
Tri Metal Beam Lead Schottky Diodes

Reliability Data

HSCH-5300 Series
HSCH-5500 Series

Conclusion

Hewlett-Packard's beam lead diodes have successfully passed stringent environmental testing. Hewlett-Packard beam lead diodes may be used in military and space applications without the necessity of hermetically sealed packaging.

General

For applications requiring component reliability estimation, Hewlett-Packard provides reliability data for all families of devices. Data is compiled from reliability tests run to demonstrate that a product meets the specified design criteria. All Schottky beam lead families have fulfilled the standard requirements of reliability qualification.

Program Description

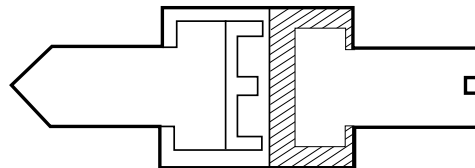
The purpose of this program is to qualify all beam lead diodes for operation in extreme environmental conditions which may be encountered during military and space operations.

The following test sequence has been designed to assess the endurance of beam lead diodes

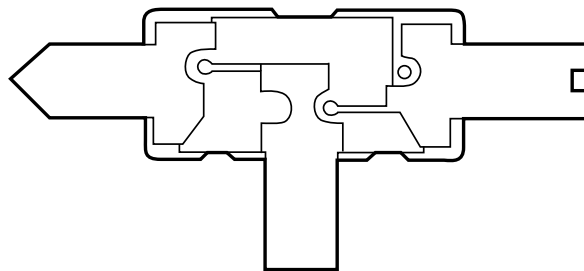
through relevant environmental stresses such as heat and humidity. To qualify a device as hermetic, the conventional procedure is to perform dye-penetrant and Radiflo tests. However, because of the absence of an enclosed cavity in the unique design of the beam lead diode, these tests are not directly applicable. Therefore, this program utilizes reliability tests such as

moisture resistance, salt atmosphere, and immersion to verify that the passivation layer on the beam lead acts as a seal to protect the active area of the diode.

To perform these tests, various Schottky diodes were mounted in non-hermetic, open packages and tested as exposed beam lead devices.



SINGLE



PAIR

Applicable Part Numbers

Schottky Beam Leads

HSCH-5300 Series

HSCH-5500 Series

Test Sequence

Test	MIL-STD-750	Tests Condition	Units Tested	Failed	LTPD
Moisture Resistance ^[1,2]	1021	98% R.H. -10°C to 65°C, 10 days	80 (40 per lot)	0	<7
Temperature Cycling Constant Acceleration	1051 2006	-65°C to 200°C, 100 cyc. 20 KG, 1 min. each axis			
Salt Atmosphere ^[2]	1041	35° fog, 24 hours	25	0	<10
Salt Water Immersion ^[2]	(MIL-STD-883, M1002B)	65°C saturated NaCl solution, 2 cycles	25	0	<10

Notes:

1. The sequence of moisture resistance and temperature cycling followed by constant acceleration assures a thorough evaluation of the effect of exposure to high humidity and heat conditions. End points were taken after each test.
2. End points were: Visual at 100X magnification and D.C. testing to MIL-STD-19500.

Results

As demonstrated by these tests, Hewlett-Packard's beam lead diodes exhibit superior performance when subjected to severe environmental conditions. This proven reliability is achievable because of Hewlett-Packard's unique beam lead design. These

beam lead diodes are made of tri-metal (Ti-Pt-Au or NiCr-Pt-Au) which extends both the operating and storage temperature range. In addition, a nitride passivation layer acts as a sealant and provides immunity from contaminants which could lead to I_R drift. Conductive particle

protection is provided by a layer of polyimide, which also functions as scratch protection. Therefore, it is recommended that Hewlett-Packard beam lead diodes be used in military and space applications without the necessity of hermetically sealed packaging.

DOD-HDBK-1686 ESD

Classification:

HSCH-5300 Series Class I

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