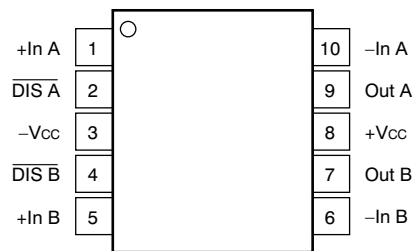


## DEM-OPA-MSOP-2B Demonstration Fixture

### 1 Description

The DEM-OPA-MSOP-2B demonstration fixture is a generic, unpopulated printed circuit board (PCB) for dual high-speed operational amplifiers in MSOP-10 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 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.

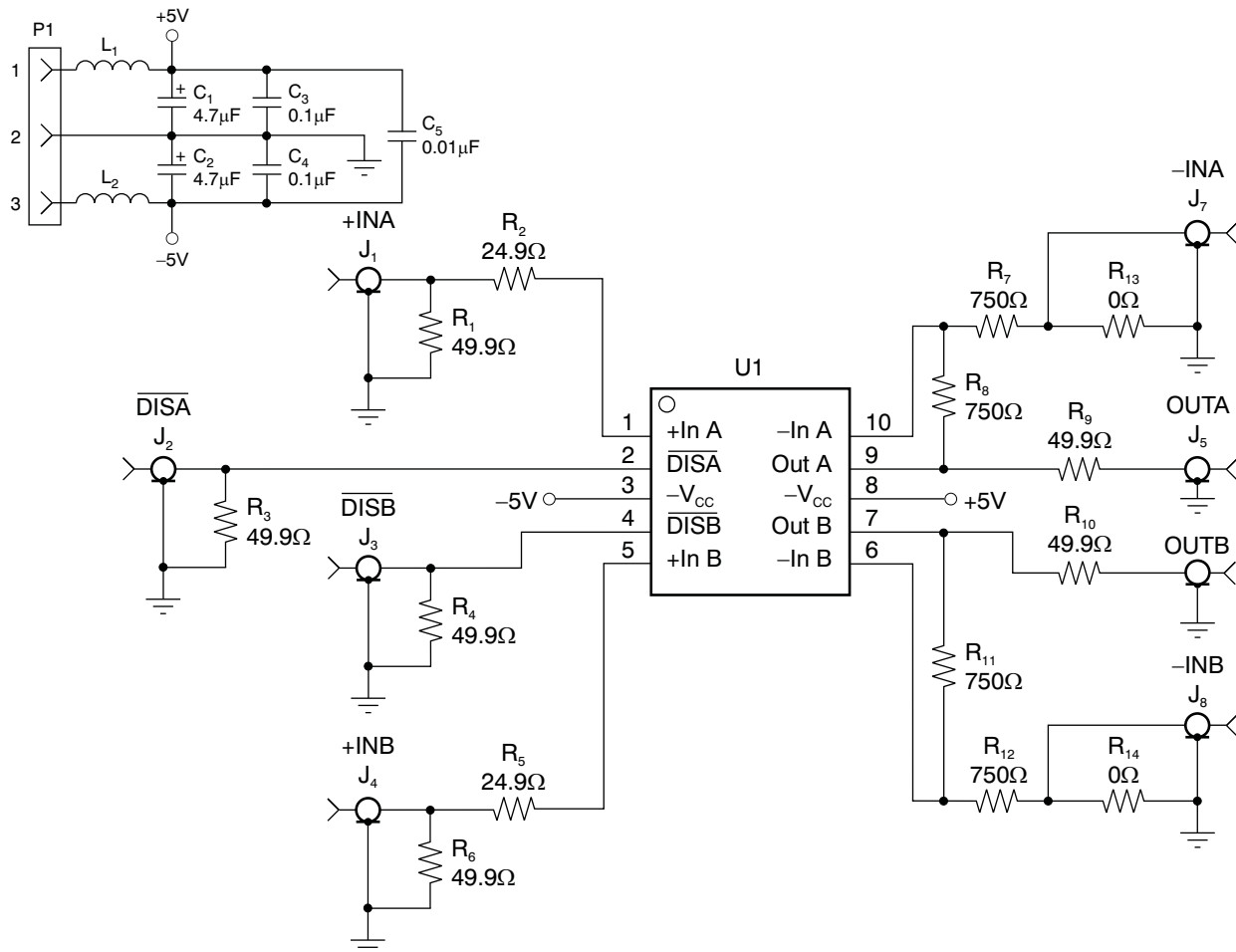


Figure 2. Schematic for DEM-OPA-MSOP-2B

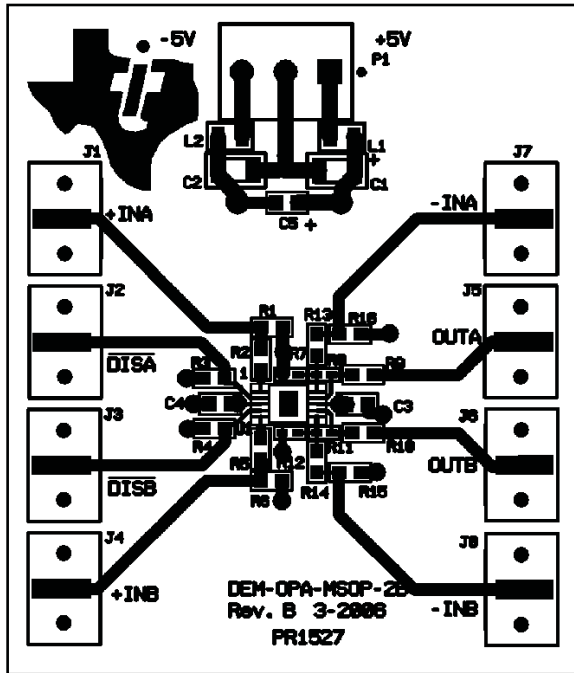
### 3 Components

Components that have RF performance similar to the ones listed in [Table 1](#) may be substituted.

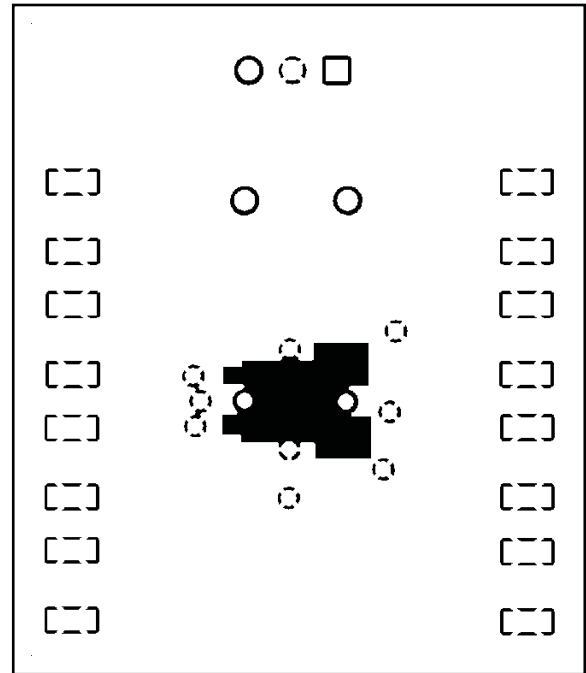
**Table 1. Component Descriptions**

PART	DESCRIPTION
C <sub>1</sub> , C <sub>2</sub>	Tantalum Chip Capacitor, SMA EIA Size 3216, 20V
C <sub>5</sub> , C <sub>3</sub> , C <sub>4</sub>	Multilayer Ceramic Chip Capacitor, SMD 0603, 25V
+INA, +INB, -INA, -INB, OUTA, OUTB, DISA, DISB	SMA or SMB Board Jack (Amphenol 901-144-8)
L <sub>1</sub> , L <sub>2</sub>	EMI-suppression ferrite chip, SMD 0805 (Steward LI 0805 B 900 R)
P <sub>1</sub>	Terminal block, 3.5mm centers (On-Shore Technology ED555/3DS)
R <sub>1</sub> – R <sub>6</sub> , R <sub>9</sub> , R <sub>12</sub> – R <sub>14</sub>	Metal film chip resistor, SMD 0603, 1/8W
R <sub>7</sub> , R <sub>8</sub> , R <sub>10</sub> , R <sub>11</sub>	Metal film chip resistor, SMD 0402, 1/16W

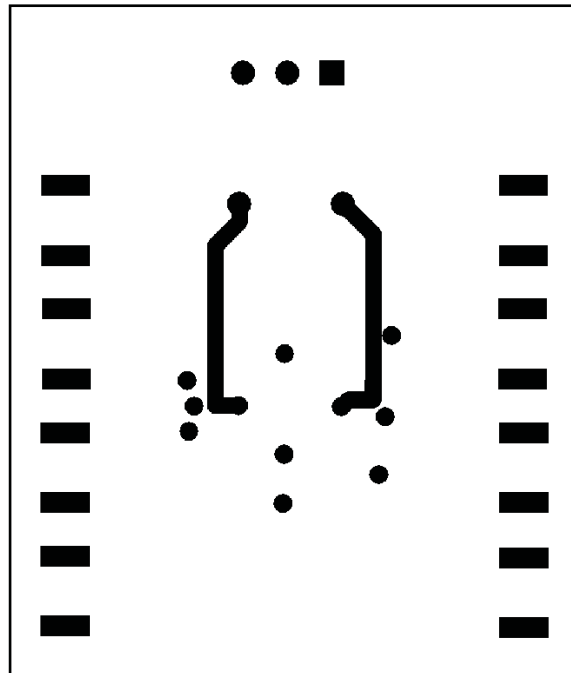
The location of the following components is illustrated in [Figure 3](#). R<sub>1</sub> and R<sub>2</sub> are the input resistance matching the source impedance for each amplifier. R<sub>2</sub> and R<sub>5</sub> are series isolation resistance that may help isolate the input parasitic from the source. R<sub>3</sub> and R<sub>4</sub> are input resistance matching for the disable line. R<sub>7</sub> and R<sub>9</sub> are the gain resistors. Note that in order to have a noninverting configuration, R<sub>13</sub> and R<sub>14</sub> need to be 0Ω. If an inverting configuration is desired, R<sub>13</sub> and R<sub>14</sub> are the matching input resistance with R<sub>1</sub> and R<sub>2</sub> set at 0Ω. R<sub>8</sub> and R<sub>11</sub> are the feedback resistors. R<sub>9</sub> and R<sub>10</sub> are output matching resistance and should be set to 50Ω for a 50Ω environment. L<sub>1</sub> and L<sub>2</sub> are ferrite chips that can reduce interactions with the power supply at high frequencies; if not desired, they can be replaced with 0Ω resistors. The power supplies are each respectively bypassed with two capacitors: C<sub>1</sub> and C<sub>3</sub> for the positive supply, and C<sub>2</sub> and C<sub>4</sub> for the negative supply. C<sub>4</sub> and C<sub>5</sub> are usually set between 2.2μF and 6.8μF, where C<sub>2</sub> and C<sub>3</sub> are 0.1μF ceramic capacitors. C<sub>5</sub>, usually set at 10nF, is connected between the positive and negative power supplies.



(a) Top Layer



(b) Mid Layer



(c) Bottom Layer

**Figure 3. DEM-OPA-MSOP-2B Demonstration Fixture Layout**

## 4 Board Layout

This demonstration fixture is a four-layer PCB. 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 to high-frequency amplifiers. The tantalum capacitors,  $C_1$  and  $C_2$ , do not need to be as close to pins 3 and 8 on the PCB and may be shared with other amplifiers. See the individual op amp data sheets 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  $50\Omega$  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 operational amplifier, and will alter the amplifier response. Instead, use low-impedance ( $\leq 500\Omega$ ) 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  $100\Omega$  resistor on the probe tip to isolate its capacitance from the circuit.

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