

Package Qualification Report

QTR: 2013- 00487

Rev: 05

Package: LP4, LP4B, LP4C, LP4K

HMC215LP4	HMC472ALP4	HMC666LP4	HMC817LP4	HMC4069LP4
HMC232LP4	HMC472LP4	HMC680LP4	HMC818LP4	HMC6187LP4
HMC263LP4	HMC497LP4	HMC683LP4	HMC849LP4C	
HMC271ALP4	HMC505LP4	HMC684LP4	HMC863LP4	
HMC271LP4	HMC506LP4	HMC685LP4	HMC897LP4	
HMC276LP4	HMC532LP4	HMC686LP4	HMC898LP4	
HMC305ALP4	HMC533LP4	HMC687LP4	HMC899LP4	
HMC305LP4	HMC535LP4	HMC688LP4	HMC909LP4	
HMC321LP4	HMC538LP4	HMC689LP4	HMC914LP4	
HMC322LP4	HMC542ALP4	HMC694LP4	HMC915LP4	
HMC334LP4	HMC542LP4	HMC695LP4	HMC921LP4	
HMC349LP4C	HMC551LP4	HMC696LP4	HMC922LP4	
HMC349ALP4C	HMC552LP4	HMC697LP4	HMC929LP4	
HMC368LP4	HMC566LP4	HMC700LP4	HMC931LP4	
HMC370LP4	HMC575LP4	HMC703LP4	HMC932LP4	
HMC384LP4	HMC596LP4	HMC704LP4	HMC933LP4	
HMC385LP4	HMC597LP4	HMC705LP4	HMC941LP4	
HMC386LP4	HMC600LP4	HMC718LP4	HMC942LP4	
HMC388LP4	HMC601LP4	HMC719LP4	HMC951LP4	
HMC389LP4	HMC602LP4	HMC736LP4	HMC960LP4	
HMC390LP4	HMC611LP4	HMC737LP4	HMC966LP4	
HMC391LP4	HMC612LP4	HMC738LP4	HMC967LP4	
HMC394LP4	HMC615LP4	HMC739LP4	HMC977LP4	
HMC409LP4	HMC621LP4	HMC750LP4	HMC980LP4	
HMC416LP4	HMC622LP4	HMC753LP4	HMC985LP4K	
HMC429LP4	HMC623LP4	HMC755LP4	HMC990LP4	
HMC430LP4	HMC624LP4	HMC757LP4	HMC1010LP4	
HMC431LP4	HMC624ALP4	HMC770LP4B	HMC1020LP4	
HMC443LP4	HMC628LP4	HMC785LP4	HMC1021LP4	
HMC444LP4	HMC629LP4	HMC786LP4	HMC1056LP4B	
HMC445LP4	HMC641LP4	HMC792LP4	HMC1065LP4	
HMC466LP4	HMC665LP4	HMC816LP4	HMC1097LP4	

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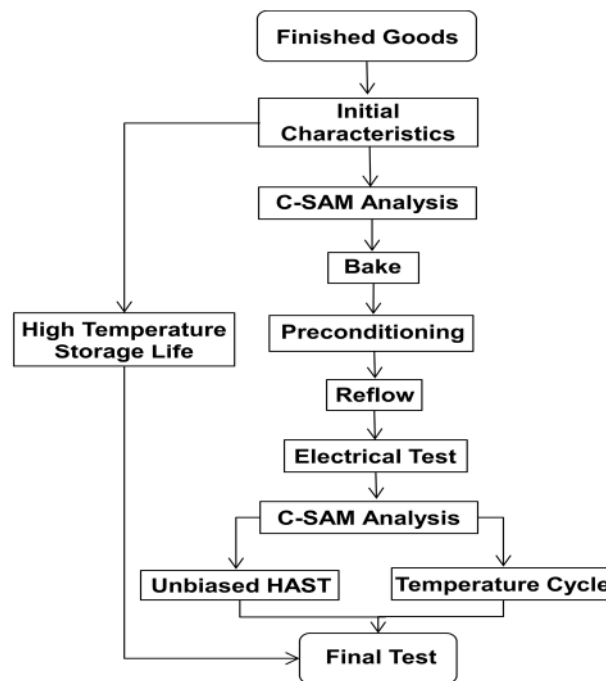
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Introduction

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. Autoclave:** A highly accelerated moisture stress test (unbiased). Devices are subjected to 96 hours of 100% relative humidity at a temperature of 121°C and pressure (14.7 PSIG). This test is performed in accordance with JEDEC JESD22-A102.
- 2. 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.
- 3. HTSL:** High Temperature Storage Life. Devices are subjected to 1000 hours at 150°C. This test is performed in accordance with JEDEC JESD22-A103.
- 4. 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).
- 5. 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).
- 6. Solderability:** Devices are subjected to 8 hours of steam age and Method 1 Dip and Look testing in accordance with JEDEC JESD22-B102.
- 7. Temperature Cycle:** Devices are subjected to 500 non-operating temperature cycling from -65°C to 150°C in accordance with JEDEC JESD22-A104.
- 8. 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.
- 9. 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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Summary of Qualification Tests:

HMC966LP4 (QTR2012-00014)

TEST	QTY IN	QTY OUT	PASS / FAIL	NOTES
Initial Electrical	298	298	Complete	
HTSL, 1000 hours	80	80	Complete	
Post HTSL Electrical Test	80	80	Pass	
MSL1 Preconditioning	159	159	Complete	
MSL1 Preconditioning Final Test	159	159	Pass	
HAST (Preconditioned)	79	79	Complete	
HAST Final Test	79	79	Pass	
Temperature Cycle (Preconditioned)	80	80	Complete	
Temperature Cycle Final Test	80	80	Pass	
Solderability	15	15	Pass	
Physical Dimensions	22	22	Pass	
X-Ray Analysis	22	22	Pass	

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HMC6445LP4B (QTR2012-00021)

TEST	QTY IN	QTY OUT	PASS / FAIL	NOTES
Initial Electrical	265	265	Complete	
HTSL, 1000 hours	80	80	Complete	
Post HTSL Electrical Test	80	80	Pass	
MSL1 Preconditioning	158	158	Complete	
MSL1 Preconditioning Final Test	158	158	Pass	
HAST (Preconditioned)	78	78	Complete	
HAST Final Test	78	78	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 Analysis	6	6	Pass	

HMC996LP4 (QTR2012-00027)

TEST	QTY IN	QTY OUT	PASS / FAIL	NOTES
Initial Electrical	320	320	Complete	
HTSL, 1000 hours	80	80	Complete	
Post HTSL Electrical Test	80	80	Pass	
MSL1 Preconditioning	240	240	Complete	
MSL1 Preconditioning Final Test	240	240	Pass	
UHAST (Preconditioned)	80	80	Complete	
UHAST Final Test	80	80	Pass	
HAST (Preconditioned)	80	80	Complete	

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HAST Final Test	80	80	Pass	
Temperature Cycle (Preconditioned)	80	80	Complete	
Temperature Cycle Final Test	80	80	Pass	

HMC1020LP4 (QTR2012-00276)

TEST	QTY IN	QTY OUT	PASS / FAIL	NOTES
Initial Electrical	267	267	Complete	
HTSL, 1000 hours	80	80	Complete	
Post HTSL Electrical Test	80	80	Pass	
MSL1 Preconditioning	160	160	Complete	
MSL1 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 Analysis	6	6	Pass	

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HMC700LP4 (QTR2012-00326)

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	
MSL1 Preconditioning	160	160	Complete	
MSL1 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 Analysis	10	10	Pass	

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HMC472LP4 (QTR2013-00013)

TEST	QTY IN	QTY OUT	PASS / FAIL	NOTES
Initial Electrical	267	267	Complete	
HTSL, 1000 hours	80	80	Complete	
Post HTSL Electrical Test	80	80	Pass	
MSL1 Preconditioning	160	160	Complete	
MSL1 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 Analysis	6	6	Pass	

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HMC1056 (QTR2014-00068)

TEST	QTY IN	QTY OUT	PASS / FAIL	NOTES
Initial Electrical	359	359	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	
MSL1 Preconditioning	160	160	Complete	
MSL1 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	
ESD	39	39	Complete	HBM Class 1B CDM Class III MM Pass 100V
Solderability	6	6	Pass	
Physical Dimensions	15	15	Pass	
X-Ray Analysis	6	6	Pass	

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Cumulative Summary of All LP4 Package Tests

TEST	Total Units Tested	Total Units Passed	Total Units Failed	Comments
HTSL, 1000 hours	560	560	0	
HAST (Preconditioned)	237	237	0	
UHAST (Preconditioned)	400	400	0	
Temperature Cycle (Preconditioned)	560	560	0	
Solderability	45	45	0	
Physical Dimensions	97	97	0	
X-Ray Analysis	56	56	0	

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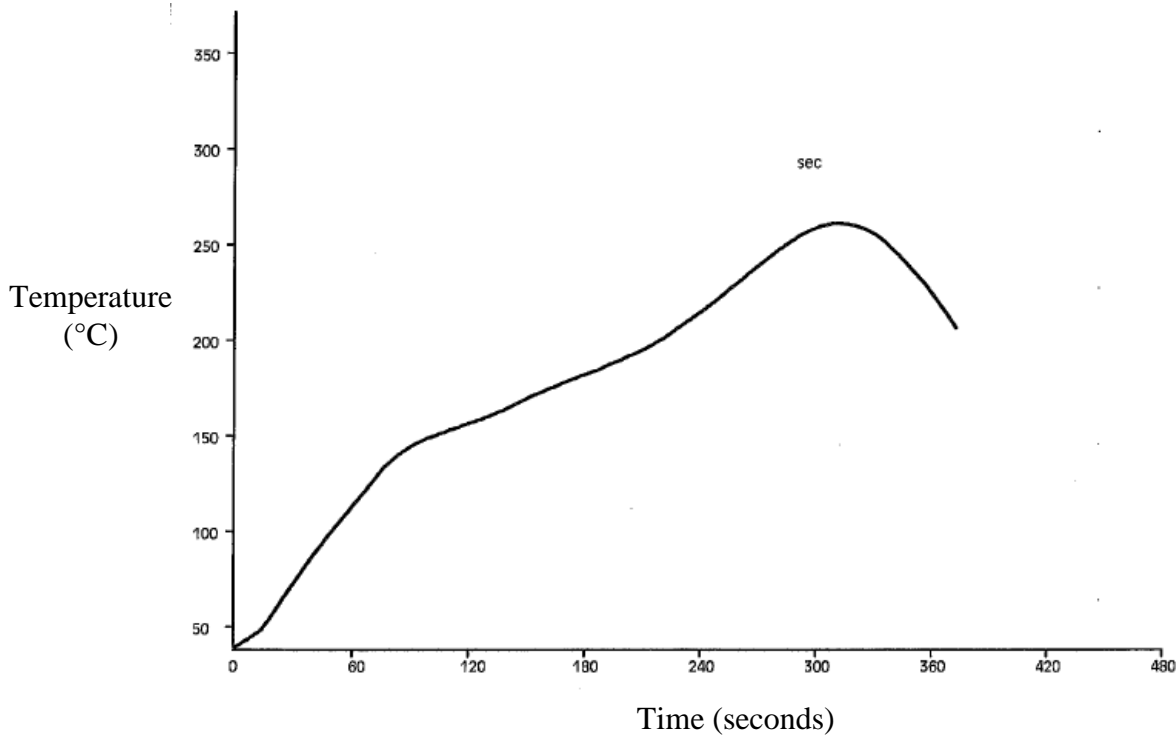
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Appendix 1



Hittite Microwave Corporation is committed to:

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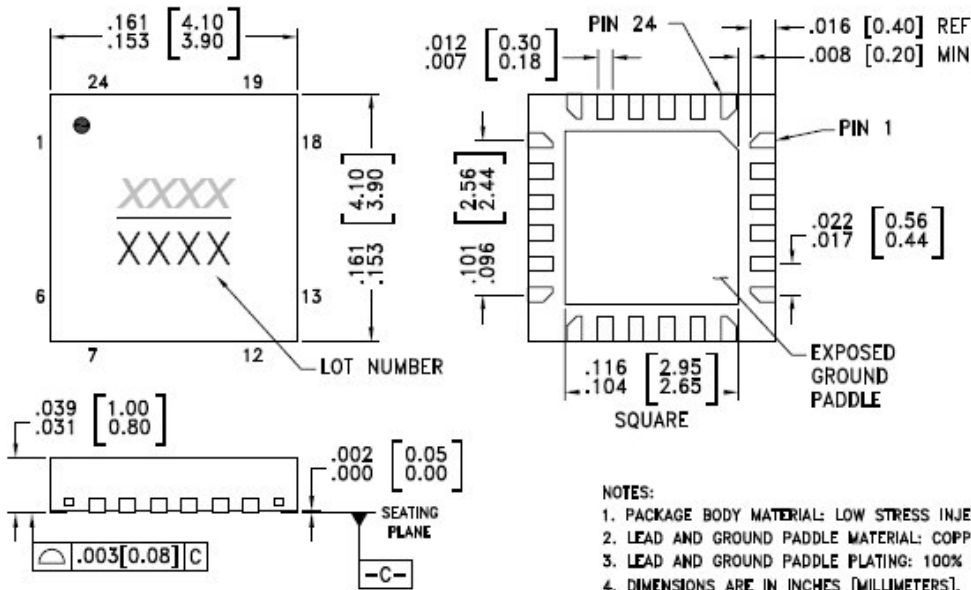
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Appendix 2

LP4 Outline

BOTTOM VIEW



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: 100% MATTE TIN
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 0.05mm 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.

Hittite Microwave Corporation is committed to:

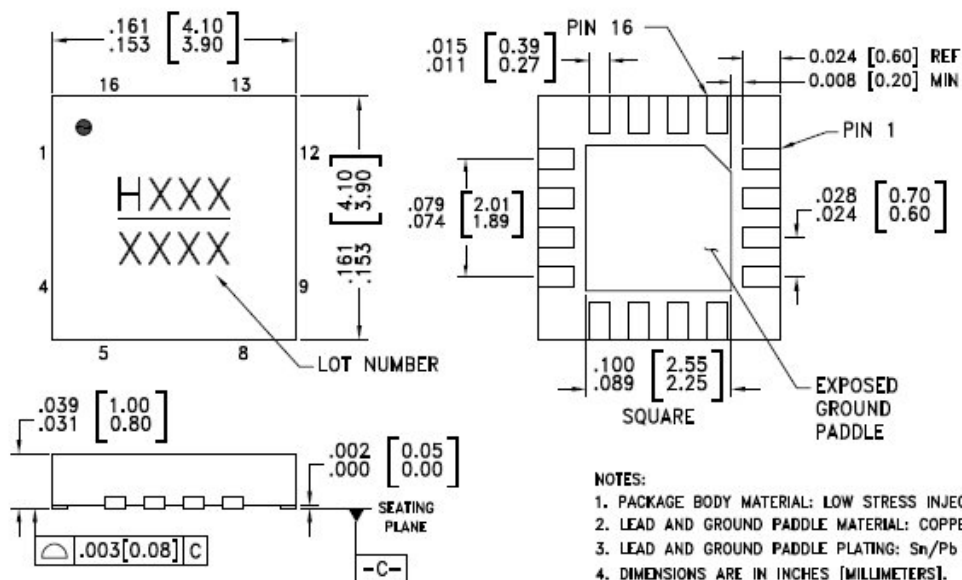
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LP4C Outline

BOTTOM VIEW



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: Sn/Pb SOLDER.
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 0.05mm 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.

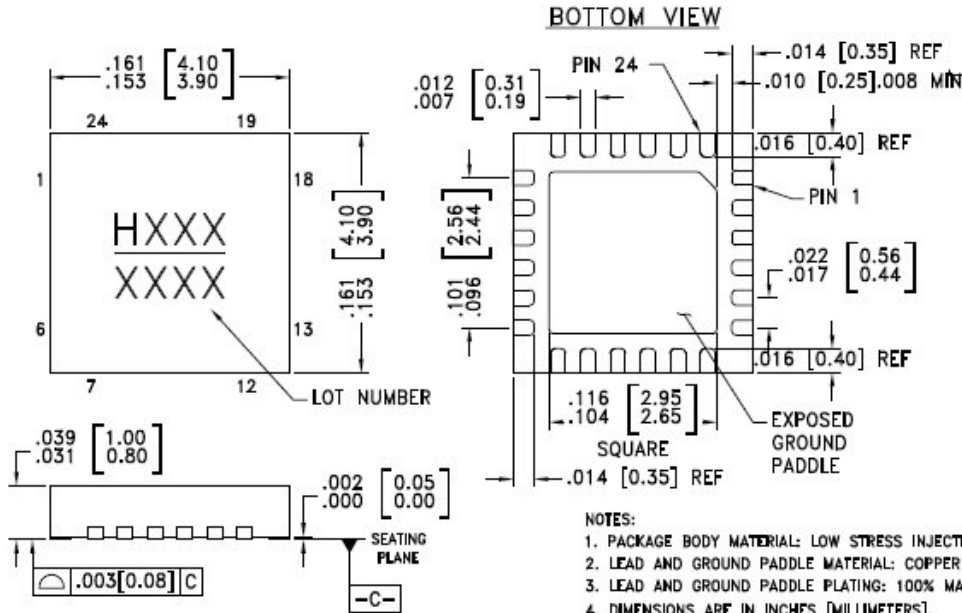
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LP4K Outline



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: 100% MATTE TIN
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 0.05mm MAX.
8. PACKAGE WARP SHALL NOT EXCEED 0.05mm
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10. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED PCB LAND PATTERN.

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