

# MAX98306 Evaluation Kit

## Evaluates: MAX98306

### General Description

The MAX98306 evaluation kit (EV kit) is a fully assembled and tested PCB that evaluates the MAX98306 stereo 3.2W Class D amplifier. The EV kit operates from a single 2.6V to 5.5V DC power supply and is capable of delivering 3.2W into a 4Ω load. The EV kit accepts a differential or single-ended audio input and provides differential outputs for the speaker. The device outputs can be connected directly to a speaker load for filterless applications. However, a filter can be added to ease evaluation.

### Features

- ◆ 2.6V to 5.5V Single-Supply Operation
- ◆ Single-Ended or Differential Audio Input
- ◆ Five Selectable Gains
- ◆ Filterless Operation
- ◆ Optional Class D Output Filters for Ease of Evaluation
- ◆ Low-Power Shutdown Mode
- ◆ Proven PCB Layout
- ◆ Fully Assembled and Tested

[Ordering Information](#) appears at end of data sheet.

### Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	0.1μF ±10%, 16V X7R ceramic capacitor (0402) Murata GRM155R71C104K TDK C1005X7R1C104K
C2	1	10μF ±10%, 6.3V X7R ceramic capacitor (0805) Murata GRM21BR70J106K TDK C2012X7R0J106K
C3, C4, C17, C18	4	1μF ±10%, 25V X7R ceramic capacitors (0603) Murata GRM188R71E105K Murata GRM188R71E105M
C5–C16, C19, C20	0	Not installed, ceramic capacitors (0603)
FB1–FB4	4	0Ω resistors (0603)
FOUTL+, FOURL-, FOUTR+, FOUTR-, GND, VDD	6	Binding posts
INL	1	White phono jack (side-entry PCB mount)
INR	1	Red phono jack (side-entry PCB mount)
JU1, JU4	2	2-pin headers
JU2	1	3-pin header
JU3	1	5-pin header
L1–L4	0	Not installed, inductors—short (PC trace)

DESIGNATION	QTY	DESCRIPTION
OUTL-, OUTL+, OUTR-, OUTR+	4	Test points
R1, R2	2	100kΩ ±5% resistors (0603)
R3–R6	0	Not installed, resistors (0603)
U1	1	3.2W Class D amplifier (14 TDFN) Maxim MAX98306ETD+
—	4	Shunts
—	1	PCB: MAX98306 EVALUATION KIT
<b>OPTIONAL COMPONENTS FOR 8Ω SPEAKER</b>		
C7–C16	10	0.22μF ±10%, 25V X7R ceramic capacitors (0603) Murata GRM188R71E224K TDK C1608X7R1E224K
L1–L4	4	22μH ±20%, 1A inductors TOKO A916CY-220M
R3–R6	4	22Ω ±5% resistors (0603)
<b>OPTIONAL COMPONENTS FOR 4Ω SPEAKER</b>		
C7–C16	10	0.47μF ±10%, 25V X7R ceramic capacitors (0603) Murata GRM188R71E474K TDK C1608X7R1E474K
L1–L4	4	10μH ±20%, 1.4A inductors TOKO A916CY-100M
R3–R6	4	10Ω ±5% resistors (0603)

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### Component Suppliers

SUPPLIER	PHONE	WEBSITE
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
TDK Corp.	847-803-6100	www.component.tdk.com
TOKO America, Inc.	847-297-0070	www.tokoam.com

**Note:** Indicate that you are using the MAX98306 when contacting these component suppliers.

### Quick Start

#### Recommended Equipment

- MAX98306 EV kit
- 2.6V to 5.5V, 2A DC power supply
- Stereo audio input
- Two 4Ω speakers

#### Procedures

The EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on the power supply until all connections are completed.**

- 1) Verify that shunts are installed as follows:
  - JU1, JU4: Installed (single-ended input)
  - JU2: Pins 1-2 (device enabled)
  - JU3: Pins 1-3 (12dB gain)
- 2) Set the power-supply output to 5V. Disable the power supply.
- 3) Connect the power-supply ground terminal to the GND PCB pad and the power-supply positive terminal to the VDD PCB pad on the EV kit.
- 4) With the audio source disabled, connect the left channel of the audio source to the INL phono jack or the INL+ test pad.
- 5) Connect the right channel of the audio source to the INR phono jack or the INR+ test pad.
- 6) Connect the audio source ground to the GND test pad.
- 7) Connect the first speaker across the OUTL+ and OUTL- test points.
- 8) Connect the second speaker across the OTR+ and OTR- test points.
- 9) Enable the power-supply output.
- 10) Enable the audio source.
- 11) Verify that the speakers are playing the audio source signal.

### Detailed Description of Hardware

#### Filterless Output

The MAX98306 EV kit's filterless outputs (OUTL+, OUTL-, OTR+, and OTR-) can be connected directly to a speaker load without any filtering. Use the OUTL+ and OUTL- test points or the OTR+ and OTR- test points to connect the speaker directly to the MAX98306 output.

#### Filtered Output

Audio analyzers typically cannot accept the Class D amplifier's pulse-width modulated (PWM) signals at their inputs. Therefore, the EV kit features optional lowpass filters at the outputs to ease evaluation. As shipped, the EV kit's lowpass filter RC components are unpopulated and the L1–L4 inductors are shorted on the PCB.

To use the filtered output posts (FOUTL+, FOURL-, FOURL+, and FOURL-), remove the shorts on L1–L4 and install components L1–L4, C7–C16, and R3–R6 (provided separately with the EV kit). Use the output posts to connect the filtered outputs to the audio analyzer. Additional filter components are provided with the EV kit for either a 4Ω or an 8Ω speaker.

#### Jumper Selection

##### Single-Ended/Differential Audio Inputs

The EV kit features jumpers JU1 and JU4 to select between a differential or single-ended input mode. See Table 1 for JU1 and JU4 configurations.

##### Shutdown Function ( $\overline{\text{SHDN}}$ )

The EV kit features a 3-pin jumper (JU2) to control the active-low shutdown input. Drive  $\overline{\text{SHDN}}$  high to place the device in normal operation; drive  $\overline{\text{SHDN}}$  low to place the device in low-power shutdown mode. See Table 2 for shunt positions.

##### Selectable Gain (GAIN)

The EV kit features a 5-pin jumper (JU3) to control the IC's five programmable gain settings. See Table 3 for gain-control configuration.

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**Table 1. JU1 and JU4 Jumper Selection**

SHUNT POSITION	IN_ - PIN	DEVICE OPERATION
Installed*	AC-grounded	Single-ended input
Not installed	AC-coupled to user-supplied negative differential input	Differential input

\*Default position.

**Table 2. JU2 Jumper Selection ( $\overline{\text{SHDN}}$ )**

SHUNT POSITION	$\overline{\text{SHDN}}$ PIN	DEVICE OPERATION
1-2*	Connected to PVDD	Normal operation
2-3	Connected to PGND	Shutdown mode

\*Default position.

**Table 3. JU3 Jumper Selection (GAIN)**

SHUNT POSITION	GAIN PIN	MAXIMUM GAIN (dB)
1-2	Connected to PVDD through 100k $\Omega$ resistor R1	9
1-3*	Connected to PVDD	12
1-4	Connected to PGND through 100k $\Omega$ resistor R2	15
1-5	Connected to PGND	18
Not installed	Unconnected	6

\*Default position.

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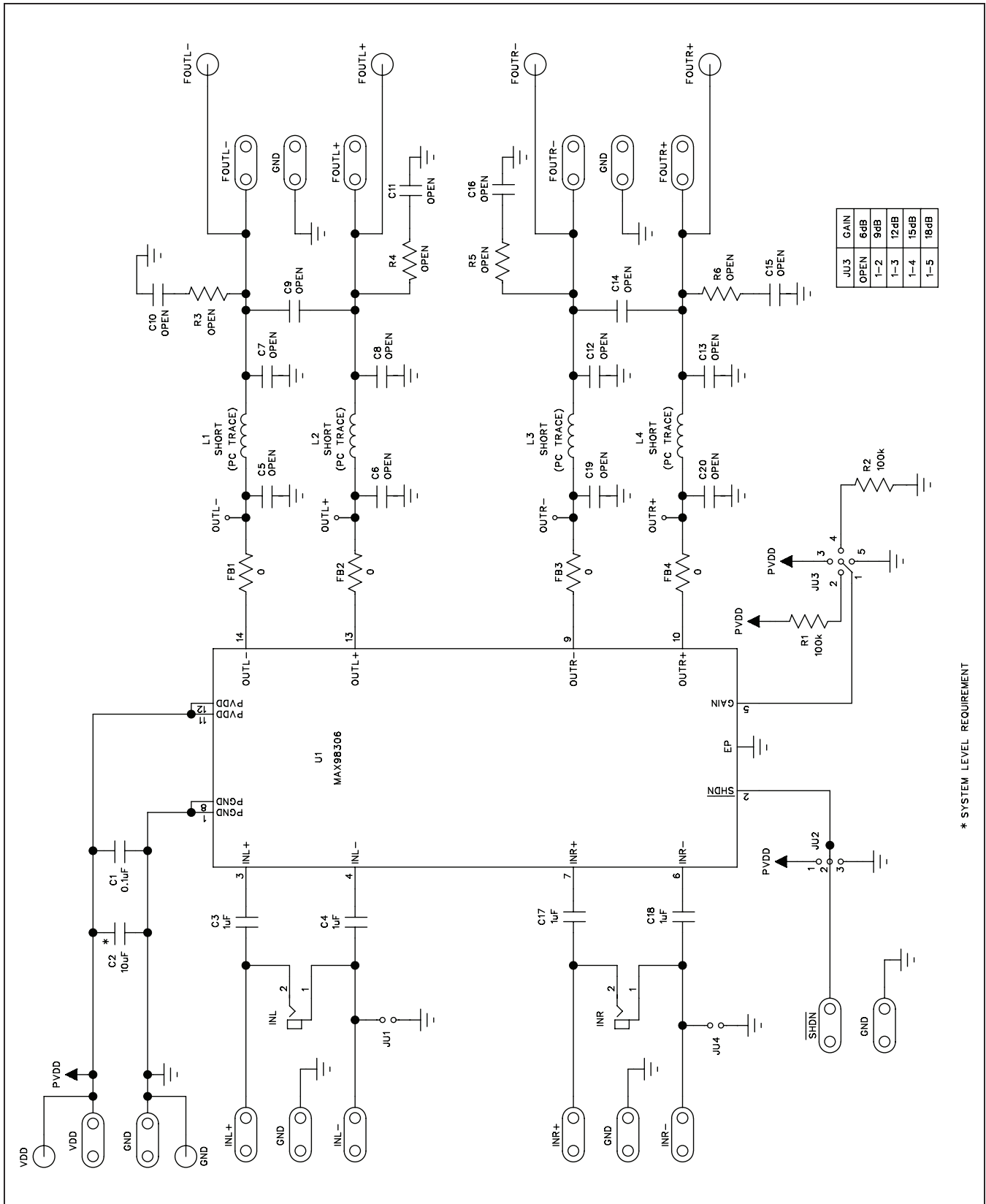


Figure 1. MAX98306 EV Kit Schematic

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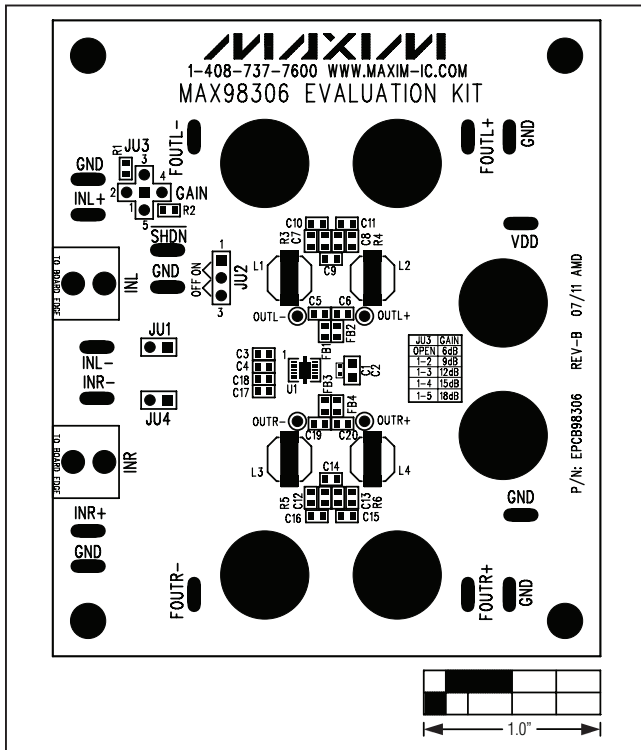


Figure 2. MAX98306 EV Kit Component Placement Guide—Component Side

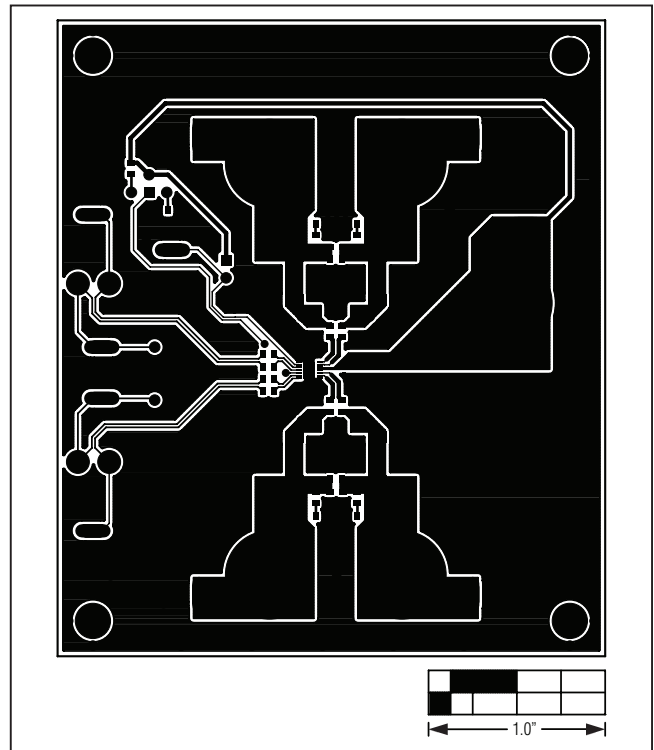


Figure 3. MAX98306 EV Kit PCB Layout—Component Side

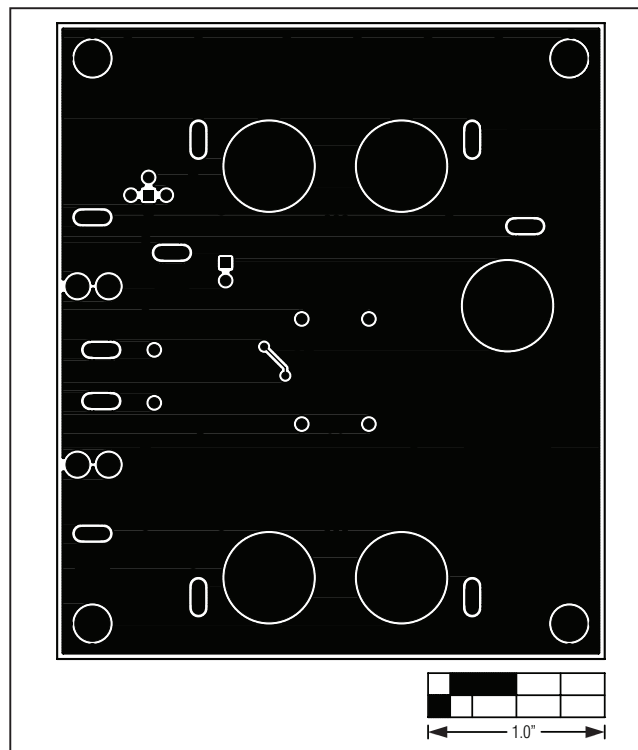


Figure 4. MAX98306 EV Kit PCB Layout—Solder Side

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### ***Ordering Information***

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<b>PART</b>	<b>TYPE</b>
MAX98306EVKIT#	EV Kit

#Denotes RoHS compliant.

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### Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	7/11	Initial release	—

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