



AH1, AH2, AH3

QUALIFICATION REPORT

I. INTRODUCTION

The AH1, AH2 and AH3 devices are high dynamic range amplifiers packaged in a low cost surface mount package. The combination of low noise figure and high output IP3 at the same bias point makes them ideal for receiver and transmitter applications.

II. SCOPE

This report summarizes the reliability qualification of the AH1, AH2 and AH3 high dynamic range amplifiers manufactured at the WJ Communications facility in Milpitas, CA and assembled in a SOT-89 plastic package. The process used is our standard H10, 4-inch process.

The reliability data are obtained through the performance of specified accelerated stress tests described in this document.

III. APPLICABLE DOCUMENTS

All the test procedures and test methods are consistent with industry standards. The standards referenced in this document are JEDEC standard 22 and MIL STD 883.

IV. QUALIFICATION TEST PLAN

Level 3 preconditioning was performed in accordance with JEDEC method A113-A for the parts in this qualification.

The AH1, AH2, and AH3 are processed using the same process flow and are all packaged in the SOT-89, therefore qualification testing done on one part qualifies the entire family of parts.

Stress or Test	Device Hours/ Cycles	Sample Size	Failed Units	Date	Reference Document	Part Tested
High Temp Op Life	154,000	154	0	1998	JESD22 A108	AH1
	19,000	38	0	1999		AH1
	77,000	77	0	2000		AH1
Total-HTOL	250,000	269	0			
Accelerated Biased Humidity (HAST)	4,800	50	0	1997	JESD22 A110	AH1
	4,992	52	0	1998		AH1
	1,248	13	0	1999		AH3
	20,328	77	0	2000		AH1
Total-HAST	26,568	192	0			
Temperature Cycle	75,000	75	1	1997	JESD22 A104	AH1
	154,000	154	2	1998		AH1
	50,000	50	0	1999		AH3
	77,000	77	1	2000		AH1
Total-Temp Cycle	356,000	356	4			
Unbiased Autoclave	3,072	32	3	1997	JESD22 A102	AH1
	19,200	200	0	1998		AH1
	4,800	50	0	1999		AH3
	7,392	77	1	2000		AH1
Total-Autoclave	34,464	359	4			
Physical Dimensions		12	0	2000, 2001	JESD22	
Mark Permanency		9	0	2000, 2001		
Solderability		74	0	1997, 1999, 2000	MS883 M2003	AH1, AH3
Lead Integrity		36	0	1997, 1999	JESD22 B105	AH1, AH3
Resistance to soldering heat		32	0	1997	JESD22 B106	AH1
Hi Temp Storage		75	1	1997	JESD22 A103	AH1
HALT		16	0	1997		AH1
Res. To Solvents		15	0	1997		AH1
Vibration		15	0	1997		AH1
Flammability		3	0	1997	IEC 695-2- 2	AH1

V. DISCUSSION OF RESULTS

1. TEMPERATURE CYCLE

356 parts have completed 356,000 temperature cycles with four failures. One part failed during the 1997 qual due to a broken bond wire. The manual bonding process has been changed to auto bonding. No parts have failed for this problem since the change to automated bonding. After failure analysis, including electrical test and de-encapsulation, three parts were determined to have failed due to ESD.

2. UNBIASED AUTOCLAVE

359 parts have completed 34,464 hours of Autoclave with 4 failures. Three parts failed during the 1997 qual due to broken bond wires. The manual bonding process has been changed to auto bonding. No parts have failed for this problem since the change to automated bonding. After failure analysis, including electrical test and de-encapsulation, one part was determined to have failed due to ESD.

3. HIGH TEMPERATURE STORAGE

75 units completed 1000 hours of high temperature storage life testing. One part failed during the 1997 qual due to a broken bond wire. The manual bonding process has been changed to auto bonding.

VI. CONCLUSIONS

The Reliability Qualification Data demonstrates that the AH1, AH2 and AH3 amplifiers fabricated at the WJ Communications Milpitas facility and assembled in a SOT-89 package demonstrate high reliability and quality levels.