



**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

QUALIFICATION # PA-060		<u>DATE:</u> 02/09/05	
Qualification Description: 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.			
Qualification Vehicle:	APA1000 ²	Package:	PQ208
Wafer lot number:	MH6PA ²	Date Code:	0440
MESA Lot Number	40735	Fab:	UMC
PCN Required?	Yes	PCN#	
Qualification Results & Conclusion:			
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
Precondition Level 3 JESD22-A113 ²	30 ⁰ C/60%RH for192 hrs 260 ⁰ C +0 ⁰ C Reflow Temp	3	0/342	End	Pass Electrical Test ⁴
Temp Cycle Level 3 (A104) ²	-65°C to 150°C Cond. C, 1Kcycles	3	0/114	500 Cy 1000 Cy	Pass Electrical Test ⁴ Pass Electrical Test ⁴
High Temp Storage (A103) ²	150°C No biased	3	0/114	1000 Hrs	Pass Electrical Test ⁴
HAST unbiased (A110) ²	130 ⁰ C, 85% RH unbiased	3	0/114	100 Hrs	Pass Electrical Test ⁴
Wire Pull Min, 4 grams ²	TM 2010	3 (45 wires/lot)	0/135		Pass, Cpk > 2.94
Bond Shear Min. 19 gf ²	B116	3 (45 wires/lot)	0/135		Pass, Cpk > 1.78
Die Shear LSL 2.5 kgf ²	TM 2019	3 (5 units/lot)	0/15		Ave. ≥ 33.5 kgf
Physical Dimension ²	B100	3 (10 units / lot)	0/30		Pass, Cpk ≥ 3.21



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

Notes and References:

- BOM: Die Attach=Ablestik 3230, Mold=G700M & Lead Finish=85%Sn/15%Pb
- 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 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
- Amkor Solderability data for Tin-Lead (85%Sn/15%Pb) external lead finish from 11/8/04 to 2/2/05.
- 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		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		2/9/05
	Software			
X	Quality	Nawal Cotran		02/9/05
X	TRB Chairperson	Tejpal Sahota		02/9/05