

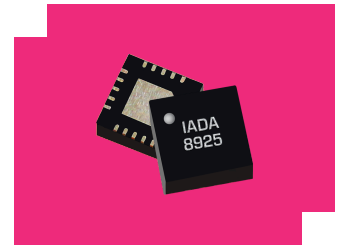
IADA-2050PSM

Amplifier/Doubler/Amplifier

DEVICE OVERVIEW

General Description

The IADA-2050PSM is an integrated MMIC active doubler fabricated with GaAs Schottky diodes. This operates over a guaranteed 10 to 25 GHz input frequency range or a doubled output frequency range of 20 to 50 GHz. It features excellent conversion loss, superior isolations and harmonic suppressions across a broad bandwidth.



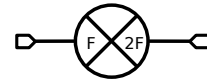
Features

- Input Frequency Range 10 – 25 GHz
- Output Frequency Range 20 - 50 GHz
- Input Power +5 dBm
- Output Power +17 dBm
- 1F Harmonic suppression 25 dBc
- 3F Harmonic suppression 25 dBc

Applications

- High frequency synthesis
- LO signal chain

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
IADA-2050PSM	Amplifier/Doubler/Amplifier	PSM	REACH RoHS	Released	EAR99
EVB-IADA-2050P	Evaluation Board, 20-50GHz Amplified Doubler	EVB	REACH RoHS	Released	EAR99

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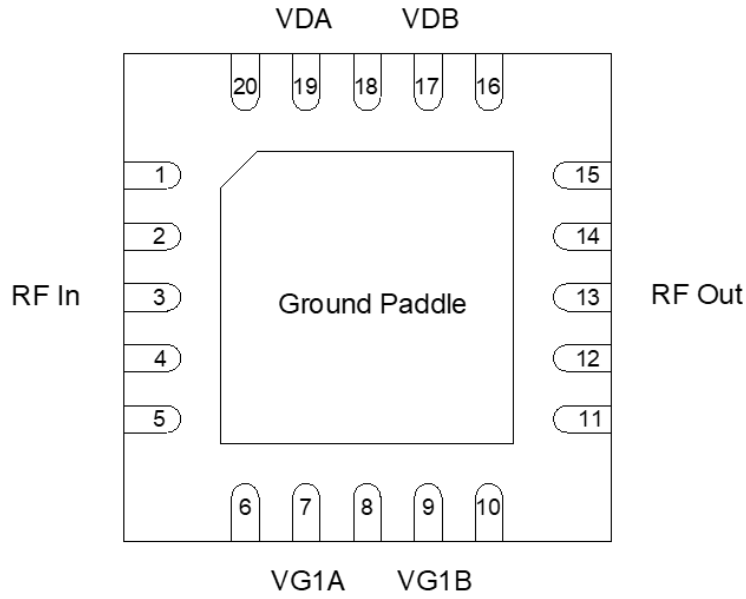
Revision History

Revision Code	Revision Date	Comment
-	2024-08-26	Initial Release
A	2026-03-02	Added Input vs. Output Power Plots over Temperature

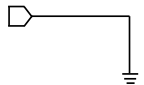
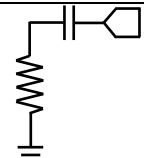
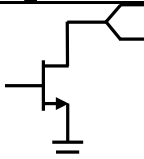
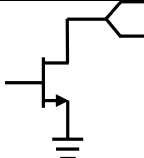
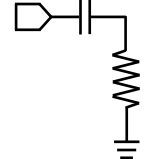
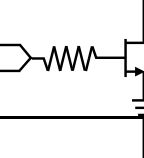
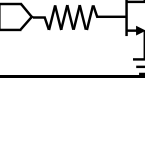
Port Configuration and Functions

Port Diagram

A top-down x-ray view of the IADA-2050PSM is shown below.



Port Functions

Port	Function	Description	DC Equivalent Circuit
Paddle	Ground	Ground pad should be connected to RF/DC ground with high electrical and thermal conductivity.	
Pin 13	Output	This pin is internally DC blocked and matched to 50 Ω at frequency range 20 – 50 GHz.	
Pin 17	VDB	Drain bias for the output amplifier. This pin must be connected to a positive power supply. Set this voltage to +5V for normal operation.	
Pin 19	VDA	Drain bias for the input amplifier. This pin must be connected to a positive power supply. Set this voltage to +5V for normal operation.	
Pin 3	Input	This pin is internally DC blocked and matched to 50 Ω at frequency range 10 - 25 GHz.	
Pin 7	VG1A	Gate control for the input amplifier. This pad must be connected to a negative power supply. Set this voltage to -0.15V for normal operation.	
Pin 9	VG1B	Gate control for the output amplifier. This pad must be connected to a negative power supply. Set this voltage to -0.15V for normal operation.	

Specifications

Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may be inoperable or have a reduced lifetime.

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	85	°C
Maximum Storage Temperature	150	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C
Negative Bias Current	2	mA
Negative Bias Voltage	-2	V
Positive Bias Current	550	mA
Positive Bias Voltage	5.5	V
Power Dissipation	2.5	W
RF Input Power	10	dBm

Package Information

Parameter	Details	Rating
ESD	< 250 Volts	HBM Class 0
Dimensions	-	4 x 4 mm
Moisture Sensitivity Level	-	MSL 1

Recommended Operating Conditions

Parameter	Min	Nominal	Max	Unit
Gate Bias DC Voltage (Vg)	-	-0.15	-	V
Positive DC Voltage (Vd)	-	5	-	V
Input Power	-	5	-	-

Sequencing Requirements

Turn-on Procedure:

- 1) Apply -0.15V to Vg
- 2) Apply +5V to Vd

Turn-off Procedure:

- 1) Turn off Vd
- 2) Turn off Vg

Electrical Specifications

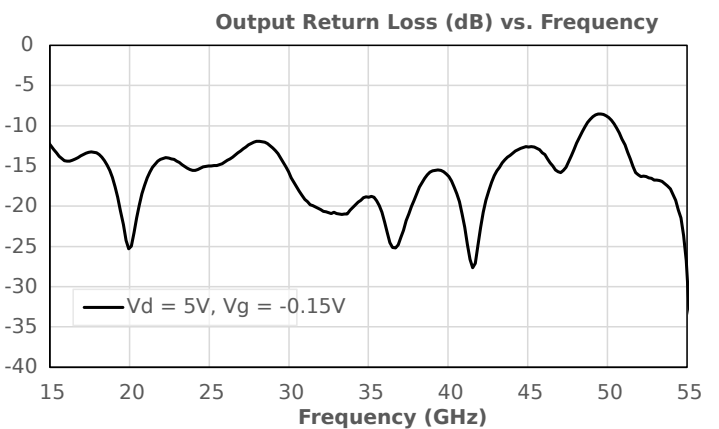
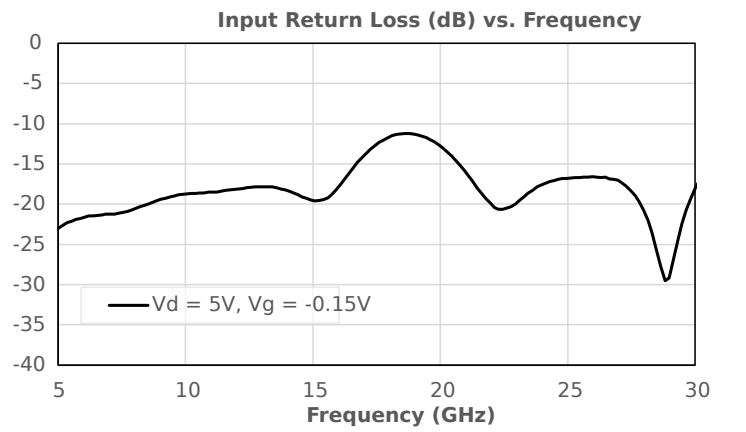
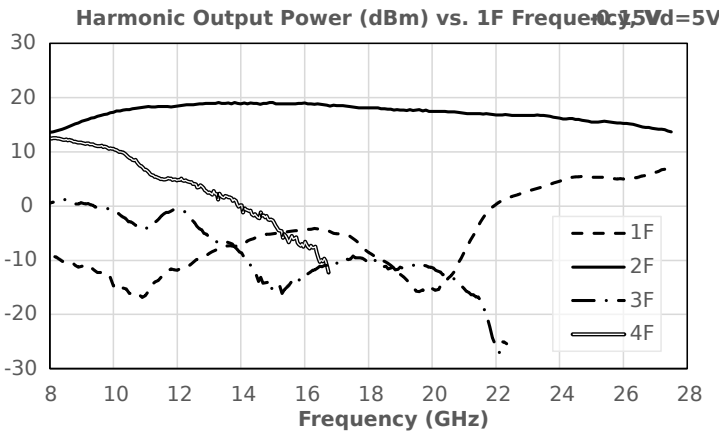
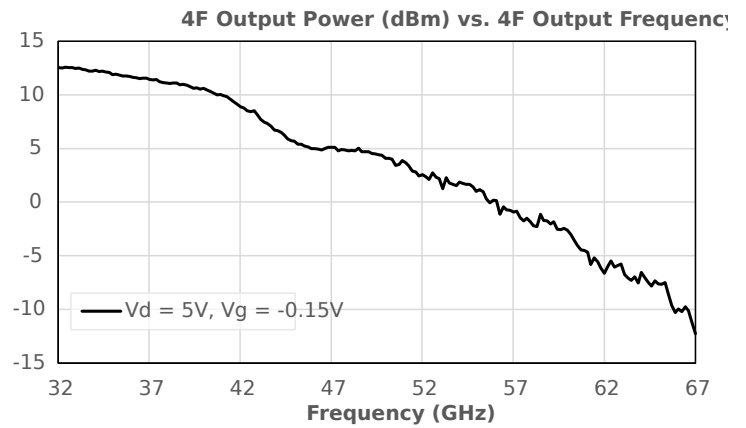
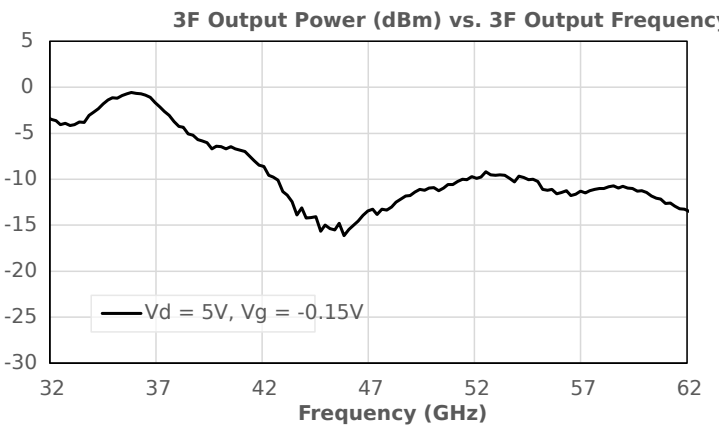
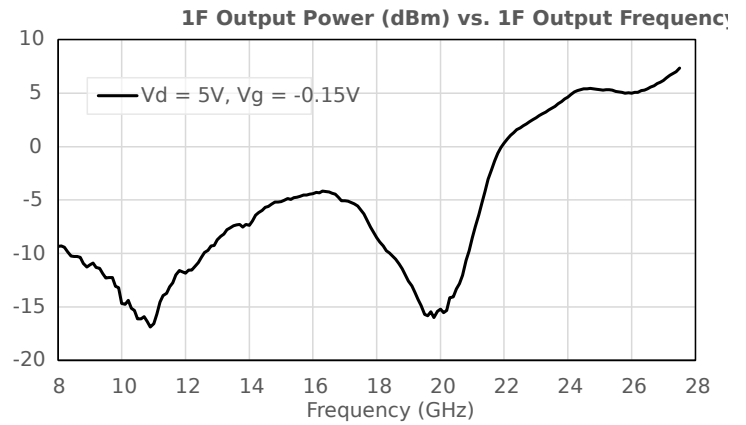
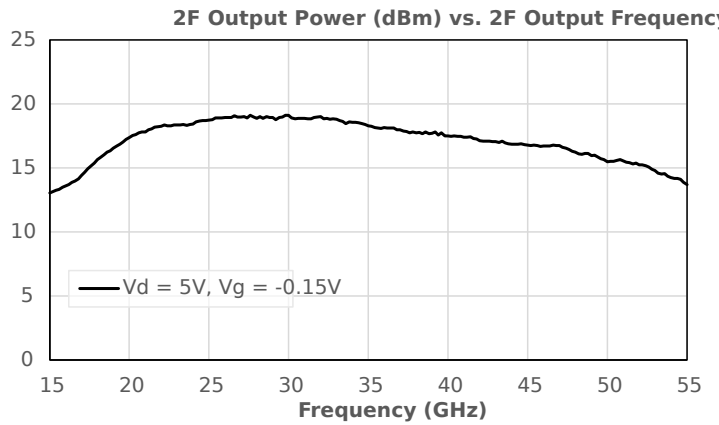
The electrical specifications apply at TA=+25°C in a 50Ω system. Suppression is relative to doubled output power.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Input Return Loss	Vd = 5V, Vg = -0.15V	10	25	-	15	-	dB
Output Return Loss	Vd = 5V, Vg = -0.15V	20	50	-	15	-	dB
Suppression, 1F	Pin = +5dBm	10	25	-	25	-	dBc
Suppression, 3F	Pin = +5dBm	30	67	-	35	-	dBc
Suppression, 4F	Pin = +5dBm	40	67	-	18	-	dBc
Current Consumption ¹	Vd = 5V, Vg = -0.15V	-	-	-	233	-	mA
Input Frequency Range	-	-	-	10	-	25	GHz
Input Power	Input = 10 - 25 GHz	-	-	-	5	-	dBm
Output Converted Power, 2F (out)	Output Freq = 20.0 - 50.0 GHz, Pin = +5dBm	-	-	-	17	-	dBm
Output Frequency Range	-	-	-	20	-	50	GHz

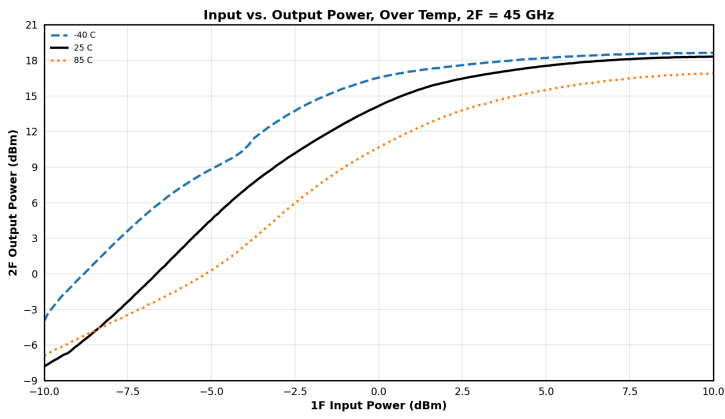
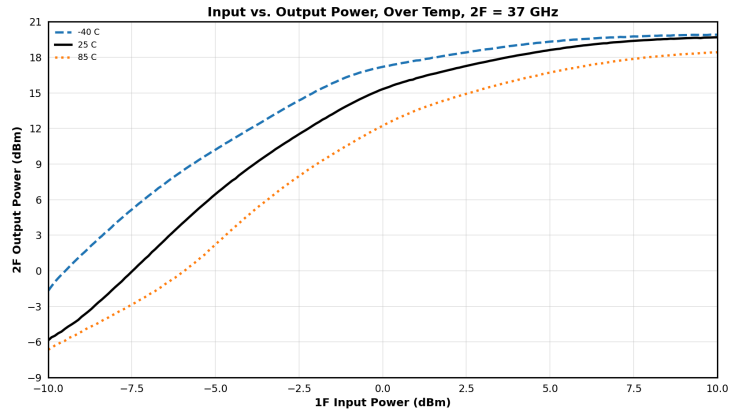
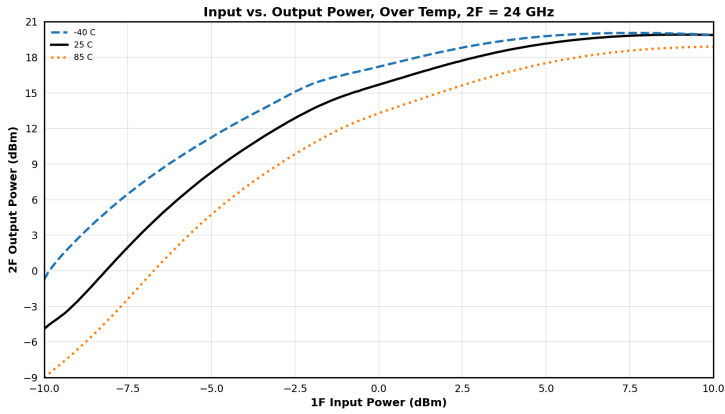
^[1] It is required that the negative bias be applied before or concurrent with the positive bias.

Typical Performance Plots

Unless otherwise specified, the performance plots below are measured with +5dBm input power.



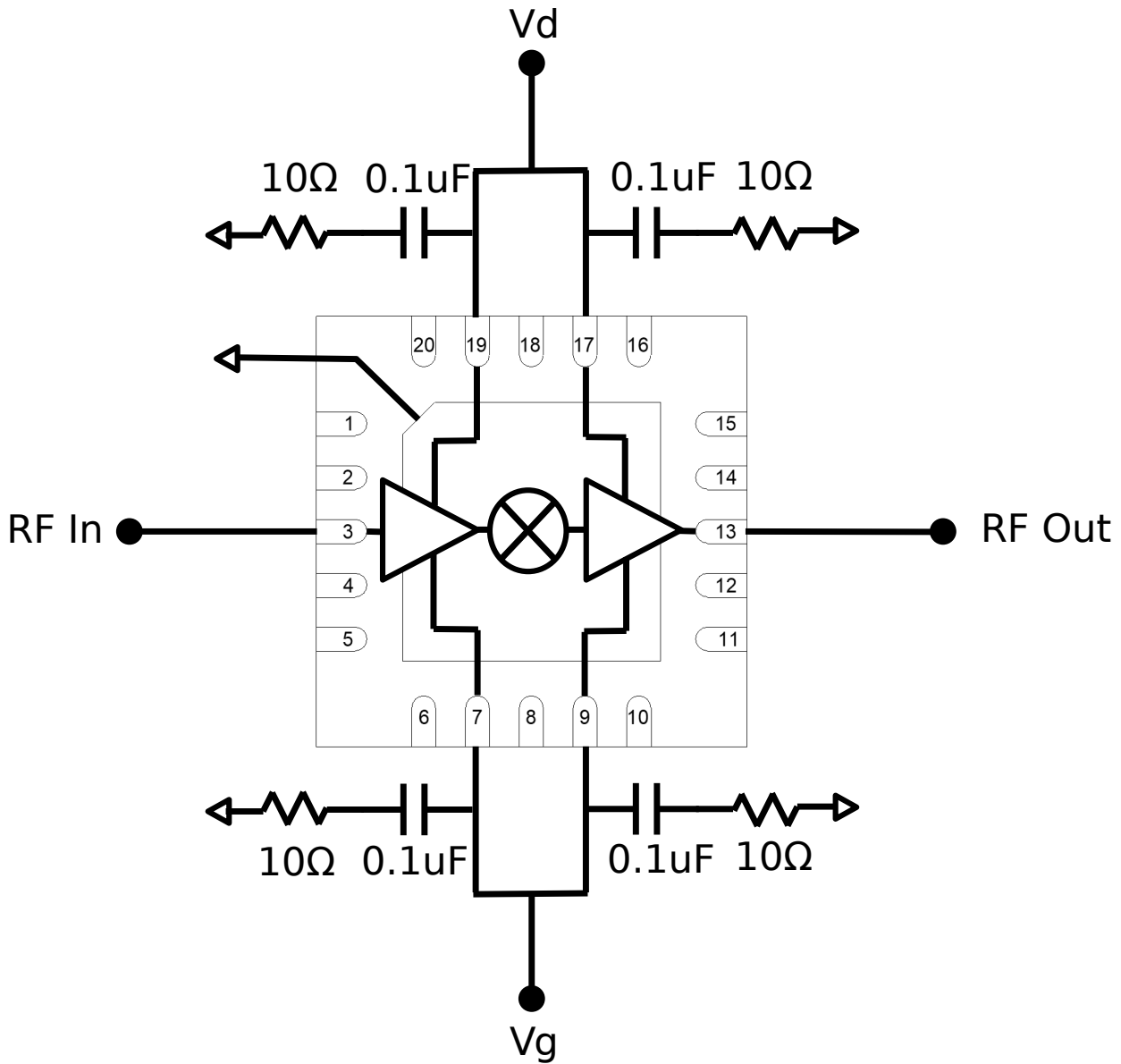
Performance Over Temperature



Application Information

The application circuit for the IADA-2050PSM is shown below.

Application Circuit



Application Circuit Description

The input and output ports of the IADA-2050PSM are DC blocked and internally matched to 50 Ohms. The paddle of the QFN should be attached to RF and DC ground with good thermal and electrical conductivity. The VDA and VDB can be supplied by a single positive DC supply rail. Supply bypassing is recommended on each Vd port to minimize the potential for RF feedback. VG1A and VG1B can also be supplied by a single negative DC supply rail. Supply bypassing is also recommended on each Vg port as shown.

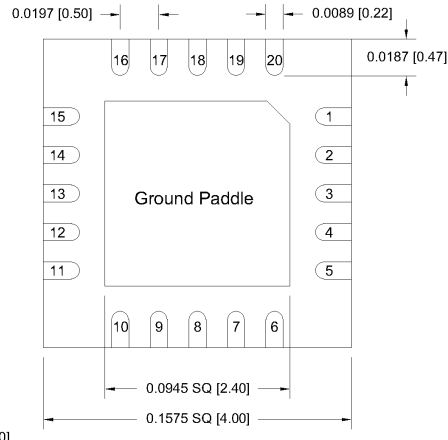
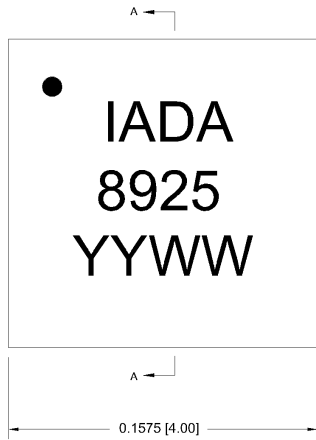
Mechanical Data

Outline Drawing

Download : [Outline 2D Drawing](#)

*All dimensions are typical


PROJECTION		REVISIONS		
INCH (MM)	APPROVALS	REV.	DESCRIPTION	DATE
		A	Initial Release	11/04/24



Pad #	Function
1	N/C
2	N/C
3	RF In
4	N/C
5	N/C
6	N/C
7	VG1A
8	N/C
9	VG1B
10	N/C
11	N/C
12	N/C
13	RF Out
14	N/C
15	N/C
16	N/C
17	VDB
18	N/C
19	VDA
20	N/C

Notes (unless otherwise specified):

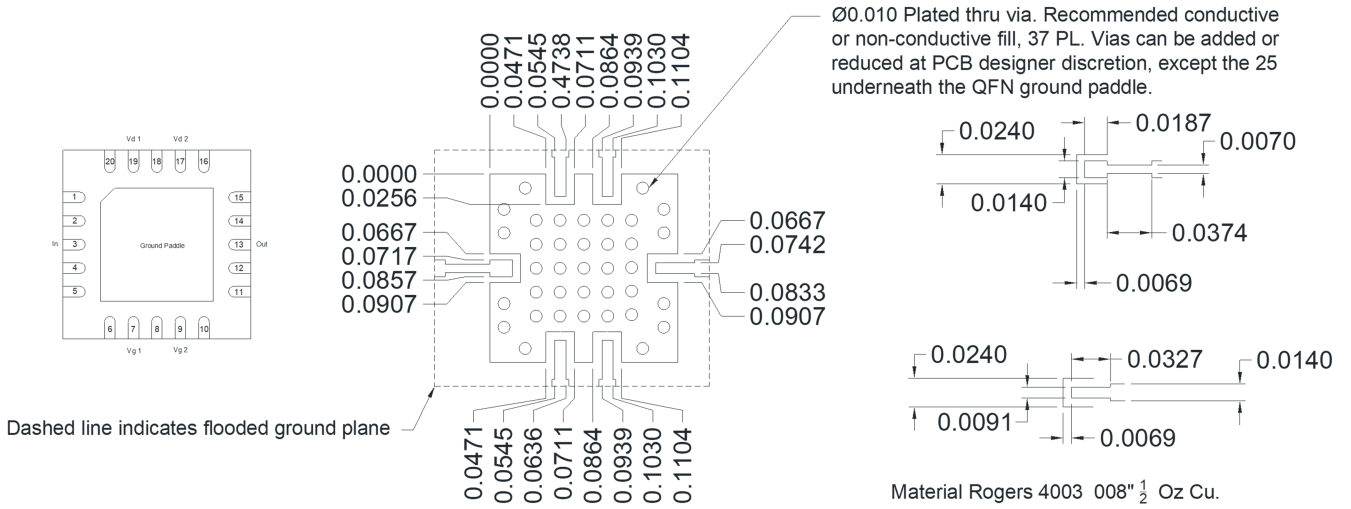
1. Substrate material is LCP.
2. I/O Leads and Die Paddle are 0.05 micron Au over 0.02 microns Pd over 0.5 microns Ni.
3. All unconnected pins should be connected to PCB RF ground.

<small>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:</small> HOLE SIZE DECIMALS ANGLES +.002/-.001 XXXL .01 ± MATERIAL: Note 1 FINISH: Note 2	NOTES:		 www.markimicrowave.com
	DRAWN BY: AT DATE: 6/12/24	Outline 4mm QFN Amplifier	
DO NOT SCALE DRAWING	SIZE: A CAGE CODE: 0UC32	DWG. NO.: IADA-2050PSM	SHEET 1 OF 1

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Footprint Image

Download : [Footprint Drawing](#)



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