



# ***Reliability Report***

**Report Title:** ADG467 redesign

**Report Number:** 7756

**Revision:** B

**Date:** 16 December 2009

## Summary

This report documents the successful completion of the reliability qualification requirements for release of the ADG467 product in a 18-SOIC\_W, 20-SSOP package. The ADG467 is an octal channel protector. The channel protector will protect sensitive components from voltage transients in the signal path whether or not the power supplies are present.

**Table 1: ADG467 Product Characteristics**

### Die/Fab

Device / Die ID	A563A
Die Size (mm)	2.11 x 2.64
Wafer Fabrication Site	Limerick 8"
Wafer Fabrication Process	HVCMOS
Passivation Layer	undoped-oxide/OxyNitride
Bond Pad Metal Composition	AlCu

### Package/Assembly

Available Package	20-SSOP
Body Size (mm)	7.50 x 5.30 x 1.80
Assembly Location	Carsem-M
Molding Compound	Sumitomo 6600HR
Wire Type	Gold Tanaka M3
Wire Diameter (mils)	1.00
Die Attach	Ablestik 84-1LMIS R4
Lead Frame Material	Copper
Lead Finish	Tin Plate
Moisture Sensitivity Level	1
Maximum Peak Reflow Temperature (°C)	260 +0/-5C

**Table 2: ADG467 Product Characteristics**

### Die/Fab

Device / Die ID	A564A
Die Size (mm)	2.11 x 2.64
Wafer Fabrication Site	Limerick 8"
Wafer Fabrication Process	HVCMOS
Passivation Layer	undoped-oxide/OxyNitride
Bond Pad Metal Composition	AlCu

### Package/Assembly

Available Package	18-SOIC_W
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Body Size (mm)	11.55 x 7.50 x 1.50
Assembly Location	Amkor-P
Molding Compound	Sumitomo 6600H
Wire Type	Gold
Wire Diameter (mils)	1.20
Die Attach	Ablestik 84-1LMIS R4
Lead Frame Material	Copper
Lead Finish	Tin Plate
Moisture Sensitivity Level	1
Maximum Peak Reflow Temperature (°C)	260C +0/-5C

## Description / Results of Tests Performed

Tables 3 and 4 provide a description of the qualification tests conducted and the associated test results for products manufactured on the same technologies as described in Tables 1, and 2. 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 3: Package Qualification Test Results**

Test Name	Spec	Conditions	Device	Package	Lot #	Sample Size	Qty. Failures	
Autoclave (AC) <sup>2</sup>	JESD22-A102	121°C 100%RH 2atm 168 hours	ADM207	Carsem-M 24-SSOP	O69361.1	45	0	
			ADM211	Carsem-M 28-SSOP	R86123.1	45	0	
Autoclave (AC) <sup>2</sup>	JESD22-A102	121°C 100%RH 2atm 96 hours	ADM691	Amkor-P 16-SOIC_W	Q7874.151	45	0	
					Q8060.155	45	0	
Autoclave (AC) <sup>2</sup>	JESD22-A102	121°C 100%RH 2atm 168 hours	ADM211E	Carsem-M 28-SSOP	N49605.1	45	0	
					N91505.1	45	0	
			ADM213		O91642.1	45	0	
					R86325.1	45	0	
Autoclave (AC) <sup>2</sup>	JESD22-A102	121°C 100%RH 2atm 96 hours	AD7398-POLY	Amkor-P 16-SOIC_W	AC47097.1	77	0	
					ADM691	Q7498.311	45	0
			DAC10		Amkor-P 18-SOIC_W	E195710.1	45	0
			ADE7751		Carsem-M 24-SSOP	AB60919.1	45	0
			ADE7755		AA89084.1	45	0	
Autoclave (AC) <sup>2</sup>	JESD22-A102	121°C 100%RH 2atm 96 hours	AD7834	Amkor-P 28-SOIC_W	Q7732.4	77	0	
Autoclave (AC) <sup>2</sup>	JESD22-A102	121°C 100%RH 2atm 96 hours	ADE7758	Amkor-P 24-SOIC_W	AC79285.1	45	0	
Autoclave (AC) <sup>2</sup>	JESD22-A102	121°C 100%RH 2atm 96 hours	ADE7758	Amkor-P 24-SOIC_W	AB21716.1	45	0	
					AB55241.1	45	0	
Biased HAST (HAST) <sup>2</sup>	JESD22-A110	130°C 85%RH 2atm, Biased 96 hours	ADE7755	Carsem-S 24-SSOP	Q4521.17	45	0	
Biased HAST (HAST) <sup>2</sup>	JESD22-A110	130°C 85%RH 2atm, Biased 96 hours	AD1895A	Carsem-S 28-SSOP	Q6604.16	77	0	
					Q6604.17	77	0	
			ADM691		Amkor-P 16-SOIC_W	Q8060.159	45	0
						Q8276.203	45	0
ADE7753	Carsem-S 20-SSOP	Q8060.36	45	0				

Test Name	Spec	Conditions	Device	Package	Lot #	Sample Size	Qty. Failures
			ADE7751	Carsem-S 24-SSOP	Q7874.9	45	0
Biased HAST (HAST) <sup>2</sup>	JESD22-A110	110°C 85%RH 2atm, Biased 96 hours	AD1896A	Carsem-S 28-SSOP	Q6605.3	77	0
					Q6605.4	77	0
Biased HAST (HAST) <sup>2</sup>	JESD22-A110	130°C 85%RH 2atm, Biased 96 hours	ADM691	Amkor-P 16-SOIC_W	O91640.1	45	0
Biased HAST (HAST) <sup>2</sup>	JESD22-A110	130°C 85%RH 2atm, Biased 96 hours	ADM691	Amkor-P 16-SOIC_W	Q7498.312	45	0
			AD7707	Amkor-P 20-SOIC_W	AB60669.1	45	0
			ADE7751	Carsem-M 24-SSOP	AB60920.1	45	0
			ADE7755	Carsem-S 24-SSOP	AA89085.1	45	0
Biased HAST (HAST) <sup>1</sup>	JESD22-A110	130°C 85%RH 2atm, Biased 96 hours	AD7874	Amkor-P 28-SOIC_W	AA88883.1	45	0
					R86164.1	45	0
					R86267.1	45	0
High Temperature Storage Life (HTSL)	JESD22-A103	150°C 1,000 hours	ADG467	Carsem-M 20-SSOP	Q7756.17	77	0
					Q7756.18	77	0
					Q7756.19	77	0
			AD7398-POLY	Amkor-P 16-SOIC_W	AC47176.1	77	0
					ADE7755	Carsem-S 24-SSOP	Q4521.19
			AD1895A	Carsem-S 28-SSOP	Q4521.21	45	0
					Q4521.5	45	0
AD974	Carsem-S 28-SSOP	Q6604.11	77	0			
AD974	Carsem-S 28-SSOP	AC76443.1	77	0			
Solder Heat Resistance (SHR) <sup>2</sup>	ADI-0049	See Footer	ADM211	Carsem-M 28-SSOP	R86126.1	10	0
Solder Heat Resistance (SHR) <sup>2</sup>	ADI-0049	See Footer	ADM691	Amkor-P 16-SOIC_W	Q7874.154	15	0
Solder Heat Resistance (SHR) <sup>2</sup>	ADI-0049	See Footer	ADM213	Carsem-M 28-SSOP	R86380.1	10	0
Solder Heat Resistance (SHR) <sup>2</sup>	ADI-0049	See Footer	AD7398-POLY	Amkor-P 16-SOIC_W	AC47178.1	11	0
			DAC10	Amkor-P 18-SOIC_W	E195709.1	15	0
			ADE7751	Carsem-M 24-SSOP	AB60922.1	15	0
			ADE7755	Carsem-M 24-SSOP	AA89062.1	15	0
			ADM691	Amkor-P 16-SOIC_W	Q7498.315	15	0
Temperature Cycling (TC) <sup>2</sup>	JESD22-A104	-65°C / +150°C 500 cycles	ADM207	Carsem-M 24-SSOP	O69363.1	45	0
			ADM211	Carsem-M 28-SSOP	R86125.1	45	0
Temperature Cycling (TC) <sup>2</sup>	JESD22-A104	-65°C / +150°C 500 cycles	ADM691	Amkor-P 16-SOIC_W	Q7874.153	45	0
					Q8060.157	45	0
Temperature Cycling	JESD22-A104	-65°C / +150°C 500	ADM211E	Carsem-M 28-SSOP	N49607.1	45	0
					N91507.1	45	0

Test Name	Spec	Conditions	Device	Package	Lot #	Sample Size	Qty. Failures
(TC) <sup>2</sup>		cycles	ADM213		O91644.1	45	0
					R86327.1	45	0
			ADM213E		O40252.1	45	0
Temperature Cycling (TC) <sup>2</sup>	JESD22-A104	-65°C / +150°C 500 cycles	ADM691	Amkor-P 16-SOIC_W	Q7498.313	45	0
			DAC10	Amkor-P 18-SOIC_W	E195711.1	45	0
			ADE7751	Carsem-M 24-SSOP	AB60921.1	45	0
			ADE7755		AA89086.1	45	0
Temperature Cycling (TC) <sup>1</sup>	JESD22-A104	-65°C / +150°C 500 cycles	AD7834	Amkor-P 28-SOIC_W	Q7732.8	77	0
Temperature Cycling (TC) <sup>1</sup>	JESD22-A104	-65°C / +150°C 500 cycles	ADE7758	Amkor-P 24-SOIC_W	AC79286.1	45	0
Temperature Cycling (TC) <sup>1</sup>	JESD22-A104	-65°C / +150°C 500 cycles	ADE7758	Amkor-P 24-SOIC_W	AB21717.1	45	0
					AB55242.1	45	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 260°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°C.

**Table 4: Fab Qualification Test Results**

Test Name	Spec	Conditions	Device	Fab Process	Lot #	Sample Size	Qty. Failures
Early Life Failure Rate (ELFR)	MIL-STD-883, Method 1015	125°C 48 hours	ADG467	Limerick 8" BiCMOS	Q7756.100	290	0
					Q7756.101	290	0
					Q7756.102	50	0
					Q7756.201	290	0
					Q7756.200	290	0
					Q7756.202	52	0
					Q7756.300	290	0
					Q7756.301	290	0
High Temperature Operating Life (HTOL) <sup>1</sup>	JESD22-A108	Ta=125°C, Biased 1,000 hours	ADG467	Limerick 8" BiCMOS	Q7756.2	45*	0
					Q7756.3	45*	0
					Q7756.4	45*	0
					Q7756.6	77	0
					Q7756.5	77	0
					Q7756.7	77	0
High Temperature Storage Life (HTSL)	JESD22-A103	150°C 1,000 hours	ADG467	Limerick 8" BiCMOS	Q7756.17	77	0
					Q7756.18	77	0
					Q7756.19	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 @ 125°C, Soak: Unbiased Soak: 168 hrs @ 85°C, 85%RH, Reflow: 3 passes through an oven with a peak temperature of 260°C.

\* Stressed to Fault condition. +55V, -40V on the drain of the Switch.

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) ESD testing is 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 Website ( [Analog Website](#) ).

**Table 6: ESD Test Results**

ESD Model	Package	ESD Test Spec	RC Network	Highest Pass Level	First Fail Level	Class
HBM	20-SSOP	ANSI/ESD STM5.1-2007	1.5k $\Omega$ , 100pF	$\pm$ 300V	NA	1A

## Latch-Up Test Results

Six samples of the ADG467 were Latch-up tested at Ta=25°C per JEDEC Standard JESD78, Class I, Level A. All six devices passed.

## Approvals

This report has been approved by electronic means (4.0). Reliability Engineer: John Browne

## Additional Information

Data sheets and other additional information are available on [Analog Devices' web site](#)