

# **Amkor Technologies Flip-Chip Package Assembly**

## ***Qualification Report***

RPT084 (v1.0) August 24, 2007





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## Revision History

The following table shows the revision history for this document.

Date	Version	Revision
08/24/07	1.0	Initial Xilinx release.

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# *Amkor Technologies Flip-Chip Package Assembly Qualification*

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## **Overview**

This report summarizes the Reliability Test results collected to date that were performed to qualify Amkor Technologies as an assembly site for Flip-Chip packaged devices.

All qualification lots completed reliability stress tests, except one Temperature Humidity Biased (THB) lot that completed 500 hours and passed at the post-electrical test. The THB lot is being continued to 1000 hours. When the 1000-hour data become available, this report will be updated with these additional data.

## **Qualification Objective**

The objective of this qualification is to qualify Amkor Technologies as an assembly site for manufacturing the Flip-Chip packaged devices.

## Qualification Matrix

Table 1: Qualification Matrix

Package Size	27 mm			31 mm	35 mm		40 mm	
Pin count	FF(G)672	FF(G)668	FF(G)676	FF(G)896	FF(G)1148	FF(G) 1152	FF(G)1513	FF(G)1517
XC2VP2	A							
XC2VP4	A							
XC2VP7	A			A				
XC2VP20				A		A		
XC2VP30				A		A		
XC2VP40					A	A		
XC2VP50					A	A (TV)		A
XC4VSX25		B						
XC4VSX35		B						
XC4VSX55					C			
XC4VFX12		B						
XC4VFX20	B							
XC4VFX40	B					C		
XC4VFX60	B					C		
XC4VFX100						C		D
XC4VFX140								D
XC4VLX15		B	B					
XC4VLX25		B	B					
XC4VLX40		B			C			
XC4VLX60		B (TV)			C			
XC4VLX80					C			
XC4VLX100					C (TV)		D	
XC4VLX160					D		D	
XC4VLX200							D (TV)	

In Table 1, the test vehicles marked with X (TV), where X = A, B, C, or D, were selected based on their similarity and die size. The packaged devices marked with A, B, C, and D are qualified by extension of A (TV), B (TV), C (TV), and D (TV) respectively.

## Reliability Test Conditions and Results

The qualification vehicles were selected from several different product families as well as several different package sizes and pin counts for reliability tests. [Table 2](#) provides a summary of the qualification.

**Table 2: Qualification Summary**

Test	Conditions	Test Vehicle	Lot Qty	Cum Device-Hr/Cyc	# of Failures
TC-B <sup>(1)</sup>	-55 to +125°C	XC2VP50/FFG1152	2	145,000	0
		XC4VLX60/FFG668	1	82,000	0
		XC4VLX100/FFG1148	6	144,000	0
		XC4VLX200/FFG1513	1	75,000	0
THB <sup>(1)</sup>	85°C, 85%RH, V <sub>DDMAX</sub>	XC4VLX100/FFG1148	6	74,000	0
HTS <sup>(2)</sup>	T <sub>A</sub> =150°C	XC4VLX100/FFG1148	6	96,000	0
TH <sup>(1)</sup>	85°C, 85%RH	XC4VLX100/FFG1148	6	90,000	0

**Notes:**

1. Level-4 preconditioning applied to THB and TC-B samples prior to the stress tests.
2. Reflow (3X) applied to HTS samples prior to the stress test.

Based on the data gathered thus far, XC2VP50/FFG1152 [A(TV)], XC4VLX60/FFG668 [B(TV)] and XC4VLX200/FFG1513 [D(TV)] have completed all the stress tests and met the requirements for production release. XC4VLX100/FFG1148 will be qualified pending the completion of a 1000-hour THB on 1 lot.

## Environmental Stress Data

Table 3: Environmental Stress Data

Test	Conditions	Rel #	Device	Package	Samples	Duration	Fail Qty	
TC-B <sup>(1)</sup>	-55 to +125°C	208207	XC2VP50	FFG1152	73	1,000 cycles	0	
		208307	XC2VP50	FFG1152	72	1,000 cycles	0	
		203807	XC4VLX60	FFG668	82	1,000 cycles	0	
		234207	XC4VLX200	FFG1513	75	1,000 cycles	0	
		213607	XC4VLX100	FFG1148	24	1,000 cycles	0	
		214007	XC4VLX100	FFG1148	24	1,000 cycles	0	
		214407	XC4VLX100	FFG1148	24	1,000 cycles	0	
		214807	XC4VLX100	FFG1148	24	1,000 cycles	0	
		215207	XC4VLX100	FFG1148	24	1,000 cycles	0	
		215607	XC4VLX100	FFG1148	24	1,000 cycles	0	
THB <sup>(1)</sup>	85°C, 85%RH, V <sub>DDMAX</sub>	213807	XC4VLX100	FFG1148	14	500 hrs <sup>(3)</sup>	0	
		214207	XC4VLX100	FFG1148	14	1,000 hrs.	0	
		214607	XC4VLX100	FFG1148	13	1,000 hrs.	0	
		215007	XC4VLX100	FFG1148	14	1,000 hrs.	0	
		215407	XC4VLX100	FFG1148	13	1,000 hrs.	0	
		215807	XC4VLX100	FFG1148	13	1,000 hrs.	0	



Table 3: Environmental Stress Data (Continued)

Test	Conditions	Rel #	Device	Package	Samples	Duration	Fail Qty	
HTS <sup>(2)</sup>	T <sub>A</sub> = 150°C	213707	XC4VLX100	FFG1148	16	1,000 hrs.	0	
		214107	XC4VLX100	FFG1148	16	1,000 hrs	0	
		214507	XC4VLX100	FFG1148	16	1,000 hrs	0	
		214907	XC4VLX100	FFG1148	16	1,000 hrs	0	
		215307	XC4VLX100	FFG1148	16	1,000 hrs	0	
		215707	XC4VLX100	FFG1148	16	1,000 hrs	0	
TH <sup>(1)</sup>	85°C, 85%RH, No bias	213907	XC4VLX100	FFG1148	15	1,000 hrs.	0	
		175807	XC4VLX100	FFG1148	15	1,000 hrs.	0	
		174707	XC4VLX100	FFG1148	15	1,000 hrs	0	
		215107	XC4VLX100	FFG1148	15	1,000 hrs	0	
		215507	XC4VLX100	FFG1148	15	1,000 hrs	0	
		215907	XC4VLX100	FFG1148	15	1,000 hrs	0	

**Notes:**

1. Level-4 preconditioning applied to THB and TC-B samples prior to the stress tests.
2. Reflow (3X) applied to HTS samples prior to the stress test.
3. The THB lot is being continued to 1,000 hours.

