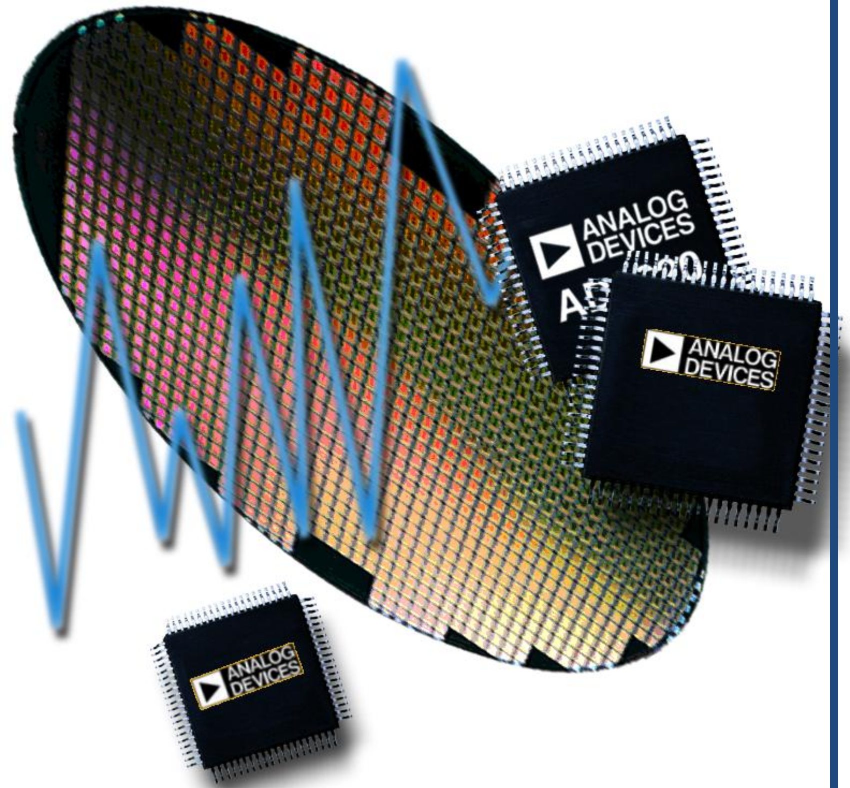

Reliability Report

Report Title: AD8630 Die Revision (Rev. Y)

Report Number: 8172

Revision: A

Date: 18 September 2009

Summary

This report documents the successful completion of the reliability qualification requirements for release of the AD8630 product in a 14-SOIC_N and 14-TSSOP package. The AD8630 was re-designed to improve latch-up performance. The AD8630 is a wide bandwidth auto-zero quad amplifier featuring rail-to-rail input and output swing and low noise.

Table 1: AD8630 Product Characteristics

Die/Fab

Die ID	6499Y
Die Size (mm)	1.73 x 2.23
Wafer Fabrication Site	TSMC Fab 9
Wafer Fabrication Process	0.6um CMOS
Transistor Count	2 thousand
Passivation Layer	undoped-oxide/SiN
Bond Pad Metal Composition	AlCu

Package/Assembly

Available Package	14-TSSOP	14-SOIC_N
Body Size (mm)	4.40 x 5.00 x 1.00	6.20 x 8.75 x 1.35
Assembly Location	Amkor-P	Amkor-P
Molding Compound	Sumitomo 7351T	Sumitomo 6600H
Wire Type	Gold	Gold
Wire Diameter (mils)	1.00	1.00
Die Attach	Ablestik 84-1LMIS R4	Ablestik 84-1LMIS R4
Lead Frame Material	Copper	Copper
Lead Finish	Tin Plate	Tin Plate
Moisture Sensitivity Level	1	1
Maximum Peak Reflow Temperature (°C)	260	260

Description / Results of Tests Performed

Tables 2 and 3 provide a description of the qualification tests conducted and the associated test results for products manufactured on the same technologies as described in Table 1. All devices were electrically tested before and after each stress. Any device that did not meet all electrical data sheet limits following stressing would be considered a valid (stress-attributable) failure unless there was conclusive evidence to indicate otherwise.

Table 2: Package Qualification Test Results

<table>
<tr><th>Test Name</th><th>Specification</th><th>Conditions</th><th>Device</th><th>Package</th><th>Lot #</th><th>Sample Size</th><th>Qty. Failures</th></tr>
<tr><td rowspan="18">Autoclave (AC)[1]</td><td rowspan="18">JESD22-A102</td><td rowspan="18">121°C
100%RH 2atm
96 hours</td><td rowspan="4">AD7524</td><td rowspan="4">Amkor-P 16-SOIC_N</td><td>AA92676.1</td><td>77</td><td>0</td></tr>
<tr><td>AA92677.1</td><td>77</td><td>0</td></tr>
<tr><td>AA92678.1</td><td>77</td><td>0</td></tr>
<tr><td>AA92679.1</td><td>77</td><td>0</td></tr>
<tr><td rowspan="3">AD8630</td><td rowspan="3">Amkor-P 14-SOIC_N</td><td>Q7954.5</td><td>77</td><td>0</td></tr>
<tr><td>Q7954.6</td><td>77</td><td>0</td></tr>
<tr><td>Q7954.7</td><td>77</td><td>0</td></tr>
<tr><td>ADN4667</td><td>Amkor-P 16-SOIC</td><td>AC80508.1</td><td>45</td><td>0</td></tr>
<tr><td rowspan="3">AD8508</td><td rowspan="9">Amkor-P 14-TSSOP</td><td>Q7262.2</td><td>77</td><td>0</td></tr>
<tr><td>Q7262.3</td><td>77</td><td>0</td></tr>
<tr><td>Q7262.4</td><td>77</td><td>0</td></tr>
<tr><td rowspan="3">AD8604</td><td>Q7518.1</td><td>77</td><td>0</td></tr>
<tr><td>Q7518.2</td><td>77</td><td>0</td></tr>
<tr><td>Q7518.3</td><td>77</td><td>0</td></tr>
<tr><td rowspan="3">AD8694</td><td>Q7543.1</td><td>77</td><td>0</td></tr>
<tr><td>Q7543.2</td><td>77</td><td>0</td></tr>
<tr><td>Q7543.3</td><td>77</td><td>0</td></tr>
<tr style="display:none"></tr>
<tr><td rowspan="13">High Temperature Storage Life (HTSL)</td><td rowspan="13">JESD22-A103</td><td rowspan="10">150°C
1,000 hours</td><td rowspan="3">AD8508</td><td rowspan="6">Amkor-P 14-TSSOP</td><td>Q7262.7</td><td>77</td><td>0</td></tr>
<tr><td>Q7262.8</td><td>77</td><td>0</td></tr>
<tr><td>Q7262.9</td><td>77</td><td>0</td></tr>
<tr><td>AD8648</td><td>Q7588.15</td><td>45</td><td>0</td></tr>
<tr><td>AD8694</td><td>Q7543.15</td><td>45</td><td>0</td></tr>
<tr><td>ADA4851-4W</td><td>Q6765.05</td><td>45</td><td>0</td></tr>
<tr><td>AD8604</td><td rowspan="3">Amkor-P 14-SOIC_N</td><td>Q7518.10</td><td>77</td><td>0</td></tr>
<tr><td>AD8630</td><td>Q7954.8</td><td>45</td><td>0</td></tr>
<tr><td>OP484</td><td>AC17816.1</td><td>77</td><td>0</td></tr>
<tr><td>ADN4667</td><td>Amkor-P 16-SOIC</td><td>AC80511.1</td><td>45</td><td>0</td></tr>
<tr><td rowspan="3">150°C
2,000 hours</td><td rowspan="3">AD7524</td><td rowspan="3">Amkor-P 16-SOIC_N</td><td>AA92680.1</td><td>77</td><td>0</td></tr>
<tr><td>AA92681.1</td><td>77</td><td>0</td></tr>
<tr><td>AA92682.1</td><td>77</td><td>0</td></tr>
<tr><td rowspan="15">Temperature Cycling (TC)[1]</td><td rowspan="15">JESD22-A104</td><td rowspan="15">-65°C /
+150°C
500 cycles</td><td rowspan="3">AD8630</td><td rowspan="9">Amkor-P 14-SOIC_N</td><td>Q7954.10</td><td>77</td><td>0</td></tr>
<tr><td>Q7954.11</td><td>77</td><td>0</td></tr>
<tr><td>Q7954.12</td><td>77</td><td>0</td></tr>
<tr><td rowspan="3">AD8604</td><td>Q7518.4</td><td>77</td><td>0</td></tr>
<tr><td>Q7518.5</td><td>77</td><td>0</td></tr>
<tr><td>Q7518.6</td><td>77</td><td>0</td></tr>
<tr><td rowspan="3">AD8608</td><td>Q7705.1</td><td>68</td><td>0</td></tr>
<tr><td>Q7705.2</td><td>67</td><td>0</td></tr>
<tr><td>Q7705.3</td><td>74</td><td>0</td></tr>
<tr><td rowspan="3">AD8608</td><td rowspan="6">Amkor-P 14-TSSOP</td><td>Q7705.4</td><td>77</td><td>0</td></tr>
<tr><td>Q7705.5</td><td>77</td><td>0</td></tr>
<tr><td>Q7705.6</td><td>77</td><td>0</td></tr>
<tr><td rowspan="3">AD8508</td><td>Q7262.12</td><td>77</td><td>0</td></tr>
<tr><td>Q7262.13</td><td>77</td><td>0</td></tr>
<tr><td>Q7262.14</td><td>77</td><td>0</td></tr>
</table>

Test Name	Specification	Conditions	Device	Package	Lot #	Sample Size	Qty. Failures
Temperature Cycling (TC)[1]	JESD22-A104	-65°C / +150°C 500 cycles	AD8694	Amkor-P 14-TSSOP	Q7543.10	77	0
					Q7543.11	77	0
					Q7543.12	77	0

[1] These samples were subjected to preconditioning (per J-STD-020 Level 1) prior to the start of the stress test. Level 1 preconditioning consists of the following:

- Bake: 24 hrs @ 125ºC,
- Soak: Unbiased Soak: 168 hrs @ 85ºC, 85%RH,
- Reflow: 3 passes through an oven with a peak temperature of 260ºC.

Table 3: Process Qualification Test Results

Test Name	Specification	Conditions	Device	Fab Process	Lot #	Sample Size	Qty. Failures
Early Life Failure Rate (ELFR)	MIL-STD-883, Method 1015	125°C Biased 48 hours	ADE7753	TSMC Fab 9 0.6um CMOS	AB63927.1	160	0
					AB63927.5	160	0
					AB63927.2	160	0
					AB63927.3	160	0
					AB63927.4	160	0
					AB63927.6	160	0
					AB63927.7	50	0
					AC79330.1	200	0
					AC79330.2	200	0
					AC79330.3	110	0
					AC80569.1	220	0
					AC80569.3	220	0
					AC80569.4	218	0
					AC80569.2	220	0
					AC80570.1	132	0
Biased HAST (HAST)	JESD22-A110	130°C 85%RH 2atm, Biased 96 hours	AD6421		119466.5	43	0
					F122280.8	45	0
					F122700.8	43	0
Biased HAST (HAST)[1]			AD8692		Q7248.8	77	0
					Q7248.9	77	0
					Q7248.10	77	0
			AD8630		Q7954.13	77	0
					Q7954.14	77	0
					Q7954.15	77	0
High Temperature Operating Life (HTOL)	JESD22-A108	125°C ‹ Tj ‹ 135°C, Biased 1,000 hours	AD8606		3673	99	0
					3673	100	0
			ADE7753		AC79339.1	45	0
					AB63928.1	45	0
					AC80728.1	45	0
		135°C ‹ Tj ‹ 150°C, Biased 500 hours	AD8515		3508	77	0
					3508	77	0
					3508	77	0
		150°C ‹ Tj ‹ 175°C, Biased 500 hours	AD8601		Q7507.3	77	0
High Temperature Operating Life (HTOL)[1]		150°C ‹ Tj ‹ 175°C, Biased 500 hours	AD8605		Q6728.5	77	0
			AD8692		Q7248.11	77	0

[1] These samples were subjected to preconditioning (per J-STD-020 Level 1) prior to the start of the stress test. Level 1 preconditioning consists of the following:

- Bake: 24 hrs @ 125ºC,
- Soak: Unbiased Soak: 168 hrs @ 85ºC, 85%RH,
- Reflow: 3 passes through an oven with a peak temperature of 260ºC.

Samples of the many devices manufactured with these package and process technologies are continuously undergoing reliability evaluation as part of the ADI Reliability Monitor Program. Additional qualification data is available on Analog Devices' web site.

ESD Test Results

The results of ESD testing are summarized in the ESD Results Table. ADI measures ESD results using stringent test procedures based on the specifications listed in Table 4. Any comparison with another supplier's results should ensure that the same ESD test procedures have been used. For further details, please see the EOS/ESD chapter of the ADI Reliability Handbook (available via the 'Quality and Reliability' link at http://www.analog.com).

Table 4: ESD Test Results

ESD Model	Package	ESD Test Spec	RC Network	Highest Pass Level	First Fail Level	Class
FICDM	14-TSSOP	ANSI/ESD STM5.3.1-1999	1Ω, Cpkg	±1500V	NA	C6
FICDM	14-SOIC_N	ANSI/ESD STM5.3.1-1999	1Ω, Cpkg	±1500V	NA	C6
HBM	14-SOIC_N	ANSI/ESD STM5.1-2007	1.5kΩ, 100pF	±5000V	±6000V	3A
MM	14-SOIC_N	ANSI/ESD STM5.2-1999	0Ω, 200pF	±200V	±400V	M3

Latch-Up Test Results

Six samples of the AD8630 were Latch-up tested at T_A=25ºC per JEDEC Standard JESD78, Class I, Level A. Electrical test was performed at ambient temperature. All six devices passed.

Approvals

Reliability Engineer: Robert Yhap
This report has been approved by electronic means (4.0)

Additional Information

Data sheets and other additional information are available on Analog Devices' web site:
http://www.analog.com