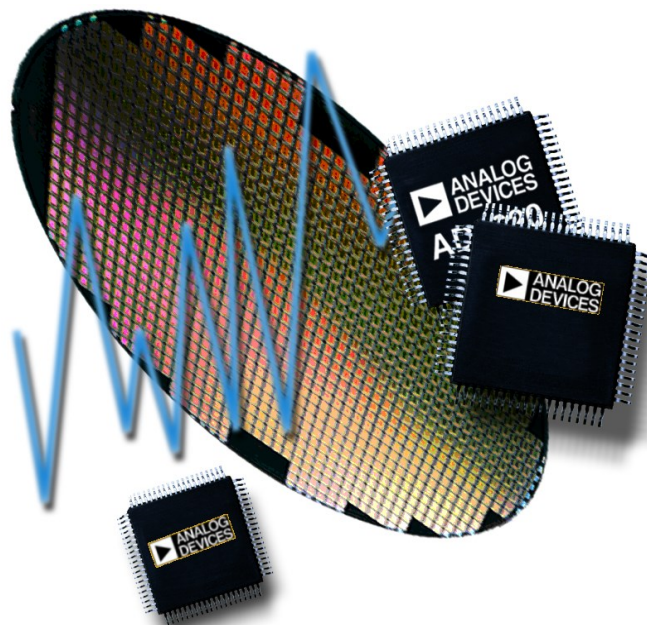




Reliability Report

Report Title: AD4190-4 DR & AD4195-4 DR
Product Revision Qualification

Report Number: 24777

Revision: A

Date: 14 November 2025

Summary

This report documents the successful completion of the reliability qualification requirements for the release of the AD4190-4 & AD4195-4 products in 32-LFCSP packages. Like the AD4170-4 (predecessor), the AD4190-4 & AD4195-4 are multi-channel ADCs for AC (up to 50kHz) & DC measurements with integrated Mux & PGA. Due to the products being qualified being identical to the AD4170-4, in terms of die and packaging, this qualification is using the AD4170-4 as the qual vehicle for testing.

Die/Fab Product Characteristics

Table 1.1: Die/Fab Product Characteristics - 0.18um CMOS

Product Characteristics	Product(s) to be qualified		Product(s) used for Substitution Data		
Generic/Root Part #	AD4190-4	AD4195-4	AD7606B	AD7616	AD4170
Die Id	TMVJ45	TMVJ45	TMLC81 / A	TMGN47	TMPA37 A
Die Size (mm)	2.65 x 4.58	2.65 x 4.58	5.97 x 5.97	5.70 x 5.70	2.65 x 4.58
Wafer Fabrication Site	E_TSMC8B08	E_TSMC8B08	E_TSMC8B08	E_TSMC8B08	E_TSMC8B08
Wafer Fabrication Process	0.18um CMOS	0.18um CMOS	0.18um CMOS	0.18um CMOS	0.18um CMOS
Die Substrate	Si	Si	Si	Si	Si
Metallization / # Layers	AlCu(0.5%)/5	AlCu(0.5%)/5	AlCu(0.5%)/5	AlCu(0.5%)/5	AlCu(0.5%)/5
Polyimide	Yes	Yes	Yes	Yes	Yes
Passivation	undoped-oxide/SiN	undoped-oxide/SiN	undoped-oxide/SiN	undoped-oxide/SiN	undoped-oxide/SiN

Table 1.2: Die/Fab Product Characteristics- 0.18um CMOS

Product Characteristics	Product(s) to be qualified		Product(s) used for Substitution	
			Data	
Generic/Root Part #	AD4190-4	AD4195-4	ADA4351-2	AD4170-4
Die Id	TMVJ45	TMVJ45	TMPG94 A	TMVJ45
Die Size (mm)	2.65 x 4.58	2.65 x 4.58	2.04 x 2.04	2.65 x 4.58
Wafer Fabrication Site	E_TSMC8B08	E_TSMC8B08	E_TSMC8B08	E_TSMC8B08
Wafer Fabrication Process	0.18um CMOS	0.18um CMOS	0.18um CMOS	0.18um CMOS
Die Substrate	Si	Si	Si	Si
Metallization / # Layers	AlCu(0.5%)/5	AlCu(0.5%)/5	AlCu(0.5%)/5	AlCu(0.5%)/5
Polyimide	Yes	Yes	Yes	Yes
Passivation	undoped-oxide/SiN	undoped-oxide/SiN	undoped-oxide/SiN	undoped-oxide/SiN

Die/Fab Test Results

Table 2.1: Die/Fab Test Results - 0.18 μ m CMOS at TSMC Fab-8B

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
Early Life Failure Rate (ELFR)	MIL-STD-883, M1015	125°C, 48 Hours	AD7616	Q11187.15	0/160
				Q11187.16	0/160
				Q11187.17	0/15
				Q11187.18	0/128
				Q11187.19	0/160
				Q11187.20	0/50
				Q11187.21	0/165
				Q11187.22	0/170
				Q11187.23	0/165
				Q11187.24	0/170
				Q11187.25	0/170
				Q11187.26	0/165
				Q11187.27	0/170
				Q11187.28	0/165
High Temperature Operating Life (HTOL)	JESD22-A108	125°C<Tj<135°C, Biased, 1,000 Hours	AD7606B	Q13259.1	0/45
				Q13259.2	0/45
				Q14040.2	0/32
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	AD7606B	Q13259.10	0/45
			AD7616	Q11187.5	0/32

Table 2.2: Die/Fab Test Results - 0.18um CMOS at TSMC Fab-8B

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
High Temperature Operating Life (HTOL)	JESD22-A108	125°C<Tj<135°C, Biased, 1,000 Hours	AD4170	Q18320.1.1	0/50
				Q18320.2.1	0/50
				Q18320.3.1	0/50
			AD7606B	Q13259.1	0/45
				Q13259.2	0/45
				Q14040.2	0/32
			ADA4351-2	Q20704.1.HO1	0/77
				Q20704.2.HO2	0/77
				Q20704.3.HO3	0/77
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	AD4170-4	Q18320.1.3	0/50
			AD7606B	Q13259.10	0/45

Package/Assembly Product Characteristics

Table 3: Package/Assembly Product Characteristics - LFCSP at ASE (AEK)

Product Characteristics	Product(s) to be qualified	Product(s) used for Substitution Data					
Generic/Root Part #	AD4170-4	AD4170-4	AD9864	AD5460	ADM1273	ADA4870	ADIN1211
Package	32-LFCSP	32-LFCSP	48-LFCSP	48-LFCSP	48-LFCSP	48-LFCSP	48-LFCSP
Body Size (mm)	4.00 x 6.00 x 0.75	4.00 x 6.00 x 0.75	7.00 x 7.00 x 0.75	7.00 x 7.00 x 0.75	8.00 x 7.00 x 0.75	7.00 x 7.00 x 0.75	7.00 x 7.00 x 0.75
Assembly Location	ASE (AEK)	ASE (AEK)	ASE (AEK)	ASE (AEK)	ASE (AEK)	ASE (AEK)	ASE (AEK)
MSL/Peak Reflow Temperature(°C)	3 / 260°C	3 / 260°C	3 / 260°C	3 / 260°C	3 / 260°C	3 / 260°C	3 / 260°C
Mold Compound	Sumitomo G700LYT	Sumitomo G700LYT	Sumitomo G700LYT	Sumitomo G700LYT	Sumitomo G700LYT	Sumitomo G700LYT	Sumitomo G700LYT
Die Attach/Underfill/TIM	Hitachi EN 4900GC	Hitachi EN 4900GC	Hitachi EN 4900GC	Hitachi EN 4900GC	Hitachi EN 4900GC	Atrox D800HT2V	Hitachi EN 4900GC
Leadframe Material	Copper	Copper	Copper	Copper	Copper	Copper	Copper
Wire Bond Material/Diameter (mils)	MKE R 2N Gold / 0.80	MKE R 2N Gold / 0.80	PdCuAu 4N / 1.00	PdCuAu 4N / 0.80	MKE R 2N Gold / 0.80	MKE R 2N Gold / 0.80	MKE R 2N Gold / 0.80

Package/Assembly Test Results

Table 4: Package/Assembly Test Results - LFCSP at ASE (AEK)

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
Highly Accelerated Temperature and Humidity Stress Test (HAST) ¹	JESD22-A110	130C 85%RH 33.3 psia, Biased, 96 Hours	AD9864	Q22773.1.HA1_CuW	0/87
				Q22773.2.HA2_CuW	0/87
				Q22773.3.HA3_CuW	0/87
Temperature Cycling (TC) ¹	JESD22-A104	-65°C/+150°C, 500 Cycles	AD5460	Q21898.1.TC1	0/50
				Q21898.2.TC2	0/50
				Q21898.3.TC3	0/50
			AD9864	Q22773.1.TC1_CuW	0/120
				Q22773.2.TC2_CuW	0/120
				Q22773.3.TC3_CuW	0/120
			ADM1273	Q20765.1.TCT	0/77
				Q20765.2.TCT	0/77
				Q20765.3.TCT	0/77
Temperature Humidity Bias (THB) ¹	JESD22-A101	85°C, 85%RH, Biased, 1,000 Hours	AD5460	Q21898.1.TH1	0/50
				Q21898.2.TH2	0/50
				Q21898.3.TH3	0/50
			ADA4870	Q20649.1.9	0/45
				Q20649.2.4	0/45
				Q20649.3.1	0/45
Unbiased HAST (UHST) ¹	JESD22-A118	130C 85%RH 33.3 psia, 96 Hours	AD4170-4	Q18320.1.5	0/50
				Q18320.2.4	0/50
				Q18320.3.3	0/50
			AD9864	Q22773.1.UH1_CuW	0/87
				Q22773.2.UH2_CuW	0/87
				Q22773.3.UH3_CuW	0/87
			ADIN2111	Q17566.1.1	0/45
				Q17566.1.2	0/45
				Q17566.2.1	0/45

¹ These samples were subjected to preconditioning at MSL 3 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
FICDM	AD4170-4	32-LFCSP	JS-002	1 Ω , Cpkg	$\pm$ 1250V	C3
HBM	AD4170-4	32-LFCSP	JS-001	1.5k Ω , 100pF	$\pm$ 4000V	3A

Table 6: Latch Up Test Result

LU Test Spec	Generic/Root Part #	Passing Current	Passing Over-Voltage	Temperature (T _A)	Class
JESD78F	AD4170-4	+100mA, -100mA	+8.25, 2.85V	25°C	I

Approvals

Reliability Engineer: Se Shanahan