19-5985; Rev 0; 7/11

MAX98307 Evaluation Kit
Evaluates: MAX98307

General Description

The MAX98307 evaluation kit (EV kit) is a fully assembled and tested circuit board that evaluates the MAX98307 filterless Class DG multilevel amplifier to drive a speaker in portable audio applications. The EV kit comes with a MAX98307 IC in a 16-pin TQFN-EP package. Designed to operate from a 2.6V to 5.25V DC power supply, the EV kit is capable of delivering 3.3W into an 8Ω load. The EV kit accepts a differential or a single-ended input signal.

Features

- **Filterless Operation Passes Radiated Emissions with Up to 30cm of Speaker Cable**
- **2.6V to 5.25V Single-Supply Operation**
- **Delivers Up to 3.3W Into an 8Ω Speaker**
- **Configurable Gain Control**
- **Differential or Single-Ended Input**
- **Low-Power Shutdown Input**
- **Proven PCB Layout**
- **Fully Assembled and Tested**

***Ordering Information* appears at end of data sheet.**

Component List

DESIGNATION	QTY	DESCRIPTION
MINIMAL COMPONENTS FOR CUSTOMER DESIGN		
C1, C2, C3	3	0.1µF ±10%, 16V X7R ceramic capacitors (0603) Murata GRM188R71C104K
C4, C5	2	0.33µF ±10%, 16V X7R ceramic capacitors (0603) Murata GRM188R71C334K
C6	1	4.7µF ±10%, 16V X7R ceramic capacitor (0805) Murata GRM21BR71C475K
C7	1	10µF ±20%, 6.3V X5R ceramic capacitor (0603) Murata GRM188R60J106M
R1, R2	2	10kΩ ±1% resistors (0603)
R3, R4	2	20kΩ ±1% resistors (0603)
U1	1	Class DG audio amplifier (16-TQFN-EP) Maxim MAX98307ETE+
OPTIONAL COMPONENTS FOR CUSTOMER EVALUATION		
C1N, PVSS	2	White test points, 40 mil drill size
C1P	1	Red test point, 40 mil drill size
C8	1	10µF ±20%, 6.3V X5R ceramic capacitor (0603) Murata GRM188R60J106M

DESIGNATION	QTY	DESCRIPTION
C9–C13	0	Not installed, capacitors (0603) Recommended: Murata GRM188R71C224K
C14–C17	0	Not installed, capacitors (0603)
FOUT-, FOUT+, PGND, PVDD	4	Binding posts
IN	1	Red, right-angle, PC-mount RCA jack
JU1	1	3-pin header
JU2	1	2-pin header
L1, L2	0	Not installed, inductors—short (PC trace) Recommended: Sumida CDRH65-220M
OUT-	1	Black test point, 63 mil drill size
OUT+	1	Red test point, 63 mil drill size
R5, R6	0	Not installed, resistors (0603) Recommended: 22Ω ±5% resistors (0603)
R7, R8	2	0Ω ±5% resistors (0603)
SU1, SU2	2	Shunts (JU1, JU2)
TP0	0	Not installed, test point (15 mil drill size)
—	1	PCB: MAX98307 EVALUATION KIT

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
Sumida Corp.	847-545-6700	www.sumida.com

Note: *Indicate that you are using the MAX98307 when contacting these component suppliers.*

Quick Start

Recommended Equipment

- MAX98307 EV kit
- 2.6V to 5.25V, 2A power supply
- Audio source (e.g., CD player, MP3 player, etc.)
- 8Ω speaker

Procedure

The EV kit 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) Install a shunt on pins 1-2 on jumper JU1 (EV kit on).
2) Verify that a shunt is not installed on jumper JU2 (differential input mode)
3) Connect the 8Ω speaker across the FOUT- and FOUT+ PCB pads.
4) Connect the positive terminal of the power supply to the PVDD PCB pad and the ground terminal to the PGND PCB pad.
5) Connect the audio source output to the IN RCA jack.
6) Connect the ground terminal of the audio source to the PGND PCB pad.
7) Turn on the audio source.
8) Turn on the power supply.

Detailed Description of Hardware

The MAX98307 EV kit features the MAX98307 filterless Class DG amplifier IC, designed to drive an 8Ω speaker in portable audio applications. The EV kit comes with a MAX98307 IC in a 16-pin TQFN package with an exposed pad. The EV kit operates from a DC power supply that provides 2.6V to 5.25V and 2A of current. The EV kit accepts differential or single-ended audio input and provides a fully differential output. The audio input source is amplified to drive up to 3.3W into an 8Ω speaker. The device outputs, available at the OUT+, OUT- test points or FOUT+, FOUT- binding posts, can be connected directly to a speaker load without any filtering and up to 30cm of cable. However, filter components can be added to ease evaluation. See the *Filtered Output* section for additional information.

Customizing the Gain

The EV kit is shipped with a gain of +14.5dB. Change the resistors (R1–R4) to customize the gain of the EV kit. Refer to the MAX98307/MAX98308 IC data sheet for details.

Filterless Output

The EV kit is shipped with filterless outputs by default. The EV kit's filterless outputs, available at the OUT+, OUT- test points or the FOUT+, FOUT- binding posts, can be connected directly to a speaker load without any filtering. Use the OUT+, OUT- test points or the FOUT+, FOUT- binding posts to connect a speaker directly to the device's outputs.

Filtered Output

Audio analyzers typically cannot accept pulse-width-modulated (PWM) signals at their inputs. Therefore, the EV kit provides component footprints for a lowpass filter at its outputs to ease evaluation. Cut open the PCB traces between inductor L1 and L2 pads. Install inductors L1, L2, capacitors C9–C13, and resistors R5, R6 (provided with the EV kit) and use the filtering output binding posts (FOUT- and FOUT+) to connect the filtered PWM outputs to the audio analyzer. The default lowpass filter at the EV kit outputs is optimized for an 8Ω speaker.

The IC can pass CE EN55022B regulations with up to 30cm of speaker cable and no filtering. However, ferrite-bead filters can be used to achieve further attenuation of radiated emissions. To install the ferrite-bead filters, verify that filter inductors L1 and L2 are not installed. Next, replace shorting resistors R7 and R8 with 0603 or smaller ferrite beads and install filter capacitors on the C14 and C15 pads. The speaker wire should be connected to the OUT- and OUT+ test points.

Jumper Selection

Shutdown Mode ($\overline{SHDN}$)

Jumper JU1 controls the shutdown pin ($\overline{SHDN}$) of the IC. The shutdown pin can also be controlled by an external logic controller connected to the EV kit $\overline{SHDN}$ PCB pad. Remove the shunt from JU1 before connecting an external controller to the $\overline{SHDN}$ pad. See Table 1 for shunt positions.

Input Mode (IN-)

Jumper JU2 provides an option to select between a differential or single-ended input mode for the EV kit. See Table 2 for jumper JU2 configuration.

Table 1. Shutdown Mode (JU1 Jumper Selection)

SHUNT POSITION	$\overline{\text{SHDN}}$ PIN CONNECTED TO	EV KIT FUNCTION
1-2*	VCC	EV kit enabled
2-3	PGND	Shutdown mode
Not installed	External logic controller	$\overline{\text{SHDN}}$ driven by external logic controller. Shutdown is active low and is 1.8V logic compliant.

**Default position.*

Table 2. Input Mode (JU2 Jumper Selection)

SHUNT POSITION	IN- PCB PAD CONNECTED TO	INPUT MODE
Installed	PGND	Single-ended
Not installed*	Use-supplied negative differential input	Differential

**Default position.*

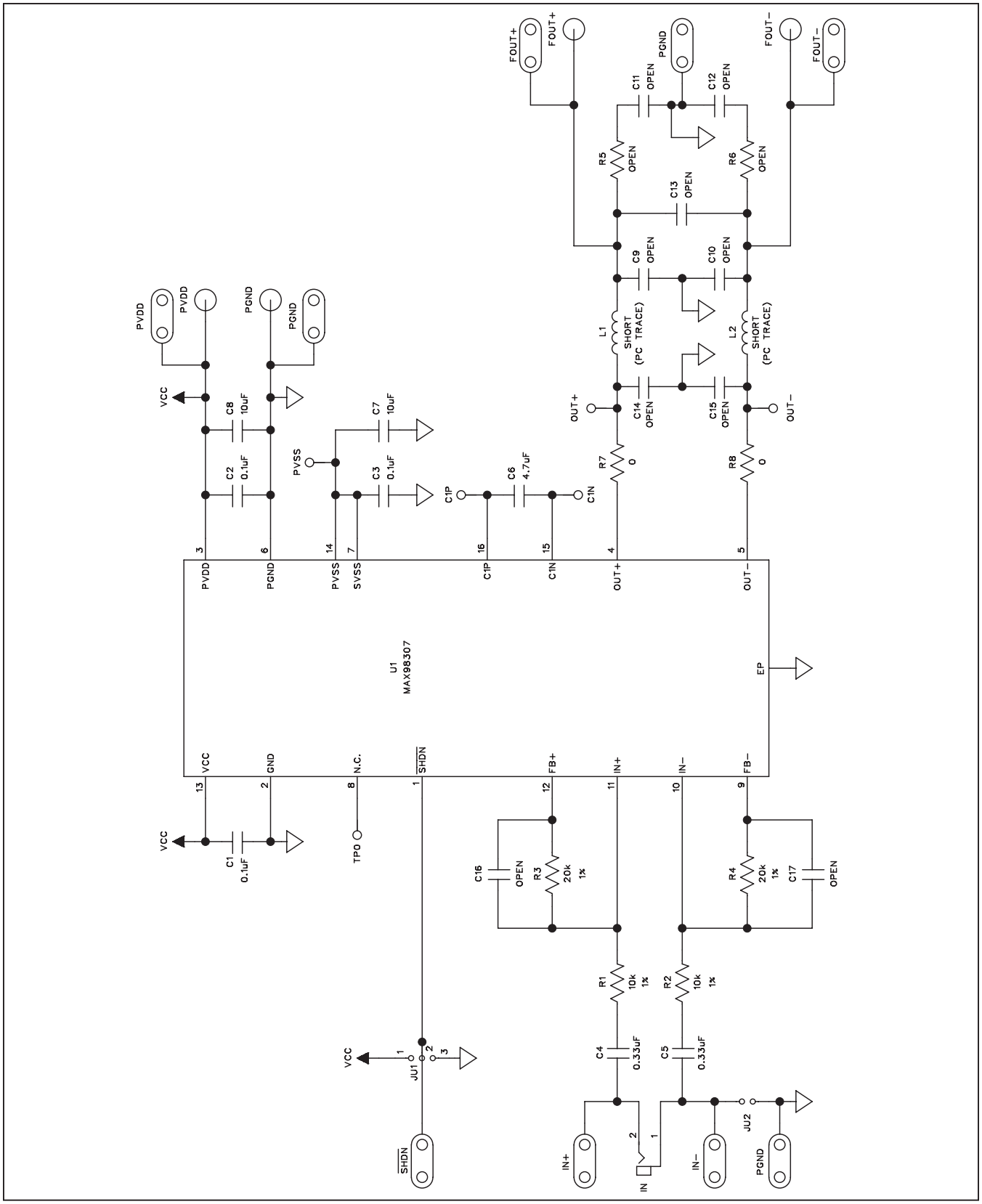

Figure 1. MAX98307 EV Kit Schematic

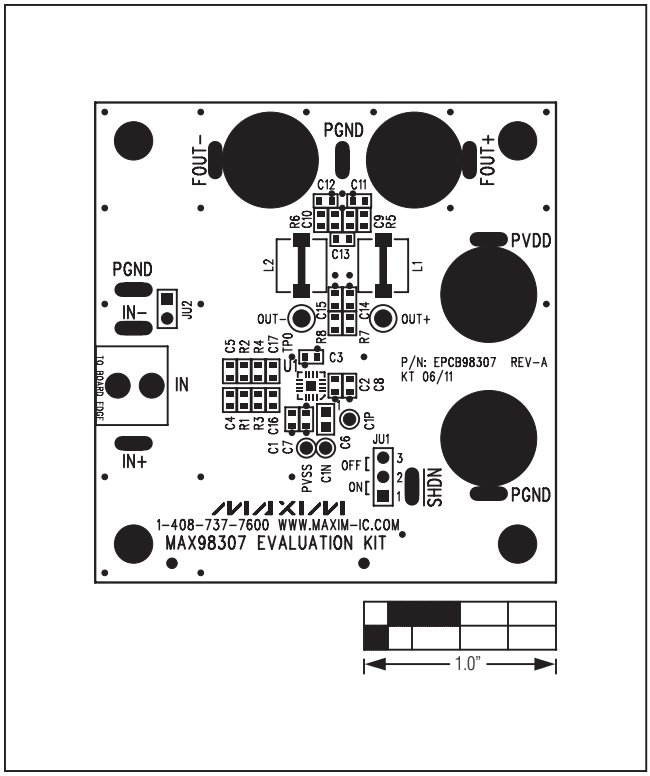

Figure 2. MAX98307 EV Kit Component Placement Guide—Component Side

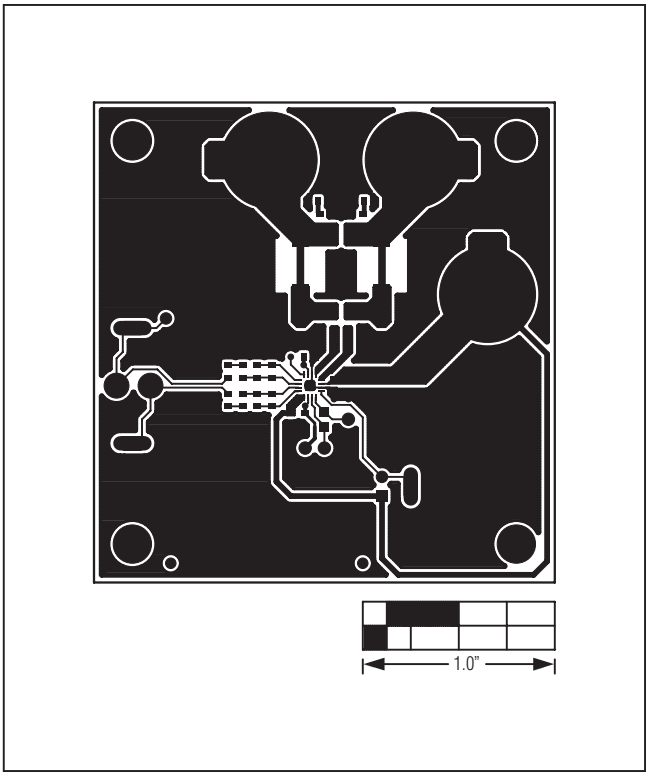

Figure 3. MAX98307 EV Kit PCB Layout—Component Side

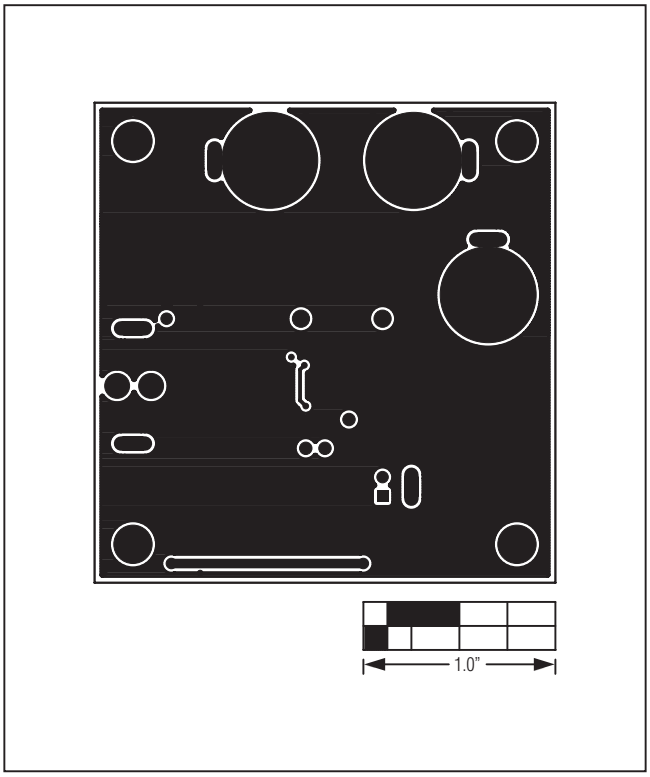

Figure 4. MAX98307 EV Kit PCB Layout—Solder Side

Ordering Information

PART	TYPE
MAX98307EVKIT#	EV Kit

#Denotes RoHS compliant.

Revision History

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

AMEYA360
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