AN2474
Application note

TS4995 1.2W fully differential audio power amplifier with selectable standby and 6db fixed gain - Evaluation board user guidelines

Introduction

This application note describes the DEMO TS4995, an evaluation board specifically designed for the TS4995 differential audio amplifier. In this document, you will find:

- a brief description of the TS4995 differential audio amplifier,
- a description of the evaluation board,
- a detailed list of evaluation board components,
- the layout of the evaluation board.

About the TS4995

The TS4995 is fully differential structure power audio amplifier which is capable of delivering 1.2W of continuous RMS output power into an 8Ω load at 5V. Due to its differential inputs, it exhibits outstanding noise immunity.

An external standby mode control reduces the supply current to less than 10nA. A STBY MODE pin allows the standby to be active High or Low. An internal thermal shutdown protection is also provided, making the device capable of sustaining short-circuits.

The TS4995 features an internal fixed gain at 6dB which reduces the number of external components on the application board, and the flip-chip package with 9 bumps allows maximum space saving.

Its key features are:

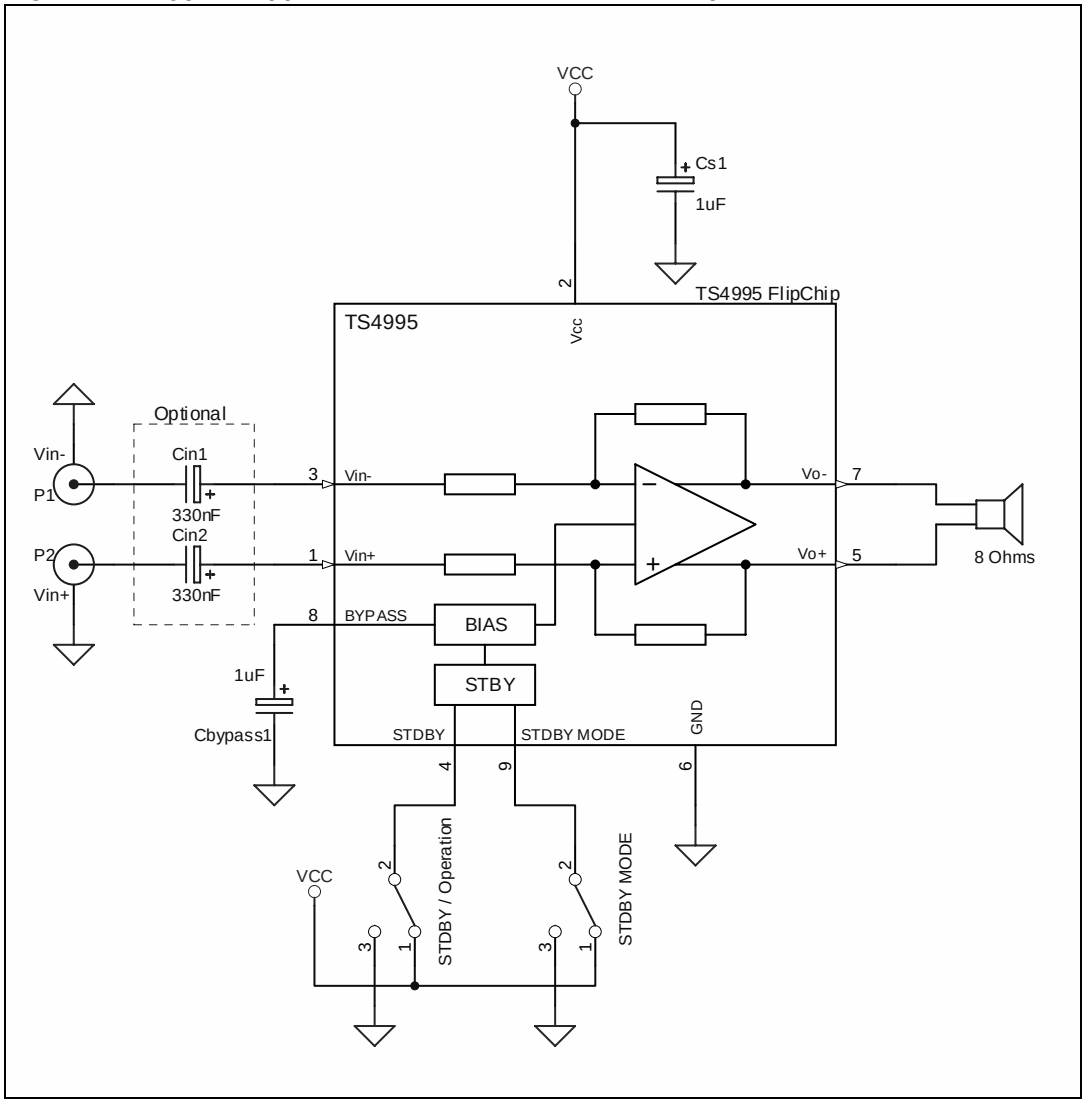
- Differential inputs
- 90dB PSRR @ 217Hz with grounded inputs
- Operating range from V_{CC} = 2.5V to 5.5V
- 1.2W rail to rail output power @ V_{CC}=5V, THD+N=1%, F=1kHz, with 8Ω load
- 6dB integrated fixed gain
- Ultra-low consumption in standby mode (10nA)
- Selectable standby mode (active low or active high)
- Ultra-fast startup time: 10ms typ. at V_{CC}=3.3V
- Available in 9-bump flip-chip (300mm bump diameter)
- Ultra-low pop & click

Figure 1 on page 2 shows a typical application for the TS4995 amplifier.

For more detailed information about the TS4995, refer to the datasheet.

1 Typical application

Figure 1. Typical application for the TS4995 audio amplifier



2 Description of the evaluation board

The DEMO TS4995 is an evaluation board designed to help you evaluate the TS4995 low power differential audio amplifier.

This section explains how to evaluate the amplifier in a typical application configuration. Using the board, you can:

- set the amplifier in standby/operation mode,
- select standby mode (active low or active high),
- modify the input configuration from capacitor coupled to common mode feedback.

The Cn4 connector is used to select between standby or operation mode; and the Cn5 connector is used for standby to select between active low or active high. For example, in *Figure 2*, the jumper that connects pin 2 and pin 3 of the Cn4 connector puts the device in standby mode, while the jumper that connects pin1 and pin 2 of the Cn5 connector determines that the standby is active high.

When the amplifier is used in common mode feedback input configuration, the input capacitors are shorted by placing jumpers on connectors Cn2 and Cn3.

Figure 2. Evaluation board schematic diagram

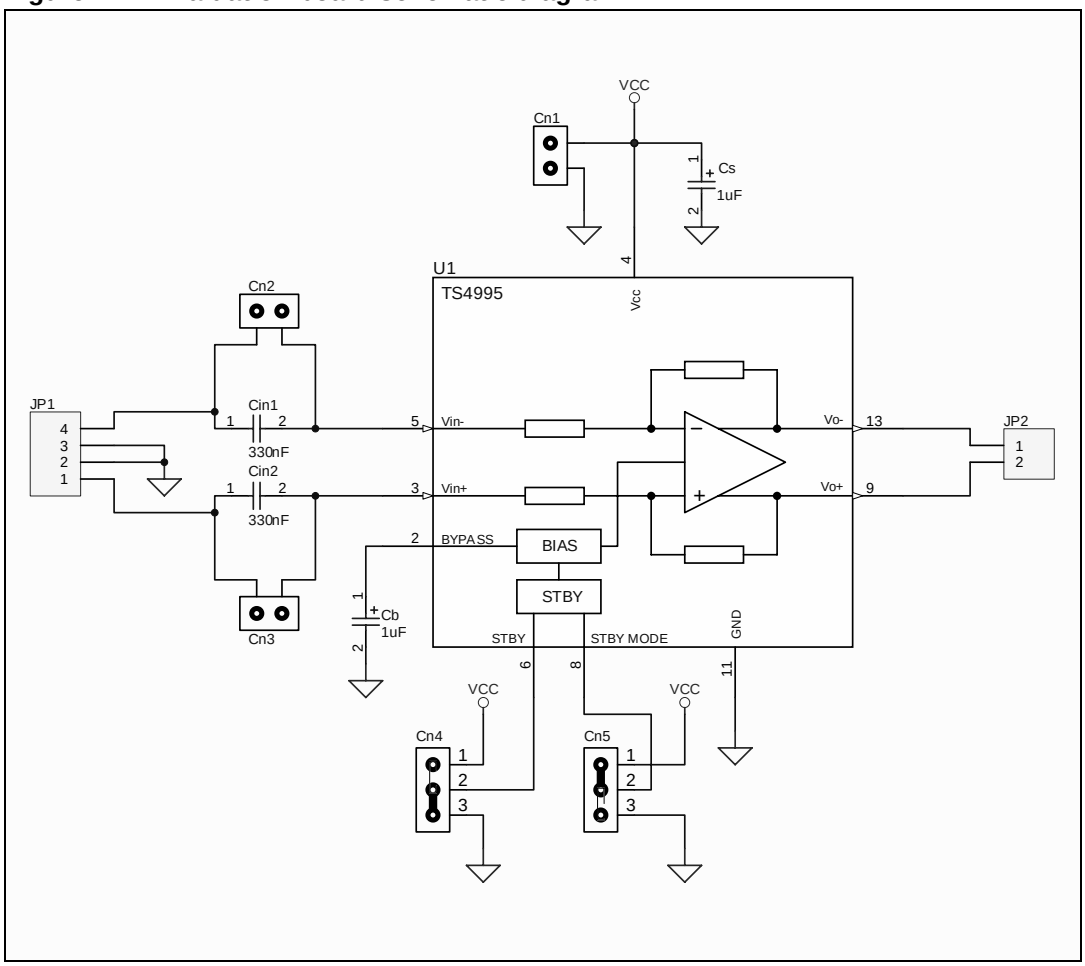
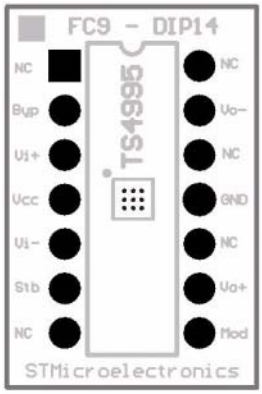


Table 1. Evaluation board bill of materials

Designation	Quantity	Description
U1	1	DIP14 socket with plugged flipchip to DIP adapter with the TS4995 audio amplifier
C1, C2	2	330nF/63V, ceramic capacitors
Cb, Cs	2	1µF/50V, electrolytic capacitor
---	2	Jumper, 2.54mm pitch (placed on Cn4 and Cn5 connectors)
Cn1, Cn2, Cn3	1	2 pins header, 2.54mm pitch
Cn4, Cn5	2	3 pins header, 2.54mm pitch
JP1	1	4 pins header, 2.54mm pitch
JP2	1	2 pins header, 2.54mm pitch

Figure 3. TS4995 flip-chip adapter



3 Evaluation board connectors

Connector(s)	Description
Cn1	Power connector (V_{CC}, GND). Power supply voltage from 2.5V to 5.5V.
Cn2	Connector used to short-circuit input capacitor $C_{in}1$ by placing jumper on it when the amplifier is used with common mode feedback input.
Cn3	Connector used to short-circuit input capacitor $C_{in}2$ by placing jumper on it when the amplifier is used with common mode feedback input.
Cn4	Standby control connector (GND, Standby, V_{CC}).
Cn5	Standby mode control connector (V_{CC}, Standby, GND). Allows you to select standby mode active high or low.
JP1	Input signal connector (V_{in-}, V_{in+} , 2 x GND).
JP2	Output signal connector (V_{o-}, V_{o+}).

Caution: When you apply the power supply through Cn1, **DO NOT** invert the polarity because it would destroy the amplifier at U1.

4 Evaluation board layout

The following schematics show the layers and the top view of the evaluation board.

Figure 4. PCB top layer

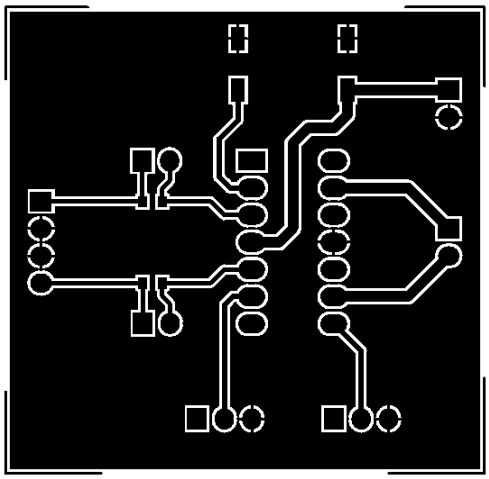


Figure 5. PCB bottom layer

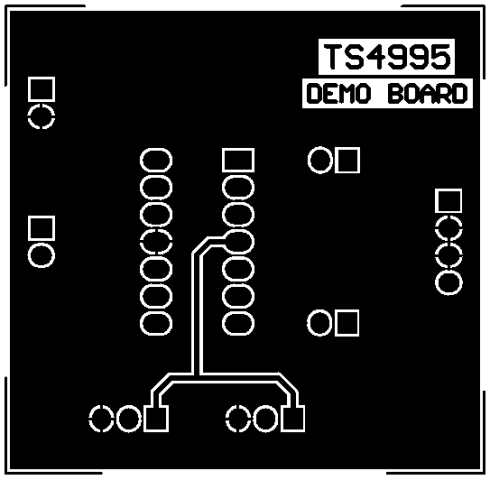
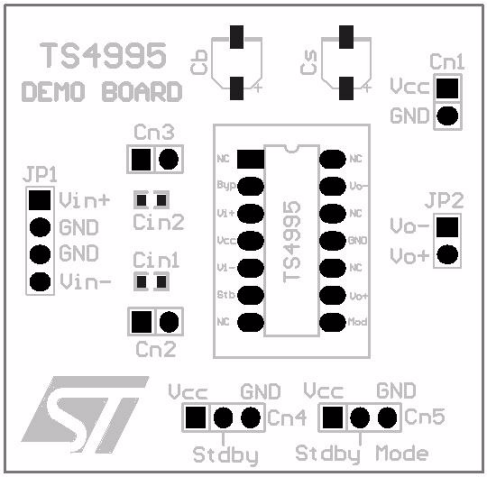


Figure 6. Top view of evaluation board



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