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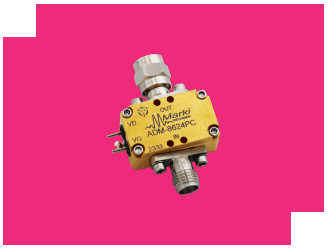
ADM-8624PC

0.2 - 20 GHz High Dynamic Range Gain Block

DEVICE OVERVIEW

General Description

The ADM-8624PC is a high-linearity, low noise amplifier capable of providing 10.5 dB gain and +26 dBm OIP3 across a broad 0.2-20 GHz bandwidth. The amplifier's low power consumption, high dynamic range and ease of use make it an ideal choice for RF front end and signal chain applications.



Download s-parameters here

Features

§ 10.5 dB flat gain response

§ +26 dBm output IP3

§ 3.0 dB noise figure

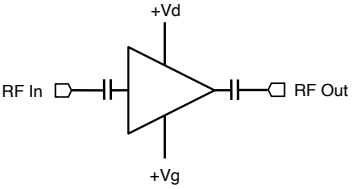
§ Excellent return losses

§ No negative bias or bias tee required

Applications

- Mobile test and measurement equipment
- Radar
- SATCOM
- 5G transceivers

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
ADM-8624PC	0.2 - 20 GHz High Dynamic Range Gain Block	PC	Standard	REACH RoHS	Released	EAR99

Table Of Contents

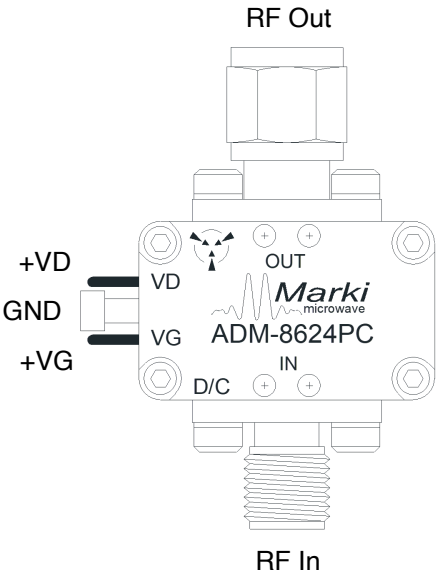
Revision History

Revision Code	Revision Date	Comment
-	2023-08-01	Initial Release

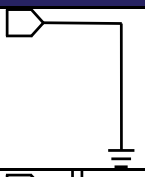
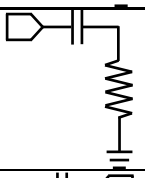
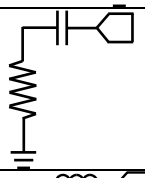
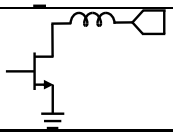
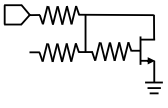
Port Configuration and Functions

Port Diagram

A port diagram of the ADM-8624PC is shown below.



Port Functions

Port	Function	Connector Type	Description	Equivalent Circuit for Package
GND	Ground	-	The housing or outside of the coaxial cables must be connected to a DC/RF ground potential with high thermal and electrical conductivity.	
RF In	RF Input	-	The amplifier's RF Input port is matched to 50 Ω and has built-in DC blocking capacitors.	
RF Out	RF Output	-	The amplifier's RF Output port is matched to 50 Ω and has built-in DC blocking capacitors.	
Vd	Positive DC Supply Vd	-	The VD pin supplies DC voltage to the drain of the amplifier IC.	
Vg	Gate Bias Pin	-	VG provides bias for an internal current mirror that sets the current draw for the amplifier. Current is limited by an internal series resistor. Increasing voltage on this pin will increase gain at the expense of efficiency.	

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 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
Drain Current (RF Applied)	60	mA
Drain Supply Voltage (Vd)	8	V
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	-55	°C
Reference Bias Current (Ig)	15	mA
Reference Bias Voltage (Vg)	6.5	V
RF Input Power	20	dBm

Package Information

Parameter	Details	Rating
Dimensions	-	21.85 x 13.21 mm

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)	4	5	6	V
Power Supply DC Voltage (Vg) [1]	-	5	-	V
Input Power for Saturation	-	9	-	-
Ambient Temperature	-40	25	85	°C
Power Supply DC Current (Idq) (No RF Input) [2]	-	40	-	mA

[1] Voltage Vg controls current Id and should be set for nominal operation at Idq=40mA.
[2] Recommended operating current conditions without RF input applied.

Sequencing Requirements

There is no sequencing required to power up or power down the amplifier. An output load is recommended to be connected to the amplifier during operation.

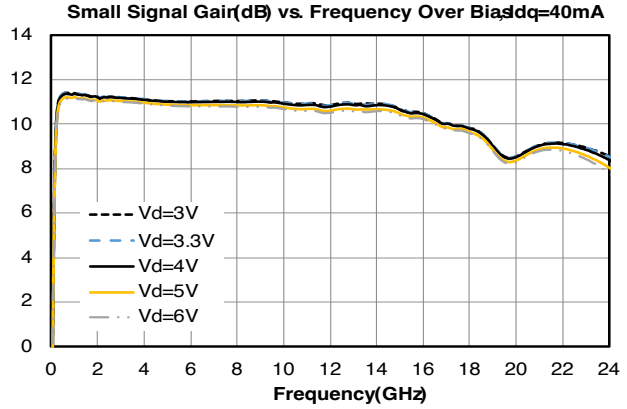
Electrical Specifications

Unless otherwise specified, electrical specifications apply at TA=+25°C and Vd,Vg = 5V.

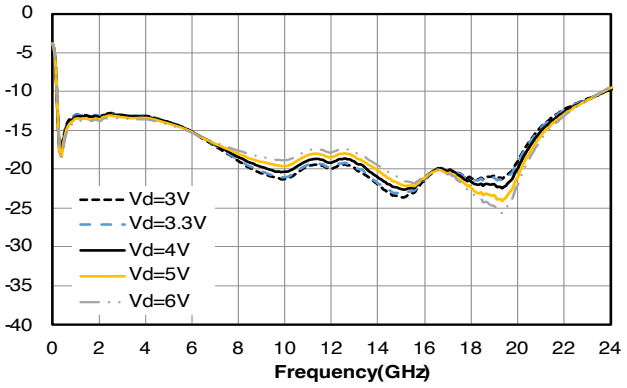
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
DC Supply Quiescent Current (Idq)	Vd,Vg = 5 V, no RF input	0.2	20	-	40	-	mA
Input IP2	Vd,Vg = 5 V, Idq = 40mA, Pin = -18 dBm per tone, 1 MHz tone spacing	0.2	20	-	21	-	dBm
Input IP3	Vd,Vg = 5 V, Idq = 40mA, Pin = -18 dBm per tone, 1 MHz tone spacing	0.2	20	-	15.5	-	dBm
Input Power for Saturation	Vd,Vg = 5V, Idq = 40mA	0.2	20	-	9	-	dBm
Input Return Loss	Vd,Vg = 5 V, Idq = 40mA, Pin = -20 dBm	0.2	20	-	18	-	dB
Noise Figure	Vd,Vg = 5 V, Idq = 40mA, Pin = -20 dBm	10	20	-	3.3	-	dB
Noise Figure	Vd,Vg = 5 V, Idq = 40mA, Pin = -20 dBm	0.2	10	-	3	-	dB
Output IP2	Vd,Vg = 5 V, Idq = 40mA, Pin = -18 dBm per tone, 1 MHz tone spacing	0.2	20	-	32	-	dBm
Output IP3	Vd,Vg = 5 V, Idq = 40mA, Pin = -18 dBm per tone, 1 MHz tone spacing	0.2	20	-	26	-	dBm
Output P1dB	Vd,Vg = 5V, Idq = 40mA	0.2	20	-	13.5	-	dBm
Output Power	Vd,Vg = 5V, Idq = 40mA	0.2	20	-	14.5	-	dBm
Output Return Loss	Vd,Vg = 5 V, Idq = 40mA, Pin = -20 dBm	0.2	20	-	13	-	dB
Reverse Isolation	Vd,Vg = 5 V, Idq = 40mA, Pin = -20 dBm	0.2	20	-	19	-	dB
Small Signal Gain	Vd,Vg = 5 V, Idq = 40mA, Pin = -20 dBm	0.2	20	-	10.5	-	dB

Typical Performance Plots

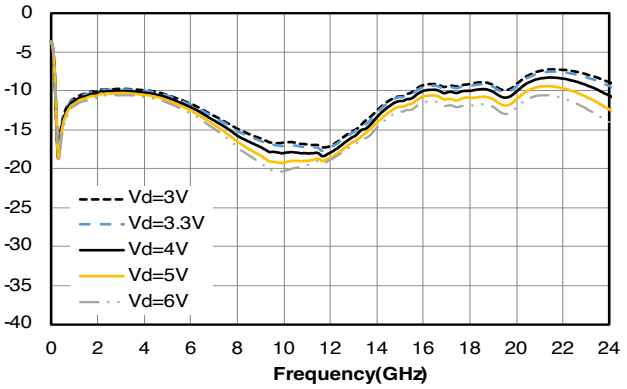
Small Signal Gain(dB) vs. Frequency Over Bias, Idq=40mA



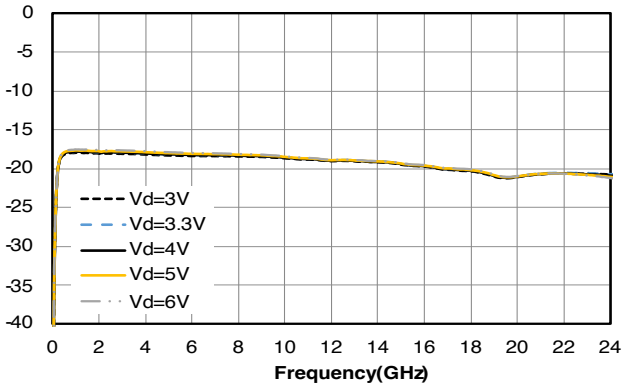
Input Return Loss(dB) vs. Frequency Over Bias, Idq= 40mA



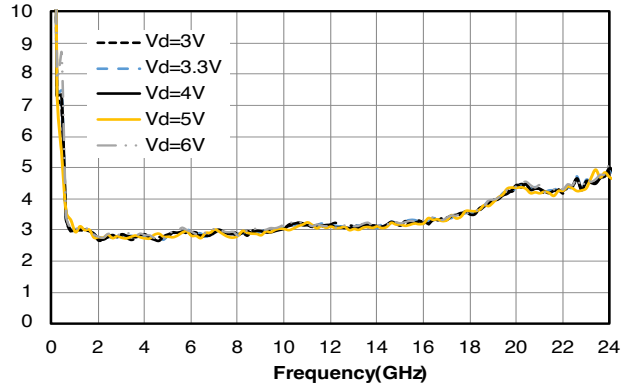
Output Return Loss(dB) vs. Frequency Over Bias, Idq=40mA



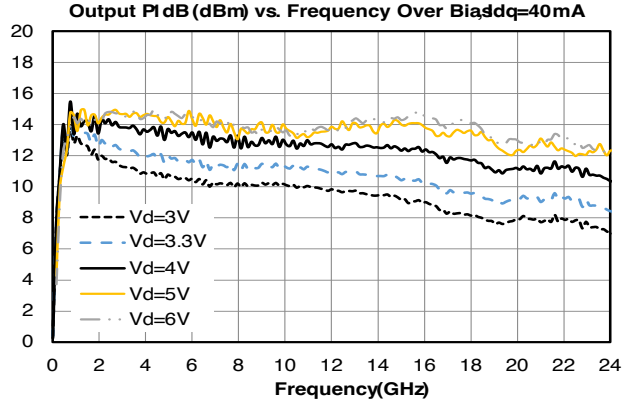
Reverse Isolation(dB) vs. Frequency Over Bias, Idq=40mA



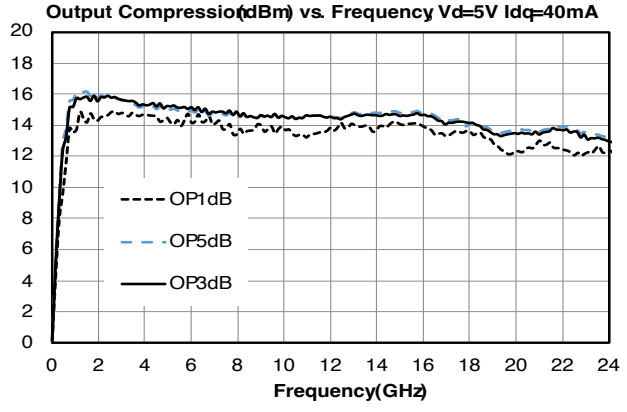
Noise Figure(dB) vs. Frequency Over Bias, Idq= 40mA



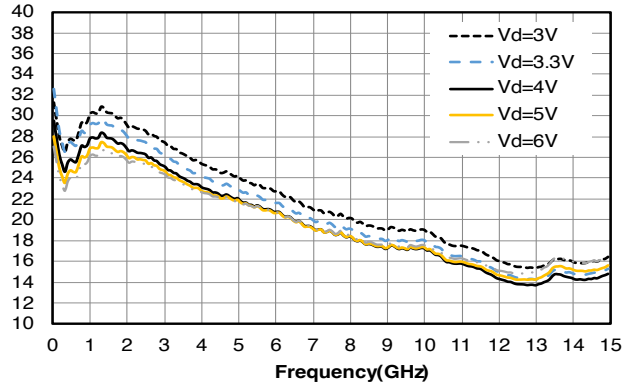
Output P1dB (dBm) vs. Frequency Over Bias, Idq=40mA



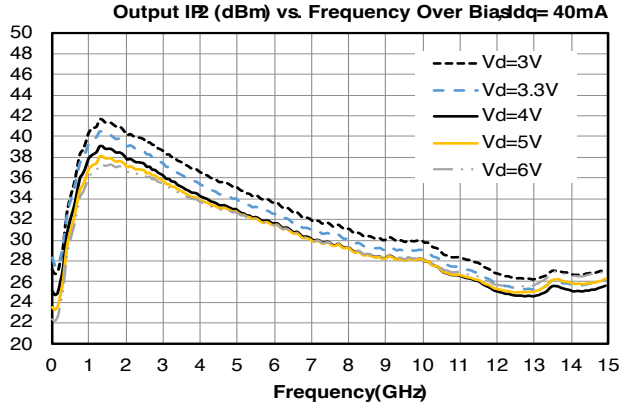
Output Compression(dBm) vs. Frequency, Vd=5V Idq=40mA



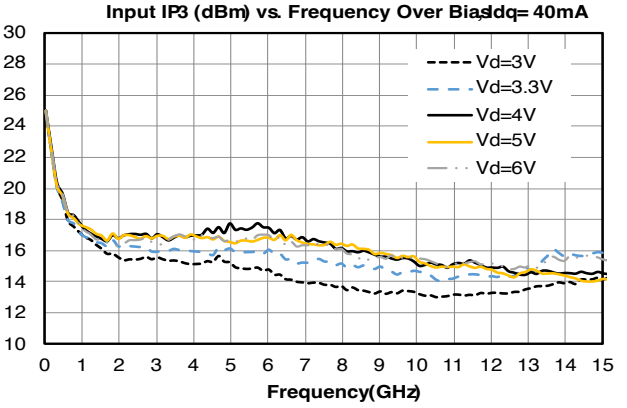
Input IP2 (dBm) vs. Frequency Over Bias, Idq= 40mA



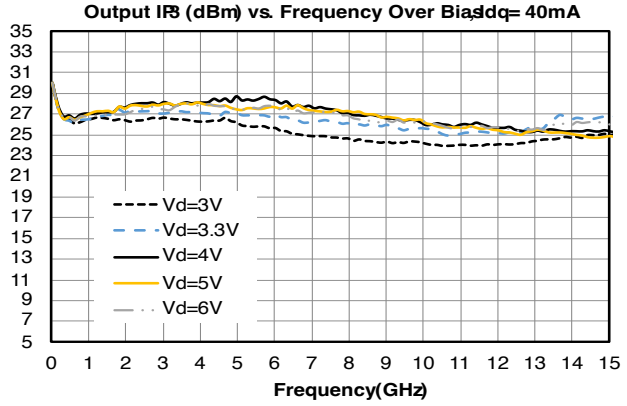
Output IP2 (dBm) vs. Frequency Over Bias, Idq= 40mA



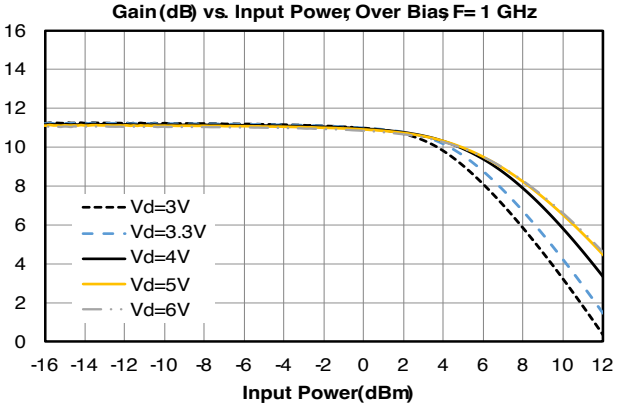
Input IP3 (dBm) vs. Frequency Over Bias, Idq= 40mA



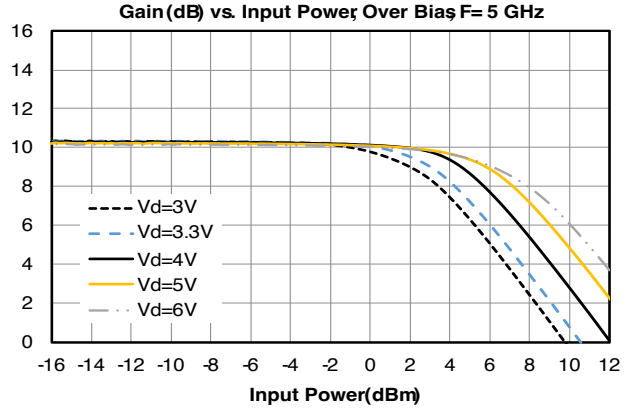
Output IP3 (dBm) vs. Frequency Over Bias, Idq= 40mA



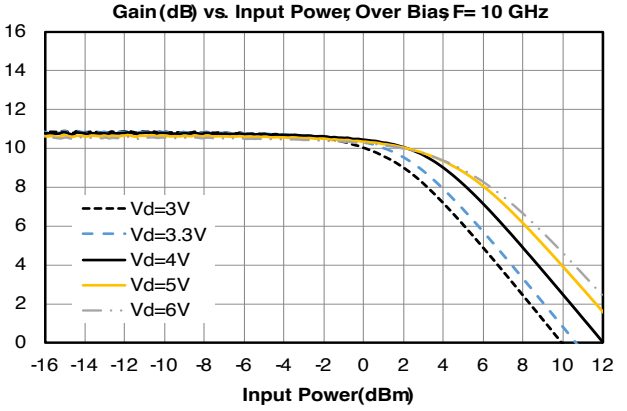
Gain (dB) vs. Input Power, Over Bias, F= 1 GHz



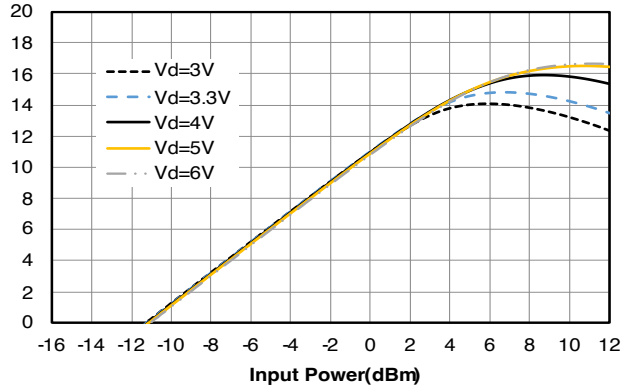
Gain (dB) vs. Input Power, Over Bias, F= 5 GHz



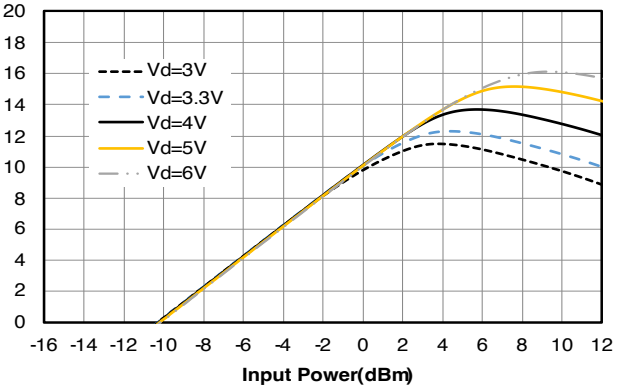
Gain (dB) vs. Input Power, Over Bias, F= 10 GHz



Output Power (dBm) vs. Input Power, Over Bias, F= 1 GHz



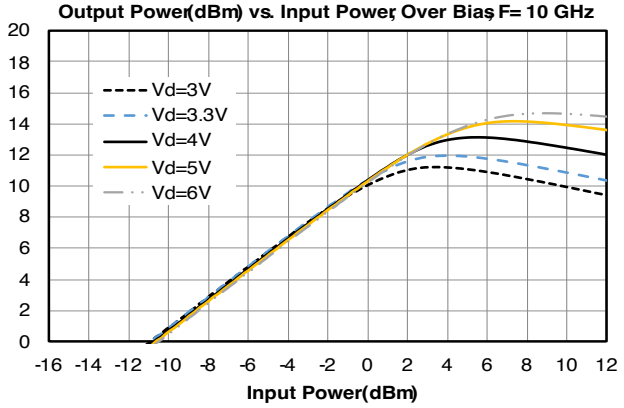
Output Power (dBm) vs. Input Power, Over Bias, F= 5 GHz



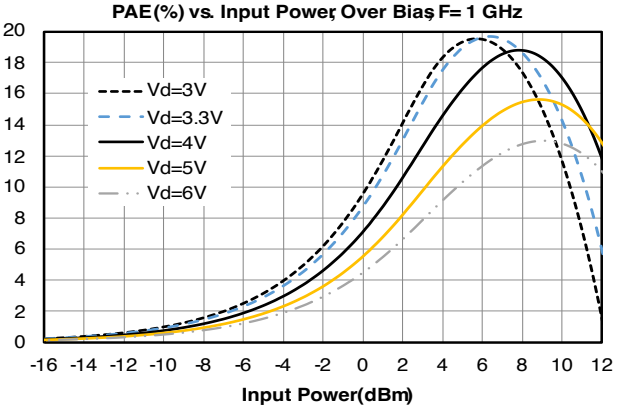
ADM-8624PC

0.2 - 20 GHz High Dynamic Range Gain Block

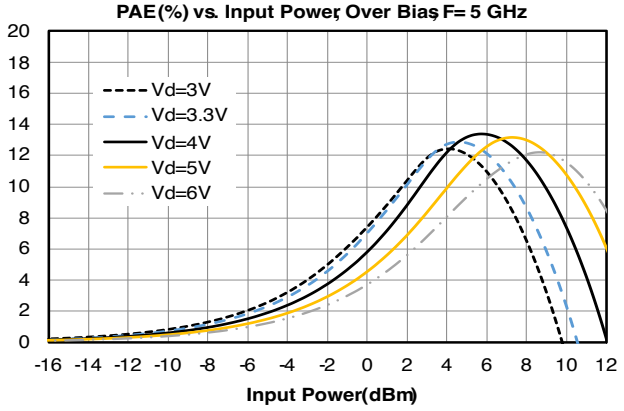
Output Power(dBm) vs. Input Power, Over Bias, F= 10 GHz



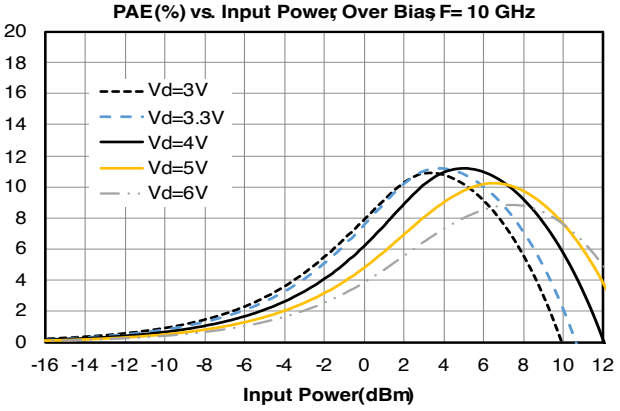
PAE(%) vs. Input Power, Over Bias, F= 1 GHz



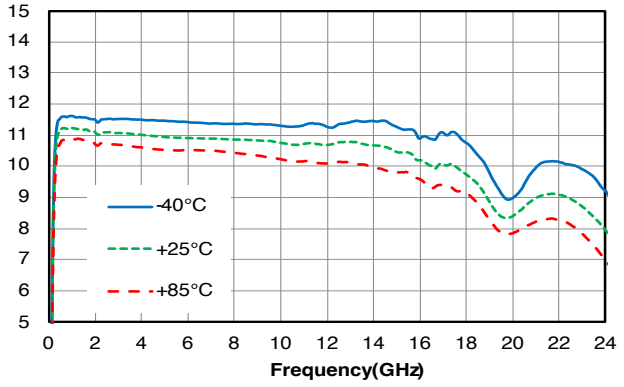
PAE(%) vs. Input Power, Over Bias, F= 5 GHz



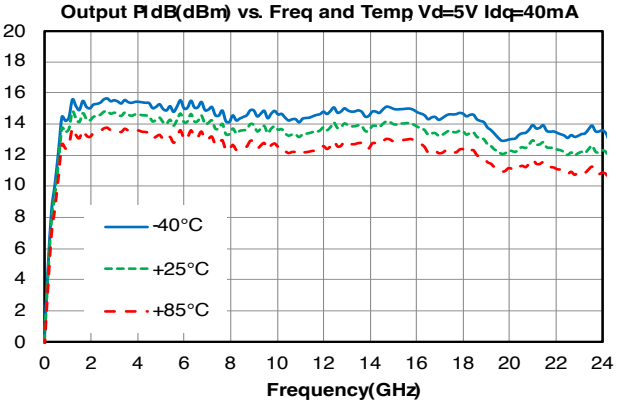
PAE(%) vs. Input Power, Over Bias, F= 10 GHz



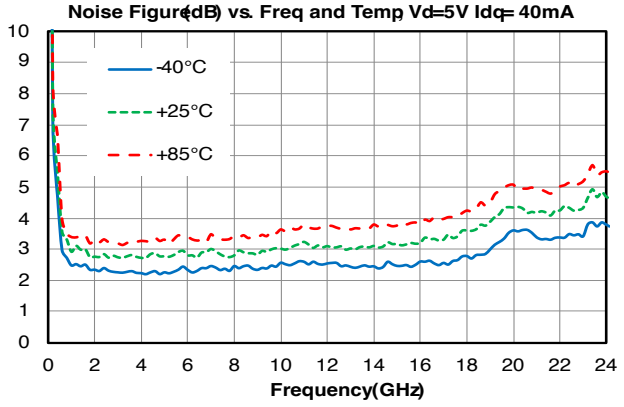
Small Signal Gain(dB) vs. Freq and Temp, Vd=5V, Idq= 40mA



Output P1dB(dBm) vs. Freq and Temp, Vd=5V Idq=40mA



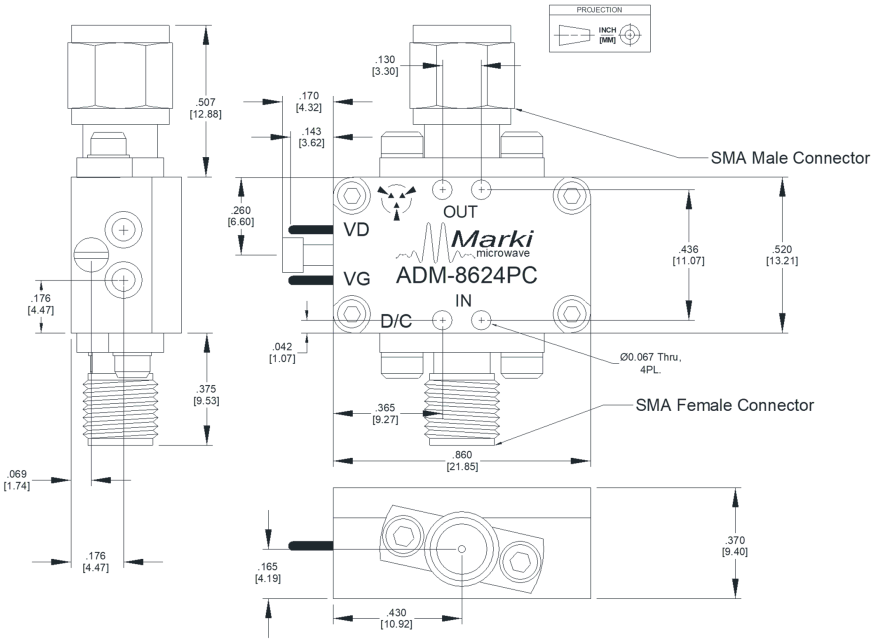
Noise Figure(dB) vs. Freq and Temp, Vd=5V Idq= 40mA



Mechanical Data

Outline Drawing

Download : Outline 2D Drawing | Outline 3D Drawing | Outline 3D STP



Port	Connector Type
Input	SMA Female
Output	SMA Male

1) All dimensions are typical.

2) Ground lug and bias pins are solderable.

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