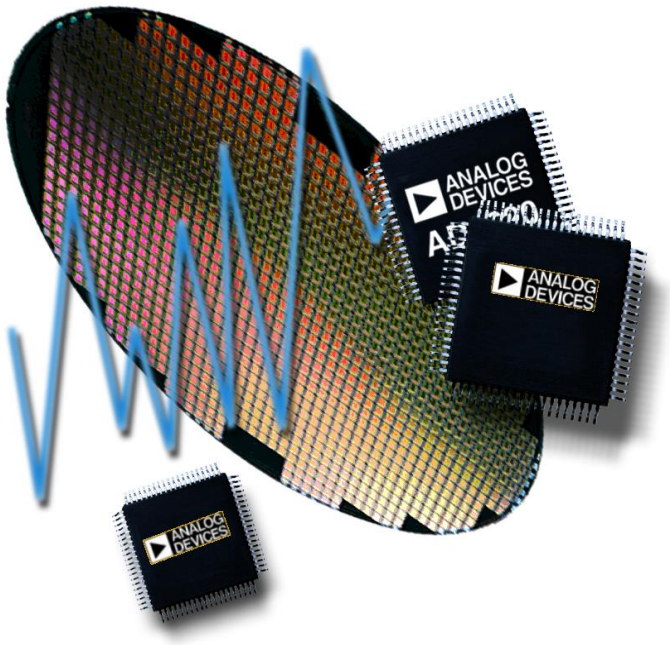

Reliability Report

Report Title: Qualification of 0.18µm CMOS Wafer Fabrication at ADI Beaverton Fab

Report Number: 21963

Revision: A

Date: 28 January 2024

Summary

This report documents the reliability qualification requirements for the release of the 0.18µm CMOS Wafer Fabrication Process in Analog Devices Beaverton (ADBN), OR Wafer Fabrication Facility.

The products listed below were selected to cover the technology being released.

The ADV7392 product is 10-Bit SD/HD Video Encoder packaged in a 40-LFCSP.

The MAX11390 product is a 24-bit, 6-channel, Delta-Sigma ADC packaged in a 6 x 6 bump array with 0.4mm bump pitch WLCSP.

Die/Fab Product Characteristics

Table 1: Die/Fab Product Characteristics- 0.18µm CMOS

Product Characteristics	Product(s) to be qualified	
Generic/Root Part #	ADV7392	MAX11390
Die Id	ND03A	AZ33C
Die Size (mm)	2.57 x 3.05	2.87 x 2.87
Wafer Fabrication Site	ADBN	ADBN
Wafer Fabrication Process	0.18µm CMOS	0.18µm CMOS
Die Substrate	Si	Si
Metallization / # Layers	AlCu / 4	AlCu / 5
Polyimide	No	No
Passivation	SiO_2/SiN	SiO_2/SiN

Die/Fab Test Results

Table 2: Die/Fab Test Results – 0.18μm CMOS at ADBN Return

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS	eTest Temp
Preconditioning	J-STD-020 JESD22-A113	MSL-3	ADV7392	Q21963.1.SH1	0/15	R
		MSL-1	MAX11390	R44425A	0/231	R
				R44425B	0/231	R
High Temperature Operating Life (HTOL)	JESD22-A108	125°C<Tj<135°C, Biased, 500 Hours, Ta=125°C	MAX11390	R44425A	0/77	RCH
				R44425B	0/77	RCH
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 500 Hours	ADV7392	Q21963.1.HS1	0/45	RH
			MAX11390	R44425A	0/77	RH
				R44425B	0/77	RH
Highly Accelerated Stress Testing (HAST)[1]	JESD22-A101	130°C, 85%RH 33.3 psia, biased, 96 Hours	ADV7392	Q21963.1.HA1	0/77	RH
		110°C, 85%RH 33.3 psia, biased, 264 Hours	MAX11390	R44425A	0/77	RH
Temperature Cycling (TC)[1]	JESD22-A104	-55°C/+125°C, 500 Cycles	ADV7392	Q21963.1.TC1	0/77	RH
		-40°C/+125°C, 850 Cycles	MAX11390	R44425A	0/77	RH
				R44425B	0/77	RH
Unbiased HAST (UHST)[1]	JESD22-A118	130°C, 85%RH 33.3 psia, 96 Hours	ADV7392	Q21963.1.UH1	0/77	R
			MAX11390	R44425A	0/77	R
				R44425B	0/77	R

[1] These samples were subjected to preconditioning at MSL 1/3 with 3x reflow peak temp of 260°C prior to the start of the stress test.

ESD and Latch-Up Test Results

Table 3: ESD Test Result Return

ESD Model	Generic/Root Part #	Package	ESD Test Spec	RC Network	Highest Pass Level	Class	eTest
FICDM	ADV7392	40-LFCSP	JS-002	1Ω, Cpkg	±500V	C2	RH
	MAX11390	36-Thin WLP			±1000V	C3	RH
HBM	ADV7392	40-LFCSP	JS-001	1.5kΩ, 100pF	±2000V	1C	RH
	MAX11390	36-Thin WLP			±3000V	3A	RH

Table 4: Latch Up Test Result Return

LU Test Spec	Generic/Root Part #	Passing Current	Passing Over-Voltage	Temperature (T_A)	Class	eTest
JESD78	ADV7392	+100mA, -100mA	+2.84V/+5.2V/+5.45V	+105°C	II	RH
	MAX11390	+250mA, -250mA	+3V/+5.4V	+85°C	II	RH

Approvals

Reliability Engineer: Denis Belisle / Rozano Rosano / Romeo De Guzman