

# IS31AP4991A 1.1W AUDIO POWER AMPLIFIER WITH ACTIVE-LOW SHUTDOWN MODE

## DESCRIPTION

The IS31AP4991A has been designed for demanding audio applications such as mobile phones and permits the reduction of the number of external components. It is capable of delivering 1.1W of continuous RMS output power into an 8Ω load @ 5V.

An externally-controlled standby mode reduces the supply current to much less than 1μA. It also includes internal thermal shutdown protection. The unity-gain stable amplifier can be configured by external gain setting resistors.

## FEATURES

- Operating from  $V_{CC} = 2.7V \sim 5.5V$
- 1.1W output power @  $V_{CC} = 5V$ , THD+N= 1%,  $f = 1kHz$ , with 8Ω load
- Ultra-low consumption in standby mode (much less than 1μA)
- 56dB PSRR @217Hz in grounded mode
- Near-zero click-and-pop
- Ultra-low distortion (0.074%@0.5W, 1kHz)
- SOP-8 and MSOP-8 package

## QUICK START

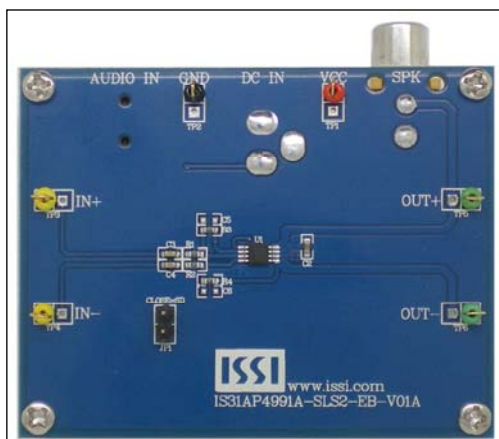


Figure 1: Photo of IS31AP4991A Evaluation Board (MSOP-8)

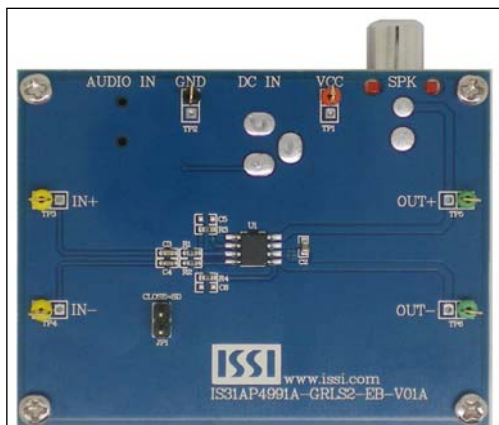


Figure 2: Photo of IS31AP4991A Evaluation Board (SOP-8)

## RECOMMENDED EQUIPMENT

- 5.0V, 1A power supply
- Audio source (i.e. MP3 player, Notebook PC, etc.)
- 8Ω speakers

## ABSOLUTE MAXIMUM RATINGS

- $\leq 5.5V$  power supply

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

## PROCEDURE

The IS31AP4991A evaluation 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 an 8Ω (or larger) speaker across the OUT- terminal and OUT+ terminal. Or connect speaker to the connector (SPK).
- 2) Connect the ground terminal of the power supply to the GND and the positive terminal to the VCC. Or connect DC power to the connector (DC IN).
- 3) If the audio source is differential, 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, C3 and R1 should disconnect, and R3 should be 0Ω. Connect the audio source to the IN- terminal, or connect audio source to the connector (AUDIO IN).
- 5) Turn on the power supply.
- 6) Turn on the audio source.

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## ORDERING INFORMATION

| Part No.                                    | Temperature Range          | Package                               |
|---------------------------------------------|----------------------------|---------------------------------------|
| IS31AP4991A-GRLS2-EB<br>IS31AP4991A-SLS2-EB | -40°C ~ +85°C (Industrial) | SOP-8, Lead-free<br>MSOP-8, Lead-free |

Table 1: Ordering Information

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

## EVALUATION BOARD OPERATION

The IS31AP4991A demo board features the IS31AP4991A Class-AB power amplifier IC, designed to drive speaker impedance of 8Ω or larger.

## CUSTOMIZING THE GAIN

The IS31AP4991A demo board is shipped with a gain of 6dB and is set by resistors  $R_I$  ( $R_1$ ,  $R_2$ ) and  $R_F$  ( $R_3$ ,  $R_4$ ). Change resistors  $R_I$  and  $R_F$  to reconfigure the gain of the board and gain determined in Equation (1):

$$Gain = \frac{2 \times R_F}{R_I} \left( \frac{V}{V} \right) \quad (1)$$

## HIGH-PASS FILTER

The input capacitor  $C_1$  ( $C_3$ ,  $C_4$ ) and input resistor  $R_I$  ( $R_1$ ,  $R_2$ ) form a high-pass filter with the corner frequency,  $f_c$ , determined in Equation (2) and refer to IS31AP4991A datasheet for more detail.

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

## SHUTDOWN MODE

Jumper (JP1) controls the shutdown pin of the IS31AP4991A IC. Connect the jumper (JP1) to enter the shutdown mode of the board.

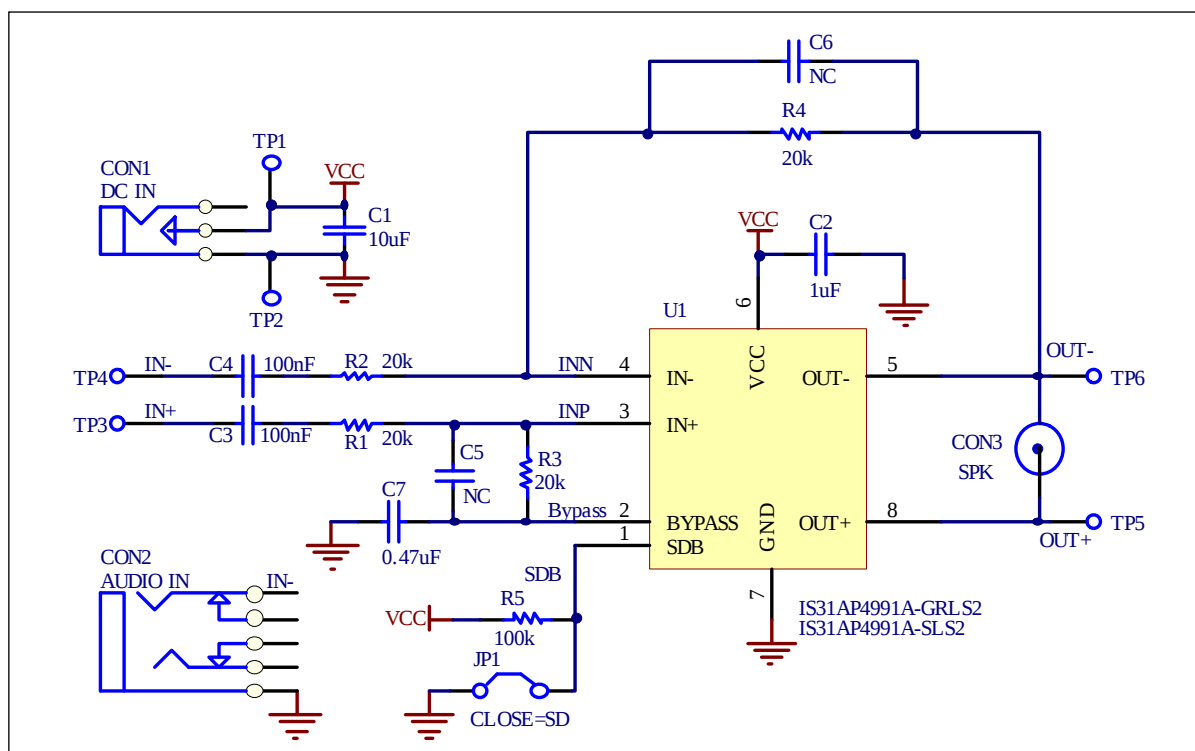


Figure 3: IS31AP4991A Application Schematic



# IS31AP4991A 1.1W AUDIO POWER AMPLIFIER WITH ACTIVE-LOW SHUTDOWN MODE

## BILL OF MATERIALS

| Name      | Symbol      | Description               | Qty | Supplier | Part No.                              |
|-----------|-------------|---------------------------|-----|----------|---------------------------------------|
| Amplifier | U1          | Class- AB Power Amplifier | 1   | ISSI     | IS31AP4991A-SLS2<br>IS31AP4991A-GRSL2 |
| Resistor  | R1,R2,R3,R4 | RES,20k,1/16W,±1%,SMD     | 4   | Yageo    | RC0603FR-0720KL                       |
| Resistor  | R5          | RES,100k,1/16W,±5%,SMD    | 1   | Yageo    | RC0603JR-07100KL                      |
| Capacitor | C1          | CAP,10µF,16V,±20%,SMD     | 1   | Yageo    | CC0805KKX7R6BB106                     |
| Capacitor | C2,C8       | CAP, 1µF, 50V,±10%,SMD    | 2   | Yageo    | CC0603KKX7R9BB105                     |
| Capacitor | C3,C4       | CAP,0.1µF,50V,±10%,SMD    | 2   | Yageo    | CC0603KKX7R9BB104                     |
| Capacitor | C7          | CAP,0.47µF,50V,±10%,SMD   | 1   | Yageo    | CC0603KKX7R9BB474                     |
| Connector | DC IN       | 2.5 mm DC connector       | 1   |          |                                       |
| Connector | SPK         | RCA –type Connector       | 1   |          |                                       |
| connector | AUDIO IN    | 3.5mm min connector       | 1   |          |                                       |
|           | C5,C6       | Not Installed             |     |          |                                       |

*Bill of materials, refer to Figure 2 above.*

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MSOP-8 Package

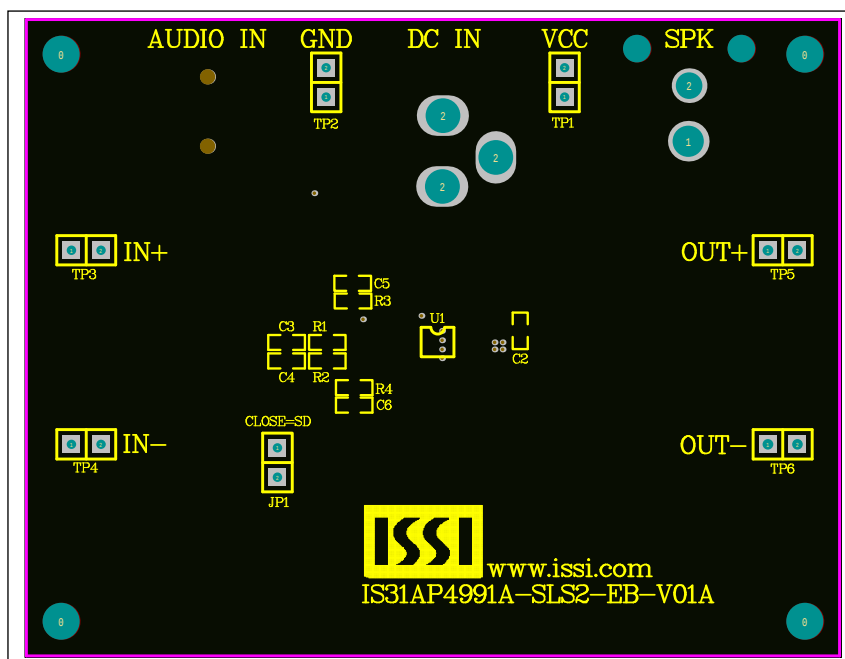


Figure 4: Board Component Placement Guide - Top Layer

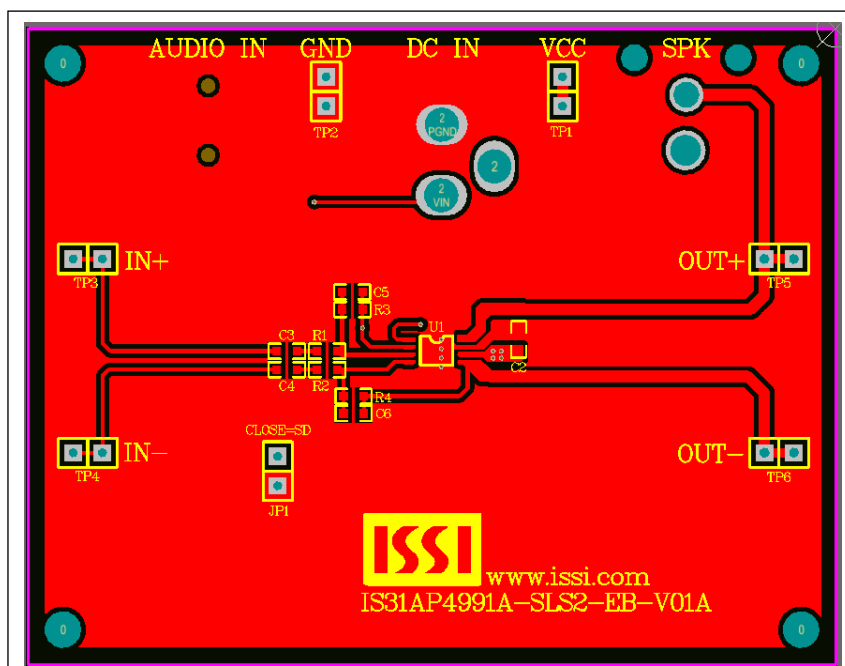


Figure 5: Board PCB Layout - Top Layer

# IS31AP4991A 1.1W AUDIO POWER AMPLIFIER WITH ACTIVE-LOW SHUTDOWN MODE

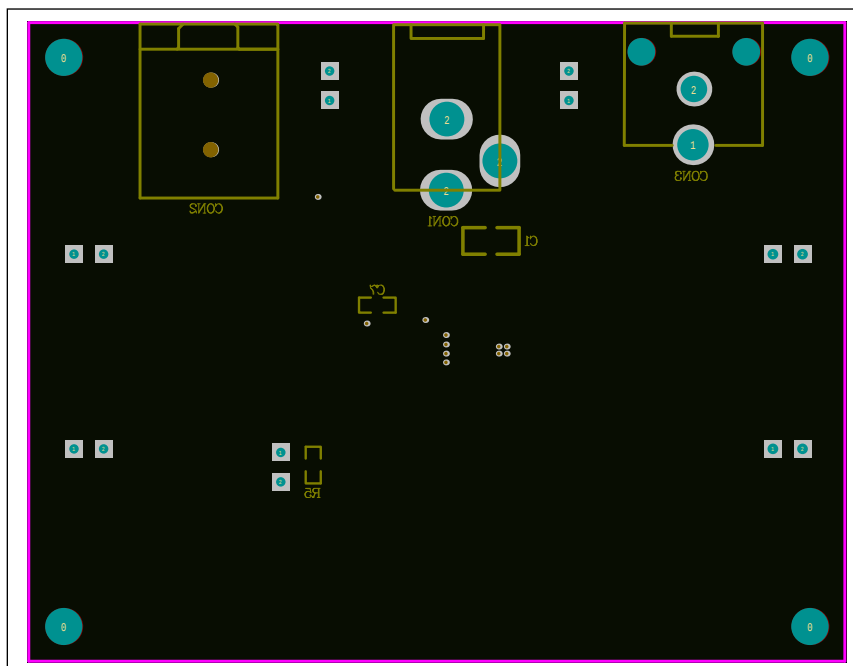


Figure 6: Board Component Placement Guide - Bottom Layer

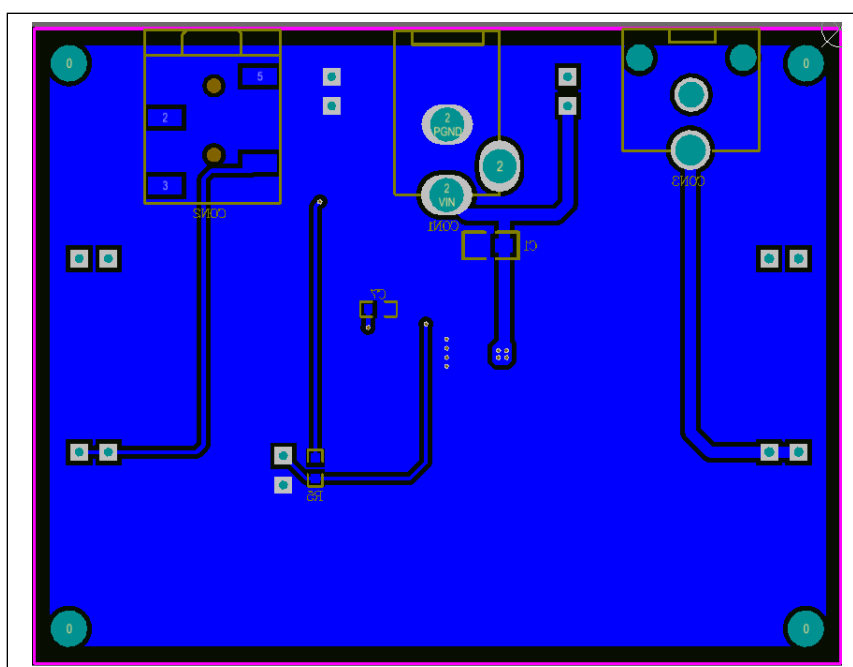


Figure 7: Board PCB Layout - Bottom Layer

# IS31AP4991A 1.1W AUDIO POWER AMPLIFIER WITH ACTIVE-LOW SHUTDOWN MODE

SOP-8 Package

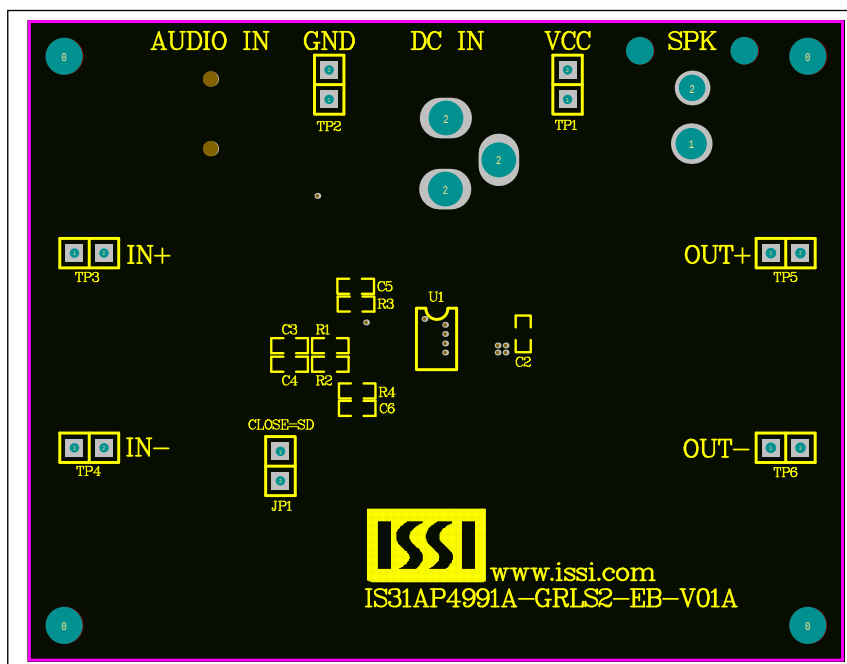


Figure 8: Board Component Placement Guide - Top Layer

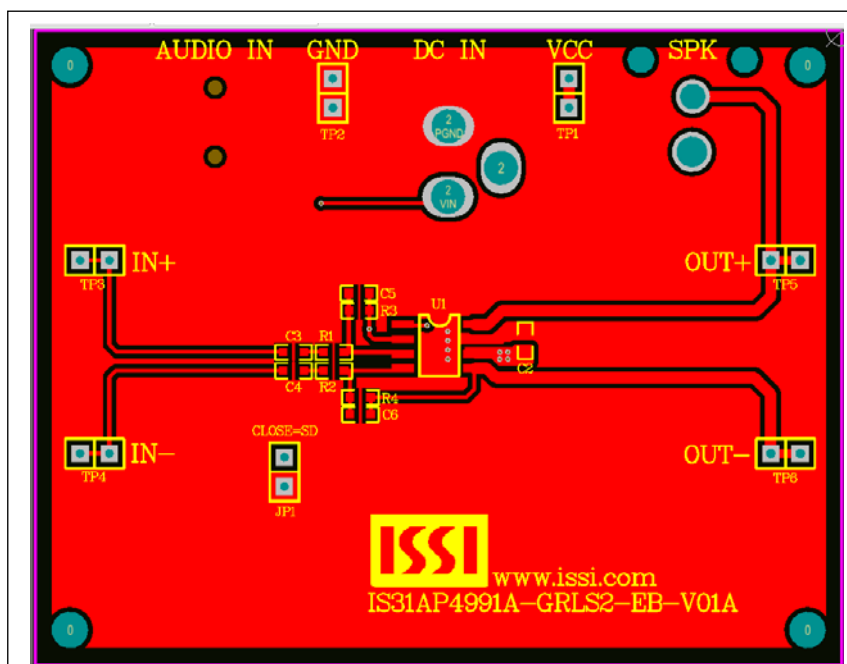


Figure 9: Board PCB Layout - Top Layer

# IS31AP4991A 1.1W AUDIO POWER AMPLIFIER WITH ACTIVE-LOW SHUTDOWN MODE

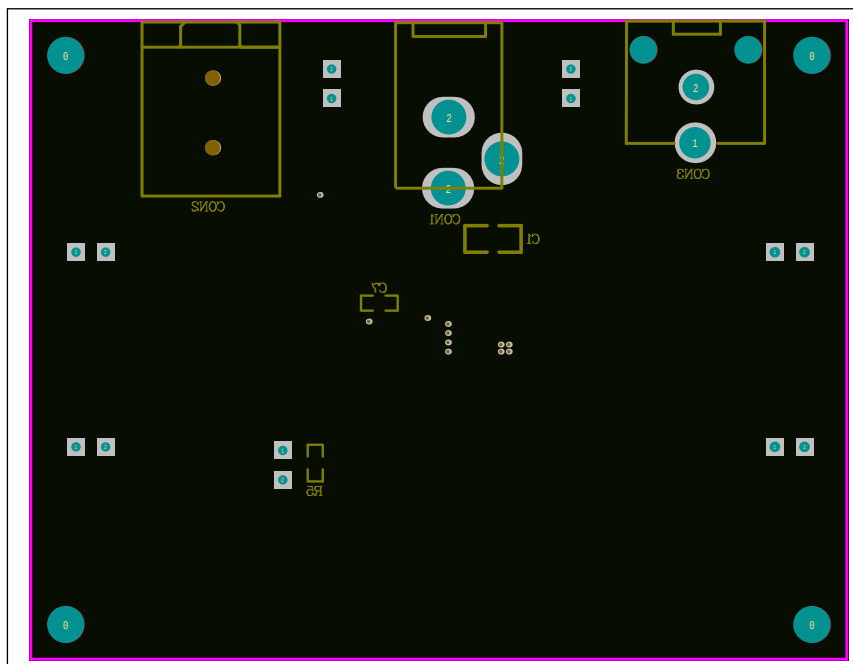


Figure 10: Board Component Placement Guide - Bottom Layer

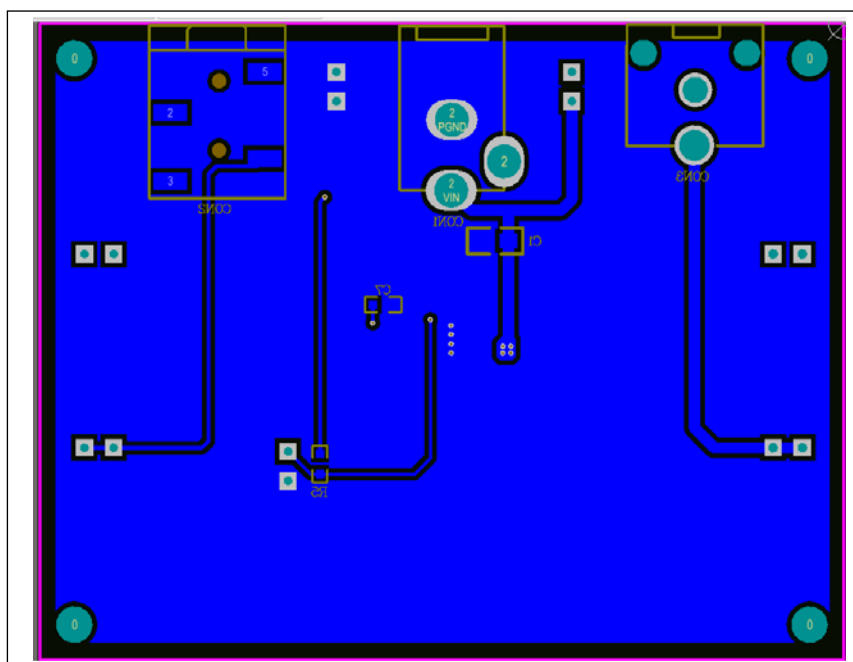


Figure 11: Board PCB Layout - Bottom Layer

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