TS1003 Op Amp Demo Board

FEATURES

- 0.8V to 5.5V Single-supply operation
- AC-coupled Inverting configuration supplied
- Fully Assembled and Tested
- 2mm x 2mm 2-layer demo board

COMPONENT LIST

DESIGNATION	QTY	DESCRIPTION
C1, C2	2	0.1µF ± 10% capacitors (0805)
C6	1	1µF ±10% capacitors (0805)
R7	1	500kΩ ± 1% resistor (0805)
R6, R10	2	1MΩ ± 1% resistors (0805)
R8, R9	2	1.25MΩ ± 1% resistors (0805)
U1	1	TS1003 operational amplifier
V_{DD} ,V_{in} ,V_{out} ,GND	6	Test points

DESCRIPTION

The demo board for the TS1003 is a completely assembled and tested circuit board that can be used for evaluating the TS1003. The TS1003 is the industry's first sub-1µA supply current, precision CMOS operational amplifier fully specified to operate over a supply voltage range from 0.8V to 5.5V. Fully specified at 1.8V, the TS1003 is optimized for ultra-long-life battery powered applications. The TS1003 exhibits a typical input bias current of 2pA, and rail-to-rail input and output stages.

The TS1003 is fully specified over the industrial temperature range (-40°C to +85°C). While the TS1003 is available in a PCB-space saving 5-lead SC70 or 5-lead SOT23 packaging, the SC70 version is mounted to the evaluation board.

Product data sheets and additional documentation can be found on factory web site at www.touchstonesemi.com.

Ordering Information

Order Number	Description
TS1003DB	Demo Board

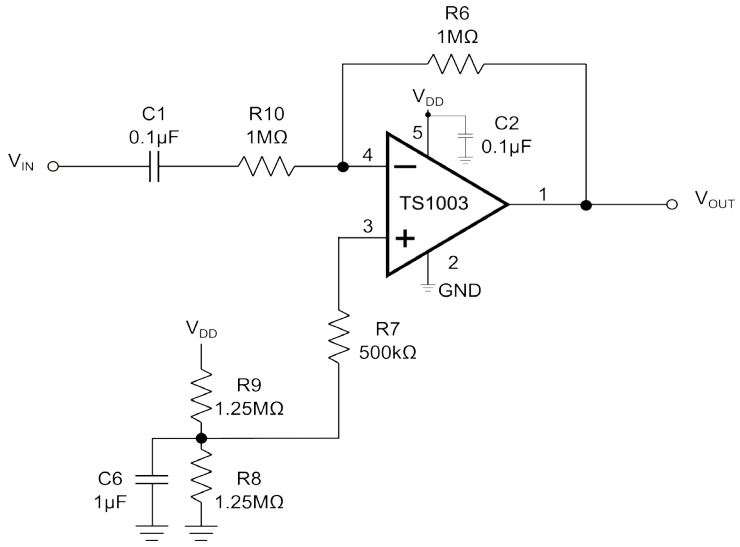

Figure 1. Inverting Configuration

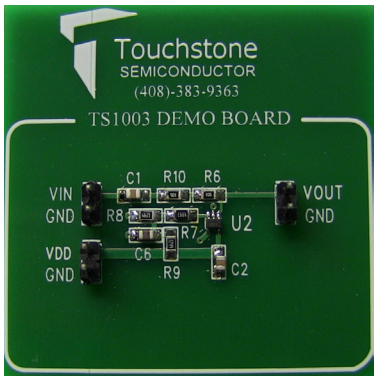

Figure 2. TS1003 Evaluation Board

TS1003 Op Amp Demo Board

Description

The TS1003 demo board provides an inverting configuration. The input to the inverting circuit is AC-coupled. The demo board provides a re-biasing scheme at one-half the power supply or $V_{DD}/2$ for the inverting configuration.

Within the inverting configuration, the AC-coupling capacitor creates a high pass filter. The resulting cut-off frequency, f_C, is given as:

$$f_C = \frac{1}{2\pi RC}$$

For the inverting amplifier, R=R10=1MΩ and C=C1=0.1µF. In both cases, these component values generate a high-pass cut-off frequency of 1.6Hz.

Inverting configuration

In an inverting configuration, the circuit's transfer function is given by the following equation:

$$\frac{V_{OUT}}{V_{IN}} = -\frac{R6}{R10}$$

In this case, R6=1MΩ and R10=1MΩ. This results in a signal gain of -1 with a circuit bandwidth of 2kHz and an overall circuit bandwidth range of 1.6Hz to 2kHz.

Quick Start Procedures

Required Equipment

- TS1003 demo board
- DC Power Supply, Single or Dual Output
- Function Generator
- 4-channel Oscilloscope
- Two 1MΩ oscilloscope probes

In order to evaluate the TS1003 operational amplifier in the inverting configuration, the following steps are to be performed:

1) Before connecting the DC power supply to the demo board, turn on the power supply and set the DC voltage to 5.5V and then turn it off.

2) Set the function generator output frequency to 500Hz and output level with a V_{OH} = 2.35V and a V_{OL} = 2.15V. This sets the input swing to 200mV_{PP}, centered at 2.25V.

3) In order to monitor the input and output signal, select two channels on the oscilloscope and set the vertical voltage scale and the vertical position on each channel to 100mV/DIV and -2.25V, respectively. Set the horizontal time scale to 500µs/DIV.

4) Connect the positive terminal of the DC power supply to V_{DD} and the ground terminal to GND. For all other connections, please refer to Table 1.

5) Connect the signal output of the function generator to V_{in} and the ground terminal to GND.

6) To monitor the input, connect the signal terminal of one of the oscilloscope probes to V_{in} and the ground terminal to GND. To monitor the output, use the second probe to connect the signal terminal to V_{out} and the ground terminal to GND.

7) Turn on the power supply and check that the power supply current is approximately 0.9µA.

8) Turn on the function generator.

9) Observe the input and output signal. The output signal is an inverted version of the input signal and the swing should be 200mV_{PP}.

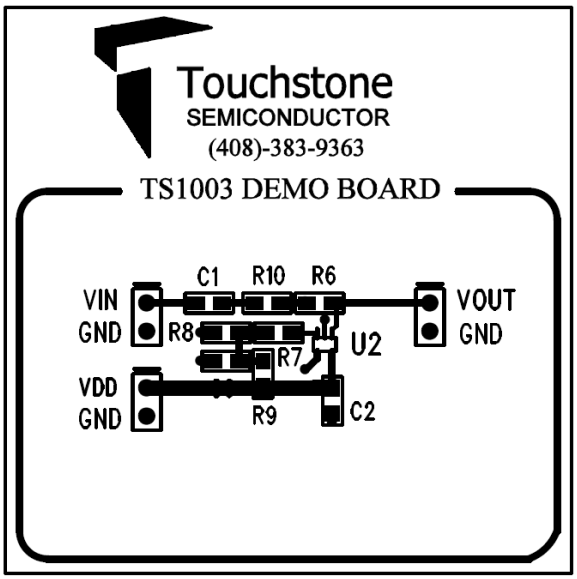

Figure 3. Top Layer #1

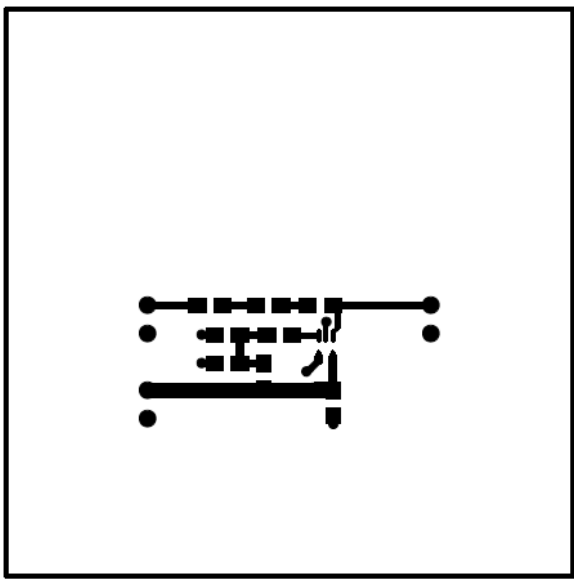

Figure 4. Top Layer #2

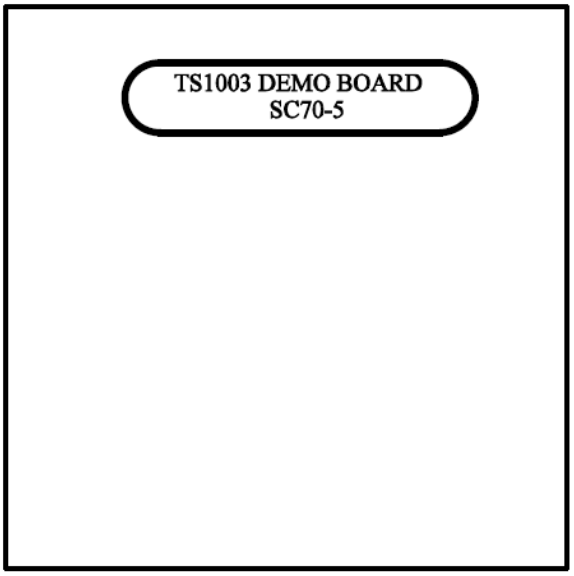

Figure 5. Bottom Layer (GND) #1

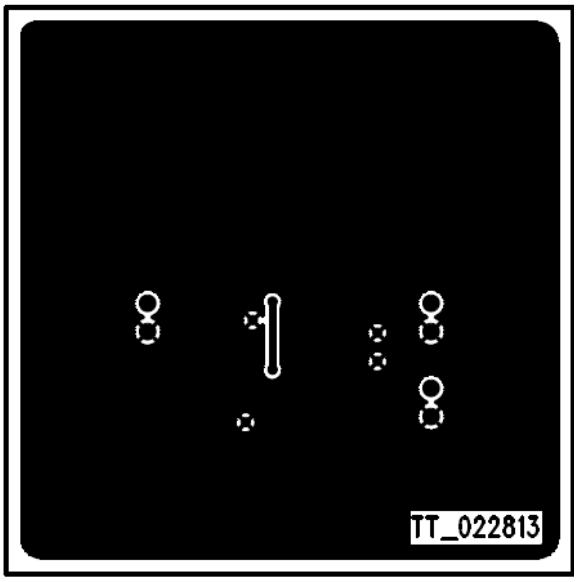

Figure 6. Bottom Layer (GND) #2