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 processes 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.

Qualification by Similarity (Qualification Family)

A new device can be qualified either by performing full scale quality and reliability tests 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 tests 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 parameters 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 conformance to the QBS rule sets applicable to that device. See JEDEC JESD47 for more information.

Device Baseline[1]				
TI Device:	SN74AUC1G14MDBVREP		*Assembly Site:*	Subcon UTL2 (Thailand)
DLA VID:	V62/06678-01XE		*Test Site:*	Subcon UTL2 (Thailand)
Wafer Fab:	TI FFAB (Germany)		*Pin/Package Type:*	SOT-23 (DBV) | 5
Fab Process:	ASLC10		*Leadframe:*	Cu
Fab Technology:	CMOS		*Termination Finish:*	NiPdAu
Die Revision:	A		*Mount Compound:*	ABLEBOND 84-1LMISR4
Die Name:	RAUC1G14AIM		*Bond Wire:*	25.4 µm Au
ESD CDM:	1000V		*Mold Compound:*	Sumitomo EME-G600
ESD HBM:	2000V		*Moisture Sensitivity:*	MSL 1 / 260°C

[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 CDM	3 units/voltage	N/A	EIA/JESD22-A114 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	45/0	3	JESD22-A108*
Biased Humidity or *Biased HAST*	85°C / 85% / 1000 hours or 130°C / 85% / 96 hours	77/0	3	JESD22-A101* JESD22-A110*
Extended Biased Humidity or *Extended Biased HAST*	85°C / 85% / 2600 hours (for reference) or 130°C / 85% / 250 hours (for reference)	77/0	1	JESD22-A101* JESD22-A110*
Unbiased HAST	130°C / 85% / 96 hours	77/0	3	JESD22-A.118*
Temperature Cycle	-65°C to +150°C non-biased for 500 cycles	77/0	3	JESD22-A104*
Solder Heat	260°C for 10 seconds	22/0	1	JESD22-B106
Resistance to Solvents	Ink symbol only	12/0	1	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	15/0	3	JESD22-A103-A*
Moisture Sensitivity	Surface Mount Only	12	1	J-STD-020-A*
				*Precondition performed per JEDEC Std. 22, Method A112/A113

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 the 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 webpage link:
www.ti.com/quality/docs/estimator.tsp

Device Family Qualification Data

TI's Qualification Summary Search Tool reports generic qualification 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 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 webpage link:
https://www.ti.com/qualificationsummary/qualsumm/home

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

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