

**ACHS-7121/7122/7123/7124/7125,
ACHS-7191/7192/7193/7194/7195,
ACHL-7241/7242/7243/7244/7245, ACHS-7225
Hall Effect Sensor**

Overview

The Broadcom® reliability test data here shows 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](#) reflect actual test data for the devices on a per-channel basis. Before stress, all the devices are preconditioned at MSL 1 using a solder reflow process (260°C peak temp) and 20 temperature cycles (–55°C to +125°C, 15-minutes dwell, 1-minute transfer). This data is taken from testing on the Broadcom devices using internal Broadcom process, 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 may not be comparable to those given in [Table 2](#) due to different conditions and factors that have been accounted for in the 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 the MIL-HDBK-217.

Test Results

Table 1: Demonstrated Operating Life Test Performance

Stress Test Condition	Total Device Tested	Total Device Hours	No. of Failed Units	Demonstrated MTTF (hr) @ Ta = +125°C	Demonstrated FITs @ Ta = +125°C
Ta = 125°C Vcc Bias (Based on the data sheet)	613	773,000	0	>773,000	<1,294

Definition of Failure

Inability to switch, *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 max. 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](#) uses the Arrhenius acceleration relationship, where a 0.43-eV activation energy is used as in the hybrid section of the 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.

Table 2: Reliability Projection for Device Listed in Title

Ambient Temperature (°C)	Junction Temperature (°C)	Typical (60% Confidence)		90% Confidence	
		MTTF (Hr/fail)	FITs (Fail/10 ⁹ h)	MTTF (Hr/fail)	FITs (Fail/10 ⁹ h)
125	140	843,619	1,185	335,710	2,979
120	135	978,039	1,022	389,201	2,569
110	125	1,329,278	752	528,973	1,890
100	115	1,835,458	545	730,402	1,369
90	105	2,578,027	388	1,025,900	975
80	95	3,688,493	271	1,467,799	681
70	85	5,383,952	186	2,142,490	467
60	75	8,031,434	125	3,196,029	313
50	65	12,267,687	82	4,881,804	205
40	55	19,228,701	52	7,651,869	131
30	45	31,003,670	32	12,337,601	81
25	40	39,821,339	25	15,846,504	63

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