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Tech Support: support@markimicrowave.com

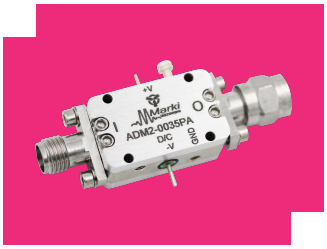
ADM2-0035PA

0.1-35 GHz 2-Stage LO Driver Amplifier

DEVICE OVERVIEW

General Description

The ADM2-0035PA is an LO driver amplifier module with 2 internally connected wideband gain stages and equalization. It is designed to provide sufficient gain and output power for Marki S-diode mixers below 35 GHz with an input power of 0-5 dBm.



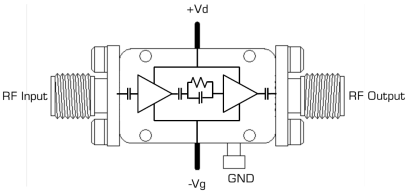
Features

- 23 dB gain
- Broadband DC-35 GHz performance
- +23 dBm output power
- No sequencing required
- DC blocked

Applications

- General purpose laboratory amplifier
- Radar and satellite communications
- 5G transceivers
- LO driver amp for Marki H-diode S-diode, and T3 mixers

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
ADM2-0035PA	0.1-35 GHz 2-Stage LO Driver Amplifier	PA	Standard	REACH RoHS	Released	EAR99

Table Of Contents

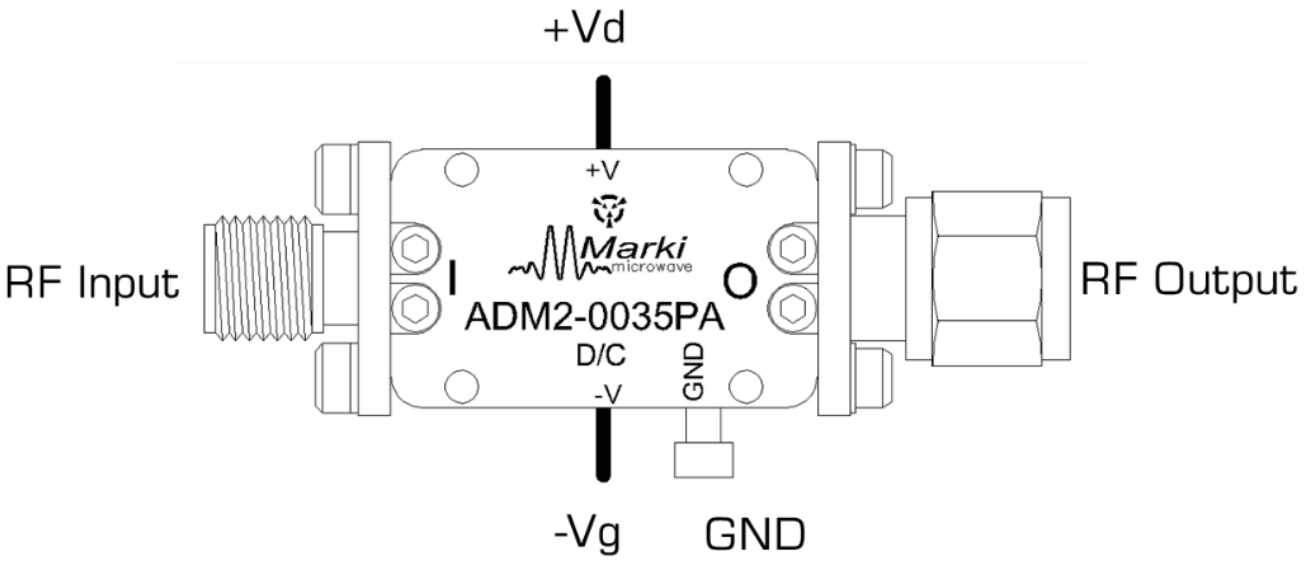
Revision History

Revision Code	Revision Date	Comment
-	2020-01-01	Datasheet Initial Release
-	2020-02-01	Added Heat Sinking Information, Updated Production Specs

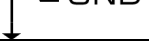
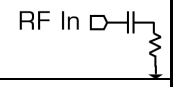
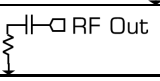
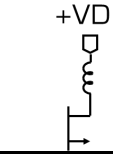
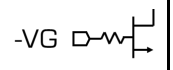
Port Configuration and Functions

Port Diagram

A top-down port diagram of the ADM2-0035PA's connectorized package is shown below.



Port Functions

Port	Function	Connector Type	Description	DC Equivalent Circuit
GND	Ground	-	Exterior housing must be connected to a DC/RF ground potential with high thermal and electrical conductivity.	
RF In	RF Input	2.92F	This is the RF input of the amplifier. It is internally DC blocked.	
RF Out	RF Output	2.92M	This is the RF output of the amplifier. It is internally DC blocked.	
+Vd	Positive DC Supply Voltage	-	This supplies positive voltage to both internal amplifier stages. A larger positive supply voltage will increase linearity, power output, and power consumption, with minimal effect on small signal gain. All DC current will flow through this port.	
-Vg	Negative DC Supply Voltage	-	This supplies negative gate voltage to both internal amplifier stages. More negative gate voltage will result in lower DC current draw to the +Vd port. For thermal and performance reasons, we recommend using -0.25 V as the gate bias voltage.	

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.

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	85	°C
Maximum Storage Temperature	150	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C
Negative Bias Current (Pin 4)	400	µA
Negative Bias Voltage (Pin4)	-2	V
Positive Bias Current (Pin1)	550	mA
Positive Bias Voltage (Pin1)	9	V
RF Input Power	20	dBm

Package Information

Parameter	Details	Rating
ESD	< 250 Volts	HBM Class 0
Weight	Package name: PA	14.1g
Dimensions	-	21.84 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
Ambient Temperature	-55	25	28	°C
Positive DC Voltage	3	7	7	V
Positive DC Current	200	320	400	mA
Negative DC Voltage [1]	-0.5	-0.25	0	V

[1] Lower gate voltages (more negative) will limit current consumption. For grounded-gate operation or gate voltages larger than -0.15 V, we recommend using a heat sink to prevent overheating.

Sequencing Requirements

There is no sequencing required for this part, however, if not using an additional heat sink, we recommend connecting the negative VG voltage either before or simultaneously to connecting the positive VD voltage to avoid excessive self-heating from high current consumption.

Heat Sinking

We have observed non-catastrophic self-heating in normal 7V/-0.25V operation which results in decreased gain and output power over time. To maintain peak performance, we recommend attaching a heat sink to the ADM2-0035PA module. We will be adding an alternate ADM2-0035PA-H module that comes with an attached heat sink in the near future.

Electrical Specifications

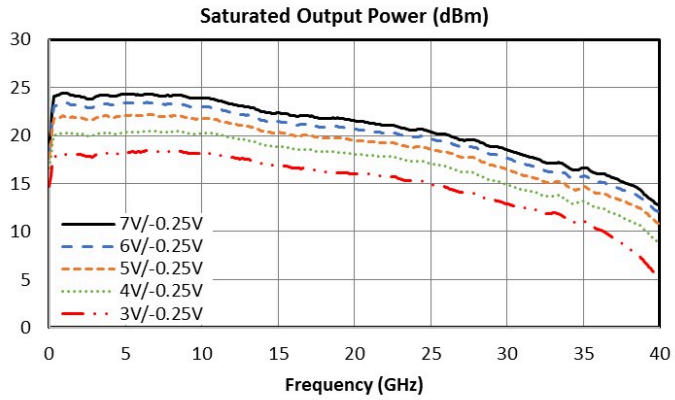
The electrical specifications apply at TA=+25°C in a 50Ω system. Min and Max limits apply only to our connectorized units and are guaranteed at TA=+25°C.

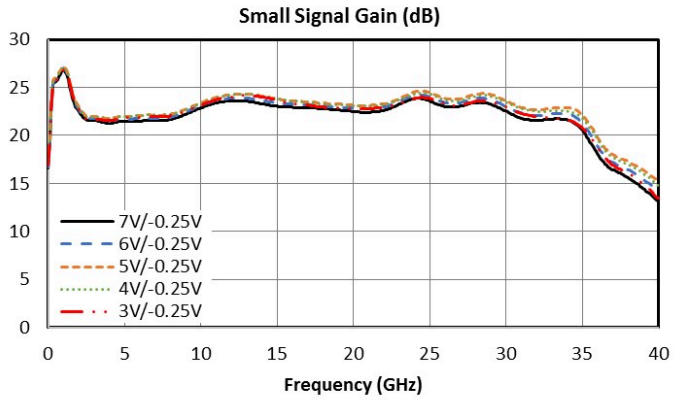
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Bias Requirements [1]	7V/-0.25V	-	-	-	320	-	mA
Input IP3	7V/-0.25V bias, -25 dBm Input Power	0.2	35	-	7	-	dBm
Input Return Loss	7V/-0.25V bias, -25 dBm Input Power	0.2	35	-	14	-	dB
Noise Figure	7V/-0.25V	0.2	26.5	-	5	-	dB
Output IP3	7V/-0.25V bias, -25 dBm Input Power	0.2	35	-	30	-	dBm
Output Power	7V/-0.25V bias, +5 dBm Input Power	0.2	24	19	23	-	dBm
Output Power	7V/-0.25V bias, +5 dBm Input Power	24	35	15	19	-	dBm
Output Return Loss	7V/-0.25V bias, -25 dBm Input Power	0.2	35	-	24	-	dB
P1dB	7V/-0.25V bias	0.2	24	-	18	-	dBm
P1dB	7V/-0.25V bias	24	35	-	13	-	dBm
Reverse Isolation	7V/-0.25V bias, -25 dBm Input Power	0.2	35	-	80	-	dB
Small Signal Gain	7V/-0.25V bias, -25 dBm Input Power	29	34	19	23	-	dB
Small Signal Gain	7V/-0.25V bias, -25 dBm Input Power	0.2	29	20	23	-	dB

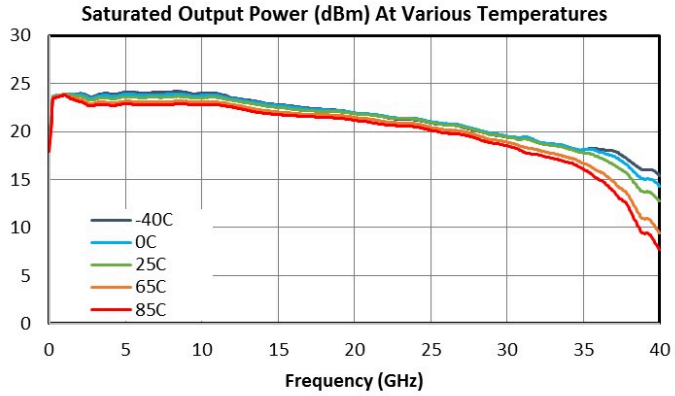
[1] Bias conditions refer to operation with no RF input power. See section 3.6 for relationship between RF input power and DC current draw.

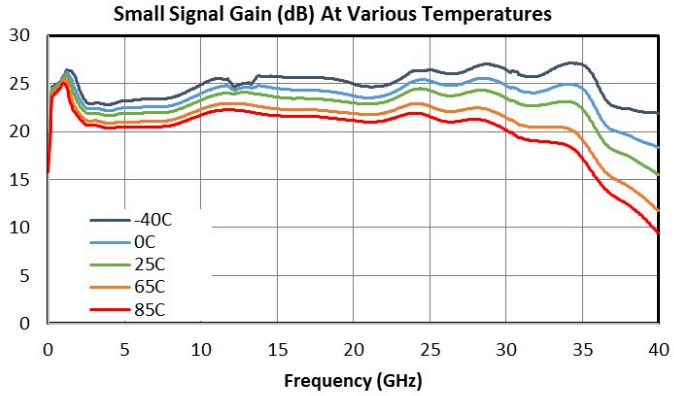
Typical Performance Plots

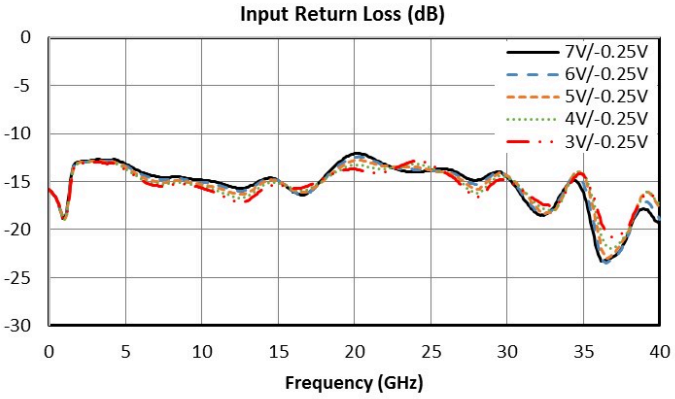
[4] At high RF power, rectified gate current pulls down the gate voltages, resulting in a lower overall DC current draw.

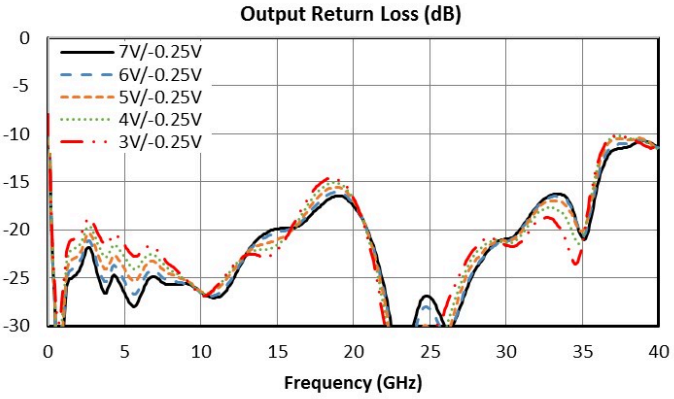




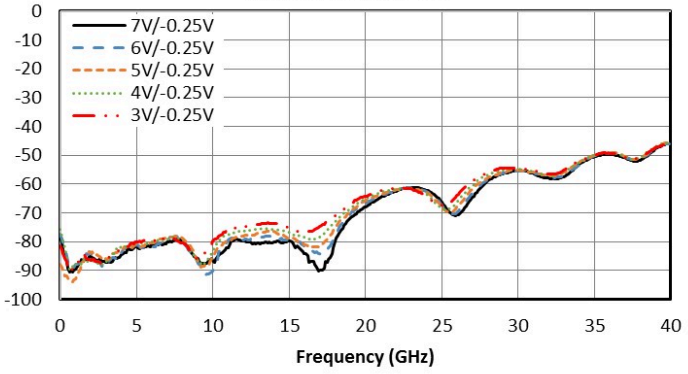




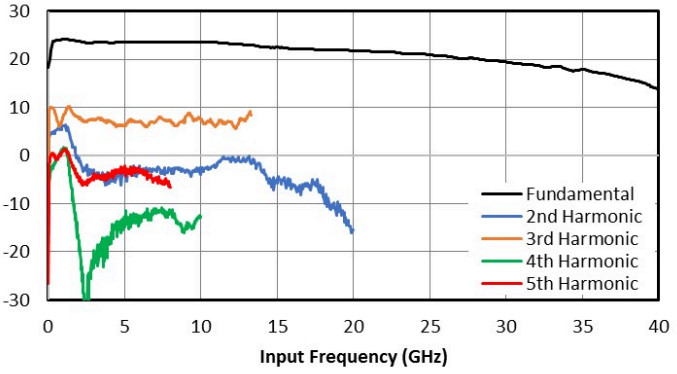




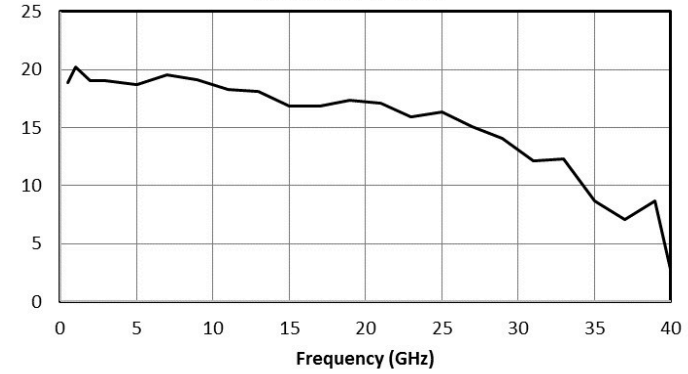
Reverse Isolation (dB)



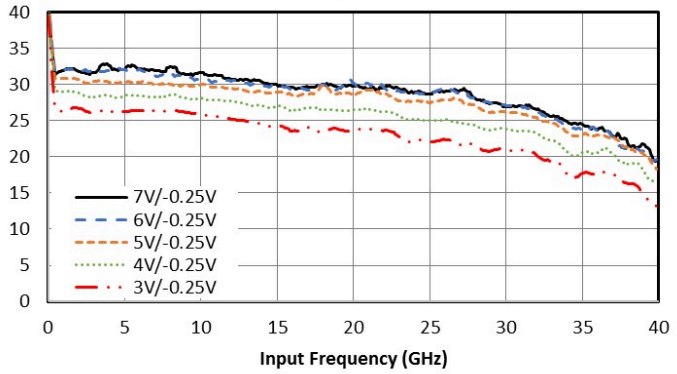
Saturated Harmonic Response (dBm), +5 dBm P_{in}, 7V/-0.25V



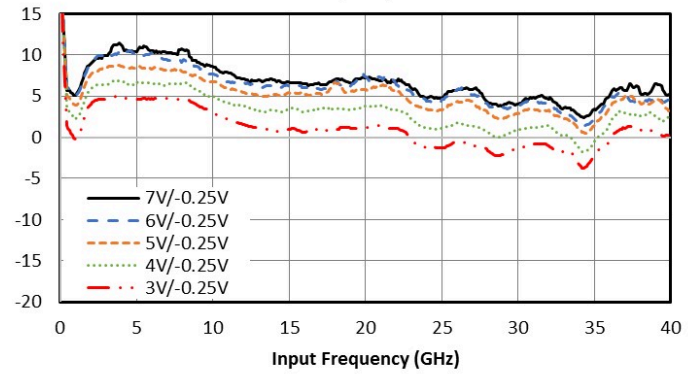
P_{1dB} (dBm) 7V/-0.25V



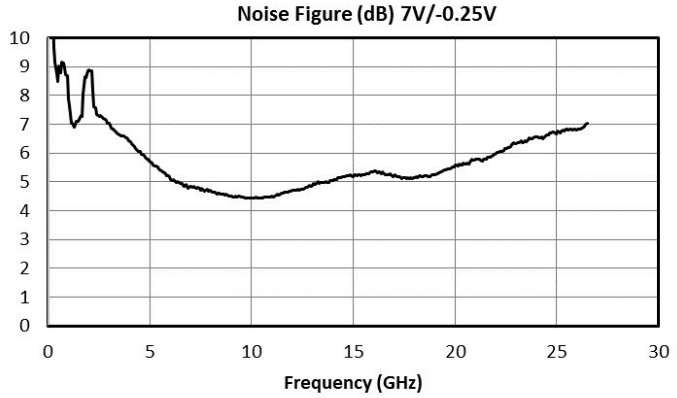
OIP3 (dBm)



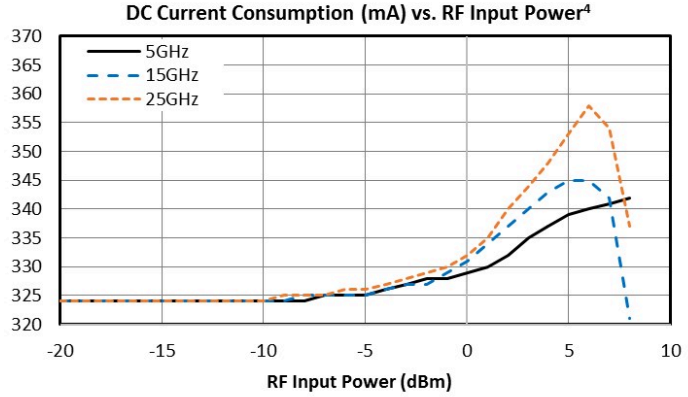
IIP3 (dBm)



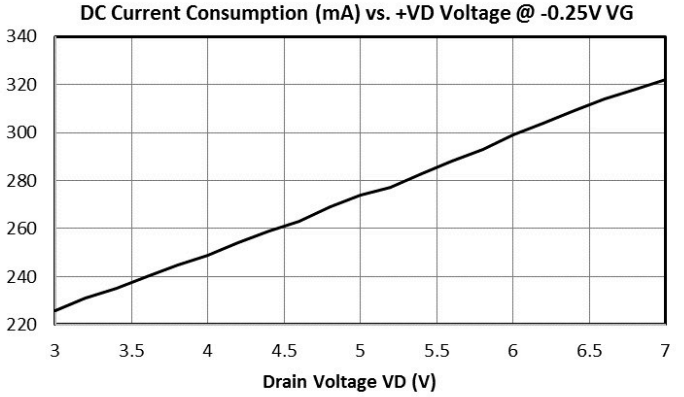
Noise Figure (dB) 7V/-0.25V



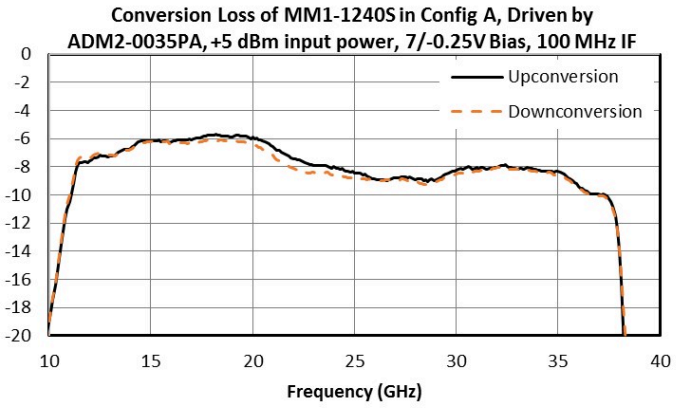
DC Current Consumption (mA) vs. RF Input Power[4]

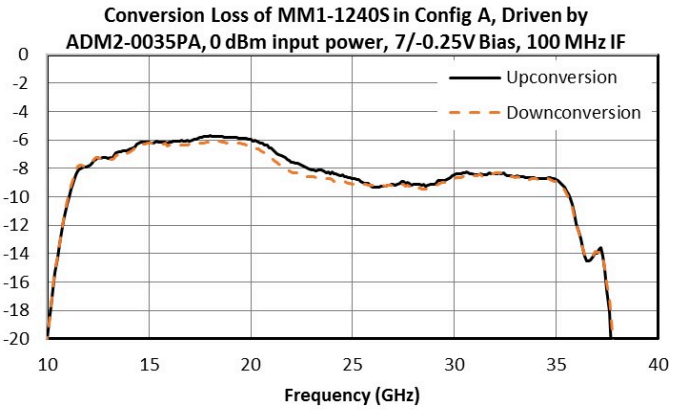


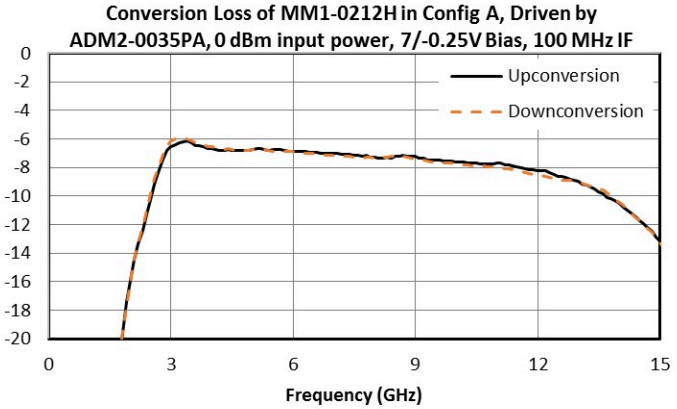
DC Current Consumption (mA) vs. +VD Voltage @ -0.25V VG

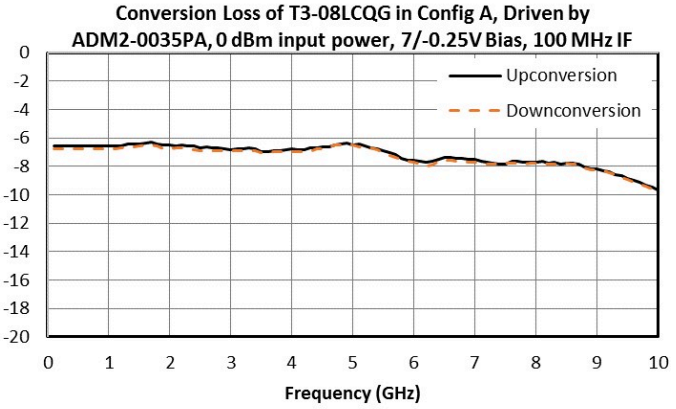


Typical Mixer Performance Plots with ADM2-0035PA as LO Driver





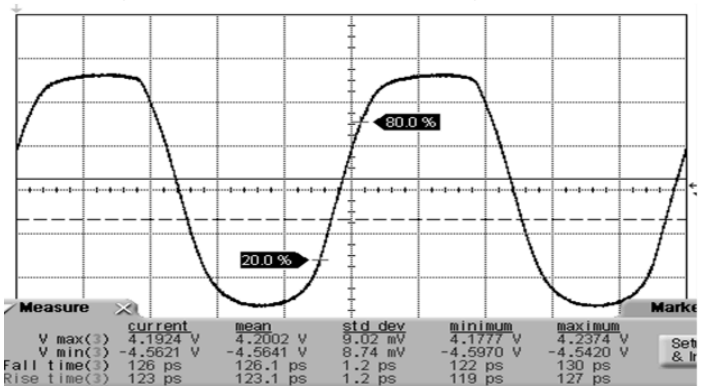




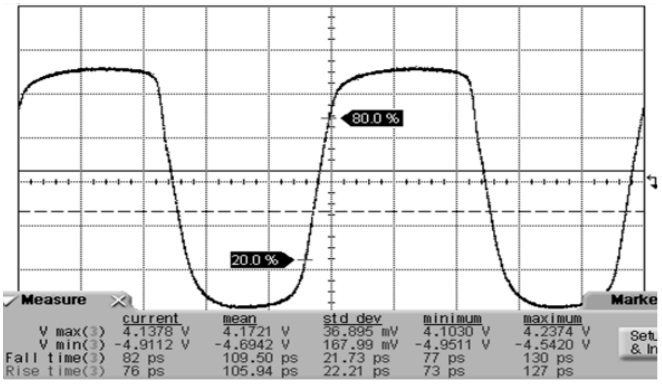
Time Domain Plots of Output Waveform

Square wave compression is a desirable LO Driver characteristic for linear operation of Marki T3 mixers

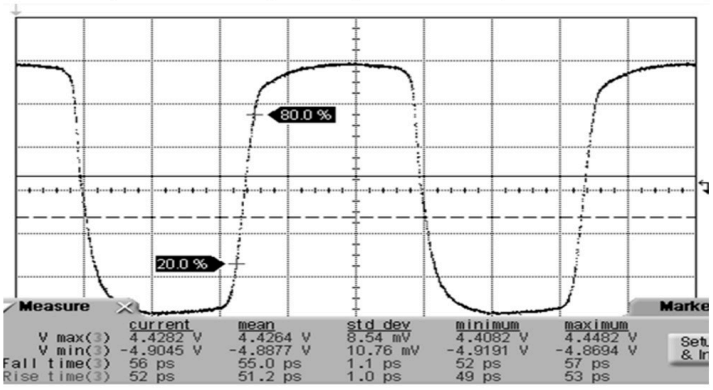
Output Waveform, 1 GHz, 0 dBm Input Power



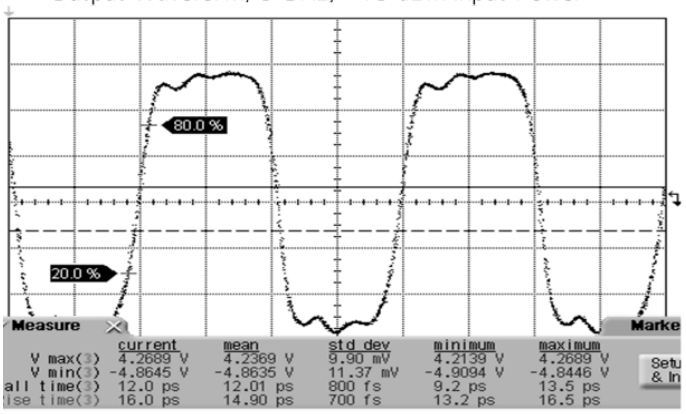
Output Waveform, 1 GHz, +5 dBm Input Power



Output Waveform, 1 GHz, +10 dBm Input Power



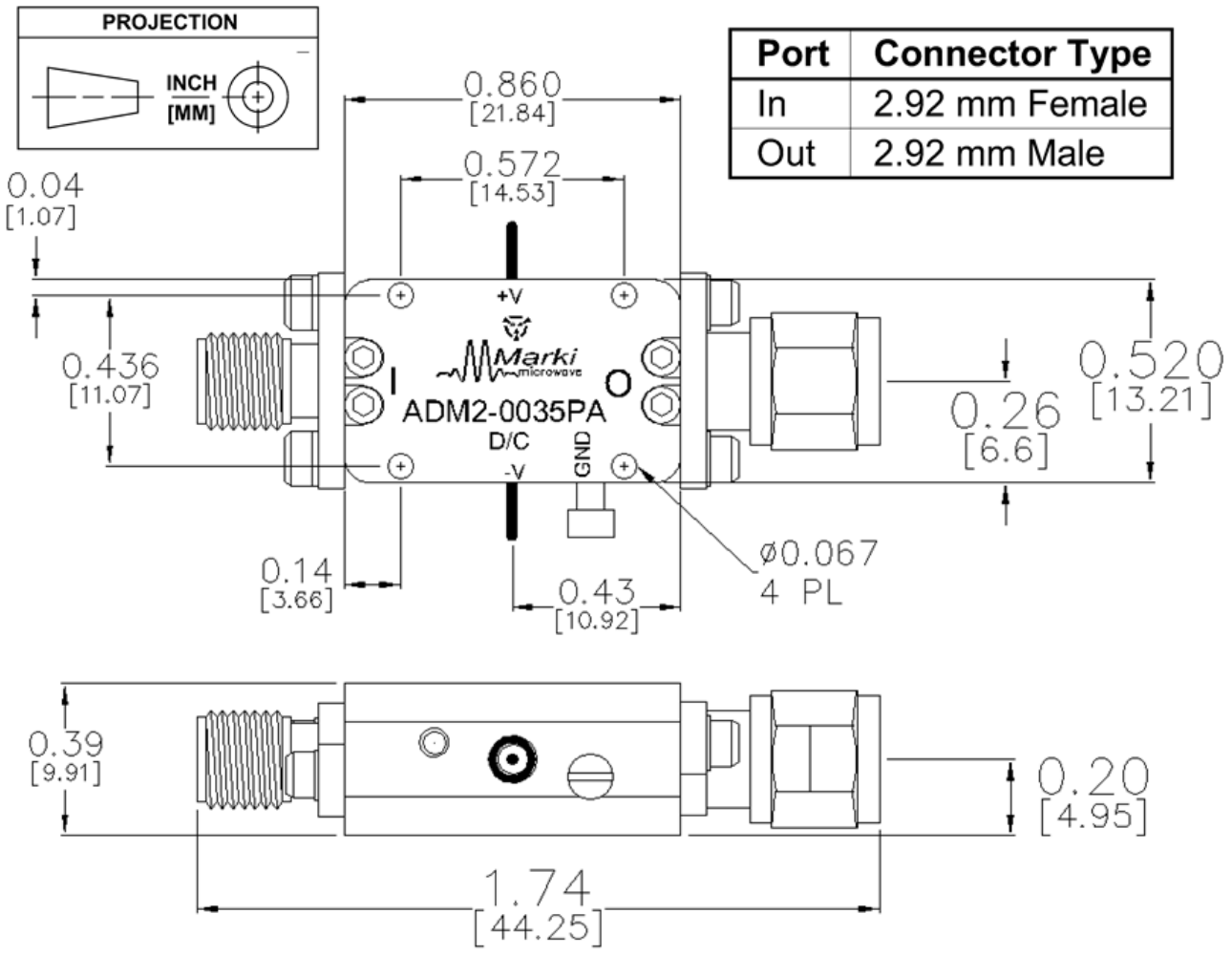
Output Waveform, 5 GHz, +10 dBm Input Power



Mechanical Data

Outline Drawing

Download : Outline 3D Drawing | Outline 3D STP



Port	Connector Type
In	2.92 mm Female
Out	2.92 mm Male

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