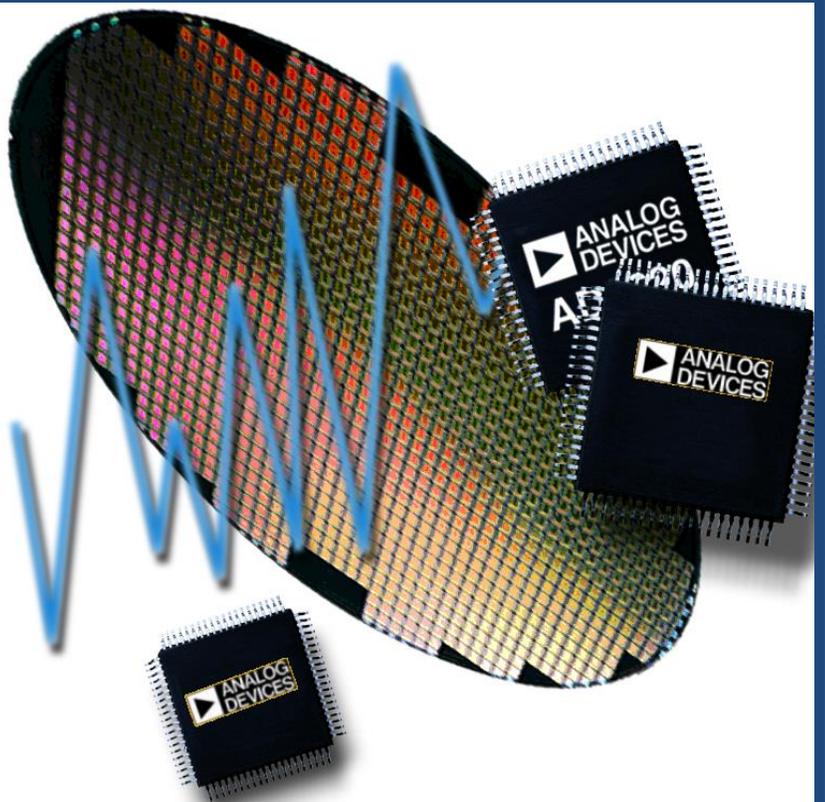


Analog Devices Welcomes Hittite Microwave Corporation

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: 2014-00374

Rev: 01

Package: LP7, LP7D, LP7F, LP7G

HMC1197LP7F

Hittite Microwave Corporation is committed to:

- *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:

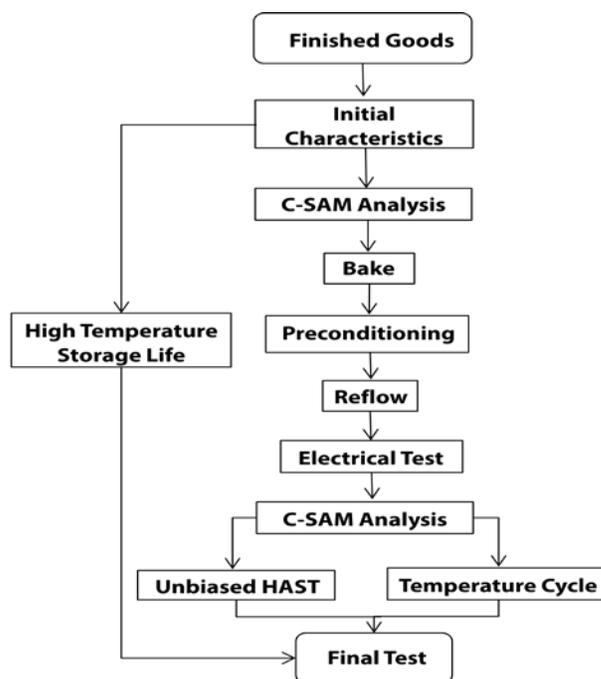
- *Take the initiative to ensure product quality*
- *Create an environment where the highest standards are maintained*
- *Continue to improve quality practices*

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. HAST:** Highly Accelerated Stress Test (biased). Devices are subjected to 96 hours of 85% relative humidity at a temperature of 130°C and pressure (18.6 PSIG), while DC biased. This test is performed in accordance with JEDEC JESD22-A110.
- 2. HTSL:** High Temperature Storage Life. Devices are subjected to 1000 hours at 150°C. This test is performed in accordance with JEDEC JESD22-A103.
- 3. 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).
- 4. 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).
- 5. Solderability:** Devices are subjected to 8 hours of steam age and Method 1 Dip and Look testing in accordance with JEDEC JESD22-B102.
- 6. Temperature Cycle:** Devices are subjected to 500 non-operating temperature cycling from -65°C to 150°C in accordance with JEDEC JESD22-A104.
- 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: 2014-00374

Rev: 01

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Summary of Qualification Tests:

HMC1197LP7F (QTR2012-00516)

TEST	QTY IN	QTY OUT	PASS / FAIL	NOTES
Initial Electrical	332	332	Complete	
HTOL, 1000 hours	80	80	Complete	
Post HTOL Electrical Test	80	80	Pass	
HTSL, 1000 hours	79	79	Complete	
Post HTSL Electrical Test	79	79	Pass	
THB	27	27	Complete	
THB Final Test	27	27	Pass	
MSL1 Preconditioning	80	80	Complete	
MSL1 Preconditioning Final Test	80	80	Pass	
Temperature Cycle (Preconditioned)	80	80	Complete	
Temperature Cycle Final Test	80	80	Pass	
ESD	39	39	Complete	HBM Class 1A CDM Class II MM Pass 100V
Solderability	6	6	Pass	
Physical Dimensions	15	15	Pass	
X-Ray	6	6	Pass	

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Package Qualification Report

QTR: 2014-00374

Rev: 01

Package: LP7, LP7D, LP7F, LP7G

Cumulative Summary of All LP7 Package Tests

TEST	Total Units Tested	Total Units Passed	Total Units Failed	Comments
HTSL, 1000 hours	79	79	0	
Temperature Cycle (Preconditioned)	80	80	0	
THB	27	27	0	
Solderability	6	6	0	
Physical Dimensions	15	15	0	
X-Ray	6	6	0	

Hittite Microwave Corporation is committed to:

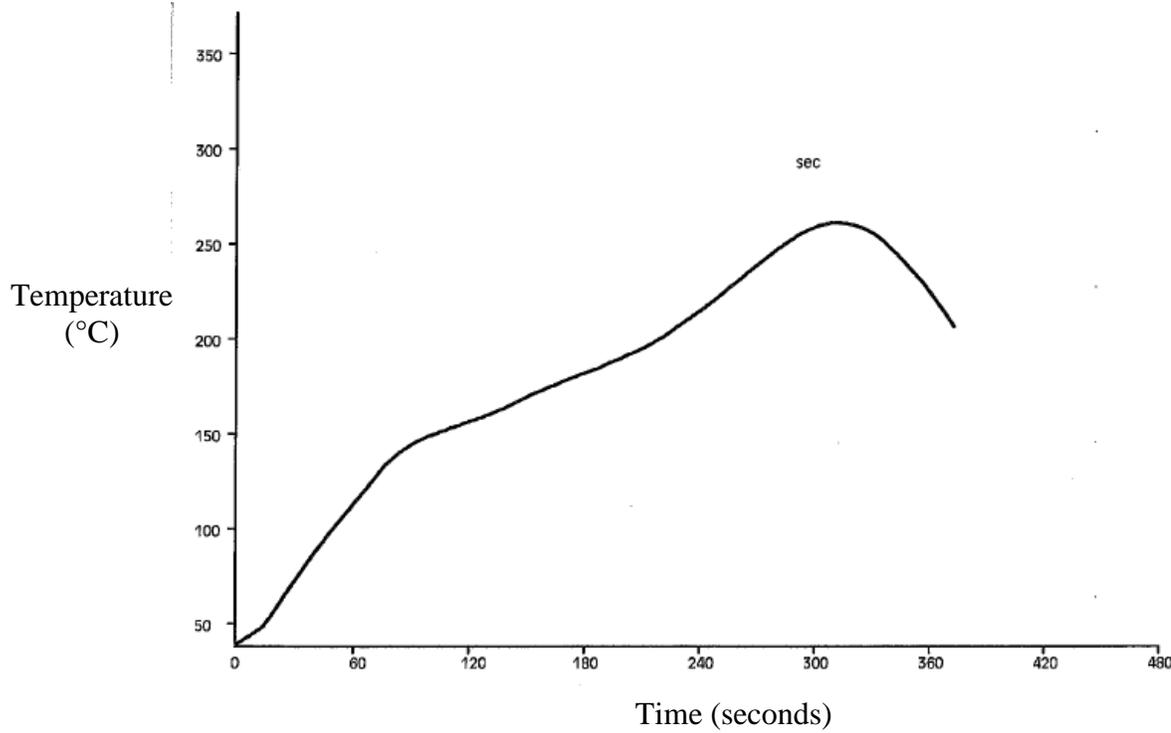
- Supplying products of the highest quality
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Appendix 1

Reflow Profile for MSL1 Preconditioning



Hittite Microwave Corporation is committed to:

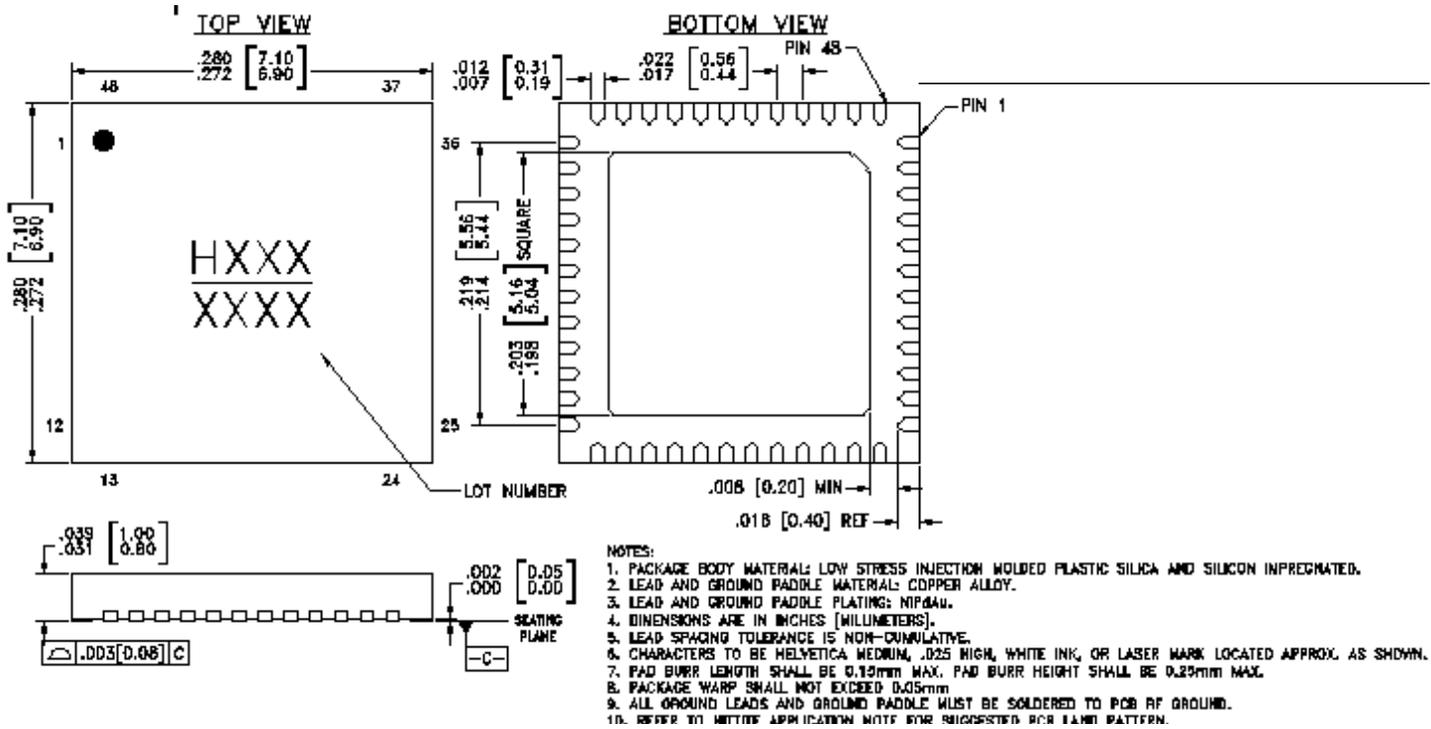
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Appendix 2

LP7 Outline



Hittite Microwave Corporation is committed to:

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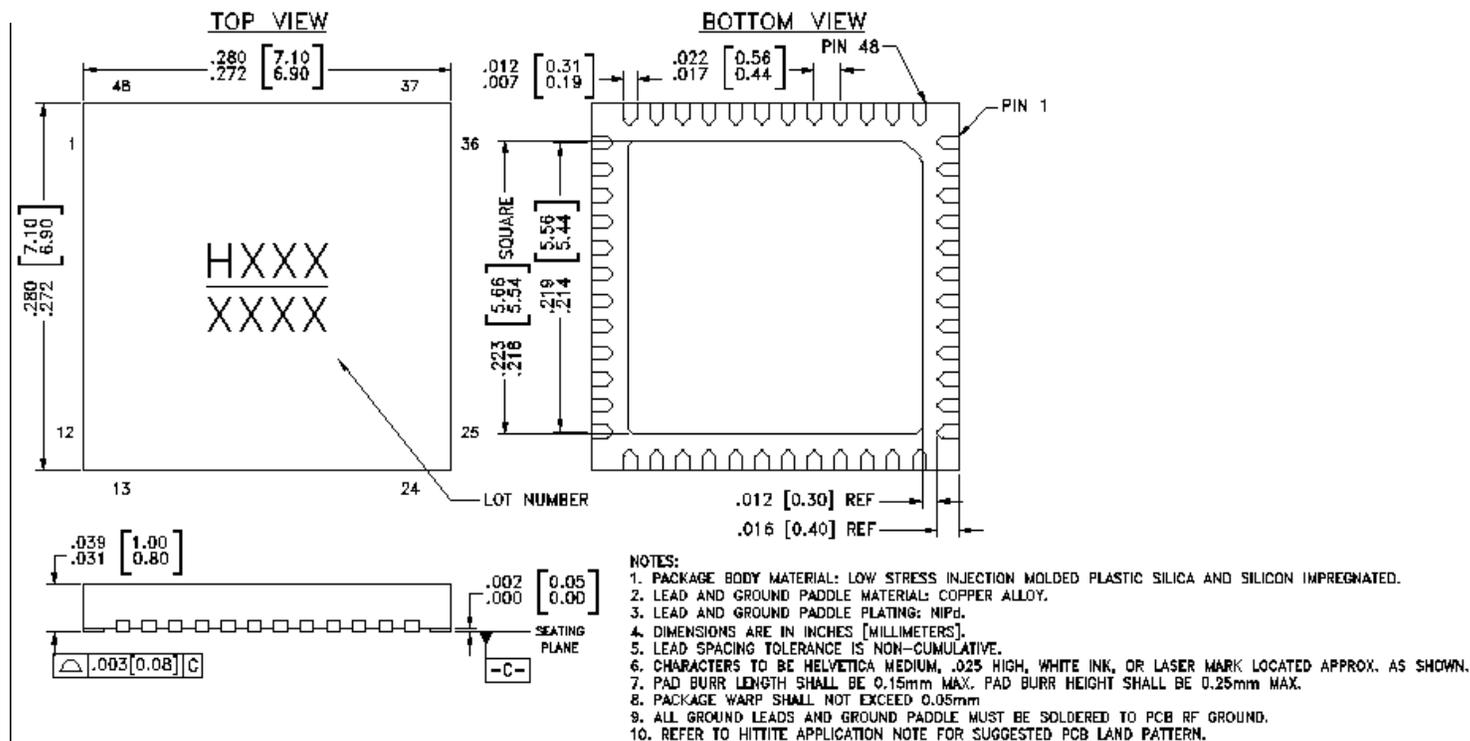
Package Qualification Report

QTR: 2014-00374

Rev: 01

Package: LP7, LP7D, LP7F, LP7G

LP7F Outline



Hittite Microwave Corporation is committed to:

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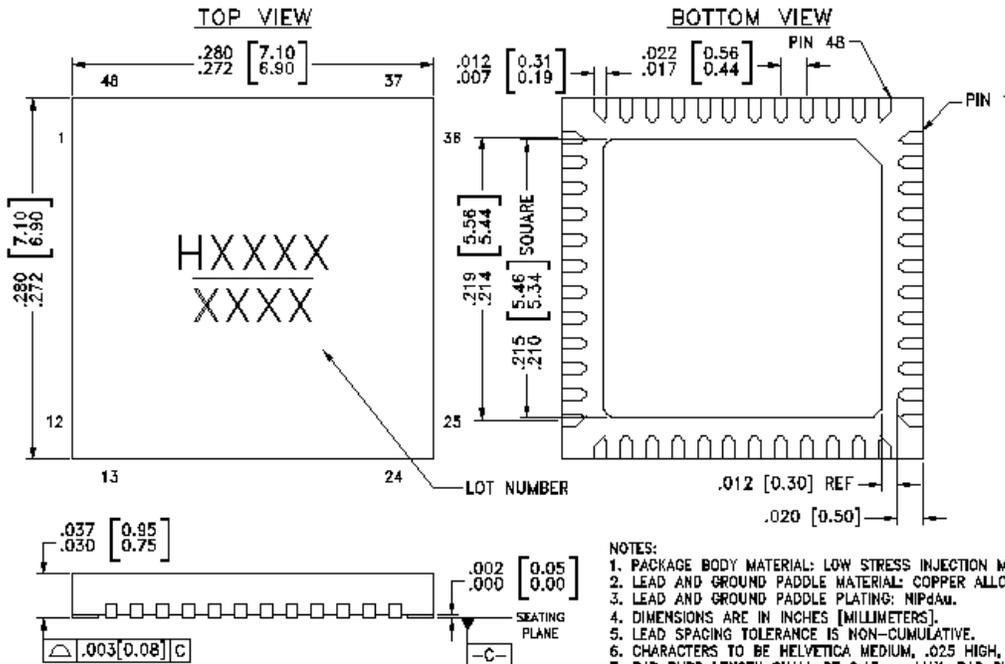
Package Qualification Report

QTR: 2014-00374

Rev: 01

Package: LP7, LP7D, LP7F, LP7G

LP7G Outline



NOTES:

1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEAD AND GROUND PADDLE MATERIAL: COPPER ALLOY.
3. LEAD AND GROUND PADDLE PLATING: NiPdAu.
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
6. CHARACTERS TO BE HELVETICA MEDIUM, .025 HIGH, WHITE INK, OR LASER MARK LOCATED APPROX. AS SHOWN.
7. PAD BURR LENGTH SHALL BE 0.15mm MAX. PAD BURR HEIGHT SHALL BE 0.25mm MAX.
8. PACKAGE WARP SHALL NOT EXCEED 0.05mm
9. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
10. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED PCB LAND PATTERN.

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