BROADCOM®

Reliability Data Sheet

ACPL-302J/335J, ACPL-337J/336J/339J/352J/351J/350J, ACPL-H342/K342, ACPL-P340/W340/P341/W341/P343/W343, ACPL-P345/P346/W345/W346, ACPL-P347/P349/W347/W349, ACPL-P480, ACPL-P483/W483/M483, ACPL-P484/W484/M484, ACNU-4803/4804, HCPL-3120, ACPL-3130, ACPL-H312/K312, ACPL-T350, HCPL-T250

Isolated Gate Drive Optocouplers and IPM Interfaces

Description

The reliability data includes Broadcom reliability test data from the reliability tests done on this product family. All these products use a 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-minute dwell, 1-minute transfer).

ATTENTION: 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. Note that 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, meaning *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 when the device 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 in Table 1 and Table 2 was obtained on devices with a high-temperature operating life duration. An exponential failure distribution is assumed, expressed in units of FIT (failures per billion device hours), and is defined only 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) at T_A = +125°C	Demonstrated FITs at T_A = +125°C
T_A = 125°C, V_{CC} Bias (Based on Data Sheet)	4,540	4,644,700	0	4,644,700	215

Table 2: Reliability Projection for the Devices Listed in the 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	5,069,024	197	2,017,168	496
120	135	5,876,710	170	2,338,578	428
110	125	7,987,188	125	3,178,422	315
100	115	11,028,657	91	4,388,744	228
90	105	15,490,505	65	6,164,292	162
80	95	22,162,929	45	8,819,516	113
70	85	32,350,376	31	12,873,509	78
60	75	48,258,219	21	19,203,876	52
50	65	73,712,455	14	29,333,135	34
40	55	115,538,870	9	45,977,539	22
30	45	186,290,748	5	74,132,542	13
25	40	239,273,186	4	95,216,374	11

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RoHS 6 fully compliant options available;
-xxxE denotes a lead-free product