



AG606 QUALIFICATION REPORT

I. SUMMARY

The AG606 is dual amplifier consisting of two InGaP HBT Darlington-pair amplifier die epoxied to paddle, wire bonded & molded in SOIC 8 exposed pad package. (Note: The same die are used in AG602-89 and AG602-86 products, which were previously qualified as members of the AGxxx Series gain block product family). The two amplifiers in each package, Channel 1 and Channel 2, are tested independently. The parameters monitored for the qualification tests were Supply Current, Gain, and OIP3. Failures are defined as any variation of 10% or greater in Supply Current, ± 1 dB in Gain, and + 5dB & -2dB in OIP3. The results of the individual qualification tests are located in section V.

II. SCOPE

This report summarizes the reliability qualification of the AG606. 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.

IV. QUALIFICATION TEST PLAN

Stress or Test	Procedures/Conditions	Device Hours/ Cycles	Sample Size	Failed Units	Date	Reference Document	Part Tested
Preconditioning Level 3	External visual 40x High Temp. Storage Life 24 hrs @ +125°C Temp. & Humidity Test 193 hrs. @ +30°C/ 60% RH Convection Solder Reflow test 3 cycles w/flux immersion, peak temperature 235°C	N/A	3 lots, a total of 795 parts	0	Q1 2004	JESD22-A113C JESD22-A101-B JESD22-B101 JESD22-A103-B JESD22-A112.4	AG606
Temperature Cycle	Test Condition C Temp. -65°C (+0°/-10°C) to +150°C (+10°/-0°C) Dwell time = 10 to 15 min.	500 cycles	3 lots, a total of 180 parts	0	Q1 2004	JESD22-A104-B	AG606



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Stress or Test	Procedures/Conditions	Device Hours/ Cycles	Sample Size	Failed Units	Date	Reference Document	Part Tested
Unbiased Autoclave	Test Condition C Temp. 121°C (+/-1°C) Pressure = 15 +/-1psig Relative Humidity = 100%	96 (-1, +5) hours	3 lots, a total of 180 parts	0	Q1 2004	JESD22-A102-C	AG606
Unbiased High Temperature Storage (HTB)	Temp. 150°C (+ 5°C, -0°C)	1000 hours	1 lot, a total of 60 parts	0	Q1 2004	JESD22-A103-B	AG606
ESD Complete details see section V.7 ESD	Charged Device Model (CDM) Human Body Model (HBM)	N/A N/A	1 lot, a total of 24 parts 1 lot, a total of 15 parts	0 failures thru 2000 volts 0 failures thru 1250 volts	Q2 2004 Q2 2004	JESD22-C101-A JESD22-A114-B	AG606
Steady State Temperature Humidity Bias Life Test 85/85 (THB)	Test Condition Temp. 85°C (+/- 2°C) Pressure = 7.12 +/-1psig Relative Humidity = 85%	1000 hours	3 lots, a total of 150 parts	0	Q2 2004	JESD22-A101-B	AG606
High Temp Op Life (HTOL)	Test Condition B Temp. 125°C (+5, -0°C)	1,000 (-0, +10) hours	3 lots, a total of 150 parts	0	Q1 2004	JESD22-A108-B	AG606

V. DISCUSSION OF RESULTS

1. Testing procedures

All of the qualification tests were performed with the AG606 using loose parts except HTOL and THB which were mounted to a PCB. The PCB layout used the recommended via pattern published in the AG606 Data Sheet. The test circuit was comparable to the recommended configuration on the AG602-89 datasheet and consisted of two single-ended, 50 ohm amplifiers per package. The application circuit was duplicated fifteen times on one large PCB for the qualification testing. A control board consisting of fifteen AG606 was tested before and after each set of the stressed devices to ensure measurement accuracy and repeatability.

2. Pre-Conditioning

Three lots of 265, a total of 795 AG606 devices, completed pre-conditioning with no electrical failures. The 795 devices underwent pre and post stress Scanning Acoustic Microscope inspection with no failures.

3. Temperature Cycle

60 Devices from three lots each (180 total AG606 devices) completed 500 temperature cycles with 0 failures.



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4. Unbiased Autoclave

60 Devices from three lots each (180 total AG606 devices) completed 96 hours of Autoclave with 0 failures.

5. Unbiased High Temperature Storage (HTB)

A total of 60 AG606 devices from one lot completed 1000 hours of Unbiased High Temperature Storage with 0 failures.

6. ESD

A total of 39 units were subjected to CDM and HBM ESD testing. The CDM test voltages were 250, 500, 750, 1,000, 1,250, 1,500, 1,750 and 2,000 volts. The HBM test voltages were 250, 500, 750, 1,000 and 1,250 volts. No failures occurred at these voltages both for CDM and HBM ESD tests. If any one of the three devices failed at a given voltage level, the device was said to fail at that level. The classification level was assigned according to the last voltage level at which all three parts passed post-ESD RF testing according to the test specifications set by WJ Communications.

A total of 39 AG606 devices completed CDM and HDM ESD testing at a variety of different voltage levels with no failures. The AG606 device has been classified as a Class 1C device (Highest Voltage Level Passed between 1000V and 2000V) for Human Body Model (HBM) testing according to JEDEC Standard JESD22-A114 and as a Class IV device (Highest Voltage Level Passed > 1000V) for Charged Device Model (CDM) testing according to JEDEC Standard JESD22-C101.

7. Steady State Temperature Humidity Bias Life Test (85°/85% RH THB)

50 Devices from three lots each (150 total AG606 devices) completed 1000 hours of 85/85 with 0 failures.

8. High Temp Op Life (HTOL)

50 Devices from three lots each (150 total AG606 devices) completed 1,000 hours of HTOL with 0 failures.

VI. CONCLUSIONS

The results of the qualification tests in this report demonstrate that the AG606 has passed the requirements set forth by JEDEC for accelerated reliability testing, and will operate with high reliability and quality levels.



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