DEM-OPA-SO-1B User's Guide

1 Description

The DEM-OPA-SO-1B demonstration fixture is a noninverting configuration, unpopulated printed circuit board (PCB) for single op amps in SO-8 packages. This board has been optimized to minimize parasitics and provide good harmonic distortion for wideband, high-gain, high-speed amplifiers. Figure 1 shows the package pinout for this PCB. For more information on these types of op amps, as well as good PCB layout techniques, see the individual op amp data sheets.

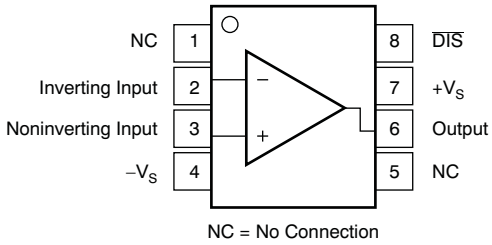


Figure 1. Package Pinout

2 Circuit

The circuit schematic in Figure 2 shows the connections for all possible components. Each individual configuration will only use some of the components.

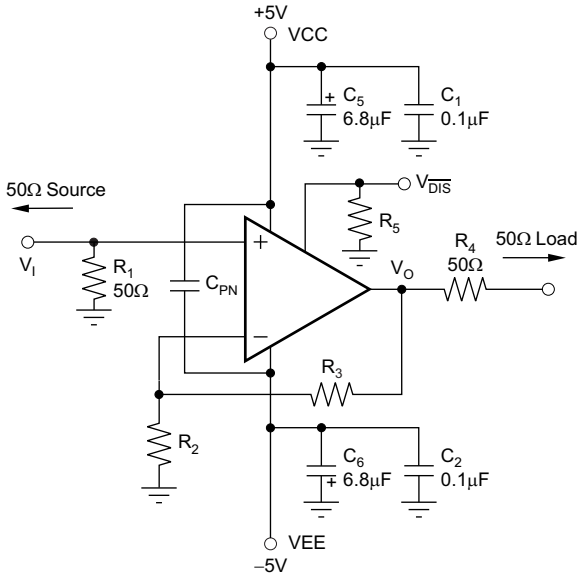


Figure 2. Schematic for DEM-OPA-SO-1B

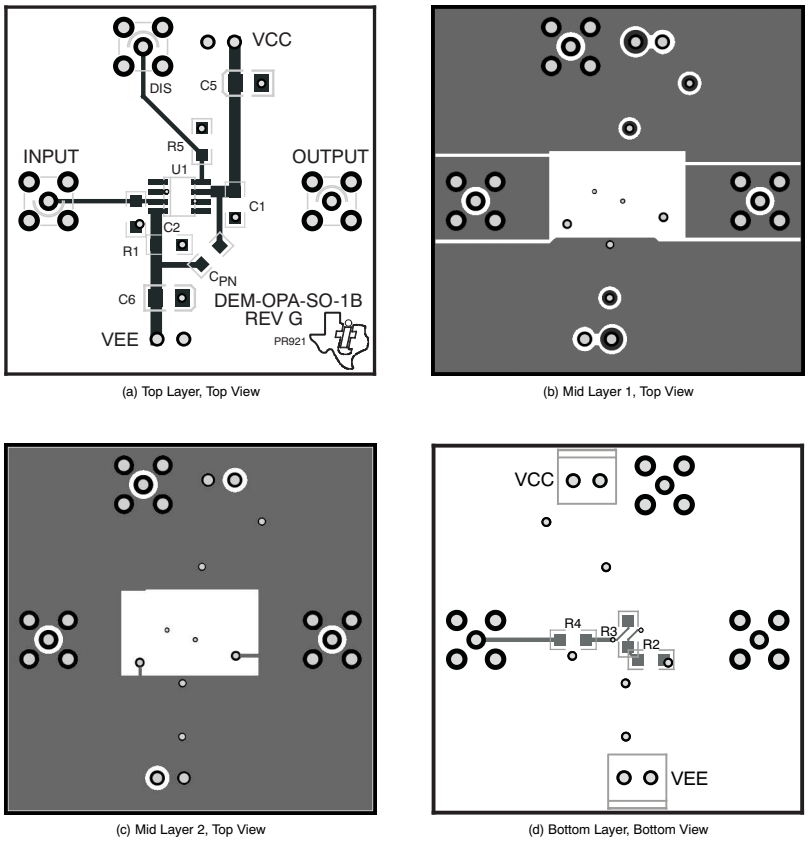
3 Components

Components that have RF performance similar to those listed in Table 1 may be substituted.

Table 1. Component Descriptions

PART	DESCRIPTION
C_5, $C6_6$	Tantalum Chip Capacitor, SMD EIA Size 3528, 20V
C_1, C_2, C_{PN}	Multilayer Ceramic Chip Capacitor, SMD 1206, 50V
INPUT, OUTPUT, DIS	SMA or SMB Board Jack (Amphenol 901-144-8)
TB1, TB2	Terminal Block, 3.5mm Centers (On-Shore Technology ED555/2DS)
R_1, R_2, R_3, R_4, R_5	Metal Film Chip Resistor, SMD 1206, 1/8W

Refer to Figure 3 for the location of the following components. R1 and R4 set the I/O impedance; R2 and R3 set the gain; and C1, C2, C5, C6 and C_{PN} are supply bypass capacitors. C_{PN} is optional; it adds a bypass between the supplies, which improves distortion performance for some models. R5 is the matching resistor for the disable pin.



Note: The board name shown in the top silkscreen for an earlier version of the fixture is DEM-OPA84XU Revision F. The layout is identical to the current Revision G with board name DEM-OPA-SO-1B.

Figure 3. DEM-OPA-SO-1B Demonstration Fixture Layout

4 Board Layout

This demonstration fixture is a four-layer PCB. The top layer has power traces and signal traces. The bottom layer has signal traces only. Both inner layers have ground planes to have impedance matching with signal traces on top and bottom layers. The ground plane has been opened up around op amp pins sensitive to capacitive loading. Power-supply traces are laid out to keep current loop areas to a minimum. Mount the SMA (or SMB) vertically. The location and type of capacitors used for power-supply bypassing are crucial for high-frequency amplifiers. The tantalum capacitors, C5 and C6, do not need to be as close to pins 7 and 4 on the PCB and may be shared with other amplifiers. See the individual op amp data sheets for more information on component selection.

5 Measurement Tips

This demonstration fixture, and the component values shown, is designed to operate in a 50Ω environment. Most data sheet plots are obtained this way. It is easy to change the component values for different input and output impedance levels. Do not use high impedance probes; they represent a heavy capacitive load to the op amp, and will alter the amplifier response. Instead, use low impedance (≤ 500Ω) probes with adequate bandwidth. The probe input capacitance and resistance set an upper limit on the measurement bandwidth. If a high impedance probe must be used, place a 100Ω resistor on the probe tip to isolate its capacitance from the circuit.

Revision History

Changes from C Revision (April, 2011) to D Revision	Page
• Changed Figure 2	1

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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