

Reliability Data Sheet

Description

This document summarizes the reliability performance of Avago Technologies ADBS-A320 Low Power Optical Finger Navigation Sensor discussing its product reliability through qualification testing, the failure definition and some general concepts of reliability used for the MTTF calculation.

Avago Technologies tests its parts at the maximum rated conditions recommended for the product in accordance to JEDEC specifications. Actual product reliability results depend heavily upon the electrical and environmental characteristics of the application and to proper adherence to the recommended usage, storage condition and assembly practices.

Product failure definition

A product has failed when it can no longer perform its intended functions. Failures fall into two categories—catastrophic and parametric.

Catastrophic Failures

A catastrophic failure has occurred when an Avago Technologies navigation sensor is no longer navigating at normal operating conditions. In most cases, this sort of catastrophic sensor failure can be attributed to open or short circuits brought about by assembly problems such as broken wire, lifted stitch or a defective die. Such catastrophic failures will result in total product malfunction.

Parametric Failures

Parametric failures occur when key electrical parameters have shifted outside of acceptable specification boundaries. Although electrical parameters can change over time with reference to their initial values, this does not typically affect the functionality of the device. Nonetheless, with regards to reliability testing, Avago Technologies considers both catastrophic and parametric failures as failures.

Qualification Testing

Before a product is released into the market, Avago Technologies subjects the product to a series of reliability tests, including environmental, mechanical and electrical tests, to ensure the product meets the intended reliability expectation. The tables provided below show the results of reliability testing conducted by Avago Technologies over a period of time as shown in the test conditions.

Moisture Sensitivity Classification: Class 1

Preconditioning per JESD22-A113 class 1 was performed on all devices prior to reliability testing except for solderability, mechanical tests and ESD classification.

MSL 1 Preconditioning (JESD22-A113):

24hrs HTSL (125°C) -> 168hrs WHTSL (85°C/85%RH) + 3x PbFree Reflow, 260°C max.

Table 1. Environmental Tests

Test Name	Reference Standard	Test Conditions	Units Tested	Units Failed
Temperature Cycle (TMCL)	JESD22-A104	-40°C to 85°C 15 mins. dwell, 5 mins. transfer 500 cycles	75	0
Wet High Temperature Operating Life (WHTOL)	JESD22-A101	85°C/85%RH, bias @ Vdd 500 hours	75	0
High Temperature Operating Life (HTOL)	JESD22-A108	85°C, bias @ Vdd 500 hours	75	0
Low Temperature Operating Life (LTOL)	JESD22A-108	-40°C, bias @ Vdd 500hrs	28	0
Wet High Temperature Storage Life (WHTSL)	JIS C-7021, Testing Method B-11	60°C/90%RH 500hrs	75	0
Temperature Cycle With Humidity (WHTMCL)	Avago Condition	10°C to 65°C, 80-98%RH 10hrs. dwell,12 hrs.transfer 5 cycle	75	0

Table 2. Mechanical Tests

Test Name	Reference Standard	Test Conditions	Units Tested	Units Failed
Mechanical Shock	JESD22-B104	1500g, 0.5ms 5 shocks/axis, 6 axis	22	0
Mechanical Vibration	JESD22-B103	20g, 20-2kHz 4 min/cycle, 4 cycles/axis, 3 axis	22	0

Table 3. Electrical Tests

Test Name	Reference Standard	Test Conditions	Units Tested	Units Failed
ESD	JESD22-A114	2kV Human Body Model	3/pin combination	0
	JESD22-A115	200V Machine Model	3/pin combination	0
	JESD22-A101	1kV CDM	3	0
Latch Up	Avago Condition	Latch Up. Trigger current $\pm 100\text{mA DC}$,	6	0

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