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Evaluating the ADA4945-1 Differential Amplifier

FEATURES

Enables quick breadboarding/prototyping
User defined circuit configuration
Dual purpose
  Standalone ADA4945-1CP-EBZ evaluation board
  Amplifier mezzanine card for ADC evaluation boards
Compatible with 10-lead PulSAR evaluation board

GENERAL DESCRIPTION

The Analog Devices, Inc., ADA4945-1CP-EBZ evaluation board is used to evaluate the performance of the ADA4945-1 fully differential amplifier. The board can be used as either a standalone evaluation board for general purpose differential amplifier evaluation or as an amplifier mezzanine card for specified ADCs. When configured as a mezzanine card the board is easily mounted atop compatible ADC evaluation boards via the 7-pin Headers J1 and J2. This usage enables quick and easy evaluation of multiple amplifier/ADC combinations.

The evaluation board can be configured to accept either a single-ended or differential input signal.

The board utilizes several two-pin or three-pin headers to control various features of the ADA4945-1. Headers allow the user to easily set the ADA4945-1 high and low output clamp levels, set the output common-mode voltage, choose high or low power mode, and set the digital ground level.

Optimized power and ground planes ensure low noise and high speed operation. Component placement and power supply bypassing are optimized for maximum circuit flexibility and performance. The evaluation board accepts 0402 or 0603 surface mount technology (SMT) components, 0805 bypass capacitors, and 2.54 mm headers.

EVALUATION BOARD PHOTOGRAPH

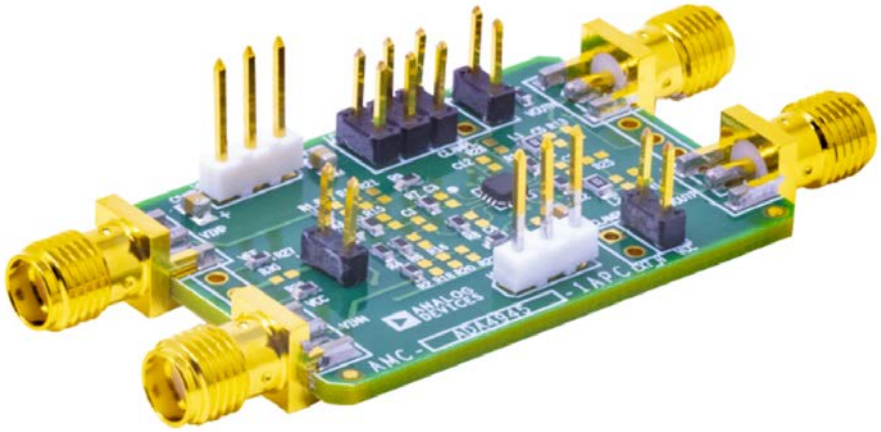

Figure 1. ADA4945-1CP-EBZ Evaluation Board

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FUNCTIONALITY AND CONTROL

OUTPUT CLAMPS

The ADA4945-1 output clamp voltage levels are set using a series of two-pin jumpers. Referring to Figure 2 and Figure 3 the $+V_{CLAMP}$ level can be set to VCC by shorting across the header labeled VCC. Alternatively, $+V_{CLAMP}$ can be set to any user defined level by applying an external voltage at pin 1 of the header labeled EXT_H. In a similar manner the $-V_{CLAMP}$ level can be set using the headers labeled VEE and EXT_L.

SETTING DIGITAL GROUND (DGND) LEVEL

DGND can be set to VEE, analog ground (AGND), or a user defined level. Referring to Figure 2 and Figure 3, DGND can be set to VEE by shorting across the two-pin header labeled P1, or can be set to AGND by shorting across the two-pin header labeled LOGIC. If some other DGND level is required the desired voltage can be applied at the LOGIC header.

POWER MODES AND DISABLE

The high power or low power operating mode can be selected using the three-pin header labeled MODE. Shorting pins 1 and 2 places the ADA4945-1 in high power mode while shorting pins 2 and 3 selects the low power mode.

Shorting across the two-pin header labeled PD places the ADA4945-1 in the disable mode.

OUTPUT COMMON-MODE VOLTAGE

The output common-mode voltage (VOCM) is set via the two-pin header labeled VCM. If the board is being used as an amplifier mezzanine card with a compatible ADC evaluation board then pin 1 of the header can accept a reference voltage from connecter J1. If the board is being used as a standalone differential amplifier evaluation board then a user defined output common mode voltage can be applied through header VCM. Alternatively, if the VCM header is left disconnected the ADA4945-1 VOCM will default to the internally generated mid-supply value.

INPUT/OUTPUT CONNECTOR CONFIGURATION

The ADA4945-1CP-EBZ evaluation board can be used as either a standalone evaluation board or as an amplifier mezzanine card for select ADC evaluation boards. To easily facilitate usage in either configuration, the input and output to the board feature two types of connectors overlaid with one another. For use as a standalone differential amplifier evaluation board use SMA side launch connectors at VINP, VINN, VOUTP, and VOUTN. For use as an amplifier mezzanine card use 7-pin headers at J1 and J2. The manufacturer and part number for both types of connector is provided in the bill of materials in Table 1.

SCHEMATIC, ASSEMBLY DRAWING, AND BOARD LAYOUT

ADA4945-1CP-EBZ FULLY DIFFERENTIAL AMPLIFIER SCHEMATIC

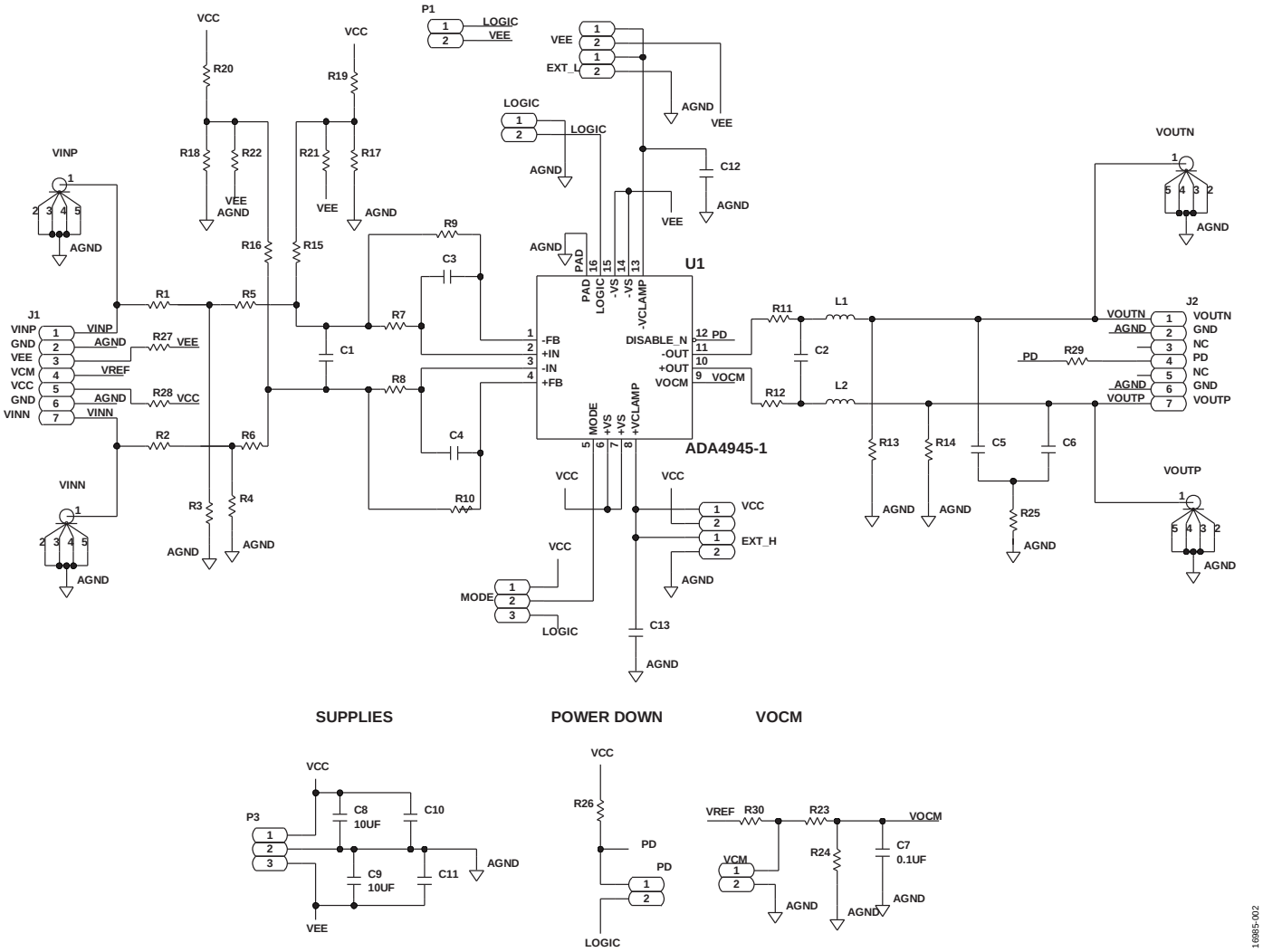

Figure 2. ADA4945-1CP-EBZ Evaluation Board Schematic

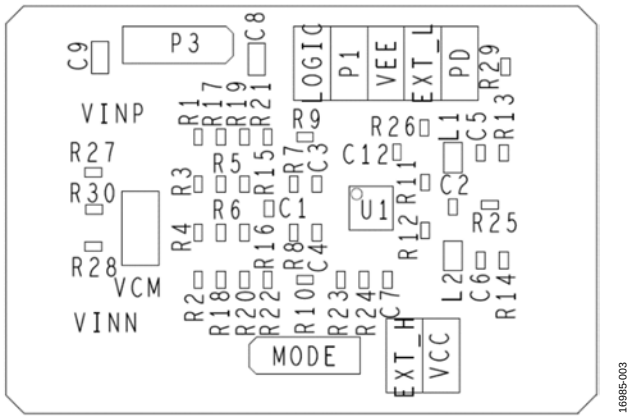

Figure 3. ADA4945-1CP-EBZ Evaluation Board Assembly Drawing, Primary Side

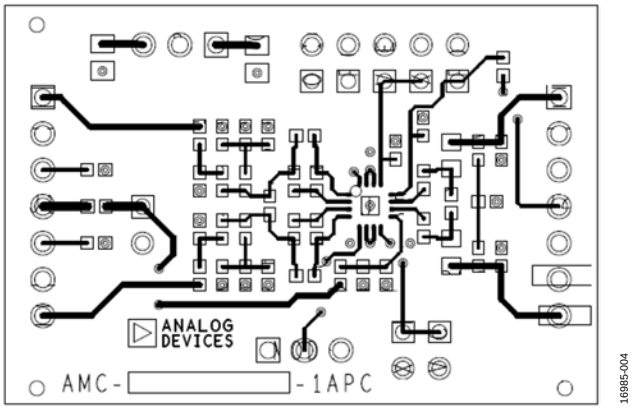

Figure 4. ADA4945-1CP-EBZ Evaluation Board Layout Pattern, Primary Side

BILL OF MATERIALS

Table 1.

Item	Qty	Description	Value	Size	Reference Designation	Manufacturer	Part Number
1	8	Ceramic capacitor	User defined	0402	C1 to C6, C12, C13		
2	3	Ceramic capacitor	0.1 µF	0402	C7, C10, C11		
3	2	Tantalum capacitor	10 µF	0805	C8, C9		
4	30	Chip resistor	User defined	0402	R1 to R30		
5	8	Berg 2-pin header			EXT_H, EXT_L, LOGIC, P1, PD, VCC, VCM, VEE	Amphenol	69157-102HLF
6	2	Connector, 7-pin header			J1, J2	Samtec	MTSW-107-07-T-S-240
7	2	Chip inductor	User defined	0805	L1, L2		
8	2	Berg 3-pin header			MODE, P3	Samtec	TSW-103-08-G-S
9	1	ADA4945-1			U1	Analog Devices	ADA4945-1
10	4	Connector, side launch SMA			VINN, VINP, VOUTN, VOUTP	Samtec	SMA-J-P-H-ST-EM1