ABA - 31563 & ABA - 32563

Reliability Data Sheet

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Description

Avago Technologies' ABA-31563/32563 are Silicon monolithic amplifier that offers excellent gain and are fabricated using Avago Technologies' HP25 silicon bipolar process, which employs a double-diffused single polysilicon process with self-aligned submicron emitter geometry.

The ABA-31563/32563 were tested at various stress intervals for DC and RF functionality i.e. NF, Gain, Id. The following data was gathered from the product qualification test results.

Reliability Prediction Model

An exponential cumulative failure function (constant failure rate) was used as the reliability prediction model to predict failure rate and mean time to failure (MTTF) at various temperatures as shown in Table 2. The wearout mechanisms are therefore not considered. The Arrhenius temperature de-rating equation is used. Avago Technologies assumes no failure mechanism change between stress and use conditions. Bias and temperature are alterable stresses and must be considered with the thermal resistance of the devices when determining the stress condition. The failure rate will have a direct relationship to the life stress. The process was tested to determine an activation energy of 0.85eV. Confidence intervals are based upon the chi-squared prediction method associated with exponential distribution.

Table 1. Life Tests
Demonstrated Performance

Test Name	Stress Test Condition	Total Units Tested	Total Device Hours	No. of Failed Units
High Temperature Operating Life	Tch = 150°C, DC Bias	72	72,000	0

A failure criterion of ± 0.5dB for NF/ Gain, was used

Table 2. Estimates for various channel temperatures

Channel Temp. (°C)	Point Typical Performance MTTF hours[1]	90% Confidence MTTF hours	Point Typical Performance FIT	90% Confidence FIT
150	7.2×10^4	3.124×10^4	13889	32014
125	3.115×10^5	1.351×10^5	3210	7399
100	1.64×10^6	7.116×10^5	610	1405
55	6.17×10^7	2.679×10^7	16.19	37.3

[1] Point MTTF is simply the total device hours divided by the number of failures. However, in cases for which no failures are observed, the point estimate is calculated under the assumption that one unit failed.

Table 3. Product Qualification – Operational Life Test Results

Stress	Conditions	Duration	Failures/ number tested
High Temperature Operating Life (HTOL)	Vd 3V with junction temperature of 150°C.	1000 hours	0/72
Wet & High Temperature Operating Life (WHTOL)	85°C/85% RH, Vd=3V	1000 hours	0/72

Table 4. Product Qualification – Environment Stress Results

Stress	Conditions	Duration	Failures/ number tested
Thermal Cycle	-65/150°C, 15 minutes dwell, 10 minutes transfer.	500 cycles	0/77
Thermal Shock	-65/150°C, 5 minutes dwell, 10 sec transfer.	500 cycles	0/77
Autoclave	121C/100%RH, 15psig	168 hrs	0/77

Table 5. Electrostatic Discharge (ESD) test results
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ESD Test	Reference:	Results
Human Body Model	EIA/JESD22-A114-B	650V (Class 1B)
Machine Model	EIA/JESD22-A115-A	100V (Class A)

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ESD Test	Reference:	Results
Human Body Model	EIA/JESD22-A114-B	800V (Class 1B)
Machine Model	EIA/JESD22-A115-A	110V (Class A)

HBM

Class 0 is ESD voltage level < 240V, Class 1A is voltage level between 250V and 500V, Class 1B is voltage level between 500V and 1000V, Class 1C is voltage level between 1000V and 2000V, Class 2 is voltage level between 2000V and 4000V, Class 3A is voltage level between 4000V and 8000V, Class 3B is voltage level > 8000V.

MM

Class A is ESD voltage level <200V, Class B is voltage level between 200V and 400V, Class C is voltage level > 400V.

Note: The device is classified as ESD sensitive.
The following precautions shoule be taken:
1) Ensure Faraday cage or conductive shield bag is used when the device is transported from one destination to another.
2) At SMT assembly station, if the static charge is above the device sensitivity level, place an ionizer near to the device for charge neutralization purpose.
3) Personal grounding has to be worn at all time when handling the device.

Moisture Sensitivity Classification: Class 1
Preconditioning per JESD22-A113-A class 1 was performed on all devices prior to reliability testing.

Flammability Rating: UL Class 94V-0

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