Product/Process Change Notice - PCN 23_0068 Rev. -

Analog Devices, Inc. One Analog Way, Wilmington, MA 01887, USA

This notice is to inform you of a change that will be made to certain ADI products (see Appendix A) that you may have purchased in the last 2 years. **Any inquiries or requests with this PCN (additional data or samples) must be sent to ADI within 30 days of publication date.** ADI contact information is listed below.

PCN Title:	Qualification of Alternate Wafer Fab Site at ADI Limerick for 0.6um CMOS Amplifier Product
Publication Date:	08-May-2023
Effectivity Date:	10-Aug-2023 *(the earliest date that a customer could expect to receive changed material)*
Revision Description:	Initial Release.

Description Of Change:

1) Analog Devices is adding Analog Devices, Limerick (ADLK) as an alternate Wafer Fab site to TSMC Fab 9 and Fab 2A for 0.6um CMOS Amplifier products.

2) Changed wafer diameter from 6" to 8" for a limited number of parts, ref table in Supporting Documents section for substrate change details.

Reason For Change:

This change will ensure manufacturing agility and continuity of supply.

Impact of the change (positive or negative) on fit, form, function & reliability:

There is no impact to fit, form, function, or reliability.

Product Identification *(this section will describe how to identify the changed material)*

Analog Devices maintains traceability internally to manufacturing location site via marking on the device.

Summary of Supporting Information:

Qualification has been performed per AEC-Q100, Stress Test Qualification for Integrated Circuits. See attached Qualification Reports.

Supporting Documents

Attachment 1: Type: Delta Qualification Matrix

ADI_PCN_23_0068_Rev_-_Delta Qualification Matrix_AD8648.xlsm...

Attachment 2: Type: Qualification Results Summary

ADI_PCN_23_0068_Rev_-_Qualification Results_Wafer Fab Site at ADI Lime...

Attachment 3: Type: Detailed Change Description

ADI_PCN_23_0068_Rev_-_Amplifier Parts - Substrate Change Detail TSMC ...

Note: If applicable, the device material declaration will be updated due to material change.

ADI Contact Information:

For questions on this PCN, please send an email to the regional contacts below or contact your local ADI sales representatives.

Americas:	Europe:	Japan:	Rest of Asia:

PCN_Americas@analog.com	PCN_Europe@analog.com	PCN_Japan@analog.com	PCN_ROA@analog.com

Appendix A - Affected ADI Models:

Added Parts On This Revision - Product Family / Model Number (95)

AD8541 / AD8541AKSZ-REEL7
AD8541 / AD8541ARTZ-REEL
AD8541 / AD8541ARTZ-REEL7
AD8541 / AD8541ARZ
AD8541 / AD8541ARZ-REEL
AD8541 / AD8541ARZ-REEL7
AD8601 / AD8601ARTZ-R2
AD8601 / AD8601ARTZ-REEL
AD8601 / AD8601ARTZ-REEL7
AD8601 / AD8601WARTZ-R7
AD8601 / AD8601WARTZ-RL
AD8601 / AD8601WDRTZ-REEL
AD8601 / AD8601WDRTZ-REEL7
AD8601 / ADW60010DRTZ-R7
AD8604 / AD8604ARQZ
AD8604 / AD8604ARQZ-RL
AD8604 / AD8604ARUZ
AD8604 / AD8604ARUZ-REEL
AD8604 / AD8604ARZ
AD8604 / AD8604ARZ-REEL
AD8604 / AD8604ARZ-REEL7
AD8604 / AD8604DRUZ
AD8604 / AD8604DRUZ-REEL
AD8604 / AD8604DRZ
AD8604 / AD8604DRZ-REEL
AD8604 / AD8604WARZ
AD8604 / AD8604WARZ-RL
AD8605 / AD8605ARTZ-R2
AD8605 / AD8605ARTZ-REEL
AD8605 / AD8605ARTZ-REEL7
AD8606 / AD45314-REEL
AD8606 / AD8606ARMZ-R7
AD8606 / AD8606ARMZ-REEL
AD8606 / AD8606ARZ
AD8606 / AD8606ARZ-REEL
AD8606 / AD8606ARZ-REEL7
AD8608 / AD8608-KGD-CHIP
AD8608 / AD8608ARUZ
AD8608 / AD8608ARUZ-REEL
AD8608 / AD8608ARZ
AD8608 / AD8608ARZ-REEL
AD8608 / AD8608ARZ-REEL7
AD8616 / AD8616ARMZ
AD8616 / AD8616ARMZ-REEL
AD8616 / AD8616ARZ
AD8616 / AD8616ARZ-REEL
AD8616 / AD8616ARZ-REEL7
AD8628 / AD8628ARTZ-R2
AD8628 / AD8628ARTZ-REEL7
AD8628 / AD8628ARZ
AD8628 / AD8628ARZ-REEL
AD8628 / AD8628ARZ-REEL7
AD8628 / AD8628AUJZ-REEL
AD8628 / AD8628AUJZ-REEL7
AD8628 / AD8628WARTZ-R7
AD8628 / AD8628WARTZ-RL
AD8628 / AD8628WARZ-R7
AD8628 / AD8628WAUJZ-R7
AD8628 / AD8628WAUJZ-RL
AD8648 / AD8648ARUZ
AD8648 / AD8648ARUZ-REEL
AD8648 / AD8648ARZ
AD8648 / AD8648ARZ-REEL
AD8648 / AD8648ARZ-REEL7
AD8648 / AD8648WARUZ
AD8648 / AD8648WARUZ-RL
AD8648 / ADW60000ARUZ-RL
AD8648 / ADW60024ARUZ-RL
AD8655 / AD8655ARMZ
AD8655 / AD8655ARMZ-REEL
AD8655 / AD8655ARZ
AD8655 / AD8655ARZ-REEL
AD8655 / AD8655ARZ-REEL7
AD8655 / AD8655WARMZ-RL
AD8656 / AD8656ARMZ
AD8656 / AD8656ARMZ-REEL
AD8656 / AD8656ARZ
AD8656 / AD8656ARZ-REEL
AD8656 / AD8656ARZ-REEL7
AD8656 / AD8656WARMZ-REEL
AD8656 / ADW60008ARMZ-RL
AD8692 / AD8692ARMZ-R7
AD8692 / AD8692ARMZ-REEL
AD8692 / AD8692ARZ
AD8692 / AD8692ARZ-REEL
AD8692 / AD8692ARZ-REEL7
AD8692 / AD8692WARMZ-REEL
AD8692 / ADW60014ARMZ-RL
AD8692 / ADW60015ARMZ-RL
AD8694 / AD8694ARUZ
AD8694 / AD8694ARUZ-REEL
AD8694 / AD8694ARZ
AD8694 / AD8694ARZ-REEL7
AD8694 / AD8694WARUZ
AD8694 / AD8694WARUZ-REEL

Appendix B - Revision History:

Rev	Publish Date	Effectivity Date	Rev Description
Rev. -	08-May-2023	10-Aug-2023	Initial Release.

ANALOG DEVICES
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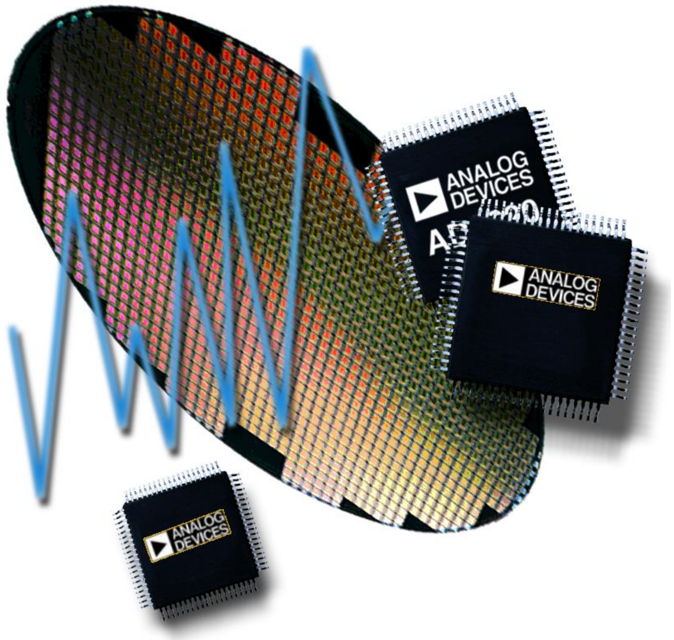
Qualification Notification of Alternate Fab foundry at ADI Limerick for Amplifier Parts

Amplifier Parts with Substrate Change from 6" to 8"

Generic	TSMC 2A	TSMC 2A
AD8655	6”	8”
AD8656	6”	8”
AD8694	6”	8”



Reliability Report

Report Title: **0.6um CMOS Wafer Fabrication for Amplifier Product at ADI Limerick Fab Qualification**

Report Number: **20900**

Revision: **A**

Date: **26 April 2023**

Summary

This report documents the reliability qualification requirements for the release of the 0.6um CMOS Wafer Fabrication Process for Amplifier Product in Analog Devices Limerick Wafer Fabrication Facility. The products listed below were selected to cover the technology being released.

The products are:

The AD8648 product in a 14-TSSOP_4.4 package is a quad, rail-to-rail, input and output, single-supply amplifier featuring low offset voltage, wide signal bandwidth, low input voltage, and low current noise.

The AD8694 product in a 14-TSSOP_4.4 package is a low cost, quad rail-to-rail output, single-supply amplifiers featuring low offset and input voltages, low current noise, and wide signal bandwidth.

AECQ100 Qualification Test Methods and Summary

AEC Test Group	AEC Stress Test Name	Abbreviation	AEC Test #	Reference
Group A ACCELERATED ENVIRONMENT STRESS TESTS	Preconditioning	PC	A1	Table 2 and Table 4
	Temperature Humidity Bias or Biased-HAST	THB or HAST	A2	
	Autoclave or Unbiased HAST or Temperature Humidity (without Bias)	AC, UHST, or TH	A3	
	Temperature Cycle	TC	A4	
	Power Temperature Cycling	PTC	A5	
	High Temperature Storage Life	HTSL	A6	
Group B ACCELERATED LIFETIME SIMULATION TESTS	High Temperature Operating Life	HTOL	B1	Table 2 and Table 4
	Early Life Failure Rate	ELFR	B2	
	NVM Endurance, Data Retention, and Operational Life	EDR	B3	
Group C PACKAGE ASSEMBLY INTEGRITY TESTS	Wire Bond Shear	WBS	C1	• Test C2 (and C1 for Cu Wire) are shown in Table 4. • Tests C3-6 are qualified and controlled with inline monitors and may be viewed on-site at Analog Devices.
	Wire Bond Pull Strength	WBP	C2	
	Solderability	SD	C3	
	Physical Dimensions	PD	C4	
	Solder Ball Shear	SBS	C5	
	Lead Integrity	LI	C6	
Group D DIE FABRICATION RELIABILITY TESTS	Electromigration	EM	D1	Die Fabrication Reliability data may be viewed on-site at Analog Devices.
	Time Dependent Dielectric Breakdown	TDDB	D2	
	Hot Carrier Injection	HCI	D3	
	Negative Bias Temperature Instability	BTI	D4	
	Stress Migration	SM	D5	
Group E ELECTRICAL VERIFICATION TESTS	Pre- and Post-Stress Electrical Test	TEST	E1	Table 5 and Table 6
	Electrostatic Discharge Human Body Model	HBM	E2	
	Electrostatic Discharge Charged Device Model	CDM	E3	
	Latch-Up	LU	E4	
	Electrical Distributions	ED	E5	• For Tests E5, E6 and E7, ADI New Product Yield Analysis Testing Guidelines meet AEC Q100 requirements. • Results for Tests E7-E11 are available as applicable on a case by case basis. • Test E12 results may be viewed on-site at Analog Devices
	Fault Grading	FG	E6	
	Characterization	CHAR	E7	
	Electromagnetic Compatibility	EMC	E9	
	Short Circuit Characterization	SC	E10	
	Soft Error Rate	SER	E11	
	Lead (Pb) Free	LF	E12	
Group F DEFECT SCREENING TESTS	Process Average Test	PAT	F1	ADI New Product Yield Analysis Testing Guidelines meet AECQ100 Requirements.
	Statistical Bin/Yield Analysis	SBA	F2	
Group G CAVITY PACKAGE INTEGRITY TESTS	Mechanical Shock	MS	G1	<Applicable only for Cavity Packages>
	Variable Frequency Vibration	VFV	G2	
	Constant Acceleration	CA	G3	
	Gross/Fine Leak	GFL	G4	
	Package Drop	DROP	G5	
	Lid Torque	LT	G6	
	Die Shear	DS	G7	
	Internal Water Vapor	IWV	G8	

Die/Fab Product Characteristics

Table 1: Die/Fab Product Characteristics- 0.6um CMOS

Product Characteristics	Product(s) to be qualified	
Generic/Root Part #	AD8648/8YX12A	AD8694/8YL18C
Die Id	6535Y	6526z
Die Size (mm)	1.445 x 2.090	1.455 x 1.335
Wafer Fabrication Site	ADI-Limerick	ADI-Limerick
Wafer Fabrication Process	0.6um CMOS	0.6um CMOS
Die Substrate	Si	Si
Metallization / # Layers	AlCu(0.5%)/2	AlCu(0.5%)/2
Polyimide	Yes	Yes
Passivation	undoped-oxide/SiN	undoped-oxide/SiN

Die/Fab Test Results

Table 2: Die/Fab Test Results - 0.6um CMOS at ADI-Limerick

Test Name	AEC #	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS	eTest Temp
High Temperature Storage Life (HTSL)	A6	JESD22-A103	150°C, 1,000 Hours	AD8648	Q20329.1.HS1_RES	0/77	RH
High Temperature Operating Life (HTOL)	B1	JESD22-A108	125°C<Tj<135°C, Biased, 500 Hours	AD8648	Q20329.1.HO1_RES	0/77	RHC
					Q20329.2.HO2_RES	0/77	RHC
					Q20329.3.HO3_RES	0/77	RHC
Temperature Cycling (TC)[1]	A4	JESD22-A104	-65°C/+150°C, 500 Cycles	AD8648	Q20329.1.TC1_RES	0/77	H
					Q20329.2.TC2_RES	0/77	H
					Q20329.3.TC3_RES	0/77	H
				AD8694	Q20385.1.TC1_RES	0/77	H
					Q20385.2.TC2_RES	0/77	H
Unbiased HAST (UHST)[1]	A3	JESD22-A118	130C 85%RH 33.3 psia, 96 Hours	AD8648	Q20329.1.UH1_RES	0/77	R
					Q20329.2.UH2_RES	0/77	R
					Q20329.3.UH3_RES	0/77	R
Highly Accelerated Temperature and Humidity Stress Test (HAST)[1]	A2	JESD22-A110	130C 85%RH 33.3 psia, Biased, 96 Hours	AD8648	Q20329.1.HA1_RES	0/77	RH
					Q20329.2.HA2_RES	0/77	RH
					Q20329.3.HA3_RES	0/77	RH
				AD8694	Q20385.1.HA1_RES	0/77	RH
					Q20385.2.HA2_RES	0/77	RH

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

Package/Assembly Product Characteristics

Table 3: Package/Assembly Product Characteristics - 14-TSSOP_4.4 at AMKOR (AP1)

Product Characteristics	Product(s) to be qualified	
Generic/Root Part #	AD8648	AD8694
Package	14-TSSOP_4.4	14-TSSOP_4.4
Body Size (mm)	5.00 x 4.40 x 1.00	5.00 x 4.40 x 1.00
Assembly Location	AMKOR (AP1)	AMKOR (AP1)
MSL/Peak Reflow Temperature(°C)	1 / 260°C	1 / 260°C
Mold Compound	Sumitomo G700K	Sumitomo G700K
Die Attach	Ablestik 8290 conductive	Ablestik 8290 conductive
Leadframe Material	Copper	Copper
Lead Finish	100Sn	100Sn
Wire Bond Material/Diameter (mils)	Gold / 1.00	Gold / 1.00

Package/Assembly Test Results

Table 4: Package/Assembly Test Results - TSSOP_4.4 at AMKOR (AP1)

Test Name	AEC #	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS	eTest Temp
High Temperature Storage Life (HTSL)	A6	JESD22-A103	150°C, 1,000 Hours	AD8648	Q20329.1.HS1_RES	0/77	RH
Highly Accelerated Temperature and Humidity Stress Test (HAST)[1]	A2	JESD22-A110	130C 85%RH 33.3 psia, Biased, 96 Hours	AD8648	Q20329.1.HA1_RES	0/77	RH
					Q20329.2.HA2_RES	0/77	RH
					Q20329.3.HA3_RES	0/77	RH
				AD8694	Q20385.1.HA1_RES	0/77	RH
					Q20385.2.HA2_RES	0/77	RH
Temperature Cycling (TC)[1]	A4	JESD22-A104	-65°C/+150°C, 500 Cycles	AD8648	Q20329.1.TC1_RES	0/77	H
					Q20329.2.TC2_RES	0/77	H
					Q20329.3.TC3_RES	0/77	H
				AD8694	Q20385.1.TC1_RES	0/77	H
					Q20385.2.TC2_RES	0/77	H
Unbiased HAST (UHST)[1]	A3	JESD22-A118	130C 85%RH 33.3 psia, 96 Hours	AD8648	Q20329.1.UH1_RES	0/77	R
					Q20329.2.UH2_RES	0/77	R
					Q20329.3.UH3_RES	0/77	R

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

ESD and Latch-Up Test Results

Table 5: ESD Test Result

ESD Model	Generic/Root Part #	Package	ESD Test Spec	RC Network	Highest Pass Level	Class	eTest Temp
FICDM	AD8648	14-TSSOP_4.4	JS-002	1Ω, Cpkg	±1250V	C3	RH
HBM	AD8648	14-TSSOP_4.4	JS-001	1.5kΩ, 100pF	±4000V	3A	RH
FICDM	AD8694	14-TSSOP_4.4	JS-002	1Ω, Cpkg	±1250V	C3	RH
HBM	AD8694	14-TSSOP_4.4	JS-001	1.5kΩ, 100pF	±4000V	3A	RH

Table 6: Latch Up Test Result

LU Test Spec	Generic/Root Part #	Passing Current	Passing Over-Voltage	Temperature (T_A)	Class	eTest Temp
JESD78	AD8648	+200ma, -200ma	+4.125V	125°C	IIA	RH
JESD78	AD8694	+200ma, -200ma	+4.125V	125°C	IIA	RH

Approvals

Reliability Engineer: Danilo Juinio Jr.