ACPL-072L/772L, HCPL-0710/0720/0721, HCPL-7710/7720/7721, HCPL-0708/0738

Digital Optocouplers

Reliability Data Sheet

Description

The reliability data shown includes Broadcom® reliability test data from the reliability tests done on this product family. All of these products use the similar wafer technology. The data in Table 1 and Table 2 reflects actual test data for devices on a per-channel basis. Before stress, all devices are preconditioned at MSL 1 using a solder reflow process (260°C peak temperature) and 20 temperature cycles (–55°C to +125°C, 15 mins dwell, 1 min transfer). This data is taken from testing on Broadcom devices using internal Broadcom processes, material specifications, design standards, and statistical process controls. **It is not transferable to other manufacturers' similar part types.**

Operating Life Test

For valid system reliability calculations, it is necessary to adjust for the time when the system is not in operation. If you are using MIL-HDBK-217 for predicting component reliability, the results may not be comparable to those given in Table 2 due to different conditions and factors that have been accounted for in MIL-HDBK-217. For example, it is unlikely that your application will exercise all available channels at full rated power with the IC always ON as Broadcom testing does. Thus, your application total power and duty cycle must be carefully considered when comparing Table 2 to predictions using MIL-HDBK-217.

Definition of Failure

Inability to switch, that is, "functional failure" is the definition of failure in this data sheet. Specifically, failure occurs when the device fails to switch ON with twice the minimum recommended drive current (but not exceeding the maximum rating) or fails to switch off when there is no input current.

Failure Rate Projections

The demonstrated point mean time to failure (MTTF) is measured at the absolute maximum stress condition. The failure rate projections in Table 2 use the Arrhenius acceleration relationship, where a 0.43 eV activation energy is used as in the hybrid section of MIL-HDBK-217.

Application Information

The data of Table 1 and Table 2 was obtained on devices with high temperature operating life duration. An exponential (random) failure distribution is assumed, expressed in units of FIT (failures per billion device hours) are only defined in the random failure portion of the reliability curve.

Test Results

Table 1 Demonstrated Operating Life Test Performance

Stress Test Condition	Total Devices Tested	Total Device Hours	Number of Failed Units	Demonstrated MTTF (hr) @ Ta = +125°C	Demonstrated FITs @ Ta = +125°C
Ta = 125°C, Vcc Bias (Based on DS)	1,155	1,035,000	0	1,035,000	966

Table 2 Reliability Projection for Devices Listed in Title

Ambient Temperature (°C)	Junction Temperature (°C)	Typical (60% Confidence)		90% Confidence	
		MTTF (Hr/fail)	FITs (Fail/10^9h)	MTTF (Hr/fail)	FITs(Fail/10^9h)
125	140	1,129,554	885	449,495	2225
120	135	1,309,534	764	521,116	1919
110	125	1,779,822	562	708,262	1412
100	115	2,457,567	407	977,964	1023
90	105	3,451,821	290	1,373,618	728
80	95	4,938,668	202	1,965,294	509
70	85	7,208,784	139	2,868,664	349
60	75	10,753,602	93	4,279,289	234
50	65	16,425,688	61	6,536,438	153
40	55	25,746,061	39	10,245,388	98
30	45	41,512,030	24	16,519,297	61
25	40	53,318,352	19	21,217,505	47

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