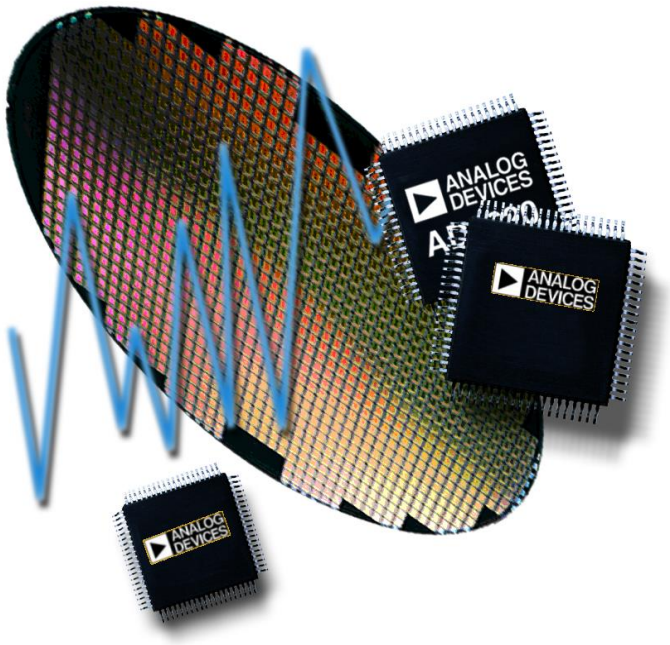

Reliability Report

Report Title: ADPA7002 Improved Detector Circuit Revision Qualification

Report Number: 19548

Revision: A

Date: 31 May 2023

Summary

This report documents the successful completion of the reliability qualification requirements for the release of the ADPA7002 product in a 16-LCC_HS package. The ADPA7002 is a gallium arsenide (GaAs), monolithic microwave integrated circuit (MMIC), pseudomorphic high electron mobility transistor (pHEMT), distributed power amplifier that operates from 20 GHz to 44 GHz.

Die/Fab Product Characteristics

Table 1: Die/Fab Product Characteristics

Product Characteristics	Product
Generic	ADPA7002
Die Id	DP964 B
Die Size (mm)	1.80 x 2.75
Wafer Fabrication Process	GaAs
Die Substrate	GaAs
Passivation	SiN

Die/Fab Test Results

Table 2: Die/Fab Test Results

Test Name	Spec	Conditions	Generic	Lot #	Fail/SS
High Temperature Operating Life (HTOL)[1]	JESD22-A108	150°C<Tj<175°C, Biased, 1,000 Hours	HMC5622A	Q11814.11	0/77
				Q11814.12	0/77
				Q11814.13	0/77
			HMC994A	Q12726.10	0/45
				Q12726.25	0/45
			HMC906A	Q12910.3	0/45
			HMC797A	Q12907.11	0/45
				Q12907.12	0/45
		Tj=125°C, Biased, 1,000 Hours	HMC907A	Q12971.1	0/45
				Q12971.3	0/45
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	ADPA7002	Q13958.HS1	0/77
				Q17419.1.HS1	0/45
				Q17419.1.HS4	0/45
				Q17419.1.HS6	0/77
			ADPA7005	Q16365.HS1	0/77
			ADPA7006	Q16366.HS1	0/77
			ADPA7007	Q13969.HS1	0/77
			HMC907AG	Q17514.1.HS1	0/77
				Q17514.2.HS2	0/77
				Q17514.3.HS3	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: Package/Assembly Product Characteristics

Product Characteristics	Product
Generic	ADPA7002
Package	16-LCC_HS
Body Size (mm)	6.00 x 6.00 x 1.32
MSL/Peak Reflow Temperature(°C)	3 / 260°C
Mold Compound	N/A
Die Attach	Sintered Ag Conductive
Leadframe Material	Alumina
Lead Finish	Au
Wire Bond Material/Diameter (mils)	4N Gold / 1.0

Package/Assembly Test Results

Table 4: Package/Assembly Test Results

Test Name	Spec	Conditions	Generic	Lot #	Fail/SS
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	ADPA7002	Q13958.HS1	0/77
				Q17419.1.HS1	0/45
				Q17419.1.HS4	0/45
				Q17419.1.HS6	0/77
			ADPA7005	Q16365.HS1	0/77
			ADPA7006	Q16366.HS1	0/77
			ADPA7007	Q13969.HS1	0/77
			HMC7229	Q11686.1	0/45
				Q11686.2	0/45
				Q11686.3	0/45
Solder Heat Resistance (SHR)	J-STD-020	MSL-3	ADPA7002	Q19548.1.SH1	0/30
Temperature Cycling (TC)[1]	JESD22-A104	-65°C/+150°C, 500 Cycles	ADPA7002	Q13958.6	0/77
				Q13958.TC1	0/77
			ADPA7005	Q13992.7	0/77
				Q16365.TC1	0/77
			ADPA7006	Q13993.TC1	0/77
				Q16366.TC1	0/77
			ADPA7007	Q13969.TC1	0/77
			HMC7229	Q11686.4	0/77
				Q11686.5	0/77
				Q11686.6	0/77
				Q11686.7	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

Table 5: ESD Test Result

ESD Model	Generic	Package	ESD Test Spec	RC Network	Highest Pass Level
FICDM	ADPA7002	16-LCC_HS	JS-002	1Ω, Cpkg	±250V
HBM	ADPA7002	16-LCC_HS	ESDA/JEDEC JS-001	1.5kΩ, 100pF	±125V

Approvals

Reliability Engineer: Carl Bunis