

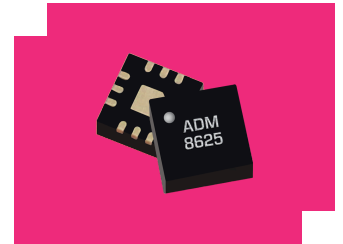
ADM-8625PSM

0.75 - 8 GHz High Dynamic Range Gain Block

DEVICE OVERVIEW

General Description

The ADM-8625PSM is a high-linearity low noise amplifier capable of providing 18 dB gain, 1.5 dB noise figure and +27 dBm OIP3 from 750 MHz to 8 GHz. The ADM-8625PSM can serve either as a linear signal amplifier, or as a saturated driver amplifier for H- or S-diode mixers. The amplifier features excellent return losses, gain flatness and high dynamic range making it suitable for RF front-end applications. The size and low power consumption of the ADM-8625PSM make it ideal for low SWaP applications. The ADM-8625PSM is available in a compact 3x3 mm QFN



[Download s-parameters here](#)

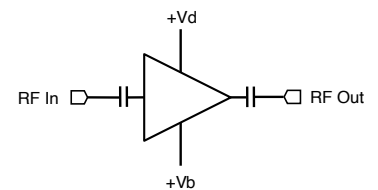
Features

- 18 dB flat gain response
- 1.5 dB noise figure
- +27 dBm output IP3
- Internally Biased and DC blocked
- No negative bias required

Applications

- Mobile test and measurement equipment
- Radar and satellite communications
- 5G transceivers
- Driver Amplifier for H and S - Diode Mixers

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
ADM-8625PSM	0.75 - 8 GHz High Dynamic Range Gain Block	QFN	REACH RoHS	Released	EAR99
EVB-ADM-8625P	Evaluation Board, 0.75 - 8 GHz High Dynamic Range Gain Block Amplifier	EVB	REACH RoHS	Released	-

Table Of Contents

- **Device Overview**
 - General Description
 - Features
 - Applications
 - Functional Block Diagram
- **Port Configuration and Functions**
 - Port Diagram
 - Port Functions
- **Revision History**
- **Specifications**
 - Absolute Maximum Ratings
 - Package Information
 - Recommended Operating Conditions
 - Sequencing Requirements
 - Electrical Specifications
 - Typical Performance Plots
- **Operation**
 - Application Information
 - Application Circuit
 - Application Circuit Description
- **Mechanical Data**
 - Outline Drawing
- **Footprint Image**
- **Evaluation Board**
 - Evaluation Board - Typical Performance Plots
 - Evaluation Board Outline Drawing

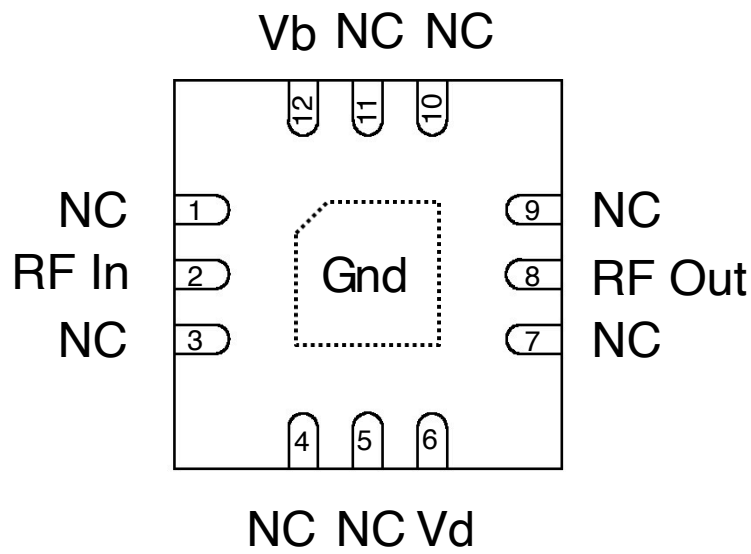
Revision History

Revision Code	Revision Date	Comment
-	2023-06-01	Initial Datasheet Release

Port Configuration and Functions

Port Diagram

A port diagram of the ADM-8625PSM QFN package is shown below (X-ray view from the top).



Port Functions

Port	Function	Description	Equivalent Circuit for Package
Paddle	Gnd	Package ground paddle must be connected to a DC/RF ground potential with high thermal and electrical conductivity.	-
Pin 12	Vb	Pin 12 provides DC bias to the amplifier. The DC value at this pin should be set to 5V for normal operation. This pin is a current mirror bias input used to set the drain current Id. An external resistor (~10-500 Ohms) may be used in series with this port to adjust the quiescent current draw of the amplifier.	-
Pin 1,3,4,5,7,9,10,11	NC	These pins are internally no-connects and should be connected to DC/RF ground.	-
Pin 2	RF Input	Pin 2 is the RF Input port of the amplifier. This pin is internally DC blocked and is RF matched to 50 Ω.	-
Pin 6	Vd	Pin 6 is the main power supply to the amplifier. The DC value at this pin should be set to 5V for normal operation.	-
Pin 8	RF Output	Pin 8 is the RF Output port of the amplifier. This pin is internally DC blocked and is RF matched to 50 Ω.	-

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 Current (Ib)	10	mA
Bias Voltage (Vb)	6	V
Drain Current (RF Applied)	75	mA
Drain Supply Voltage (Vd)	6	V
Maximum Operating Temperature for MTTF > 1E6 hours	85	°C
Maximum Storage Temperature	125	°C
Max Junction Temperature for MTTF of 1E6 hours	175	°C
Max Power Dissipation for MTTF of 1E6 hours	0.34	W
Minimum Operating Temperature for MTTF > 1E6 hours	-40	°C
Minimum Storage Temperature	-55	°C
RF Input Power	15	dBm
θ_{Jc} , Junction to Case Thermal Resistance	62	°C/W

Package Information

Parameter	Details	Rating
Weight	Package name: QFN	0.023g
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
Power Supply DC Voltage (Vd)	3	5	6	V
Input Power for Saturation	-	6	-	dBm
Power Supply DC Current (Ib)	2	4	4	mA
Ta Ambient Temperature	-40	25	85	°C
Power Supply DC Current (Id) (No RF Input) ¹	26	49	58	mA
Power Supply DC Bias (Vb)	3	5	6	V

^[1] Recommended operating current conditions without RF input applied. Data in this datasheet was measured on the EVB-ADM-8625P evaluation board with Rbias = 130Ω on the Vb line.

Sequencing Requirements

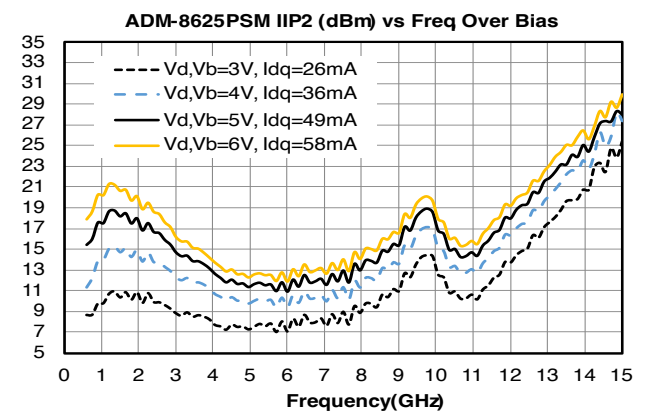
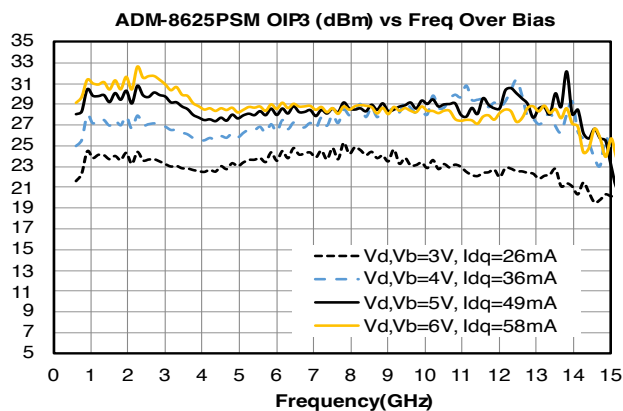
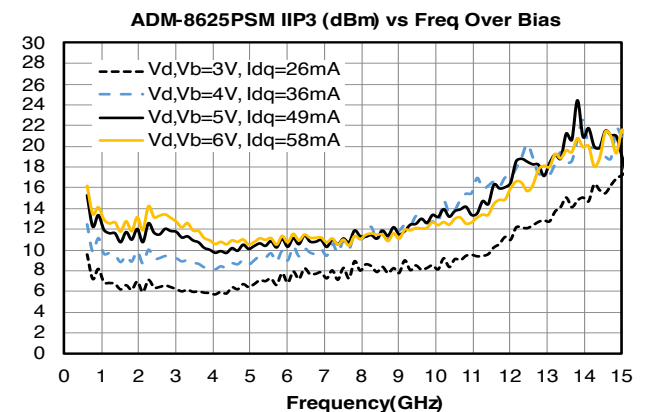
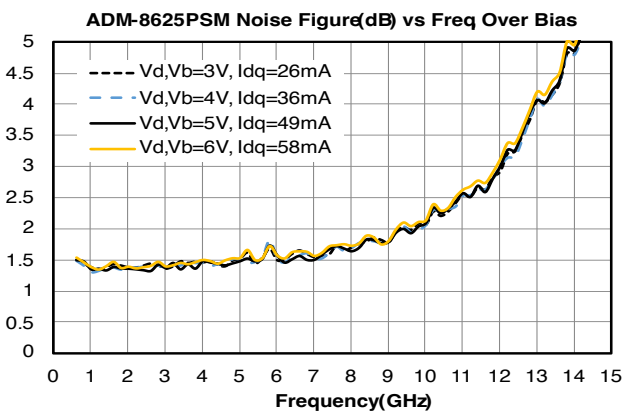
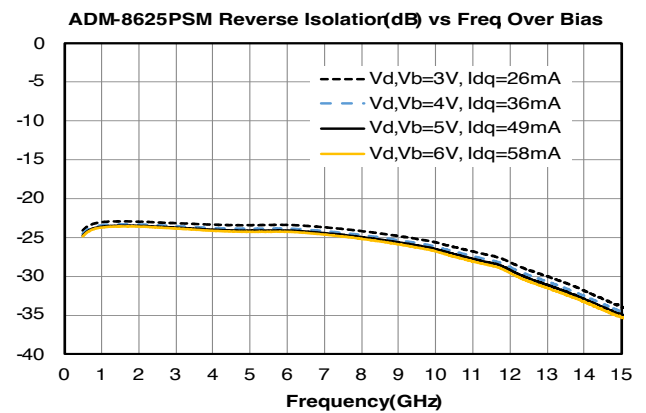
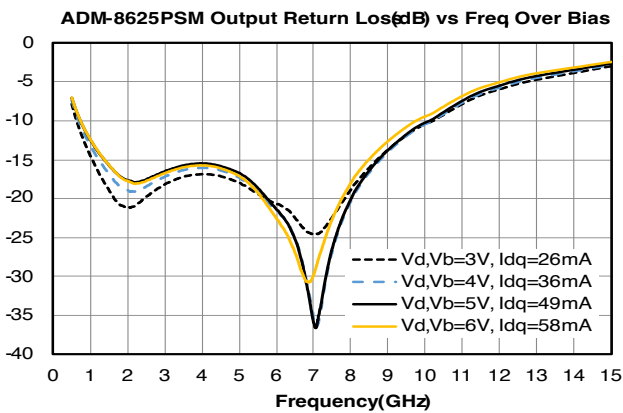
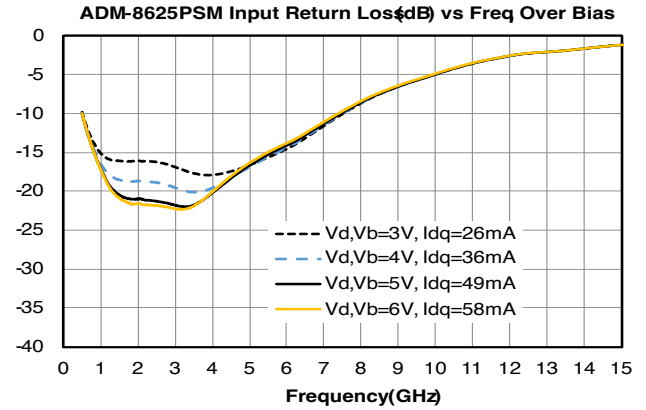
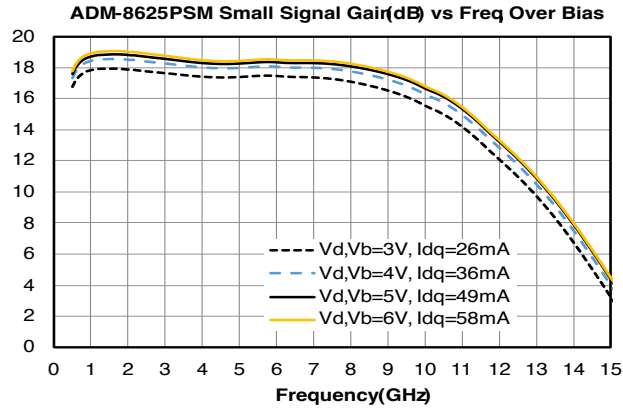
There is no sequencing required to power up or power down the amplifier.

Electrical Specifications

Unless otherwise specified, electrical specifications apply at TA=+25°C, Rbias = 130Ω and Vd,Vb = 5 V.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
DC Supply Quiescent Current (Idq)	Vd, Vb = 5 V no RF input	-	-	-	49	-	mA
Input IP2	Vd, Vb = 5 V Pin = -15 dBm per tone, 10 MHz tone spacing	0.75	8	-	13	-	dBm
Input IP3	Vd, Vb = 5 V Pin = -15 dBm per tone, 10 MHz tone spacing	0.75	8	-	12	-	dBm
Input Power for Saturation	Vd, Vb = 5V	0.75	8	-	6	-	dBm
Input Return Loss	Vd, Vb = 5 V Pin = -20 dBm	0.75	8	-	15	-	dB
Noise Figure	Vd, Vb = 5 V Pin = -20 dBm	0.75	8	-	1.5	-	dB
Output IP2	Vd, Vb = 5 V Pin = -15 dBm per tone, 10 MHz tone spacing	0.75	8	-	31	-	dBm
Output IP3	Vd, Vb = 5 V Pin = -15 dBm per tone, 10 MHz tone spacing	0.75	8	-	27	-	dBm
Output P1dB	Vd, Vb = 5V	0.75	8	-	17	-	dBm
Output Power	Vd, Vb = 5V	0.75	7	-	19	-	dBm
Output Return Loss	Vd, Vb = 5 V Pin = -20 dBm	0.75	8	-	16	-	dB
Reverse Isolation	Vd, Vb = 5 V Pin = -20 dBm	0.75	8	-	24	-	dB
Small Signal Gain	Vd, Vb = 5 V Pin = -20 dBm	0.75	8	16	18	-	dB

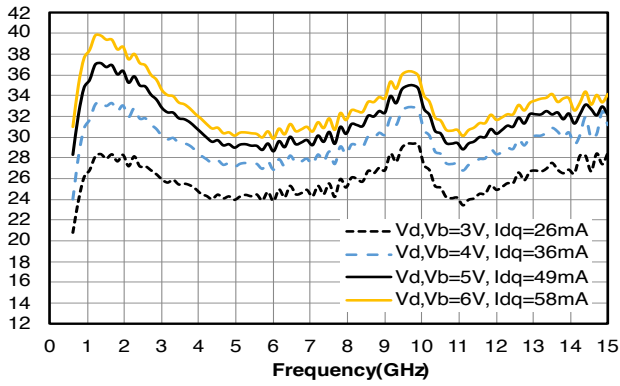
Typical Performance Plots



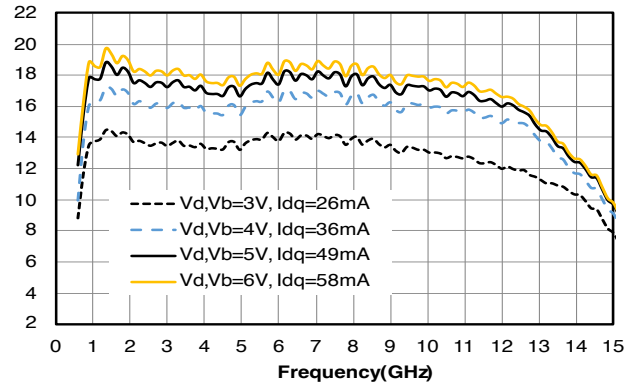
ADM-8625PSM

0.75 - 8 GHz High Dynamic Range Gain Block

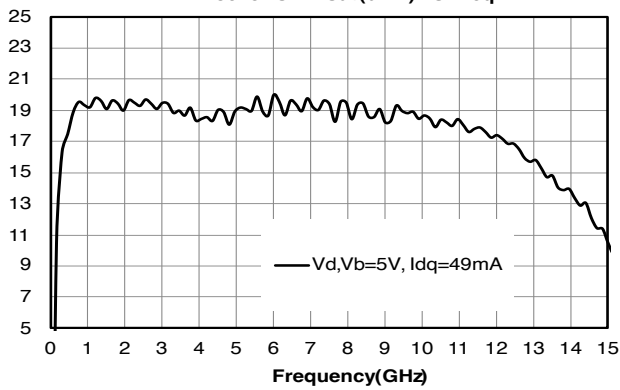
ADM-8625PSM OIP2 (dBm) vs Freq Over Bias



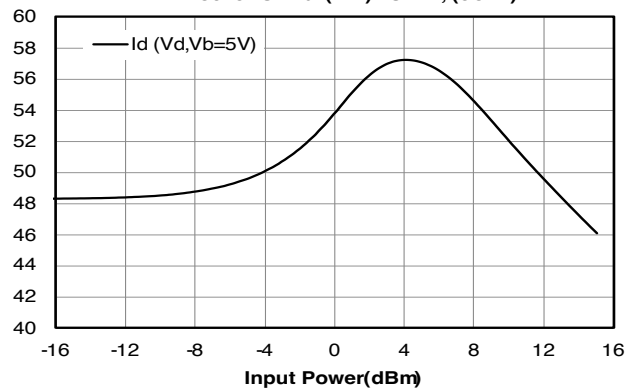
ADM-8625PSM P1dB (dBm) vs Freq Over Bias



ADM-8625PSM PSat (dBm) vs Freq



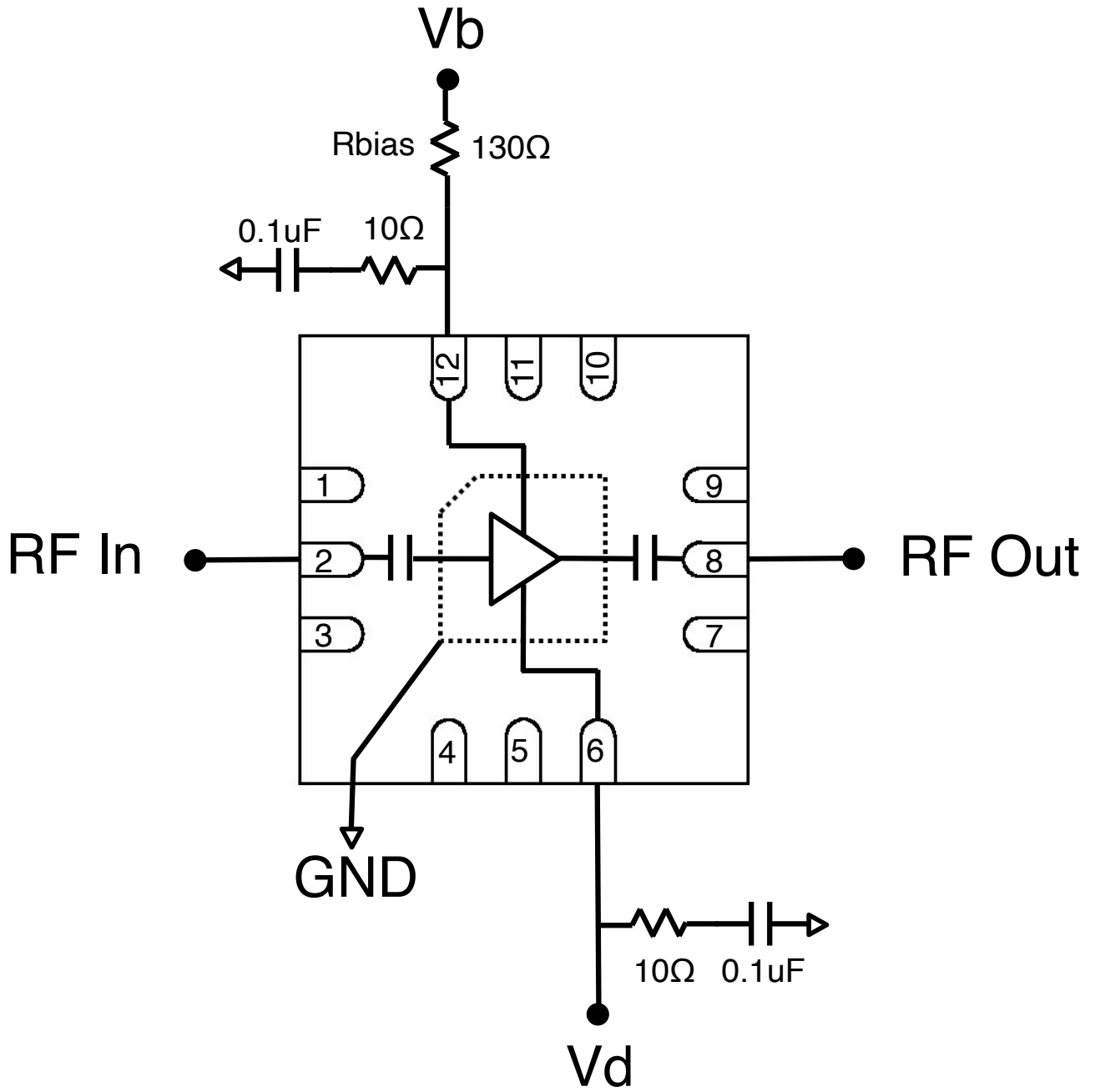
ADM-8625PSM Id (mA) vs. Pin, (5GHz)



Application Information

Below is the recommended application circuit for the ADM-8625PSM.

Application Circuit



Application Circuit Description

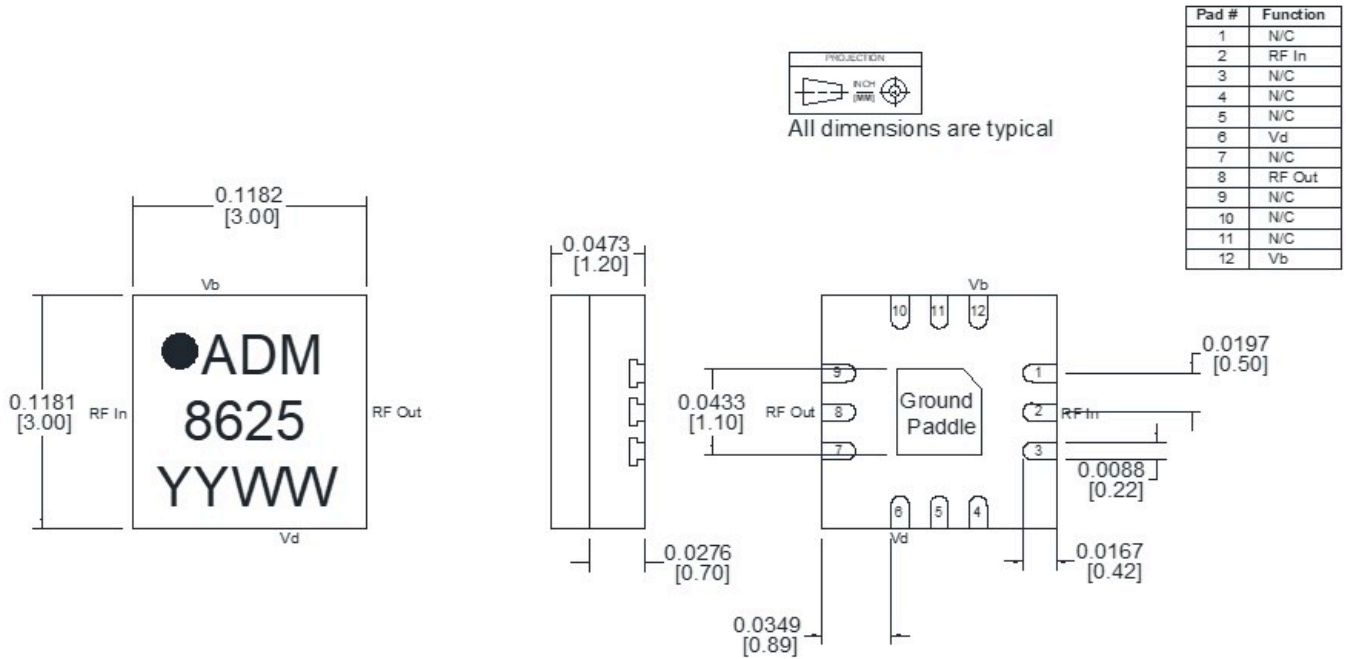
The ADM-8625PSM is internally DC blocked at the input and output pins. It is also internally matched to 50 Ohms so no external RF matching components are required. The amplifier is internally biased and DC power is supplied through the Vd pin. Vd is connected directly to an internal choke inductor. The external shunt RC network on this pin provides bypassing while dampening any resonances that may be caused between the bypass cap and internal choke.

The Vb pin provides DC bias to the amplifier. More specifically, this pin is a current mirror bias input used to set the drain current Id. An external resistor (~10-500 Ohms) may be used in series with this port to adjust the quiescent current draw of the amplifier. The shunt RC network on this pin serves a similar purpose to that on the Vd pin but since this pin isn't directly connected to an internal choke, the possibility of unwanted resonances is reduced. Measurements shown in this datasheet are taken with both Vd and Vb RC networks present on the EVB.

Mechanical Data

Outline Drawing

Download : [Outline 3D Drawing](#) | [Outline 3D STP](#)



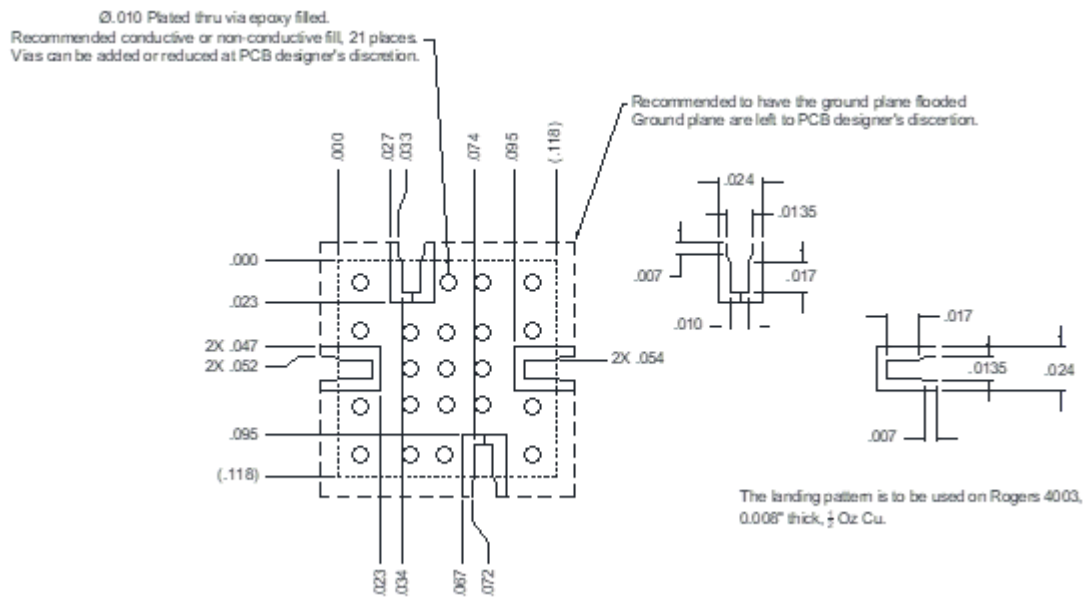
- 1) Substrate material is LCP
- 2) I/O Leads and Die Paddle are (from base to finish):
 - a. Ni: 0.5 um MIN
 - b. Pd: 0.02 um MIN
 - c. Au: 0.05 um MAX
- 3) All unconnected pins should be attached to PCB RF ground.

ADM-8625PSM

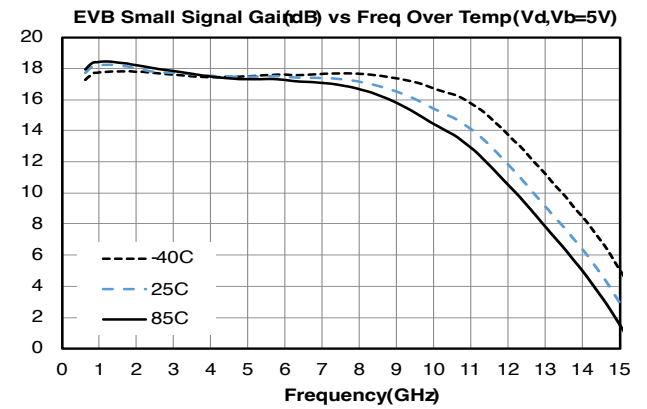
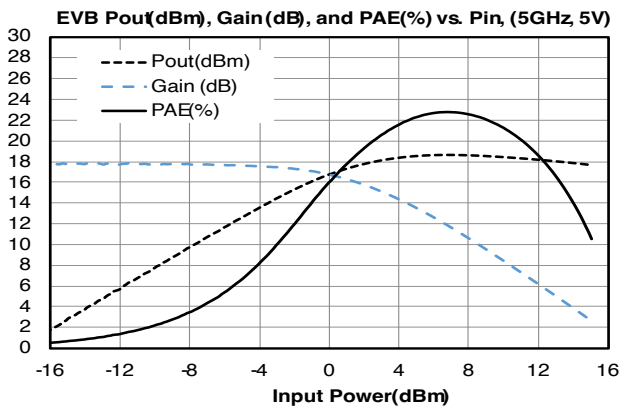
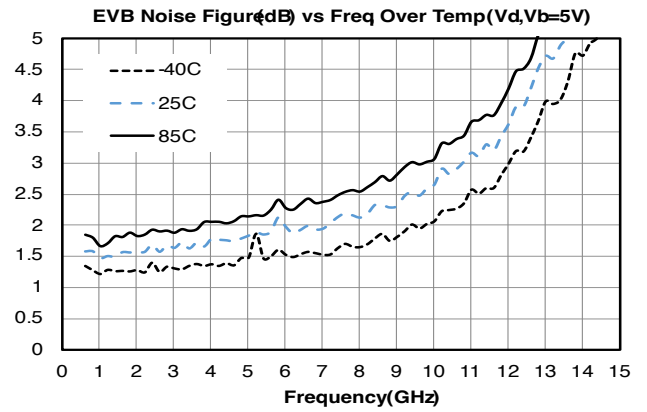
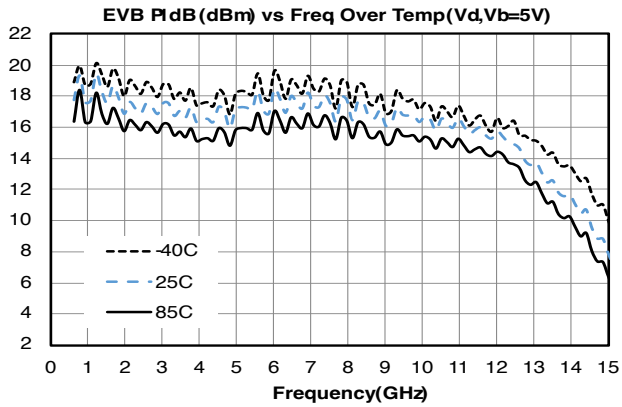
0.75 - 8 GHz High Dynamic Range Gain Block

Footprint Image

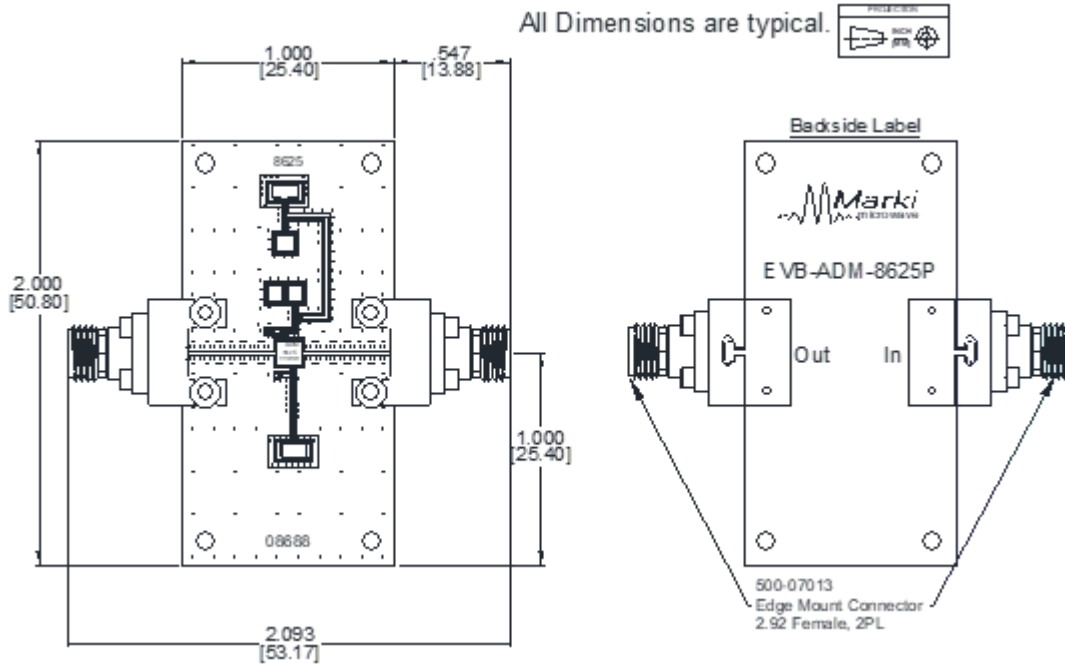
Download : [Footprint Drawing](#)



Evaluation Board - Typical Performance Plots



Evaluation Board - Outline Drawing



DISCLAIMER

MARKI MICROWAVE, INC., ("MARKI") PROVIDES TECHNICAL SPECIFICATIONS AND DATA (INCLUDING DATASHEETS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, AND OTHER INFORMATION AND RESOURCES "AS IS" AND WITH ALL FAULTS. MARKI DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. These resources are intended for developers skilled in the art designing with Marki products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards and other requirements. Marki makes no guarantee regarding the suitability of its products for any particular purpose, nor does Marki assume any liability whatsoever arising out of your use or application of any Marki product.

Marki grants you permission to use these resources only for development of an application that uses Marki products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Marki intellectual property or to any third-party intellectual property. Marki reserves the right to make changes to the product(s) or information contained herein without notice.

MARKI MICROWAVE and T3 MIXER are trademarks or registered trademarks of Marki Microwave, Inc. All other trademarks used are the property of their respective owners.

© 2023, Marki Microwave, Inc