Dual VGA, Ultralow Noise Preamplifier, and Programmable R_{IN} Evaluation Board

AD8332-EVALZ

GENERAL DESCRIPTION

The AD8332-EVALZ is a platform for the test and evaluation of the AD8332 variable gain amplifier (VGA). The board is shipped assembled and tested, and users only need to connect the signal and VGAIN sources to a single 5 V power supply. Figure 1 is a photograph of the component side of the board, and Figure 2 is the schematic.

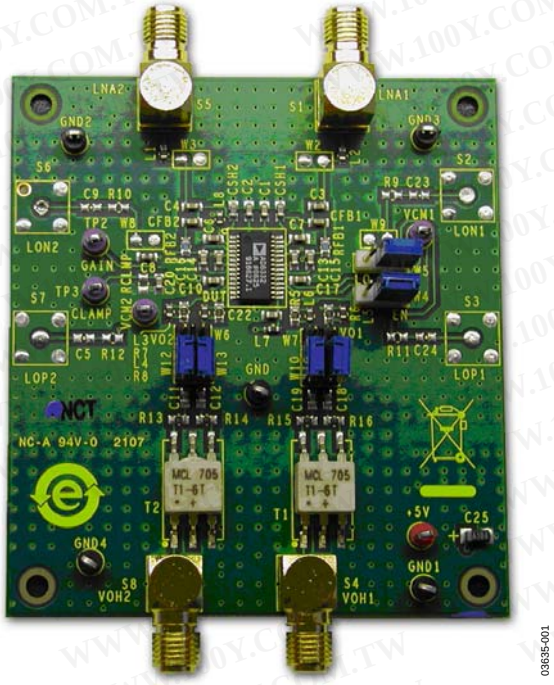

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Figure 1. AD8332-EVALZ Photo of Component Side

USER-SUPPLIED OPTIONAL COMPONENTS

The board is built and tested using the components shown in black in Figure 2. Provisions are made for optional components (shown in gray) that can be installed for testing at the user's discretion. The default LNA input impedance is 50 Ω to match various signal generators and network analyzers. Input impedances up to 6 kΩ are realized by changing values of RFBx and CSHx. Consult the AD8332 data sheet for more details on this circuit feature.

For reference, Table 1 lists the common input impedance values and corresponding adjustments. The board is designed for 0603-size, surface-mount components.

Table 1. LNA External Component Values for Common Source Impedances

R_{IN} (Ω)	RFBx (Ω, Std 1% Value)	CSHx (pF)
50	274	22
75	412	12
100	562	8
200	1.13 k	1.2
500	3.01 k	None
6 k	∞	None

SMA connectors, S2, S3, S6, and S7, are provided for access to the LNA outputs or the VGA inputs. If the LNA is used alone, 0.1 µF coupling capacitors can be installed at locations C5, C9, C23, and C24. Resistors of 68 Ω to 100 Ω can be required if the load capacitances, as seen by the LNA outputs, are larger than approximately 10 pF.

A resistor can be inserted at RCLMP if output clamping is desired. The peak-to-peak clamping level is adjusted by installing one of the standard 1% resistor values listed in the AD8332 data sheet.

A high frequency differential probe connected to the 2-pin headers VOx is the preferred method to observe a waveform at the VGA output. A typical setup is shown in Figure 3. Single-ended loads can be connected directly via the board edge SMA connectors. Note that the AD8332 output amplifier is buffered with 237 Ω resistors; therefore, be sure to compensate for attenuation if low impedances are connected to the output SMAs.

MEASUREMENT SETUP

The basic board connections for measuring bandwidth are shown in Figure 3. A 5 V, 100 mA (minimum) power supply is required, and a low noise voltage reference supply is required for VGAIN.

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Rev. D

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3/03—Revision 0: Initial Version

EVALUATION BOARD SCHEMATIC

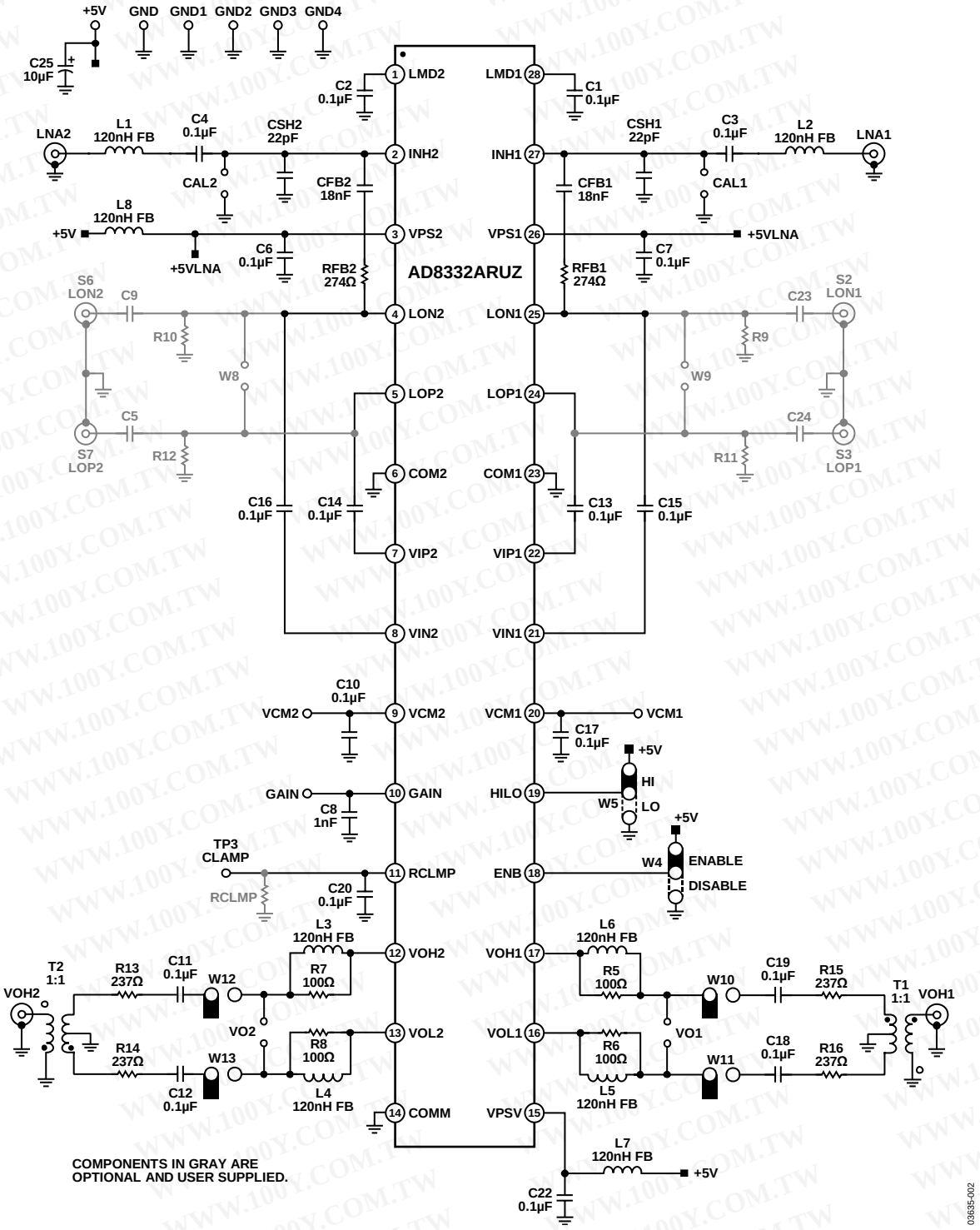

Figure 2. AD8332-EVALZ Schematic

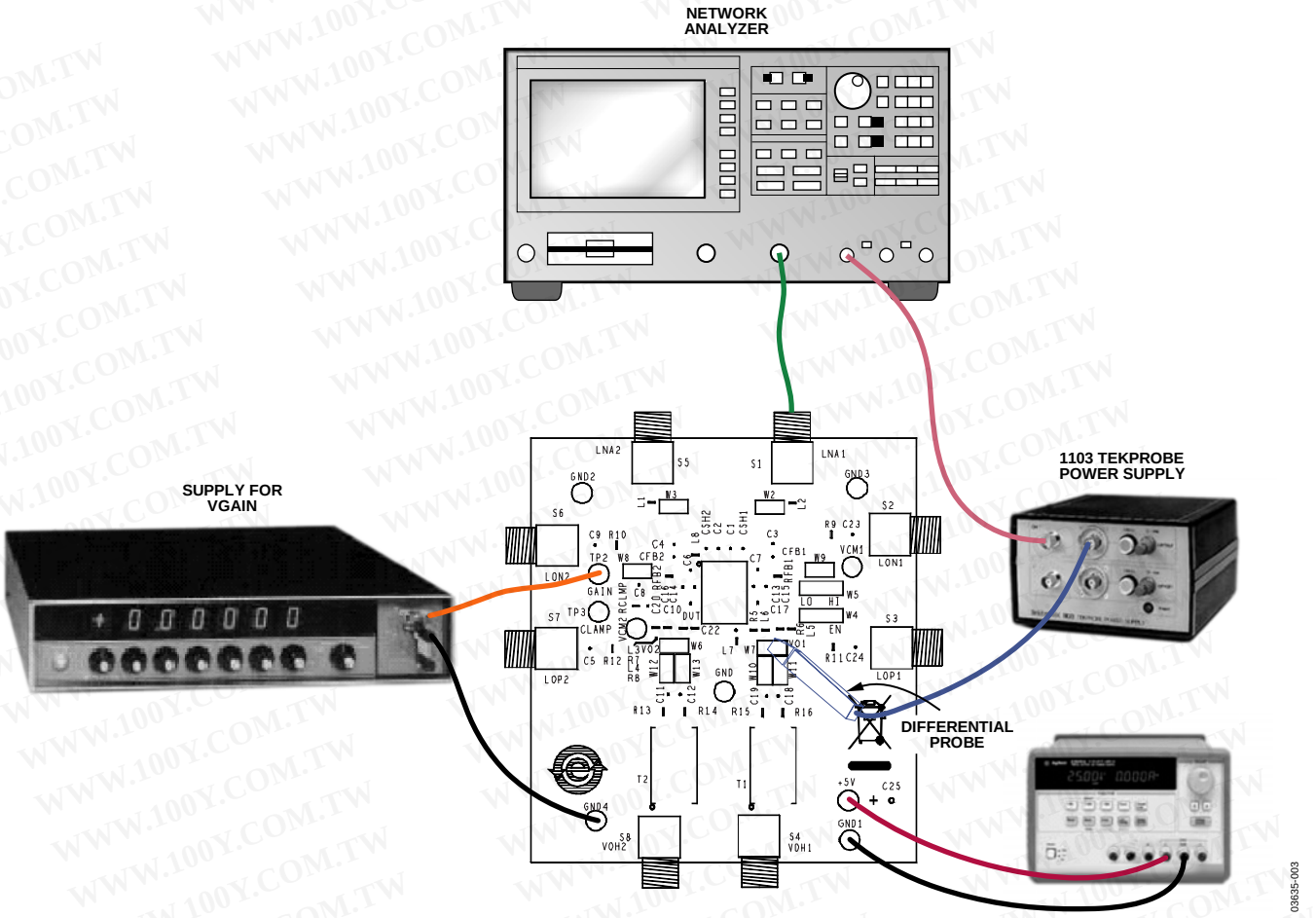

Figure 3. Typical Board Test Connections

BOARD LAYOUT AND PARTS LIST

The evaluation board circuitry uses four conductor layers. The two inner layers are power and ground planes, and all interconnecting circuitry is located on the outer layers. Figure 5, Figure 6, Figure 7, and Figure 8 illustrate the copper patterns.

EVALUATION BOARD PCB LAYERS

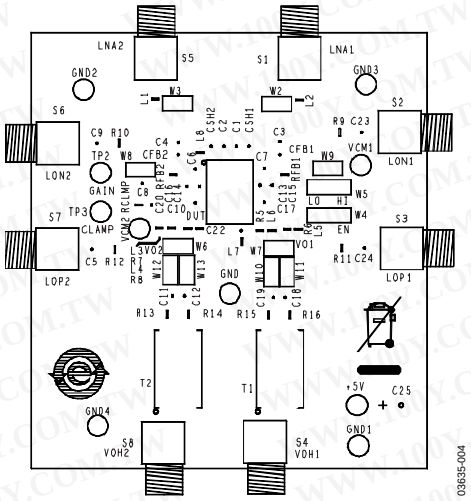

Figure 4. AD8332-EVALZ Assembly

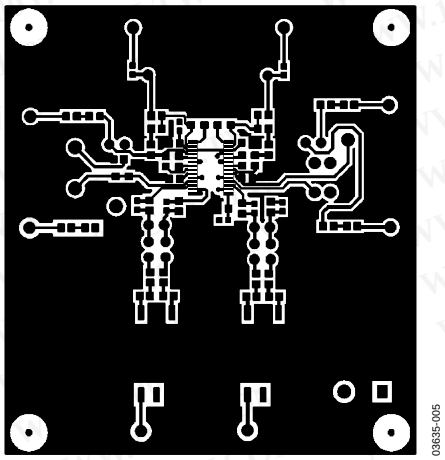

Figure 5. Primary Side Copper

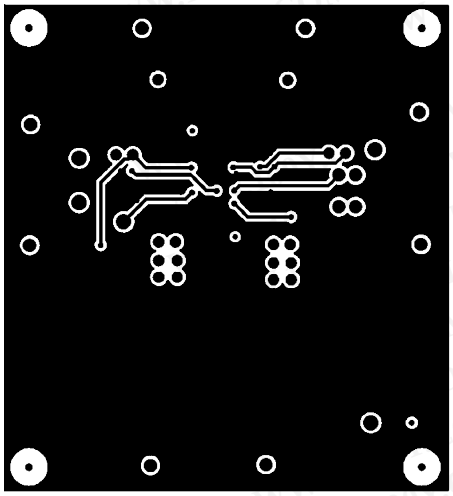

Figure 6. Secondary Side Copper

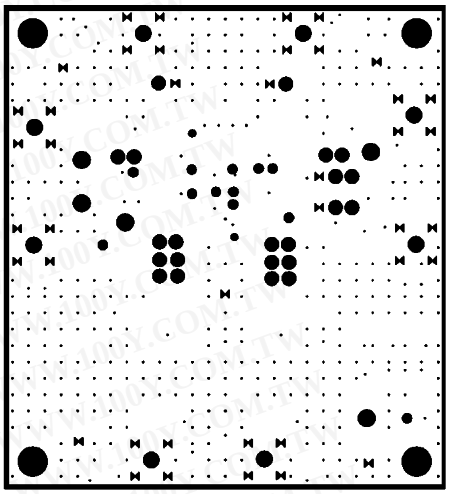

Figure 7. Ground Plane

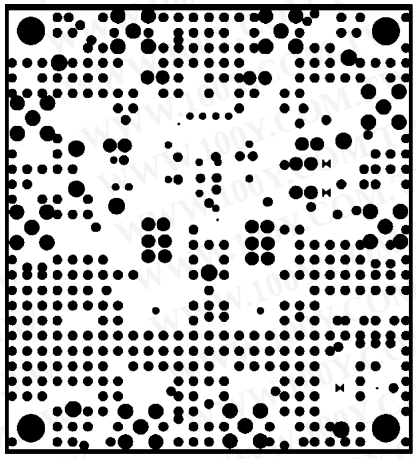

Figure 8. Power Plane

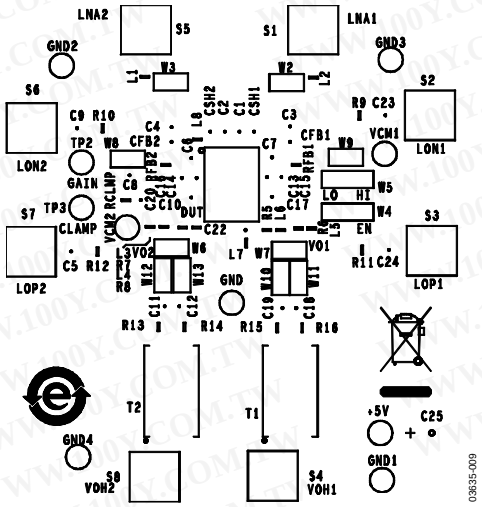

Figure 9. Component Side Silkscreen

ORDERING INFORMATION

PARTS LIST

Table 2.

Qty.	Name	Description	Reference Designation	Mfg.	Mfg. Part Number
8	Inductor	Ferrite Bead, 120 nH, 0603	L1, L2, L3, L4, L5, L6, L7, L8	Murata	BLM18BA750SN1D
2	Resistor	SM, 274 Ω, 1%, 1/10 W, 0603	RFB1, RFB2	Panasonic	ERJ-3EKF2740V
4	Resistor	SM, 237 Ω, 1%, 1/10 W, 0603	R13, R14, R15, R16	Panasonic	ERJ-3EKF2370V
4	Resistor	SM, 100 Ω, 1%, 1/16 W, 0603	R5, R6, R7, R8	Panasonic	ERJ-3EKF1
2	Capacitor	SM, 18 nF, 10%, 50 V, 0603	CFB1, CFB2	Panasonic	ECJ-1VB1E183K
18	Capacitor	SM, 0.1 µF, 10%, 0603	C1, C2, C3, C4, C6, C7, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C22	Panasonic	C0603C104K4RAC
1	Capacitor	SM, 1 nF, 50 V, 0603	C8	Panasonic	ECJ-1VB2A102K
2	Capacitor	SM, 22 pF, 50 V, 0603	CSH1, CSH2	Panasonic	ECJ-1VC1H220J
1	Capacitor	SM, 10 µF	C25	Nichicon	F931A106MAA
2	Transformer	RF	T1, T2	Mini-Circuits	T1-6T
6	Header	2-Pin	VO1, VO2, W10, W11, W12, W13	Molex	22-10-2021
2	Header	3-Pin	W4, W5	Molex	22-10-2031
4	Connector	SMA, PC Mount, Right Angle	LNA1, LNA2, VOH1, VOH2	Amphenol	901-143-6RFX
4	Test Point	Violet	VCM1, VCM2, GAIN, CLAMP	Components Corp	TP104-01-07
1	Test Point	Red	+5V	Components Corp	TP104-01-02
5	Test Point	Black	GND, GND1, GND2, GND3, GND4	Components Corp	TP104-01-00

ORDERING GUIDE

Model	Description
AD8332–EVALZ[1]	Evaluation Board

[1] Z = RoHS Compliant Part.

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.

NOTES

NOTES

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