



# ***Reliability Report***

**Report Title:**            **Wilmington Fab Polyimide  
Qualification**

**Report Number:**    **4478**

**Date:**                    **3/6/2008**

## Summary

This report details the activity's undertaken to qualify a Polyimide Overcoat process in the Wilmington Wafer Fabrication Facility. A number of devices were chosen to cover the different process options available. They are as follows: AD664, BiMOSIIA Quad 12-bit Digital-to-Analog Converter, AD679 BiMOSIIA 14-bit Sampling Analog-to-Digital Converter, AD712 Bipolar 3 Dual BiFet Operational Amplifier and the AD822.

## Process Description

A photosensitive Polyimide layer is applied to wafers post passivation. The Polyimide is then patterned, developed and etched. The etch process opens the bond pads through the Polyimide and passivation. This then allows normal assembly of the product.

The process was developed due to previous polyimide coating, Dow 4939, being obsoleted. This polyimide coating was applied at the package level post wire bond.

### AD664, AD679, AD712, AD822 Product Characteristics

#### Die/Fab

<b>Maximum Power Dissipation (W)</b>	1.000
<b>Device / Die ID</b>	AD664
<b>Die Size (mm)</b>	7.36 x 7.36
<b>Wafer Fabrication Site</b>	ADI-Wilmington
<b>Wafer Fabrication Process</b>	BiMOSIIA
<b>Transistor Count</b>	4 thousand
<b>Passivation Layer</b>	doped-oxide/SiN
<b>Bond Pad Metal Composition</b>	AlCu
<b>Polyimide Layer</b>	Yes

#### Package/Assembly

<b>Available Package(s)</b>	44-PLCC
<b>Body Size (mm)</b>	16.51 x 16.51 x 1.91
<b>Assembly Location</b>	Amkor-P
<b>Die Attach</b>	Ablestik 8340
<b>Lead Frame Material</b>	Copper Olin 194
<b>Bond Wire Type</b>	Gold
<b>Bond Wire Dia. (mils)</b>	1.30
<b>Mold Compound</b>	Sumitomo 6730B
<b>Lead Finish</b>	Tin / Lead Solder Plate
<b>Die Overcoat</b>	NA
<b>Moisture Sensitivity Level</b>	MSL 3

<b>Maximum Peak Reflow (°C)</b>	220°C
<b>Die/Fab</b>	
<b>Maximum Power Dissipation (W)</b>	0.270
<b>Device / Die ID</b>	AD822C
<b>Die Size (mm)</b>	1.78 x 2.29
<b>Wafer Fabrication Site</b>	ADI-Wilmington
<b>Wafer Fabrication Process</b>	CB
<b>Transistor Count</b>	84
<b>Passivation Layer</b>	doped-oxide/SiN
<b>Bond Pad Metal Composition</b>	AlCu
<b>Polyimide Layer</b>	Yes

**Package/Assembly**

<b>Available Package(s)</b>	8-SOICnb
<b>Body Size (mm)</b>	3.90 x 4.90 x 1.40
<b>Assembly Location</b>	Carsem-M
<b>Die Attach</b>	Ablestik 84-1LMIS R4
<b>Lead Frame Material</b>	Copper
<b>Bond Wire Type</b>	Gold
<b>Bond Wire Dia. (mils)</b>	1.00
<b>Mold Compound</b>	Sumitomo 6600H
<b>Lead Finish</b>	Tin / Lead Solder Plate
<b>Die Overcoat</b>	NA
<b>Moisture Sensitivity Level</b>	MSL 1
<b>Maximum Peak Reflow (°C)</b>	220°C

**Die/Fab**

<b>Maximum Power Dissipation (W)</b>	1.000
<b>Device / Die ID</b>	D712
<b>Die Size (mm)</b>	2.87 x 1.82
<b>Wafer Fabrication Site</b>	ADI-Wilmington
<b>Wafer Fabrication Process</b>	Bipolar 3
<b>Transistor Count</b>	120
<b>Passivation Layer</b>	doped-oxide/SiN
<b>Bond Pad Metal Composition</b>	AlCu
<b>Polyimide Layer</b>	Yes

**Package/Assembly**

<b>Available Package(s)</b>	8-SOICnb
<b>Body Size (mm)</b>	3.90 x 4.90 x 1.40
<b>Assembly Location</b>	Carsem-M
<b>Die Attach</b>	Ablestik 84-1LMIS R4

<b>Lead Frame Material</b>	Copper
<b>Bond Wire Type</b>	Gold
<b>Bond Wire Dia. (mils)</b>	1.00
<b>Mold Compound</b>	Sumitomo 6600H
<b>Lead Finish</b>	Tin / Lead Solder Plate
<b>Die Overcoat</b>	NA
<b>Moisture Sensitivity Level</b>	MSL 1
<b>Maximum Peak Reflow (°C)</b>	220°C

**Die/Fab**

<b>Maximum Power Dissipation (W)</b>	0.560
<b>Device / Die ID</b>	AD679
<b>Die Size (mm)</b>	6.60 x 6.60
<b>Wafer Fabrication Site</b>	ADI-Wilmington
<b>Wafer Fabrication Process</b>	BiMOSIIA
<b>Passivation Layer</b>	doped-oxide/SiN
<b>Bond Pad Metal Composition</b>	AlCu
<b>Polyimide Layer</b>	Yes

**Package/Assembly**

<b>Available Package(s)</b>	28-PDIP
<b>Body Size (mm)</b>	0.00 x 0.00 x 0.00
<b>Assembly Location</b>	Amkor-P
<b>Die Attach</b>	Ablestik 84-1LMIS R4
<b>Lead Frame Material</b>	Copper Olin 151
<b>Bond Wire Type</b>	Gold
<b>Bond Wire Dia. (mils)</b>	1.20
<b>Mold Compound</b>	Sumitomo 6300H
<b>Lead Finish</b>	Tin / Lead Solder Plate
<b>Die Overcoat</b>	Dow 4939
<b>Moisture Sensitivity Level</b>	NA
<b>Maximum Peak Reflow (°C)</b>	NA

## Package/Assembly Qualification Test Results

The below table provides a description of the Assembly/Package qualification tests conducted and the associated test results on the AD664, AD679, AD712, AD822 for the Polyimide Qualification.

Test Name	Conditions	Specificati on	Device	Package	Lot #	Sample Size	Qty. Rejects
Autoclave [1]	121C 100%RH 2atm P168	JEDEC- STD-22, Method A102	AD664	44-PLCC	M51092.1 POLY	45	0
				44-PLCC	M51099.1c ontro	45	0
Autoclave	121C 100%RH 2atm P168	JEDEC- STD-22, Method A102	AD679	28-PDIP	M51097.1	32	0
SHR [2]	See MSL CSAM POST	ADI-0049	AD712	8-SOICnb	M51055.2	10	0
Temp Cycle	- 65C/+150C P1000	JEDEC- STD-22, Method A104	AD679	28-PDIP	M51098.1	32	0
Temp Cycle [2]	- 65C/+150C P1000	JEDEC- STD-22, Method A104	AD712	8-SOICnb	M51056.1	77	0
			AD822	8-SOICnb	M51059.1	77	0

- 1) These Samples were subjected to preconditioning (per J-STD-020 Level 3) prior to the start of the stress test. Level 3 preconditioning consists of the following: Bake: 24 hrs @ 125°C, Soak: Unbiased Soak: 192 hrs @ 30°C, 60%RH, Reflow: 3 passes through an oven with a peak temperature of 225+0/-5°C.
- 2) 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 @ 125°C, Soak: Unbiased Soak: 168 hrs @ 85°C, 85%RH, Reflow: 3 passes through an oven with a peak temperature of 260+0/-5°C.

Samples of the many devices manufactured with these 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

## Process Qualification Test Results

The below table provides a description of the process qualification tests conducted and the associated test results on the AD664, AD679, AD712, AD822 and other products manufactured on the same technologies as described in the product characteristics table.

Test Name	Conditions	Specification	Device	Fab Process	Lot #	Sample Size	Qty. Rejects
HAST	130C 85%RH 2atm, Biased P96	JEDEC-STD-22, Method A110	AD679	BiMOSIIA	M70362.1	45	0
HAST [1]	130C 85%RH 2atm, Biased P96	JEDEC-STD-22, Method A110	AD712	Bipolar 3	M51057.1	77	0
HAST [2]	130C 85%RH 2atm, PWR CYC P96	JEDEC-STD-22, Method A110	AD664	BiCMOS	M51094.1 POLY	45	0
					M51101.1c ontro	45	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 @ 125°C, Soak: Unbiased Soak: 168 hrs @ 85°C, 85%RH, Reflow: 3 passes through an oven with a peak temperature of 260+0/-5°C.
- 2) These Samples were subjected to preconditioning (per J-STD-020 Level 3) prior to the start of the stress test. Level 3 preconditioning consists of the following: Bake: 24 hrs @ 125°C, Soak: Unbiased Soak: 192 hrs @ 30°C, 60%RH, Reflow: 3 passes through an oven with a peak temperature of 225+0/-5°C.

Samples of the many devices manufactured with these 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

## Approvals

Reliability Engineer: Denis Belisle

This report has been approved by electronic means (3.6).

## Additional Information

Data sheets and other additional information are available on Analog Devices' web site at the addresses shown below.

**Home Page:** <http://www.analog.com>  
**Sales Info:** [http://www.analog.com/world/corp\\_fin/sales\\_directory/distrib.html](http://www.analog.com/world/corp_fin/sales_directory/distrib.html)  
**Reliability Data:** <http://www.analog.com/world/quality/read/1stpage.html>  
**Reliability Handbook:** <http://www.analog.com/corporate/quality/manuals/>