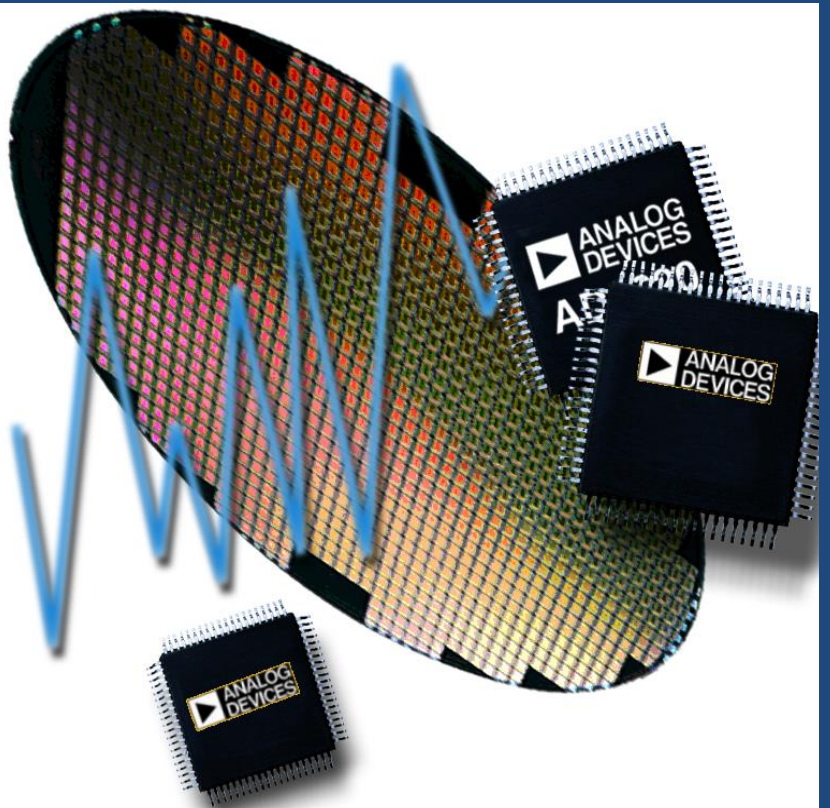


Analog Devices Welcomes Hittite Microwave Corporation

NO CONTENT ON THE ATTACHED DOCUMENT HAS CHANGED





Reliability Report

Report Title:	Qualification Test Report
Report Type:	See Attached
Date:	See Attached

Package Qualification Report

QTR: 2014-00380

Rev: 02

Package: LC4, LC4B

HMC129LC4	HMC564LC4	HMC813LC4B
HMC144LC4	HMC577LC4B	HMC841LC4B
HMC253LC4	HMC586LC4B	HMC842LC4B
HMC342LC4	HMC587LC4B	HMC843LC4B
HMC383LC4	HMC588LC4B	HMC844LC4B
HMC392LC4	HMC608LC4	HMC858LC4B
HMC498LC4	HMC609LC4	HMC910LC4B
HMC499LC4	HMC613LC4B	HMC911LC4B
HMC504LC4B	HMC620LC4	HMC913LC4B
HMC517LC4	HMC633LC4	HMC940LC4B
HMC519LC4	HMC634LC4	HMC944LC4
HMC520LC4	HMC641LC4	HMC953LC4B
HMC521LC4	HMC660LC4B	HMC954LC4B
HMC522LC4	HMC661LC4B	HMC955LC4B
HMC523LC4	HMC732LC4B	HMC962LC4
HMC525LC4	HMC733LC4B	HMC963LC4
HMC526LC4	HMC751LC4	HMC997LC4
HMC527LC4	HMC752LC4	HMC1041LC4
HMC528LC4	HMC791LC4B	HMC1042LC4
HMC543LC4B	HMC798LC4	HMC6380LC4B
HMC557LC4	HMC812LC4	

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- *Supplying products of the highest quality*
- *Advance in state-of-the-art technology that supports our products*
- *Enhance our competitive position with superior product standards*

Hittite's employees recognize the responsibility to:

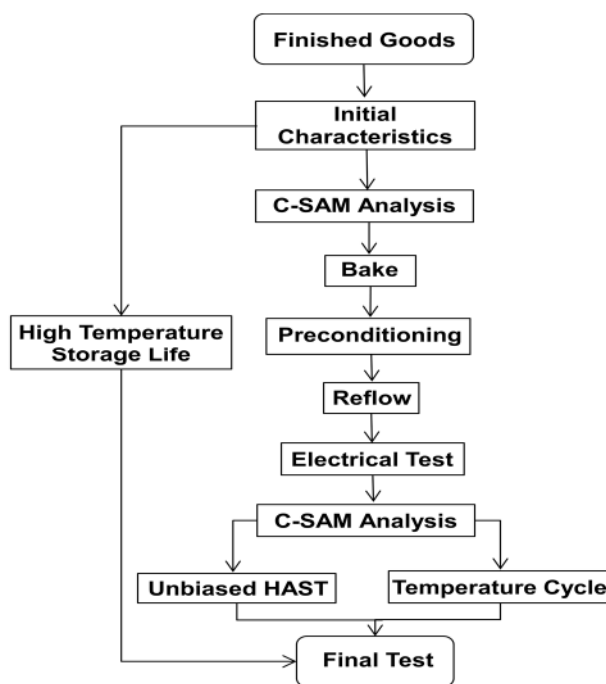
- *Take the initiative to ensure product quality*
- *Create an environment where the highest standards are maintained*
- *Continue to improve quality practices*

Introduction

The Reliability tests summarized in this report are designed to satisfy the reliability requirements designated by Hittite Microwave Corporation. The testing was devised to simulate exposure to environments the product may experience during assembly, test, and life in the end user application. The pass/fail criteria are dependent upon DC and critical RF parameters determined by the appropriate catalog specifications. A complete data sheet for the devices tested can be found at www.hittite.com.

The Package Reliability Plan is as follows:

Package Reliability



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Glossary of Terms & Definitions:

1. **HTSL:** High Temperature Storage Life. Devices are subjected to 1000 hours at 150°C. This test is performed in accordance with JEDEC JESD22-A103.
2. **MSL Preconditioning:** Moisture sensitivity level pre-conditioning is performed in accordance with JEDEC JESD22-A113, lead free, 260°C peak temperature (see Appendix 1 for reflow profile).
3. **Physical Dimensions:** Devices are inspected to the current package outline drawing to ensure all package dimensions are within specification (see Appendix 2 for applicable outline drawings).
4. **Solderability:** Devices are subjected to 8 hours of steam age and Method 1 Dip and Look testing in accordance with JEDEC JESD22-B102.
5. **Temperature Cycle:** Devices are subjected to 500 non-operating temperature cycling from -65°C to 150°C in accordance with JEDEC JESD22-A104.
6. **THB:** Temperature Humidity Bias. Devices are subjected to 1000 hours of 85% relative humidity at a temperature of 85°C, while DC biased. This test is performed in accordance with JESD22-A101.
7. **UHAST:** Unbiased Highly Accelerated Stress Test. Devices are subjected to 96 hours of 85% relative humidity at a temperature of 130°C and pressure (18.6 PSIG). This test was performed in accordance with JEDEC JESD22-A118.
8. **X-Ray Analysis:** Devices are inspected to the current assembly drawing to ensure devices are assembled correctly and are free of any assembly anomalies.

Qualification Sample Selection:

All qualification devices used were manufactured and tested on standard production processes and met pre-stress acceptance test requirements.

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Package Qualification Report

QTR: 2014-00380
Package: LC4, LC4B

Rev: 02

Summary of Qualification Tests:

HMC383LC4 (QTR2012-00320)

TEST	QTY IN	QTY OUT	PASS / FAIL	NOTES
Initial Electrical	384	384	Complete	
HTOL, 1000 hours	80	80	Complete	
Post HTOL Electrical Test	80	80	Pass	
HTSL, 1000 hours	80	80	Complete	
Post HTSL Electrical Test	80	80	Pass	
MSL3 Preconditioning	158	158	Complete	
MSL3 Preconditioning Final Test	158	158	Pass	
UHAST (Preconditioned)	79	79	Complete	
UHAST Final Test	79	79	Pass	
Temperature Cycle (Preconditioned)	79	79	Complete	
Temperature Cycle Final Test	79	79	Pass	
ESD	39	39	Complete	HBM Class 1A CDM Class III MM Pass 50V
Solderability	6	6	Pass	
Physical Dimensions	15	15	Pass	
X-Ray	6	6	Pass	

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Package Qualification Report

QTR: 2014-00380

Rev: 02

Package: LC4, LC4B

HMC910LC4B (QTR2013-00108)

TEST	QTY IN	QTY OUT	PASS / FAIL	NOTES
Initial Electrical	271	271	Complete	
HTSL, 1000 hours	80	80	Complete	
Post HTSL Electrical Test	80	80	Pass	
MSL Preconditioning	160	160	Complete	
MSL Preconditioning Final Test	160	160	Pass	
UHAST (Preconditioned)	80	80	Complete	
UHAST Final Test	80	80	Pass	
Temperature Cycle (Preconditioned)	80	80	Complete	
Temperature Cycle Final Test	80	80	Pass	
Solderability	6	6	Pass	
Physical Dimensions	15	15	Pass	
X-Ray	10	10	Pass	

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Package Qualification Report

QTR: 2014-00380

Rev: 02

Package: LC4, LC4B

HMC7XXXLC4 (QTR2013-00361)

TEST	QTY IN	QTY OUT	PASS / FAIL	NOTES
Initial Electrical	366	366	Complete	
HTOL, 1000 hours	81	81	Complete	
Post HTOL Electrical Test	81	81	Pass	
HTSL, 1000 hours	78	78	Complete	
Post HTSL Electrical Test	78	78	Pass	
MSL3 Preconditioning	183	183	Complete	
MSL3 Preconditioning Final Test	183	183	Pass	
UHAST (Preconditioned)	78	78	Complete	
UHAST Final Test	78	78	Pass	
Temperature Cycle (Preconditioned)	78	78	Complete	
Temperature Cycle Final Test	78	78	Pass	
THB (Preconditioned)	27	27	Complete	
THB Final Test	27	27	Pass	
ESD	24	24	Complete	HBM Class 1A CDM Class IV MM Pass 75V

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Package Qualification Report

QTR: 2014-00380
Package: LC4, LC4B

Rev: 02

Cumulative Summary of All LC4 Package Tests

TEST	Total Units Tested	Total Units Passed	Total Units Failed	Comments
HTSL, 1000 hours	238	238	0	
UHAST (Preconditioned)	237	237	0	
Temperature Cycle (Preconditioned)	237	237	0	
THB (Preconditioned)	27	27	0	
Solderability	12	12	0	
Physical Dimensions	30	30	0	
X-Ray	16	16	0	

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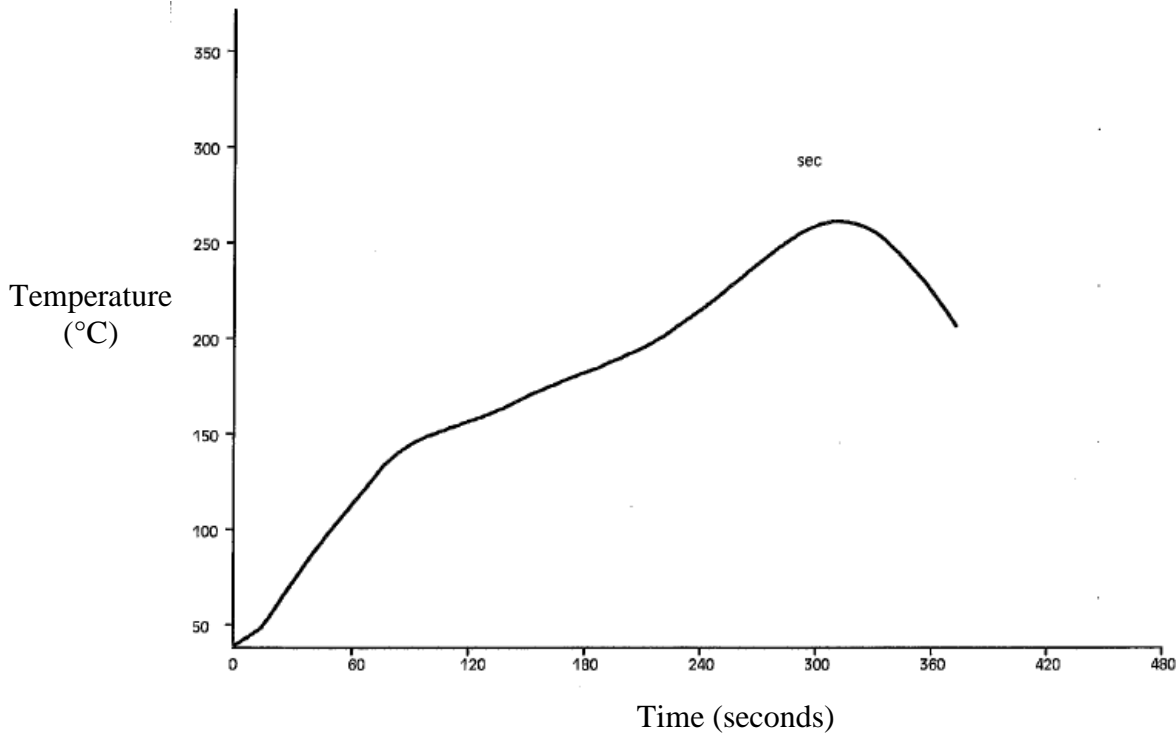
- Supplying products of the highest quality
- Advance in state-of-the-art technology that supports our products
- Enhance our competitive position with superior product standards

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Appendix 1

Reflow Profile for MSL Preconditioning



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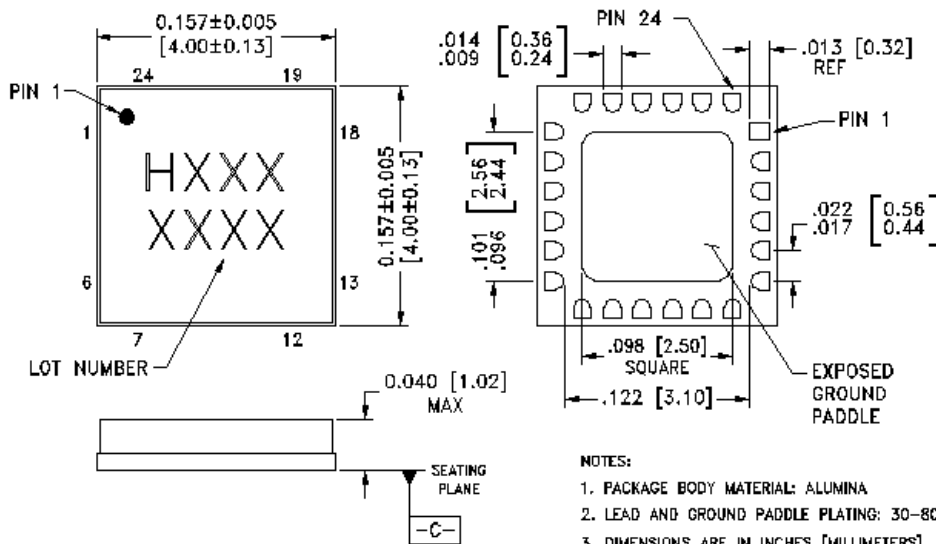
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Appendix 2

LC4 Outline

BOTTOM VIEW



NOTES:

1. PACKAGE BODY MATERIAL: ALUMINA
2. LEAD AND GROUND PADDLE PLATING: 30-80 MICROINCHES GOLD OVER 50 MICROINCHES MINIMUM NICKEL.
3. DIMENSIONS ARE IN INCHES [MILLIMETERS].
4. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
5. CHARACTERS TO BE BLACK INK MARKED WITH .018"MIN to .030"MAX HEIGHT REQUIREMENTS. UTILIZE MAXIMUM CHARACTER HEIGHT BASED ON LD DIMENSIONS AND BEST FIT. LOCATE APPROX. AS SHOWN.
6. PACKAGE WARP SHALL NOT EXCEED 0.05mm DATUM [-C-]
7. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

Hittite Microwave Corporation is committed to:

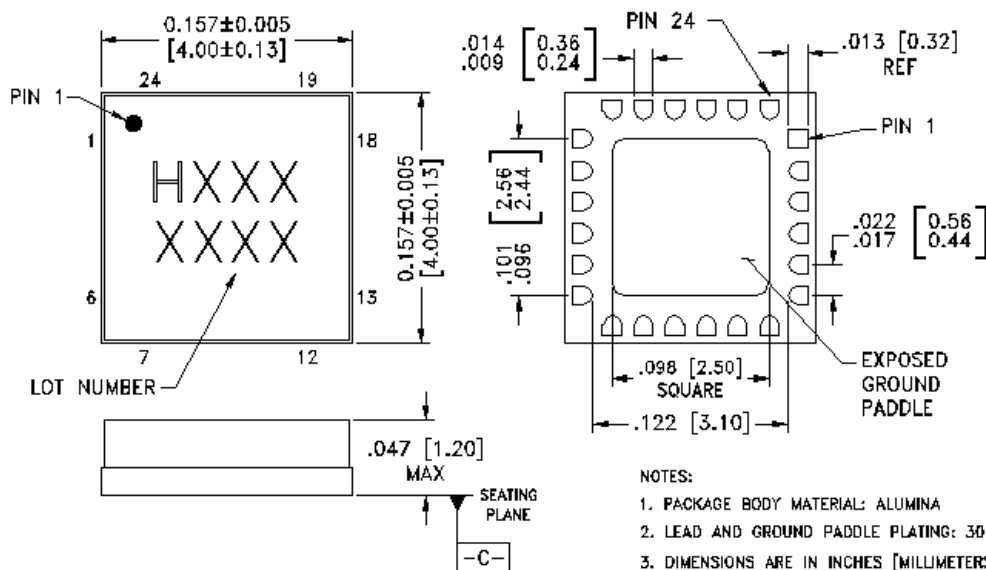
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LC4B Outline

BOTTOM VIEW



NOTES:

1. PACKAGE BODY MATERIAL: ALUMINA
2. LEAD AND GROUND PADDLE PLATING: 30-80 MICROINCHES GOLD OVER 50 MICROINCHES MINIMUM NICKEL.
3. DIMENSIONS ARE IN INCHES [MILLIMETERS].
4. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
5. CHARACTERS TO BE BLACK INK MARKED WITH .018"MIN to .030"MAX HEIGHT REQUIREMENTS. UTILIZE MAXIMUM CHARACTER HEIGHT BASED ON LID DIMENSIONS AND BEST FIT. LOCATE APPROX. AS SHOWN.
6. PACKAGE WARP SHALL NOT EXCEED 0.05mm DATUM $-C-$
7. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

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