Xilinx Spartan-3A/-3AN FT/FTG 256 2-Layer Substrate

Qualification Report

RPT112 (v1.0) October 20, 2008

Revision History

The following table shows the revision history for this document.

Date	Version	Revision
10/20/08	1.0	Initial release.

Table of Contents

Overview

This qualification report summarizes the results of the reliability tests that were performed to qualify the 90nm Spartan®-3A FPGA product family in the 2-layer FT256 substrate.

Package Qualifications

A full package qualification was run on XA3S400A-FTG256. Since XA qualification is more stringent (since it includes passing electrical read points at room, -40 and 125°C), this qualification testing covers by extension XC3S400A-FT/FTG256. This qualification also covers XC3S50A-FT/FTG256, XC3S200A-FT/FTG256, and XC3S200AN-FT/FTG256 by similarity (including smaller die size) per Table 1.

Table 1: **Qualification Matrix**

Part Number	FT/FTG 256
XC3S50A	X
XC3S200A	X
XC3S200AN	X
XC3S400A	X
XA3S400A	X

	= Package qualification vehicle
	= Qualified by similiarity
X	= Available product

Major Package Information Used in This Qualification

Table 2: **Package Information**

Die Attach	Ablestik 2300 Series
Wire Material	Au
Mold Compound	Nitto GE100 Series
Substrate Type	BT
# of Substrate Layers	2
MSL Level	3

Reliability Test Conditions and Results

Table 3: **Reliability Stress Tests**

Note: The Electrical Readpoint for each test is tested at room, -40 and 125°C.

Stress Test	ABV	Test Methods	Test Conditions	Requirements		Results
				Sample	# Lots	
Preconditioning	PC (1)	JESD22-A113 JEDEC J-STD-020	MSL 3; 192hrs, 30°C/60%RH; 3X Reflow (2), 250/260°C+0,-5°C	77	9	Pass
Temperature Humidity Bias	THB	JESD22-A101	85°C, 85%RH, V_{CCMAX}, 1000hrs	77	3	Pass
Biased HAST	HAST	JESD22-A110	130°C, 85%RH, V_{CCMAX}, 96hrs	77	3	Pass
Unbiased HAST	UHST	JESD22-A118	130°C, 85%RH, 96hrs	77	3	Pass
Temperature Cycle	TC	JESD22-A104	-55°C, 125°C, 1000cyc	77	3	Pass
High Temperature Storage Life	HTSL (3)	JESD22-A103	150°C, 1000hrs	45	1	Pass
High Temperature Operating Life	HTOL (4)	JESD22-A108	125°C, V_{CCMAX}, 1000hrs	77	3	Pass
Early Life Failure Rate	ELFR (5)	AEC Q100-008	125°C, V_{CCMAX}, 48hrs	800	3	Pass
Wire Bond Pull Strength	WBP	MIL-STD-883-2011	Post 1000cyc of TC	5	1	Pass
ESD-HBM	HBM	AEC Q100-002	500V, 1000V, 1500V, 2000V, etc.	3	1	Pass
ESD-CDM	CDM	AEC Q100-011	250V, 500V, 750V, 1000V	3	1	Pass
Latch-Up	LU	AEC Q100-004	125°C, ±200mA (I-test) 150% of V_{CCMAX} (Vsupply test)	6	1	Pass

Notes:

(1) Preconditioning was done prior to the THB, HAST, UHST and TC tests.

(2) Reflow was run at either 250°C or 260°C depending on package volume.

(3) A 3X reflow was done prior to the HTSL test.

(4) HTOL was run on Spartan-3 and Spartan-3E families.

(5) ELFR was run on Spartan-3 family.

ESD and LU Test Results

Table 4: **ESD and LU Results**

	Highest Passing Voltage		
Product	**ESD-HBM**	**ESD-CDM**	**Latch-Up**
XA3S200A-FTG256	>2kV	750V	Pass
XA3S400A-FTG256	>2kV	750V	Pass

Reliability Test Data

Qualification Vehicle: XA3S400A-FTG256

Table 5: **Test Results**

Stress Test	Product	Fab Lot#	Assy Lot#	Assy Loc	Duration	Sample	Result
HAST	XA3S400A-FTG256	KMQ53.06	17988	SPIL	96	77	Pass
HAST	XA3S400A-FTG256	KRS34	18046	SPIL	96	77	Pass
HAST	XA3S400A-FTG256	KMN45	18094	SPIL	96	77	Pass
UHST	XA3S400A-FTG256	KMQ53.06	17988	SPIL	96	77	Pass
UHST	XA3S400A-FTG256	KRS34	18046	SPIL	96	77	Pass
UHST	XA3S400A-FTG256	KMN45	18094	SPIL	96	77	Pass
TC	XA3S400A-FTG356	KMQ53.06	17988	SPIL	1000	77	Pass
TC	XA3S400A-FTG256	KRS34	18046	SPIL	1000	77	Pass
TC	XA3S400A-FTG256	KMN45	18094	SPIL	1000	77	Pass
HTSL	XA3S400A-FTG356	KMQ53.06	17988	SPIL	1000	45	Pass
WBP	XA3S400A-FTG356	KMQ53.06	17988	SPIL	N/A	5	Pass
		KRS34	18046				
		KMN45	18094				