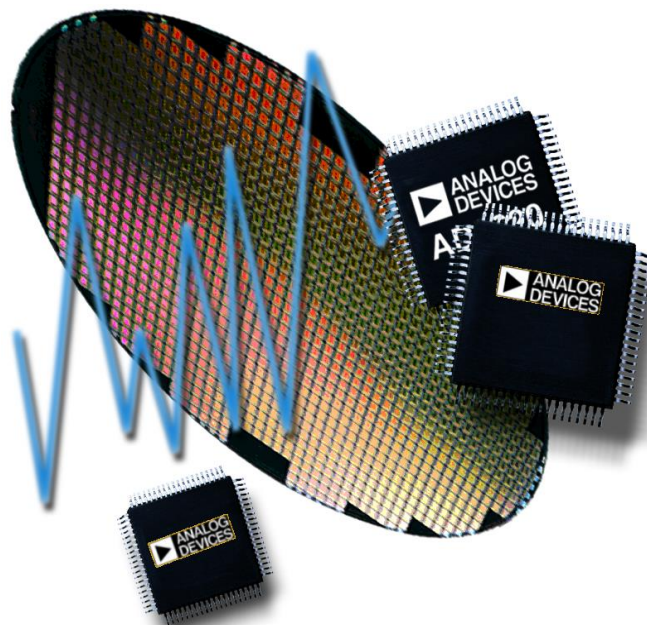




Reliability Report

Report Title:	SO Package Copper Wire Conversion at AET Qualification
Report Number:	23880
Revision:	A
Date:	2 April 2025

Summary

This report documents the successful completion of the reliability qualification requirements for the Gold to Copper Wire Conversion in SO Packages assembled at ASE Taiwan (AET). The AD7192, ADA4891-2, ADM1491E, ADM202E were used as qualification vehicles for this conversion.

- The ADA4891-2 is a CMOS, high speed amplifier that offers high performance at a low cost. This amplifier features true single-supply capability, with an input voltage range that extends 300 mV below the negative rail.
- The ADM1491E is an RS-422 transceiver with ± 8 kV ESD protection and is suitable for high speed, full-duplex communication on multipoint transmission lines. The ADM1491E is designed for use in motor control applications requiring communications at data rates up to 16 Mbps.
- The ADM202E is a robust, high speed, 2-channel RS-232/V.28 interface device that operates from a single 5 V power supply. This product is suitable for operation in harsh electrical environments and are compliant with the EU directive on EMC (89/336/EEC).
- The AD7192 is a low noise, complete analog front end for high precision measurement applications. It contains a low noise, 24-bit sigma-delta (Σ - Δ) analog-to-digital converter (ADC).

Die/Fab Product Characteristics

Table 1: Die/Fab Product Characteristics

Product Characteristics	Product(s) to be qualified			
Generic/Root Part #	ADA4891-2	ADM1491E	ADM202E	AD7192
Die Id	TMAQ18 A	TMS327B0005A A	TMBD86 A0001A01A	TMX924 A0003A
Die Size (mm)	0.78 x 1.29	1.49 x 1.88	1.32 x 1.94	2.74 x 3.44
Wafer Fabrication Site	TSMC Fab-3	TSMC Fab-2A	TSMC Fab-2A	TSMC Fab-2B
Wafer Fabrication Process	0.35um DMOS	BiCMOS	BiCMOS	0.50um CMOS
Die Substrate	Si	Si	Si	Si
Metallization / # Layers	AlCu/3	AlCu/2	AlCu/2	AlCu/3
Polyimide	No	No	No	No
Passivation	undoped-oxide/SiN	undoped-oxide/SiN	undoped-oxide/SiN	undoped-oxide/SiN

Package/Assembly Product Characteristics

Table 2: Package/Assembly Product Characteristics – SO Package at ASE (AET)

Product Characteristics	Product(s) used for Substitution Data			
Generic/Root Part #	ADA4891-2	ADM1491E	ADM202E	AD7192
Package	8-MINI_SO	14-SOIC_N	16-SOIC_N	24-TSSOP_4.4
Body Size (mm)	3.00 x 3.00 x 0.85	8.65 x 6.00 x 1.50	9.90 x 5.50 x 1.50	7.80 x 4.40 x 1.20
Assembly Location	ASE (AET)	ASE (AET)	ASE (AET)	ASE (AET)
MSL/Peak Reflow Temperature(°C)	1 / 260°C	1 / 260°C	1 / 260°C	1 / 260°C
Mold Compound	Sumitomo G700LA	Sumitomo G700LA	Sumitomo G700LA	Sumitomo G700LA
Die Attach/Underfill/TIM	Hitachi EN 4900GC conductive	Hitachi EN 4900GC conductive	Hitachi EN 4900GC conductive	Hitachi EN 4900GC conductive
Leadframe Material	Copper	Copper	Copper	Copper
Lead Finish	100Sn	100Sn	100Sn	100Sn
Wire Bond Material/Diameter (mils)	PdCuAu 4N / 1.00	PdCuAu 4N / 1.00	PdCuAu 4N / 1.30	PdCuAu 4N / 1.00

Package/Assembly Test Results

Table 3: Package/Assembly Test Results - SO Package at ASE (AET)

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	ADA4891-2	Q22742.1.HTS1_CuW	0/77
				Q22742.2.HTS2_CuW	0/77
				Q22742.3.HTS3_CuW	0/77
			ADM1491E	Q22741.1.HT1	0/77
			ADM202E	Q22739.1.HTS1_CuW	0/77
				Q22739.2.HTS2_CuW	0/77
				Q22739.3.HTS3_CuW	0/77
			AD7192	Q22744.1.HT1	0/77
Highly Accelerated Temperature and Humidity Stress Test (HAST) ¹	JESD22-A110	130C 85%RH 33.3 psia, Biased, 96 Hours	ADA4891-2	Q22742.1.HA1_CuW	0/77
				Q22742.2.HA2_CuW	0/77
				Q22742.3.HA3_CuW	0/77
			ADM1491E	Q22741.1.HA1	0/77
				Q22741.2.HA2	0/77
				Q22741.3.HA3	0/77
			ADM202E	Q22739.1.HA1_CuW	0/77
				Q22739.2.HA2_CuW	0/77
				Q22739.3.HA3_CuW	0/77
			AD7192	Q22744.1.HA1	0/77
				Q22744.2.HA2	0/77
				Q22744.3.HA3	0/77
Solder Heat Resistance (SHR)	J-STD-020	MSL-1	ADA4891-2	Q22742.1.SH1_CuW	0/11
				Q22742.2.SH2_CuW	0/11
				Q22742.3.SH3_CuW	0/11
			ADM1491E	Q22741.1.SH1	0/11
				Q22741.2.SH2	0/11
				Q22741.3.SH3	0/11
			ADM202E	Q22739.1.SH1_CuW	0/11
				Q22739.2.SH2_CuW	0/11
				Q22739.3.SH3_CuW	0/11

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
			AD7192	Q22744.1.SH1	0/11
				Q22744.2.SH2	0/11
				Q22744.3.SH3	0/11
Temperature Cycling (TC) ¹	JESD22-A104	-65°C/+150°C, 500 Cycles	ADA4891-2	Q22742.1.TC1_CuW	0/77
				Q22742.2.TC2_CuW	0/77
				Q22742.3.TC3_CuW	0/77
			ADM1491E	Q22741.1.TC1	0/77
				Q22741.2.TC2	0/77
				Q22741.3.TC3	0/77
			AD7192	Q22744.1.TC1	0/77
				Q22744.2.TC2	0/77
				Q22744.3.TC3	0/77
Unbiased HAST (UHST) ¹	JESD22-A118	130C 85%RH 33.3 psia, 96 Hours	ADA4891-2	Q22742.1.UH1_CuW	0/77
				Q22742.2.UH2_CuW	0/77
				Q22742.3.UH3_CuW	0/77
			ADM1491E	Q22741.1.UH1	0/77
				Q22741.2.UH2	0/77
				Q22741.3.UH3	0/77
			ADM202E	Q22739.1.UH1_CuW	0/77
				Q22739.2.UH2_CuW	0/77
				Q22739.3.UH3_CuW	0/77
			AD7192	Q22744.1.UH1	0/77
				Q22744.2.UH2	0/77
				Q22744.3.UH3	0/77

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.

Approvals

Reliability Engineer: Pernell Marc Mosuela