Texas Instruments Incorporated

Post Office Box 84
Sherman, Texas 75090
6412 Highway 75 South
Sherman, Texas 75090

(903) 868-7111

Texas Instruments Enhanced Plastic Products Reliability Report

(Subject To Attached Disclaimers)

Device Type/Device Family:	SN74LV240ADW
Package Type:	DW
Wafer Fabrication Facility:	FFAB
Assembly/Test Facility:	Malaysia
Reporting Period:	2Q2001 through 2Q2002

Biased Life Test

Test Method:	JESD22-A108
Test Condition:	125°C / 1000 hours or equivalent
Sample Size:	4280
Rejects:	0
Activation Energy (eV):	0.7
Equivalent Device Hours:	2.3E+05
Failure Rate (FIT)*:	1.65

*Derated to +55°C with a 60% Confidence Level

Package Related Tests

Description	Condition	Referenced Method	Sample Size/Rejects	
Biased Humidity or HAST	85°C / 85% / 1000 hours or 130°C / 85% / 96 hours	JESD22-A101 JESD22-A110	200/0	*
Autoclave	121 °C @ 2 atmospheres absolute for 96 hours	JESD22-A102	300/0	*
Temperature Cycle	-65 °C to +150 °C non-biased for 500 cycles or equivalent	JESD22-A104	200/1	*
High Temp Storage	150 °C / 1,000 hours	JESD22-A103-A	100/0	*

* Preconditioning per JEDEC Std. 22, Method A112/A113

EXAMPLE - EXAMPLE

Initial Product Qualification

The subject Enhanced Plastic device, device family, and/or package family have passed Texas Instruments product qualification as follows:

Description	Condition	Sample Size	Referenced Method	
Electrical Characterization	TI Data Sheet	50 units/lot	N/A	
Electrostatic Discharge Sensitivity	HBM MM	3 units/voltage	EIA/JESD22-A114 EIA/JESD22-A115	
Latch-up	Per Technology	5/0 units/lot	EIA/JESD78	
Physical Dimensions	TI Data Sheet	5/0	EIA/JESD22- B100	
Thermal Impedance	Theta-JA on board	Per Pin-Package	EIA/JESD51	
Bias Life Test	125°C / 1000 hours or equivalent	116/0	JESD22-A108	*
Biased Humidity	85°C / 85% / 1000 hours or	77/0	JESD22-A101	*
HAST	130°C / 85% / 96 hours		JESD22-A110	
Autoclave	121 °C @ 2 atmospheres absolute for 96 hours	77/0	JESD22-A102	*
Temperature Cycle	-65 °C to +150 °C non-biased for 1,000 cycles	77/0	JESD22-A104	*
Solder Heat	260 °C for 10 seconds	22/0	JESD22-B106	
Resistance to Solvents	Ink symbol only	12/0	JESD22-B107	
Solderability	Condition A (steam age for 8 hours)	22/0	ANSI/J-STD-002-92	
Flammability	Method A / Method B	5/0	UL-1964	
Bond Strength	-	76/0 wires	ASTM F-459	
Die Shear	-	5/0	MIL-STD-883 Method 2019	
High Temp Storage	150 °C / 1,000 hours	45/0	JESD22-A103-A	*
Moisture Sensitivity	Surface Mount Only	12/0	J-STD-020-A	

* Precondition performed

EXAMPLE - EXAMPLE

Supplemental Device Characteristics

Device Type: SN74LV240ADW

Die Revision: I
Master Die: SN74LV240A
Wafer Fab: FFAB
Fab Technology: CMOS
Fab Process: EPIC-1S
Process Code: 50C48.1
Passivation: 10KA CN
Metal 1: TiW/AlCu(2%)
Metal 2: TiW/AlCu(2%)

Assembly Site: MLA
Package Type: DW
Pin Count: 20
Mold Compound: Hysol 9AS
Mount Compound: Hitachi EN-4088Z
Bond: TS-0.95 Au
Lead Composition: Cu
Lead Finish: NIPdAu
Die Thickness: 11 mils

EXAMPLE - EXAMPLE

Quality and Reliability Data Disclaimer

The attached quality and reliability information is specific to the TI Enhanced Plastic product family of plastic encapsulated commercial-off-the-shelf (COTS) semiconductor products and components. Due to possible differences in product assembly and test baselines, this information is NOT APPLICABLE to TI standard, industrial, or automotive catalog commercial products.

Plastic encapsulated TI semiconductor devices are not designed and are not warranted to be suitable for use in some military applications and/or military environments. Use of plastic encapsulated TI semiconductor devices in military applications and/or military environments, in lieu of hermetically sealed ceramic devices, is understood to be fully at the risk of Buyer.

Quality and reliability data provided by Texas Instruments is intended to be an estimate of product performance based upon history only. It does not imply that any performance levels reflected in such data can be met if the product is operated outside the conditions expressly stated in the latest published data sheet for a device.

Existing industry standards for plastic encapsulated microcircuit qualification and reliability monitors are based upon historical data, experiments, and field experience with the use of these devices in commercial and industrial applications. The applicability of these standards in determining the suitability for use and safety performance in military and aerospace applications has not been established. Due to the multiple variations in field operating conditions, a component manufacturer can only base estimates of product life on models and the results of package and die level qualification.

The buyer’s use of this data, and all consequences of such use, is solely the buyer’s responsibility. Buyer assumes full responsibility to perform sufficient engineering and additional qualification testing in order to properly evaluate the buyer’s application and determine whether a candidate device is suitable for use in that application. The information provided by TI shall not be considered sufficient grounds on which to base any such determination.

> THIS INFORMATION IS PROVIDED "AS IS" WITHOUT ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND INCLUDING WARRANTIES OF MERCHANTABILITY, NONINFRINGEMENT OF INTELLECTUAL PROPERTY, OR FITNESS FOR ANY PARTICULAR PURPOSE. IN NO EVENT SHALL TI OR ITS SUPPLIERS BE LIABLE FOR ANY DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION, LOSS OF INFORMATION) ARISING OUT OF THE USE OF OR INABILITY TO USE THE INFORMATION, EVEN IF TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.
>
> **THIS INFORMATION SHOULD NOT BE USED TO ASSIST IN THE PRACTICE OF “UPRATING” OR “UPSCREENING” DEVICES FOR USE BEYOND THEIR RATED LIMITS.**
>
> TI may provide technical, applications or design advice, quality characterization, and reliability data or service providing these items shall not expand or otherwise affect TI's warranties as set forth in the Texas Instruments Incorporated Standard Terms and Conditions of Sale for Semiconductor Products and no obligation or liability shall arise from TI's provision of such items.

Quality and Reliability Data copyright © 2002, Texas Instruments Incorporated, all rights reserved.

EXAMPLE - EXAMPLE