Objective:	To Qualify the TSMC 11 as 2nd source for Proton/Veyron ASIC, 0.18 MS ULL OTP Fab Expansion						
Freescale PN / Part Name:	MMA8450Q, *51Q, *52Q, *53Q	Customer Name / PN:	General			Plan-Results Revision	12-Jul-11
Technology & Package:	TSMC 0.18. micron ASIC, HD Poly MEMS Package = 16 pin 3x3x1.0 mm QFN - lead free. Package code technology codes - 003Z	QUARTZ Tracking #:	212099				
Fab Assembly Final Test	ASIC = TSMC / G-cell = OHT Carsem KLM	Design Engr/ Phone #:	Sung-Jin Jo				(Signature/Date may be electronic)
Maskset / Rev#:	G-cell: DA01M00Z ASIC: DA00N16D	Product Engr/ Phone #:	Patricia Monteilh			Prepared By Signature/Date:	Bobby Mays 20-Sept-2010
Die Size (in um) W x L x T	ASIC=1.955x0.931mm (1.82mm2) G-cell=2.09x1.32mm (2.76mm2)	NPI PRQE/ Phone #:	Bobby Mays			NPI Quality Approval Signature/Date:	Bobby Mays 03-Jun-2010
Part Operating Temperature Grade:	3 -40 C to +85 C	Lot Trace/Date Codes:	LOT A 8EMPTP341500 3DUG	LOTB 8EMPTP341600 3DUG	LOT C 8EMPTP341700 3DUG	LOT X 8EMPTP341800 (Fab3) 3DUG	CAB Approval Signature/Date: SASD CAB WW22 2011 03-0Jun-2011

GROUP A - ACCELERATED ENVIRONMENTAL STRESS TESTS

Green Cells Indicate Tests that will be performed

Stress Test Location (Tempe or KLM)	Stress	Reference M=MIL883 J=JESD22	Stress Conditions (Test Conditions shown below are typical. Modifications must be explained in the comment section)	Electrical Testing After Stress: Req' Stress Readpoints	Electrical Testing After Stress: Req'd Test Temps	Min Sample Size	# of Lots	Total Units	Qual Acceptance Criteria	Results LotID-(#Rej/SS)	Stress Test Selection: Req'd (X)	Stress Test Selection: Not Req'd (X)	Stress Test Selection: Re-use Data (X)	Stress Test Selection: If not required, explain. If data is re-used, input device name and quartz number.	Comments
Tempe	**PC (Preconditioning)**	JA 113	Preconditioning required for **THB, UHAST,** and **TC** **Preconditioning Conditions:** -Moisture Sensitivity Level (MSL) = 3 -Reflow temp = 260 +5 /- 0℃ **CSAM** -Perform CSAM on 5 units before and after precond		Room = 25 C Hot = 85 C	All	All	All	N/A	Lot A (0/240) Lot B (0/240) Lot C (1/240) Lot X (FAB3)-(0/113)	X				This preconditioning is performed on samples prior to UnBiased HAST. Temp Cycle and THB 1 unit failed PC - See CQI #447020A (root cause - particle between metal lines). An additional 130 units were re-run through PC with 0/130 failures.
Tempe	**THB**	JA101 JA110	**THB Conditions (after preconditioning):** Temperature = 85℃ Humidity = 85% Bias = 3.6V **CSAM on 5 units after THB**	168 hrs (QP) 504 hrs & 1008 hrs (FIO) Electrical testing must occur within 48 hrs after stress readpoint.	Room = 25 C Hot = 85 C	77	3	271	Zero Electrical Test Failures Zero CSAM Failures	Lot A (0/80) Lot B (0/80) Lot C (0/80) Lot X (Fab3)-(0/27)	X				
Tempe	**UHST**	JA102 JA118	**UHAST Conditions (after preconditioning):** -Temperature = 130 ℃ -Humidity = 85%	96 hrs Electrical testing must occur within 48 hrs after stress readpoint.	Room = 25 C Hot = 85 C	77	3	271	Zero Electrical Test Failures	Lot A (0/80) Lot B (0/80) Lot C (0/80) Lot X (Fab3)-(0/43)	X				
Tempe	**TC**	JA104	**TC Conditions (after preconditioning):** -Temperature = -40 to 125℃ CSAM: 5 units after each temp cycle readpoint.	200 cyc (QP) 500, 1000 & 1500 cyc (FIO)	Room = 25 C Hot = 85 C	77	3	271	Zero Electrical Test Failures Zero CSAM Failures	Lot A (0/79) Lot B (0/80) Lot C (0/80) Lot X (Fab3)-(0/43)	X				

TEST GROUP B - ACCELERATED LIFETIME SIMULATION TESTS

Stress Test Location (Tempe or KLM)	Stress	Reference M=MIL883 J=JESD22	Stress Conditions (Test Conditions shown below are typical. Modifications must be explained in the comment section)	Electrical Testing After Stress: Req' Stress Readpoints	Electrical Testing After Stress: Req'd Test Temps	Min Sample Size	# of Lots	Total Units	Qual Acceptance Criteria	Results LotID-(#Rej/SS)	Req'd (X)	Not Req'd (X)	Re-use Data (X)	If not required, explain. If data is re-used, input device name and quartz number.	Comments

Tempe	**HTOL**	JA108	**High Temp Op Life Conditions;** Temperature =125°C Bias = 3.6V	168 hrs (QP) 504 hrs & 1008 hrs (FIO) - Electrical testing must occur within 96 hrs after stress readpoint.	Room = 25 C Hot = 85 C Cold = -40 C	77	3	271	Zero Electrical Test Failures	Lot A (0/80) Lot B (0/80) Lot C (0/80) Lot X (Fab3)-(0/43)	X				
Tempe	**ELFR**	JA108	Early Life Failure Rate Conditions; Temperature =125°C Bias = 3.6	48 hrs	Room = 25 C Hot = 85 C	306	3	918	Zero Electrical Test Failures	Lot A (0/306) Lot B (0/306) Lot C (0/306)	X				
	TEST GROUP C - PACKAGE ASSEMBLY INTEGRITY TESTS														
				Electrical Testing After Stress											
Stress Test Location (Tempe or CARSEM)	**Stress**	**Reference M=MIL883 J=JESD22**	**Stress Conditions (Test Conditions shown below are typical. Modifications must be explained in the comment section)**	**Req' Stress Readpoints**	**Req'd Test Temps**	**Min Sample Size**	**# of Lots**	**Total Units**	**Qual Acceptance Criteria**	**Results LotID-(#Rej/SS)**	**Req'd (X)**	**Not Req'd (X)**	**Re-use Data (X)**	**If not required, explain. If data is re-used, input device name and quartz number.**	**Comments**
CARSEM	**WBS**	AEC Q100-001	Wire Bond shear	N/A	N/A	30 bonds from minimum 5 units	3	15	Cpk = or > 1.67	Lot A - Cpk>1,67 Lot B - Cpk>1,67 Lot C - Cpk>1,67	X				
CARSEM	**WBP**	M2011	Wire Bond Pull Cond. C or D	N/A	N/A	30 bonds from minimum 5 units	3	15	Cpk = or > 1.67	Lot A - Cpk>1,67 Lot B - Cpk>1,67 Lot C - Cpk>1,67	X				
CARSEM	**SD**	JB102	Solderability; 8hr. Steam age (1 hr. for Au-plated leads) prior to test on devices which have received Burn-in. Sample 1 test to be performed in Sn63/Pb37 solder bath. Sample 2 test to be performed in Sn-Ag(3.9+0/-0.5%)-Cu(0.6+0/-0.2%) solder bath.	N/A	N/A	15	1	15	>95% lead coverage of critical areas	N/A			X	Re-use data from original qual, #169117. Same assembly BOM	
CARSEM	**PD**	JB100	Physical Dimensions - PD per 98A drawing	N/A	N/A	10	3	30	Cpk = or > 1.67	N/A			X	Re-use data from original qual, #169117. Same assembly BOM	
Tempe	**DIMENSIONAL & BOM VERIFICATION**		N/A	N/A	N/A	10	3	30	PPE to verify PD against valid 98A drawing. PPE to verify qual lot ERF BOM is accurate.	N/A			X	Re-use data from original qual, #169117. Same assembly BOM	
	TEST GROUP D - DIE FABRICATION RELIABILITY TESTS														
				Electrical Testing After Stress											
Stress Test Location (Tempe or KLM)	**Stress**	**Reference M=MIL883 J=JESD22**	**Stress Conditions (Test Conditions shown below are typical. Modifications must be explained in the comment section)**	**Req' Stress Readpoints**	**Req'd Test Temps**	**Min Sample Size**	**# of Lots**	**Total Units**	**Qual Acceptance Criteria**	**Results LotID-(#Rej/SS)**	**Req'd (X)**	**Not Req'd (X)**	**Re-use Data (X)**	**If not required, explain. If data is re-used, input device name and quartz number.**	**Comments**
TSMC 11	**EM**		Electro Migration							N/A			X	Re-use data from FAB11 original qual, 0.18u MS. Report "T018CLQR023_2_0.pdf"	
TSMC 11	**TDDB**		Time Dependent Dielectric Breakdown							N/A			X	Re-use data from Fab3 Original 0.18u MS qual.	
TSMC 11	**HCI**		Hot Carrier Injection							Pass	X				Data provided by TSMC: 'TSMC 0.18um Mixed Signal Ultra-Low Leakage (ULL) with OTP 1P6M Salicide Al_FSG 1.8&3.3V Qualification Report - Fab11' - TSMC Doc No.: T-018-CM-QR-054.
	TEST GROUP E - ELECTRICAL VERIFICATION TESTS														
				Electrical Testing After Stress											

Stress Test Location (Tempe or KLM)	Stress	Reference M=MIL883 J=JESD22	Stress Conditions (Test Conditions shown below are typical. Modifications must be explained in the comment section)	Req' Stress Readpoints	Req'd Test Temps	Min Sample Size	# of Lots	Total Units	Qual Acceptance Criteria	Results LotID-(#Rej/SS)	Req'd (X)	Not Req'd (X)	Re-use Data (X)	If not required, explain. If data is re-used, input device name and quartz number.	Comments
Tempe	**ESD (HBM)**	AEC-Q100-002	Electrostatic Discharge; Human Body Model (HBM);	500 / 1000 / 1500 / 2000 Volts 2500 FIO	Room = 25 C Hot = 85 C	3 units per Voltage level	1	12	Zero Electrical Test Failures	500 - 0/3 1000 - 0/3 1500 - 0/3 2000 - 0/3	X				
Tempe	**ESD (MM)**	AEC-Q100-003	Electrostatic Discharge; Machine Model (MM); FCDM can be used to replace MM;	50 / 100 / 150 / 200QP 300 FIO Volts	Room = 25 C Hot = 85 C	3 units per Voltage level	1	12	Zero Electrical Test Failures	50 - 0/3 100 - 0/3 150 - 0/3 200 - 0/3	X				
Tempe	**ESD (CDM)**	AEC-Q100-011	Electrostatic Discharge; Charged Device Model (FCDM);	250 / 500 for qual 750 / 1500 Volts FIO Corner pins =/> 750V; All other pins =/> 500V Electrical testing must occur within 96 hrs after stress readpoint.	Room = 25 C Hot = 85 C	3 units per Voltage level	1	12	Zero Electrical Test Failures	250 - 0/3 500 - 0/3 750 - 0/3 1500 0 /3	X				
Tempe	**LU**	AEC-Q100-004	Latch-up to be performed at 85 C	+/- 100mA @+85C	Room = 25 C Hot = 85 C	6	1	6	Zero Electrical Test Failures	0/6	X				
KLM	**GL**	AEC-Q100-006	Electro-Thermally Induced Gate Leakage; Temperatue = 155°C Time = 4.0 min Voltage = +400/-400 V	Electrical testing must occur within 96 hrs after stress readpoint.	Room = 25 C	6	1	6	Zero Electrical Test Failures	0/6	X				
Tempe	**ED**	AEC-Q100-009 Freescale spec	Electrical Distribution	N/A	Room = 25 C Hot = 85 C Cold = -40 C	30	4	120	Cpk -= 1.33	Lot A - Cpk >= 1.33 Lot B - Cpk >= 1.33 Lot C - Cpk >= 1.33 Lot X (Fab3) - Cpk >= 1.33	X				