

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

1 Description

The DEM-OPA-SOT-1B demonstration fixture is a noninverting configuration, unpopulated printed circuit board (PCB) for single op amps in SOT23 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.

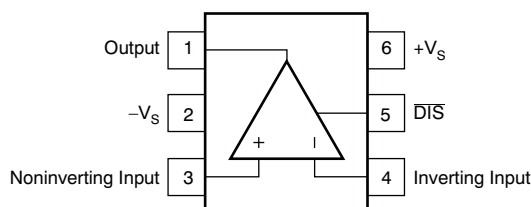


Figure 1. Package Pinout

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.

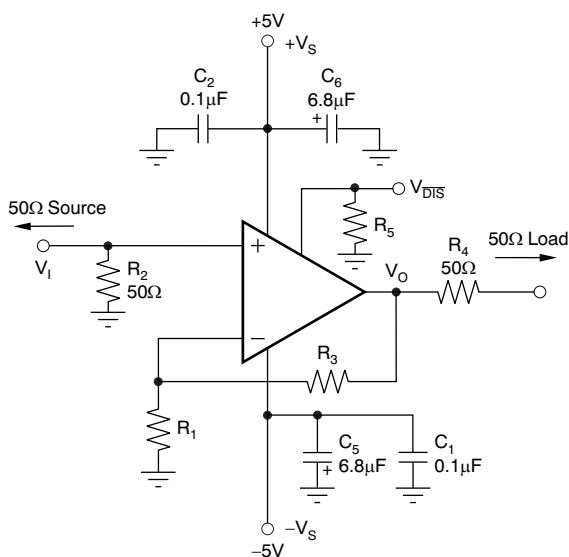


Figure 2. Schematic for DEM-OPA-SOT-1B

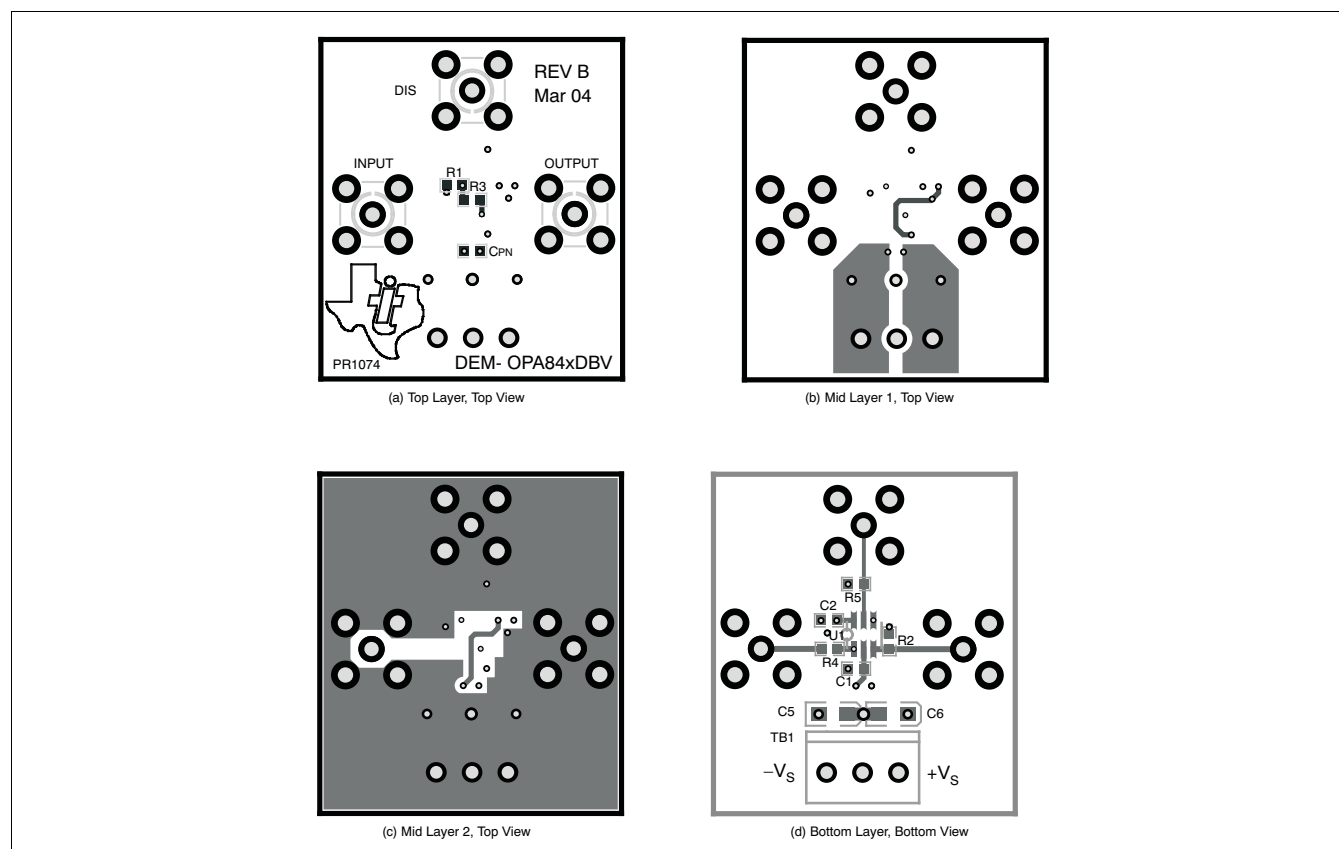
3 Components

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

Table 1. Component Descriptions

PART	DESCRIPTION
C_5, C_6	Tantalum Chip Capacitor, SMD EIA Size 3216, 20V
C_1, C_2, C_{PN}	Multilayer Ceramic Chip Capacitor, SMD 0603, 50V
INPUT, OUTPUT, DIS	SMA or SMB Board Jack (Amphenol 901-144-8)
TB1	Terminal Block, 3.5mm Centers (On-Shore Technology ED555/3DS)
R_1, R_2, R_3, R_4, R_5	Metal Film Chip Resistor, SMD 0603, 1/8W

Please refer to [Figure 3](#) for the location of the following components. R_2 and R_4 set the I/O impedance; R_1 and R_3 set the gain; and C_1, C_2, C_5, C_6 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. R_5 is the matching resistor for the disable pin.



- (1) The board name shown in the top silkscreen is DEM-OPA84xDBV with the Revision B design finalized in March 2004.

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

4 Board Layout

This demonstration fixture is a four-layer PCB. Mid-layer 1 has only power traces. Mid-layer 2 has both ground and power traces. 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) connectors vertically. The location and type of capacitors used for power-supply bypassing are crucial to high-frequency amplifiers. The tantalum capacitors, $C_{BYP}V_{SP}$ and $C_{BYP}V_{SN}$, do not need to be as close to pins 6 and 2 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 ($\leq 500\Omega$) 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 100Ω resistor on the probe tip to isolate its capacitance from the circuit.

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During normal operation, some circuit components may have case temperatures greater than $+50^{\circ}C$. The EVM is designed to operate properly with certain components above $+50^{\circ}C$ as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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