

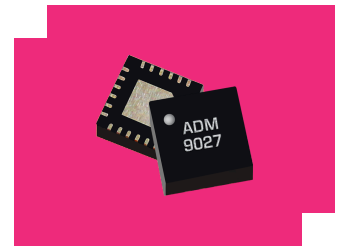
ADM-9027PSM

2-24 GHz Distributed Amplifier

DEVICE OVERVIEW

General Description

The ADM-9027PSM is a wideband distributed low noise amplifier capable of providing 16 dB gain and +25 dBm OIP3 from 2 to 20 GHz and a low 1.8 dB typical noise figure from 8 to 16 GHz. The ADM-9027PSM is an ideal linear signal amplifier for applications requiring low power consumption and small form-factors. The amplifier has excellent return losses and gain flatness and includes integrated DC blocking capacitors and RF choke.



[Download s-parameters here](#)

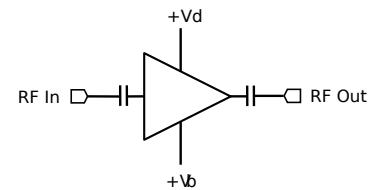
Features

- Broadband 2 to 24GHz Operation
- Low Noise Figure
- Integrated DC Blocks and RF Choke
- Single Positive Supply Capable
- Excellent Return Losses

Applications

- Communication Systems
- Test and Measurement Equipment
- Satellite Communications
- Electronic Warfare

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
ADM-9027PSM	2-24 GHz Distributed Amplifier	QFN	RoHS REACH	Released	EAR99
EVB-ADM-9027P	Evaluation Board, 2-24GHz Distributed Amplifier	EVB	REACH RoHS	Released	EAR99

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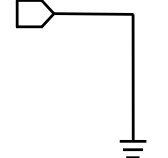
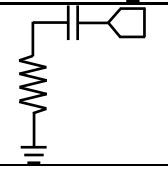
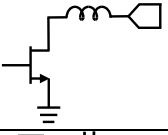
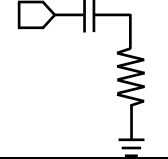
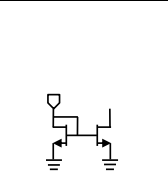
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Revision History

Revision Code	Revision Date	Comment
-	2024-07-09	Initial Release

Port Configuration and Functions

Port Functions

Port	Function	Description	Equivalent Circuit for Package
1-4,6,7,9-15,17-21,23,24	Non-connect (NC)	These pins are not internally connected. Datasheet performance is measured with these pins connected to ground.	-
Paddle	Ground	DC and RF Ground are provided through the QFN paddle. The paddle should be attached to a DC/RF ground with high thermal and electrical conductivity.	
Pin 16	RF Output	This is the amplifiers RF output port. This port is internally matched to 50 Ohms and is internally DC blocked.	
Pin 22	Vd	This is the positive DC supply voltage for the amplifier IC. This pin is nominally set to +6V. This part requires off-chip bypass capacitors of 100pF and 0.1uF installed at this pin as close to the IC as possible. See applications circuit.	
Pin 5	RF Input	This is the amplifiers RF input port. It is internally matched to 50 Ohms and is internally DC blocked.	
Pin 8	Vb	This is the positive DC bias voltage for the amplifier IC. The voltage at this pin controls the current draw Id of the part. Higher voltage results in higher current. For normal operation, the voltage at this pin is adjusted to produce an Id of 60mA when Vd=6V. Alternatively, it is possible to use a single positive voltage supply and a 751Ohm resistor between Vd and Vb pins. This part requires off-chip bypass capacitors of 100pF and 0.1uF installed at this pin as close to the IC as possible. See applications circuit.	

Specifications

Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If any one of these limits are exceeded, the device may become inoperable or have a reduced lifetime. Reliability limits are individual, instantaneous catastrophic limits only. Functional operation limits are indicated below. Operation of the device at multiple absolute maximum limits or for extended periods at a single limit can cause degradation and damage to the device.

Parameter	Maximum Rating	Unit
Bias Supply Voltage (Vb)	6.5	V
Drain Current (Id) (No RF Applied)	85	mA
Maximum Operating Temperature for MTTF > 1E6 hours	85	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature for MTTF > 1E6 hours	-40	°C
Minimum Storage Temperature	-65	°C
Positive Drain Supply Voltage (Vd)	8	V
RF Input Power	15	dBm

Package Information

Parameter	Details	Rating
Dimensions	-	4 x 4 mm
Moisture Sensitivity Level	-	MSL 1

Recommended Operating Conditions

The Recommended Operating Conditions indicate the limits, inside which the device should be operated, to guarantee the performance given in Electrical Specifications. Operating outside these limits may not necessarily cause damage to the device, but the performance may degrade outside the limits of the electrical specifications. For limits, above which damage may occur, see Absolute Maximum Ratings.

Parameter	Min	Nominal	Max	Unit
Positive DC Current (Id) (No RF Input)	50	60	77	mA
Positive DC Voltage (Vd)	5	6	7	V
Ambient Temperature	-40	25	85	°C
Positive DC Bias Voltage (Vb)	2	2.3	3	V

Sequencing Requirements

There is no sequencing required to power up or power down the amplifier. The amplifier must have an output load connected during operation.

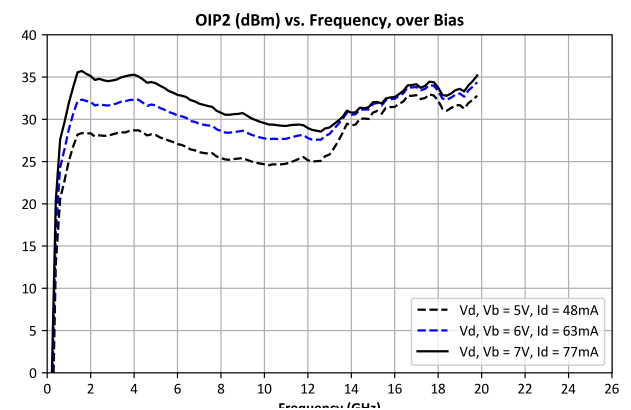
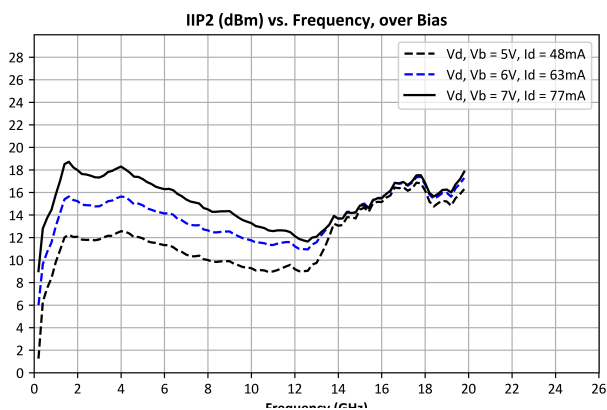
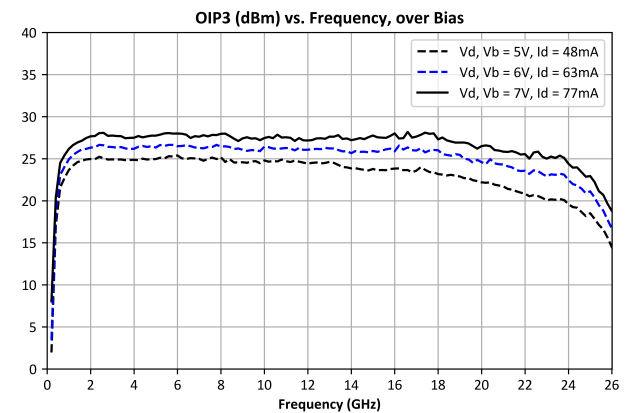
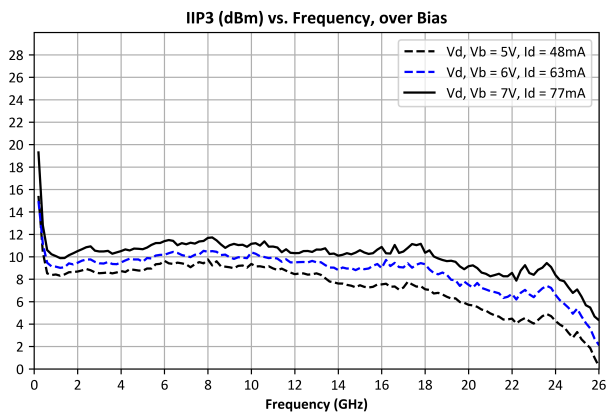
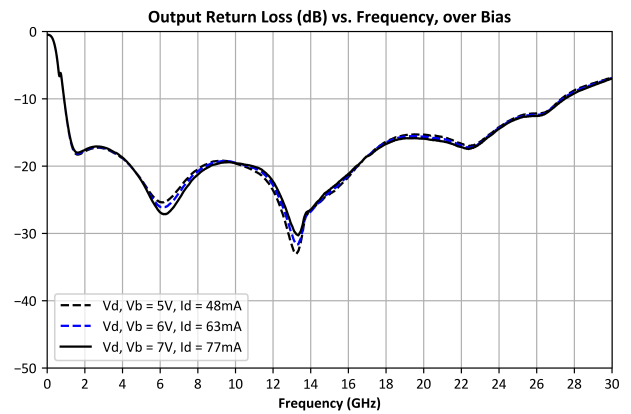
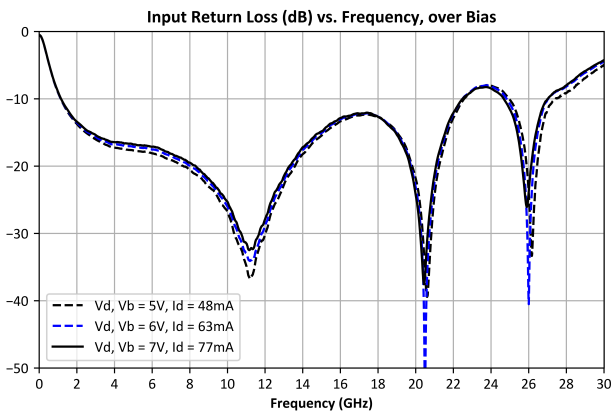
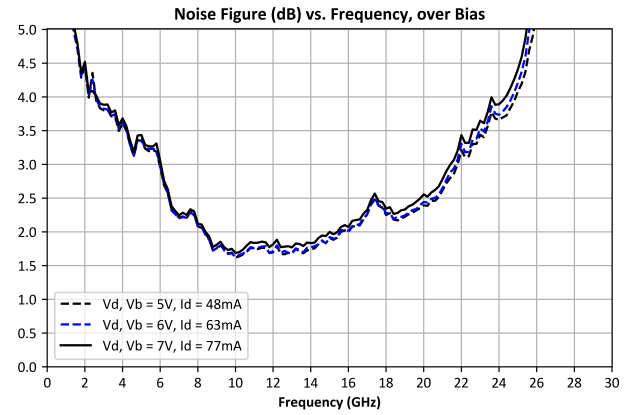
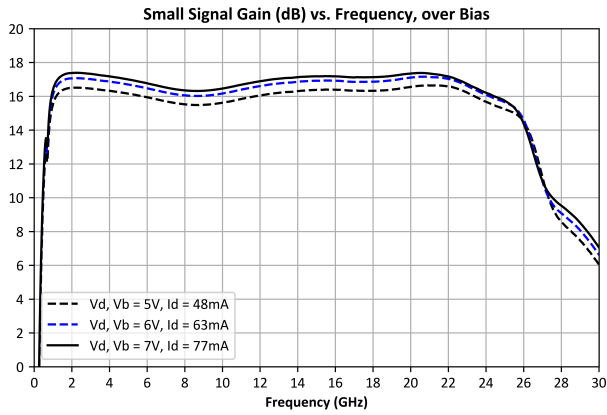
Electrical Specifications

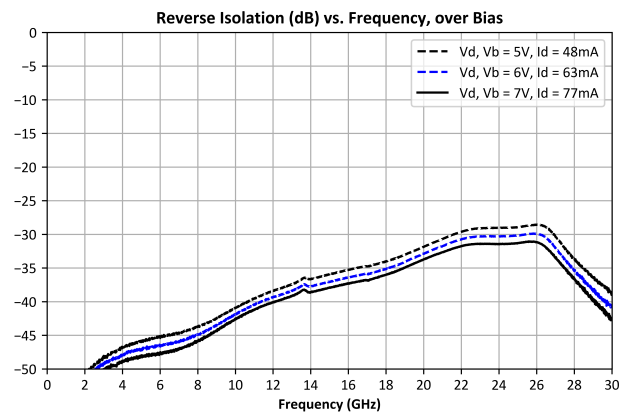
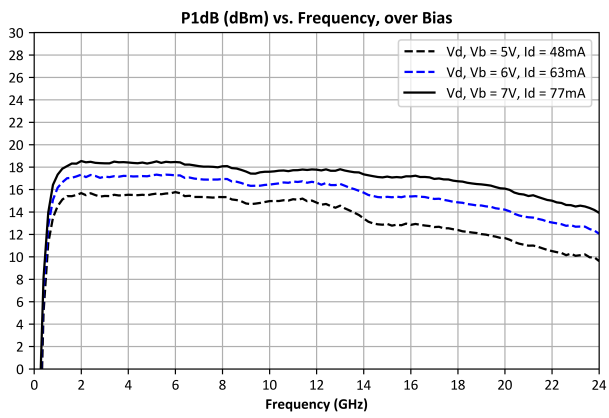
Unless otherwise specified, electrical specifications apply at TA=+25°C, Vd = 6V and Vb set such that Id=60mA.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Input Return Loss	Vd=6V, Id=60mA	2	24	-	15	-	dB
Noise Figure	Vd=6V, Id=60mA	16	24	-	3	-	dB
Noise Figure	Vd=6V, Id=60mA	8	16	-	1.8	-	dB
Noise Figure	Vd=6V, Id=60mA	2	8	-	3.1	-	dB
Output IP3	Vd=6V, Id=60mA	20	24	-	23	-	dBm
Output IP3	Vd=6V, Id=60mA	2	20	-	26	-	dBm
Output P1dB	Vd=6V, Id=60mA	12	24	-	15	-	dBm
Output P1dB	Vd=6V, Id=60mA	2	12	-	17	-	dBm
Output Return Loss	Vd=6V, Id=60mA	2	24	-	20	-	dB
Reverse Isolation	Vd=6V, Id=60mA	2	24	-	38	-	dB
Small Signal Gain	Vd=6V, Id=60mA	2	24	14	17	-	dB

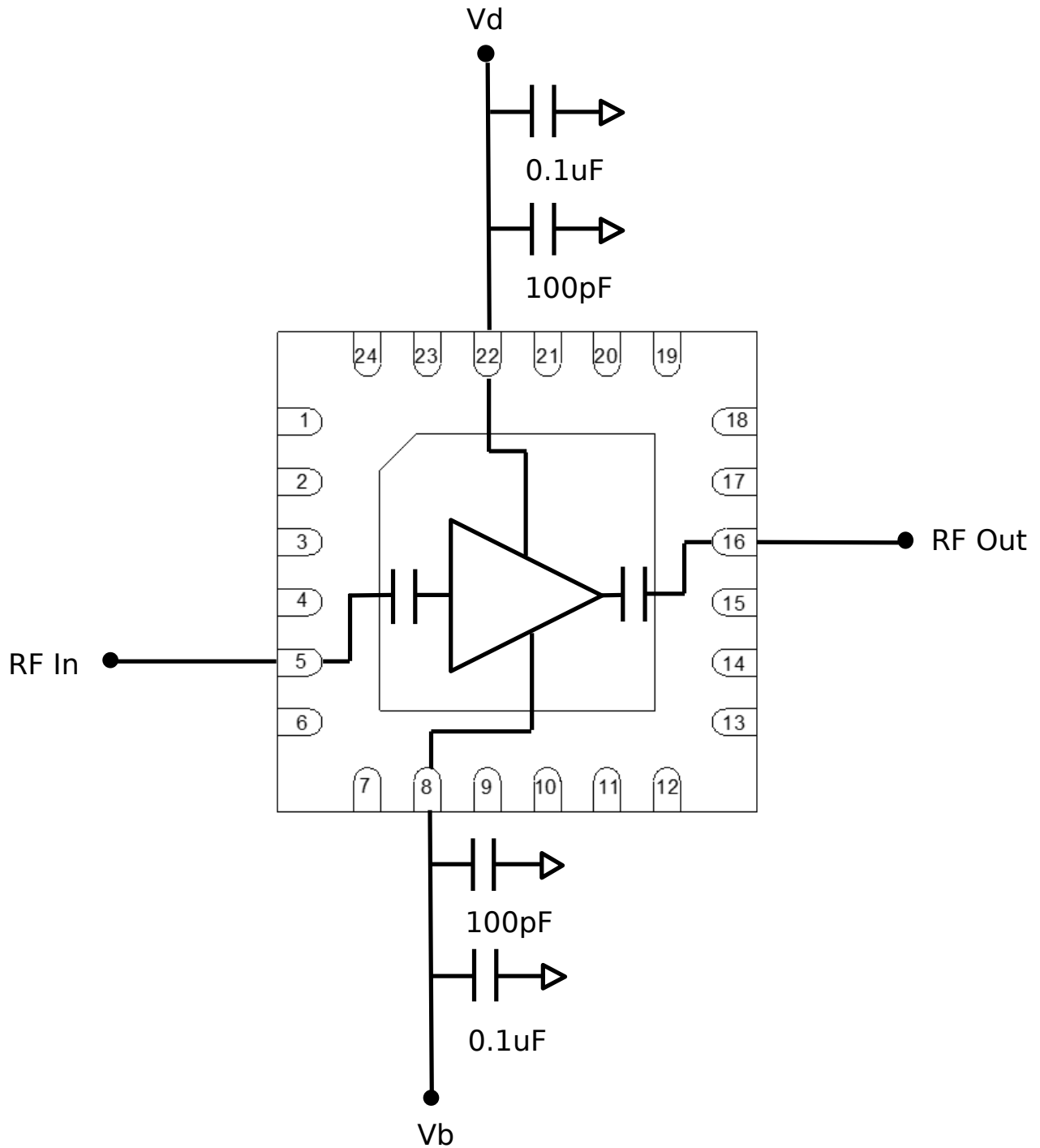
Datasheet performance is measured with the single supply bias circuit shown below with a series 715 Ohm resistor between Vd and Vb.

Typical Performance Plots





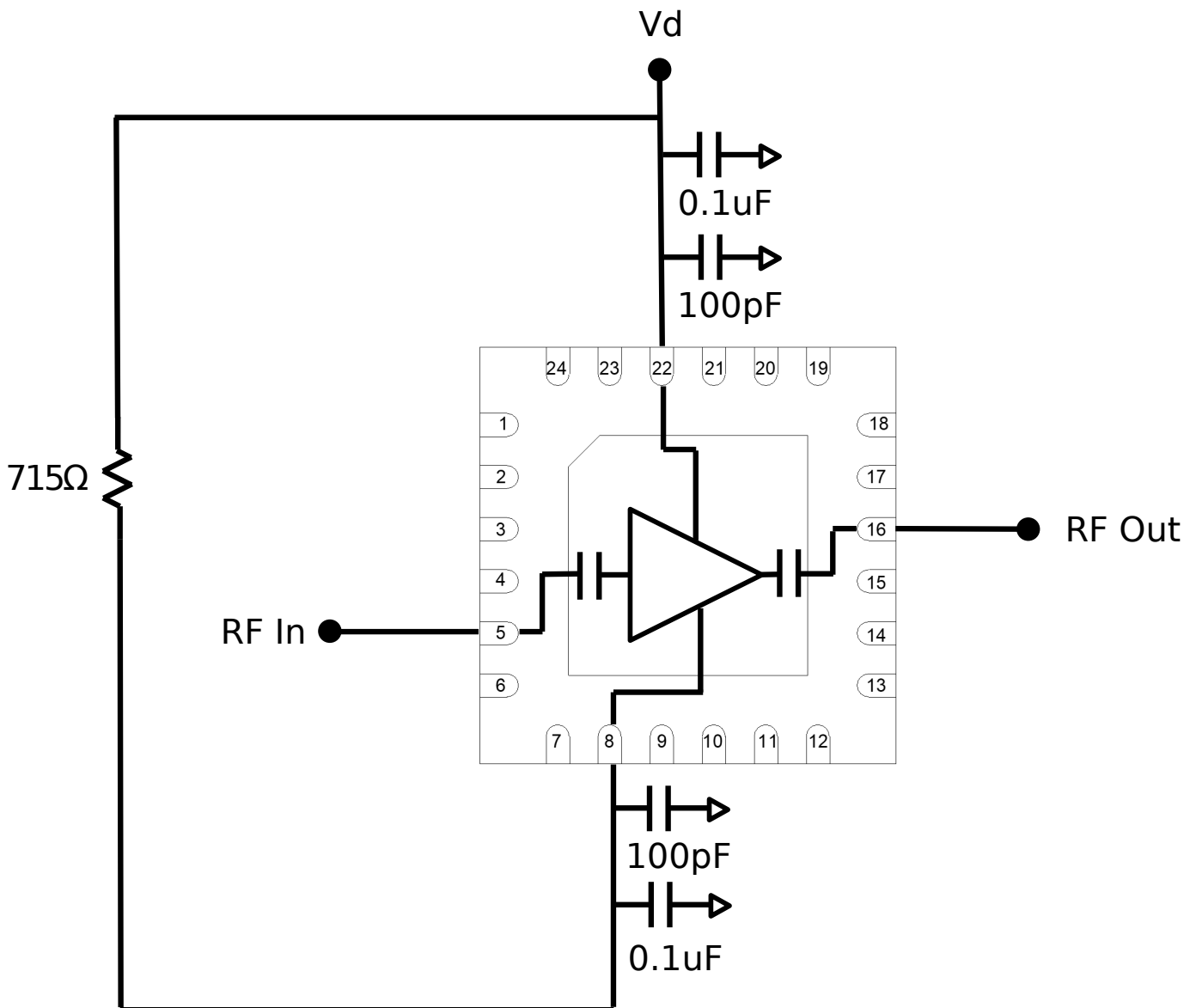
Application Circuit



Application Circuit Description

Above is the recommended application circuit for the ADM-9027PSM. Multiple DC power supply bypassing capacitors are shown around the part. DC drain voltage is supplied to the amplifier across a 0.1uF+100pF bypass capacitor combination to the Vd pin. DC bias voltage is supplied to the Vb pin across a 0.1uF+100pF bypass capacitor combination. No external DC blocking capacitors are required.

An alternate application circuit, shown below, allows for the use of a single positive DC supply to provide voltage to both Vd and Vb pins simultaneously. Decoupling capacitors are kept in the same arrangement as the dual supply circuit but a 715 Ohm resistor is added in series between the Vd and Vb pins. The supply is connected directly to Vd and then to Vb via a series 715 Ohm resistor. The alternate circuit is illustrated below.

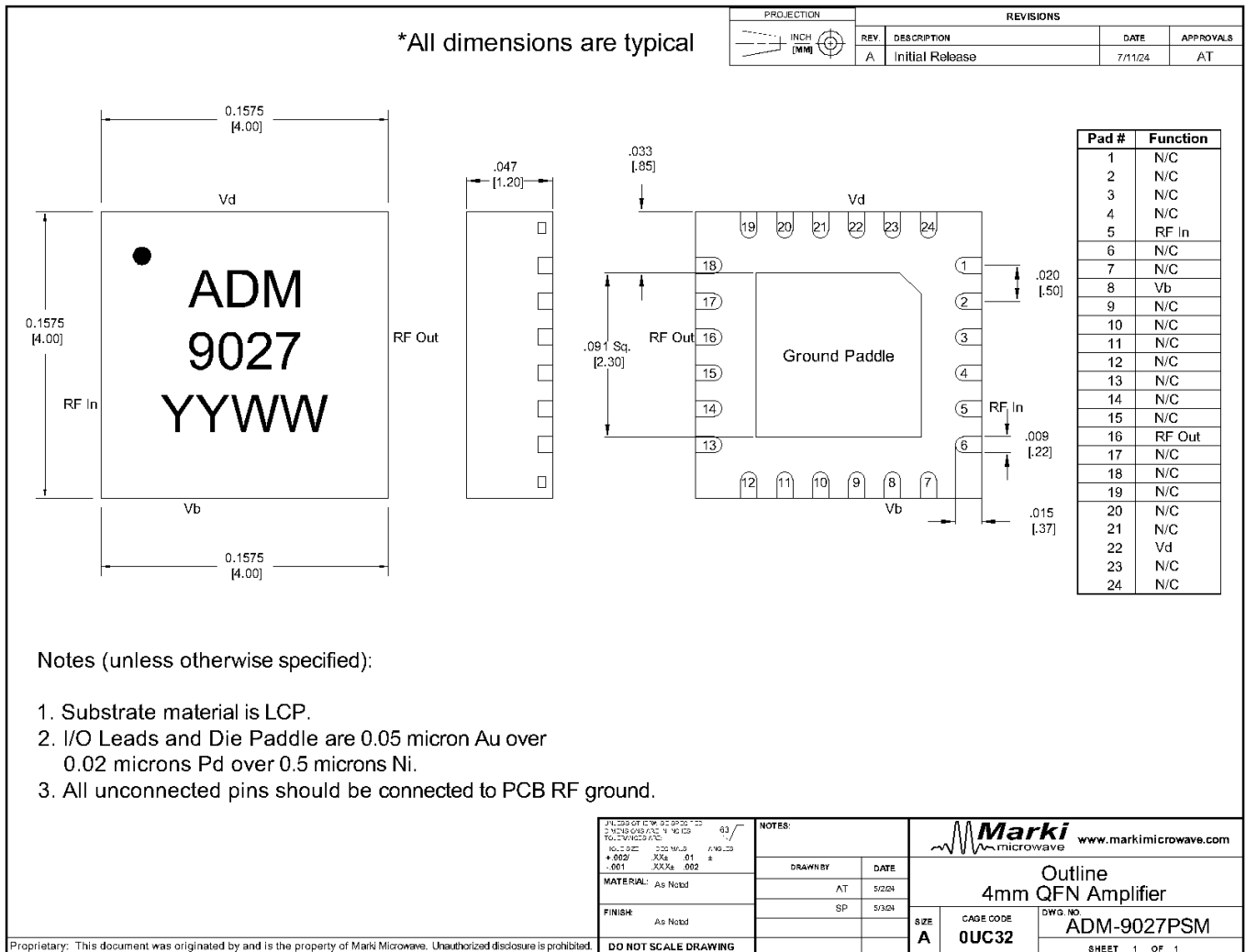


Mechanical Data

Outline Drawing

Download : [Outline 2D Drawing](#)


*All dimensions are typical



Pad #	Function
1	N/C
2	N/C
3	N/C
4	N/C
5	RF In
6	N/C
7	N/C
8	Vb
9	N/C
10	N/C
11	N/C
12	N/C
13	N/C
14	N/C
15	N/C
16	RF Out
17	N/C
18	N/C
19	N/C
20	N/C
21	N/C
22	Vd
23	N/C
24	N/C

Notes (unless otherwise specified):

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

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCH (MM) TOLERANCES ARE: FRACTIONS DECIMALS ANGLES +.002/-.001 .005 .010 .015 .030 .050 .100 .150 .300 .500 .750 1.000	NOTES: DRAWN BY: AT DATE: 5/2/24 CHECKED BY: SP DATE: 5/3/24	 Outline 4mm QFN Amplifier DWG NO: ADM-9027PSM
MATERIAL: As Noted FINISH: As Noted	DO NOT SCALE DRAWING	SIZE: A CAGE CODE: 0UC32 SHEET 1 OF 1

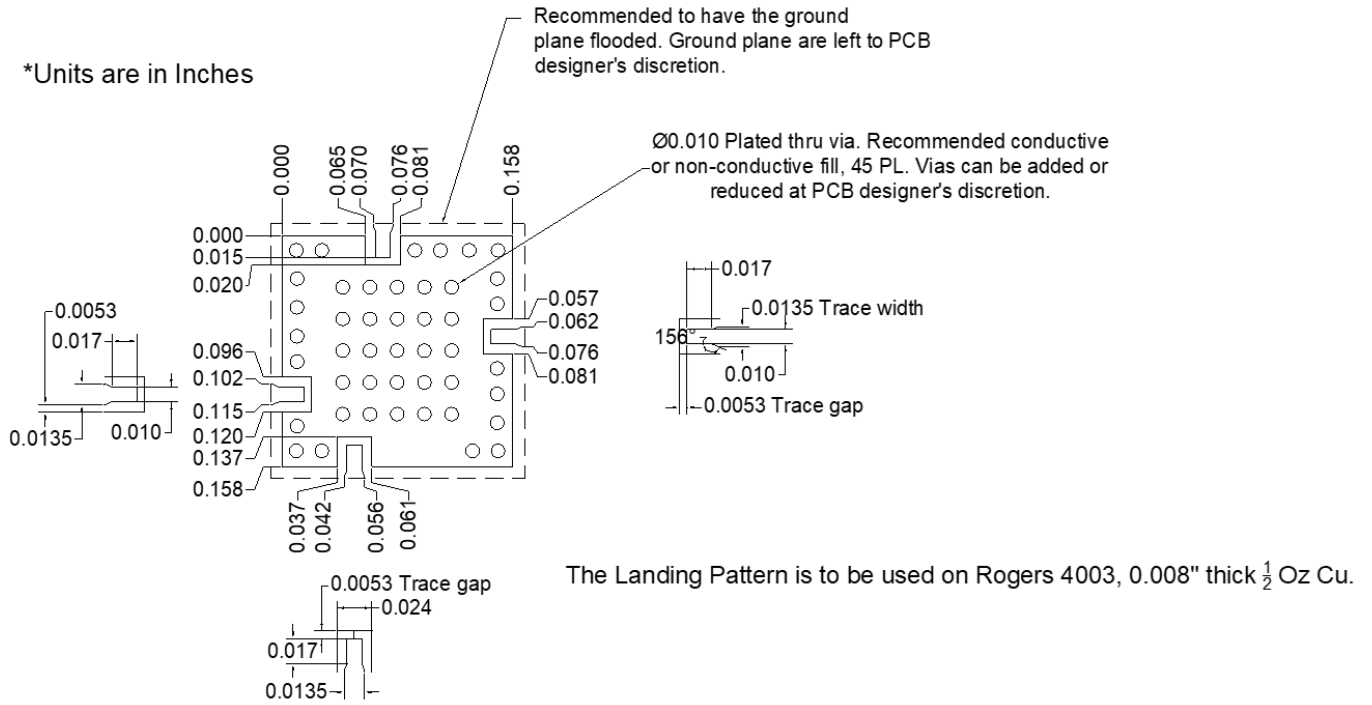
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Notes (unless otherwise specified):

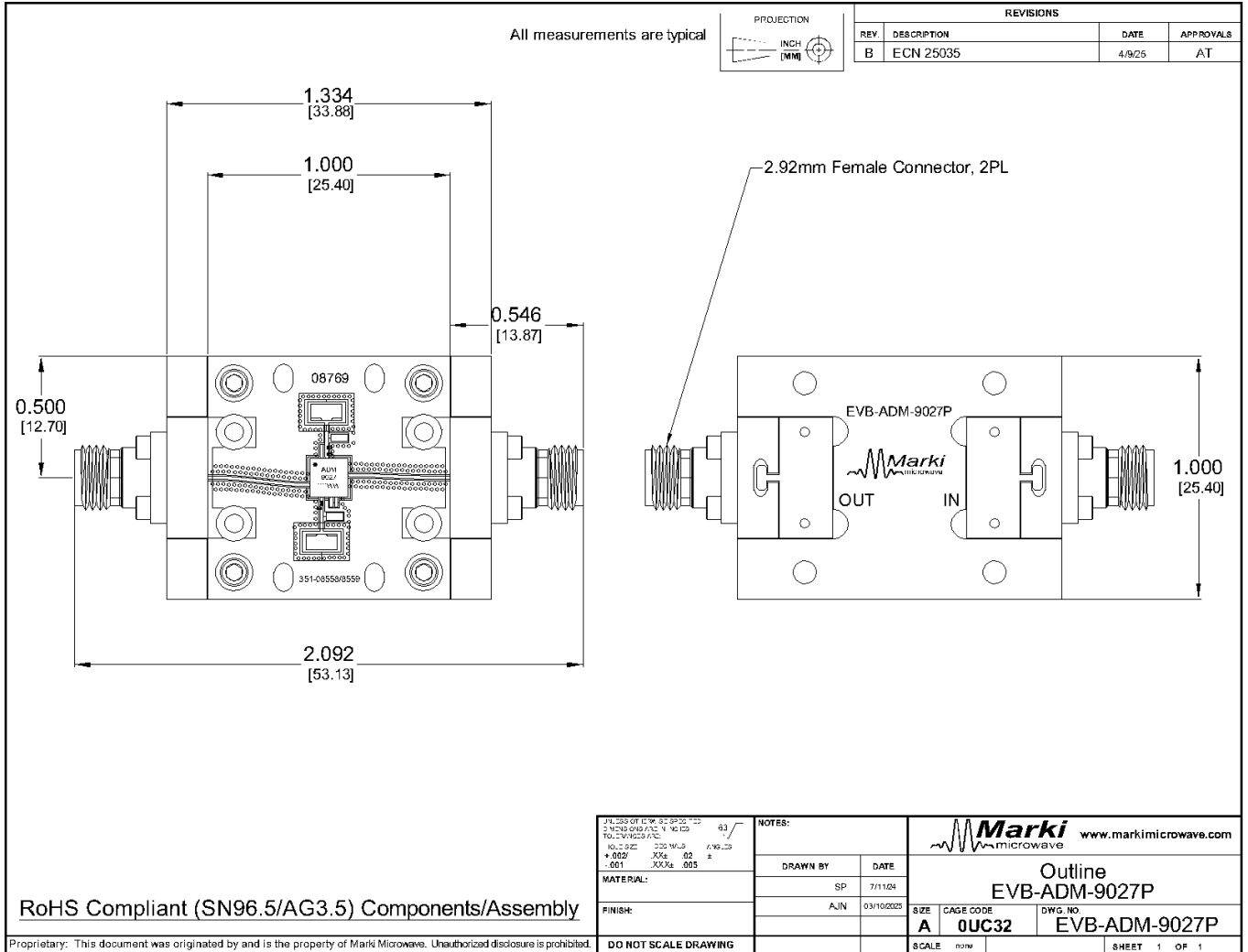
- Substrate material is LCP.
- I/O Leads and Die Paddle are 0.05 micron Au over 0.02 microns Pd over 0.5 microns Ni.
- All unconnected pins should be connected to PCB RF ground.

Footprint Image

Download : [Footprint Drawing](#)



Evaluation Board - Outline Drawing



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