

DEM-OPA-SOT-1A Demonstration Fixture

1 Description

The DEM-OPA-SOT-1A demonstration fixture is a generic, unpopulated printed circuit board (PCB) designed to provide an optimized layout when evaluating wideband operational amplifiers in the tiny SOT-23 package. [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.

Only a few components are necessary to be assembled onto the board to set up the operational amplifier in either an inverting or noninverting configuration. In order to avoid parasitic component inductance the board only accepts surface mount resistors and capacitors. The actual values of the components, especially the resistors, depend on the type of operational amplifier used and the intended mode of operation. The board was designed to accommodate a variety of amplifiers: voltage feedback types or current feedback types. Furthermore, the evaluation board not only handles op amps in the existing 5-lead SOT-23 package but also the evaluation platform for 6-lead SOT-23 package. Therefore, the layout includes a sixth pad for the IC (U1) located on the opposite side of pad 2. The sixth lead may be an optional function pin for those amplifiers featuring a disable function. As shown in [Figure 3a](#) (top layer view), the user has the option to either hardwire this function pin to the positive supply by shortening the solder switch A, or connecting it to connector J3 soldering the switch in position B.

For a detailed discussion on the individual op amp and the appropriate selection of the recommended feedback and gain resistors, see the respective data sheets. As a reminder, the frequency response performance of a current feedback amplifier is determined by the feedback resistor value. Also note that the feedback resistor compensates for the package parasitics, and therefore its value usually varies for different packages.

All high-frequency devices have a common sensitivity to component and layout parasitics that may alter the AC performance. Therefore, slight adjustments of the feedback resistor (R2) and/or the gain resistor (R6) might be necessary to obtain the final desired frequency response. For current feedback amplifiers, increasing RF from its nominal value will reduce the achievable bandwidth, while decreasing RF will cause the frequency response to peak more. However, at higher gains, it might be advantageous to decrease RF in order to optimize for bandwidth.

For voltage feedback amplifiers, changing the impedance level (increasing or decreasing RF and RG) can also control the amount of peaking.

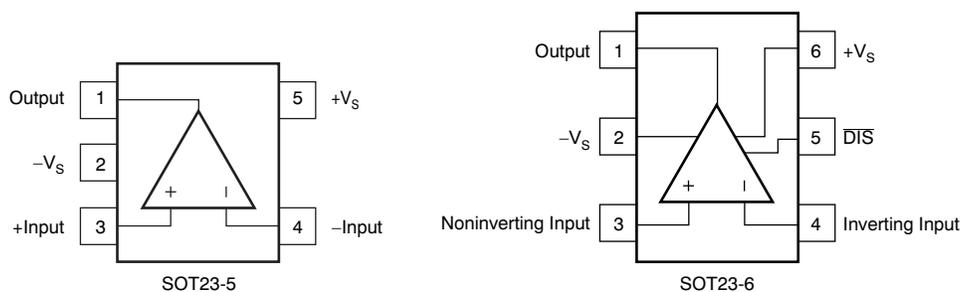
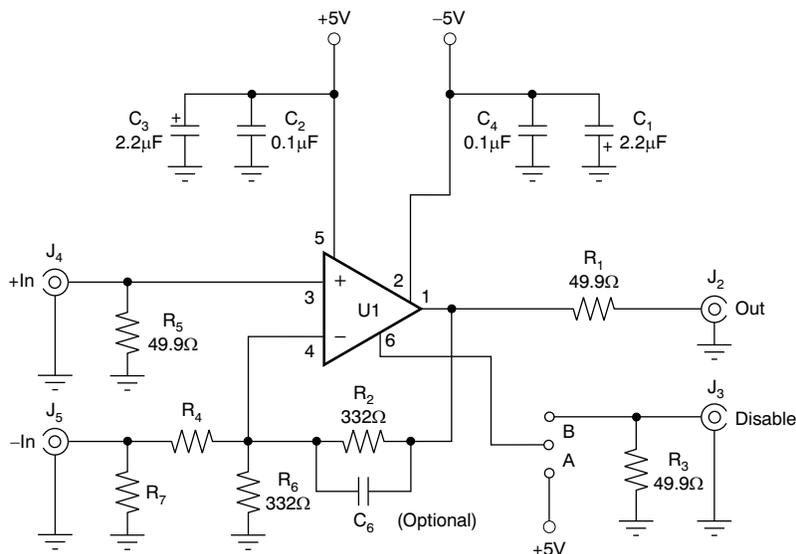


Figure 1. SOT23 Package Pinout, Top View

2 Circuit

The circuit schematic in [Figure 2](#) shows the connections for all possible components. Each configuration uses only some of the components. The power-supply bypassing capacitors are crucial components for high-frequency amplifiers and should not be omitted during evaluation. Typically, each supply should be bypassed by a parallel combination of a ceramic 0.1µF capacitor and a tantalum 2.2µF capacitor. Those bypass capacitors are located on the board such that the return path to the power connector is very short. Any larger transient currents will have a short loop, and will not reflect to the input and cause an increase in distortion.



NOTE: Values for G = +2, OPA658. R₃, R₄, R₇, C₅ not assembled.

Figure 2. Schematic for DEM-OPA-SOT-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 ₁ , C ₃	2.2µF, 16V, Size 3548
C ₂ – C ₄	0.1µF, 50V, Size 1206 (C ₅ - optional)
C ₆	Feedback capacitor; depends on application (not used on current feedback op amps).
R ₁ , R ₃ , R ₅	Typically 50Ω
R ₂ , R ₄ , R ₆	Depends on application
J ₁	Power Connector (On-Shore Technology ED555/3DS)
J ₂ – J ₅	SMA or SMB Connectors
R ₇	Set to get R ₇ R ₄ = desired input impedance for inverting operation.

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