

# ACPL-785E, 5962-9755701EPx, HCPL-7851, 5962-9755701HPx Hermetically Sealed, Analog Isolation Amplifier

## Overview

The Broadcom® reliability data shown represents the high-reliability class of this product family. Both of the products listed use the same LEDs, ICs, DLA-approved packaging materials, processes, stress conditions, and testing per MIL-PRF-38534. Additionally, Broadcom internal processes, material specifications, design standards, and statistical process controls are used. *The data is not transferable to other manufacturers' similarpart 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 LEDs 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.

**Table 1: Demonstrated Operating Life Test Performance**

Stress Test Condition	Total Devices Tested	Total Device Hours	Number of Failed Units	Demonstrated MTTF (hour) at $T_A = +125^{\circ}\text{C}$	Demonstrated FITs at $T_A = +125^{\circ}\text{C}$
$T_A = +125^{\circ}\text{C}$ $V_{CC} = 5.5\text{V}$ $V_{IN} = \text{N/A}$ $V_{OUT} = \text{N/A}$ $T_J = +150^{\circ}\text{C}$	360	1,440,000	0	> 1,440,000	< 694

**NOTE:** Total tested devices include devices that are manufactured in both San Jose and Singapore. Transfer of hermetic optocoupler manufacturing from San Jose to Singapore was completed in 2000.

## 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](#) uses 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 up to 5000 hours. An exponential (random) failure distribution is assumed, expressed in units of FIT (failures per billion device hours), is only defined in the random failure portion of the reliability curve.

## Environmental Testing

All high reliability hermetic optocouplers listed meet the 100% screening and quality conformance inspection testing of MIL-PRF-38534 Class H.

**Table 2: Reliability Projections for Devices Listed In Title**

Ambient Temperature (°C)	Junction Temperature (°C)	Typical (60% Confidence)		90% Confidence	
		MTTF (Hr/Fail)	FITs (Fail/10 <sup>9</sup> Hr)	MTTF (Hr/Fail)	FITs (Fail/10 <sup>9</sup> Hr)
125	150	1,571,554	636	625,384	1599
120	145	1,809,345	553	720,011	1389
110	135	2,423,287	413	964,323	1037
100	125	3,293,552	304	1,310,636	763
90	115	4,547,716	220	1,809,718	553
80	105	6,387,578	157	2,541,873	393
70	95	9,138,982	109	3,636,767	275
60	85	13,339,821	75	5,308,448	188
50	75	19,899,490	50	7,918,803	126
40	65	30,395,657	33	12,095,648	83
30	55	47,642,965	21	18,959,042	53
25	50	60,273,251	17	23,985,138	42

**Table 3: ESDS Classification per Method 3015, MIL-STD-883**

Part Number	ESD Class
5962-9755701HPx, HCPL-7851	1
5962-9755701EPx, ACPL-785E	1

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