

2 - 40 GHz Wideband LO Driver Amplifier

ADM1-8007PC

1. Device Overview

1.1 General Description

The ADM1-8007PC is a high-linearity, high gain, low noise distributed amplifier capable of providing +20dBm output power up to 35 GHz. When driven with an input power of 0 to +5 dBm, the ADM1-8007PC can provide sufficient LO drive to power all H and most S diode mixers to 40GHz. The amplifier has excellent return losses and gain flatness.



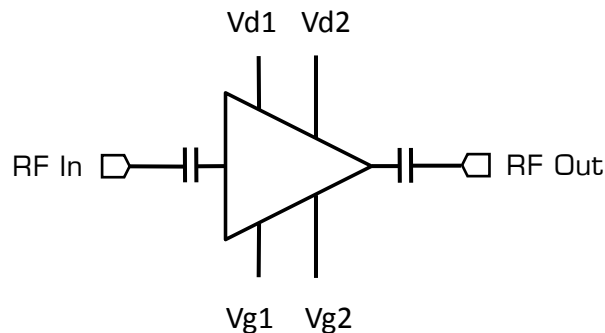
1.2 Features

- +22 dBm output power
- +22 dB gain
- 3.3dB Noise Figure
- Excellent gain flatness
- No negative bias or bias sequencing
- No external bias tee required
- .s2p S-Parameters: [ADM1-8007PC](#)

1.3 Applications

- Mobile test and measurement equipment
- Radar and satellite communications
- 5G Transceivers
- Driver amplifier H & S – diode mixers

1.4 Functional Block Diagram



1.5 Part Ordering Options¹

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
ADM1-8007PC	Connectorized Module	PC	RoHS	Active	EAR99

¹ Refer to our [website](#) for a list of definitions for terminology presented in this table.

Table of Contents

1. Device Overview	1	3.3 Sequencing Requirements	6
1.1 General Description.....	1	3.4 Electrical Specifications	6
1.2 Features	1	3.5 ADM1-8007PC Typical Performance Plots.....	7
1.3 Applications	1	3.6 Typical Performance Plots of Marki MM1-0330T with ADM1-8007PC	8
1.4 Functional Block Diagram	1	3.7 Typical Performance Plots of Marki MM1-1850S with ADM1-8007PC.....	8
1.5 Part Ordering Options.....	1	3.8 Typical Performance Plots of Marki MT3-0113SCQG with ADM1-8007PC ...	9
2. ADM1-8007PC Port Configurations and Functions	3	3.9 Typical Performance Plots of Marki MM1-1044L with ADM1-8007PC	9
2.1 ADM1-8007PC Port Diagram	3	4. Mechanical Data.....	10
2.2 ADM1-8007PC Port Functions.....	4	4.1 ADM1-8007PC Package Outline Drawing	10
3. Specifications	5		
3.1 Absolute Maximum Ratings.....	5		
3.2 Recommended Operating Condition...	5		

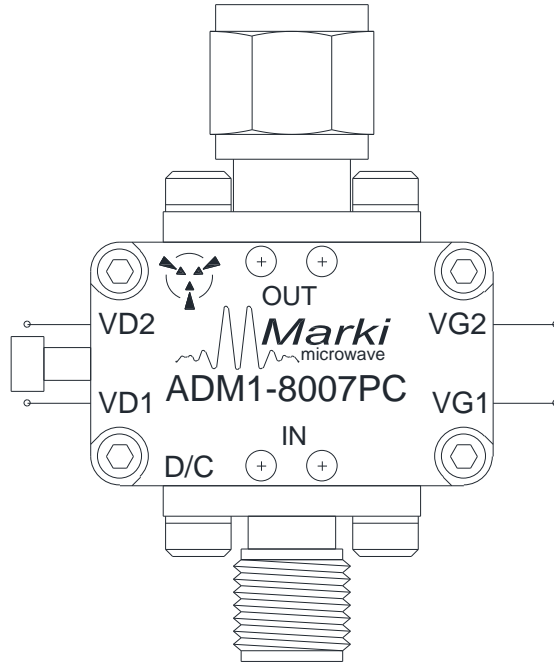
Revision History

Revision Code	Revision Date	Comment
-	October 2022	Initial Release

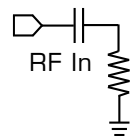

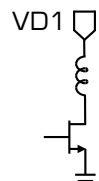
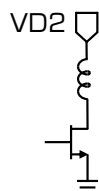
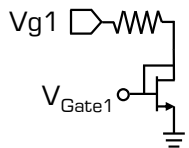
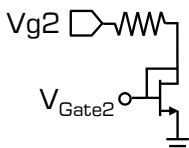
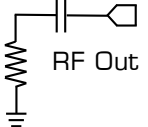
2. ADM1-8007PC Port Configurations and Functions

2.1 ADM1-8007PC Port Diagram

A port diagram of the ADM1-8007PC is shown below.



2.2 ADM1-8007PC Port Functions

Pin	Function	Description	Equivalent Circuit for Package
IN	RF Input	This is the RF Input port of the amplifier die. It is RF matched to 50 Ω , and has built-in DC blocking capacitors.	
GND	Ground	Housing or outside of the coaxial cables must be connected to a DC/RF ground potential with high thermal and electrical conductivity.	
VD1	Stage 1 Drain Supply Pin	The VD pin supplies DC voltage to the drain of the amplifier IC.	
VD2	Stage 2 Drain Supply Pin	The VD pin supplies DC voltage to the drain of the amplifier IC.	
VG1	Stage 1 Bias Voltage	VG1 provides bias for an internal current mirror that sets the current draw for amplifier input stage. Current is limited by an internal series resistor. Increasing voltage on this pin will increase gain at the expense of efficiency.	
VG2	Stage 2 Bias Voltage	VG2 provides bias for an internal current mirror that sets the current draw for amplifier output stage. Increasing voltage on this pin will increase gain at the expense of efficiency.	
OUT	RF Output	This is the amplifier's RF Output. It is RF matched to 50 Ω and has built-in DC blocking capacitors.	

3. Specifications

3.1 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	Units
Drain Supply Voltage (Vd1,Vd2)	+8	V
Drain Current (Id1+Id2)	400	mA
Bias Voltage (Vg1,Vg2)	8	V
Bias Current (Ig1+Ig2)	95	mA
RF Input Power	+15	dBm
Operating Temperature for MTTF > 1E6 hours	-40 to +85	°C
Storage Temperature	-65 to +125	°C

3.2 Recommended Operating Condition

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.

Recommended Operating Conditions	Min	Nominal	Max	Units
T _A , Ambient Temperature	-40	+25	+85	°C
Power Supply DC Voltage (Vd1,Vd2)	+3	+5	+6	V
Power Supply DC Voltage (Vg1,Vg2)	+3	+5	+6	V
Power Supply DC Current (Id1+Id2) (No RF Input) ²	122	213	253	mA
Power Supply DC Current (Ig1+Ig2) (No RF Input) ³	11	19	23	mA
Input Power for Saturation	0	+1	+8	dBm

² Recommended operating current conditions without RF input applied.

³ Recommended operating current conditions without RF input applied. Bias current into Vg pin.

3.3 Sequencing Requirements

There is no sequencing required to power up or power down the amplifier. The amplifier must have an output load connected during operation.

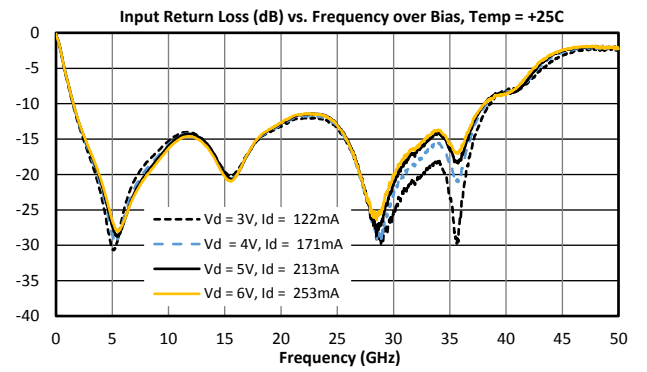
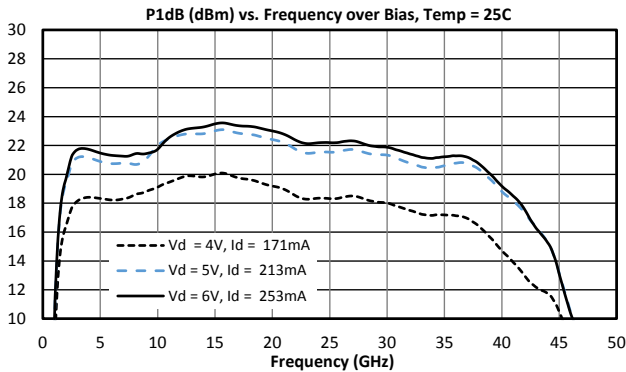
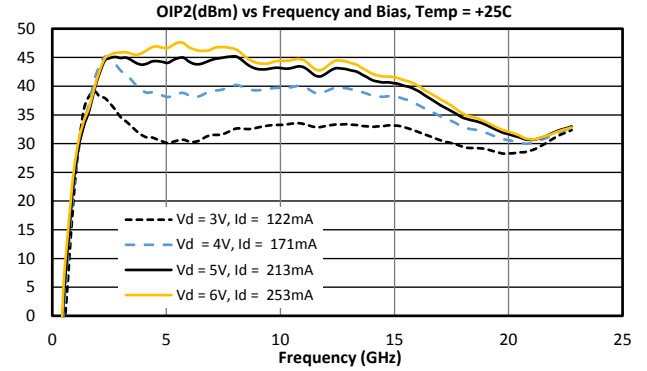
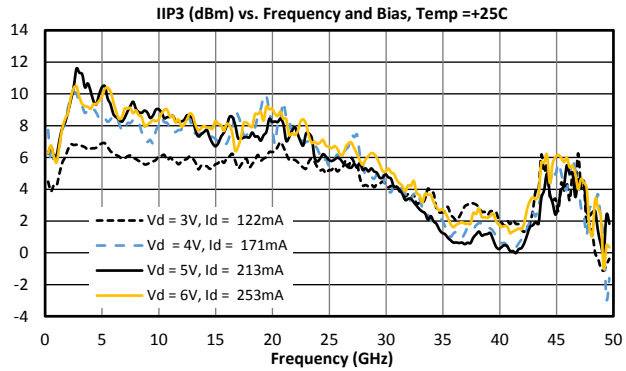
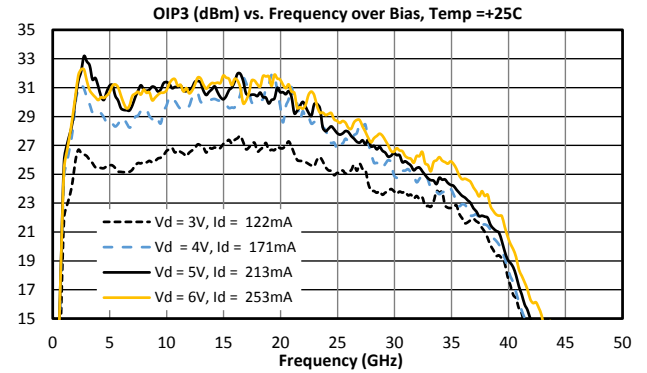
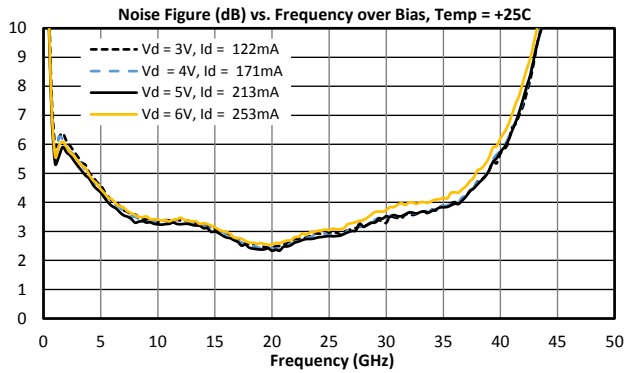
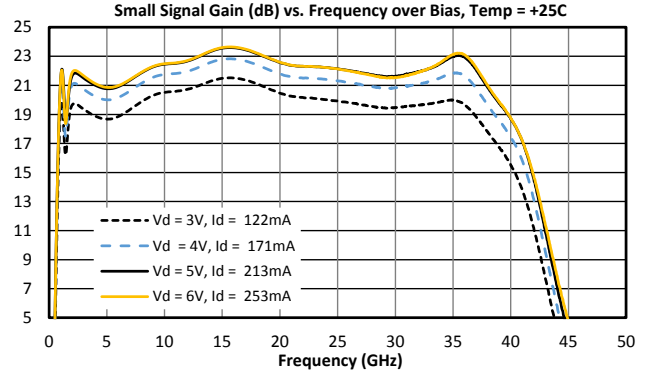
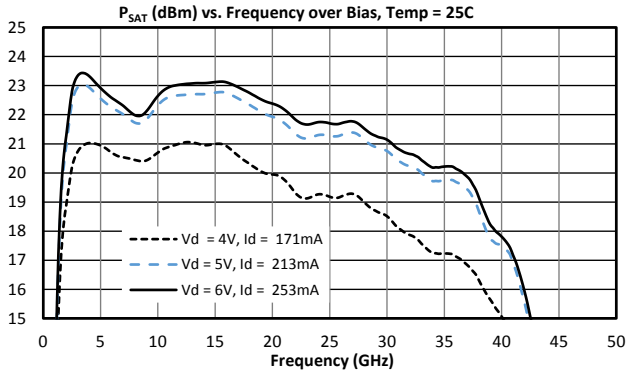
3.4 Electrical Specifications

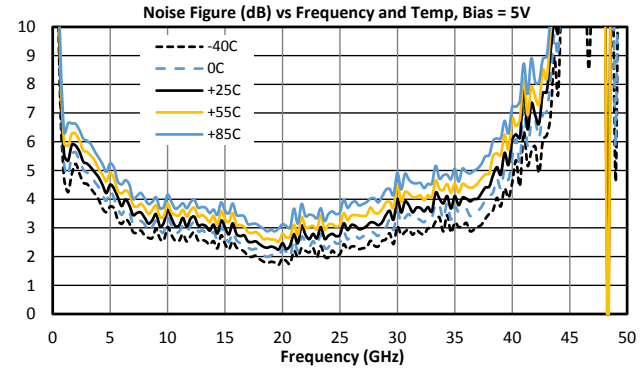
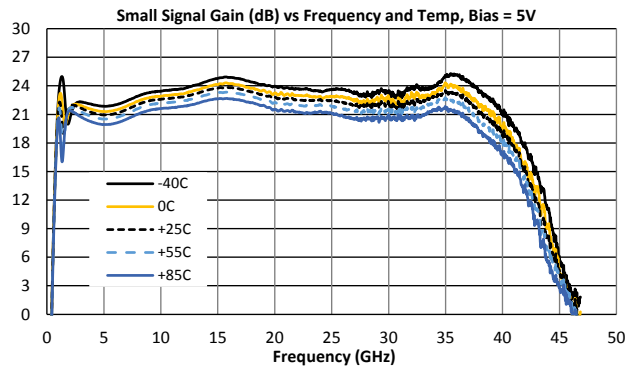
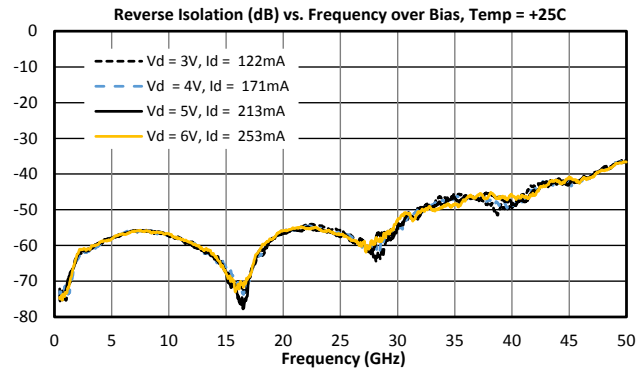
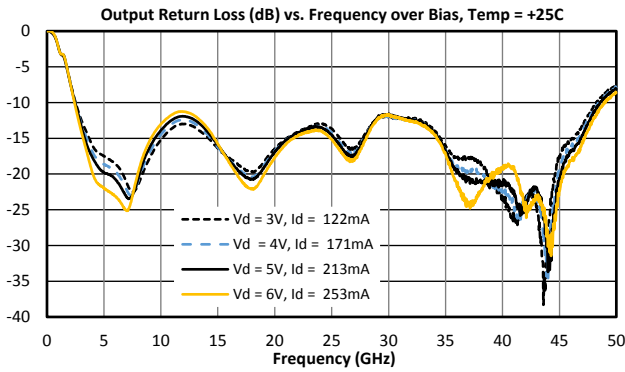
Unless otherwise specified, electrical specifications apply at $T_A=+25^\circ\text{C}$, $V_{d1}, V_{d2}, V_{g1}, V_{g2} = 5\text{ V}$.

Min and Max limits apply only to our connectorized units and are guaranteed at $T_A=+25^\circ\text{C}$

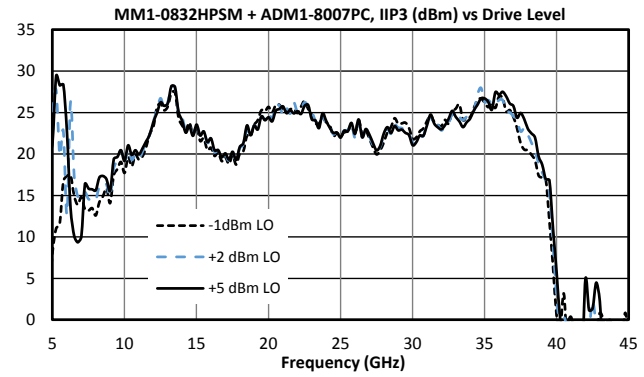
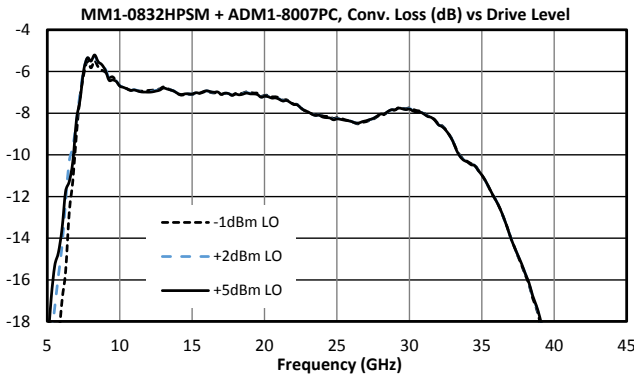
Parameter	Test Conditions	Frequency	Min	Typical	Units
Saturated Output Power	$V_{d1}, V_{d2}, V_{g1}, V_{g2} = 5\text{ V}$	2 GHz – 27 GHz		+22	dBm
		27 GHz – 40 GHz		+20	dBm
Small Signal Gain	$V_{d1}, V_{d2}, V_{g1}, V_{g2} = 5\text{ V}$ $P_{in} = -20\text{ dBm}$	2 GHz – 40 GHz		22	dB
Input Return Loss				15	
Output Return Loss				15	
Reverse Isolation				55	
Noise Figure				3.3	
Input IP3	$V_{d1}, V_{d2}, V_{g1}, V_{g2} = 5\text{ V}$ $P_{in} = -24\text{ dBm}$ per tone, 1 MHz tone spacing	2 GHz – 20 GHz		+9	dBm
Output IP3		20 GHz – 40 GHz		+5	
		2 GHz – 20 GHz		+30	
Output IP2		20 GHz – 40 GHz		+25	
		2 GHz – 12 GHz		+45	
		12 GHz – 22 GHz		+37	
Output P1dB	$V_{d1}, V_{d2}, V_{g1}, V_{g2} = 5\text{ V}$	2 GHz – 40 GHz		+21	
Input Power for Saturation		2 GHz – 27 GHz		+2	
		27 GHz – 40 GHz		+0	
DC Supply Quiescent Current (I_{dq}) (Drain + Bias Current)	$V_{d1}, V_{d2}, V_{g1}, V_{g2} = 5\text{ V}$ no RF input			232	mA

3.5 ADM1-8007PC Typical Performance Plots

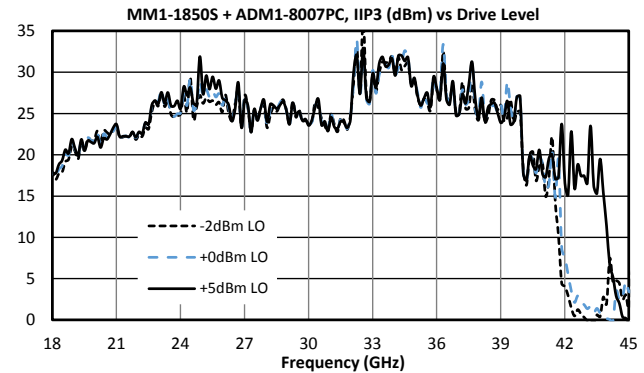
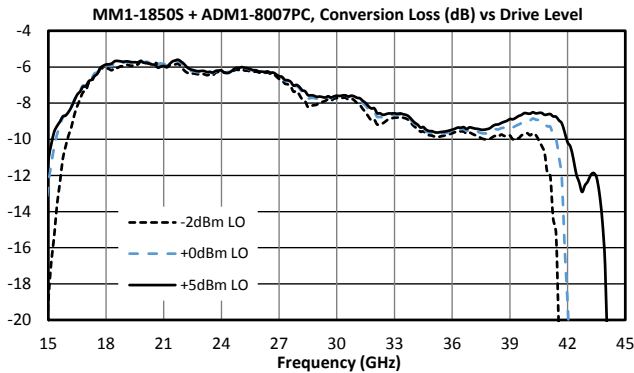




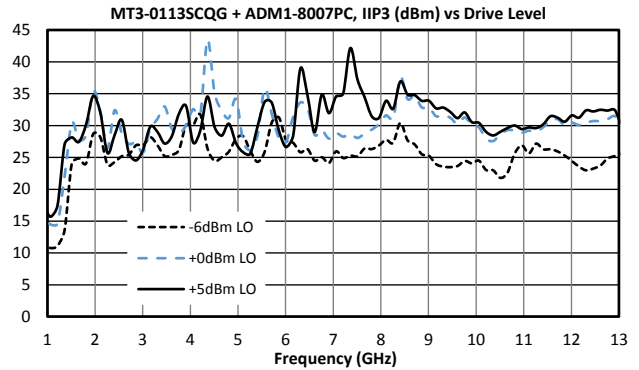
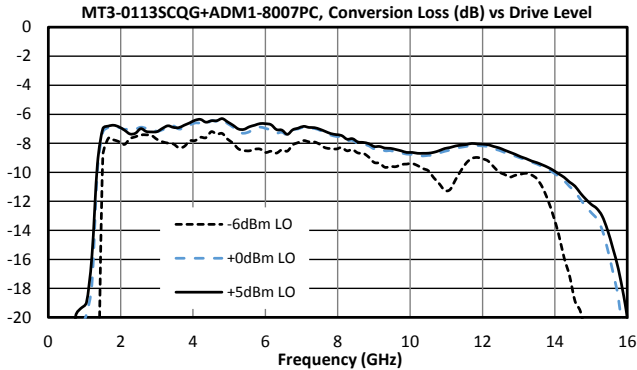
3.6 Typical Performance Plots of Marki MM1-0832HPSM with ADM1-8007PC



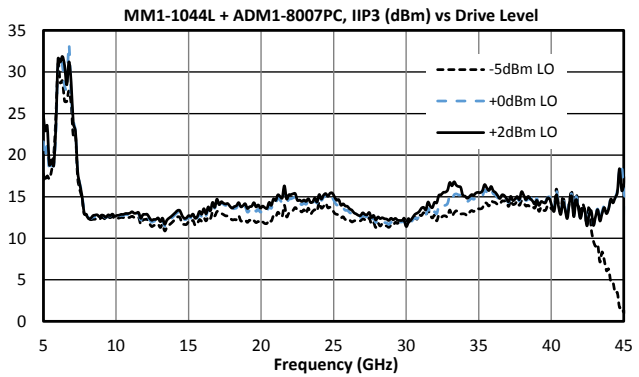
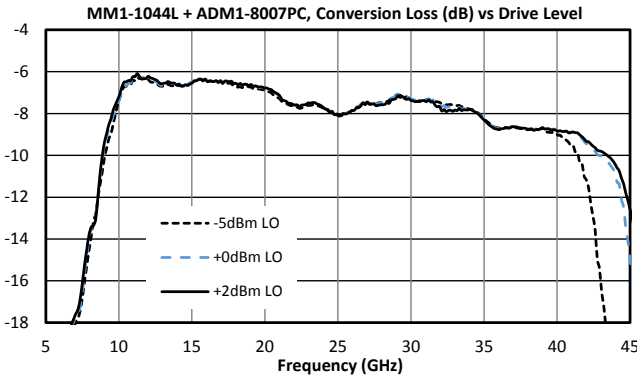
3.7 Typical Performance Plots of Marki MM1-1850S with ADM1-8007PC



3.8 Typical Performance Plots of Marki MT3-0113SCQG with ADM1-8007PC



3.9 Typical Performance Plots of Marki MM1-1044L with ADM1-8007PC



4. Mechanical Data

4.1 ADM1-8007PC Package Outline Drawing

