



ACTEL RELIABILITY QUALIFICATION SUMMARY

QUALIFICATION # FP-146 (Amendment 1)		DATE: 10/24/08 Original Approval 9/2/08	
Qualification Description: A3P1000 Rev A Commercial Qualification, 0.13μ process at UMC			
Qualification Vehicle:	A3P1000 Rev A	Package:	FGG256
Wafer lot number:	QHJHT	Date Code:	0828
MESA Lot Number	58914	Fab:	UMC
PCN Required?	Yes	PCN#	TBD
Qualification Results & Conclusion:			
<p>A3P1000 (Rev A) Commercial Qualification, 0.13μ process at UMC has passed per commercial qualification requirements.</p> <p>Amendment1: Updated qualification summary with applicable reliability data.</p>			

Notes and References:

AGL1000 (FP-133), A3PE3000 (FP-129), and AGL600 (FP-110) qualification summaries apply, additional reliability activities not required for A3P1000 Rev A material. Refer to Appendix A for additional information.

NVM studies (SILC, HTR, Endurance, and HCI) are covered by AGL600 (FP-110) qualification, AGL600 vs. A3P1000 :

- No changes to form, fit or function of the NVM cell.
- No changes to the internal program or erase voltages generated on chip
- No changes to the charge coupled on or off the floating gate.

CMOS studies (HTOL) are covered by A3PE3000 (FP-129) and AGL1000 (FP-133) qualifications, A3PE3000 vs. A3P1000:

- No changes to fabrication site
- No changes to silicon design rules and device technology profile (DTP)

Package studies (FGG484 - HAST, Temp. Cycle, and HTS) are covered by A3PE3000 (FP-129) qualification. Additional package specific qualification data can be provided upon request.

I/O studies (ESD, Latchup, and I/O capacitance) are covered by AGL1000 (FP-133) qualification, AGL1000 Rev A vs. A3P1000 Rev A:

- No changes to mask set



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APPENDIX A

Qualification Results Summary (FP-110)

Stress Test	Test Condition	No. of Qual Lots	# Failures / Sample Size	Test Duration Pull Point	Failure Analysis Results/Mechanism
Flash SILC (low Vt, high Vt)	Room temp; 110% of 500 cycles FGG256 package 1-04-12008	3	0/129 : high Vt <100 FIT : low Vt Checkerboard	72, 500, 644, 1000 hours	Passed
Flash HTR (low Vt, high Vt)	250°C; 110% of 500 cycles CQ208 package 1-04-12007	3	0/129 : high Vt <100 FIT : low Vt checkerboard	72, 168, 500, 1000 hours	Passed
Flash Endurance	Room temp; nominal voltages 110% of 500 Program/Erase Cycles FGG256 package JESD 22 A117 1-01-12006	3	0/129	110% of 500 Program/Erase Cycles	Passed
HCI	Ta=-55°C, Vcc = 1.875V, 75MHz FGG256	1	0/6	224 Hours (Equivalent to 20 years, Vcc=1.575V)	Passed

Qualification Results Summary (FP-129)

Stress Test	Test Condition	No. of Qual Lots	# Failures / Sample Size	Test Duration Pull Point	Failure Analysis Results/Mechanism
High Temperature Operation Life HTOL	Ta=125°C; Tj =135.24°C; Vcc = 1.6V; FGG484 package JESD A108 TM 1015	1	0/129	168, 500, 1000, 2000 hours	Passed
Temperature Cycle	TM 1010, Cond B -55C to 125C	3	0/77	1000 cycles	Passed
HTS	Ta=150°C FGG484 package JESD22-A103	1	0/77	1000, 2000hrs	Passed
HAST (Biased)	Biased, Ta = 110°C, RH = 85%, Vcc = 1.6V FGG484 package JESD 22 A110	3	0/77	264hrs	Passed



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Qualification Results Summary (FP-133)

Stress Test	Test Condition	No. of Qual Lots	# Failures / Sample Size	Test Duration Pull Point	Failure Analysis Results/Mechanism
High Temperature Operation Life HTOL	Ta=125°C; Tj = 132°C; Vcc = 1.6V; FGG484 package JESD A108 TM 1015	1	0/129	168 hours, 1000 hours	Passed
ESD	TM 3015, JESD22 A114 mandatory, A115 opt FGG484 package	1	0/3	HBM 2kV	Passed
ESD	CDM : JESD22-C101-A FGG484 package	1	0/3	CDM 200V	Passed
Capacitance Test	Measure at room temperature, TM3012 FGG484 package	1	0/6		Passed
Latch-up	FGG484 package JEDEC 78	1	0/6		Passed

