Evaluating the ADL8201 DC to 30GHz, RF Limiter

FEATURES

- 4-layer, Rogers RO4003C and Isola 370HR evaluation board
- End launch, 2.92mm RF connectors
- Through calibration path (depopulated)

EVALUATION KIT CONTENTS

- ADL8201-EVALZ evaluation board

EQUIPMENT NEEDED

- RF signal generator
- RF spectrum analyzer
- RF network analyzer

GENERAL DESCRIPTION

The ADL8201-EVALZ is a 4-layer printed circuit board (PCB) fabricated from 12mil thick, Rogers 4003C and Isola 370HR, copper clad, forming a nominal thickness of 62mils. The RFIN and RFOUT ports on the ADL8201-EVALZ are populated with 2.92mm, female coaxial connectors, and the corresponding RF traces have a 50Ω characteristic impedance. The ADL8201-EVALZ is populated with components suitable for use over the entire −55°C to +125°C operating temperature range of the ADL8201. To calibrate board trace losses, a through calibration path is provided between the J1 and J2 connectors. J1 and J2 must be populated with RF connectors to use the through calibration path. Refer to Figure 6 and Table 1 for the through calibration path performance.

The RF traces on the ADL8201-EVALZ are 50Ω grounded, coplanar waveguide. The package ground leads and the exposed pad 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.

For full details on the ADL8201, see the ADL8201 data sheet, which must be consulted in conjunction with this user guide when using the ADL8201-EVALZ.

EVALUATION BOARD PHOTOGRAPHS

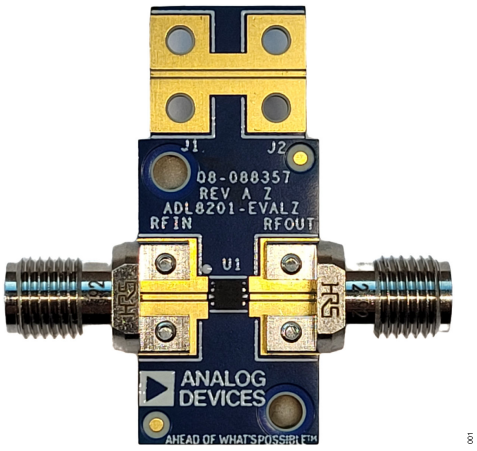

Figure 1. ADL8201-EVALZ Primary Side

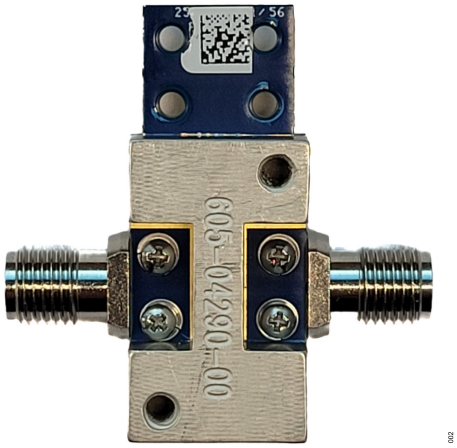

Figure 2. ADL8201-EVALZ Secondary Side

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REVISION HISTORY

1/2026—Revision 0: Initial Version

EVALUATION BOARD HARDWARE

OPERATING THE ADL8201-EVALZ

The ADL8201 needs no supply and external biasing circuitry. The ADL8201 has DC-coupled, single-ended input and output ports that show 50Ω input impedance.

Connect a calibrated network analyzer to the RFIN and RFOUT, 2.92mm connectors to evaluate the small signal performance of the ADL8201. Note that the measurements performed at the 2.92mm connectors of the ADL8201-EVALZ include the losses of the 2.92mm connectors and the PCB. The through line must be measured to calibrate out the effects on the ADL8201-EVALZ. The through line is the summation of an RF input line and an RF output line that are connected to the device and equal in length.

Connect a signal generator to RFIN and a spectrum analyzer to RFOUT as is shown in Figure 3 to create a power sweep to validate the power limiting functionality of the ADL8201.

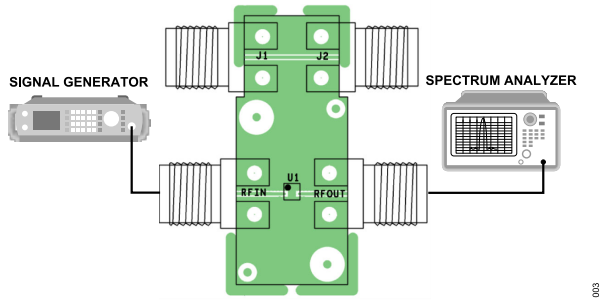

Figure 3. Test Setup Diagram

Additional test equipment is needed to fully evaluate the device functions and performance.

For third-order intercept point evaluation, use two signal generators and a spectrum analyzer. A high isolation power combiner is also recommended.

For power compression, use a 2-channel power meter and a signal generator. A power amplifier may be needed depending on the signal generator at the RF input. In addition, test accessories, such as couplers and attenuators, must have enough power handling.

EVALUATION BOARD HARDWARE

EXPECTED PERFORMANCE

Figure 4 shows the typical board loss for the ADL8201-EVALZ at room temperature, as well as the embedded and de-embedded insertion loss for the ADL8201.

Figure 5 shows the typical output power (P_{OUT}) levels vs. the varying input power (P_{IN}) depicting the power limiting behavior of the ADL8201 for several frequencies.

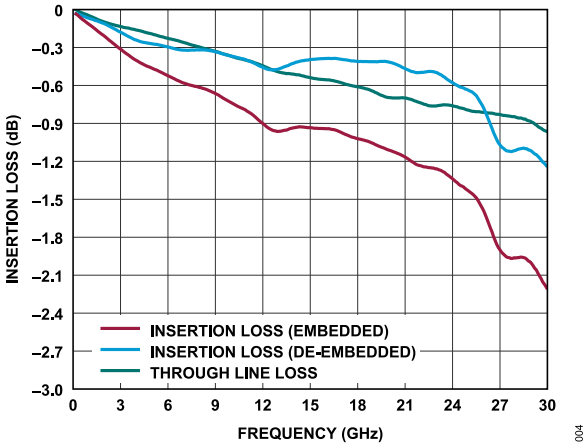

Figure 4. Insertion Loss vs. Frequency

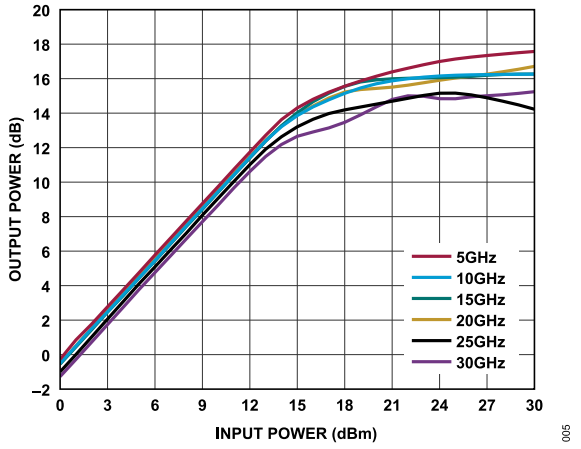

Figure 5. Output Power vs. Input Power

Through Calibration Path

The ADL8201-EVALZ includes a calibration path (see Figure 6 and Table 1). The calibration path SMA connectors, J1 and J2, must be populated with RF connectors to use the through calibration path.

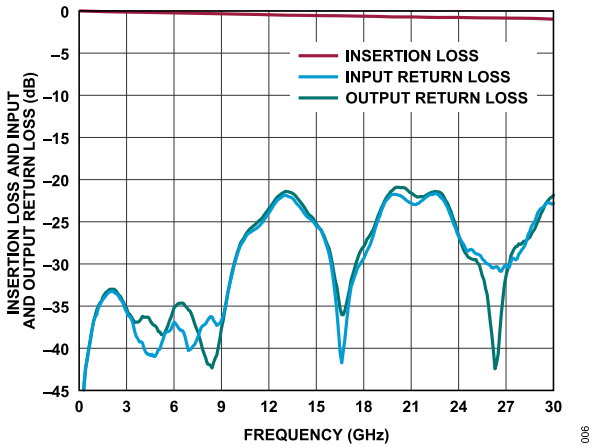

Figure 6. Insertion Loss and Input and Output Return Loss of the Through Calibration Path

Table 1. Insertion Loss of the Through Calibration Path

Frequency (GHz)	Insertion Loss (dB)
1	–0.05
2	–0.1
4	–0.16
6	–0.23
8	–0.3
10	–0.37
12	–0.45
14	–0.51
16	–0.56
18	–0.62
20	–0.71
22	–0.75
24	–0.77
26	–0.82
28	–0.86
30	–0.97

EVALUATION BOARD SCHEMATIC AND ARTWORK

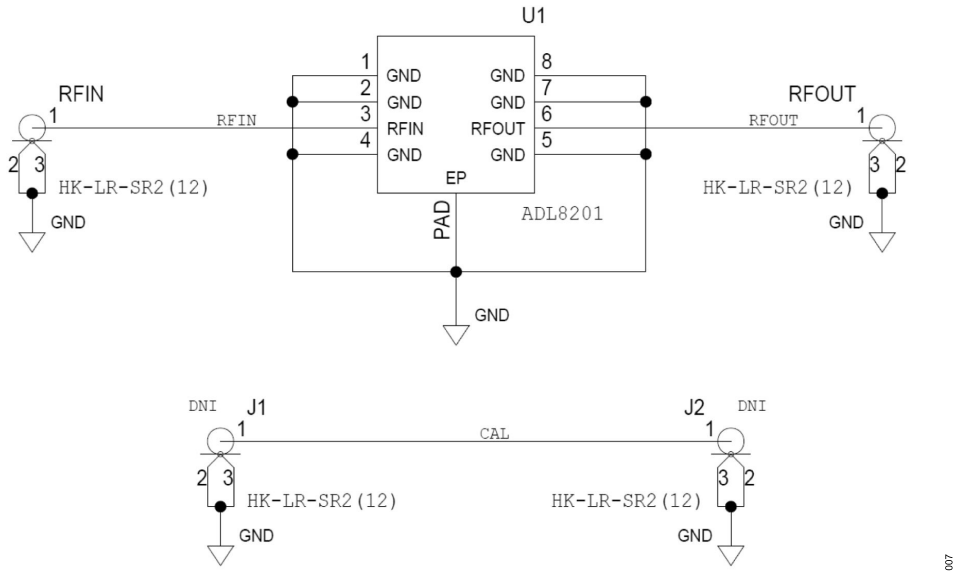

Figure 7. ADL8201-EVALZ Schematic

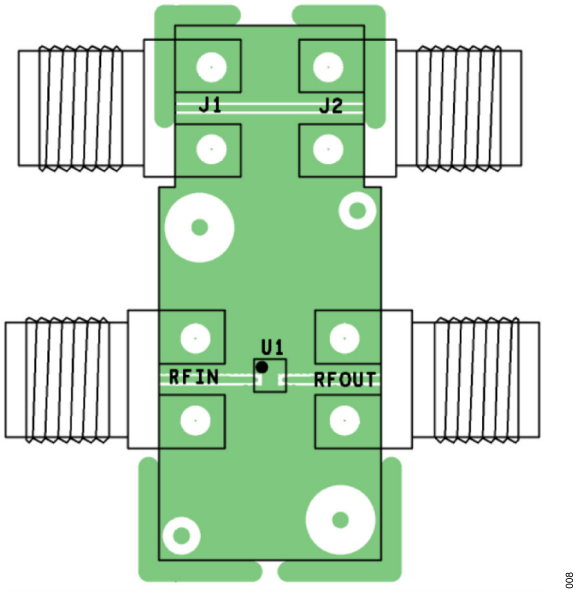

Figure 8. ADL8201-EVALZ Assembly Drawing (J1 and J2 Are Not Installed)

ORDERING INFORMATION

EVALUATION BOARDS

Table 2. Evaluation Boards

Model[1]	Description
ADL8201-EVALZ	Evaluation Board

[1] Z = RoHS-Compliant Part.

BILL OF MATERIALS

Table 3. Bill of Materials

Reference Designator	Description	Manufacturer	Part Number
U1	DC to 30GHz, RF limiter	Analog Devices, Inc.	ADL8201ACPZN
RFIN, RFOUT	Connectors, 2.92mm, jack edge	Hirose Electric Co Ltd.	HK-LR-SR2 (12)
J1, J2	Connectors, 2.92mm, jack edge, do not install (DNI)	Hirose Electric Co Ltd.	HK-LR-SR2 (12)