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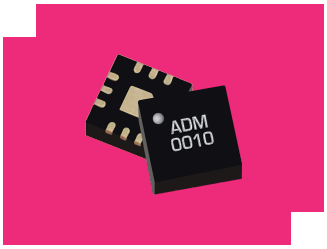
ADM-10721PSM

4-22 GHz Broadband Low Noise Amplifier

DEVICE OVERVIEW

General Description

The ADM-10721PSM is a broadband low noise amplifier covering 4 GHz to 22 GHz. Optimized for ultra-low power operation in compact systems, it operates from a single 3V supply at just 17mA bias current, providing typically 20 dB of small-signal gain with a typical noise figure of 2.3 dB. The ADM-10721PSM requires no application circuit other than bypass capacitors on the DC supply lines, which simplifies integration and reduces board space. Packaged in a compact 3mm QFN, it is well suited for wideband frontend applications that demand low DC power consumption, high gain, and minimal added noise. Measured small-signal S-parameters are available to support accurate system simulation.



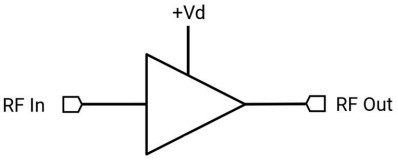
Features

- Broadband 4 to 22 GHz Operation
- Low Noise Figure, 2.3 dB Typical
- Low DC Power Consumption, 3V at 17 mA
- Single Supply Voltage
- No Sequencing Required

Applications

- SATCOM
- Phased array systems

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
ADM-10721PSM	4-22 GHz Broadband Low Noise Amplifier	Plastic QFN	REACH RoHS	Released	EAR99
EVB-ADM-10721P	Evaluation Board, 4-22 GHz Broadband Low Noise Amplifier	EVB	REACH RoHS	Released	EAR99

Table Of Contents

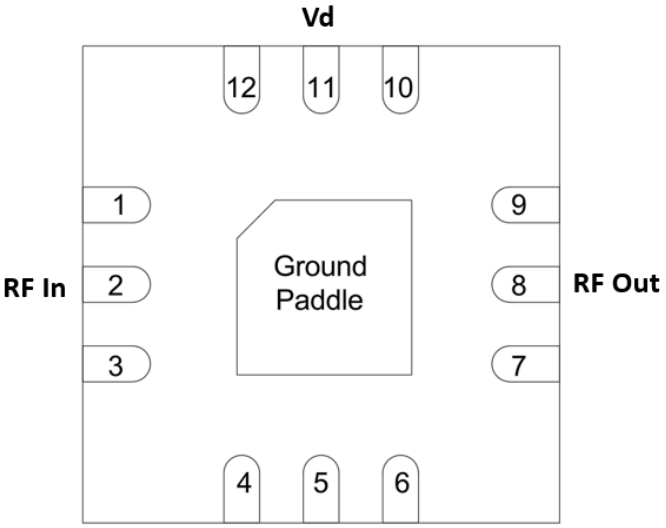
Revision History

Revision Code	Revision Date	Comment
-	2025-10-20	Initial Release
A	2026-01-19	Updated the Junction to Case Thermal Resistance

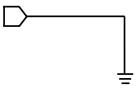
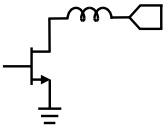
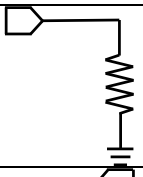
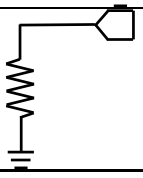
Port Configuration and Functions

Port Diagram

A port diagram of the ADM-10721PSM is shown below.



Port Functions

Port	Function	Description	DC Equivalent Circuit
GND	Ground	Ground paddle and non-connected pins must be connected to a DC/RF ground potential with high thermal and electrical conductivity, and low inductance.	
Pin 11	Vd	Pin 11 is the DC bias supply for the amplifier. The voltage at this pin should be set to 3V for normal operation. This part requires an off-chip bypass capacitor of 0.1uF installed at this pin as close to the IC as possible. See applications circuit.	
Pin 1,3,4,5,6,7,9,10,12	Ground	These pins are not internally connected to the amplifier die. It is recommended to connect these pins to ground to provide RF isolation and mechanical stability. See the recommended landing pattern for details. Datasheet performance was measured with these pins connected to GND.	-
Pin 2	RF Input	Pin 2 is the amplifier's RF input pin. This port is internally matched to 50 Ohms and is internally DC shorted to GND. This pin may be left floating if no DC is present on the line but should be DC blocked otherwise.	
Pin 8	RF Output	Pin 8 is the amplifier's RF output pin. This port is internally matched to 50 Ohms and is internally DC shorted to GND. This pin may be left floating if no DC is present on the line but should be DC blocked otherwise.	

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. This amplifier is designed and characterized in a 50Ω system, and operation in a reflective environment can cause performance degradation.

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	85	°C
Maximum Storage Temperature	150	°C
Max Junction Temperature for MTTF > 1E6 hours	175	°C
Minimum Operating Temperature	-40	°C
Minimum Storage Temperature	-65	°C
Positive Drain Supply Current (with RF Input)	38	mA
Positive Drain Supply Voltage (Vd)	6	V
RF Input Power	10	dBm
θJC, Junction to Case Thermal Resistance	103	°C/W

Package Information

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Dimensions	-	3 x 3 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
Ambient Temperature	-40	25	85	°C
Positive DC Current (Id) (No RF Input)	17	17	30	mA
Power Supply DC Voltage	3	3	5	V

Sequencing Requirements

There are no sequencing requirements to power up or power down the amplifier.

Electrical Specifications

The electrical specifications apply at TA=+25°C in a 50Ω system. QFNs are 100% RF tested.

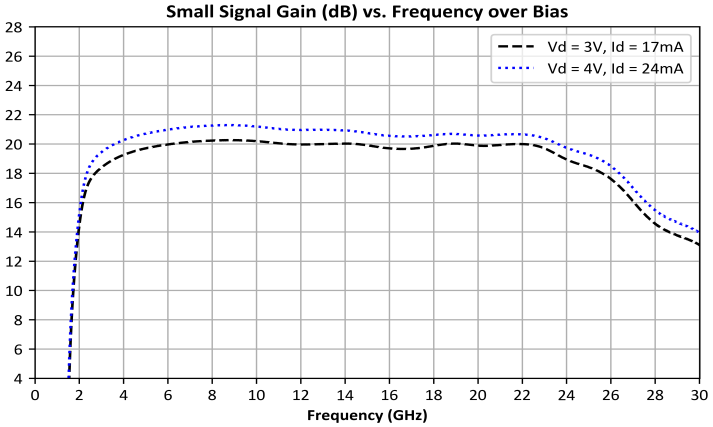
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Small Signal Gain	3V bias, -30 dBm Input Power	4	22	-	20	-	dB
Input Return Loss	3V bias, -30 dBm Input Power	4	22	-	17	-	dB
Output Return Loss	3V bias, -30 dBm Input Power	4	22	-	20	-	dB
Reverse Isolation	3V bias, -30dBm Input Power	4	22	-	30	-	dB
Noise Figure	3V bias, -30 dBm Input Power	4	22	-	2.3	-	dB
Output P1dB	3V bias	4	22	-	4.7	-	dBm
Output IP2	3V bias	2	11	-	22	-	dBm
Output IP3	3V bias	4	22	-	17	-	dBm
Current Consumption [1]	3V bias	-	-	-	17	-	mA

[1] Bias conditions for Id tested with no RF input power. Bias conditions presented as Vd.

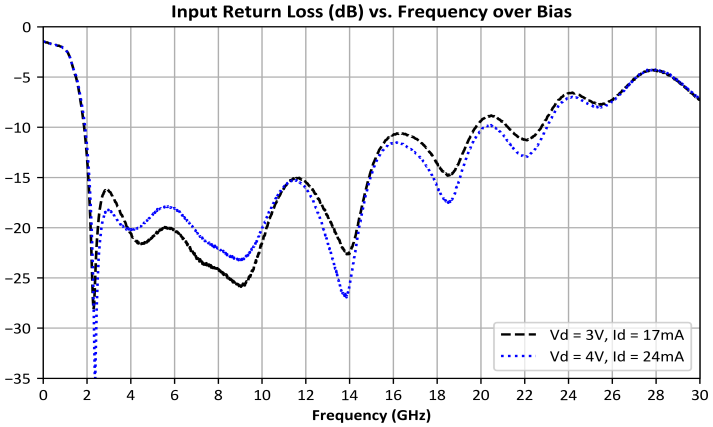
Typical Performance Plots (vs Bias)

Measurement data de-embedded using standard evaluation board and external wideband test equipment bias tees.

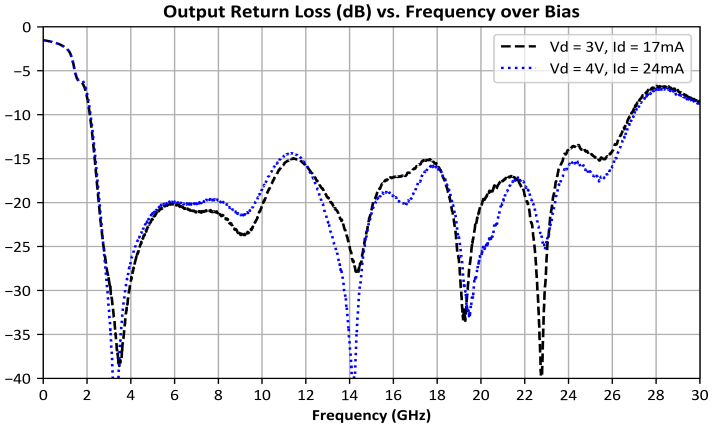
Small Signal Gain (dB) vs. Frequency over Bias



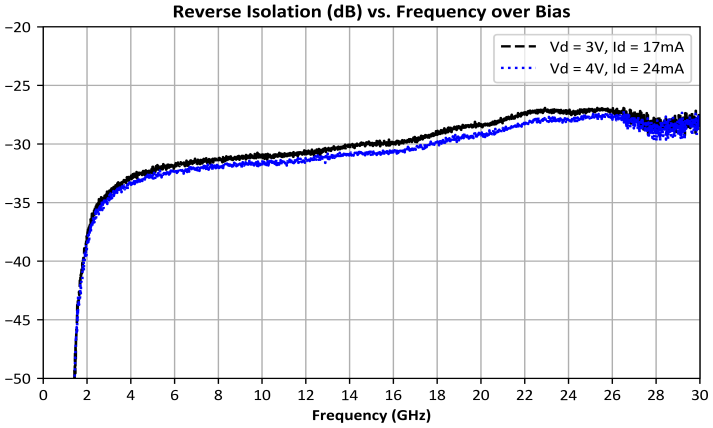
Input Return Loss (dB) vs. Frequency over Bias



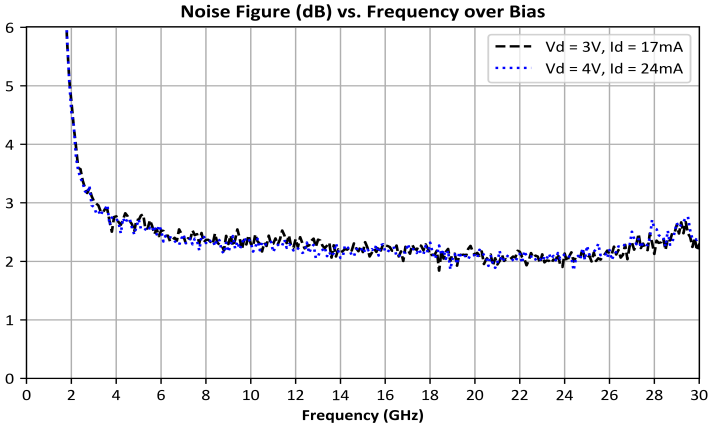
Output Return Loss (dB) vs. Frequency over Bias



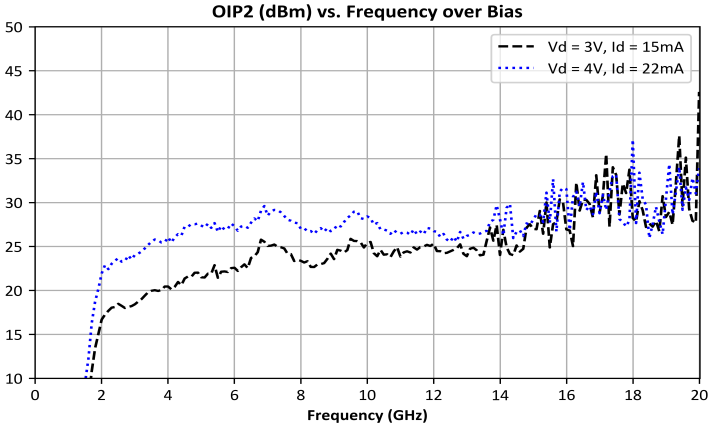
Reverse Isolation (dB) vs. Frequency over Bias



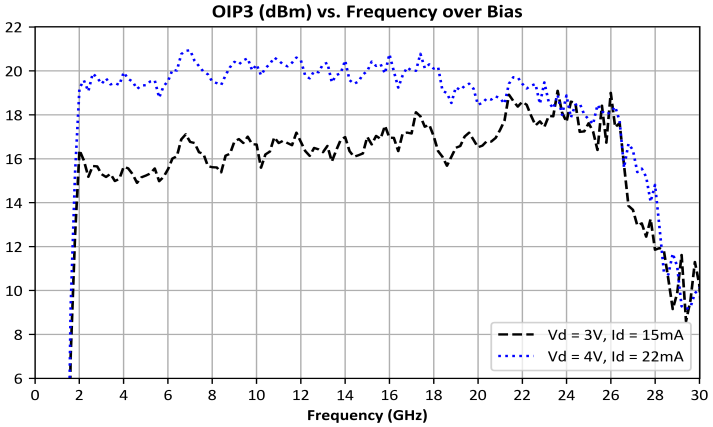
Noise Figure (dB) vs. Frequency over Bias



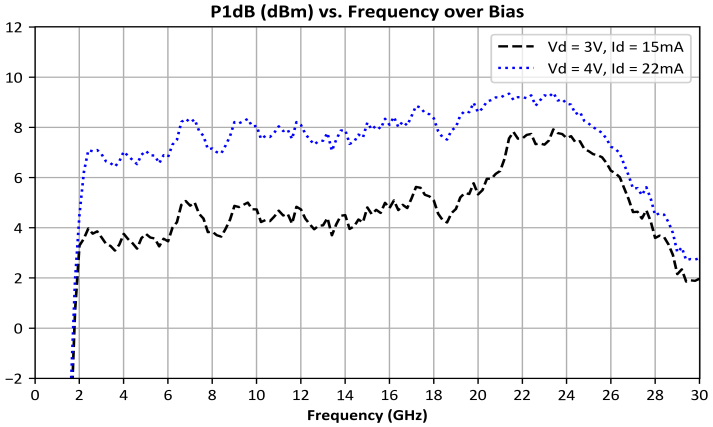
OIP2 (dBm) vs. Frequency over Bias



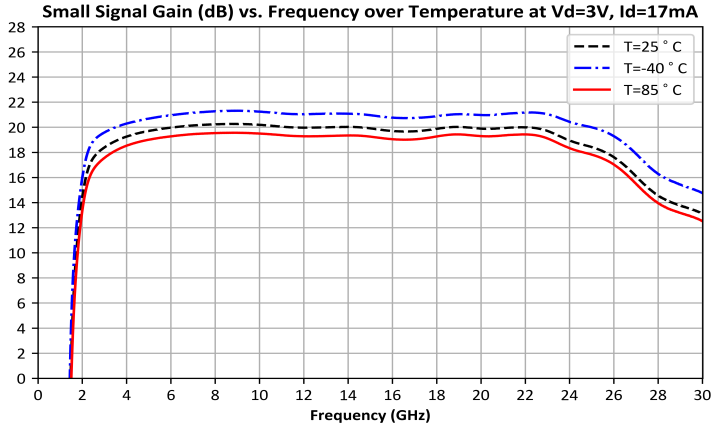
OIP3 (dBm) vs. Frequency over Bias

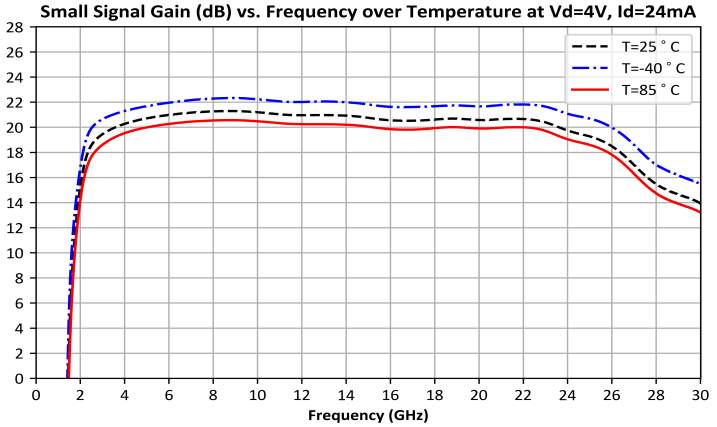


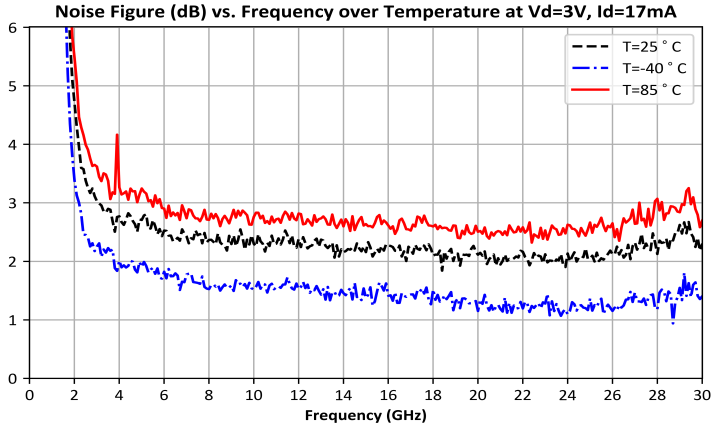
P1dB (dBm) vs. Frequency over Bias

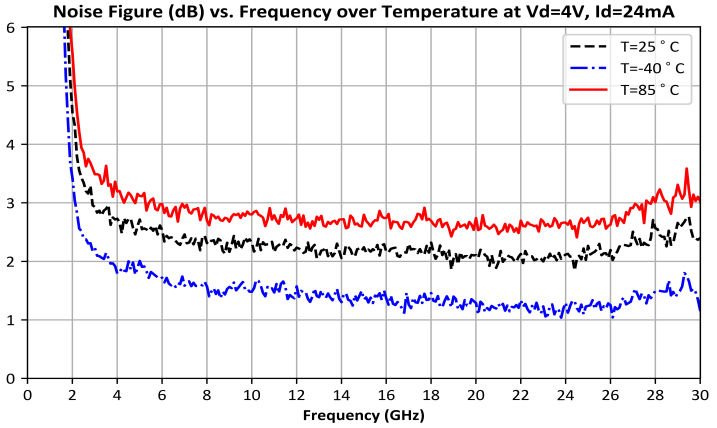


Typical Performance Plots (vs Temperature)





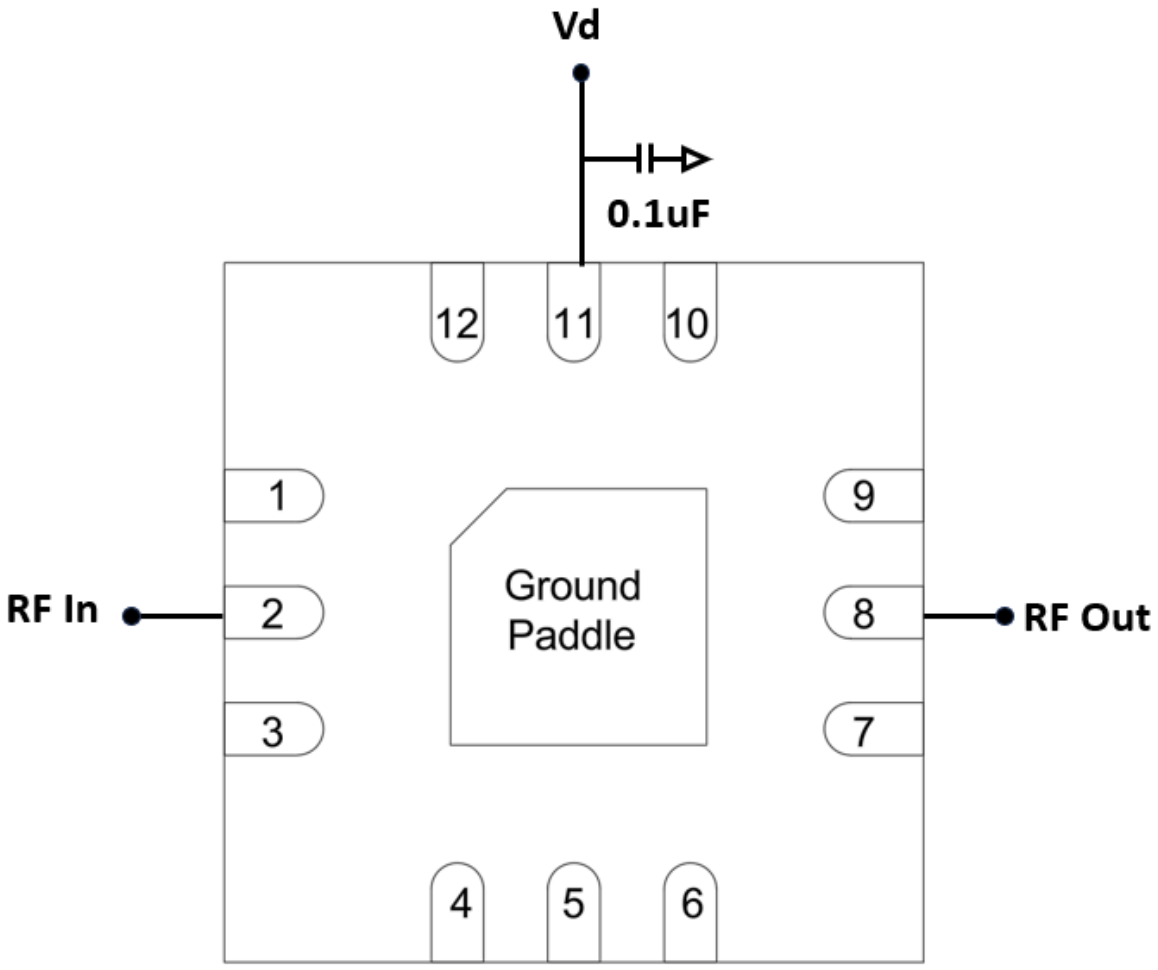




Application Information

Below is the recommended application circuit for the ADM-10721PSM. This is the configuration that is used to characterize this device. However, each PCB layout and environment are different which may require minor modifications of the biasing network. Please contact support@markimicrowave.com for more information.

Application Circuit



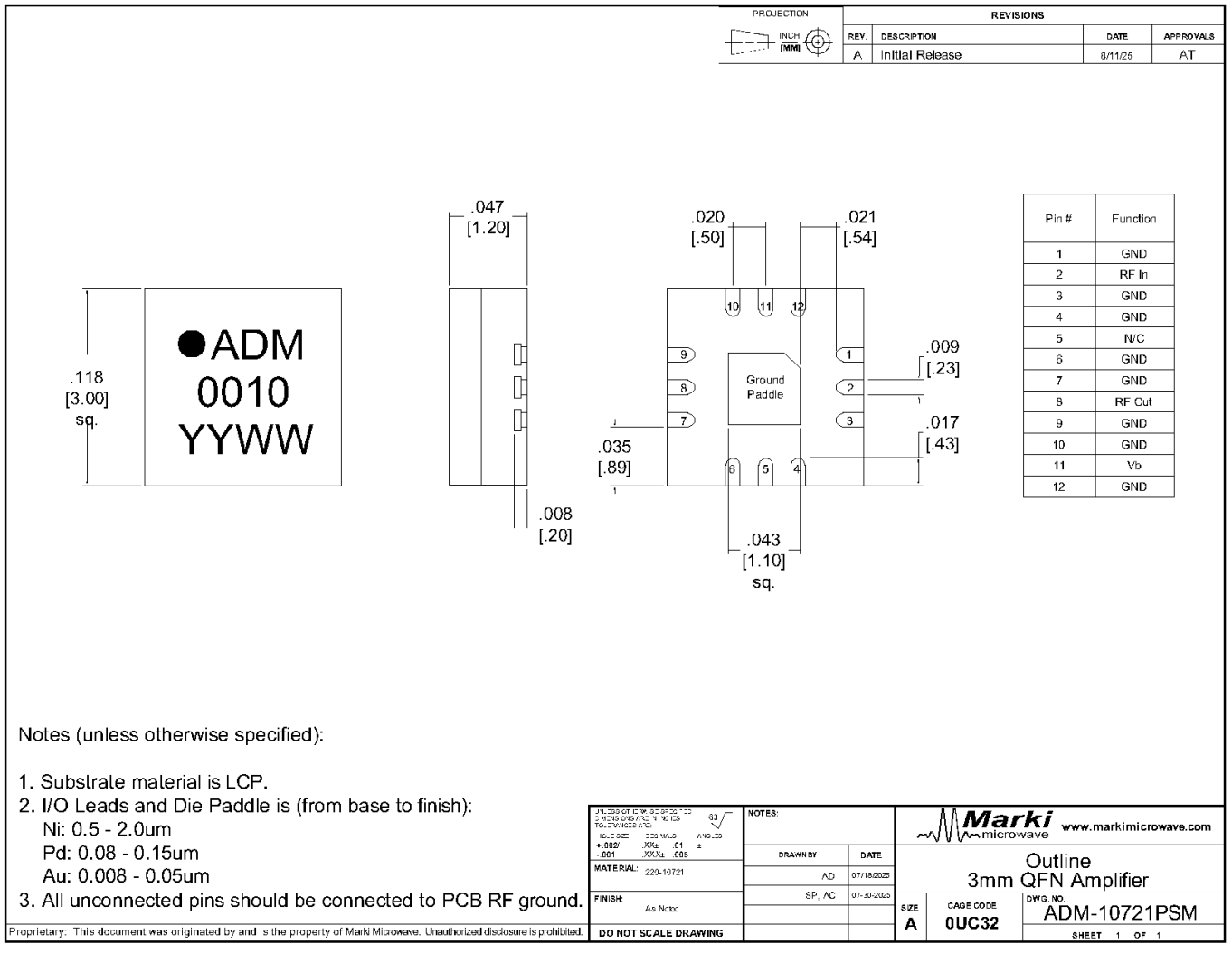
Application Circuit Description

Above is the recommended application circuit for the ADM-10721PSM. DC drain voltage is supplied to the amplifier across a 0.1uF bypass capacitor to the Vd pin. The RF input and output ports are internally shorted to GND but can be left floating if no DC is present on the RF line. If DC is present, blocking capacitors are required at the input and output.

Mechanical Data

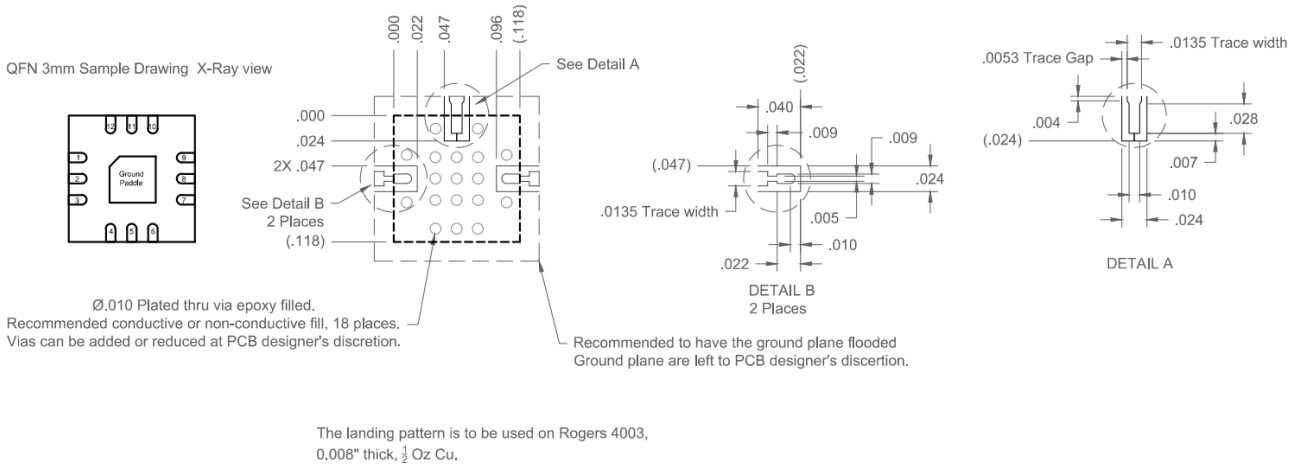
Outline Drawing

Download : Outline 2D Drawing



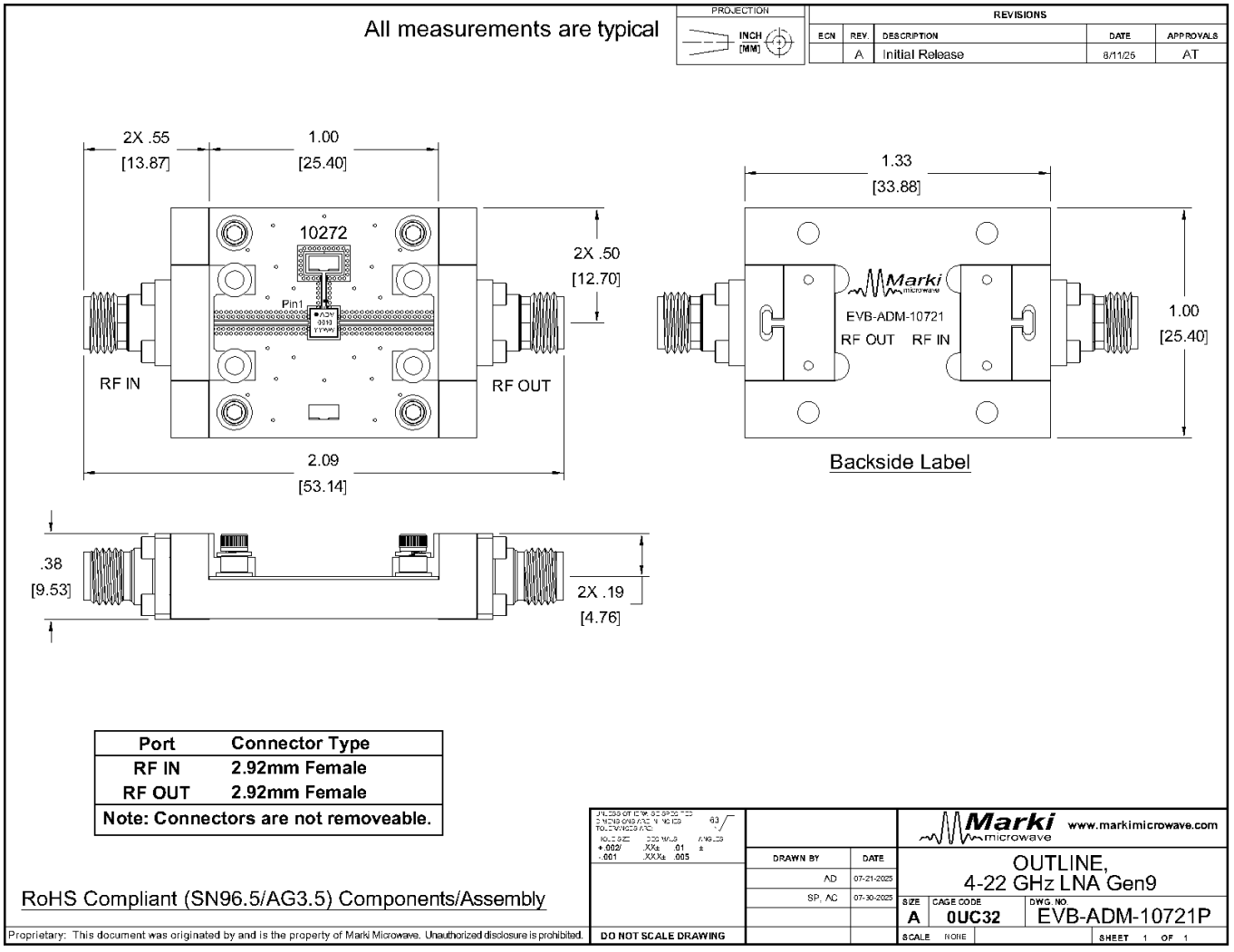
Footprint Image

Download : Footprint Drawing



The landing pattern is to be used on Rogers 4003,
0.008" thick, $\frac{1}{2}$ Oz Cu.

Evaluation Board - Outline Drawing



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