



Reliability Report

Report Title: Qualification of Gold to Copper Wire
for LFCSP Products at AEK

Report Number: 23655

Revision: B

Date: 19 February 2025

Summary

This report documents the interim status of the reliability qualification requirements of bond wire change from gold to copper wire for LFCSP package assembled in AEK.

The products listed below were selected to cover the bond wire change for this project:

- The ADP5042 is a micro power management unit (micro PMU) combining one step-down (buck) dc-to-dc convertor, two low dropout linear regulators (LDO), a supervisory circuit, with dual watchdog, for processor control.
- The AD7193 is Ultra-Low Noise 24-Bit Sigma Delta ADCs.
- The AD9864 is a general-purpose IF subsystem that digitizes a low level 10 MHz to 300 MHz IF input with a signal bandwidth ranging from 6.8 kHz to 270 kHz.
- The ADP1741 are CMOS, low dropout linear regulators that operate from 1.6 V to 3.6 V and provide up to 2 A of output current.

Die/Fab Product Characteristics

Table 1.1: Die/Fab Product Characteristics- 0.35um DMOS

Product Characteristics	Product(s) to be qualified
Generic/Root Part #	ADP5042
Die Id	TMBC87
Die Size (mm)	1.81 x 2.11
Wafer Fabrication Site	TSMC Fab-3
Wafer Fabrication Process	0.35um DMOS
Metallization	AlCu
Polyimide	No
Passivation	undoped-oxide/SiN

Table 1.2: Die/Fab Product Characteristics- 0.50um CMOS

Product Characteristics	Product(s) to be qualified
Generic/Root Part #	AD7193
Die Id	TMX924
Die Size (mm)	2.74 x 3.44
Wafer Fabrication Site	TSMC Fab-2B
Wafer Fabrication Process	0.50um CMOS
Metallization	AlCu
Polyimide	No
Passivation	undoped-oxide/SiN

Table 1.3: Die/Fab Product Characteristics- 0.35um BiCMOS

Product Characteristics	Product(s) to be qualified
Generic/Root Part #	AD9864
Die Id	TMF427B0001
Die Size (mm)	3.43 x 3.42
Wafer Fabrication Site	TSMC Fab-3
Wafer Fabrication Process	0.35um BiCMOS
Metallization	AlCu
Polyimide	No
Passivation	undoped-oxide/SiN

Table 1.4: Die/Fab Product Characteristics- 0.35um CMOS

Product Characteristics	Product(s) to be qualified
Generic/Root Part #	ADP1741
Die Id	TMX922
Die Size (mm)	1.08 x 1.48
Wafer Fabrication Site	TSMC Fab-11
Wafer Fabrication Process	0.35um CMOS
Metallization	AlCu
Polyimide	No
Passivation	undoped-oxide/SiN

Package/Assembly Product Characteristics

Table 2: Package/Assembly Product Characteristics - LFCSP at ASE (AEK)

Product Characteristics	Product(s) to be qualified			
Generic/Root Part #	ADP5042	AD7193	AD9864	ADP1741
Package	20-LFCSP	32-LFCSP	48-LFCSP	16-LFCSP
Body Size (mm)	4.00 x 4.00 x 0.75	5.00 x 5.00 x 0.75	7.00 x 7.00 x 0.75	4.00 x 4.00 x 0.75
Assembly Location	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
Mold Compound	Sumitomo G700LYT	Sumitomo G700LYT	Sumitomo G700LYT	Sumitomo G700LYT
Die Attach	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 / 1.20	PdCuAu 4N / 1.00	PdCuAu 4N / 1.00	PdCuAu 4N / 1.30

Package/Assembly Test Results

Table 3: Package/Assembly Test Results - LFCSP at ASE (AEK)

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS			
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	AD7193	Q22774.1.HS1_CuW	0/45			
			AD9864	Q22773.1.HS1_CuW	0/45			
			ADP5042	Q22776.1.HS1_CuW	0/45			
			ADP1741	Q22779.1.HS1_CuW	0/77			
Highly Accelerated Temperature and Humidity Stress Test (HAST) ¹	JESD22-A110	130C 85%RH 33.3 psia, Biased, 96 Hours	AD7193	Q22774.1.HA1_CuW	0/77			
				Q22774.2.HA2_CuW	0/77			
				Q22774.3.HA3_CuW	0/77			
			ADP5042	Q22776.3.HA3_CuW	0/77			
Solder Heat Resistance (SHR)	J-STD-020	MSL-3	AD7193	Q22774.1.SH1_CuW	0/11			
				Q22774.2.SH2_CuW	0/11			
				Q22774.3.SH3_CuW	0/11			
			AD9864	Q22773.1.SH1_CuW	0/11			
				Q22773.2.SH2_CuW	0/11			
				Q22773.3.SH3_CuW	0/11			
			ADP5042	Q22776.1.SH1_CuW	0/11			
			ADP1741	Q22779.1.SH1_CuW	0/11			
				Q22779.2.SH2_CuW	0/11			
				Q22779.3.SH3_CuW	0/11			
			Temperature Cycling (TC) ¹	JESD22-A104	-65°C/+150°C, 500 Cycles	AD7193	Q22774.1.TC1_CuW	0/77
							Q22774.2.TC2_CuW	0/77
Q22774.3.TC3_CuW	0/77							
AD9864	Q22773.1.TC1_CuW	0/77						
	Q22773.2.TC2_CuW	0/77						
	Q22773.3.TC3_CuW	0/77						
ADP5042	Q22776.1.TC1_CuW	0/77						

Table 3: Package/Assembly Test Results - LFCSP at ASE (AEK) cont.

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
Unbiased HAST (UHST) ¹	JESD22-A118	130C 85%RH 33.3 psia, 96 Hours	AD7193	Q22774.1.UH1_CuW	0/77
				Q22774.2.UH2_CuW	0/77
				Q22774.3.UH3_CuW	0/77
			AD9864	Q22773.1.UH1_CuW	0/77
				Q22773.2.UH2_CuW	0/77
				Q22773.3.UH3_CuW	0/77
			ADP5042	Q22776.1.UH1_CuW	0/77
				Q22776.3.UH3_CuW	0/77
			ADP1741	Q22779.1.UH1_CuW	0/77
				Q22779.2.UH2_CuW	0/77
				Q22779.3.UH3_CuW	0/77

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.

Approvals

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