



Reliability Report

Report Title: HMC1190ALP6NE New Product Qualification
Report Number: 11869
Revision: A
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Summary

This report documents the interim completion of the reliability qualification requirements for the release of the HMC1190ALP6NE product in a 40-LFCSP package. The HMC1190A is a high linearity broadband dual channel downconverting mixer with integrated PLL and VCO optimized for multi-standard receiver applications that require a compact, low power design.

Table 1: HMC1190ALP6NE Product Characteristics

Die/Fab

Die Id	F7901	J7001A
Die Size (mm)	3.80 x 2.28	1.66 x 2.72
Wafer Fabrication Site	Global Foundries	WIN Semi
Wafer Fabrication Process	0.35µm SiGe Bipolar	0.5µm GaAs PHEMT
Approximate Transistor Count	63,900	100
Passivation Layer	doped-oxide/OxyNitride	SiN
Bond Pad Metal Composition	AlCu	AlCu/Au

Package/Assembly

Package	40-LFCSP
Body Size (mm)	6.00 x 6.00 x 0.85
Assembly Location	Unisem
Molding Compound	Sumitomo G770
Wire Type	Gold
Wire Diameter (mils)	1.00
Die Attach	Ablestik 8200C
Lead Frame Material	Copper
Lead Finish	NiPdAu
Moisture Sensitivity Level	3
Maximum Peak Reflow Temperature (°C)	260

Description / Results of Tests Performed

Tables 2 through 4 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: LFCSP at Unisem Package Qualification Test Results

Test Name	Specification	Conditions	Device	Lot #	Sample Size	Qty. Failures
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	HMC1190ALP6NE	Q11869.1	45	0
				Q11869.7	45	0
				Q11869.8	45	0
Solder Heat Resistance (SHR) ¹	J-STD-020	MSL-3	HMC1190ALP6NE	Q11869.11	11	0
				Q11869.12	11	0
				Q11869.4	11	0
Temperature Cycling (TC) ¹	JESD22-A104	- 65°C/+150°C, 500 Cycles	HMC1190ALP6NE	Q11869.10	45	0
				Q11869.9	45	0
Temperature Humidity Bias (THB)	JESD22-A101	85°C, 85%RH, Biased, 1,000 Hours	HMC1190ALP6NE	Q11869.6	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, Unbiased Soak: 192 hrs @ 30°C, 60%RH, Reflow: 3 passes through an oven with a peak temperature of 260°C.

Table 3: 0.35µm SiGe Bipolar at IBM-ASTC Fab Qualification Test Results

Test Name	Specification	Conditions	Device	Lot #	Sample Size	Qty. Failures
High Temperature Operating Life (HTOL)	JESD22-A108	125°C<Tj<135°C, Biased, 500 Hours	HMC1190ALP6NE	Q11869.16	45	0
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	HMC1190ALP6NE	Q11869.1	45	0
				Q11869.7	45	0
				Q11869.8	45	0
Temperature Humidity Bias (THB)	JESD22-A101	85°C, 85%RH, Biased, 1,000 Hours	HMC1190ALP6NE	Q11869.6	45	0

Table 4: 0.5µm GaAs PHEMT at WinSemi Fab Qualification Test Results

Test Name	Specification	Conditions	Device	Lot #	Sample Size	Qty. Failures
High Temperature Operating Life (HTOL)	JESD22-A108	125°C<Tj<135°C, Biased, 500 Hours	HMC1190ALP6NE	Q11869.16	45	0
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	HMC1190ALP6NE	Q11869.1	45	0
				Q11869.7	45	0
				Q11869.8	45	0
Temperature Humidity Bias (THB)	JESD22-A101	85°C, 85%RH, Biased, 1,000 Hours	HMC1190ALP6NE	Q11869.6	45	0

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) 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: HMC1190ALP6NE ESD Test Results

ESD Model	Package	ESD Test Spec	RC Network	Highest Pass Level	First Fail Level	Class
FICDM	40-LFCSP	JESD22-C101	1Ω, Cpkg	±1000V	NA	IV
HBM	40-LFCSP	ESDA/JEDEC JS-001-2011	1.5kΩ, 100pF	±500V	±1000V	1B

Approvals

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Additional Information

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