

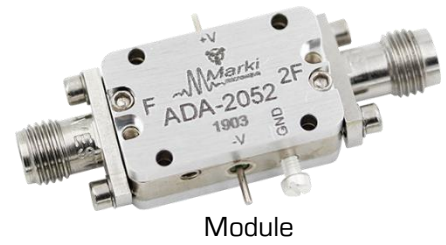
AMPLIFIER/DOUBLER/AMPLIFIER

ADA-2052

1. Device Overview

1.1 General Description

The ADA-2052 can be used as a frequency extender to enhance the frequency range of a <26 GHz synthesizer up to 52 GHz. Useful for lab testing, test and measurement, and prototype systems. It consists of an input buffer ADM-5974CH amplifier, MMD-2060HCH doubler, and output buffer AMM-6702CH amplifier to provide a +16 dBm output (suitable for driving most mixers) from a -6 to +2 dBm input.

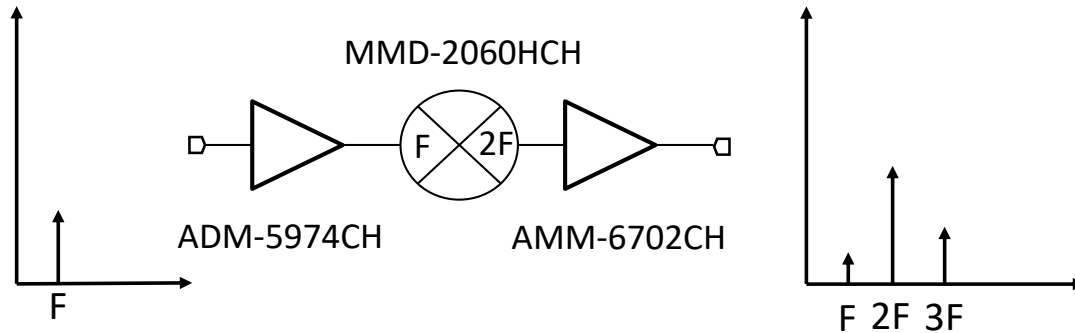


Module

1.2 Electrical Summary

Parameter	Typical	Unit
Input Frequency Range	10 – 26	GHz
Output Frequency Range	20 - 52	GHz
Input Power	-6 to +2	dBm
Output Power	+16	dBm
1F Harmonic suppression	30	dBc
3F Harmonic suppression	26	dBc

1.3 Functional Block Diagram



1.4 Part Ordering Options¹

Part Number	Description	Green Status	Product Lifecycle	Export Classification
ADA-2052	Connectorized module	RoHS	Active	EAR99

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

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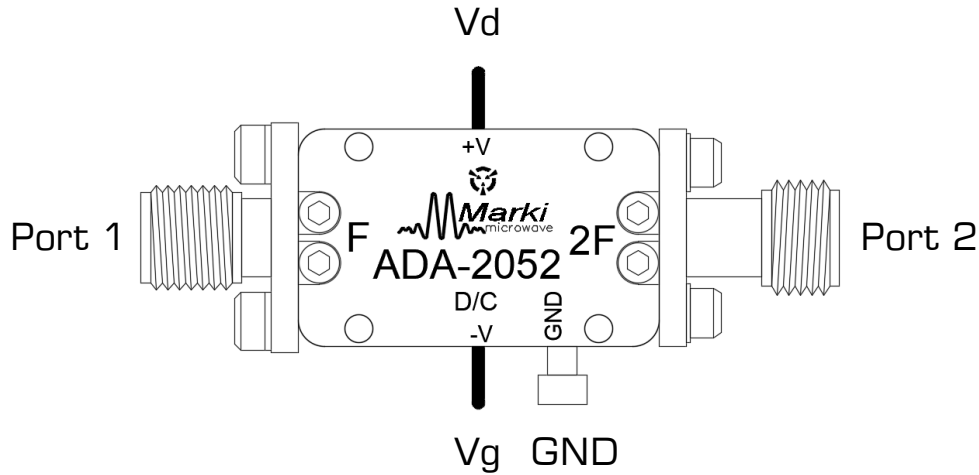
Revision History

Revision Code	Revision Date	Comment
-	February 2019	Datasheet Initial Release
A	January, 2020	Added Sequencing Requirements
B	June, 2020	Updated Outline Drawing and Port Diagram
C	August, 2020	Updated Chipset Information

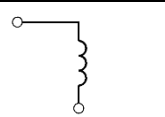
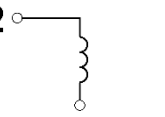
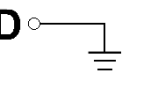
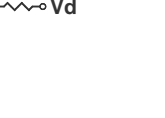
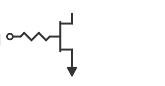
2. Port Configurations and Functions

2.1 Port Diagram

A top-down view of the ADA-2052 outline drawing is shown below.



2.2 Port Functions

Port	Function	Description	Equivalent Circuit
Port 1	Input	This pin is DC open and matched to 50 Ω at frequency range 10 - 26 GHz	P1 
Port 2	Output	This pin is DC open and matched to 50 Ω at frequency range 20 - 52 GHz	P2 
GND	Ground	Ground path is provided through the metal housing and outer ground lug.	GND 
Vd	Positive bias	Drain bias port must be connected to a 3.5 - 5.0 Volt power supply.	
Vg	Negative bias	Gate control for the amplifier must be connected to a -0.5 to -0.6 Volt power supply.	

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 be inoperable or have a reduced lifetime.

Absolute Maximum Ratings	
Parameter	Maximum Rating
Positive Bias Voltage	5 V
Positive Bias Current	550 mA
Negative Bias Voltage	-2 V
Negative Bias Current	2 mA
RF Input Power	+20 dBm
Power Dissipation	2.5 W
ESD (Human Body Model)	Class 1A
Operating Temperature	-55°C to +85°C
Storage Temperature	-65°C to +150°C

3.2 Sequencing Requirements

Turn-on Procedure:

- 1) Apply -0.6V to Vg
- 2) Apply Vd

Turn-off Procedure:

- 1) Turn off Vd
- 2) Turn off Vg

3.3 Electrical Specifications

The electrical specifications apply at $T_A = +25^\circ\text{C}$ in a 50Ω system.

Parameter	INPUT (GHz)	OUTPUT (GHz)	Min	Typ.	Max
Input (dBm) F(in)	10.0 – 26.0		-6	0	
Output Converted Power (dBm) 2F(out)		20.0 – 52.0	+14	+16	
Suppressions (dBc) F(in) Fundamental 3F(out) Third Harmonic		10.0 - 26.0 30.0 - 60.0		30 26	
Bias Requirements (mA) ¹ Vd: +4.0 Volts DC ² Vg: -0.6 Volts DC				400 0	

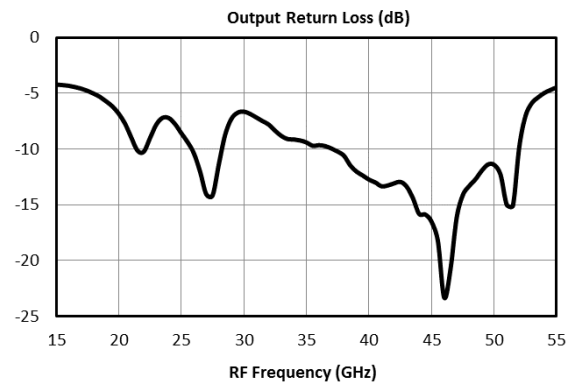
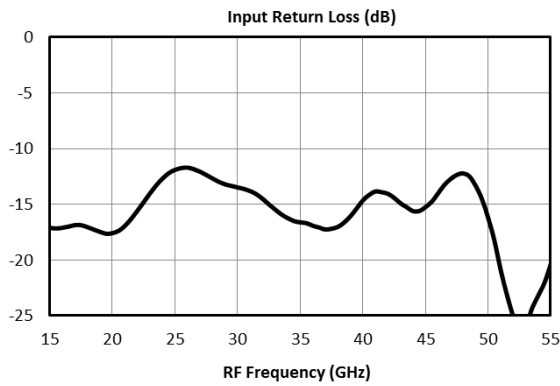
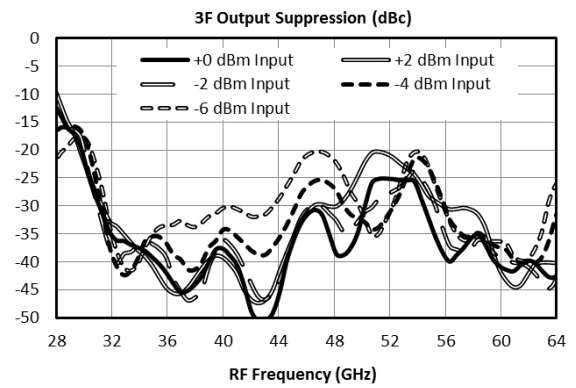
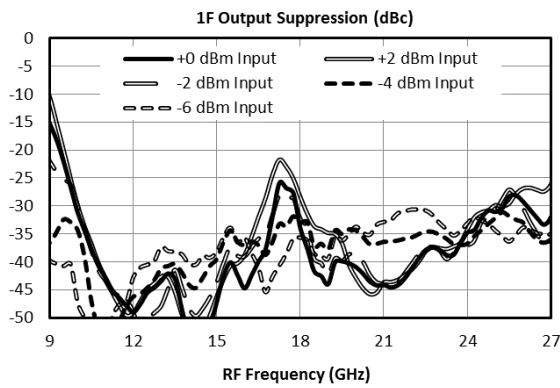
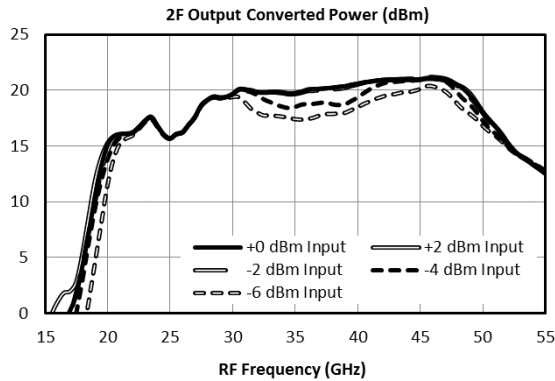
Suppression is relative to doubled output power. Isolation is defined as relative to the fundamental input power.

¹It is required that the negative bias be applied before or concurrent with the positive bias. Contact support@markimicrowave.com for alternate bias options.

²The higher input power the better 2F output power and the worse 1F suppression will be, (see plot **2F Output Converted Power**)

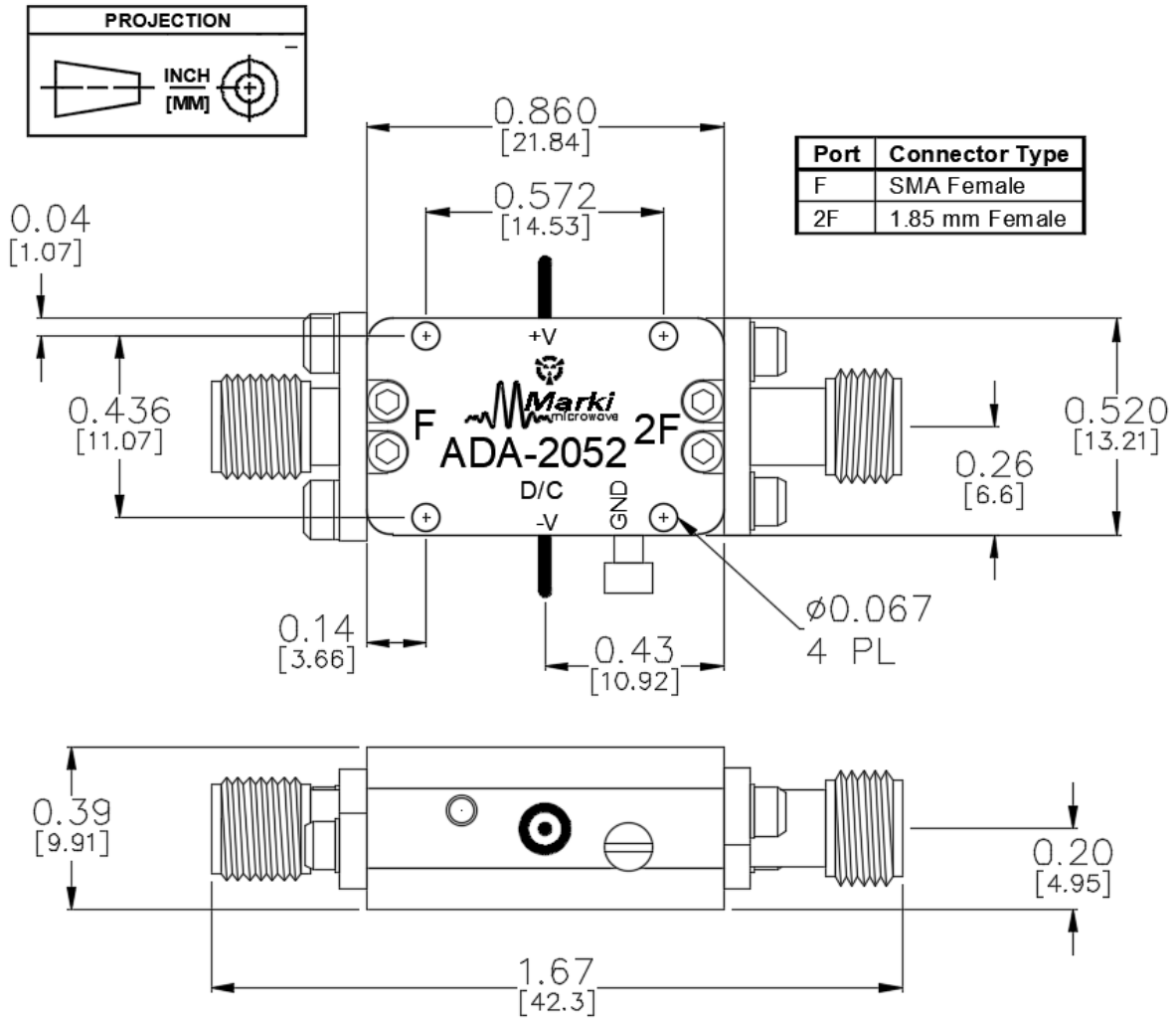
³Suppression and current consumption will vary with bias voltage. Optimal performance is at approximately +4.0 V / -0.6 V.

3.4 Typical Performance Plots



4. Mechanical Data

4.1 Outline Drawing



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