HCPL-0723

50Mbd 2ns PWD High Speed CMOS Optocoupler

Reliability Data Sheet

Description

The reliability data shown includes Avago Technologies reliability test data from the qualification of this product family. All of these products use similar IC, and the same packaging materials, processes, stress conditions and testing. 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 using a solder reflow process (245 ºC peak temperature, 2X) and 20 temperature cycles (-55 ºC to +125 ºC, 15 mins dwell, 5 mins transfer). These data are taken from testing on Avago Technologies devices using internal Avago Technologies 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 MIL-HDBK-217. For example it is unlikely that your application will exercise all available channels at full rated power as Avago Technologies 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 Device Tested	Total Device Hours	Number of Failed Units	DemonstratedMTTF(hr) @ Ta = +125 °C	Demonstrated FITs @ Ta = +125 °C
Ta = 125 °C Vdd1/2 = 5.5V Vin = Gnd (LED ON) Iout = 25mA	180	180,000	0	> 180,000	< 5,556

Definition of Failure

Inability to switch, i.e. "functional failure" is the definition of failure in this data sheet. Specifically, failure occurs when the device fails to switch ON with 2 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 MIL-HDBK-217.

Application Information

The data of Table 1 and 2 were obtained on devices with high temperature operating life duration up to 1000 hours. 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 Projections (per channel) for Devices Listed in Title

		Typical (60% Confidence)		90% Confidence	
Ambient Temperature (°C)	**Junction Temperature (°C)**	**MTTF (Hr/fail)**	**FITs (Fail/10^9h)**	**MTTF (Hr/fail)**	**FITs (Fail/10^9h)**
125	140	196,444	5,091	78,173	12,792
110	125	227,745	4,391	90,629	11,034
100	115	427,403	2,340	170,080	5,880
90	105	600,317	1,666	238,890	4,186
80	95	858,899	1,164	341,790	2,926
70	85	1,253,702	798	429,606	2,004
60	75	1,870,193	535	744,223	1,344
50	65	2,856,643	350	1,136,770	880
40	55	4,477,579	223	1,781,804	561
30	45	7,219,489	139	2,872,918	348
25	40	9,272,763	108	3,689,996	271

Mechanical Tests (Testing done on a constructional basis)

Test Name	MIL-STD-883	Test Conditions	Units Tested	Units Failed
Temp Cycle	1010 Cond. B	-55 to 125 °C Transfer = 5 mins Dwell = 15 mins 1000 cycles	120	0
Solderability	2003	Sn 60 Pb 40 SolderTemp = 230 °C (2 sec)	10	0

Environmental Testing

Test Name	MIL-STD-883	Test Conditions	Units Tested	Units Failed
Wet Temp Biased Test	-	Ta = 85°C, RH = 85% Vdd1/2 = 5V Vin = Gnd (LED ON) Iout = 25mA	90	0
Autoclave	-	Ta = 121°C, RH = 100% UnbiasedTime = 168 hours	90	0

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