Agilent HCPL-2730/2731 Dual Channel, Low Input Current, High Gain Optocoupler

Reliability Data Sheet

Description

The reliability data shown includes Agilent Technologies reliability test data from the past four years on this product family. All of these products use the same LEDs, 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 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 Device Tested	Total Device Hours	Number of Failed Units	Demonstrated MTTF(hr) @ Ta = +125 °C	Demonstrated FITs @ Ta = +125 °C
Ta = 125 °C Vcc = 15V If = 20mA Iout = 60mA	480	480,000	0	>480,000	<2,083

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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	
		MTTF (Hr/fail)	FITs (Fail/10^9h)	MTTF (Hr/fail)	FITs (Fail/10^9h)
125	140	523,851	1,909	208,461	4,797
110	125	607,320	1,647	241,677	4138
100	115	1,139,741	877	453,549	2,205
90	105	1,600,844	625	637,040	1,570
80	95	2,290,397	437	911,441	1,097
70	85	3,343,204	299	1,330,395	752
60	75	4,987,178	201	1,984,598	504
50	65	7,617,710	131	3,031,392	330
40	55	11,940,202	84	4,751,484	210
30	45	19,251,956	52	7,661,123	131
25	40	24,727,351	40	9,840,002	102

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	240	0
Physical Dimension	2009	Dev profile @ 10X	120	0
Solder Heat Resistance	N/A	Temp = 260C, 10 sec	50	0
Solderability	Method 2003	Steam Aging (93 °C,8hrs) & solder dip (245 °C, 5sec)	50	0

Environmental Testing

Test Name	MIL-STD-883	Test Conditions	Units Tested	Units Failed
Temp. and Humidity Bias	N/A	Ta = 85 °C, RH = 85% Vcc = 18V, Vin=-5V Time = 1000 hours	160	0
Unbiased Pressure Pot	N/A	Ta=121C, RH=100% Time = 168 hours	60	0

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Data subject to change.

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