ACPL-061L/064L, ACPL-K64L/W61L, ACPL-M61L/M62L, ACPL-077L, HCPL-0723/7723

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 minutes dwell, 1 minute transfer). This data is taken from testing on Broadcom devices using internal Broadcom processes, material specifications, design standards, and statistical process controls. **THEY ARE 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. Note that if you are using MIL-HDBK-217 for predicting component reliability, the results might 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 product data sheet)	1,813	1,890,000	0	1,890,000	529

Table 2 . Reliability Projection for Device Listed

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	2,062,664	485	820,817	1,218
120	135	2,391,324	418	951,603	1,051
110	125	3,250,110	308	1,293,349	773
100	115	4,487,731	223	1,785,848	560
90	105	6,303,325	159	2,508,345	399
80	95	9,018,437	111	3,588,797	279
70	85	13,163,867	76	5,238,429	191
60	75	19,637,013	51	7,814,353	128
50	65	29,994,734	33	11,936,105	84
40	55	47,014,547	21	18,708,969	53
30	45	75,804,576	13	30,165,674	33
25	40	97,363,946	10	38,745,010	26

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