Agilent HCPL-2300
8 MBd Low Input Optocoupler
Reliability Data Sheet

Description

The reliability data shown includes Agilent 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 °C peak temperature, 2X) and 20 temperature cycles (-55 °C to +125 °C, 15 mins dwell, 5 mins transfer). These data are taken from testing on Agilent Technologies devices using internal Agilent 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 Agilent 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	Demonstrated MTTF (hr) @ Ta = +125 °C	Demonstrated FITs @ Ta = +125 °C
Ta = 125 °C If = 5mA Vcc = 5.5V Iout = 25mA	230	230,000	0	> 230,000	< 4,347

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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

Ambient Temperature (°C)	Junction Temperature (°C)	Typical (60% Confidence)		90% Confidence	
125	140	251,012	3,984	99,888	10,011
110	135	291,008	3,436	115,803	8,635
100	115	546,126	1,831	217,325	4,601
90	105	767,072	1,304	305,248	3,276
80	95	1,097,483	911	436,731	2,290
70	85	1,601,953	624	637,480	1,569
60	75	2,389,691	418	950,952	1,052
50	65	3,650,155	274	1,452,540	688
40	55	5,721,351	175	2,276,750	439
30	45	9,224,902	108	3,670,950	272
25	40	11,848,531	84	4,714,995	212

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	150	0
Terminal Strength	2004	2 lb tension8 oz lead bend stress	380	0
Physical Dimension	2009	Dev profile @ 10X	200	0
Solder Heat Resistance	N/A	Temp = 260C, 10 sec	20	0
Solderability	2003	Sn 60 Pb 40 Solder Temp = 230 °C (2 sec)	20	0

Environmental Testing

Test Name	MIL-STD-883	Test Conditions	Units Tested	Units Failed
Autoclave	-	Ta = 121C, RH = 100% UnbiasedTime = 168 hours	100	0

Basic Material Properties

Material Property	Test Result
Mold Compound Flammability Classification	UL 94V-0
Mold Compound Oxygen Index	32%
Mold Compound Glass Transition Temperature	Tg = 160 °C
Mold Compound Hydrolizable Chlorine	<30 ppm

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Data subject to change.

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