LM239A-EP Quad Differential Comparator

ABSTRACT

This report presents the reliability and qualification results for the LM239A-EP Quad Differential Comparator. The LM239A-EP is manufactured with a controlled baseline and has the following:

- An Extended Product Life Cycle
- One Assembly and Test Site
- Product Traceability
- Extended Product-Change Notification

Contents

Trademarks

1 Texas Instruments Enhanced Product Qualification and Reliability Report

TI qualification testing is a risk mitigation process that is engineered to assure device longevity in customer applications. Wafer fabrication process and package level reliability are evaluated in a variety of ways that may include accelerated environmental test conditions with subsequent derating to actual use conditions. Manufacturability of the device is evaluated to verify a robust assembly flow and assure continuity of supply to customers, TI Enhanced Products are qualified with industry standard test methodologies performed to the intent of Joint Electron Devices Engineering Council (JEDEC) standards and procedures. Texas Instruments Enhanced Products are certified to meet GEIA-STD-0002-1 Aerospace Qualified Electronic Components.

2 Qualification by Similarity (Qualification Family)

A new device can be qualified either by performing full scale quality and reliability test on the actual device or using previously qualified device(s) through "Qualification by Similarity" (QBS) rules. By establishing similarity between the new device and those qualified previously, repetitive test will be eliminated, allowing for timely production release. When adopting QBS methodology, the emphasis is on qualifying the differences between a previously qualified product and the new product under consideration. The QBS rules for a technology, product, test parameter or package shall define which attributes are required to remain fixed in order for the QBS rules to apply. The attributes which are expected and allowed to vary will be reviewed and a QBS plan shall be developed, based on the reliability impact assessment above, specifying what subset of the full complement of environmental stresses is required to evaluate the reliability impact of those variations. Each new device shall be reviewed for the conformance to the QBS rule sets applicable to the device. See JEDEC JESD47 for more information.

Device Baseline[1]				
TI Device:	**LM239AMDREP**		*Pin/Package Type:*	SOIC (D) | 14
	V62/03672-02XE		*Moisture Sensitivity:*	Level-1-260C-UNLIM
Wafer Fab:	SH-BIP-1			
Fab Technology:	JI1			
Die Revision:	- ("-" denotes initial release)			
Die Name:	STLMC339PS			

(1) Baseline information in effect as of the date of this report.

Device Baseline[1]				
TI Device:	**LM239AMPWREP**		*Pin/Package Type:*	TSSOP (PW) | 14
	V62/03672-02YE		*Moisture Sensitivity:*	Level-1-260C-UNLIM
Wafer Fab:	SH-BIP-1			
Fab Technology:	JI1			
Die Revision:	- ("-" denotes initial release)			
Die Name:	STLMC339PS			

(1) Baseline information in effect as of the date of this report.

Device Baseline[1]				
TI Device:	**LM239AQDREP**		*Pin/Package Type:*	SOIC (D) | 14
	V62/03672-01XE		*Moisture Sensitivity:*	Level-1-260C-UNLIM
Wafer Fab:	SH-BIP-1			
Fab Technology:	JI1			
Die Revision:	- ("-" denotes initial release)			
Die Name:	STLMC339PS			

(1) Baseline information in effect as of the date of this report.

Enhanced Products New Device Qualification Matrix Note that qualification by similarity ("qualification family") per JEDEC JESD47 is allowed				
Description	**Condition**	**Sample Size Used/Rejects**	**Lots Required**	**Test Method**
Electromigration	Maximum Recommended Operating Conditions	N/A	N/A	Per TI Design Rules
Wire Bond Life	Maximum Recommended Operating Conditions	N/A	N/A	Per TI Design Rules
Electrical Characterization	TI Data Sheet	15	3	N/A
Electrostatic Discharge Sensitivity	HBM	3 units/voltage	N/A	EIA/JESD22-A114
	CDM			EIA/JESD22-C101
Latch-up	Per Technology	5/0	3	EIA/JESD78
Physical Dimensions	TI Data Sheet	5/0	1	EIA/JESD22- B100
Thermal Impedance	Theta-JA on board	Per Pin-Package	N/A	EIA/JESD51
Bias Life Test	125°C / 1000 hours or equivalent	7/0	3	JESD22-A108*
Biased Humidity	85°C / 85% / 1000 hours	25/0	3	JESD22-A101*
or	or			
Biased HAST	130°C / 85% / 96 hours			JESD22-A110*
Extended Biased Humidity	85°C / 85% / 2600 hours (for reference)			JESD22-A101*
or	or	77/0	1	
Extended Biased HAST	130°C / 85% / 250 hours (for reference)			JESD22-A110*
Unbiased HAST	130°C / 85% / 96 hours	25/0	3	JESD22-A.118*
Temperature Cycle	-65°C to +150°C non-biased for 500 cycles	25/0	3	JESD22-A104*
Solder Heat	260°C for 10 seconds	N/A	N/A	JESD22-B106
Resistance to Solvents	Ink symbol only	N/A	N/A	JESD22-B107
Solderability	Condition A (steam age for 8 hours)	22/0	1	ANSI/J-STD-002-92
Flammability	Method A / Method B	5/0	1	UL-1964
Bond Shear	Per wire size	5 units x 30/0 bonds	3	JESD22-B116
Bond Pull Strength	Per wire size	5 units x 30/0 bonds	3	ASTM F-459
Die Shear	Per die size	5/0	3	TM 2019
High Temp Storage	150 °C / 1,000 hours	25/0	3	JESD22-A103-A*
Moisture Sensitivity	Surface Mount Only	12	1	J-STD-020-A*
				*Precondition performed per JEDEC Std. 22, Method A112/A113

3 Technology Family FIT/MTBF Data

Mean Time Between Fails (MTBF) and Failures in Time (FIT) rates are device reliability statistics calculated based on data collected from TI's internal reliability testing (life test).

TI's DPPM/FIT/MTBF Estimator Search Tool reports te generic data based on technology groupings and shows conditions under which the rates were derived. All terms used in the tool and definitions can be found on the TI reliability terminology page. Failure rates are summarized by technology and mapped to the associated material part numbers. The failure rates are highly dependent on the number of units tested, therefore, it is not recommended to compare failure rates.

TI DPPM/FIT/MTBF Estimator Search Tool web page link: www.ti.com/quality/docs/estimator.tsp

4 Device Family Qualification Data

TI's Qualification Summary Search Tool reports generic data representative of the material sets, processes, and manufacturing sites used by the device family and may not include all of the testing performed for a specific for a specific EP device. Please see the Enhanced Products New Device Qualification Matrix above for the full suite of qualification testing performed to release Enhanced Product devices.

TI Qualification Summary Search web page link: www.ti.com/qualificationsummary/qualsumm/home

5 Ongoing Reliability Monitoring

TI periodically monitors the reliability of its products, wafer fab processes, and package technologies through its Ongoing Reliability Monitor (ORM) program. The ORM program involves collecting environment reliability stress data on representative sets of devices, processes and packages. The results from the ORM program are updated quarterly in this report.

TI Ongoing Reliability Monitoring Search web page link: www.ti.com/orm/home?actionId=2801.html

For additional information or technical support please contact the Texas Instruments Customer Support Center at www.ti.com/support or send an email to support@ti.com.

For more information on TI Enhanced Products please visit www.ti.com/ep.

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.

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