

FEATURES

- 3.3V Single-supply operation
- AC-coupled configuration
- Fully Assembled and Tested
- 2in x 2in 2-layer circuit board

COMPONENT LIST

DESIGNATION	QTY	DESCRIPTION
C1, C2, C1B, C2B	4	0.1 μ F $\pm$ 10% capacitors (0805)
R1, R1B, R6	3	100k Ω $\pm$ 1% resistor (0805)
R2, R2B	2	340k Ω $\pm$ 1% resistor (0805)
R3, R3B	2	84.5k Ω $\pm$ 1% resistors (0805)
R4, R4B	2	10M Ω $\pm$ 1% resistors (0805)
R5, R5B	2	158k Ω $\pm$ 1% resistors (0805)
U1	1	TS9001-1 Comparator
U2	1	TS9001-2 Comparator
J2, J3, VINA, VINB, VOUTA, VOUTB	6	Test points

DESCRIPTION

The demo board for the TS9001-1 and TS9001-2 is a completely assembled and tested circuit board that can be used for evaluating either or both analog comparator(s). The TS9001-1 and TS9001-2 are analog comparator products in the “NanoWatt Analog” high-performance analog integrated circuits portfolio.

The TS9001-1 and TS9001-2 circuits are AC-coupled at the input and are configured to operate with a 3.3V single voltage supply. For evaluating each circuit at a different supply voltage, the values of resistors R5 and R5B need to be changed. Each circuit has a dedicated supply test point, and both circuits can be evaluated simultaneously or individually. For additional information, refer to the “Description” section.

The TS9001-1’s output stage is push-pull and the TS9001-2’s output stage is open-drain. Both products are available in a PCB-space saving 5-lead SC70 surface-mount package.

Product data sheets and additional documentation can be found at www.silabs.com.

ORDERING INFORMATION

Order Number	Description
TS9001DB	Demo Board

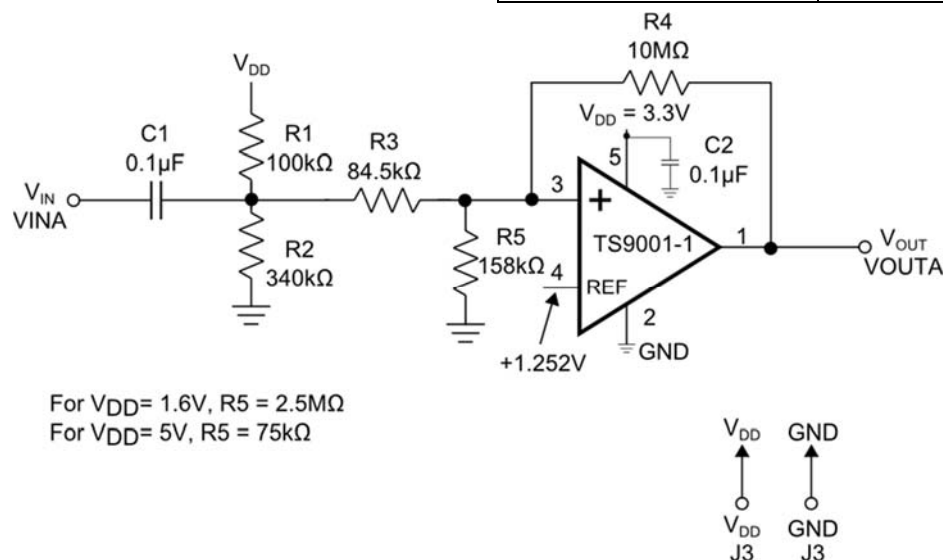


Figure 1. TS9001-1 Push-Pull Threshold Detection Configuration

TS9001 Comparator Demo Board



The demo board provides two configurations for evaluating the TS9001-1 and TS9001-2 comparators on a single PCB board. In both cases, the input to each circuit is AC-coupled. The demo board provides a re-biasing scheme.

The TS9001-1/2 demo board provides a dedicated power supply for the TS9001-1 and a dedicated power supply for the TS9001-2. This provides the user the flexibility of evaluating one circuit at a time or both at the same time.

DEFAULT CONFIGURATIONS

TS9001-1 and TS9001-2

The default configuration for both the TS9001-1 and TS9001-2 scheme is for $V_{CC} = 3.3V$ only. For evaluating at $V_{CC} = 1.6V$ and $5V$, refer to Figures 1 and 2, and Table 1 for the necessary changes to the circuit s.

Parameter	V_{DD}		
	1.6V	3.3V	5V
V_{THR}	1.278V	1.922V	2.693V
V_{THF}	1.258V	1.892V	2.643V
V_{HYSB}	20mV	30mV	50mV

Table 1. TS9001-1 and TS9001-2 Threshold and Hysteresis Values

QUICK START PROCEDURES

Required Equipment

- TS9001DB demo board
- A DC Power Supply, Single or Dual Output, an HP Model HP6624A or equivalent
- A Function Generator, an Agilent Model 33220A or equivalent
- 4-channel Oscilloscope, an Agilent Model DSO1014A or equivalent
- Two $1M\Omega$, 10x, oscilloscope probes

Signal	TS9001-1	TS9001-2
V_{DD}	J3	J2
GND		
V_{IN}	VINA	VINB
V_{OUT}	VOUTA	VOUTB

Table 1. Demo board jumper test points

TS9001-1 Threshold Detector

To evaluate the TS9001-1 push-pull output threshold detector circuit, the following steps are to be performed:

- 1) Before connecting the DC power supply to the demo board power test points, turn on the power supply and set the DC voltage to 3.3V and then turn it off.
- 2) Set the function generator frequency to 500Hz and its output swing to 200mV_{PP}.
- 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 the channel monitoring the input to 100mV/DIV and 0V, respectively, and on the channel monitoring the output to 1V/DIV and 0V, respectively. Set the horizontal time scale to 500μs/DIV and set the input coupling on both channels to AC-coupling.
- 4) Connect the positive terminal of the DC power supply to V_{DD} and its ground terminal to GND on Jumper J3. For all other connections, please refer to Table 2.
- 5) Connect the signal output of the function generator to VIN and the ground terminal to GND located on jumper VINA.
- 6) To monitor the input, connect the signal terminal of one of the oscilloscope probes to VIN and the ground terminal to GND located on Jumper VINA. To monitor the output, use the second probe to connect the signal terminal to VOUT and the ground terminal to GND to Jumper VOUTA.
- 7) Turn on the power supply and check that the power supply current is approximately 18μA.
- 8) Turn on the function generator.
- 9) Observe the input and output signal. The output signal should alternate between 0V to 3.3V.

TS9001-2 Threshold Detector

To evaluate the TS9001-2 open drain output threshold detector circuit, the following steps are to be performed:

- 1) Before connecting the DC power supply to the demo board power test points, turn on the power supply and set the DC voltage to 3.3V and then turn it off.
- 2) Set the function generator frequency to 500Hz and its output swing to 200mV_{PP}.
- 3) To monitor the input and output signal, select two channels on the oscilloscope and set the vertical voltage scale and the vertical position on the channel monitoring the input to 100mV/DIV and 0V, respectively, and on the channel monitoring the output to 1V/DIV and 0V, respectively. Set the horizontal time scale to 500μs/DIV and set the input coupling on both channels to AC-coupling.
- 4) Connect the positive terminal of the DC power supply to V_{DD} and the ground terminal to GND to Jumper J2. For all other connections, please refer to Table 2.
- 5) Connect the signal output of the function generator to VIN and the ground terminal to GND located on Jumper VINB.
- 6) To monitor the input, connect the signal terminal of one of the oscilloscope probes to VIN and the ground terminal to GND located on jumper VINB. To monitor the output, use the second probe to connect the signal terminal to VOUT and the ground terminal to GND to Jumper VOUTB.
- 7) Turn on the power supply and check that the power supply current is approximately 34μA.
- 8) Turn on the function generator.
- 9) Observe the input and output signal. The output signal should alternate between 0V to 3.3V.

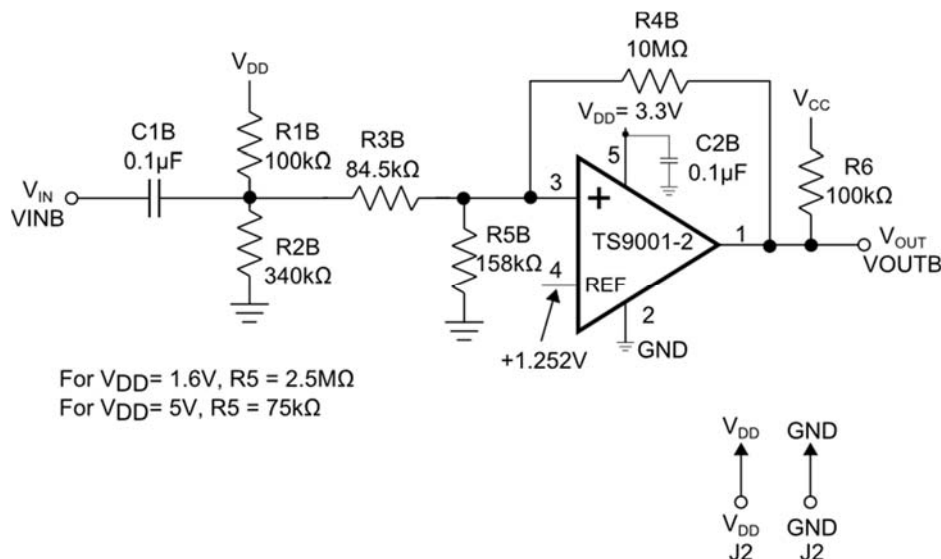


Figure 2. TS9001-2 Open-Drain Threshold Detection Configuration

TS9001 Comparator Demo Board

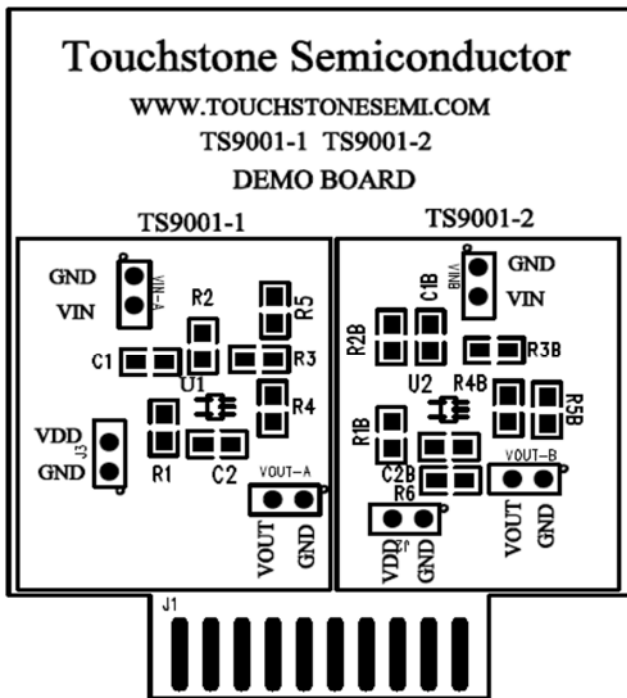


Figure 3. Top Layer Component View

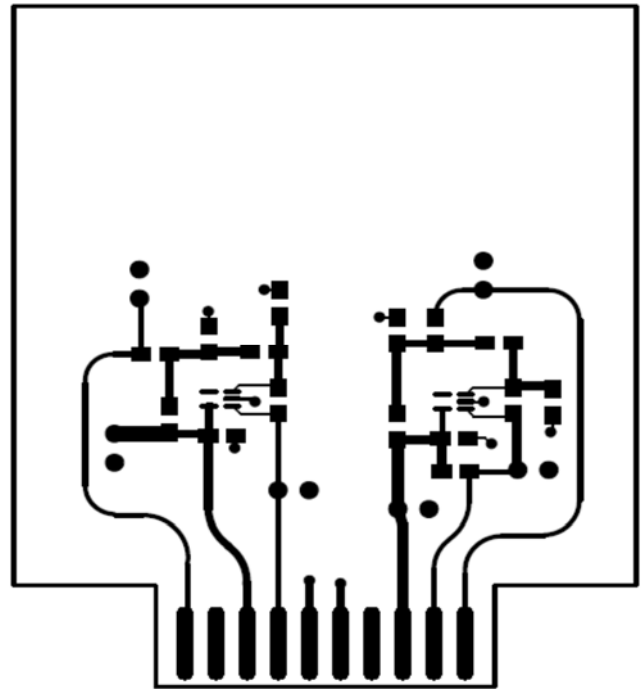


Figure 4. Top Layer Trace View

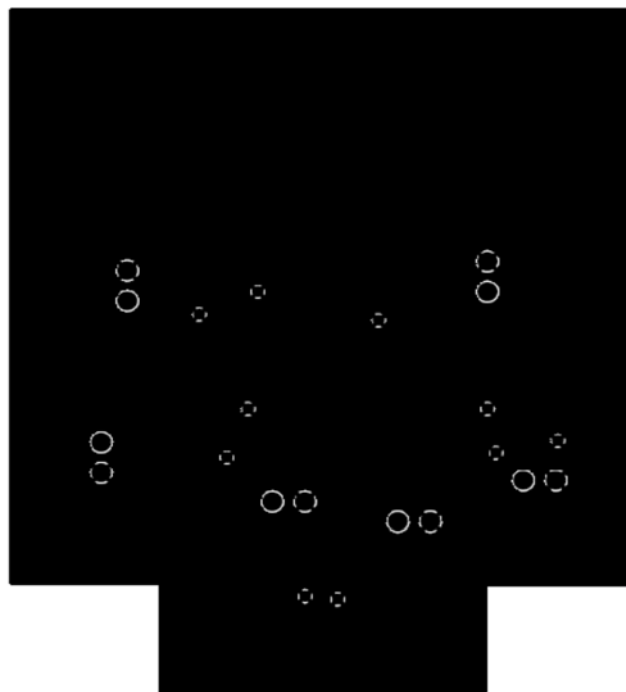
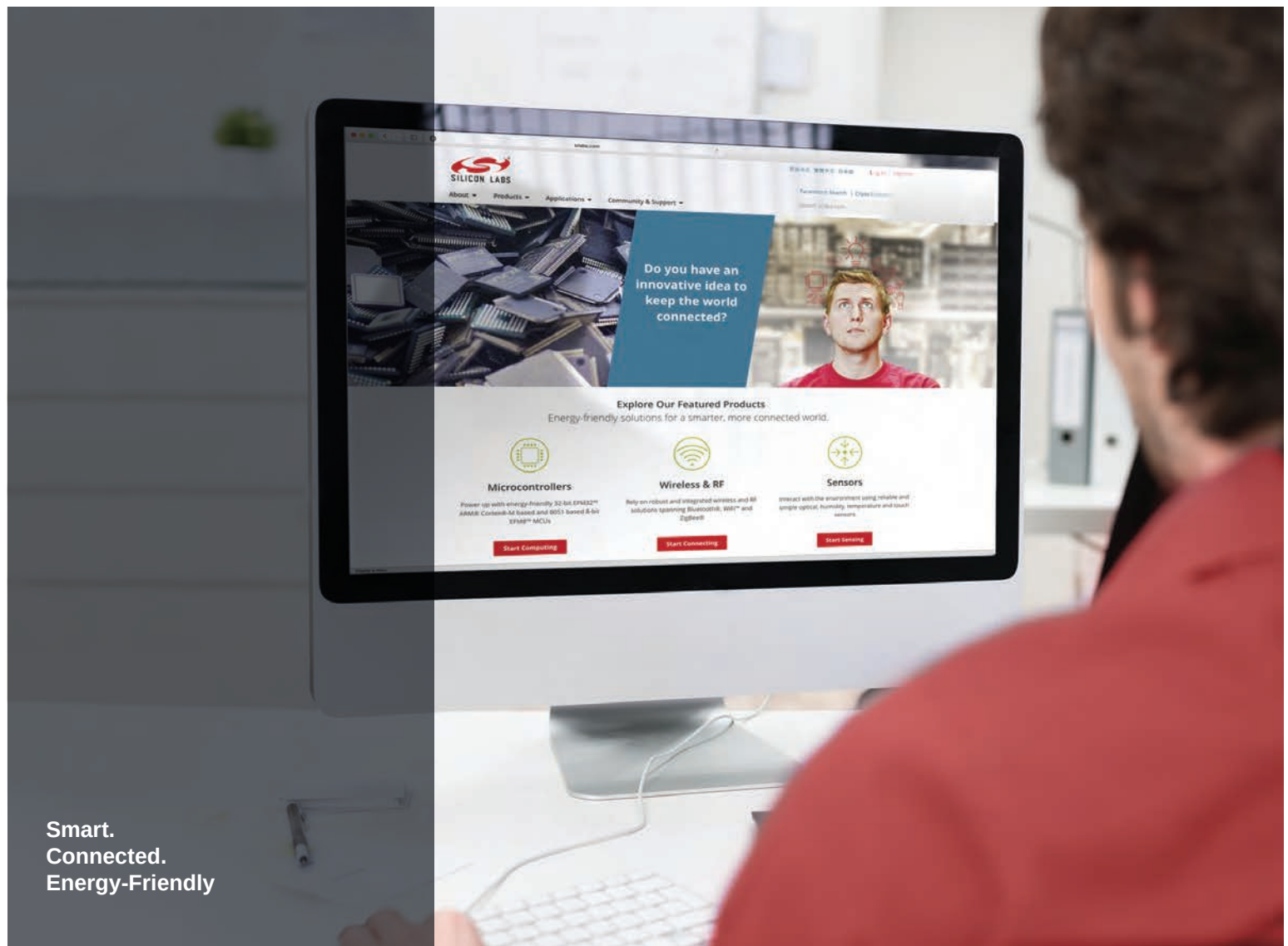


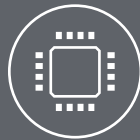
Figure 5. Bottom Layer (GND)



Smart.
Connected.
Energy-Friendly



Products
www.silabs.com/products



Quality
www.silabs.com/quality



Support and Community
community.silabs.com

Disclaimer

Silicon Laboratories intends to provide customers with the latest, accurate, and in-depth documentation of all peripherals and modules available for system and software implementers using or intending to use the Silicon Laboratories products. Characterization data, available modules and peripherals, memory sizes and memory addresses refer to each specific device, and "Typical" parameters provided can and do vary in different applications. Application examples described herein are for illustrative purposes only. Silicon Laboratories reserves the right to make changes without further notice and limitation to product information, specifications, and descriptions herein, and does not give warranties as to the accuracy or completeness of the included information. Silicon Laboratories shall have no liability for the consequences of use of the information supplied herein. This document does not imply or express copyright licenses granted hereunder to design or fabricate any integrated circuits. The products must not be used within any Life Support System without the specific written consent of Silicon Laboratories. A "Life Support System" is any product or system intended to support or sustain life and/or health, which, if it fails, can be reasonably expected to result in significant personal injury or death. Silicon Laboratories products are generally not intended for military applications. Silicon Laboratories products shall under no circumstances be used in weapons of mass destruction including (but not limited to) nuclear, biological or chemical weapons, or missiles capable of delivering such weapons.

Trademark Information

Silicon Laboratories Inc., Silicon Laboratories, Silicon Labs, SiLabs and the Silicon Labs logo, CMEMS®, EFM, EFM32, EFR, Energy Micro, Energy Micro logo and combinations thereof, "the world's most energy friendly microcontrollers", Ember®, EZLink®, EZMac®, EZRadio®, EZRadioPRO®, DSPLL®, ISOmodem®, Precision32®, ProSLIC®, SiPHY®, USBXpress® and others are trademarks or registered trademarks of Silicon Laboratories Inc. ARM, CORTEX, Cortex-M3 and THUMB are trademarks or registered trademarks of ARM Holdings. Keil is a registered trademark of ARM Limited. All other products or brand names mentioned herein are trademarks of their respective holders.



Silicon Laboratories Inc.
400 West Cesar Chavez
Austin, TX 78701
USA

<http://www.silabs.com>