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
- RoHS & Halogen-Free Compliance
- TSCA Compliance

QUICK START

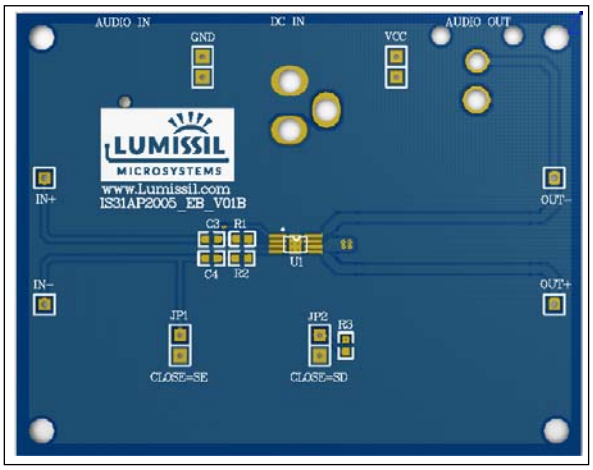

Figure 1 Photo of IS31AP2005 Evaluation Board

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 contacts Lumissil's analog marketing team at analog@Lumissil.com or (408) 969-6600.

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_I (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.

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

HIGH-PASS FILTER

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

$$f_c = \frac{1}{(2\pi R_I C_I)} \qquad (2)$$

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.

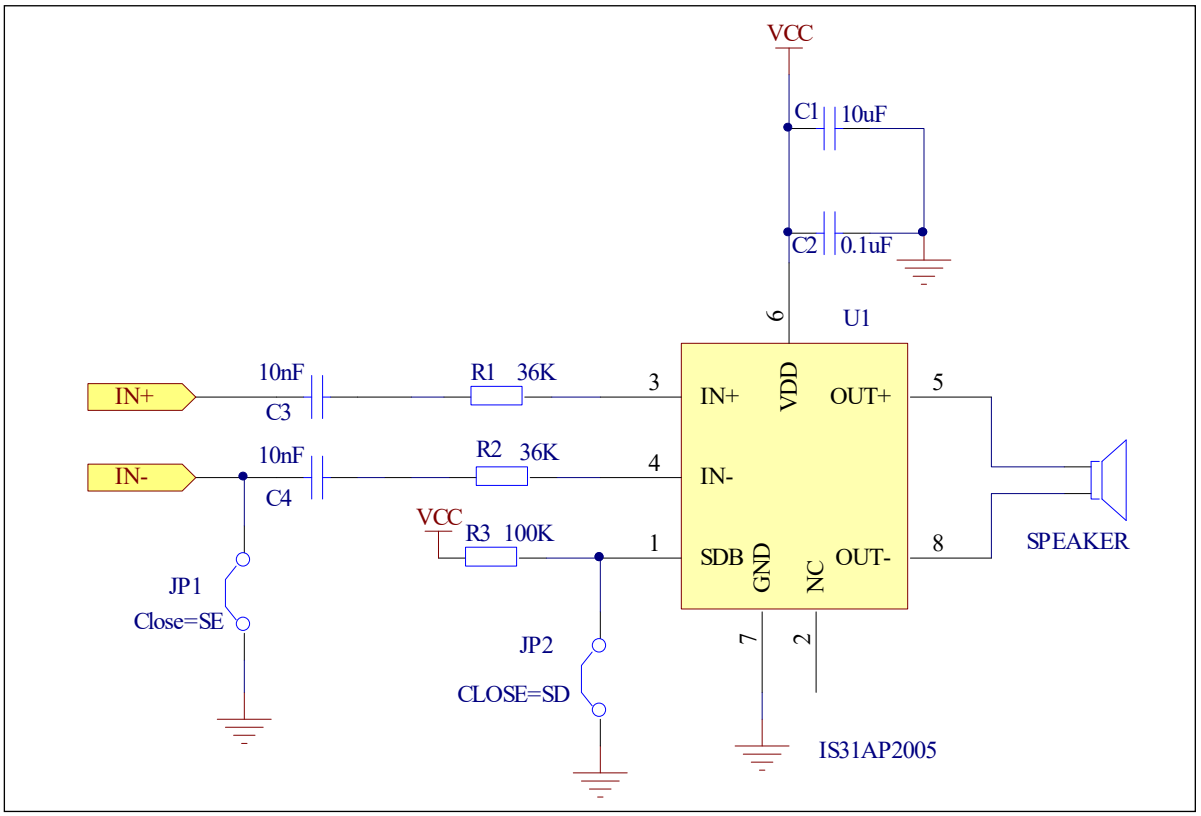

Figure 2 IS31AP2005 Application Circuit

BILL OF MATERIALS

Name	Symbol	Description	Qty	Supplier	Part No.
Amplifier	U1	Class- D power amplifier	1	Lumissil	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.

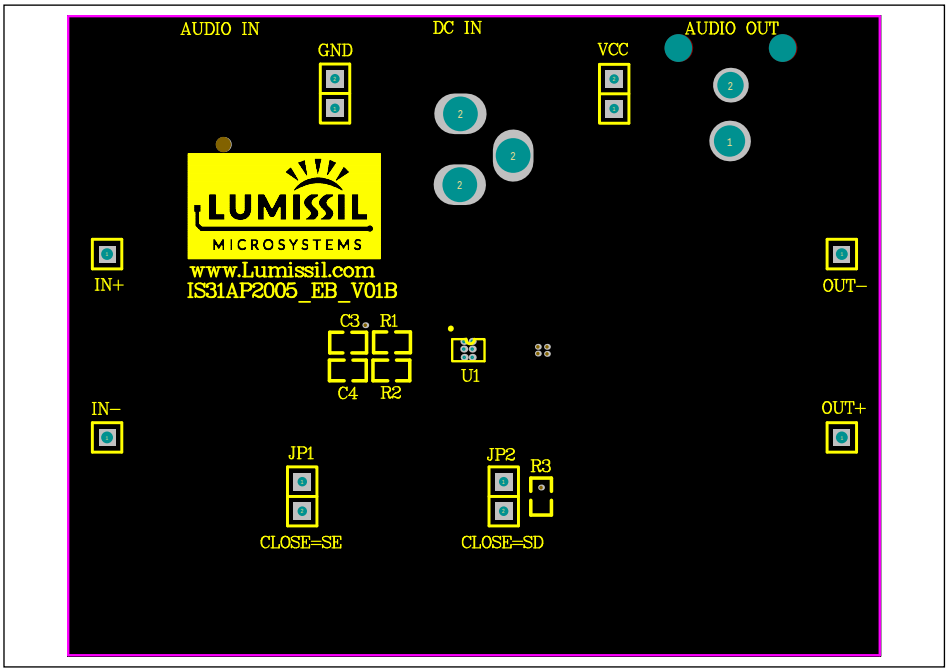

Figure 3 Board Component Placement Guide - Top Layer

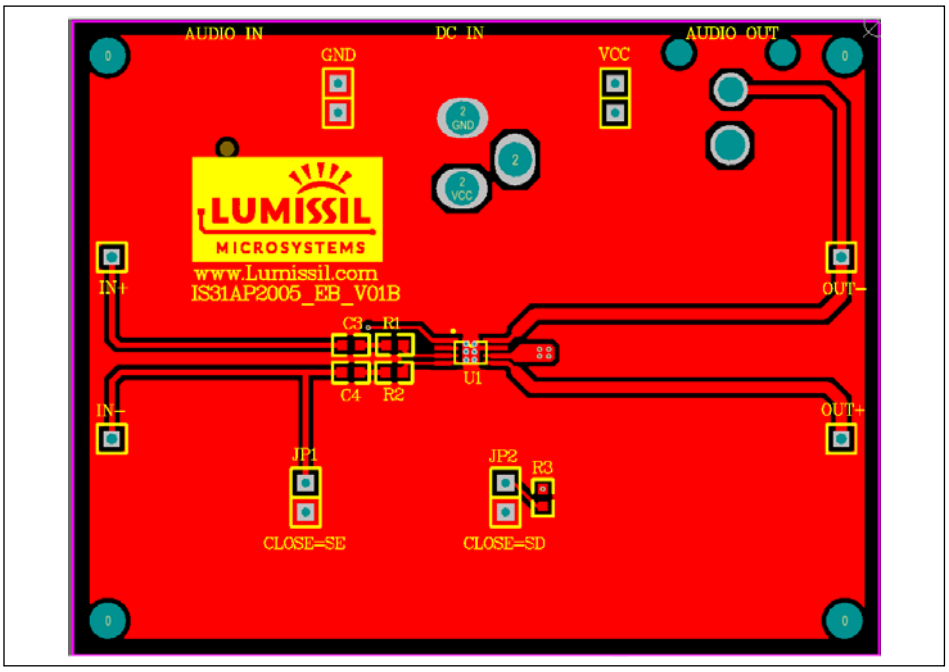

Figure 4 Board PCB Layout - Top Layer

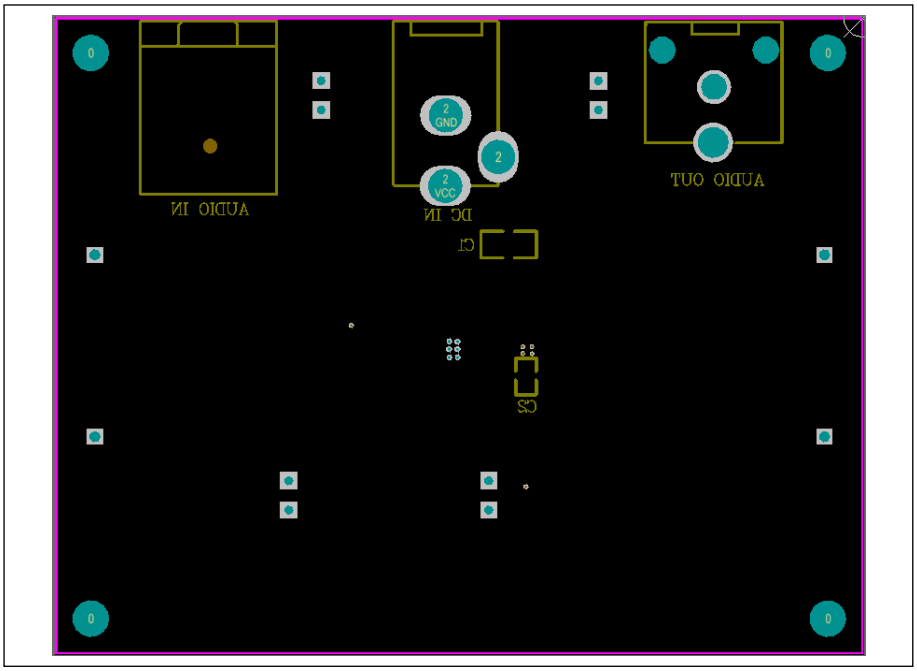

Figure 5 Board Component Placement Guide - Bottom Layer

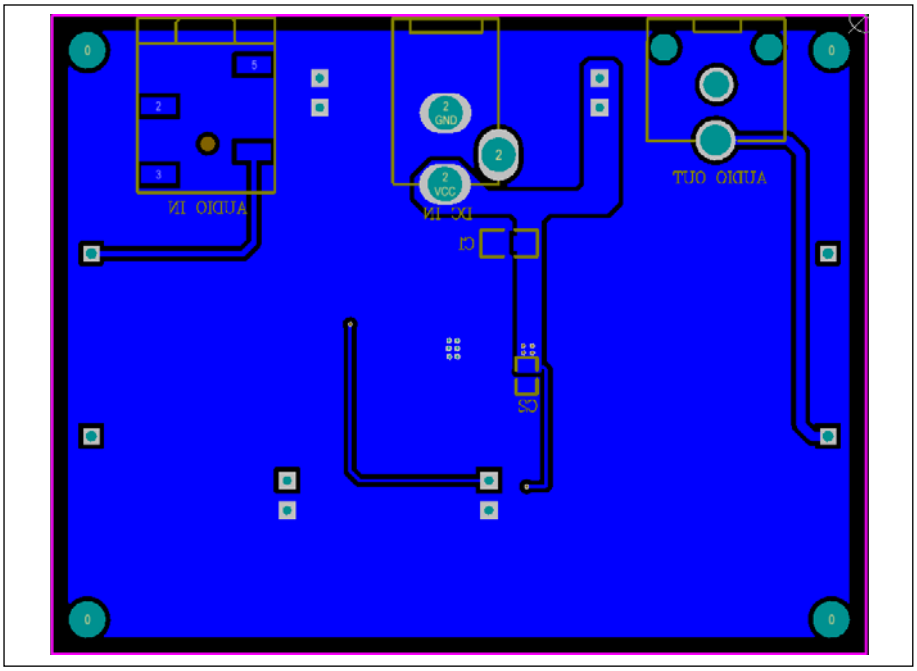

Figure 6 Board PCB Layout - Bottom Layer

REVISION HISTORY

Revision	Detail Information	Date
A	Initial release	2015.01.09
B	Update to new Lumissil logo	2024.11.21