DEM-OPA-MSOP-2A Demonstration Fixture

1 Description

The DEM-OPA-MSOP-2A demonstration fixture is a generic, unpopulated printed circuit board (PCB) for dual high-speed operational amplifiers in MSOP-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.

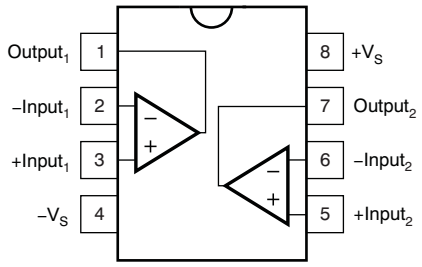


Figure 1. MSOP-8 Package Pinout, Top View

2 Circuit

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

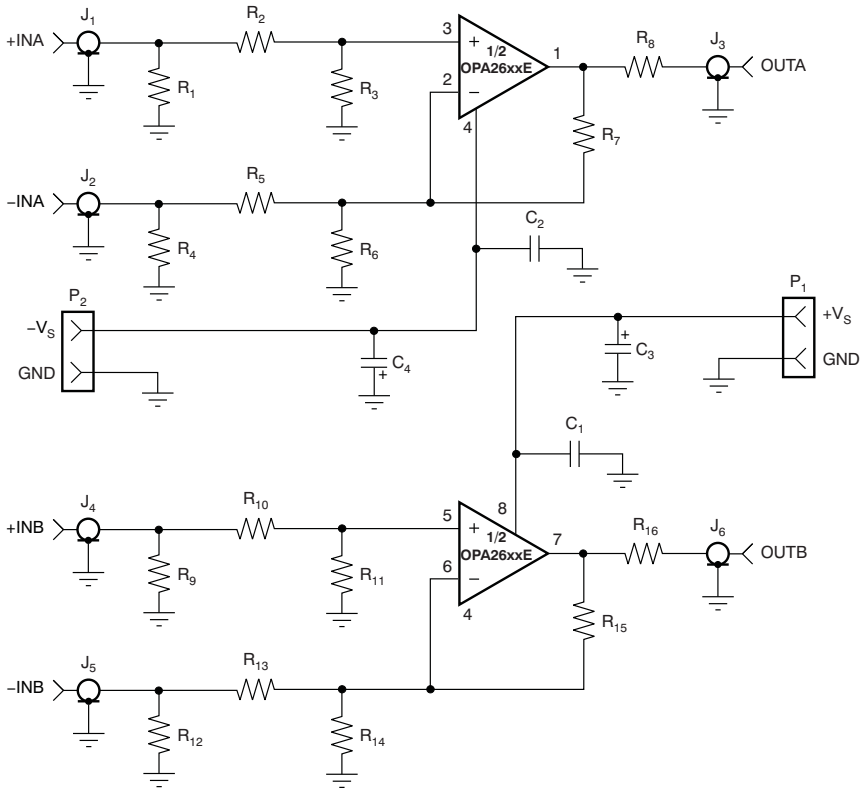


Figure 2. Schematic for DEM-OPA-MSOP-2A

3 Components

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

Table 1. Component Descriptions

PART	DESCRIPTION
C_1, C_2	Multilayer Ceramic Chip Capacitor, Size 1206, 20V
C_3, C_4	Tantalum Chip Capacitor, Size 3528, 16V
R_1 – R_{16}	Metal Film Chip Resistor, Size 1206, 1/8W
J_1 – J_6	SMA or SMB Board Jack (Amphenol 901-144-8)
P_1, P_2	Power Connectors (On-Shore Technology ED555/2DS)

Resistors R_1, R_4, R_9 and R_{12} are used to set the input impedance. Resistors R_8 and R_{16} set the output impedance. The values in Table 2 support test equipment with 50Ω input and output impedances; other source and load impedances are easily accommodated.

Table 2 lists suggested component values for the a dual voltage feedback operational amplifier in three different configurations: as a Noninverting Amplifier (NIA), an Inverting Amplifier (IA) and a Difference Amplifier (DA). The gain for the DA is the differential mode gain. Other dual op amps can also be easily configured; consult the respective data sheet for a specific op amp to select component values.

Table 2. Example Component Selection Guide(1)(2)

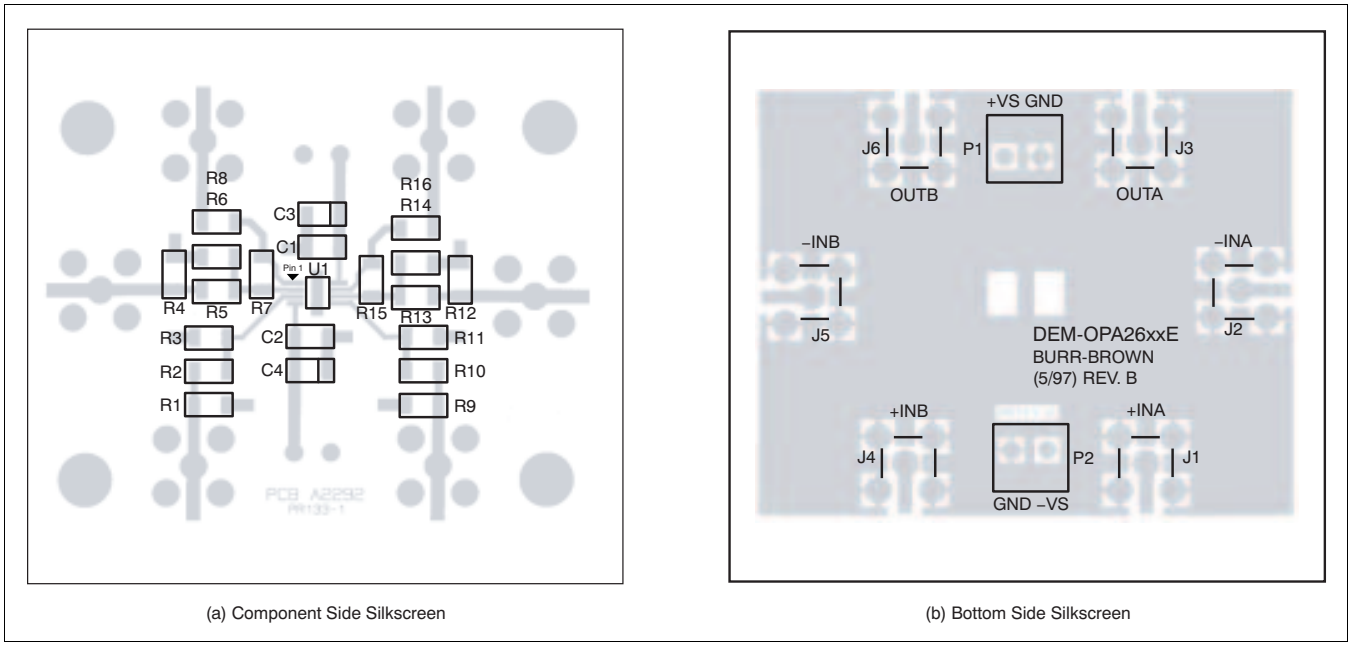
CONFIGURATION	NONINVERTING	INVERTING	DIFFERENCE
Gain	+2	–1	+1
C_1, C_2	0.1µF	0.1µF	0.1µF
C_3, C_4	4.7µF	4.7µF	4.7µF
R_1, R_9	49.9Ω	Not used	53.6Ω
R_2, R_{10}	20.0Ω	Not used	402Ω
R_3, R_{11}	Not used	20.0Ω	402Ω
R_4, R_{12}	Not used	56.2Ω	61.9Ω
R_5, R_{13}	Not used	R_G = 402Ω	R_G = 402Ω
R_6, R_{14}	R_G = 402Ω	Not used	Not used
R_7, R_{15}	R_F = 402Ω	R_F = 402Ω	R_F = 402Ω
R_8, R_{16}	49.9Ω	49.9Ω	49.9Ω

(1) The values listed here are for illustration purposes only. See the individual op amp data sheet for information on selecting these values. See the specific data sheet to select proper values. The I/O impedances are 50Ω.

(2) R_F and R_G refer to the *feedback* and *gain-setting* resistors for current-feedback op amps.

4 Board Layout

This demonstration fixture is a two-layer PCB. (See Figure 3.) It uses a ground plane on the bottom layer, and signal and power traces on the top layer. 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.



(a) Component Side Silkscreen

(b) Bottom Side Silkscreen

(1) The board name shown in the silkscreen is DEM-OPA26xxE with the Burr-Brown Revision B design finalized in May 1997.

Figure 3. DEM-OPA-MSOP-2A Demonstration Board Layout

The location and type of capacitors used for power-supply bypassing are crucial for high-frequency amplifiers. The tantalum capacitors, C_3 and C_4, do not need to be close to pins 8 and 4 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.

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 under these conditions. 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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