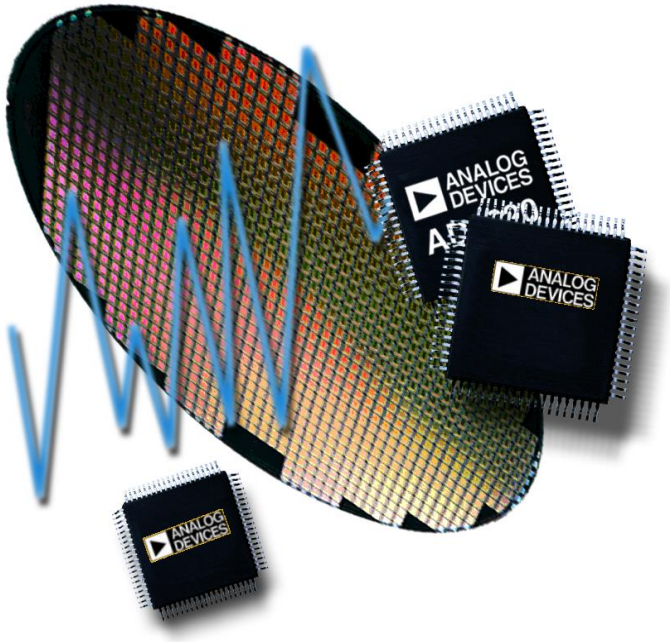

Reliability Report

Report Title: WIN PE15 and PE15-0P SiN Removal Qualification

Report Number: 18823

Revision: A

Date: 13 September 2023

Summary

This report documents the successful completion of the reliability qualification requirements for assessing the removal of SiN from select ADI products on this GaAs process.

Die/Fab Product Characteristics

Table 1.1: Die/Fab Product Characteristics- GaAs

Product Characteristics	Product(s) to be qualified		
Generic/Root Part #	HMC8411 - PE15-0P	HMC8413 - PE15-0P	ADL8104 - PE15-0P
Die Id	FP012 B	FP756 B	FP786 B
Die Size (mm)	0.94 x 0.85	0.94 x 1.47	1.85 x 1.85
Wafer Fabrication Site	WinSemi	WinSemi	WinSemi
Wafer Fabrication Process	GaAs	GaAs	GaAs
Die Substrate	GaAs	GaAs	GaAs
Metallization / # Layers	Au/2	Au/2	Au/2
Passivation	SiN	SiN	SiN

Table 1.2: Die/Fab Product Characteristics- GaAs

Product Characteristics	Product(s) to be qualified		
Generic/Root Part #	HMC8413 - PE15	HMC8411 - PE15	ADL8104 - PE15
Die Id	FP756 A	FP012 A	FP786 A
Die Size (mm)	0.94 x 1.47	0.94 x 0.85	1.85 x 1.85
Wafer Fabrication Site	WinSemi	WinSemi	WinSemi
Wafer Fabrication Process	GaAs	GaAs	GaAs
Die Substrate	GaAs	GaAs	GaAs
Metallization / # Layers	Au/2	Au/2	Au/2
Passivation	SiN	SiN	SiN

Die/Fab Test Results

Table 2: Die/Fab Test Results - GaAs at WinSemi

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
High Temperature Operating Life (HTOL) [1]	JESD22-A108	150°C<Tj<175°C, Biased, 1,000 Hours	HMC8411 - PE15	Q18823.1.HO1	0/77
			ADL8104 - PE15	Q18823.1.HO2	0/77
			HMC8411 - PE15-0P	Q18823.1.HO3	0/77
			ADL8104 - PE15-0P	Q18823.1.HO4	0/77
			HMC8413 - PE15	Q18823.1.H05	0/77
			HMC8413 - PE15-0P	Q18823.1.HO6	0/77
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	ADL8104 - PE15	Q18823.1.HS1	0/77
			ADL8104 - PE15-0P	Q18823.1.HS2	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.

Package/Assembly Product Characteristics

Table 3.1: Package/Assembly Product Characteristics - 16-LFCSP at ASE (AEK)

Product Characteristics	Product(s) to be qualified	
Generic/Root Part #	ADL8104 - PE15	ADL8104 - PE15-0P
Package	16-LFCSP	16-LFCSP
Body Size (mm)	3.00 x 3.00 x 0.75	3.00 x 3.00 x 0.75
Assembly Location	ASE (AEK)	ASE (AEK)
MSL/Peak Reflow Temperature(°C)	3 / 260°C	3 / 260°C
Mold Compound	Sumitomo G700LYT	Sumitomo G700LYT
Die Attach/Underfill/TIM	Hitachi EN 4900GC conductive	Hitachi EN 4900GC conductive
Leadframe Material	Copper	Copper
Wire Bond Material/Diameter (mils)	MKE R 2N Gold / 1.00	MKE R 2N Gold / 1.00

Table 3.2: Package/Assembly Product Characteristics - 6-LFCSP at ASE (AEK)

Product Characteristics	Product(s) to be qualified			
Generic/Root Part #	HMC8411 - PE15	HMC8411 - PE15-0P	HMC8413 - PE15	HMC8413 - PE15-0P
Package	6-LFCSP	6-LFCSP	6-LFCSP	6-LFCSP
Body Size (mm)	2.00 x 2.00 x 0.85	2.00 x 2.00 x 0.85	2.00 x 2.00 x 0.85	2.00 x 2.00 x 0.85
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
Wire Bond Material/Diameter (mils)	MKE R 2N Gold / 1.00	MKE R 2N Gold / 1.00	MKE R 2N Gold / 1.00	MKE R 2N Gold / 1.00

Package/Assembly Test Results

Table 4: 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	ADL8104 - PE15	Q18823.1.HS1	0/77
			ADL8104 - PE15-0P	Q18823.1.HS2	0/77
Temperature Cycling (TC)[1]	JESD22-A104	-55°C/+125°C, P1000	ADL8104 - PE15-0P	Q18823.1.TC3	0/77
			HMC8411 - PE15-0P	Q18823.1.TC1	0/77
			HMC8413 - PE15-0P	Q18823.1.TC2	0/77
Solder Heat Resistance (SHR)	J-STD-020	MSL-1	HMC8411 - PE15-0P	Q18823.1.SH2	0/11
			HMC8413 - PE15-0P	Q18823.1.SH4	0/11
			HMC8411 - PE15	Q18823.1.SH1	0/11
			HMC8413 - PE15	Q18823.1.SH3	0/11
Unbiased HAST (UHST)[1]	JESD22-A118	110C 85%RH 17.7 psia, P264	ADL8104 - PE15	Q18823.1.UH3	0/77
			ADL8104 - PE15-0P	Q18823.1.UH6	0/77
			HMC8411 - PE15	Q18823.1.UH1	0/77
			HMC8411 - PE15-0P	Q18823.1.UH4	0/77
			HMC8413 - PE15	Q18823.1.UH2	0/77
			HMC8413 - PE15-0P	Q18823.1.UH5	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.

ESD Test Results

The results of Human Body Model (HBM) and Field-Induced Charged Device Model (FICDM) ESD testing are summarized in Table 5. 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 on Analog Devices' web site).

Table 5: HMC8411 - PE15-0P ESD Test Results

ESD Model	Package	ESD Test Spec	RC Network	Highest Pass Level	Class
FICDM	6-LFCSP	JS-002	1Ω, Cpkg	±1250V	C3
HBM	6-LFCSP	ESDA/JEDEC JS-001-2011	1.5kΩ, 100pF	±500V	1B

Approvals

Reliability Engineer: Robert Parker-Mason