HEWLETT® PACKARD

Tri Metal Beam Lead Schottky Diodes (Non-Hermetic Packaged)

Reliability Data

5082-2207/09
5082-2794
5082-2830

The following cumulative test results have been obtained from testing performed at Hewlett-Packard Communications Components Division in accordance with the latest revision of MIL-STD-750. Data was gathered from the product qualification, reliability monitor, and engineering evaluation.

For the purpose of this reliability data sheet, a failure is any part which fails to meet the electrical and/or mechanical specification listed in the Hewlett-Packard Communications Components Designer's Catalog.

1. Life Test

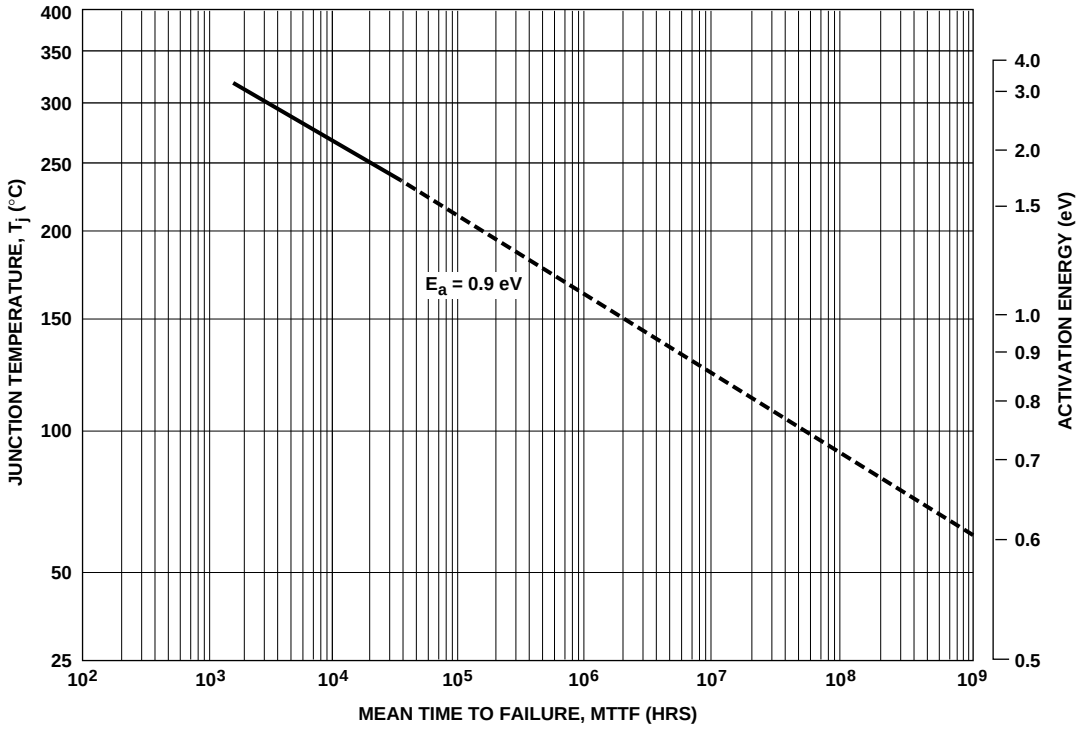
A. Demonstrated Performance

Test	Test Conditions	Units Tested	Total Device Hrs.	Total Failed	Failure Rate 1%/1K Hrs.
High Temp. Reverse Bias (HTRB)	V_R = 80% V_{BR}, T_A = 150°C	482	482,000	0	0
High Temp. Operating Life (OL)	I_P = 50 mA AC, T_A = 125°C	1052	1,050,000	0	0
Room Temp. Operating Life (OL)	P_{fm} = 125 mW, 25°C V_R = 80% V_{BR}, 60 Hz	297	297,000	0	0
High Temp. Storage (HTS)	T_A = 125°C	319	319,000	0	0

B. Failure Rate Prediction

The failure rate will depend on the junction temperature of the device. The estimated life at different temperatures is calculated, using the Arrhenius plot with activation energy of 0.9 eV, and listed in the following table.

Junction Temp. T_J (°C)	Point[1]		90% Confidence Level[2]	
	MTTF (Hours)	FIT[3]	MTTF (Hours)	FIT[3]
150	1.7×10^6	588.0	7.4×10^5	1351.0
140	3.1×10^6	322.0	1.3×10^6	769.0
130	5.7×10^6	175.0	2.5×10^6	402.0
120	1.1×10^7	91.0	5.0×10^6	200.0
100	4.7×10^7	21.0	2.0×10^7	50.0
75	3.5×10^8	2.8	1.5×10^8	6.7
50	3.6×10^9	0.28	1.56×10^9	0.64



Notes:

1. The point MTTF is simply the total device hours divided by the number of failures which can only be generated as elevated temperature. Data in the above table is obtained by extrapolation at low temperatures.
2. The MTTF and failure rate represent the performance level for which there is a 90% probability of the device doing better than the stated value. The confidence level is based on the statistics of failure distribution. The assumed distribution is exponential. This particular distribution is commonly used in describing useful life failures.
3. FIT is defined as Failure in Time, or specifically, failures per billion hours. The relationship between MTTF and FIT is as follows: FIT = 10^9/(MTTF).

C. Example of Failure Rate Calculation

At 50°C with a device operating 8 hours a day, 5 days a week, the percent utilization is:

% Utilization = (8 hrs/day x 5 days/wk) ÷ 168 hrs/wk = 25%

Then the point failure per year is:

(2.8 x 10^{-10}/hr) x (25%) x (8760 hrs/yr) = 6.1 x 10^{-5}% per year

Likewise, the 90% confidence level failure rate per year is:

(6.4 x 10^{-10}/hr) x (25%) x (8760 hrs/yr) = 1.4 x 10^{-4}% per year

2. Environmental and Mechanical Tests

Test	MIL-STD-750 Reference	Test Conditions	Units Tested	Total Failed
Solderability	2026	260°C, 5 seconds	144	0
Solder Heat	2031	260°C, 10 seconds	115	0
Moisture Resistance		85°C/85% RH, biased, 1000 hrs.	845	0
Thermal Shock	1056	-65°C/125°C, 5 min. dwell, 200 cycles	744	0
Temperature Cycle	1051	-65°C/125°C, 10 min. dwell, 200 cycles	1784	0
Lead Integrity		>3 oz	214	0

3. DOD-HDBK-1686 ESD Classification:

5082-2207/09 Class I
5082-2794 Class I
5082-2830 Class I

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