



Agilent HCPL-4562

High Bandwidth, Analog / Video Optocoupler

Reliability Data Sheet

Description

The reliability data shown includes Agilent Technologies reliability test data from the past three years on this product. Before stress, all devices are preconditioned using a solder reflow process (peak temperature 260°C, 5 sec. 2X) and 20 temperature cycles (-55°C to +125°C, 15 minutes dwell, 5 minutes transfer). These data are taken from testing on Agilent Technologies devices using internal Agilent processes, material specifications, design standards, and statistical process

controls. **THEY ARE NOT TRANSFERABLE TO OTHER MANUFACTURERS' SIMILAR PRODUCT 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 LED(s) always ON 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 Devices Tested	Total Device Hours	Number of Failed Units	Demonstrated MTTF (hr) @ $T_A = +125^\circ\text{C}$	Demonstrated FITs @ $T_A = +125^\circ\text{C}$
$T_A = +125^\circ\text{C}$ $V_{CC} = 15.0\text{ V}$ $I_{in} = 20\text{ mA}$ $I_{out} = 6\text{ mA}$	400	400,000	0	> 400,000	< 2,500

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 use the Arrhenius acceleration relationship, where a 0.43eV activation energy is used as in the hybrid section of MIL-HDBK-217.

Application Information

The data of Tables 1 and 2 were obtained on devices with high temperature operating life duration up to 1000 hours. An exponential (random) failure distribution is assumed.



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Table 2. Reliability Projections

Ambient Temperature (°C)	Junction Temperature (°C)	Typical (60% Confidence)		90% Confidence	
		MTTF (hr/fail)	FITs (fail/10 ⁹ hr)	MTTF (hr/fail)	FITs (fail/10 ⁹ hr)
125	140	436,542	2,291	173,717	5,756
110	135	506,100	1,976	201,397	4,965
100	115	949,784	1,053	377,956	2,646
90	105	1,334,038	750	530,866	1,884
80	95	1,908,665	524	759,532	1,317
70	85	2,786,005	359	1,108,660	902
60	75	4,155,984	241	1,653,829	605
50	65	6,348,096	158	2,526,156	396
40	55	9,950,175	101	3,959,565	253
30	45	16,043,307	62	6,384,261	157
25	40	20,606,140	49	8,199,991	122

Table 3. Mechanical Tests

Test Name	MIL-STD-883 Reference	Test Conditions	Units Tested	Units Failed
Solderability	2003	Sn60 Pb40 Solder Temp. = 260°C Time = 15 seconds	397	0
Temperature Cycle	1010 Cond. B	-55°C to +125°C Transfer = 5 minutes Dwell = 15 minutes, 200 cycles	160	0
Mechanical Shock	2002 Cond. B	1500 g, 0.5 ms pulse 5 each / 6 surfaces (30 total)	139	0
Vibration Variable Frequency	2007 Cond. A	20 g, 20 - 2000 Hz, 4 mins/cycle, 4 times/axis (12 total)	139	0
Physical Dimension	2009	Dev. Profile @ 10X	220	0
Terminal Strength	2004	2 lb. Tension	150	0

Table 4. Environmental Testing

Test Name	MIL-STD-883 Reference	Test Conditions	Units Tested	Units Failed
Temp. and Humidity Bias	N/A	T _A = 85°C, RH = 85% See Table 1 for bias condition. Time = 1000 hours	120	0
Un-Biased Pressure Pot	N/A	T _A = 121°C, RH = 100% Time = 96 hours	79	0
Salt Atmosphere	1009, Cond. A	T _A = 35°C mist	80	0
Resistance to Solvents	2015	3 one minute immersion. Brush after solvent soak.	80	0

Table 5. Basic Material Properties

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

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Data subject to change.

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