

Evaluating the ADL7075 100MHz to 31GHz, High Survivability, Low Noise Amplifier

FEATURES

- ▶ 4-layer Rogers 4350B evaluation board
- ▶ End launch, 2.9mm RF connectors
- ▶ Through calibration path (depopulated)

EVALUATION KIT CONTENTS

- ▶ ADL7075-EVALZ evaluation board

EQUIPMENT NEEDED

- ▶ RF signal generator
- ▶ RF spectrum analyzer
- ▶ RF network analyzer
- ▶ 5V, 500mA power supply
- ▶ External bias tee or external DC block

DOCUMENTS NEEDED

- ▶ [ADL7075](#) data sheet

GENERAL DESCRIPTION

The ADL7075-EVALZ is a 4-layer printed circuit board (PCB) fabricated from 10mil thick, Rogers 4350B, and copper clad.

The RFIN and RFOUT ports on the ADL7075-EVALZ are populated with 2.9mm, female coaxial connectors, and the corresponding RF traces have a 50 Ω characteristic impedance. The ADL7075-EVALZ is populated with components suitable for use over the entire -55°C to +125°C operating temperature range.

To calibrate board trace losses, a through calibration path, THRU-CAL, is provided between the J1 and J2 connectors. J1 and J2 must be populated with RF connectors to use the through calibration path. For the through calibration path performance, see [Figure 4](#) and [Table 1](#).

Access the ADL7075-EVALZ ground path and the VDD pin through the surface-mount technology (SMT) test point connectors, GND, and VDD. A supplementary test point for VBIAS is included for simple access on the RBIAS pin (for the test point locations, see [Figure 6](#)).

The RF traces on the ADL7075-EVALZ are 50 Ω , grounded, coplanar waveguide. The package ground leads and the exposed pads connect directly to the ground plane. Multiple vias connect the top and bottom ground planes with particular focus on the area directly beneath the ground paddle to provide adequate electrical conduction and thermal conduction.

The power-supply decoupling capacitors on the ADL7075-EVALZ represent the configuration used to characterize and qualify the device.

Full specifications on the ADL7075 are available in the ADL7075 data sheet available from Analog Devices, Inc., and must be consulted with this user guide when using the ADL7075-EVALZ evaluation board.

ADL7075-EVALZ EVALUATION BOARD PHOTOGRAPHS

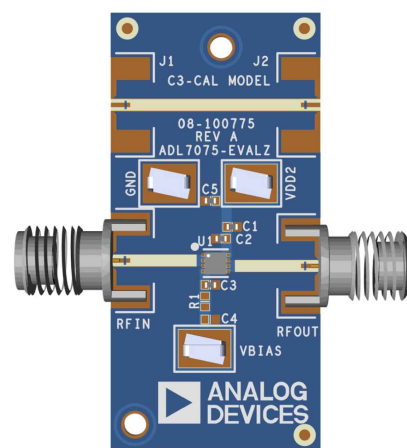


Figure 1. ADL7075-EVALZ Primary Side

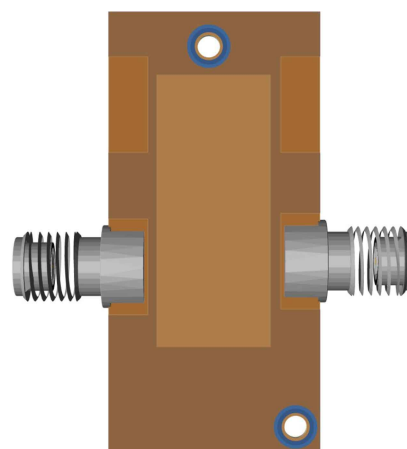


Figure 2. ADL7075-EVALZ Secondary Side

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REVISION HISTORY

7/2026—Revision 0: Initial Version

OPERATING THE ADL7075-EVALZ

A 5V, 500mA power supply is required to provide the bias to the ADL7075 when using the ADL7075-EVALZ. Connect the 5V power supply to the RBIAS and VDD2 test points. Connect the ground reference to the GND test point, and the external DC blocks to the RFIN and RFOUT connectors.

For the recommended resistor values to achieve different supply currents, refer to the ADL7075 data sheet. The default value of the external resistor, R1, connected on the ADL7075-EVALZ is 665Ω, which is the same value used to characterize the ADL7075.

The following bias conditions are recommended to achieve the performance specified in the ADL7075 data sheet: supply voltage (V_{DD}) = 5V, quiescent current (I_{DQ}) = 90mA, and bias resistance (R_{BIAS}) = 665Ω.

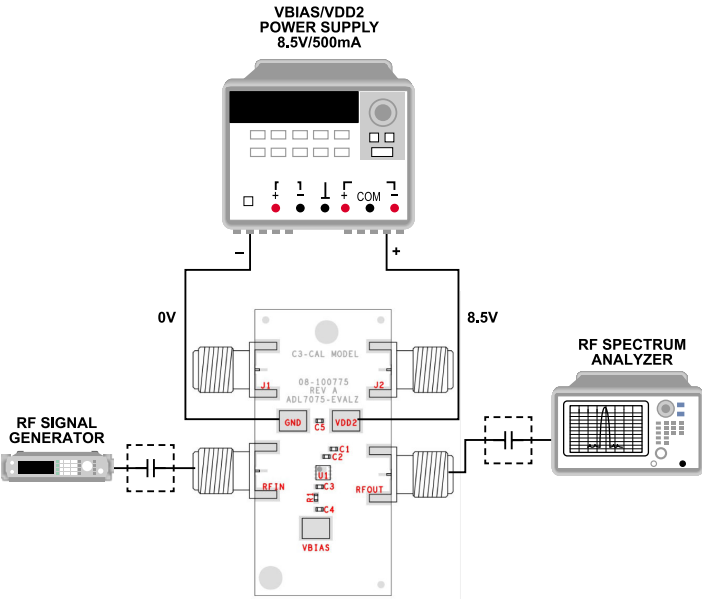


Figure 3. Operating Block Diagram of ADL7075-EVALZ

RECOMMENDED BIAS SEQUENCING

During Power-Up

To power up the ADL7075-EVALZ, follow this bias sequence:

1. Tie VBIAS and VDD2 together.
2. Connect the VBIAS and VDD2 power supply.
3. Set the VBIAS and VDD2 supply to 5V.
4. Apply the RF input signal.

During Power-Down

To power down the ADL7075-EVALZ, follow this bias sequence:

1. Turn off the RF input signal.
2. Set the VBIAS and VDD2 supply to 0V.

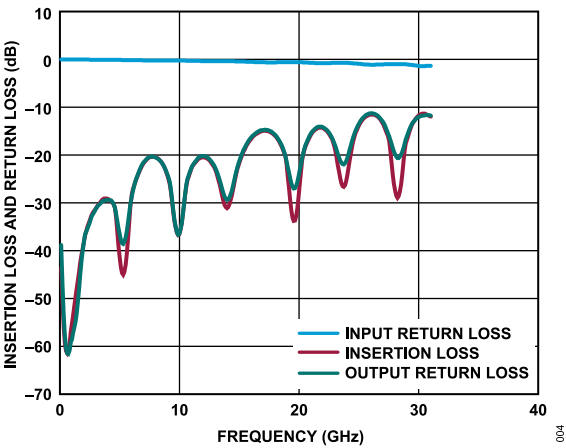


Figure 4. Insertion Loss and Return Loss of the Through Calibration Path

Table 1. Insertion Loss of the Through Calibration Path

Frequency (GHz)	Insertion Loss (dB)	Input Return Loss (dB)	Output Return Loss (dB)
1	0.02	-53.8	-57.4
3	0.07	-31.0	-31.0
5	0.11	-43.7	-37.9
7	0.19	-21.5	-21.3
9	0.22	-25.1	-24.8
11	0.29	-22.5	-22.3
13	0.34	-23.7	-23.4
15	0.43	-21.2	-20.9
17	0.60	-14.9	-14.8
19	0.55	-24.4	-22.5
21	0.72	-15.6	-15.3
23	0.73	-19.3	-18.2
25	0.93	-13.7	-13.3
27	1.03	-13.6	-13.2
29	1.04	-16.8	-16.0
31	1.32	-12.0	-11.8

EVALUATION BOARD SCHEMATIC AND ASSEMBLY DRAWING

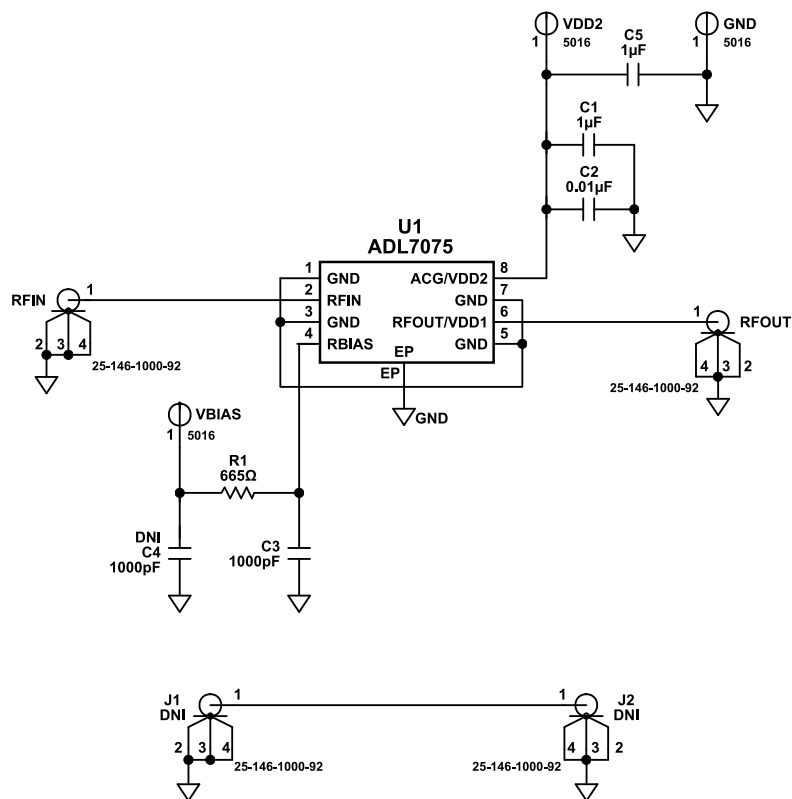


Figure 5. ADL7075-EVALZ Schematic

EVALUATION BOARD SCHEMATIC AND ASSEMBLY DRAWING

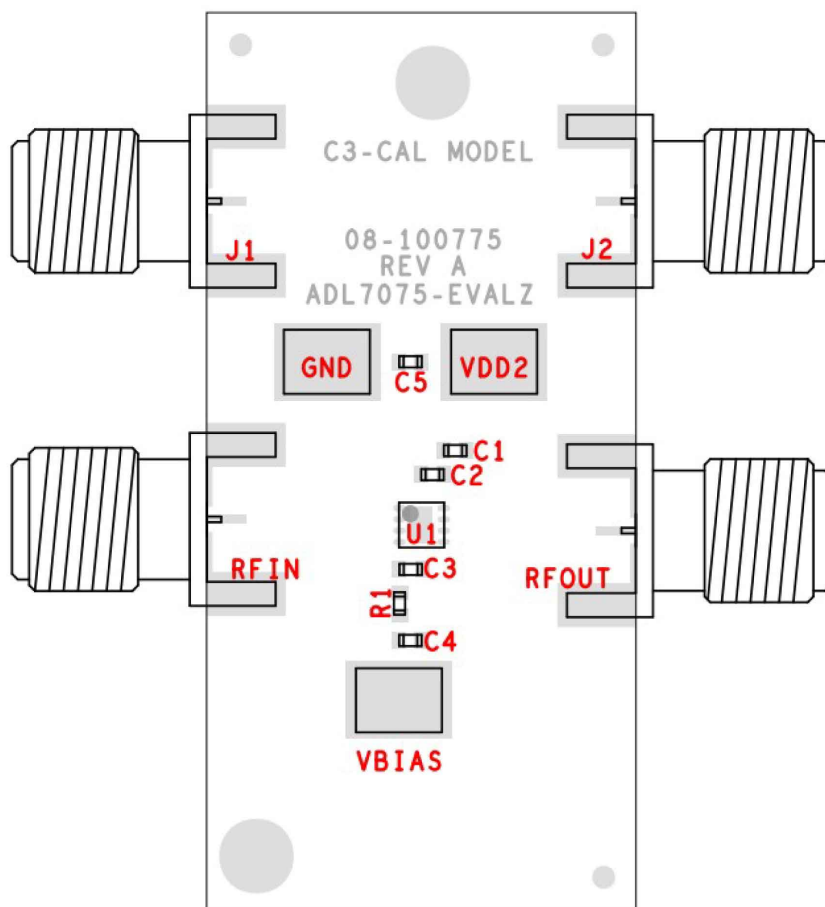


Figure 6. ADL7075-EVALZ Assembly Drawing (J1 and J2 Are Not Installed)

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ORDERING INFORMATION

ORDERING GUIDE

Model ¹	Description
ADL7075-EVALZ	Evaluation Board

¹ Z = RoHS-Compliant Part.

BILL OF MATERIALS

Table 2. ADL7075-EVALZ Bill of Materials

Reference Designator	Description	Manufacturer	Part Number
C1, C5	Ceramic capacitors, SMD, 0402, 1 μ F, 10%, 25V	Cal-Chip Electronics	GMC04X6S105K25NT
C2	Ceramic capacitor, SMT (0402), 0.01 μ F, 10%, 25V, X7R	TDK	CGA2B2X7R1E103K050BA
C3	Ceramic capacitor, 1000pF, 16V, 10%, X7R, 0402	Yageo	CC0402KRX7R7BB102
RFIN, RFOUT	Connectors, 2.9mm, jack edge	SRI Connector Gage Co.	25-146-1000-92
VDD2, AGND, VBIAS	Connectors, SMT test points	Keystone Electronics	5016
J1, J2	Connectors, 2.9mm, jack edge, do not install (DNI)	SRI Connector Gage Co.	25-146-1000-92
R1	Resistor, 665 Ω , surface-mount device (SMD), 1%, 1/10W, 0402	Panasonic	ERJ2RKF6650X
U1	100MHz to 31GHz, high survivability, low noise amplifier	Analog Devices, Inc.	ADL7075

**ESD Caution**

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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