

IS31AP2005 CLASS-D AUDIO AMPLIFIER

DESCRIPTION

The IS31AP2005 demo board is a fully assembled and tested PCB that uses the IS31AP2005 Class-D power amplifier to drive an 8Ω or 4Ω speaker in portable audio applications. Designed to operate from a 2.7V to 5.5V DC power supply, the demo board accepts a single-ended or differential input signal. The demo board provides a BTL output capable of delivering 2.6W into a 4Ω speaker at 5V.

FEATURES

- Supply voltage range from 2.7V to 5.5V
- Delivers 2.6W into a 4Ω speaker at 5V supply (THD+N=10%)
- Delivers 1.8W into an 8Ω speaker at 5V supply (THD+N=10%)
- Available in MSOP-8 and DFN-8 packages

QUICK START

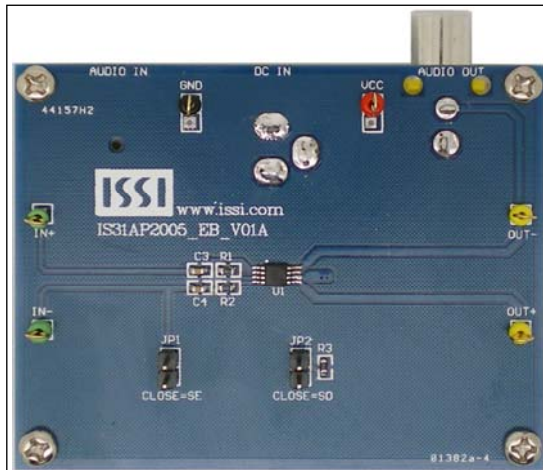


Figure 1: Photo of IS31AP2005 Evaluation Board

RECOMMENDED EQUIPMENT

- 5.0V, 2A power supply
- Audio source (i.e. MP3 player, Notebook PC, etc.)
- 8Ω or 4Ω speaker

ABSOLUTE MAXIMUM RATINGS

- ≤ 5.5V power supply

Caution: Do not exceed the conditions listed above; otherwise the board will be damaged.

PROCEDURE

The IS31AP2005 demo board is fully assembled and tested. Follow the steps listed below to verify board operation.

Caution: Do not turn on the power supply until all connections are completed.

- 1) Connect a 4Ω (or larger) speaker across the OUT- terminal and OUT+ terminal.
- 2) Connect the ground terminal of the power supply to the GND and the positive terminal to the VCC. Or connect DC power to connector (DC IN).
- 3) If the audio source is differential, remove jumper JP1, connect the negative of the audio source to the IN- terminal, and connect the positive of the audio source to IN+ terminal.
- 4) If the audio source is single-ended, connect the audio source to the IN+ terminal, and close jumper JP1; or connect audio source to the audio connector (AUDIO IN) and close jumper JP1.
- 5) Turn on the power supply.
- 6) Turn on the audio source.

ORDERING INFORMATION

| Part No. | Temperature Range | Package |
|--------------------|----------------------------|-------------------|
| IS31AP2005-SLS2-EB | -40°C ~ +85°C (Industrial) | MSOP-8, Lead-free |

Table 1: Ordering Information

For pricing, delivery, and ordering information, please contact ISSI's analog marketing team at analog@issi.com or (408) 969-6600.

IS31AP2005 CLASS-D AUDIO AMPLIFIER

DETAILED DESCRIPTION

The IS31AP2005 demo board features the IS31AP2005 Class-D power amplifier IC, designed to drive speaker impedance of 4Ω or larger.

CUSTOMIZING THE GAIN

The IS31AP2005 demo board is shipped with a gain of 18.4dB and is set by resistors R_1 (R_1 , R_2). Change resistors R_1 and R_2 to reconfigure the gain of the board. Gain determined in Equation (1) and refer to IS31AP2005 data sheet for more detail.

$$Gain = \frac{2 \times 150k\Omega}{R_1} \left(\frac{V}{V} \right) \quad (1)$$

HIGH-PASS FILTER

The input capacitors C_1 (C_3 , C_4) and input resistors R_1 (R_1 , R_2) form a high-pass filter with the corner frequency, f_c determined in Equation (2).

$$f_c = \frac{1}{(2\pi R_1 C_1)} \quad (2)$$

SHUTDOWN MODE

Jumper (JP2) controls the shutdown pin of the IS31AP2005 IC. Connect the shunt across pin 1 and 2 of the jumper (JP2) to enter the shutdown mode of the board.

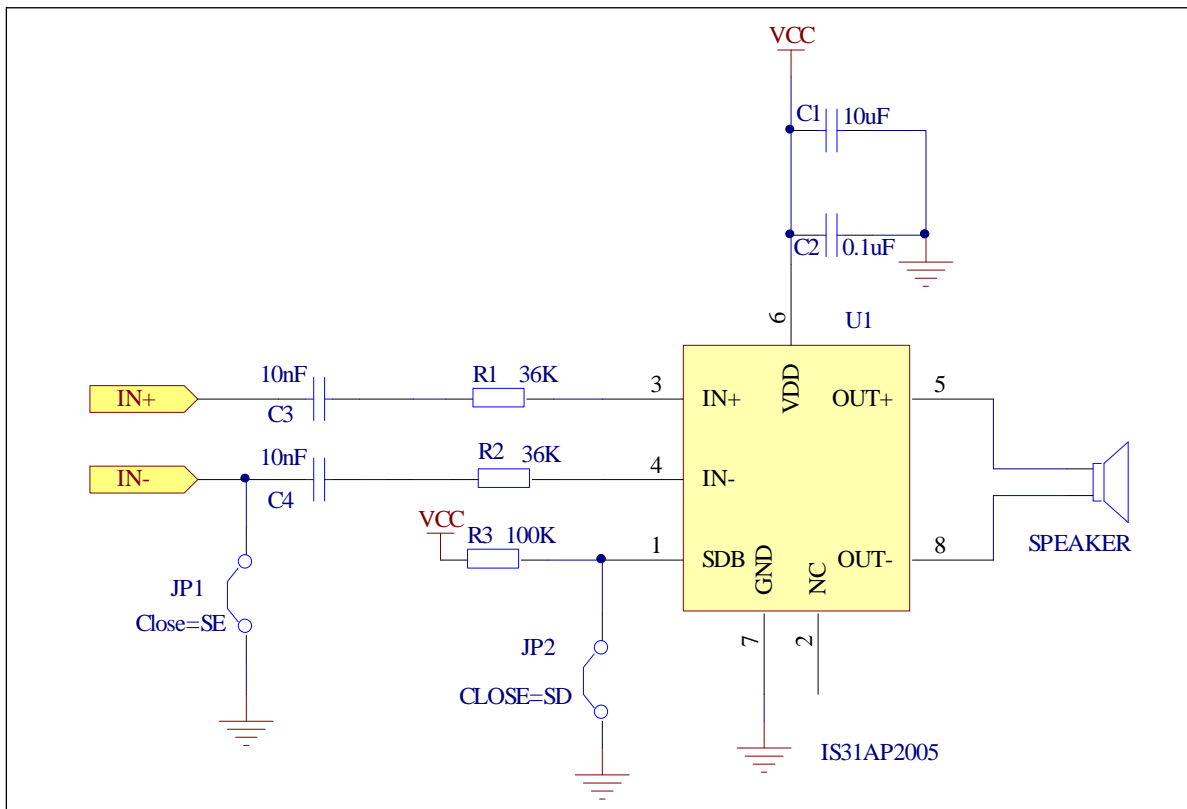


Figure 2: IS31AP2005 Application Circuit



IS31AP2005 CLASS-D AUDIO AMPLIFIER

BILL OF MATERIALS

| Name | Symbol | Description | Qty | Supplier | Part No. |
|-----------|-----------|--------------------------|-----|----------|-------------------|
| Amplifier | U1 | Class- D power amplifier | 1 | ISSI | IS31AP2005 |
| Resistor | R1,R2 | RES,36k,1/16W,±1%,SMD | 2 | Yageo | RC0603FR-0720KL |
| Resistor | R3 | RES,100k,1/16W,±5%,SMD | 1 | Yageo | RC0603JR-07100KL |
| Capacitor | C1 | CAP,10µF,10V,±20%,SMD | 1 | Yageo | CC0805KKX7R6BB106 |
| Capacitor | C2 | CAP,0.1µF,50V,±10%,SMD | 1 | Yageo | CC0603KKX7R9BB104 |
| Capacitor | C3,C4 | CAP,0.1µF,50V,±10%,SMD | 2 | Yageo | CC0603KKX7R9BB104 |
| Connector | DC IN | 2.5mm DC connector | 1 | | |
| Connector | AUDIO OUT | RCA –type connector | 1 | | |
| Connector | AUDIO IN | 3.5mm min connector | 1 | | |

Bill of materials, refer to Figure 2 above.

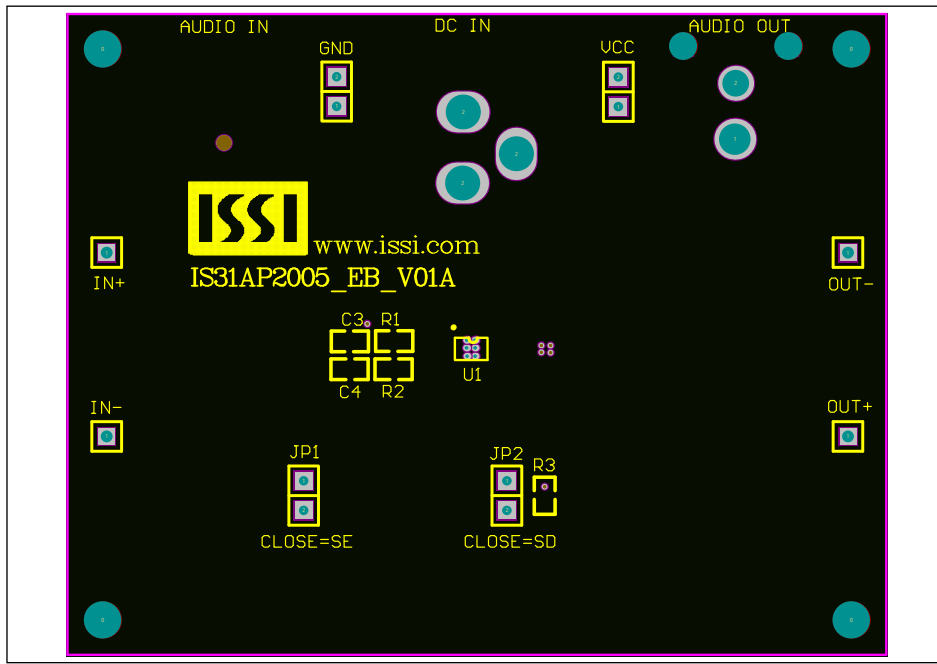


Figure 3: Board Component Placement Guide - Top Layer

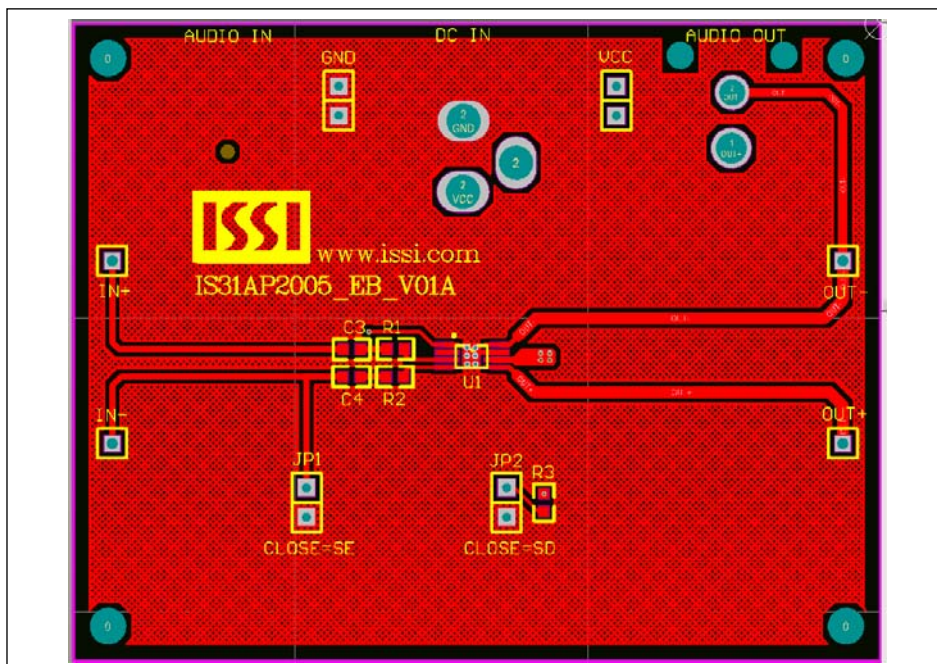


Figure 4: Board PCB Layout - Top Layer

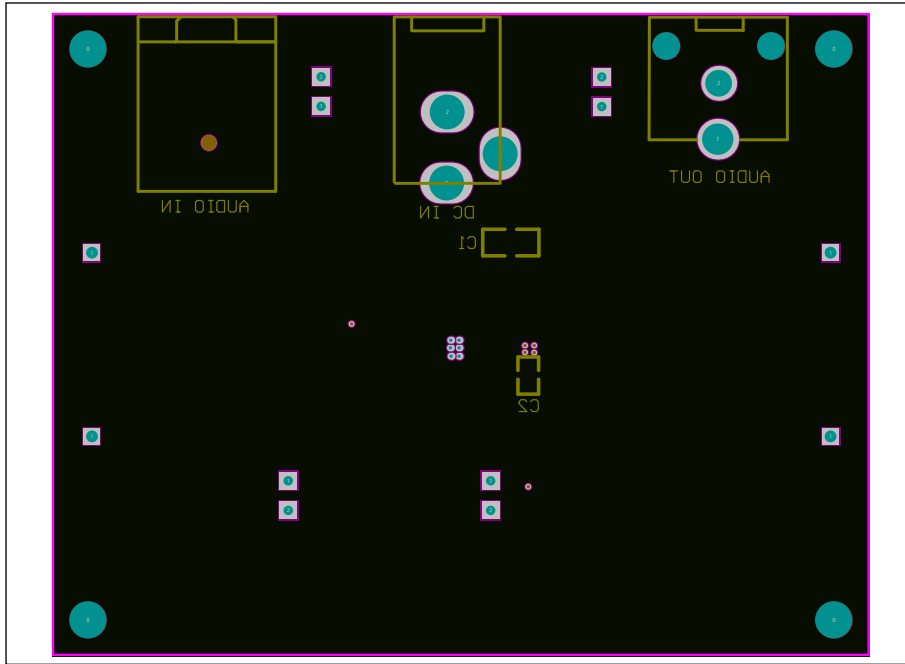


Figure 5: Board Component Placement Guide - Bottom Layer

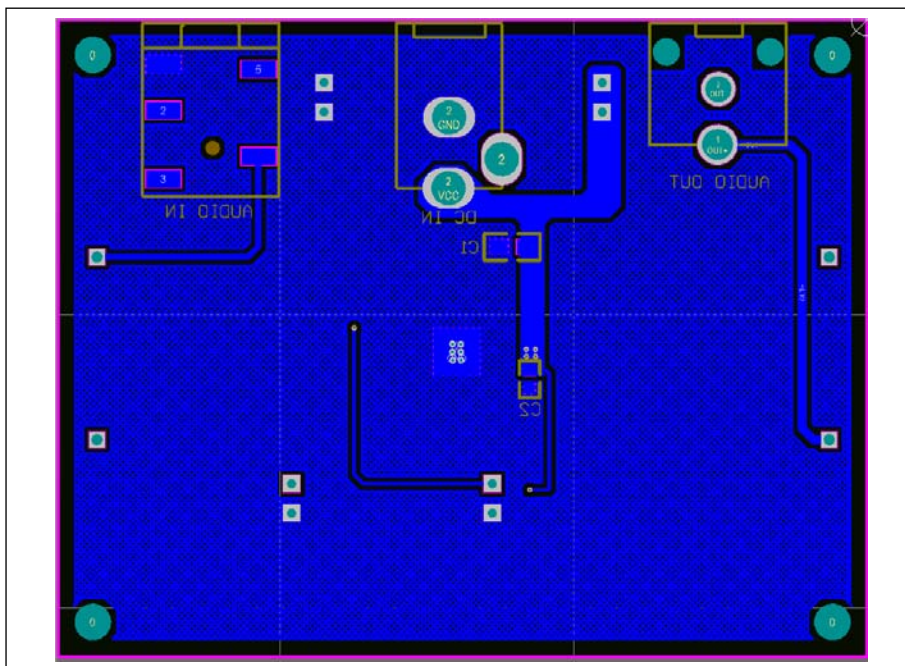


Figure 6: Board PCB Layout - Bottom Layer

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