



**Qualify Amkor Std PQ208 or Smaller Package using Qualification Result  
from PA-057 and Amkor Solderability data on Std external lead finish -  
85%Sn/15%Pb**

**February 09, 2005**

**PA-060 Revision 0**



# ACTEL RELIABILITY QUALIFICATION REPORT

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### Product Introduction:

Qualify Amkor Std PQ208 or Smaller Package using Qualification Result from PA-057 and Amkor Solderability data on Std external lead finish - 85%Sn/15%Pb.



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## Section 1: Packaging and assembly process flow

Vendor: Amkor Korea

Process per Spec. # , 1-04-11120, Assembly Baseline Requirement – ATK

Bill of Material: Mold : Sumitomo G700M

Epoxy : Ablebond 3230

Lead Finish: 85%Sn/15%Pb

Bonding Diagram No. 1-8A-11454

## Section 2: Qualification Summary(s):

### Qualification Results Summary

<b>QUALIFICATION # PA-060</b>			<b>DATE:</b> 02/09/05
<b>Qualification Description:</b> Qualify Amkor Std PQ208 or Smaller Package using Qualification Result from PA-057 and Amkor Solderability data on Std external lead finish - 85%Sn/15%Pb.			
<b>Qualification Vehicle:</b>	APA1000 <sup>2</sup>	<b>Package:</b>	PQ208
<b>Wafer lot number:</b>	MH6PA <sup>2</sup>	<b>Date Code:</b>	0440
<b>MESA Lot Number</b>	40735	<b>Fab:</b>	UMC
<b>PCN Required?</b>	Yes	<b>PCN#</b>	
<b>Qualification Results &amp; Conclusion:</b>			
Note: 2 -Amkor Std PQ208 or Smaller Package using Qualification Result from PA-057 and Amkor Solderability data on Std external lead finish - 85%Sn/15%Pb passed qualification. For other qualified devices see "Appendix A".			
1. Old Mold Compound: Nitto MP8000CH4			
2. New Mold Compound: Sumitomo G700M			

### Qualification Results Summary

Stress Test	Test Condition	No. of Qual Lots	# Failures / Sample Size	Test Duration Pull Point	Failure Analysis Results/Mechanism
<b>Precondition</b> Level 3 JESD22-A113 <sup>2</sup>	30°C/60%RH for192 hrs 260°C +0°C Reflow Temp	3	0/342	End	Pass Electrical Test <sup>4</sup>
Temp Cycle Level 3 (A104) <sup>2</sup>	-65°C to 150°C Cond. C, 1Kcycles	3	0/114	500 Cy 1000 Cy	Pass Electrical Test <sup>4</sup> Pass Electrical Test <sup>4</sup>
High Temp Storage (A103) <sup>2</sup>	150°C No biased	3	0/114	1000 Hrs	Pass Electrical Test <sup>4</sup>
HAST unbiased (A110) <sup>2</sup>	130°C, 85% RH unbiased	3	0/114	100 Hrs	Pass Electrical Test <sup>4</sup>
Wire Pull Min, 4 grams <sup>2</sup>	TM 2010	3 (45 wires/lot)	0/135		Pass, Cpk > 2.94
Bond Shear Min. 19 gf <sup>2</sup>	B116	3 (45 wires/lot)	0/135		Pass, Cpk > 1.78
Die Shear LSL 2.5 kgf <sup>2</sup>	TM 2019	3 (5 units/lot)	0/15		Ave. ≥ 33.5 kgf
Physical Dimension <sup>2</sup>	B100	3 (10 units / lot)	0/30		Pass, Cpk ≥ 3.21



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X-Ray <sup>2</sup>	Vendor	3 (30 units / lot)	0/90		Pass
Flammability <sup>2</sup>	UL94	---	---		Rated as "V0"
Solderability Test 85%Sn/15%Pb Lead finish <sup>3</sup>	B102	65	0/325 lots		Pass

### Notes and References:

1. BOM: Die Attach=Ablestik 3230, Mold=G700M & Lead Finish=85%Sn/15%Pb
2. Qualification # PA-057 – Qualify Amkor PQ208 or Smaller Package using Green Material for APA Family 13.81x13.38mm die size or smaller.
  - The report qualified Amkor Korea's green material (mold, die attach and 100%Sn plating) on APA1000-PQ208.
  - Test result from this report will be used to justify the reliability of the mold compound and die attach materials.
  - The MRT L3 for green material calls for peak reflow temperature of 260°C
3. Amkor Solderability data for Tin-Lead (85%Sn/15%Pb) external lead finish from 11/8/04 to 2/2/05.
4. Commercial Test Program: APA1000-xls

### Appendix A

#### Device/Package Type Qualified

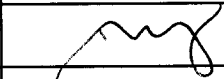
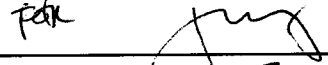
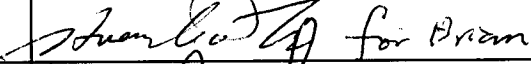
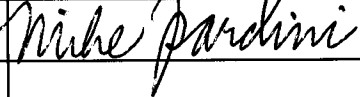
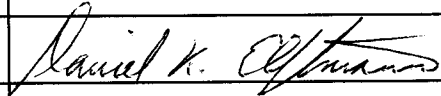
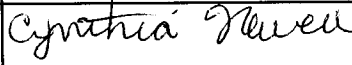
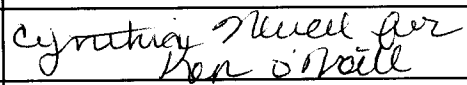
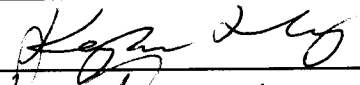


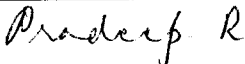

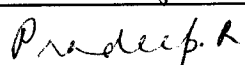
Device	Package	Qual Vehicle
APA1000	PQ208	
APA750	PQ208	
APA600	PQ208	
APA450	PQ208	
APA300	PQ208	
APA150	PQ208	
APA075	PQ208	



# ACTEL RELIABILITY QUALIFICATION SUMMARY

Qualification Release Approval:	Date:	02/09/05
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## Qualification Release Approval Sign-Off

	<u>Department</u>	<u>Name</u>	<u>Signature</u>	<u>Date</u>
X	Originator	Julio Moral		2/9/05
X	Packaging Engineering	Raymond Kuang		2/9/05
X	Technology Development	Brian Cronquist	 for Brian	2/9/05
X	Operations Planning	Mike Pardini		2/9/05
	Yield Enhancement			
X	Product Engineering	Dan Elftmann		2/9/05
	Test Operations			
X	Customer Marketing	Cindy Newell		2/9/05
X	Product Marketing	Ken O'Neil		2/9/05
	Test Engineering			
X	HiRel Program Management	Kangsen Huey		2/9/05
X	Engineering	Esam Elashmawi	 for Esam	2/9/05
	Software			
X	Quality	 Nawal Cotran		02/9/05
X	TRB Chairperson	 Tejpal Sahota		02/9/05