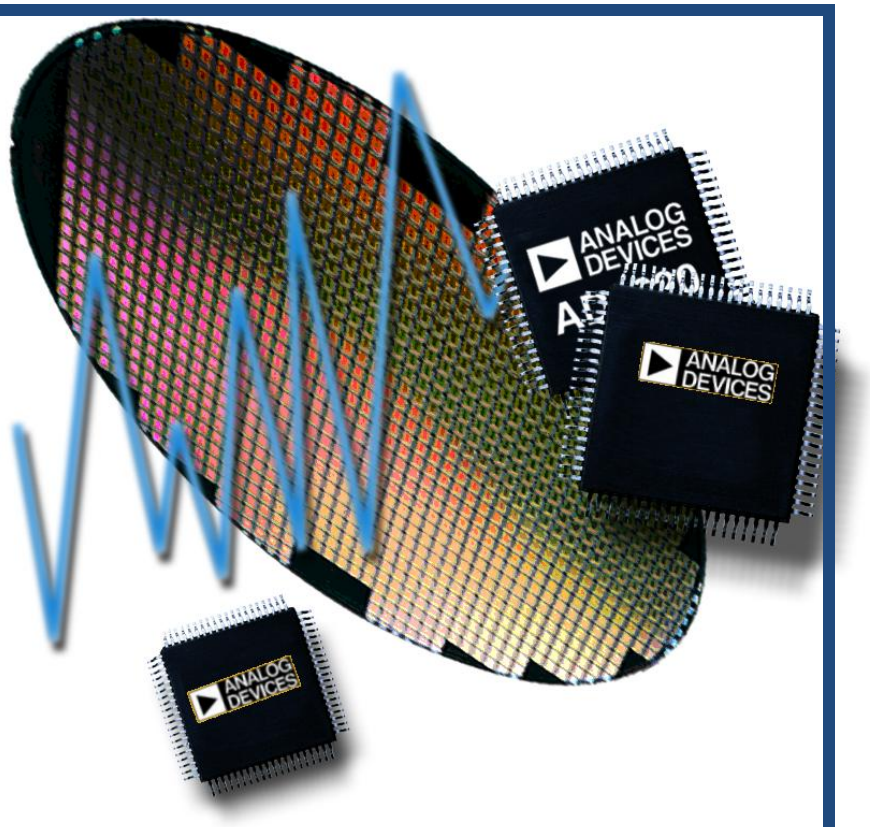


# Reliability Report

**Report Title:** AD8603 at TSMC

**Report Number:** 8710

**Revision:** A

**Date:** 4 February 2011

## Summary

This report documents the successful completion of the reliability qualification requirements for release of the AD8603 product in a 5-TSOT package. The AD8603 is a single micro-power rail-to-rail input and output amplifier that features very low offset voltage as well as low input voltage and current noise.

## Table 1: AD8603 Product Characteristics

### Die/Fab

| | |
|---|---|
| Die ID | 6465Y |
| Die Size (mm) | 0.94 x 1.42 |
| Wafer Fabrication Site | TSMC Fab-9 |
| Wafer Fabrication Process | 0.6µm CMOS |
| Transistor Count | 2 thousand |
| Passivation Layer | undoped-oxide/SiN |
| Bond Pad Metal Composition | AlCu |
| Die Overcoat | Polyimide |

### Package/Assembly

| | |
|---|---|
| Available Package | 5-TSOT |
| Body Size (mm) | 1.60 x 2.90 x 0.90 |
| Assembly Location | Carsem-M |
| Molding Compound | Hitachi CEL8240HF10LX |
| Wire Type | Gold Tanaka GLD |
| Wire Diameter (mils) | 0.80 |
| Die Attach | QMI 519 |
| Lead Frame Material | Copper |
| Lead Finish | Matte Sn |
| Moisture Sensitivity Level | 1 |
| Maximum Peak Reflow Temperature (°C) | 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: TSOT at Carsem-M Package Qualification Test Results

| Test Name | Spec | Conditions | Device | Lot # | Sample Size | Qty. Failures |
|---|---|---|---|---|---|---|
| Autoclave (AC)[1] | JESD22-A102 | 121°C, 100%RH, 2atm, 96 hours | AD5227 | Q8040.2 | 77 | 0 |
| | | | | Q8040.3 | 77 | 0 |
| | | | | Q8040.4 | 77 | 0 |
| | | | AD8603 | Q8710.1 | 77 | 0 |
| | | | | Q8710.2 | 77 | 0 |
| | | | | Q8710.3 | 77 | 0 |
| Highly Accelerated Temperature and Humidity Stress (HAST)[1] | JESD22-A110 | 130°C, 85%RH, 2atm, Biased, 96 hours | AD8603 | Q8710.7 | 77 | 0 |
| | | | | Q8710.8 | 77 | 0 |
| | | | | Q8710.9 | 77 | 0 |
| High Temperature Storage Life (HTSL) | JESD22-A103 | 150°C, 1000 hours | AD8603 | Q8710.10 | 77 | 0 |
| | | | AD5227 | Q8040.8 | 77 | 0 |
| Solder Heat Resistance (SHR)[1] | ADI-0049 | See Footer[1] | AD8603 | Q8710.12 | 11 | 0 |
| | | | | Q8710.13 | 11 | 0 |
| | | | | Q8710.14 | 11 | 0 |
| Temperature Cycling (TC)[1] | JESD22-A104 | -65°C / +150°C, 500 cycles | AD8603 | Q8710.15 | 77 | 0 |
| | | | | Q8710.16 | 77 | 0 |
| | | | | Q8710.17 | 77 | 0 |
| | | | AD5227 | Q8040.5 | 77 | 0 |
| | | | | Q8040.6 | 77 | 0 |
| | | | | Q8040.7 | 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: 0.6µm CMOS at TSMC Fab-9 Fab Qualification Test Results

| Test Name | Spec | Conditions | Device | Lot # | Sample Size | Qty. Failures |
|---|---|---|---|---|---|---|
| Early Life Failure Rate (ELFR) | MIL-STD-883, Method 1015 | 125°C, 48 hours | AD8628 | Q8479.82 | 240 | 0 |
| | | | | Q8479.83 | 240 | 0 |
| | | | | Q8479.84 | 240 | 0 |
| | | | | Q8479.85 | 240 | 0 |
| | | | | Q8479.87 | 240 | 0 |
| | | | | Q8479.88 | 240 | 0 |
| | | | | Q8479.90 | 90 | 0 |
| | | | ADE7753 | Q7670.0202 | 250 | 0 |
| | | | | Q7670.0203 | 250 | 0 |
| | | | | Q7670.0204 | 250 | 0 |
| | | | | Q7670.0205 | 250 | 0 |
| | | | | Q7670.0206 | 245 | 0 |
| | | | | Q7670.0207 | 250 | 0 |
| | | | | Q7670.0208 | 250 | 0 |
| | | | | Q7670.0201 | 250 | 0 |
| Highly Accelerated Temperature and Humidity Stress (HAST) | JESD22-A110 | 130°C, 85%RH, 2atm, Biased, 96 hours | AD6421 | F122758.5 | 45 | 0 |
| | | | AD8605 | 159715.1 | 45 | 0 |
| | | | | 159715.1 | 45 | 0 |
| | | | AD7873 | Q7321.6 | 77 | 0 |
| | | | | Q7321.4 | 77 | 0 |
| Highly Accelerated Temperature and Humidity Stress (HAST)[1] | | | AD8603 | Q8710.7 | 77 | 0 |
| | | | | Q8710.8 | 77 | 0 |
| | | | | Q8710.9 | 77 | 0 |
| | | | ADA4692-2 | Q7559.13 | 77 | 0 |
| | | | | Q7559.4 | 77 | 0 |
| | | | | Q7559.5 | 77 | 0 |
| High Temperature Operating Life (HTOL) | JESD22-A108 | 125°C ‹ Tj ‹ 135°C, Biased, 1000 hours | AD8601 | Q7454.5 | 77 | 0 |
| | | | | Q7454.6 | 77 | 0 |
| | | | | Q7454.7 | 77 | 0 |
| | | | AD8628 | Q8478.21 | 45 | 0 |
| | | | | Q8478.22 | 45 | 0 |
| | | | AD7873 | Q7321.9 | 77 | 0 |
| | | | | 7321.7 | 77 | 0 |
| | | | | 7321.8 | 77 | 0 |
| High Temperature Operating Life (HTOL)[1] | | | AD8648 | Q7588.7 | 77 | 0 |
| | | | | Q7588.8 | 77 | 0 |
| High Temperature Storage Life (HTSL) | JESD22-A103 | 150°C, 1000 hours | AD8506 | Q8001.7 | 77 | 0 |
| | | | AD8601 | Q8277.10 | 65 | 0 |
| | | | AD8603 | Q8710.10 | 77 | 0 |
| | | | AD8692 | Q7248.12 | 77 | 0 |
| | | | | Q7248.13 | 77 | 0 |
| | | | AD8629 | Q7892.3 | 45 | 0 |
| | | | AD8630 | Q7954.8 | 45 | 0 |
| | | | AD8648 | Q7588.15 | 45 | 0 |
| | | | AD8692 | Q7248.14 | 77 | 0 |
| | | | ADA4692-2 | Q7559.6 | 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 Human Body Model (HBM), Machine Model (MM), and Field Induced Charged Device Model (FICDM) ESD testing are summarized in the ESD Results Table. ADI measures ESD results using stringent test procedures based on the specifications listed. 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 the Analog Devices' web site ).

**Table 4: AD8603 ESD Test Results**

| ESD Model | Package | ESD Test Spec | RC Network | Highest Pass Level | First Fail Level | Class |
|---|---|---|---|---|---|---|
| FICDM | 5-TSOT | JESD22-C101 | 1Ω, Cpkg | ±1500V | NA | IV |
| HBM | 5-TSOT | ANSI/ESDA/JEDEC JS-001-2010 | 1.5kΩ, 100pF | ±4000V | NA | 3A |
| MM | 5-TSOT | JESD22-A115 | 0Ω, 200pF | ±200V | ±400V | NA |

## Latch-Up Test Results

Six samples of the AD8603 were Latch-up tested at $T_A$=25ºC per JEDEC Standard JESD78, Class I, Level A. All six devices passed.

## Approvals

Reliability Engineer: Li Li Tay
This report has been approved by electronic means (5.0).

## Additional Information

Data sheets and other additional information are available on Analog Devices' web site.