Cypress Semiconductor
Tin Whisker Test Report

Tin Whisker Test in TS056 (20 x 14 x 1.2mm) 56 Lead, Thin Small Outline Package at Cypress Thailand

I. Lot Information

1.1 Substrate:	
Package Type	TSOP
Lead Count	56
Assembly Location	Cypress Thailand
Plating Location	Cypress Thailand
Base Material	Cu Alloy
Forming Operation	Stamped
Post Finish Treatment	Anneal Bake at 150°C for 1 hour
Underplating	None

1.2 Plating Finish:	
Alloy Type and Content	100% Sn
Finish Surface	Matte
Plating Chemistry	Technics
Plating Line Manufacturer	Technics
Plating Thickness	400 – 800 U”
Carbon Content	500ppm maximum
Ionic Content	6.45mg NaCl/in^2

1.3 Misc. Details:	
Reference Specification	JESD22-A121 / JESD201
Inspection Methodology	Per JESD22-A121

II. Ambient Room Temperature Storage

2.1 Basic Information:	
Test Condition – Ambient Storage	30+/-2°C & 60+/-3%RH
Cumulative exposure time (hours) or # of cycles at read point	4000 hours
Reference Specification	JESD22-A121 / JESD201

2.2 Preconditioning Conditions:	Precondition
Reflow at specified temperature (See Appendix A for more details)	260°C reflow

2.3 Sample Parameters:	
Number of samples tested	6
Number of Lots	1 (6 units per lot)
Number of terminations or coupon areas inspected per sample	16 per sample, 6 samples at each readpoint
Total number of terminations or coupon areas inspected	384

2.4 Whisker Data:	
1000 hours (max whisker length)	0um
2000 hours (max whisker length)	0um
3000 hours (max whisker length)	0um
4000 hours (max whisker length)	0um

2.5 Observations:	
Number of terminations or coupon areas with whiskers	None
Whisker density (Low, Medium, High per inspected area)	N/A
Type of whisker (kinked, straight, branched)	N/A
Additional Comments / Exceptions	None

III. High Temperature and Humidity Storage

3.1 Basic Information:	
Test Condition – High Temperature and Humidity Storage	60+/-5°C & 87+3/-2%RH
Cumulative exposure time (hours) or # of cycles at read point	4000 hours
Reference Specification	JESD22-A121 / JESD201

3.2 Preconditioning Conditions:	Precondition
Reflow at specified temperature (See Appendix A for more details)	260°C reflow

3.3 Sample Parameters:	
Number of samples tested	6
Number of Lots	1 (6 units per lot)
Number of terminations or coupon areas inspected per sample	16 per sample, 6 samples at each readpoint
Total number of terminations or coupon areas inspected	384

3.4 Whisker Data:	
1000 hours (max whisker length)	0um
2000 hours (max whisker length)	0um
3000 hours (max whisker length)	0um
4000 hours (max whisker length)	0um

3.5 Observations:	
Number of terminations or coupon areas with whiskers	None
Whisker density (Low, Medium, High per inspected area)	N/A
Type of whisker (kinked, straight, branched)	N/A
Additional Comments / Exceptions	None

IV. Temperature Cycling

4.1 Basic Information:	
Test Condition – Temperature Cycling	-55+0/-10°C to +85+10/-0°C, air to air, 3 cycles/hour
Cumulative exposure time (hours) or # of cycles at read point	1500 cycles
Reference Specification	JESD22-A121 / JESD201

4.2 Preconditioning Conditions:	Precondition
Reflow at specified temperature (See Appendix A for more details)	260°C reflow

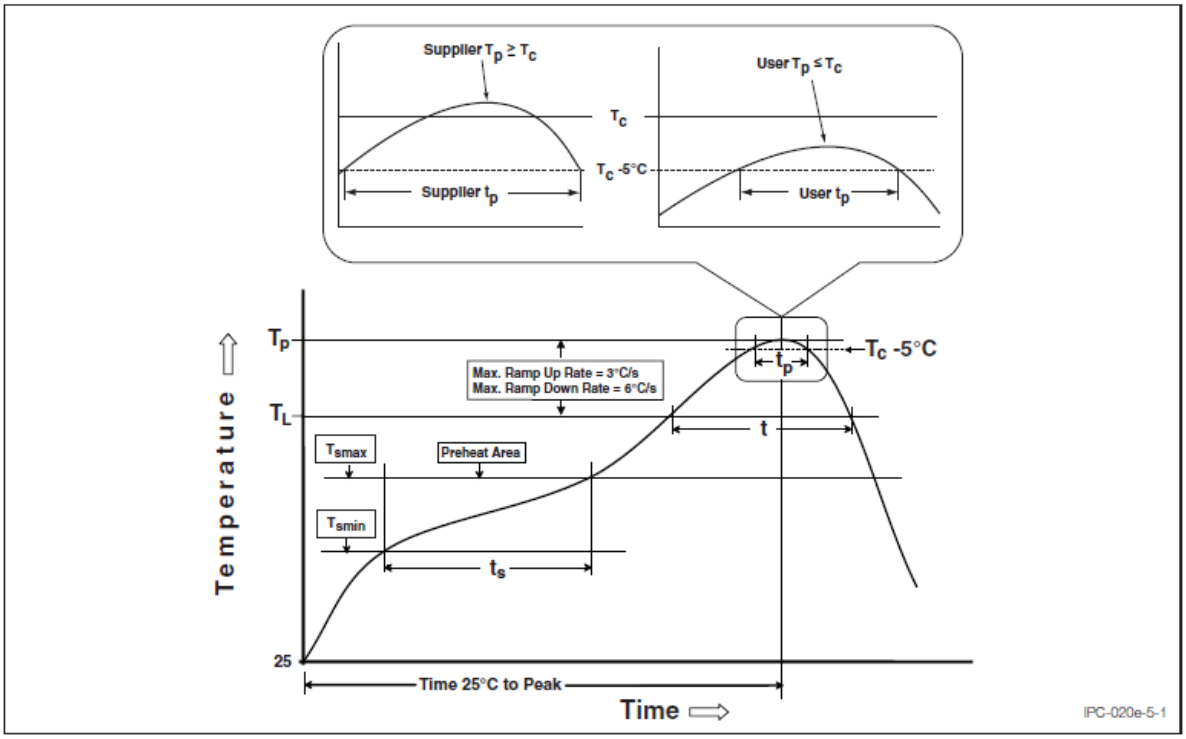
4.3 Sample Parameters:	
Number of samples tested	6
Number of Lots	1 (6 units per lot)
Number of terminations or coupon areas inspected per sample	16 per sample, 6 samples at each readpoint
Total number of terminations or coupon areas inspected	288

4.4 Whisker Data:	
500 cycles (max whisker length)	15.03um
1000 cycles (max whisker length)	23.02um
1500 cycles (max whisker length)	24.27um

4.5 Observations:	
Number of terminations or coupon areas with whiskers	288
Whisker density (Low, Medium, High per inspected area)	Low
Type of whisker (kinked, straight, branched)	Straight and Curved
Additional Comments / Exceptions	All inspected units had whiskers

Appendix A: Reflow Profiles

	Plating Unmelted	Plating Melted
Reference Specification	J-STD-020E	
Average ramp up rate (Ta to Tp)	3°C/sec max	3°C/sec max
Preheat Range	100 to 150°C	150 to 200°C
Preheat time	60-120 secs	60-120 secs
Liquidous Temp	183°	217°C
Time above liquidous temp	60-150 secs	60-150 secs
Peak temp	Varie	Varies
Time (tp)* within 5°C of the specified classification temperature (Tc), see figure below	20* secs	30* secs
Ramp down rate	6°C/sec max	6°C/sec max
Time to peak temp	6 mins max	8 mins max



Schematic of the Reflow Profile (Source: IPC/JEDEC J-STD-020E)

V. Revision History

Document Number: 002-20161

Document Title: Tin Whisker Test in TS056 (20 x 14 x 1.2mm) 56 Lead, Thin Small Outline Package at Cypress Thailand

Rev.	ECN No.	Issue Date	Originator of Change	Description of Change
**	5782697	06/15/2017	BAKC	Initial release

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