ACPL-M60L/W60L/W611, ACPL-K370/K376, HCPL-2601/2611, HCPL-2630/2631/4661, HCPL-0600/0601/0611, HCPL-0630/0631/0661, HCPL-M600/M601/M611, HCPL-2200/2201/2202/2211/2212/2219, HCPL-2231/2232, HCPL-2602/2612, HCPL-4200, HCPL-3700/3760, 6N137, 6N138/9

Digital Optocouplers, Isolated Line Receiver, Isolated 20 mA Current Loop Transmitter/Receiver, Isolated Voltage/Current Detector

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 a similar wafer technology. The data in Table 1 and Table 2 reflect 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 two times 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 conditions. 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 Device 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	3,969	3,939,000	0	3,939,000	252

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/10^9 h)
125	140	4,331,595	231	1,723,715	580
120	135	5,021,780	199	1,998,367	500
110	125	6,825,231	147	2,716,032	368
100	115	9,424,234	106	3,750,280	267
90	105	13,236,983	76	5,267,525	190
80	95	18,938,719	53	7,536,474	133
70	85	27,644,120	36	11,000,701	91
60	75	41,237,727	24	16,410,142	61
50	65	62,988,941	16	25,065,820	40
40	55	98,730,548	10	39,288,835	25
30	45	159,189,609	6	63,347,915	16
25	40	204,464,288	5	63,347,915	12

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

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