


SELECTED ITEM DRAWING

			
Unless otherwise specified DIMENSIONS ARE IN INCHES (MM)	TOLERANCES: .XX +/- 0.010 .XXX +/- 0.005 .XXXX +/- 0.002 ANGLES +/- .5 DEG	Drawing practices per ASME Y14.100	17 GHz to 27 GHz, Variable Gain Amplifier
			DRAWING NUMBER SID000016
		SIZE A	

SID000016

Rev. A

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1. SCOPE

1.1. Scope

This drawing establishes the requirements for the 17 GHz to 27 GHz, GaAs, PHEMT, MMIC, Variable Gain Amplifier, to be screened in accordance with MIL-PRF-38534, Class H, to the requirements specified in 4.1, and 4.2 herein.

1.2. Analog Devices Part Number

<u>Generic Part Number</u>	<u>Screened Part Number</u>
ADH997S	HMC7746

2. APPLICABLE DOCUMENTS

2.1. Government Documents

Unless otherwise specified, the following drawings and standards, of the issue in effect on the date of the accepted purchase order, in the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, shall form a part of this drawing to the extent specified herein.

DEPARTMENT OF DEFENSE TEST METHOD STANDARD

MIL-STD-883 Microcircuits

DEPARTMENT OF DEFENSE PERFORMANCE SPECIFICATIONS

MIL-PRF-38534 Hybrid Microcircuits, General Specifications For

2.2. Non-Government Documents

The following documents, of the issue in effect on the date of the purchase order, form a part of this drawing to the extent specified herein:

Analog Devices Inc.

HMC799LC4 Data Sheet	Commercial Product Datasheet	v03.0424 (Reference Only)
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3. REQUIREMENTS

3.1. General Requirements

The devices delivered shall comply to this specification.

3.2. Design Construction and Physical Dimensions

The design construction and physical dimensions shall be as defined in Figure 1 herein.

3.3. Traceability

Each delivered device shall be traceable to the wafer number and the wafer lot number of each device. Inspection lot records shall be maintained to provide traceability to the specific wafer and wafer lot from which the chips originated.

4. QUALITY ASSURANCE PROVISIONS

4.1. Element Evaluation Requirements

All deliverable Die shall have passed 100% element electrical test per 4.2.1 and passed 100% visual inspection, per MIL-STD-883 TM2010 Condition B, after wafer dicing.

4.2. Dice Qualification Requirements

Dice qualification requirements shall be in accordance with MIL-PRF-38534, Appendix C, Table C-II, per Class H.

4.2.1. Element Electrical Test (RF-On Wafer)

Electrical tests shall consist of the tests specified on Table I, tested at room temperature only.

4.2.2. Final Electrical Test

Sample Die shall be randomly selected from the wafer that has successfully passed RF-On wafer testing per 4.2.1 and shall be mounted to suitable fixturing for screening. Final electrical tests shall consist of the tests specified in Table II tested at -40 °C and +80 °C.

4.2.3. Wire Bond Evaluation

Wire bond pull test shall be performed in accordance with MIL-PRF-38534, Appendix C, Paragraph C.3.3.3 and C.3.3.5.

5. MIL-PRF-38534 EXCEPTIONS

5.1. Wafer Fabrication

Foundry information is available upon request.

5.2. Microcircuit Dice Evaluation Requirements (TABLE C-II)

- Pre-screen test post assembly required to Die qualification to remove all assembly related rejects.

6. PREPARATION FOR DELIVERY

The preparation for delivery, packaging, preservation, ESD protection and handling shall be in accordance with MIL-PRF-38534.

6.1. Die Packaging Information

The Die shall be delivered in accordance with Table III herein.

6.2. Inspection Data Requirements

The following data shall accompany each shipment.

- a. A Certificate of Conformance (C of C) certifies that the lot(s) meets all requirements of this specification.
- b. Die Photograph
- c. Summary of RF-On wafer test data per 4.2.1.
- d. Final electrical test results per 4.2.2.
- e. Wire Bond Evaluation per 4.2.3.
- f. Failure Analysis with photos (If applicable)
- g. A cover sheet indicating the following purchasing information:
 1. Customer purchase order number.
 2. Analog Devices part number.
 3. Part lot identification codes.
 4. Date & quantity shipped.

TABLE I: DIE ELECTRICAL CHARACTERISTICS

Parameter	Conditions <u>1/2/3/</u> Unless otherwise specified	Limits			Units
		Min	Typ	Max	
Gain		18			dB
Gain Control Range		12	15		dB
Supply Current (Idd1 + Idd2 + Idd3) <u>3/</u>	No Signal at RFIN		150	200	mA

TABLE I Notes:

1/ Test limits apply at +25 °C only with Vdd1 = Vdd2 = Vdd3 = +4 V, Vctrl = -4.5 V & -1 V, and Idd = 150 mA.

2/ Measurements made at 25 GHz, 25.5 GHz, and 26 GHz unless otherwise noted.

3/ Adjust Vgg1 and Vgg2 between -2 V and 0V to achieve Idd1 + Idd2 = Idd3 = 150 mA typical.

TABLE II: ELECTRICAL CHARACTERISTICS FOR QUALIFICATION SAMPLES

Parameter	Conditions <u>1/2/6/</u> Unless otherwise specified	Sub-Group	Limits			Units
			Min	Typ	Max	
Gain		4, 5, 6	16	18		dB
Gain Variation over Temperature		5, 6		0.03	0.045	dB/°C
Gain Control Range		4, 5, 6	12	15		dB
Input Return Loss		4, 5, 6	9	12		dB
Output Return Loss		4, 5, 6	14	20		dB
Output Power for 1 dB Compression (OP1dB) <u>3/4/</u>		7, 8A, 8B	20	23		dBm
Supply Current (Idd1 + Idd2 + Idd3) <u>5/</u>	No Signal at RFIN	1, 2, 3		170	200	mA

TABLE II Notes:

1/ Test limits apply between -40 °C and +80 °C with Vdd1 = Vdd2 = Vdd3 = +5 V, Vctrl = -4.5 V & -1 V, and Idd = 170 mA.

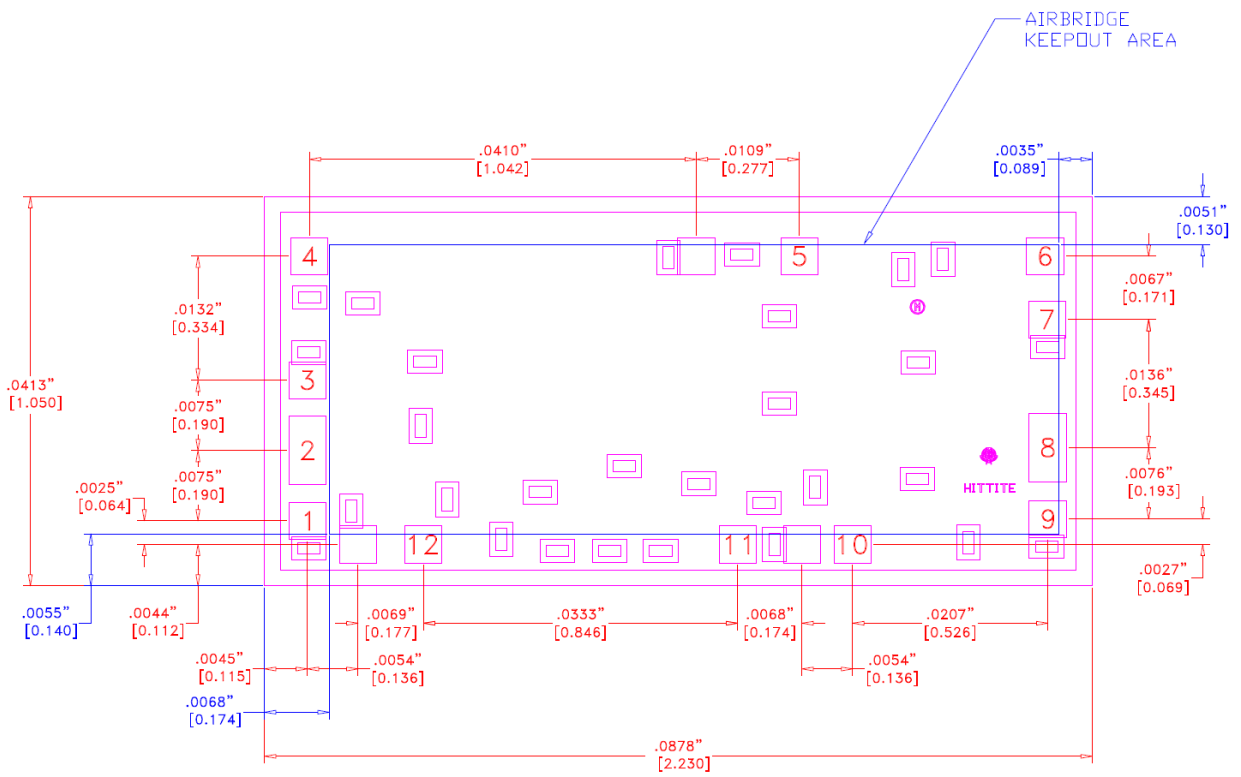
2/ Measurements made at 25 GHz, 25.5 GHz, and 26 GHz unless otherwise noted.

3/ OP1dB testing is go-no-go confirming minimum requirements are met.

4/ OP1dB shall be measured with Vctrl = -4.5V only.

5/ Adjust Vgg1 and Vgg2 between -2 V and 0V to achieve Idd1 + Idd2 = Idd3 = 170 mA typical.

6/ See MIL-PRF-38535 Table C-Xa for subgroup parameter definitions.



NOTES:

1. ALL DIMENSIONS ARE IN INCHES [MM]
2. DIE THICKNESS IS .004
3. BOND PAD METALIZATION: GOLD
4. OVERALL DIE SIZE $\pm .002$ "
5. UNLABELED PADS ARE N/C

PAD	DESCRIPTION	PAD SIZE
1	GND	.0039[.100] X .0039[.100]
2	RFIN	.0039[.100] X .0073[.185]
3	GND	.0039[.100] X .0039[.100]
4	Vdd1	.0039[.100] X .0039[.100]
5	Vdd2	.0039[.100] X .0039[.100]
6	Vdd3	.0039[.100] X .0039[.100]
7	GND	.0039[.100] X .0039[.100]
8	RFOUT	.0039[.100] X .0073[.185]
9	GND	.0039[.100] X .0039[.100]
10	Vgg2	.0039[.100] X .0039[.100]
11	Vctrl	.0039[.100] X .0039[.100]
12	Vgg1	.0039[.100] X .0039[.100]

Figure 1 – Device Outline for the HMC7746

TABLE III: DIE PACKAGING INFORMATION

Standard Package	Alternate
GP-2 (Gel Pack)	<u>1/</u>

TABLE III Note:

1/ For alternate packaging information, contact Analog Devices Inc.

ORDERING GUIDE

Model	Temperature Range
HMC7746	-40 °C to +80 °C

Revision History

Revision History		
Rev	Description of Change	Date
A	Initial release.	10/07/2024