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MAX9830A Evaluation Kit

General Description

The MAX9830A evaluation kit (EV kit) is a fully assembled and tested circuit board that uses the MAX9830A filterless Class D amplifier to drive a mono bridge-tied-load (BTL) speaker in portable audio applications. Designed to operate from a 2.6V to 5.5V DC power supply, the EV kit is capable of delivering 2W into a 4Ω load. The EV kit accepts differential or single-ended input signals. The MAX9830A EV kit also evaluates the MAX9830B–MAX9830E.

Features

- ◆ Industry-Leading Quiescent Current
1.6mA (VDD = 5V), 1.2mA (VDD = 3.6V)
- ◆ Filterless Operation Passes EN55022B-Radiated Emissions with Up to 24in (61cm) of Speaker Cable
- ◆ Evaluates the MAX9830B–MAX9830E (with IC Replacement)
- ◆ 2.6V to 5.5V Single-Supply Operation
- ◆ 2W Mono Class D Output
- ◆ Differential or Single-Ended Input
- ◆ Low-Power Shutdown Input
- ◆ Fully Assembled and Tested

Ordering Information

PART	TYPE
MAX9830AEVKIT+	EV Kit

+Denotes lead(Pb)-free and RoHS compliant.

Component List

DESIGNATION	QTY	DESCRIPTION
REQUIRED COMPONENTS		
C1	1	0.1μF ±10%, 25V X7R ceramic capacitor (0603) Murata GRM188R71E104K TDK C1608X7R1E104K
C2	1	10μF ±20%, 6.3V X5R ceramic capacitor (0603) Murata GRM188R60J106M TDK C1608X5R0J106M
C3, C4	0	Not installed, ceramic capacitors (0603)
C5, C6	2	0.47μF ±10%, 10V X7R ceramic capacitors (0603) TDK C1608X7R1A474K Murata GRM188R61A474K
C7–C11	5	0.22μF ±10%, 25V X7R ceramic capacitors (0603) Murata GRM188R71E224K TDK C1608X7R1E224K

DESIGNATION	QTY	DESCRIPTION
REQUIRED COMPONENTS		
JU1	1	3-pin header
JU2	1	2-pin header
L1, L2	0	Not installed, inductors
L3, L4	2	0Ω resistors (0805)
L5	1	Ferrite bead, 100Ω at 100MHz, 50mΩ DCR, 3A (0603) TDK MPZ16085101A
OUT-, OUT+	2	Test points
R1, R2	2	22Ω ±5% resistors (0603)
U1	1	Mono Class D amplifier (8 TDFN) Maxim MAX9830AETA+
—	2	Shunts
—	1	PCB: MAX9830A EVALUATION KIT+
OPTIONAL COMPONENTS		
L1, L2	2	22μH ±20%, 0.7A inductors TOKO A915AY-220M

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Evaluates: MAX9830A-MAX9830E

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 MAX9830A when contacting these component suppliers.

Quick Start

Recommended Equipment

- 2.6V to 5.5V, 1A DC supply
- 4Ω speaker
- Mono audio signal source

Procedure

The MAX9830A 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: Pins 1-2 (device enabled)
JU2: Installed (single-ended input)
- 2) Set the power-supply output to 5V.
- 3) Disable the power-supply output.
- 4) Connect the power-supply ground to the GND pad and the power-supply positive output to the VDD pad on the EV kit.
- 5) Verify that the audio source output is disabled.
- 6) Connect the mono audio source between the INPUT+ and INPUT- pads on the EV kit.
- 7) Connect the speaker across the OUT+ and OUT- test points.
- 8) Enable the power-supply output.
- 9) Enable the audio source.
- 10) Verify that the speaker is playing the audio source signal.

Detailed Description of Hardware

The MAX9830A EV kit features the MAX9830A filterless Class D amplifier IC, designed to drive a BTL mono speaker in portable audio applications. The EV kit operates from a DC power supply that provides 2.6V to 5.5V and 1A of current. The EV kit accepts a differential or single-ended audio input. The audio input source is amplified to drive 2W into a 4Ω speaker.

The EV kit provides two sets of differential outputs. The device outputs (OUT+, OUT-) can be connected directly to a speaker load, without any filtering, with up to 24in (61cm) of cable. However, a filter can be added to ease evaluation.

Speaker Amplifier Shutdown

Jumper JU1 enables or disables the speaker amplifier. See Table 1 for jumper JU1 configuration.

Input Mode

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

Table 1. Shutdown Input (JU1)

SHUNT POSITION	SHDN PIN	AMPLIFIER
1-2*	Connected to VDD	Enabled
2-3	Connected to GND	Disabled

*Default position.

Table 2. JU2 Settings

SHUNT POSITION	IN- PIN	INPUT MODE
Installed*	Connected to GND	Single-ended input
Not installed	Connected to user-supplied negative differential input	Differential input

*Default position.

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Optional Output Filtering

The MAX9830A is designed to pass EN55022B emissions standards without any filtering when using up to 61cm of cable to connect the speaker. When evaluating the MAX9830A without any filtering, connect the speaker to the outputs (OUT+, OUT-).

The MAX9830A EV kit also features PCB pads for a low-pass filter that can be added to ease evaluation. Audio analyzers typically cannot accept the Class D amplifier's

pulse-width-modulated (PWM) waveform at their inputs. The lowpass filter extracts the audio content from the PWM output signal and allows the device to be connected directly to an audio analyzer. The PWM output signal can be lowpass filtered by installing $22\mu\text{H} \pm 20\%$, 0.7A inductors (TOKO A915AY-220M) at L1 and L2. The filtered outputs should then be monitored at the FOUT+ and FOUT- pads.

Evaluates: MAX9830A-MAX9830E

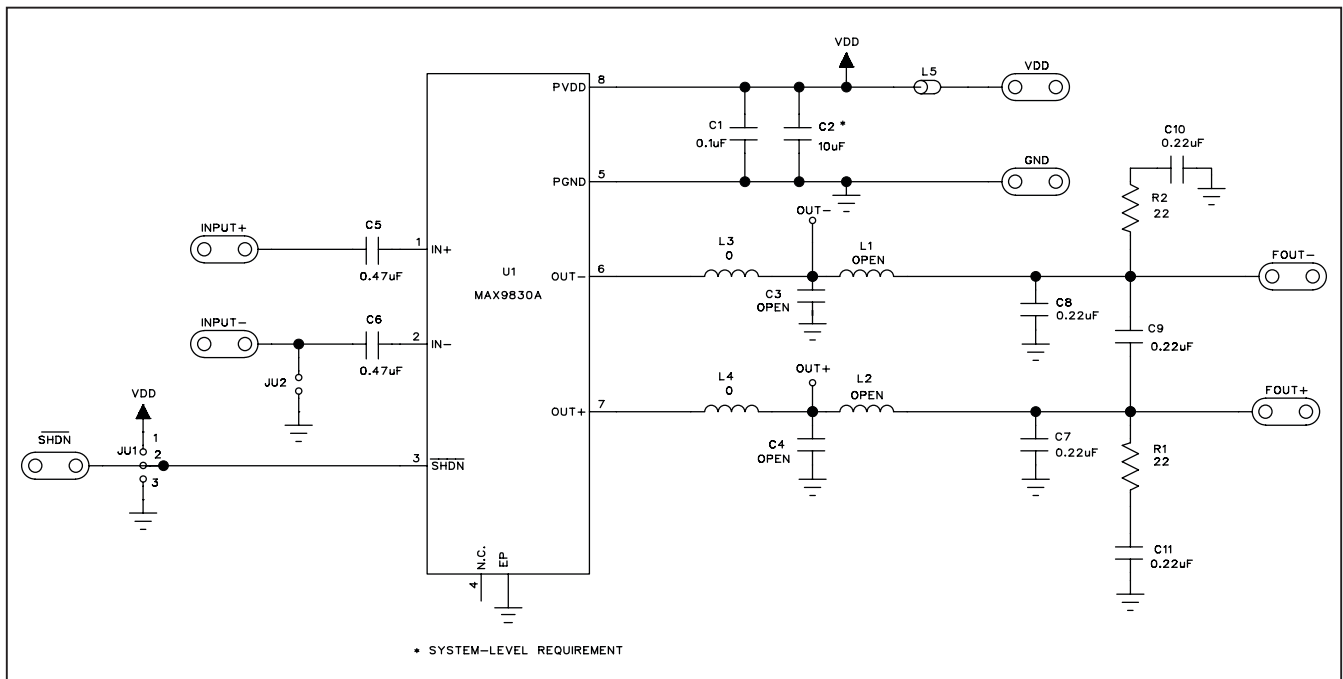


Figure 1. MAX9830A EV Kit Schematic

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Evaluates: MAX9830A—MAX9830E

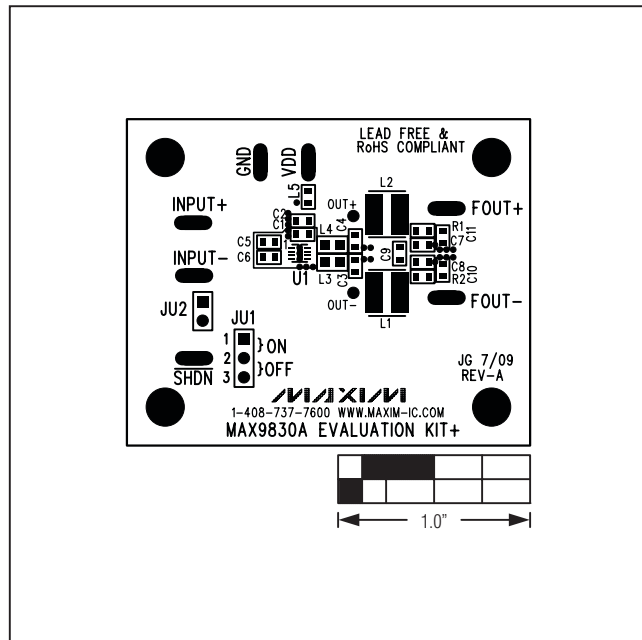


Figure 2. MAX9830A EV Kit Component Placement Guide—Component Side

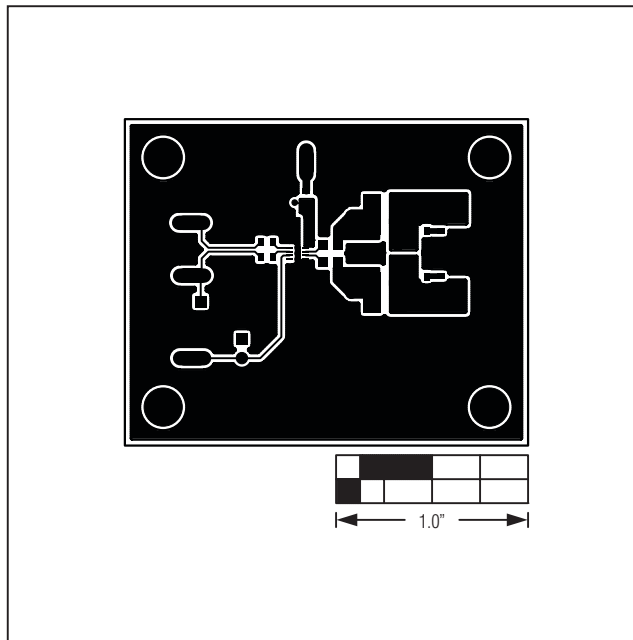


Figure 3. MAX9830A EV Kit PCB Layout—Component Side

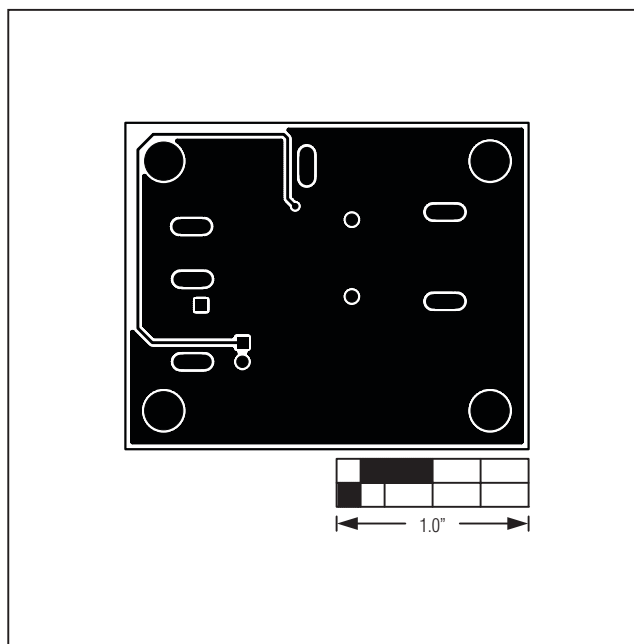


Figure 4. MAX9830A EV Kit PCB Layout—Solder Side

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