

AEC-Q100F Qualification Result Summary

Objective: Qualification plan for Bluefin in ATMC in 144LQFP		Customer Name(s): Various PN(s):		Plan or Results: 0 Revision # & Date: 08-Apr-2009	
Freescale PN: 9S12XD512 Part Name: Bluefin		Technology: ATMC 0.25um Emb Flash Package: 144ld LQFP 20 x 20 (Package Code: 8259)		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		QUARTZ Tracking #: 132857 (Signature/Date shown below may be electronic)	
Maskset#: M23S Rev#: 0		Prod. Package Engr: Ngion Lee Fee-B21503 Phone #: 603-78734888		PPE Approval (for DIM/BOM results) Ngion Lee Fee-B21503 Signature & Date: 10-Apr-09	
Die Size (in mm) 6.630X6.410 W x L x T		NPI PRQE: Miza Ismail R27786 Phone #: 603 78732723		NPI PRQE Approval Miza Ismail Signature & Date: 10-Apr-09	
Part Operating Temp. Grade: Grade 1 -40°C to +125°C		Trace/DateCode: MHA0V43Z00 MHA0V43Y00 MHA0VQ8000		LOT A DD533921 LOT B DD536861 LOT C DD528831	
Target Dates Test Start: 11/01/08 Test Finish: 04/07/09		Test Program Name: 9S12XDP512_ALL_A27		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	Preconditioning (PC) : 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	Preconditioning (PC) : 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	Highly Accelerated Stress Test (HAST): 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	Autoclave (AC): 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	Temperature Cycle (TC): 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	High Temperature Storage Life (HTSL): 150°C for 1008 hrs (Devices incorporating NVM shall receive 'NVM endurance preconditioning'(EDR) prior to this test, and special NVM test sequencing after this test; see AEC-Q100 for details) Timed RO = 96hrs. MAX	TEST @ RH	77	0	0	pass	per EDR

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)
Freescale PN: 9S12XD512 Part Name: Bluefin									
Customer Name(s): Various PN(s):					Plan or Results: 0 Revision # & Date: 08-Apr-2009				
TEST GROUP B - ACCELERATED LIFETIME SIMULATION TESTS									
HTOL JESD22-A108 High Temperature Operating Life (HTOL): 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 <i>Timed RO of 96hrs. MAX</i>									
ELFR AEC Q100-008 Early Life Failure Rate (ELFR): Ta = 125°C for 48 hrs; Bias = 5.5V (Core V : 2.95V) NVM in Checkerboard 1k Flash W/E Cycling @ 125°C 10k EE W/E Cycling @ 125°C <i>Timed RO of 48 hrs MAX</i>									
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 <i>Timed RO of 48hrs. MAX</i>									
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 <i>Timed RO of 48hrs. MAX</i>									
Virgin Checkerboard State Data Retention, NVM in Checkerboard DRB 504, 1008hrs @ 150°C <i>Timed RO of 48hrs. MAX</i>									
TEST GROUP C - PACKAGE ASSEMBLY INTEGRITY TESTS									
WBS AEC Q100-001 Wire Bond shear (WBS)									
WBP MiStd883-2011 Wire Bond Pull (WBP): Cond. C or D									

Freescale PN: 9S12XD512 Part Name: Bluefin			Customer Name(s): Various PN(s):			Plan or Results: 0 Revision # & Date: 08-Apr-2009		
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		Electro Migration (EM)						The data, test method, calculations and internal criteria should be available to the customer upon request for new technologies.
TDDB		Time Dependent Dielectric Breakdown (TDDB)						The data, test method, calculations and internal criteria should be available to the customer upon request for new technologies.
HCI		Hot Carrier Injection (HCI)						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	ElectroStatic Discharge/ Human Body Model Classification (HBM): 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	ElectroStatic Discharge/ Machine Model Classification m(MM): 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	ElectroStatic Discharge/ Charged Device Model Classification (CDM): Test @ 250/500/750cp Volts See AEC-Q100-011 for classification levels. Timed RO of 96hrs MAX.	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	Latch-up (LU): 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	Electrical Distribution (ED)	TEST @ RHC Cpk = or > 1.67	30	3	90	Cpk > 1.8	
FG	AEC-Q100-007	Fault Grading (FG)	FG shall be = or > 90% for qual units					Production Test requirement: 98% w/o lddq 95% w/lddq 100% TYPE2
CHAR	AEC-Q003	Characterization (CHAR): 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.

Freescale PN: 9S12XD512 Part Name: Bluefin			Customer Name(s): Various PN(s):				Plan or Results: 0 Revision # & Date: 08-Apr-2009	
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	Electro-Thermally Induced Gate Leakage (GL); 155°C, 2.0 min, +400/-400 V Timed RO of 96 hrs MAX. 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 A : 0/6	
EMC	SAE J1752/3 - Radiated Emissions	Electromagnetic Compatibility (EMC) (see AEC Q100 Appendix 5 for test applicability; done on case-by-case basis per customer/Freescale agreement)	<40dBuV 150kHz - 1GHz	1	0	0		

General Notes:
 Quartz 132857, M23S, Bluefin ATMC :
 Die Size : 6.630X6.410mm, Flash size : 4x64Kx16, Polymide : S200, Leadframe : Copper solid-flag 7.62x7.62mm, Die Attach : Ablebond 8290, Wire : 0.98mils Au Wire, Mold Cpd : CEL9200HF10M

Generic Data Reference List:
 Quartz 87197, M80F, Razorfish :
 Die Size : 5.932 x6.175mm, Flash size : 4x64Kx16, Polymide : S200, Leadframe : Copper solid-flag 7.62x7.62mm, Die Attach : Ablebond 8290, Wire : 0.98mils Au Wire, Mold Cpd : CEL9200HF10M