ACNT-H313

2.5 A Output Current IGBT Gate Drive Optocoupler in 14.2mm Stretched SO8 Package

Reliability Data Sheet

Description

The reliability data shown includes Avago Technologies reliability test data from the reliability qualification done on this product family. All of these products use the 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 at MSL 1 using a solder reflow process (250 °C peak temp) and 20 temperature cycles (-55 °C to +125 °C, 15 mins dwell, 1 min 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 with the IC always ON 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.

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. 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 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
T_A = 125 °C V_{CC} = 35 V I_F = 25 mA I_{OUT} = 26 mA	227	286,020	0	> 286,020	<3,496

Table 2. Reliability Projection for Device 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	312,150	3,204	124,217	8,050
120	135	361,887	2,763	144,009	6,944
110	125	491,850	2,033	195,727	5,109
100	115	679,143	1,472	270,258	3,700
90	105	953,903	1,048	379,596	2,634
80	95	1,364,790	733	543,105	1,841
70	85	1,992,132	502	792,749	1,261
60	75	2,971,735	337	1,182,572	846
50	65	4,539,203	220	1,806,330	554
40	55	7,114,868	141	2,831,291	353
30	45	11,471,759	87	4,565,072	219
25	40	14,734,410	68	5,863,411	171

Table 3. Mechanical Tests (Testing done on a constructional basis)

Test Name	Reference Standard	Test Conditions	Units Tested	Units Failed
Temperature Cycling	JESD-A104	-55 to 125 °C Transfer = 1 min Dwell = 15 mins 1000 cycles	230	0
Solderability (RoHS condition)	JESD-B102	8hrs steam aging (93 °C), followed by solder dip (260 °C,5sec)	15	0
Preconditioning	J-STD-20 JA113	As per reference standard (to conform to MSL 1)	1151	0

Table 4. Environmental Testing

Test Name	Reference Standard	Test Conditions	Units Tested	Units Failed
Highly Accelerated Stress Test	JESD-A110	Ta = 130 °C, R.H.=85% Biased Time = 96hrs	228	0
Unbiased HAST	JESD-A118	Ta = 130 °C, RH =85% Unbiased Time = 96 hrs	231	0
High Temperature Bake	JESD-A103	Ta = 150 °C Unbiased Time = 1000hrs	231	0

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