User's Guide
SBOU035A–July 2005–Revised February 2006

DEM-OTA-SO-1A Demonstration Fixture

1 Description

The DEM-OTA-SO-1A demonstration fixture is a generic, unpopulated printed circuit board (PCB) for single operational transconductance amplifiers in SO-8 packages. Figure 1 shows the package pinout for this PCB. For more information on these op amps, as well as good PCB layout techniques, see the individual amplifier data sheets.

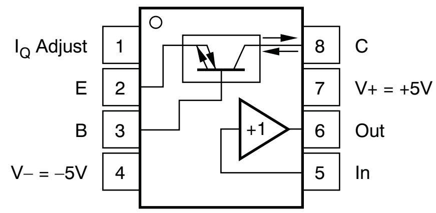


Figure 1. SO Package Pinout, Top View

2 Circuit

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

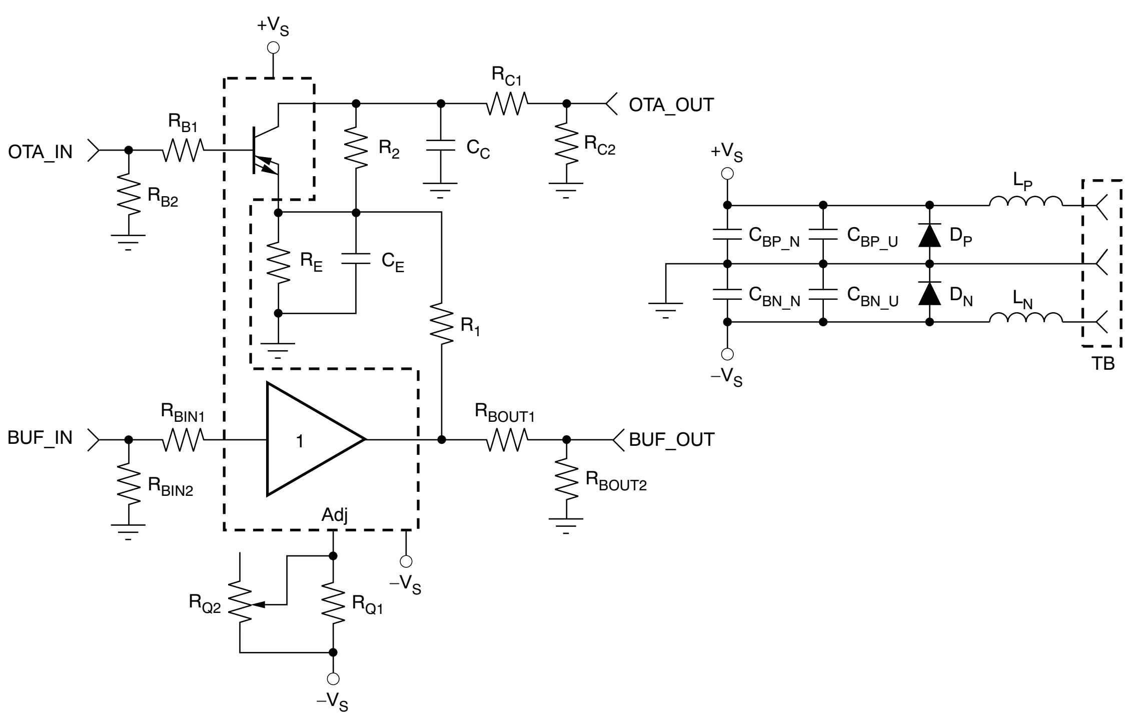


Figure 2. Schematic for DEM-OTA-SO-1A

3 Components

Components that have RF performance similar to the ones in Table 1 may be substituted.

Table 1. Component Descriptions

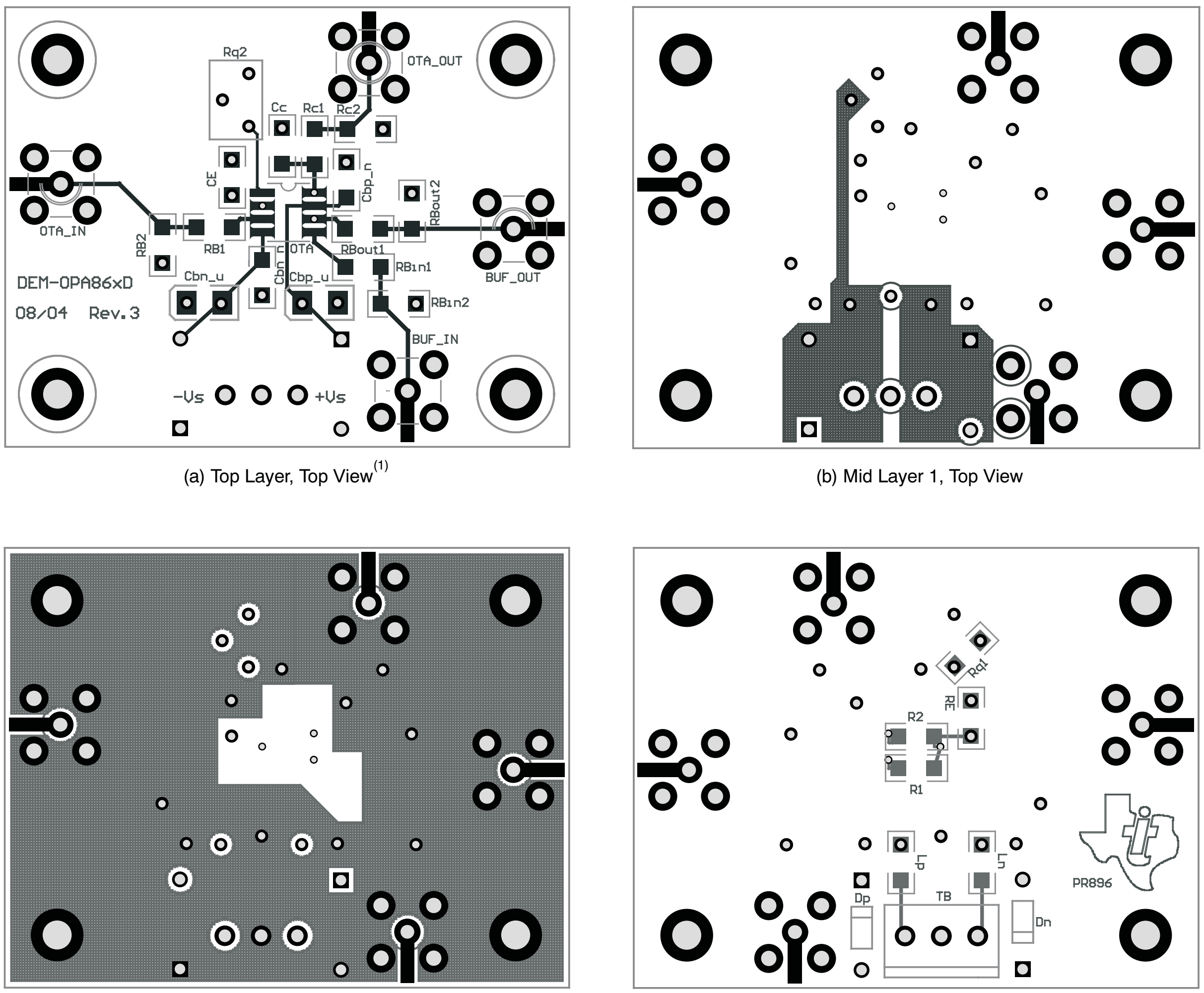
PART	DESCRIPTION
C_{BP_U}, C_{BN_U}	Tantalum Chip Capacitor, SMD EIA Size 3528, 20V
C_{BP_N}, C_{BN_N}, C_C, C_E	Multilayer Ceramic Chip Capacitor, SMD 1206, 50V
OTA_IN, OTA_OUT, BUF_IN, BUF_OUT	SMA or SMB Board Jack (Amphenol 901-144-8)
L_P, L_N	EMI-Suppression Ferrite Chip, SMD 1206 (Steward LI 1206 B 900 R)
TB	Terminal Block, 3.5mm Centers (On-Shore Technology ED555/3DS)
R_{XXX}	Metal Film Chip Resistor, SMD 1206, 1/8W

Please refer to Figure 3 for the location of the following components:

- R_{B2}, R_{C1}, and R_{C2} set the desired input/output impedances of the OTA section.
- R_{BIN2}, R_{BOUT1}, and R_{BOUT2} set the desired input/output impedances of the buffer section.
- R_{BIN1}, and R_{B1} are used to form a band-limiting pole at high frequency with the parasitic input capacitance.
- Either R_{Q1} or R_{Q2} is used to set the quiescent current of the OTA section.
- R_E (used in conjunction with R_{C1} and R_{C2}) sets the gain.
- R_1, R_2, C_C, and C_E are used in application circuits. Please refer to the individual product data sheet when using these components.

4 Board Layout

This demonstration fixture is a four-layer PCB. It uses both a ground plane and power traces on the inner layers. The ground plane has been opened up around op amp pins that are sensitive to capacitive loading. Power-supply traces are laid out to keep current loop areas to a minimum. The SMA (or SMB) connectors may be mounted either vertically or horizontally onto the board edge. The location and type of capacitors used for power-supply bypassing are crucial for high-frequency amplifiers. The tantalum capacitors, C_{BP_U} and C_{BN_U}, do not need to be close to pins 4 and 7 on the PCB and may be shared with other amplifiers. See the individual op amp data sheet for more information on proper board layout techniques and component selection.



(a) Top Layer, Top View[1]

(b) Mid Layer 1, Top View

(c) Mid Layer 2, Top View

(d) Bottom Layer, Bottom View

(1) The board name appearing in the top silkscreen is DEM-OPA86xD with the Revision 3 design finalized in August 2004.

Figure 3. DEM-OTA-SO-1A Demonstration Board Layout

5 Measurement Tips

This demonstration fixture, with 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. However, 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.

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