HMPS-282x
MiniPak Schottky Diode

Reliability Data Sheet

Introduction

The following data was gathered from the product qualification stress tests for HMPS-282x series. The reliability of HMPS-2822, HMPS-2825 can be cross referenced to HMPS-2820 based on similarity in wafer fabrication process and package assembly. The product was subjected to severe environmental conditions and electrical stress to meet the minimum reliability expectations of today's RF requirement.

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. Agilent 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 1.33 eV. 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	130	43,680	0

Table 2. Estimates for various channel temperatures are as follows.

Channel Temp. (°C)[2]	Point Typical Performance MTTF hours[1]	90% Confidence MTTF hours	Point Typical Performance FIT	90% Confidence FIT
150	4.36 x 104	1.89 x 104	22935.7	52910.1
125	4.32 x 105	1.87 x 105	2314.8	5347.6
100	5.81 x 106	2.52 x 106	172.1	396.8
85	3.29 x 107	1.43 x 107	30.4	69.9

Notes:
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.
2. Thermal Resistance: θjc = 300°C/W

Table 3. Product Qualification – Operational Life Test Results.

Stress	Conditions	Duration	Failures/ number tested
High Temperature Operating Life (HTOL)	Vf = 0.7 V with junction temperature of 150°C Avg. Power = 30 mW	336 hours	0/130
WHTOL	85°C/85% RH	336 hours	0/130

Table 4. Product Qualification – Environment Stress Results.

Stress	Conditions	Duration	Failures/number tested
TMCL	-65/150°C, 10 minutes dwell	200 cycles	0/273

Table 5. Electrostatic Discharge (ESD) test results.

ESD Test	Reference	Results
Human Body Model	EIA/JESD22-A114-B	Do not exceed 600 V (Class 1B)
Machine Model	EIA/JESD22-A115-A	Do not exceed 40 V (Class A)

Notes:
The device is classified as ESD sensitive, precaution has to be taken as follows:
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 times when handling the device.

HBM

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

MM

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

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

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

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