Evaluating the ADL6346B, 40dB Gain, 1500MHz to 2700MHz Transmit Amplifier

FEATURES

- Full featured evaluation board for the ADL6346-EVALZB
- Single-supply operation

EQUIPMENT NEEDED

- 5V DC power supply
- 1.8V DC power supply
- Signal generator
- Spectrum analyzer
- Network analyzer (option)

DOCUMENTS NEEDED

- ADL6346B data sheet

GENERAL DESCRIPTION

The ADL6346-EVALZB is designed to evaluate the features and performance of the ADL6346B, 40.0dB gain transmit amplifier, which has a frequency range of 1500MHz to 2700MHz.

Additional information on the ADL6346B is provided in the ADL6346B data sheet. Consult the data sheet in conjunction with this user guide when using the ADL6346-EVALZB evaluation board.

EVALUATION BOARD CONNECTION DIAGRAM

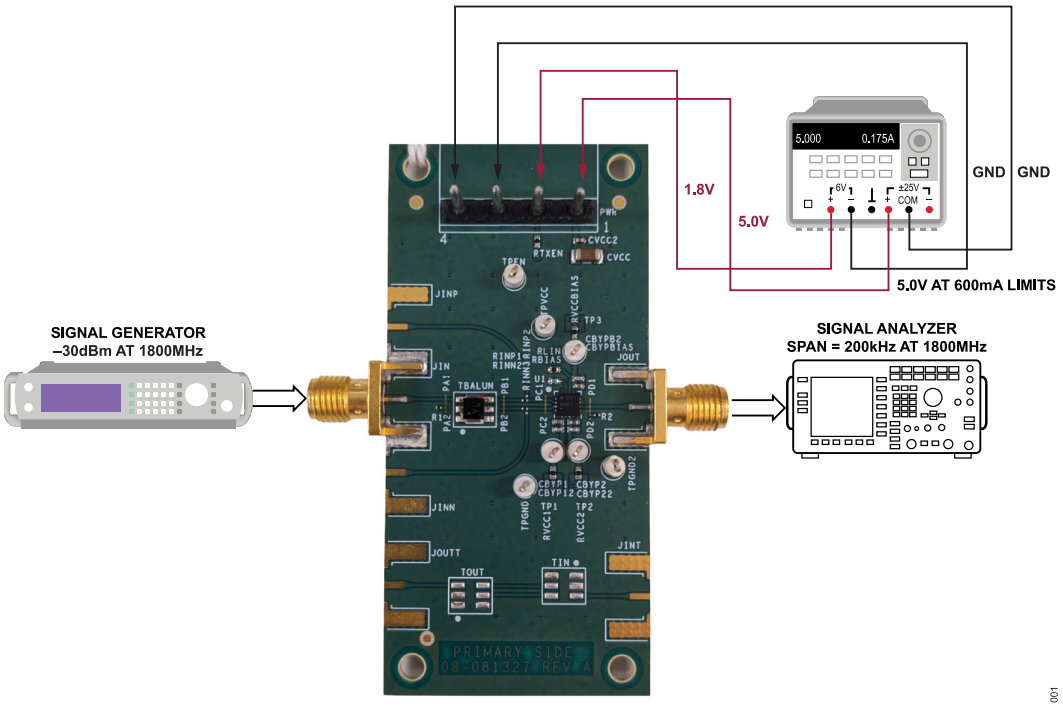

Figure 1. ADL6346-EVALZB Typical Measurement Setup (Option 1)

TABLE OF CONTENTS

REVISION HISTORY

3/2026—Revision 0: Initial Version

EVALUATION BOARD HARDWARE

HARDWARE SETUP

The hardware is connected as shown in Figure 2. To power up the ADL6346-EVALZB, use a 5.0V at 600mA DC power supply and a regular 1.8V DC power supply.

See Table 1 to connect the equipment needed to evaluate the ADL6346-EVALZB.

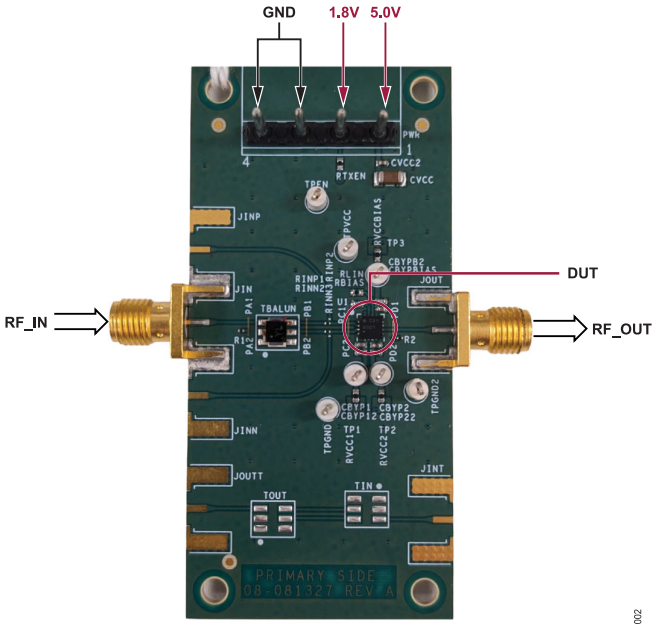

Figure 2. ADL6346-EVALZB Connections

Table 1. ADL6346-EVALZB Equipment Connections

Equipment	Connection
Power Supply	PWR 1 (5.0V). PWR 2 (1.8V). PWR 3 and PWR 4 (GND).
Signal Source	JIN
Network Analyzer	Connect to the two ports on the network analyzer (see Figure 3).
Signal Generator	Set the source to a −30dBm output signal level (see Figure 1).
Signal Analyzer	JOUT
Spectrum Analyzer	Connect to the port (see Figure 1).

EVALUATION BOARD HARDWARE

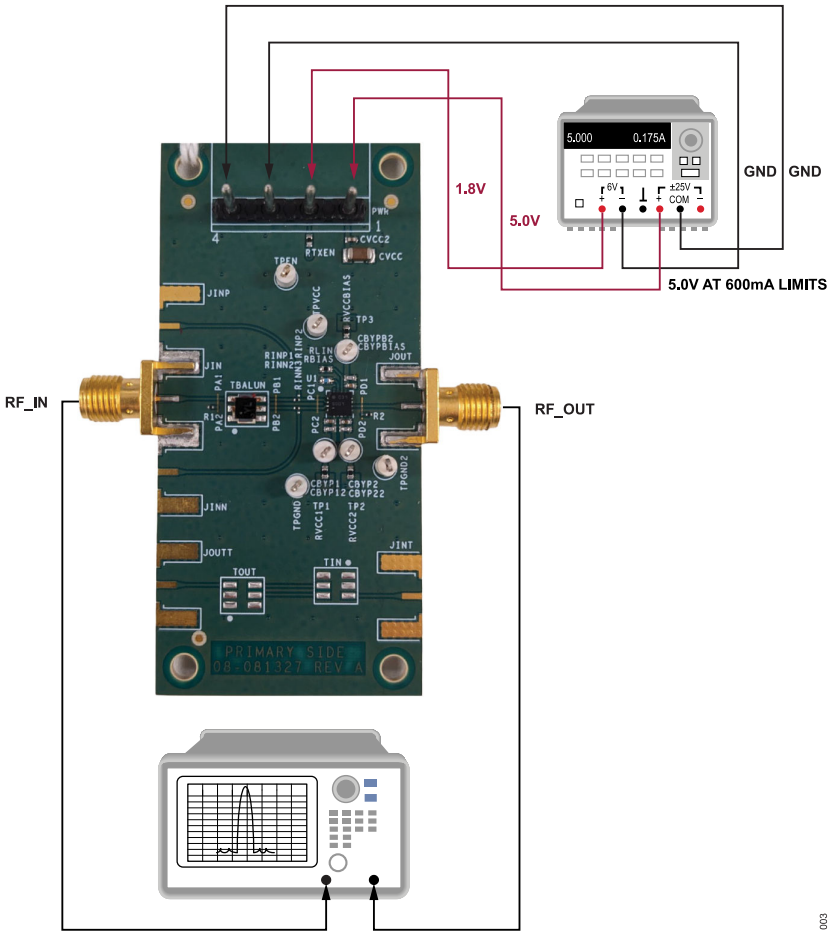

Figure 3. ADL6346-EVALZB Measurement Setup with Network Analyzer (Option 2)

EVALUATION BOARD QUICK START PROCEDURES

SINGLE-TONE DEMONSTRATION

Use the following settings to configure the ADL6346-EVALZB as an example of amplifying a 1800MHz sine wave:

1. Configure the hardware according to the Hardware Setup section and what is shown in Figure 1 or Figure 3.
2. Set the frequency of the signal generator to 1800MHz and the output level to −30dBm. Connect the spectrum analyzer to the RFOUT1 connector.
3. Turn on the 5.0V DC power supply connected to the PWR 1 test point.
4. Turn on the 1.8V DC power supply connected to the PWR 2 test point.
5. Measure the signal levels with a signal analyzer. The gain of the ADL6346B is derived from the following formula: *Gain = Signal Level at Signal Analyzer – Input Signal Level + Board Loss* (see Table 2) + *Cable Loss.*

LOSSES AND SIGNAL-TO-NOISE RATIO (SNR) DEGRADATION

The ADL6346B provides a nominal 40.0dB of power gain between the input and output pins. The on-board balun TCM2-63WX+ (Mini-Circuits) is used to translate from the single-ended board input to the differential inputs of the ADL6346B (see Figure 4). Consider the board losses to derive the accurate RF performance, conversion gain, noise figure, and output third-order intercept (OIP3) of the device. Table 2 details the board losses including the balun and Subminiature Version A (SMA) connectors on the ADL6346-EVALZB.

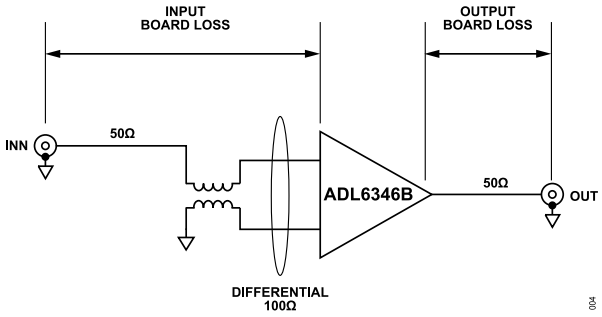

Figure 4. Losses and SNR Degradation for the ADL6346-EVALZB

Table 2. Board Loss Table for the ADL6346-EVALZB

	Loss (dB)		
Frequency (MHz)	Input	Output	Total
1500	1.03	0.31	1.34
1600	1.05	0.32	1.37
1700	1.08	0.32	1.40
1800	1.11	0.33	1.44
1900	1.15	0.35	1.50
2000	1.21	0.35	1.56
2100	1.28	0.36	1.64
2200	1.37	0.37	1.74
2300	1.46	0.37	1.83
2400	1.57	0.38	1.95
2500	1.70	0.39	2.09
2600	1.84	0.39	2.23
2700	1.99	0.40	2.39

EVALUATION BOARD SCHEMATICS AND ARTWORK

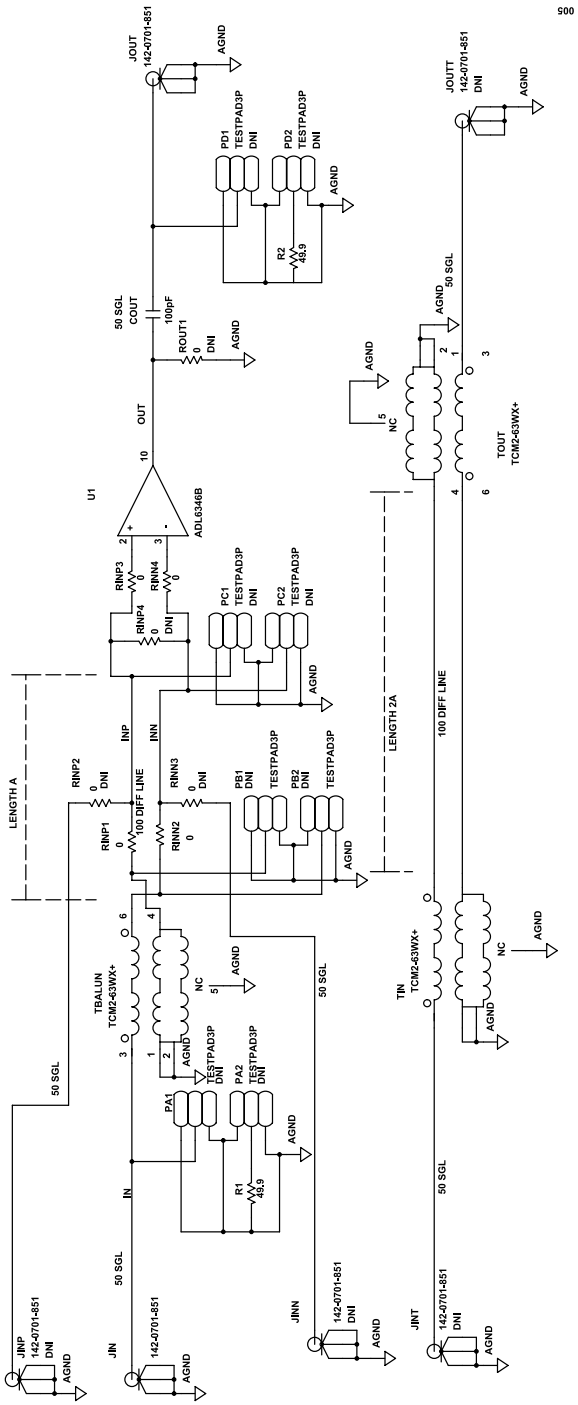

Figure 5. ADL6346-EVALZB Schematic

EVALUATION BOARD SCHEMATICS AND ARTWORK

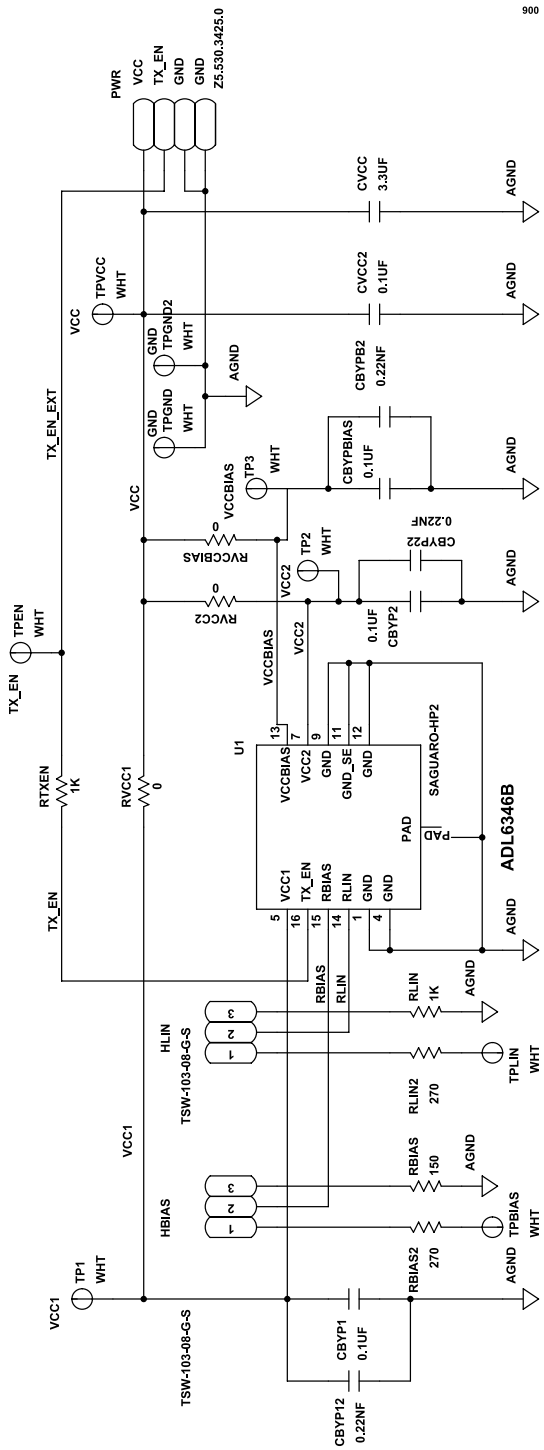

Figure 6. ADL6346-EVALZB Schematic 2

EVALUATION BOARD SCHEMATICS AND ARTWORK

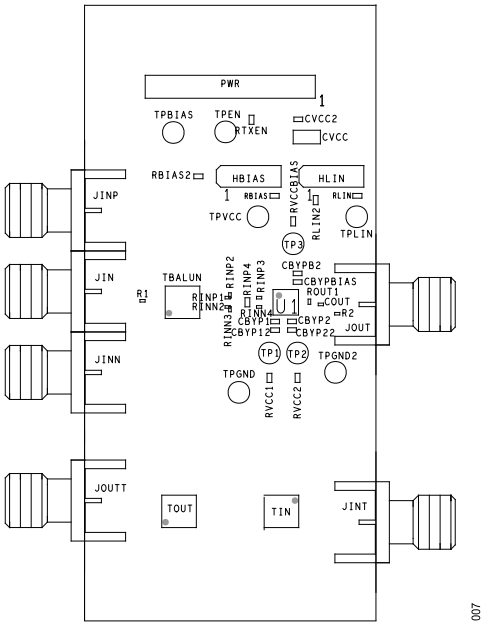

Figure 7. ADL6346-EVALZB Front Side

ORDERING INFORMATION

ORDERING GUIDE

Model[1]	Package Description
ADL6346-EVALZB	Evaluation Board for ADL6346B

[1] Z = RoHS Compliant Part.

BILL OF MATERIALS

Table 3. Bill of Materials for ADL6346-EVALZB

Quantity	Reference Designator	Description	Manufacturer	Part Number
4	CBYP1, CBYP2, CBYPBIAS, CVCC2	Capacitors, 0.1µF, 16V, C0402 package	Kemet	C0402C104J4RACTU
3	CBYP12, CBYP22, CBYPB2	Capacitors, 220pF, 25V, C0402 package	AVX Corporation	04023A221KAT2A
1	COUT	Capacitors, 100pF, 25V, C0201 package	Murata	GRM033R71E101KA01D
1	CVCC	Capacitors, 3.3µF, 16V, C1206 package	Kemet	C1206C335K4PAC
2	JIN, JOUT	Edge mount, SMA connectors	Cinch	142-0701-851
1	PWR	Connector PCB terminal strip header	Wieland Electric GMBH	Z5.530.3425.0
2	HBIAS, HLIN	Connector headers through hole, 3 position	Samtec	TSW-103-08-G-S
2	R1, R2	Resistors, 49.9Ω, 0.05W, 0201 package	Vishay	CRCW020149R9FKED
1	RBIAS	Resistors, 150Ω, 0.1W, 0402 package	Panasonic	ERJ-2GEJ151X
2	RBIAS2, RLIN2	Resistors, 270Ω, 0.1W, 0402 package	Panasonic	ERJ-2RKF2700X
4	RINN2, RINN4, RINP1, RINP3	Resistors, 0Ω, 0.05W, 0201 package	Panasonic	ERJ-1GN0R00C
2	RLIN, RTXEN	Resistor, 1kΩ, 0.063W, 0402 package	Yageo	RC0402JR-071KL
3	RVCC1, RVCC2, RVCCBIAS	Resistors, 0Ω, 0.1W, 0402 package	Panasonic	ERJ-2GE0R00X
3	TBALUN, TIN, TOUT	Transformer baluns, 1:2 ratio, 30MHz to 6000MHz	Mini-Circuits Labs	TCM2-63WX+
9	TP1 to TP3, TPBIAS, TPEN, TPGND, TPGND2, TPLIN, TPVCC	PCB test point connectors	Keystone Electronics	5xxx
1	U1	0dB gain, 1500MHz to 2700MHz transmit amplifier	Analog Devices, Inc.	ADL6346ACRZB
1	PCB	Evaluation board	Analog Devices	ADL6346-EVALZB

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.