

DEM-OPA-MSOP-1A Demonstration Fixture

1 Description

The DEM-OPA-MSOP-1A demonstration fixture is a generic, unpopulated printed circuit board (PCB) for a single, wide bandwidth, DC restoration circuit in an MSOP-10 package. [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 amplifier data sheets.

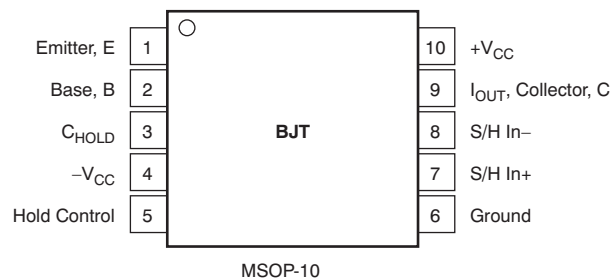


Figure 1. MSOP Package Pinout, Top View

2 Circuit

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

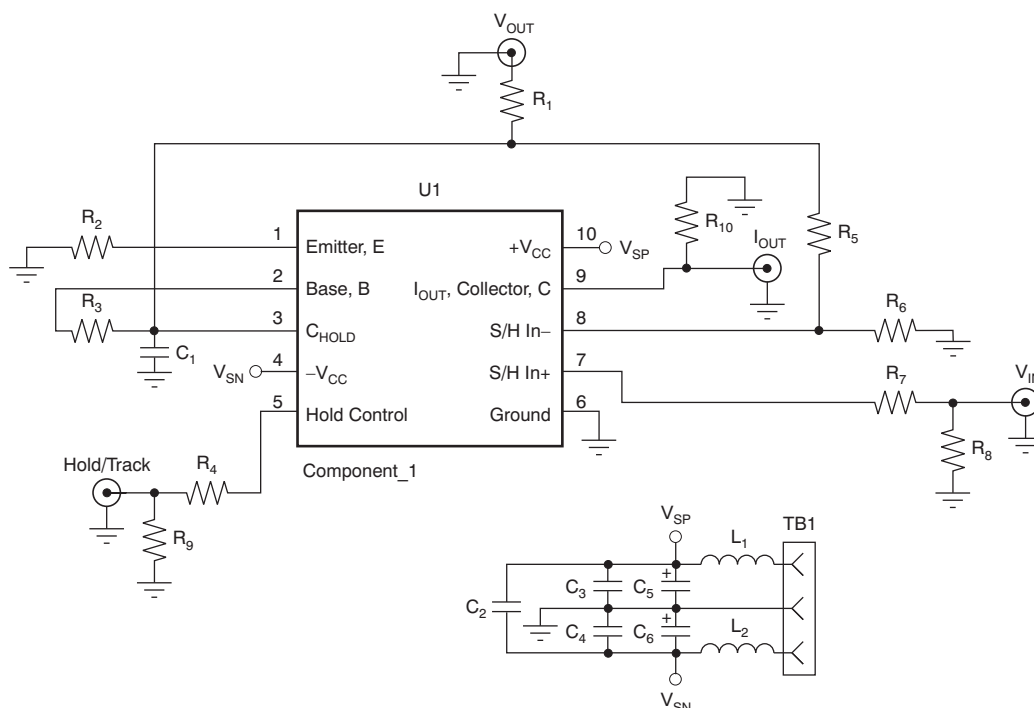


Figure 2. Schematic for DEM-OPA-MSOP-1A

3 Components

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

Table 1. Component Descriptions

PART	DESCRIPTION
C ₅ , C ₆	Tantalum Chip Capacitor, SMD EIA Size 3216, 20V
C ₁ , C ₃ , C ₄	Multilayer Ceramic Chip Capacitor, SMD 0603, 50V
C _C	Multilayer Ceramic Chip Capacitor, SMD 0805, 50V
V _{OUT} , V _{IN} , Hld/Trade, I _{OUT}	SMA or SMB Board Jack (Amphenol 901-144-8)
L ₁ , L ₂	EMI-Suppression Ferrite Chip, SMD 1206 (Steward LI 1206 B 900 R)
TB ₁	Terminal Block, 3.5mm Centers (On-Shore Technology ED555/3DS)
R _{XX}	Metal Film Chip Resistor, SMD 0603, 1/8W

Please refer to [Figure 3](#) for the location of the following components:

- R₁, R₃, R₅ and R₆ set the desired input/output impedances of the Operational Transconductance Amplifier (OTA) section when evaluated by itself.
- R₂ is used to set the gain of the OTA section.
- R₁, R₇, and R₈ set the desired input/output impedances of the sampling OTA section when evaluated by itself
- C₁ is the hold capacitor.
- R₄ and R₉ sets the input impedance for the TTL control.
- C₂, C₃, C₄, C₅, and C₆ are supply bypass capacitors. C₂ is optional; it adds a bypass between the supplies, which may improve distortion performance.

- L_1 and L_2 are ferrite chips that can reduce interactions with the power supply at high frequencies. If not desired, they can be replaced with 0Ω resistors.

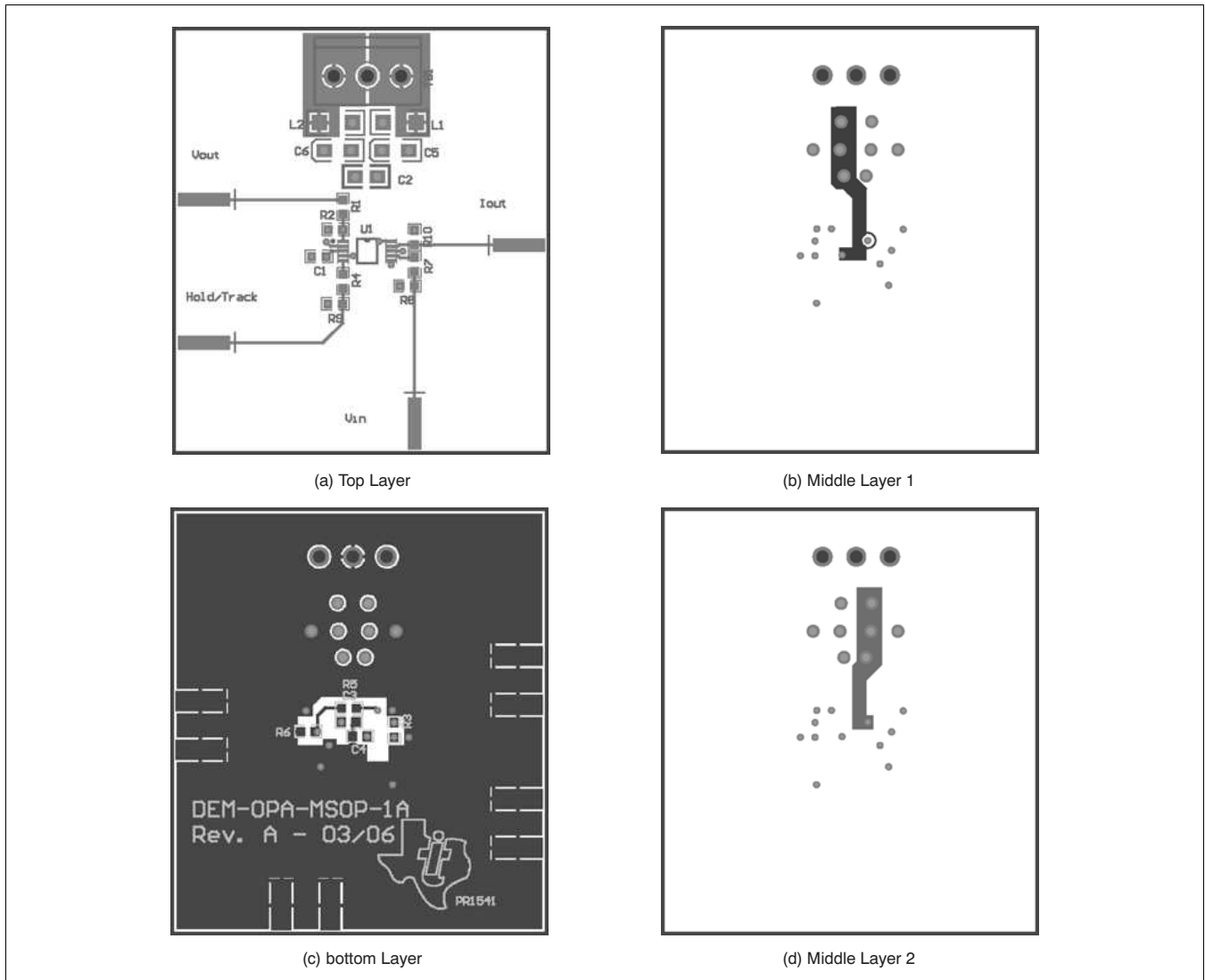


Figure 3. DEM-OPA-MSOP-1A Demonstration Fixture Layout

4 Board Layout

This demonstration fixture is a four-layer PCB. It uses a ground plane bottom layer. The ground plane has been opened up around op amp pins that are sensitive to capacitive loading. Power-supply traces are laid out in the internal planes. The SMA (or SMB) connectors may be mounted 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_5 and C_6 , do not need to be close to pins 4 and 14 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 ($\leq 500\Omega$) 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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