



### AEC-Q100F Qualification Result Summary

Objective: <b>Qualification plan for Bluefin in ATMC in 80QFP</b>			
Freescale PN: 9S12XD512 Part Name: Bluefin		Customer Name(s): Various PN(s):	
Technology: ATMC 0.25um Emb Flash Package: 80ld QFP 14 x 14 (Package Code: 6019)		Design Engr: Phone #: not applicable	
Fab / Assembly / Final Test Sites: ATMC / FSL-KLM-FM / FSL-KLM-FM		Product Engr: Tan Chee Chuang - B13988 Phone #: 03-7873 2744	
Maskset#: M23S Rev#: 0		Prod. Package Engr: Ngion Lee Fee-B21503 Phone #: 603-78734888	
Die Size (in mm) 6.630X6.410 W x L x T		NPI PRQE: Miza Ismail R27786 Phone #: 603 78732723	
Part Operating Temp. Grade: Grade 1 -40°C to +125°C		Trace/DateCode: LOT A DD533921 LOT B DD536861 LOT C DD528831 MHA0V4J700 MHA0VQ8G00	
Target Dates Test Start: 11/01/08 Test Finish: 04/07/09		PPE Approval (for DIM/BOM results) Ngion Lee Fee-B21503 Signature & Date: 10-Apr-09	
Test Program Name: 9S12XDP512_ALL_A27		NPI PRQE Approval Miza Ismail Signature & Date: 10-Apr-09	
		CAB Approval 08452152M Signature & Date: 06-May-09	
		Customer Approval Signature & Date:	

(see Instruction #8 for use of rows 10-13; see examples below)

#### TESTS HIGHLIGHTED IN YELLOW WERE PERFORMED FOR THIS STUDY

This testing is performed by Freescale Reliability Lab (KLM) unless otherwise noted in the Comments.								
GROUP A - ACCELERATED ENVIRONMENTAL STRESS TESTS								
Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size (Note 1)	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments (Note 2)
PC	JESD22-A113 J-STD-020	<b>Preconditioning (PC)</b> : PC required for SMDs only. MSL 3 @ 260°C, +5/-0°C SAM before and after. Required (Note 3 and Note 4)	TEST @ RH	11	3	33	Lot A : pass Lot B : pass Lot C : pass	
PC	JESD22-A113 J-STD-020	<b>Preconditioning (PC)</b> : PC required for SMDs only. MSL 3 @ 260°C, +5/-0°C	TEST @ RH			All surface mount devices prior to THB, HAST, AC, UHST, TC, PC+PTC and as required per test conditions.	Lot A : 0/231 Lot B : 0/231 Lot C : 0/231	
HAST	JESD22-A101 A110	<b>Highly Accelerated Stress Test (HAST)</b> : PC before HAST (for SMDs only): Required  HAST = 130°C/85%RH for 96 hrs. Bias = 5.5V Timed RO of 48hrs. MAX	TEST @ RH	77	3	231	Lot A : 0/77 Lot B : 0/77 Lot C : 0/77	
AC	JESD22-A102 A118	<b>Autoclave (AC)</b> : PC before AC (for SMDs only): Required  AC = 121°C/100%RH/15 psig for 96 hrs Timed RO of 2-48hrs. MAX	TEST @ R	77	3	231	Lot A : 0/77 Lot B : 0/77 Lot C : 0/77	
TC	JESD22-A104 AEC Q100-Appendix 3	<b>Temperature Cycle (TC)</b> : PC before TC (for SMDs only): Required  TC = -65°C to 150°C for 500 cycles.  WBP after TC on 5 devices from 1 lot; 2 bonds per corner and one mid-bond per side on each device. Record which pins were used.	TEST @ HC WBP => 3 grams	77	3	231	Lot A : 0/77 Lot B : 0/77 Lot C : 0/77  post 500TC Wirepull : Lot A > 3g	
HTSL	JESD22-A103	<b>High Temperature Storage Life (HTSL)</b> : 150°C for 1008 hrs  Timed RO = 96hrs. MAX	TEST @ RH	77	1	77	Lot B : 0/77	

TEST GROUP B - ACCELERATED LIFETIME SIMULATION TESTS								
Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size (Note 1)	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments (Note 2)
HTOL	JESD22-A108	<b>High Temperature Operating Life (HTOL):</b> Ta = 125°C for 1008 hrs Bias = 5.5V (Core V : 2.95V)  10k Flash W/E Cycling @ 125°C 100k EE W/E Cycling @ 125°C Half NVM in Checkerboard, Half NVM in Inverse Checkerboard 504, 1008hrs @ 125°C	TEST @ RHC	77	0	0		completed in 144LQFP
ELFR	AEC Q100-008	<b>Early Life Failure Rate (ELFR):</b> Ta = 125°C for 48 hrs; Bias = 5.5V (Core V : 2.95V) NVM in Checkerboard	TEST @ RH	800	0	0		completed in 144LQFP
EDR	AEC Q100-005	NVM Endurance, Data Retention,  10k Flash W/E Cycling @ 125°C 100k EE W/E Cycling @ 125°C NVM in Checkerboard DRB 504, 1008hrs @ 150°C <b>Timed RO of 48hrs. MAX</b>	TEST @ RHC	77	0	0		completed in 144LQFP
		NVM Endurance, Data Retention,  10k Flash W/E Cycling @ -40°C 10k EE W/E Cycling @ -40°C NVM in Checkerboard DRB 504, 1008hrs @ 150°C <b>Timed RO of 48hrs. MAX</b>	TEST @ RHC	77	0	0		completed in 144LQFP
		Virgin Checkerboard State Data Retention,  NVM in Checkerboard DRB 504, 1008hrs @ 150°C <b>Timed RO of 48hrs. MAX</b>	TEST @ RHC	77	0	0		completed in 144LQFP
TEST GROUP C - PACKAGE ASSEMBLY INTEGRITY TESTS								
Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size (Note 1)	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments (Note 2)
WBS	AEC Q100-001	<b>Wire Bond shear (WBS)</b>	Cpk = or > 1.67	30 bonds from minimum 5 units	1	5	Lot A : cpk 2.08	
WBP	MilStd883-2011	<b>Wire Bond Pull (WBP):</b> Cond. C or D	Cpk = or > 1.67	30 bonds from minimum 5 units	1	5	Lot A : cpk 6.33	
TEST GROUP D - DIE FABRICATION RELIABILITY TESTS								
Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size (Note 1)	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments (Note 2)
EM		<b>Electro Migration (EM)</b>						The data, test method, calculations and internal criteria should be available to the customer upon request for new technologies.
TDDB		<b>Time Dependent Dielectric Breakdown (TDDB)</b>						The data, test method, calculations and internal criteria should be available to the customer upon request for new technologies.
HCI		<b>Hot Carrier Injection (HCI)</b>						The data, test method, calculations and internal criteria should be available to the customer upon request for new technologies.



TEST GROUP E - ELECTRICAL VERIFICATION TESTS								
Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size (Note 1)	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments (Note 2)
HBM	AEC-Q100-002	<b>ElectroStatic Discharge/ Human Body Model Classification (HBM):</b> Test @ 500/1000/1500/2000 Volts See AEC-Q100-002 for classification levels.	TEST @ RH 2KV min.	3 units per Voltage level	1	12	Lot A : 500V : 0/3 1000V : 0/3 1500V : 0/3 2000V : 0/3	EKB Lab
MM	AEC-Q100-003	<b>ElectroStatic Discharge/ Machine Model Classification m(MM):</b> Test @ 50/100/200 Volts See AEC-Q100-003 for classification levels.	TEST @ RH 200V min.	3 units per Voltage level	1	9	Lot A : 50V : 0/3 100V : 0/3 200V : 0/3	EKB Lab
CDM	AEC-Q100-011	<b>ElectroStatic Discharge/ Charged Device Model Classification (CDM):</b> Test @ 250/500/750cp Volts See AEC-Q100-011 for classification levels. <b>Timed RO of 96hrs MAX.</b>	TEST @ RH Corner pins => 750V; All other pins => 500V	3 units per Voltage level	1	9	Lot A : 250V : 0/3 500V : 0/3 750V cp: 0/3	
LU	JESD78 plus AEC-Q100-004	<b>Latch-up (LU):</b> Test per JEDEC JESD78 with the AEC-Q100-004 requirements. Ta= Maximum operating temperature Vsupply = Maximum operating voltage	TEST @ RH	6	1	6	Lot A : 0/6	EKB Lab
ED	AEC-Q100-009, Freescale 48A spec	<b>Electrical Distribution (ED)</b>	TEST @ RHC Cpk = or > 1.67	30	0	0		completed in 144LQFP
FG	AEC-Q100-007	<b>Fault Grading (FG)</b>	FG shall be = or > 90% for qual units					Production Test requirement: 98% w/o lddq 95% w/lldq 100% TYPE2
CHAR	AEC-Q003	<b>Characterization (CHAR):</b> Performed on new technologies and part families per AEC Q003. Required ? : ?						Performance of this test offers opportunities for lot / sample size reductions per AEC Q100 Table 2A.
Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size (Note 1)	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments (Note 2)
GL	AEC-Q100-006	<b>Electro-Thermally Induced Gate Leakage (GL):</b> 155°C, 2.0 min, +400/-400 V <b>Timed RO of 96 hrs MAX.</b> For all failures, perform unbiased bake (4hrs/125°C, or 2hrs/150°C) and retest; recovered units are GL failures.	TEST @ R	6	1	6	Lot B : 0/6	
EMC	SAE J1752/3 - Radiated Emissions	<b>Electromagnetic Compatibility (EMC)</b> (see AEC Q100 Appendix 5 for test applicability; done on case-by-case basis per customer/Freescale agreement)	<40dBuV 150kHz - 1GHz	1	0	0		completed in 144LQFP

General Notes:  
 Quartz 132857, M23S, Bluefin ATMC :  
 Die Size : 6.630X6.410mm, Flash size : 4x64Kx16, Polyimide : S200, Leadframe : Copper solid-flag 7.62x7.62mm, Die Attach : CRM-1064MBL, Wire : 0.98mils Au Wire, Mold Cpd : CEL9200HF10M

Generic Data Reference List:  
 N/A