

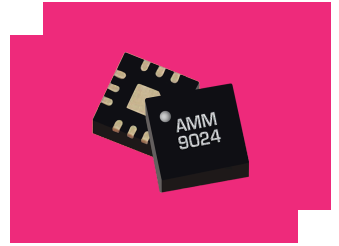
# AMM-9024PSM

## DC-50 GHz GaAs Surface Mount Low Noise Amplifier

### DEVICE OVERVIEW

#### General Description

The AMM-9024PSM is a surface-mount amplifier suitable for use as a single tone driver or general-purpose gain block. This amplifier is optimized for excellent gain flatness in-band. The AMM-9024PSM is packaged in a compact 3mm QFN for surface mount integration onto printed circuit boards



[Download s-parameters here](#)

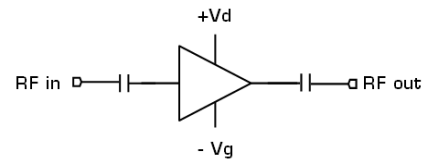
#### Features

- +11 dB Small Signal Gain
- +14 dBm saturated output power
- Excellent gain flatness
- Compact 3mm QFN package

#### Applications

- Mobile test and measurement equipment
- Radar and satellite communications
- 5G transceivers
- LO driver for Marki L-, H-, and S-diode mixers

#### Functional Block Diagram



#### Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
AMM-9024PSM	DC-50 GHz GaAs Surface Mount Low Noise Amplifier	QFN	REACH RoHS	Released	3A001.b.2.d
<u>EVB-AMM-9024P</u>	EVB-AMM-9024P	EVB		Released	-

## AMM-9024PSM

### DC-50 GHz GaAs Surface Mount Low Noise Amplifier

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#### Revision History

Revision Code	Revision Date	Comment
-	2025-11-18	Initial Release

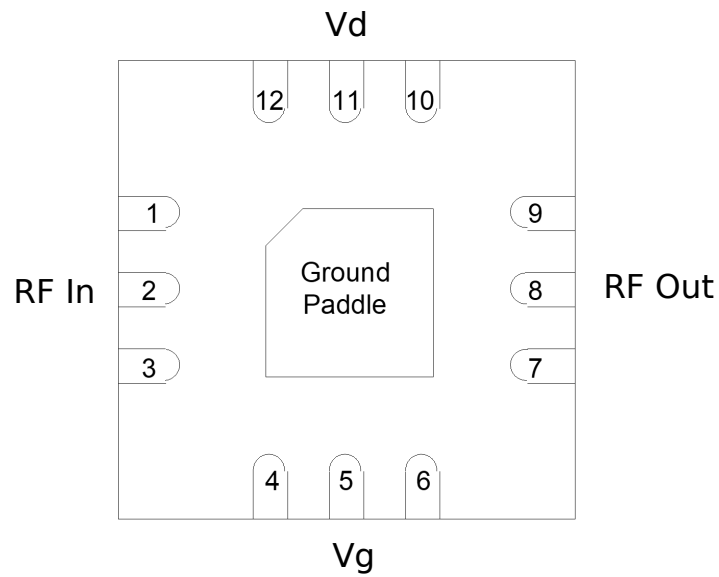
## AMM-9024PSM

DC-50 GHz GaAs Surface Mount Low Noise Amplifier

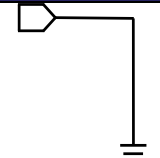
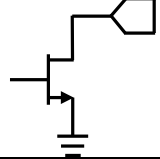

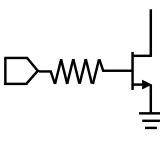
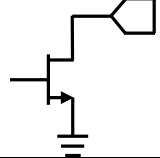
### Port Configuration and Functions

#### Port Diagram

A port diagram of the AMM-9024PSM's QFN package is shown below. The diagram is shown as a top down x-ray view.



**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.	
Pin 2	RF Input	Pin 2 is the RF input of the amplifier. This input is internally RF matched to 50 Ohms.	
Pin 5	Vg	This pin provides DC bias to the gate of the amplifier. This pin requires a negative bias voltage for normal operation. The drain current Id of the amplifier will be controlled by the voltage applied to this pin. As this voltage becomes more positive, drain current will increase. For normal operation, the voltage on this pin should be set to produce a drain current of 45mA.	
Pin 8	RF Output	Pin 8 is the RF output. This pin is internally RF matched to 50 ohms.	
Pins 1,3,4,6,7,9,10,12	Non-connect (NC)	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.	-

## 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
Drain Supply Voltage	7	V
Gate Supply Voltage (Vg)	-1.5	V
Maximum Operating Temperature	85	°C
Maximum Storage Temperature	125	°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)	70	mA
RF Input Power	20	dBm
Thermal Resistance, θJC	120	°C/W

### Package Information

Parameter	Details	Rating
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
Power Supply DC Current	-	45	-	mA
Power Supply DC Voltage	-	5	-	V
Gate Bias DC Voltage	-	-0.25	-	V

## Sequencing Requirements

### Turn-on Procedure:

1. Apply Vg = -0.5V (Pin 5)
2. Apply Vd voltage (Pin 11)
3. Increase Vg voltage towards -0.1V to achieve Id = 45mA
4. Apply RF Input Power

### Turn-off Procedure:

1. Turn off RF Input Power
2. Turn off Vd voltage (Pin 11)
3. Turn off Vg voltage (Pin 5)

#### Electrical Specifications

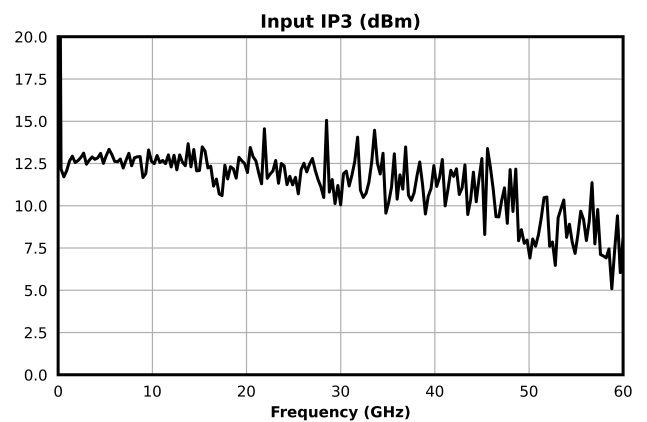
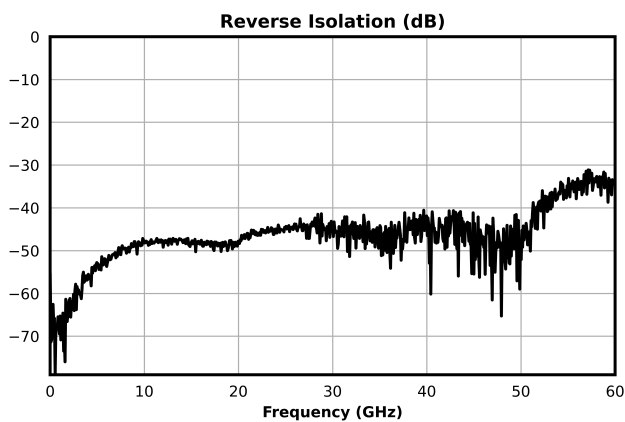
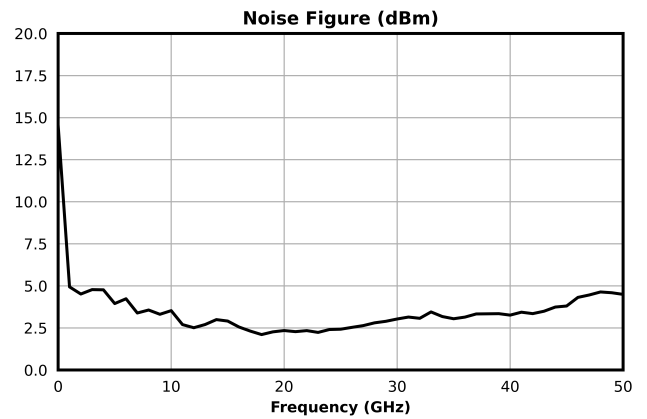
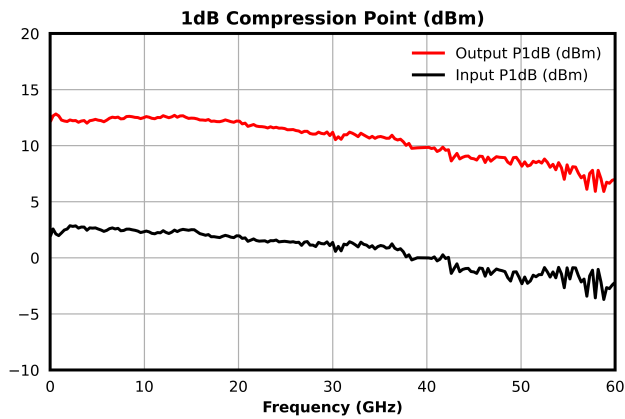
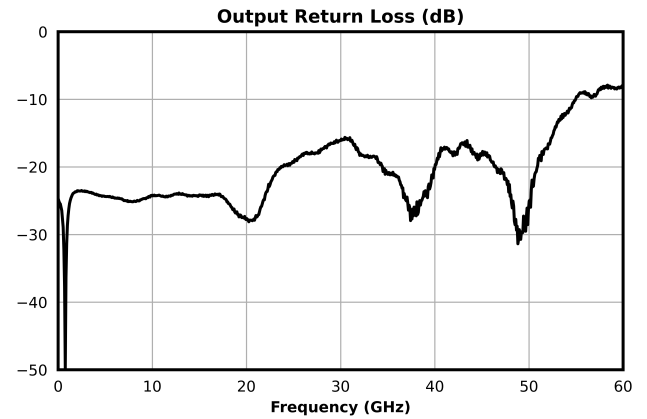
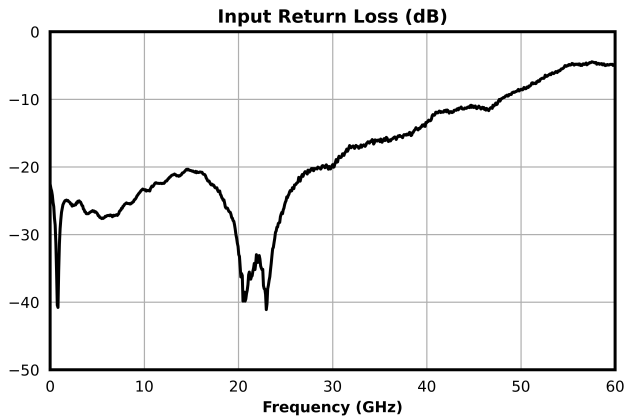
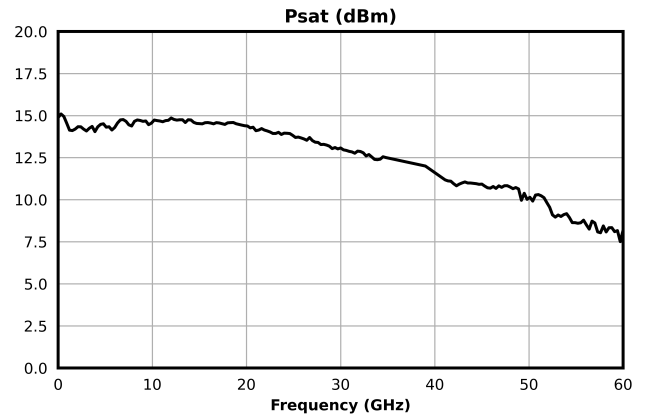
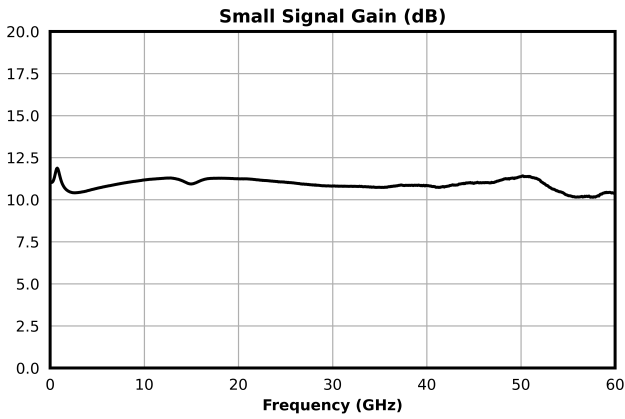
The electrical specifications apply at TA=+25°C in a 50Ω system. QFNs are 100% RF tested.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Small Signal Gain	Vd=5V, Id=45mA, Pin=-20dBm	0	50	-	11.0	-	dB
Input Return Loss	Vd=5V, Id=45mA, Pin=-20dBm	0	50	-	21	-	dB
Output Return Loss	Vd=5V, Id=45mA, Pin=-20dBm	0	50	-	24	-	dB
Reverse Isolation	Vd=5V, Id=45mA, Pin=-20dBm	0	50	-	48	-	dB
Psat	Vd=5V, Id=45mA	0	50	-	14	-	dBm
Input P1dB	Vd=5V, Id=45mA	0	50	-	1.5	-	dBm
Output P1dB	Vd=5V, Id=45mA	0	50	-	11.5	-	dBm
Input IP3	Vd=5V, Id=45mA, Pin=-18dBm	0	50	-	12	-	dBm
Output IP3	Vd=5V, Id=45mA, Pin=-18dBm	0	50	-	23	-	dBm
Input IP2	Vd=5V, Id=45mA, Pin=-18dBm	0	50	-	13	-	dBm
Output IP2	Vd=5V, Id=45mA, Pin=-18dBm	0	50	-	24	-	dBm
Noise Figure	Vd=5V, Id=45mA	0	50	-	3.3	-	dB

# AMM-9024PSM

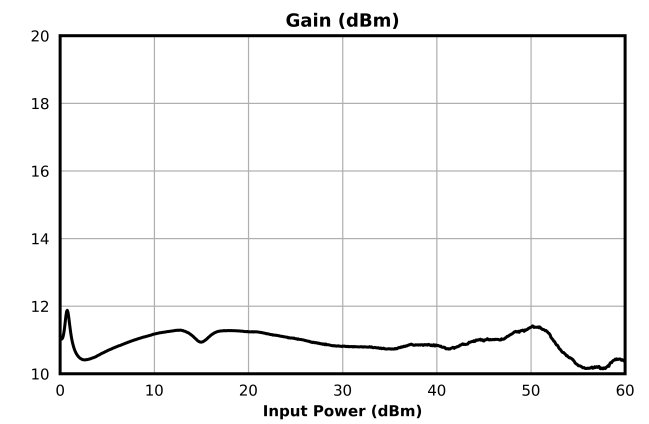
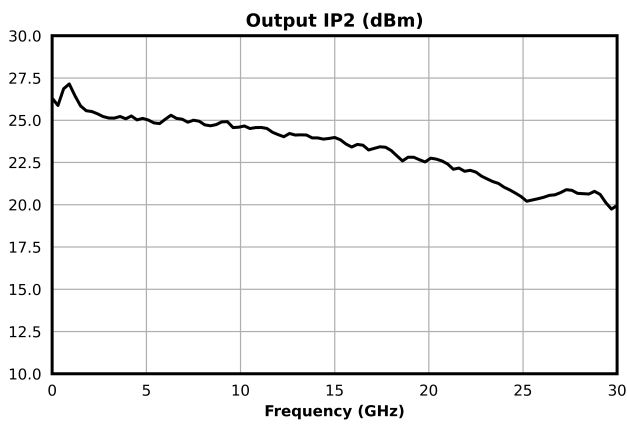
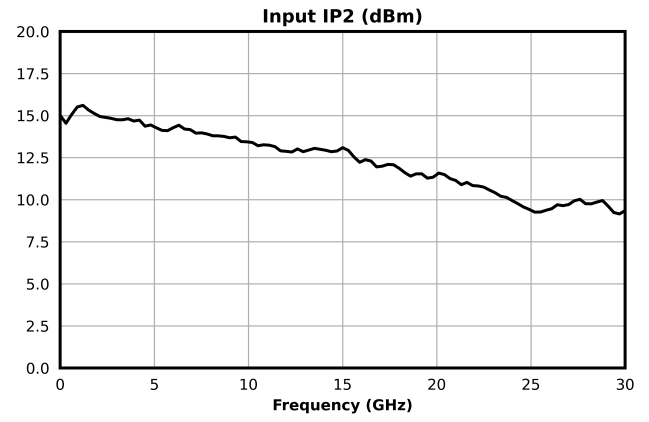
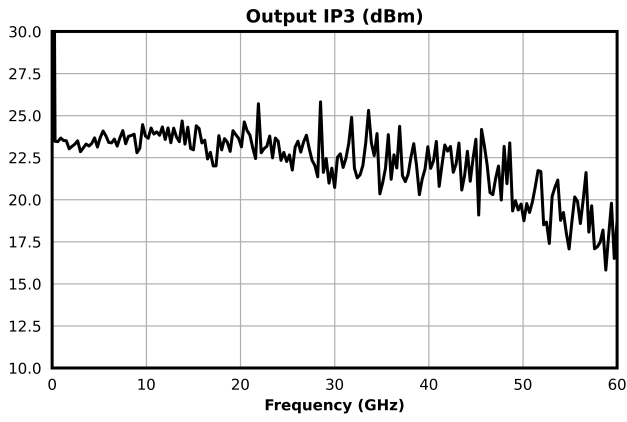
## DC-50 GHz GaAs Surface Mount Low Noise Amplifier

### Typical Performance Plot



# AMM-9024PSM

## DC-50 GHz GaAs Surface Mount Low Noise Amplifier



## AMM-9024PSM

### DC-50 GHz GaAs Surface Mount Low Noise Amplifier

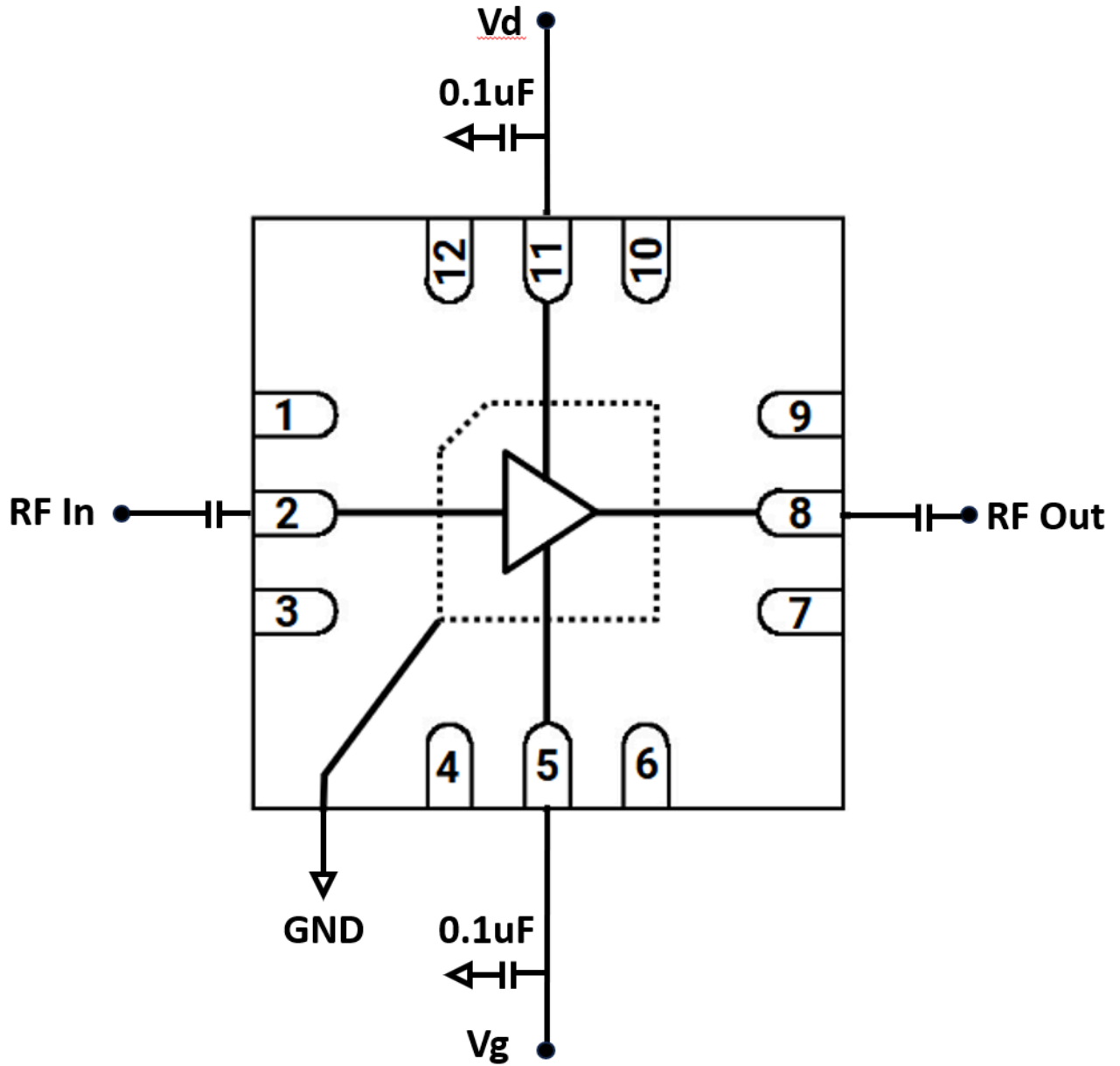
#### Application Information

Below is the recommended application circuit for the AMM-9856PSM. 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](mailto:support@markimicrowave.com) for more information.

## AMM-9024PSM

DC-50 GHz GaAs Surface Mount Low Noise Amplifier

### Application Circuit



## AMM-9024PSM

### DC-50 GHz GaAs Surface Mount Low Noise Amplifier

#### Application Circuit Description

Above is the recommended application circuit for the AMM-9024PSM. Multiple DC power supply bypassing capacitors are shown around the part. DC drain voltage is supplied to the amplifier across a 0.1uF bypass capacitor to the Vd pin. DC bias voltage is supplied to the Vg pin across a 0.1uF bypass capacitor combination. The RF input and output ports are DC coupled, blocking capacitors are required at the input and output.

#### Constant Current and Constant Voltage Operation

As with most amplifiers utilizing HEMT technology, the AMM-9024PSM can be biased with a constant gate and drain voltage, or with a constant drain current by regulating the gate voltage. Using a constant gate and drain voltage for biasing reduces complexity, but has variable current consumption during operation. On the other hand, biasing the gate using a feedback network that samples the drain current minimizes unit-to-unit variation in gain and other parameters.

Under small signal excitation at a fixed temperature, these two approaches are equivalent. However, they will diverge in large signal conditions, where the drain current is affected by the frequency and power of the input signal. In these conditions P1dB, P3dB, and P5dB will be somewhat different, but based on tests with similar parts, they will be within a few dBm of the constant voltage curves.

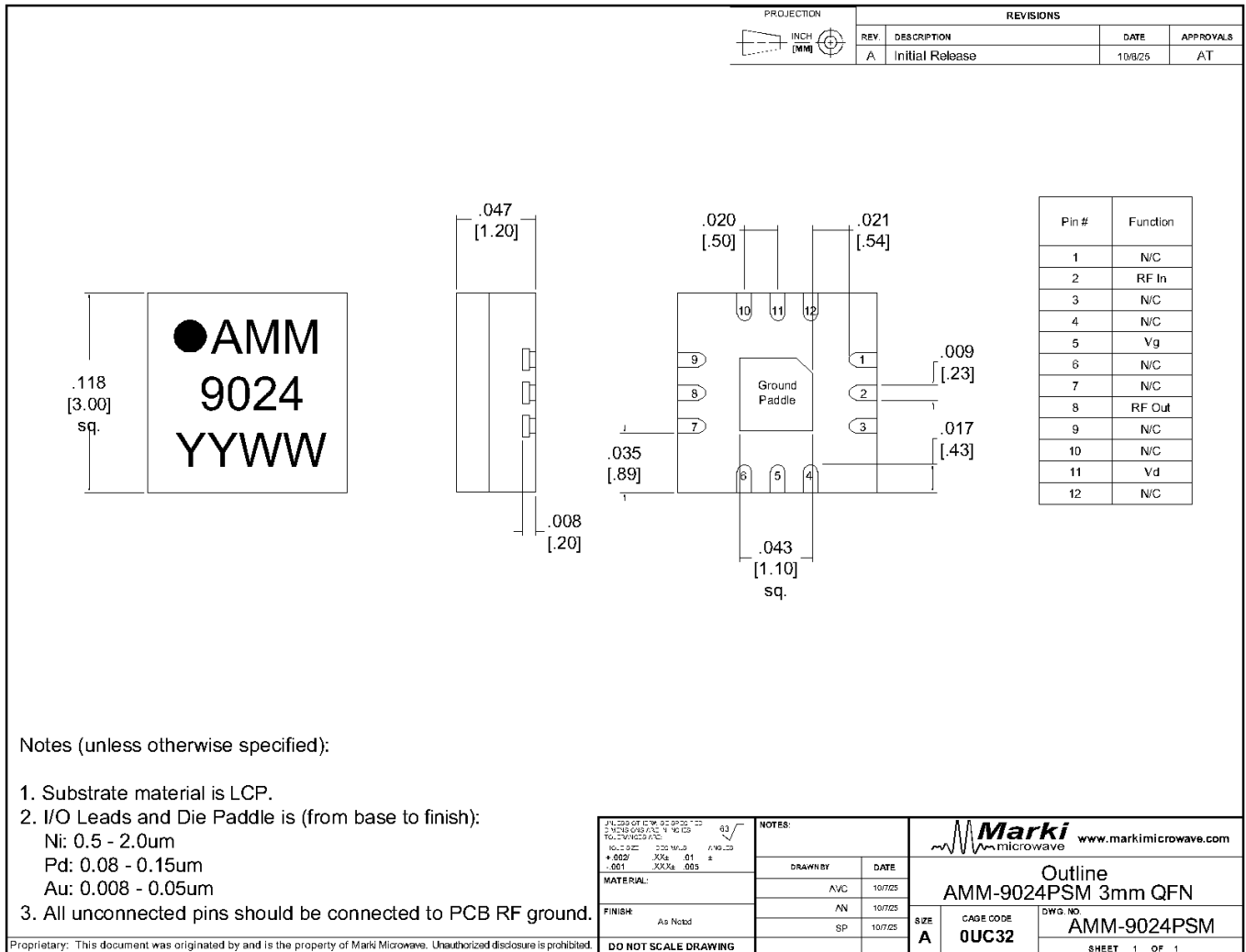
# AMM-9024PSM

## DC-50 GHz GaAs Surface Mount Low Noise Amplifier

### Mechanical Data

### Outline Drawing

Download : [Outline 2D Drawing](#)

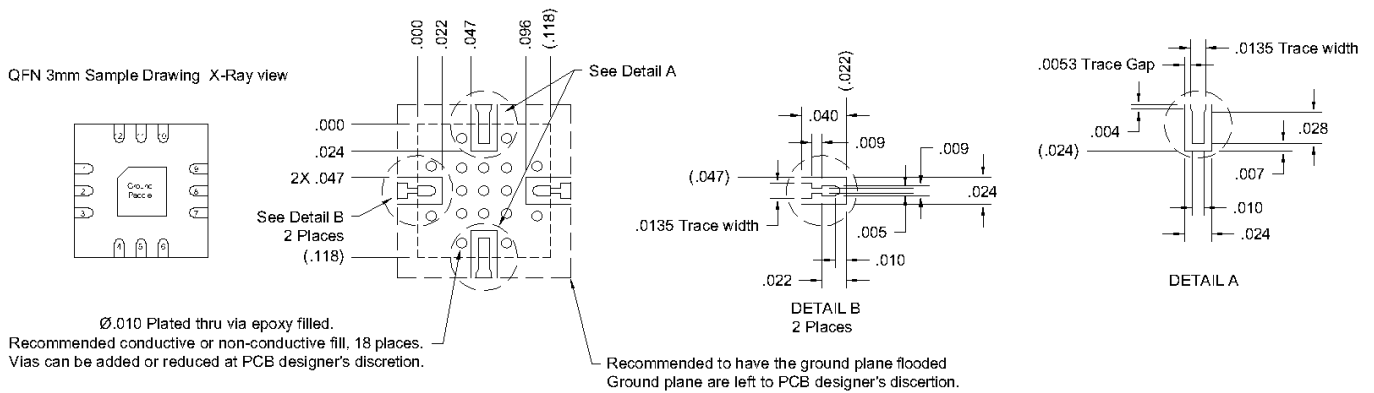


## AMM-9024PSM

### DC-50 GHz GaAs Surface Mount Low Noise Amplifier

#### Footprint Image

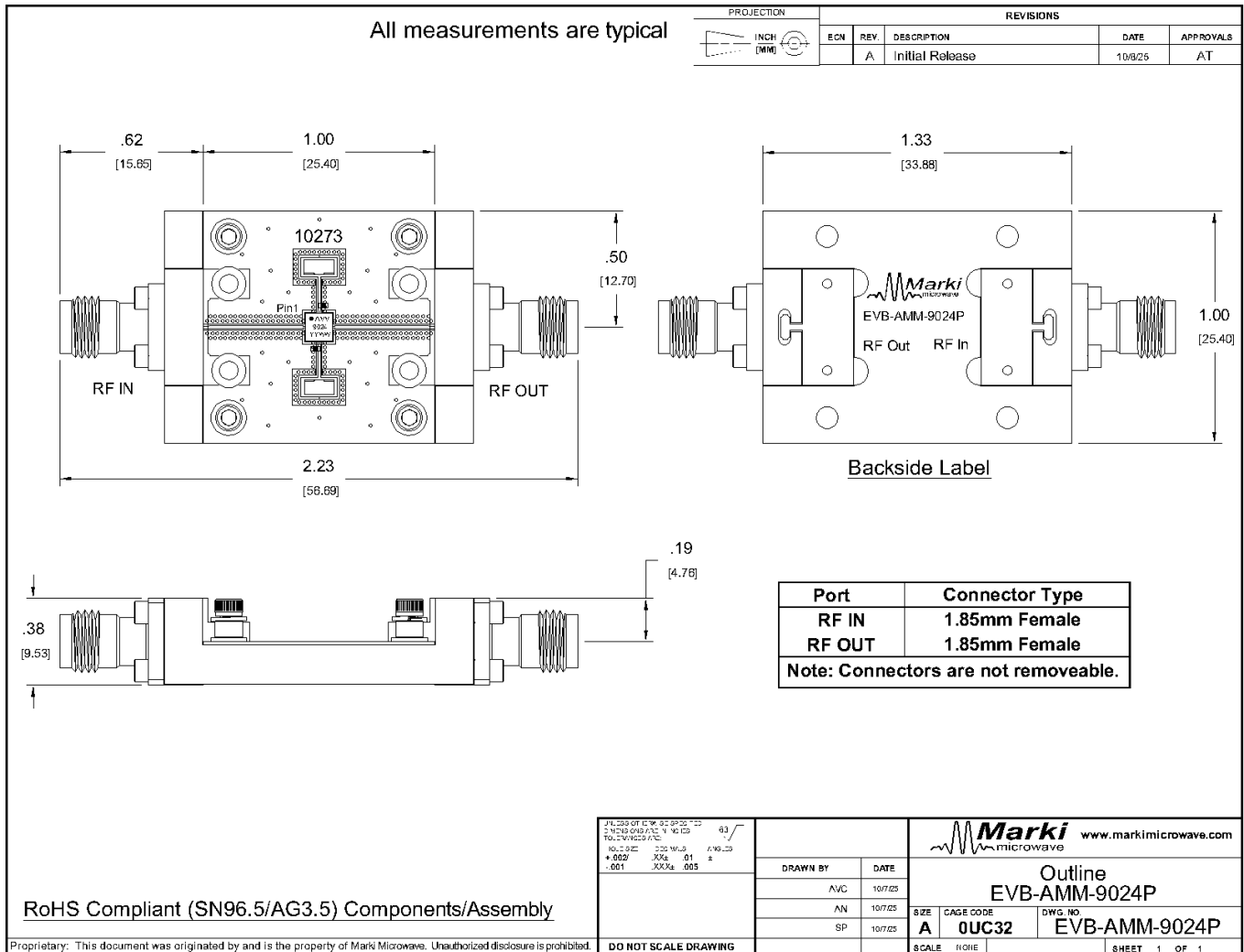
Download : [Footprint Drawing](#)



# AMM-9024PSM

DC-50 GHz GaAs Surface Mount Low Noise Amplifier

## Evaluation Board - Outline Drawing



## AMM-9024PSM

### DC-50 GHz GaAs Surface Mount Low Noise Amplifier

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