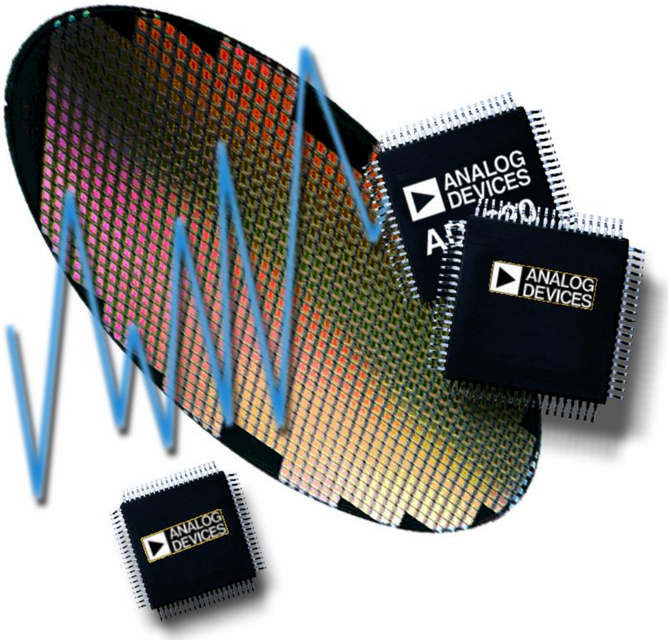

Reliability Report

Report Title: **AD1030 STA Assembly Qualification for Dual Site Release**

Report Number: **22861**

Revision: **A**

Date: **12 December 2024**

Summary

This report documents the successful completion of the reliability qualification requirements for the release of the AD1030 product in a 61-WLCSP package for the addition of assembly site. The AD1030 is an optical module component targeted for low-medium applications for direct detection such like EML, DML, and others.

Die/Fab Product Characteristics

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

Product Characteristics	Product(s) to be qualified
Generic/Root Part #	AD1030
Die Id	TMPK20 A
Die Size (mm)	3.75 x 3.75
Wafer Fabrication Site	E_TSMC1008
Wafer Fabrication Process	0.18um CMOS
Die Substrate	Si
Metallization / # Layers	AlCu/6
Polyimide	Yes
Passivation	undoped-oxide/SiN

Die/Fab Test Results

Table 2: Die/Fab Test Results – 0.18um CMOS at TSMC Fab-10

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	AD1030	Q17801.1.HS1	0/45
Highly Accelerated Temperature and Humidity Stress Test (HAST)	JESD22-A110	130C 85%RH 33.3 psia, Biased, 96 Hours	AD1030	Q17801.1.HA1	0/45
				Q17801.2.HA2	0/45
				Q17801.3.HA3	0/45
			ADUCM430	Q17666.1.HA1	0/32
				Q17666.2.HA2	0/32
				Q17803.1.HA1	0/32
High Temperature Operating Life (HTOL)	JESD22-A108	125°C<Tj<135°C, Biased, 1,000 Hours	ADUCM430	Q17666.1.HO1	0/77
				Q17666.2.HO2	0/77
				Q17666.3.HO3	0/77
Early Life Failure Rate (ELFR)	MIL-STD-883, M1015	125°C, 48 Hours	ADPD4200	Q18200.1.EL1a	0/200
				Q18200.2.EL2a	0/200
				Q18200.3.EL3a	0/200

Package/Assembly Product Characteristics

Table 3: Package/Assembly Product Characteristics - 61-WLCSP at STATS (STA)

Product Characteristics	Product(s) to be qualified
Generic/Root Part #	AD1030
Package	61-WLCSP
Bump Pitch (mm)	0.4
Bump Diameter (mm)	0.26
Bumping Foundry	STATS (STA)
RDL Layers	1
RDL Composition	Ti(0.1)/Cu(0.2)/Cu(5)
RDL Passivation	L1: HD4100 (7.5) / L2: HD4100 (10)
Under Bump Metallization	Ti(0.1)/Cu(0.2)/Cu(8.6)
Bump Composition	95.5Sn_4.0Ag_0.5Cu
MSL/Peak Reflow Temperature(°C)	MSL 1 / 260

Package/Assembly Test Results

Table 4: Package/Assembly Test Results - WLCSP at STATS (STA)

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	AD81013	Q19393.1.HTS1	0/40
				Q19393.2.HTS2	0/40
				Q19393.3.HTS3	0/40
			ADUCM413DieB	Q13982.3	0/45
				Q13982.6	0/45
				Q13982.7	0/45
Highly Accelerated Temperature and Humidity Stress Test (HAST)[1]	JESD22-A110	130C 85%RH 33.3 psia, Biased, 96 Hours	AD81013	Q19393.2.HA2A1	0/40
				Q19393.3.HA3A1R	0/40
				Q19393.4.HA1xA1	0/40
			ADUCM413DieB	Q13982.11	0/45
				Q13982.14	0/45
				Q13982.15	0/45
Temperature Cycling (TC)	JESD22-A104	-40/125, Soak2, 10-14C/min, 1,000 Cycles	AD1030	Q22861.1.TC1	0/50
				Q22861.2.TC2	0/50
				Q22861.3.TC3	0/50
Unbiased HAST (UHAST)[1]	JESD22-A118	130C 85%RH 33.3 psia, 96 Hours	AD81007	Q13268.UH1	0/40
				Q13268.UH2	0/40
				Q13268.UH3	0/40
			AD81013	Q19393.1.UH1A1	0/40
				Q19393.2.UH2A1	0/40
				Q19393.3.UH3A1	0/40
			ADUCM413DieB	Q13982.12	0/45
				Q13982.13	0/45
				Q13982.16	0/45
				Q19416.1.TC1	0/45
Solder Heat Resistance (SHR)[1]	J-STD-020	MSL-1	AD1030	Q17801.1.SH1	0/11
				Q17801.2.SH2	0/11
				Q17801.3.SH3	0/11

[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
FICDM	AD1030	61-WLCSP	JS-002	1Ω, Cpkg	±1250V	C3
HBM	AD1030	61-WLCSP	JS-001	1.5kΩ, 100pF	±4000V	3A

Table 6: Latch Up Test Result

LU Test Spec	Generic/Root Part #	Passing Current	Passing Over-Voltage	Temperature (T_A)	Class
JESD78	AD1030	+100mA, -100mA	+3.6V	25°C	I

Approvals

Reliability Engineer: Aldrin Cerezo