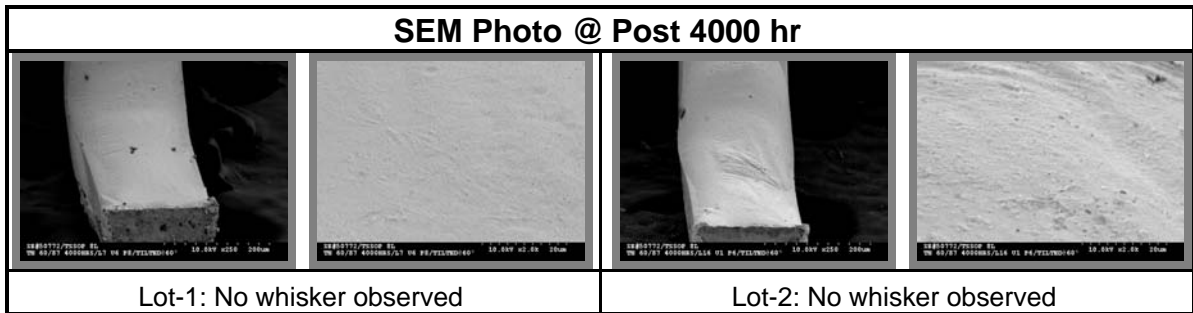
SEM Photo @ Post 4000 hr

	
Lot-3: No whisker observed	

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5.3.7. High Temperature/Humidity (60°C/87%RH) post 255°C simulated reflow

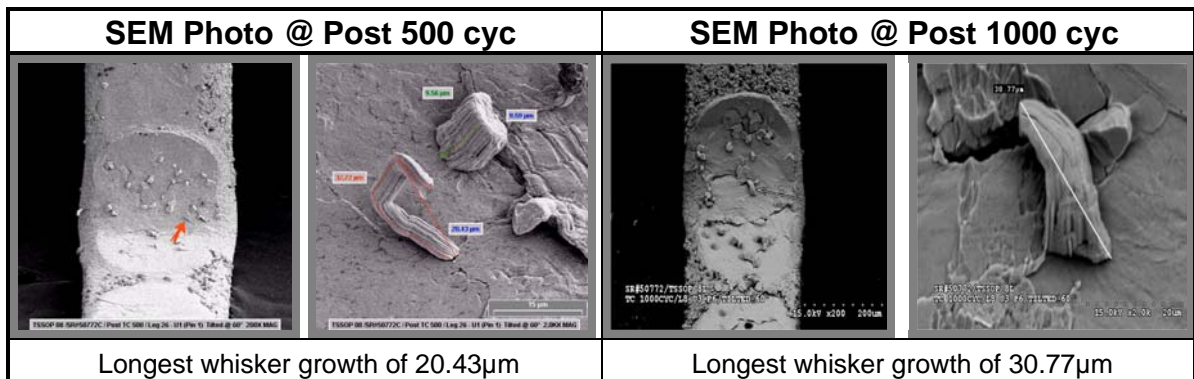
Lot No.	Component # / Termination #	Readpoints				
		0 hr	1000 hr	2000 hr	3000 hr	4000 hr
Lot-1	Comp # <u>6</u> / Term # <u>8</u>	none	none	none	none	none
Lot-2	Comp # <u>1</u> / Term # <u>6</u>	none	none	none	none	none
Lot-3	Comp # <u>3</u> / Term # <u>6</u>	none	none	none	none	none



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5.3.8. Thermal Cycling (-55/85°C) post 215°C simulated reflow

Lot No.	Component # / Termination #	Readpoints			
		0 cyc	500 cyc	1000 cyc	1500 cyc
Lot-1	Comp # <u>1</u> / Term # <u>4</u>	none	18.83µm	-	-
	Comp # <u>3</u> / Term # <u>3</u>	none	16.23µm	-	-
	Comp # <u>3</u> / Term # <u>6</u>	none	-	30.77µm	32.32µm
	Comp # <u>6</u> / Term # <u>8</u>	none	-	18.87µm	22.34µm
Lot-2	Comp # <u>1</u> / Term # <u>3</u>	none	19.94µm	-	-
	Comp # <u>3</u> / Term # <u>3</u>	none	19.02µm	-	-
	Comp # <u>2</u> / Term # <u>5</u>	none	-	20.15µm	-
	Comp # <u>6</u> / Term # <u>5</u>	none	-	22.05µm	25.85µm
	Comp # <u>4</u> / Term # <u>2</u>	none	-	-	30.41µm
Lot-3	Comp # <u>1</u> / Term # <u>1</u>	none	20.43µm	-	-
	Comp # <u>4</u> / Term # <u>1</u>	none	15.58µm	-	-
	Comp # <u>1</u> / Term # <u>4</u>	none	-	30.02µm	32.44µm
	Comp # <u>2</u> / Term # <u>5</u>	none	-	28.53µm	30.00µm


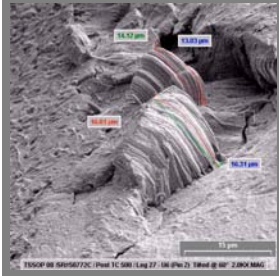
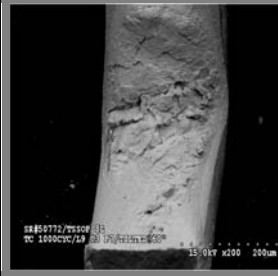



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5.3.9. Thermal Cycling (-55/85°C) post 255°C simulated reflow

Lot No.	Component # / Termination #	Readpoints			
		0 cyc	500 cyc	1000 cyc	1500 cyc
Lot-1	Comp # <u>1</u> / Term # <u>1</u>	none	13.74µm	-	-
	Comp # <u>3</u> / Term # <u>2</u>	none	6.20µm	-	-
	Comp # <u>3</u> / Term # <u>7</u>	none	-	25.99µm	31.49µm
	Comp # <u>5</u> / Term # <u>8</u>	none	-	18.83µm	-
	Comp # <u>4</u> / Term # <u>2</u>	none	-	-	23.67µm
Lot-2	Comp # <u>1</u> / Term # <u>1</u>	none	8.83µm	-	-
	Comp # <u>2</u> / Term # <u>2</u>	none	4.36µm	-	-
	Comp # <u>1</u> / Term # <u>8</u>	none	-	16.55µm	-
	Comp # <u>4</u> / Term # <u>3</u>	none	-	15.44µm	-
	Comp # <u>2</u> / Term # <u>1</u>	none	-	-	15.80µm
	Comp # <u>6</u> / Term # <u>7</u>	none	-	-	17.71µm
Lot-3	² Comp # <u>5</u> / Term # <u>2</u>	none	10.29µm	-	-
	³ Comp # <u>6</u> / Term # <u>2</u>	none	16.31µm	-	-
	Comp # <u>1</u> / Term # <u>5</u>	none	-	10.08µm	13.79µm
	Comp # <u>2</u> / Term # <u>8</u>	none	-	11.27µm	-
	Comp # <u>3</u> / Term # <u>1</u>	none	-	-	13.36µm

Note 2 & 3: Whisker in comp#5 term#2 & comp#6 term#2 were lost at 1000cyc readpoint.

SEM Photo @ Post 500 cyc		SEM Photo @ Post 1000 cyc	
			
Longest whisker growth of 16.31µm		Longest whisker growth of 25.99µm	

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5.4. Appendix

5.4.1. Inspection Equipment

5.4.1.1. Optical Microscope

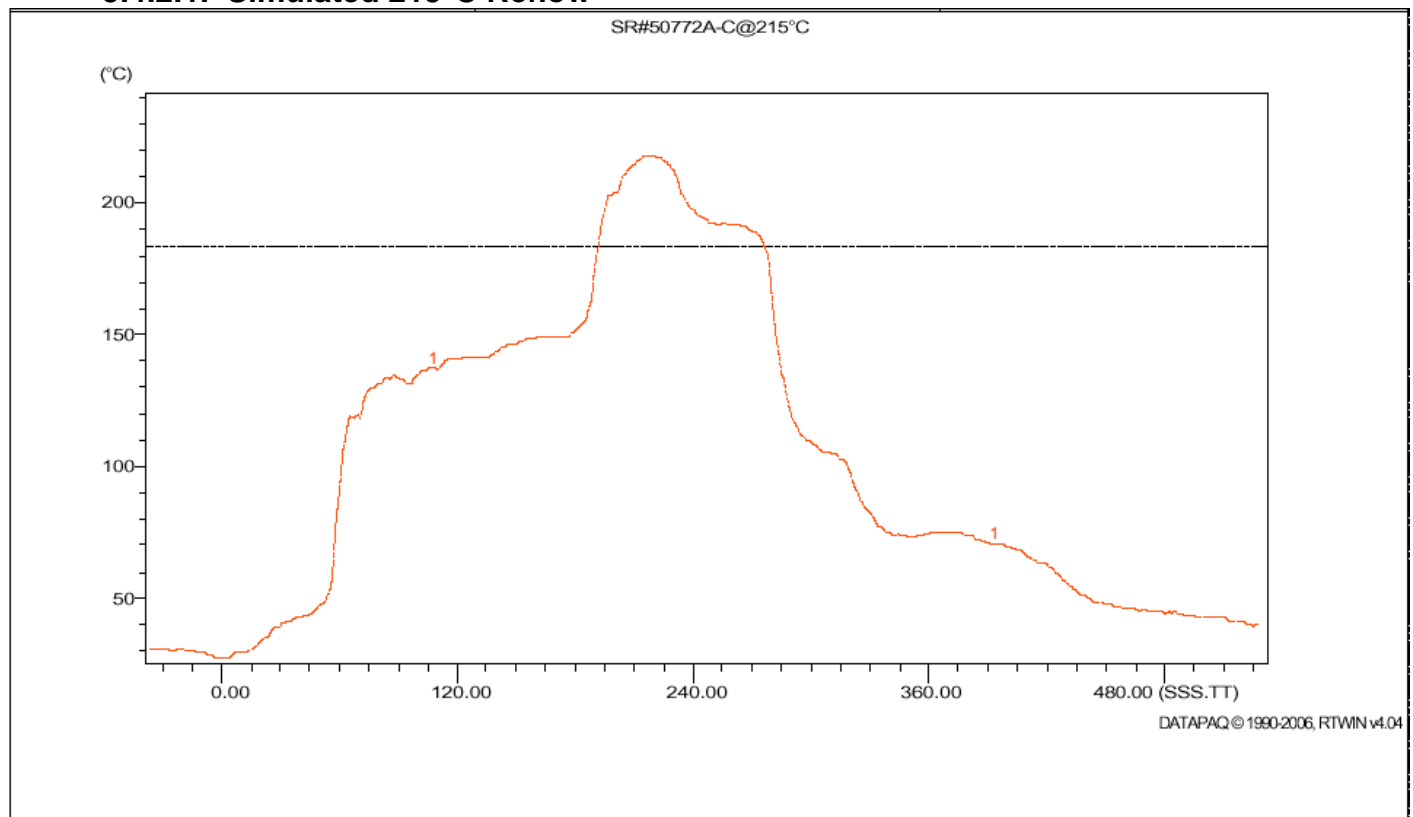
Instrument maker : Olympus
Model number : SZ40
Magnification : 40-60x

5.4.1.2. SEM

Instrument maker : Hitachi
Model number : S4500 & S3000N
Magnification : 500kx

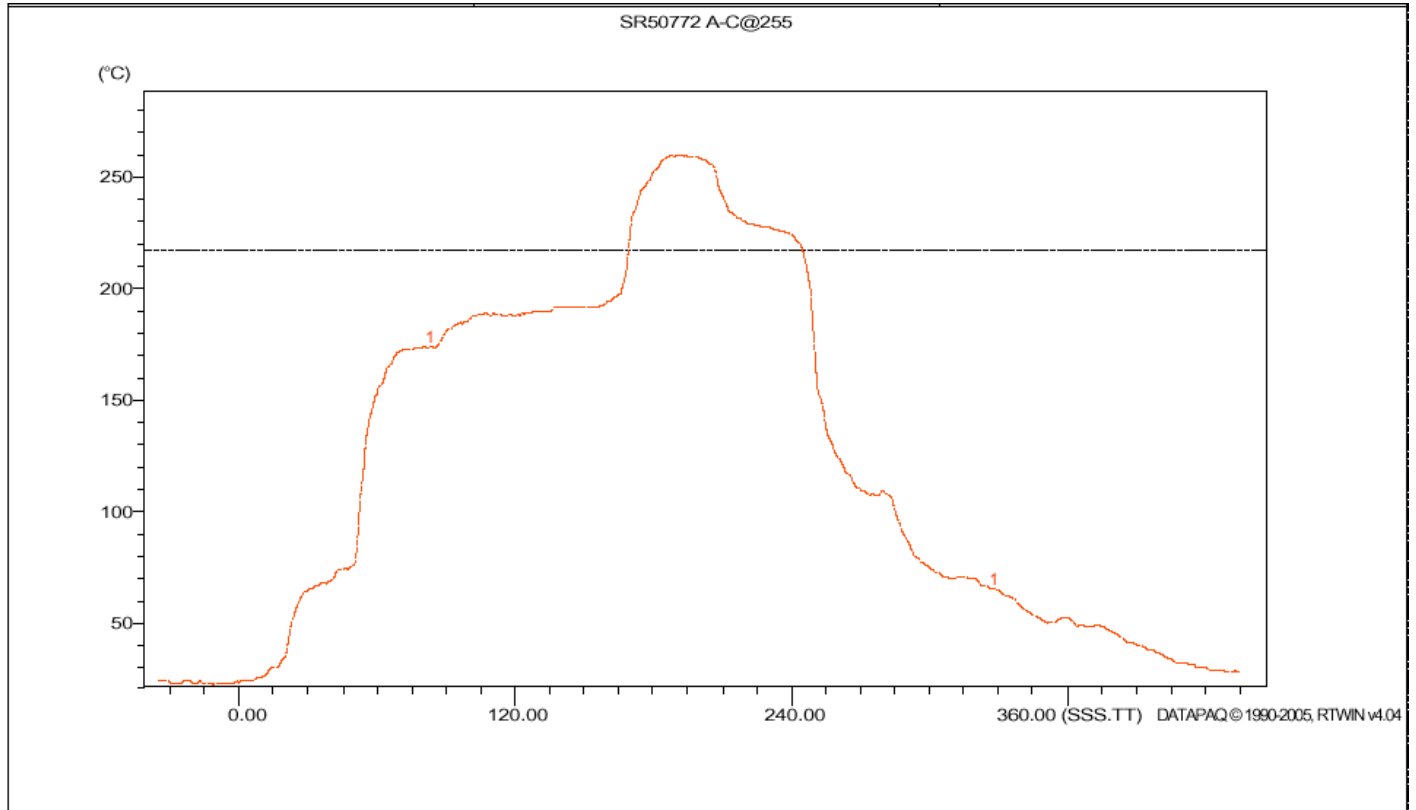
5.4.2. Reflow Profiles

5.4.2.1. Simulated 215°C Reflow



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5.4.2.2. Simulated 255°C Reflow



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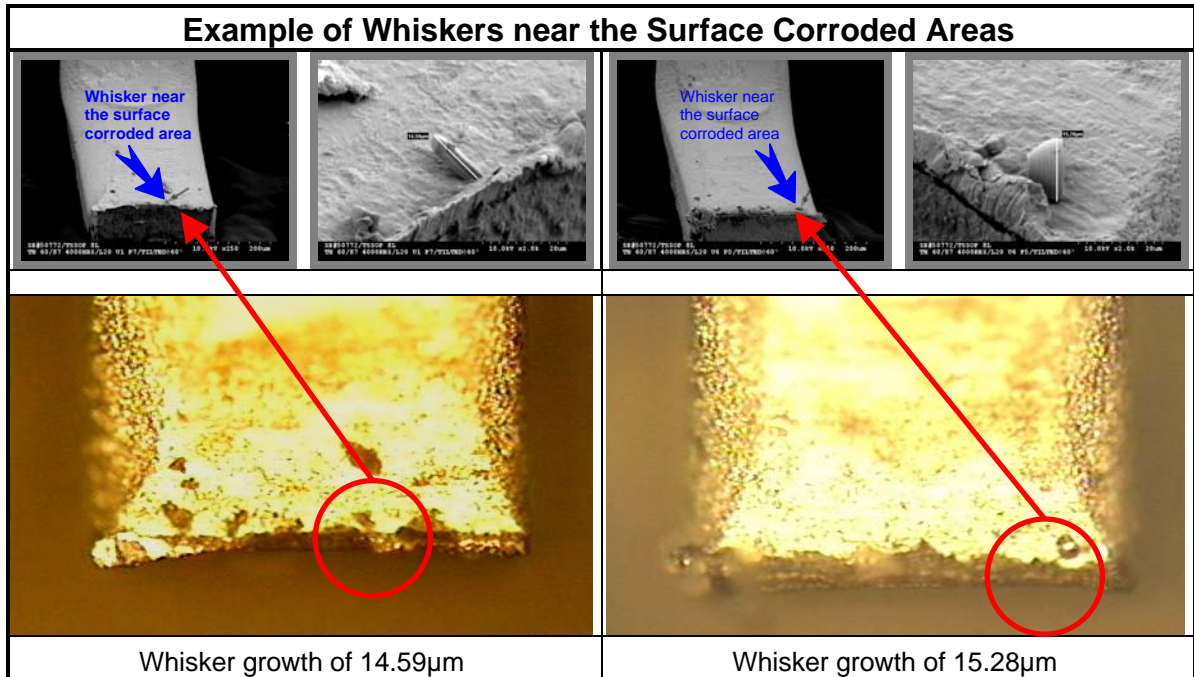
5.4.3. Verification Results of Terminations with Surface Corrosion

5.4.3.1. Surface Corrosion Definition from JEDEC Standard JESD201

Surface Corrosion: A localized change to a silver-colored Sn surface finish appearing in an optical microscope as non-reflective dark spots ranging in size from about 25 micrometers on the longest dimension to the entire termination.

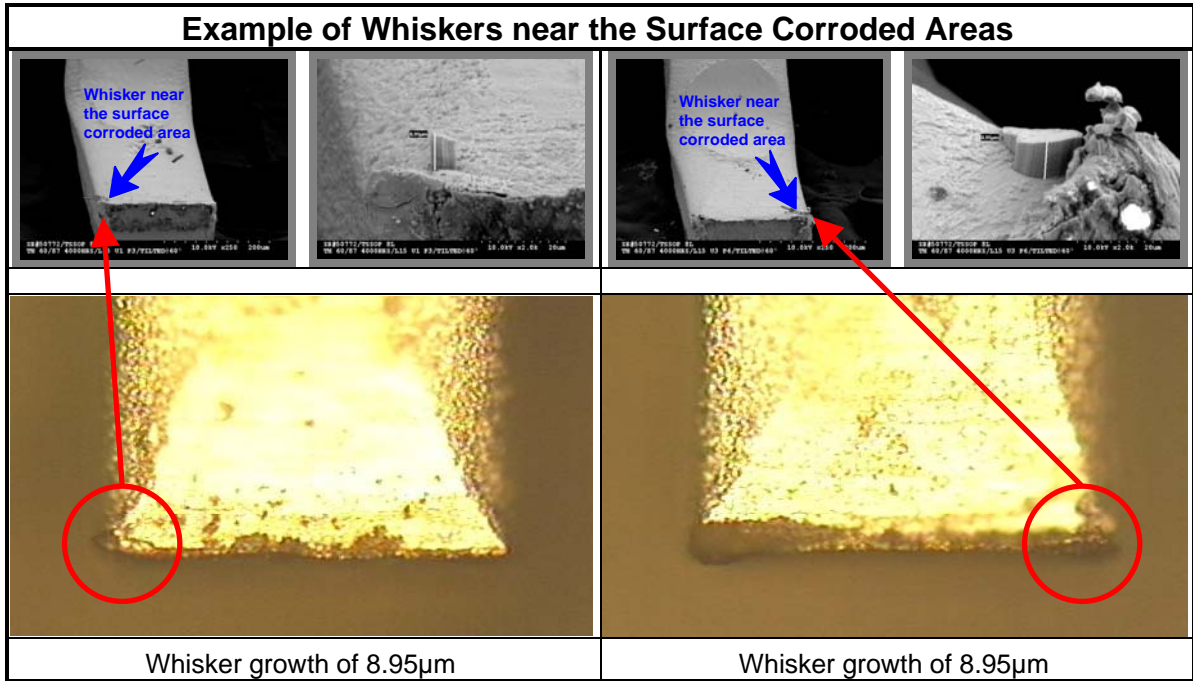
5.4.3.2. Verification of Surface Corrosion at different High Temperature/Humidity Conditions

5.4.3.2.1. High Temperature/Humidity (60°C/87%RH)



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5.4.3.2.2. High Temperature/Humidity (60°C/87%RH) post 215°C simulated reflow



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5.4.3.2.3. High Temperature/Humidity (60°C/87%RH) post 255°C simulated reflow

