

MAXIM

MAX4297 Evaluation Kit

Evaluates: MAX4297

General Description

The MAX4297 is a stereo, switch-mode (Class-D) audio power amplifier intended for multimedia and general-purpose high-power applications. It has greater than 83% efficiency and is capable of delivering 2W maximum continuous power to a 4Ω load.

The MAX4297 evaluation kit (EV kit) is a fully assembled and tested surface-mount board. The EV kit is designed to be driven by the lineout or headphone jack of a CD player or directly connected to any audio source. It can be powered by either three AA batteries or an external power supply. The EV kit includes a volume control and two terminal blocks for quick speaker connection.

Component List

DESIGNATION	QTY	DESCRIPTION
BAT1	1	Battery holder (3AA)
C1, C7, C14	3	0.1μF, 16V X7R ceramic capacitors Taiyo Yuden EMK107BJ104KA or Murata GRM39X7R104K016
C2, C15	2	150pF, 50V NPO ceramic capacitors
C3, C16	2	5pF, 50V NPO ceramic capacitors
C4, C5, C8, C10–C13, C17, C18	9	1μF, 10V X7R ceramic capacitors Taiyo Yuden LMK212BJ105KG or Murata GRM40X7R105K010
C6, C19, C20	0	Not installed
C9, C23	2	330μF, 6.3V POSCAPs Sanyo 6TPB330M
J1	1	3.5mm stereo jack
J2, J3	2	2-position terminal blocks for speakers
JU1–JU4	4	3-pin jumpers
L1–L4	4	15μH inductors Coilcraft DO3316P153 or Coiltronics UP2B-150
R1	1	10kΩ, thumbwheel potentiometer Panasonic EVU-TU5B32B14
R2, R3, R5, R6	4	51kΩ ±5% resistors
R4, R7	2	100kΩ ±5% resistors
U1	1	MAX4297EAG

Features

- ◆ 2W/Channel Output Power at +5V
0.7W/Channel Output Power at +3V
- ◆ Programmable PWM Oscillator Frequency Selection (125kHz, 250kHz, 500kHz, 1MHz)
- ◆ Low 0.4% THD+N ($R_L = 4\Omega$, $f_{IN} = 1\text{kHz}$, $f_{OSC} = 250\text{kHz}$)
- ◆ +2.7V to +5.5V Input Range
- ◆ Volume Control
- ◆ Fully Assembled and Tested Surface-Mount Board

Ordering Information

PART	TEMP. RANGE	IC PACKAGE
MAX4297EVKIT	0°C to +70°C	24 SSOP

Component Suppliers

SUPPLIER	PHONE	FAX
Coilcraft	847-639-6400	847-639-1469
Coiltronics	561-241-7876	561-241-9339
Murata	814-237-1431	814-238-0490
Panasonic	201-392-7522	201-392-4441
Sanyo	619-661-6835	619-661-1055
Taiyo Yuden	408-573-4150	408-573-4159

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Quick Start

Required Equipment

- Two 4Ω/8Ω speakers
- Either three AA batteries or a DC power supply capable of supplying +2.7V to +5.5V at 1.5A.

The MAX4297 EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Do not turn on the power supply until all connections are completed:**

- 1) Connect the speakers to terminal blocks J2 and J3.
- 2) Connect an audio source, such as a CD player, to stereo jack J1 or the pads labeled INPUTL, INPUTR, and AUDIO-GND.
- 3) Set jumper JU2 to position 1–2 for battery power or 2–3 for a DC power supply.
- 4) Set the remaining jumpers to the following positions:

JU1: 2–3 (MAX4297 enabled)	}	f _{osc} = 250kHz
JU3: 2–3 (FS2 = low)		
JU4: 1–2 (FS1 = high)		
- 5) Either insert three AA batteries into the battery holder, or connect a DC power supply to the VSUPPLY and GND pads.
- 6) Turn on the audio source.
- 7) Adjust the volume control if necessary.

Detailed Description

The MAX4297 EV kit is a stereo, switch-mode (Class-D) audio power amplifier. The EV kit is designed to be driven by the lineout or headphone jack of a CD player or directly connected to any audio source. It can be powered by either three AA batteries or an external power supply. A thumbwheel potentiometer mounted to the board is provided to control volume.

The EV kit is shipped with the components selected for driving 4Ω speakers with the MAX4297 set to unity gain. The gain can be increased by changing resistors R4 and R7. See the equations below for determining values:

$$\text{Left channel: Gain} = -R4 / (R2 + R3) = -R4 / 102k\Omega$$

$$\text{Right channel: Gain} = -R7 / (R5 + R6) = -R7 / 102k\Omega$$

To drive speakers other than 4Ω, replace inductors L1–L4 and capacitors C4, C5, C17, and C18. Refer to the MAX4295/MAX4297 data sheet for selecting the values.

Jumper Selection

Jumper JU1 controls the shutdown pin (SHDN) on the MAX4297. See Table 1 for shunt positions.

Jumper JU2 selects between an external power supply or the on-board battery pack. See Table 1 for shunt positions.

Jumpers JU3 and JU4 control frequency select pins FS1 and FS2. See Tables 1 and 2 for the shunt positions.

Note: The MAX4297 EV kit is optimized for a 250kHz switching frequency. Inductors L1–L4 and capacitors C4, C5, C17, and C18 may need to be optimized for other switching frequencies. Refer to the MAX4295/MAX4297 data sheet for selecting the values.

Table 1. Jumper Selection

JUMPER	JUMPER POSITION	FUNCTION
JU1	1–2	SHDN = low. MAX4297 disabled.
	2–3*	SHDN = high. MAX4297 enabled.
	Open	Drive pad SHDN with an external signal.
JU2	1–2	Power is supplied by the battery pack.
	2–3*	Power is supplied by an external power supply connected to VSUPPLY and GND pads.
JU3	1–2	Frequency select pin FS2 = VCC.
	2–3*	Frequency select pin FS2 = GND.
JU4	1–2*	Frequency select pin FS1 = VCC.
	2–3	Frequency select pin FS1 = GND.

*Default position.

Table 2. Frequency Selection

JU3 (FS2)	JU4 (FS1)	FREQUENCY
2–3 (GND)	2–3 (GND)	125kHz
2–3 (GND)	1–2 (VCC)	250kHz
1–2 (VCC)	2–3 (GND)	500kHz
1–2 (VCC)	1–2 (VCC)	1MHz

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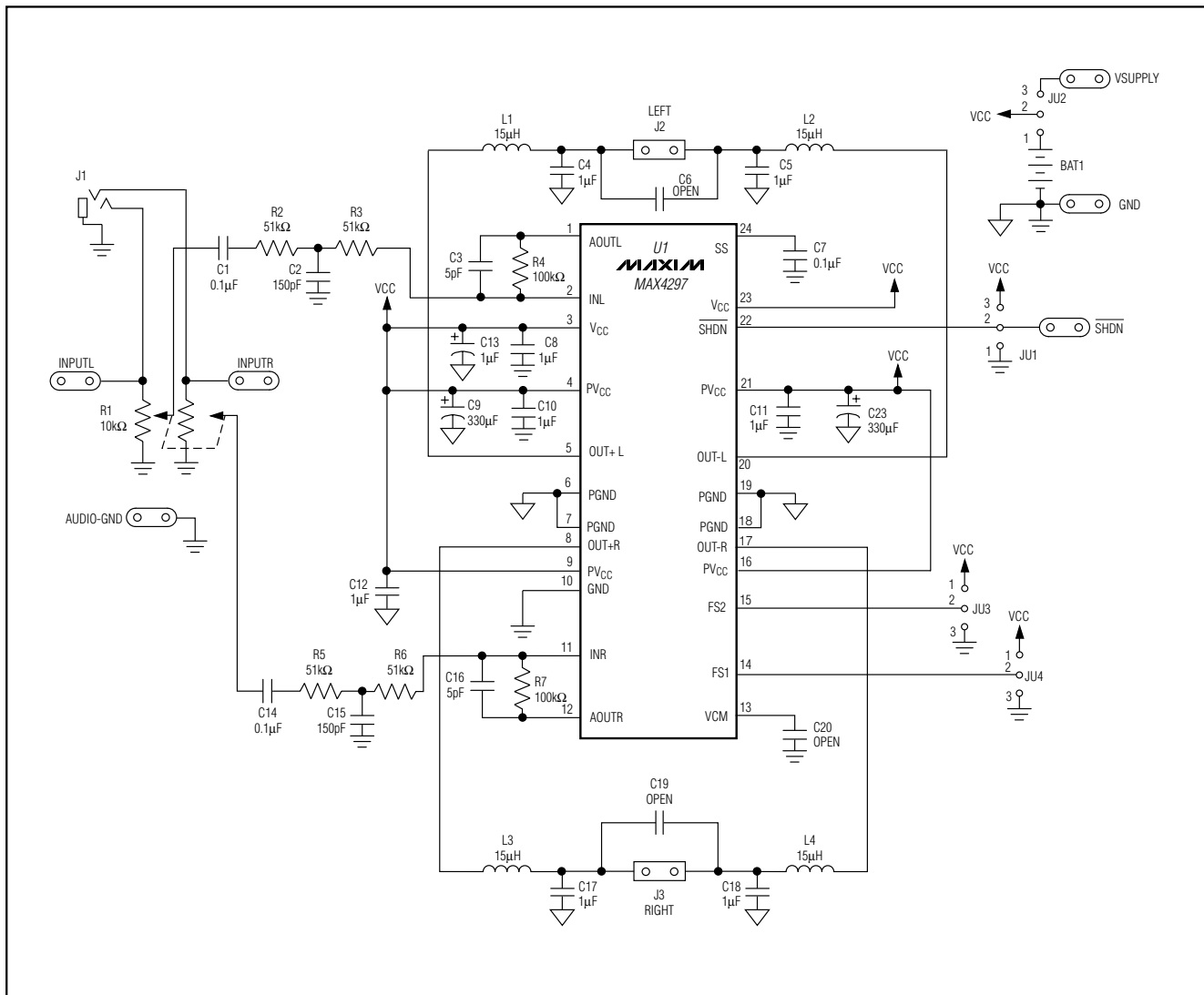


Figure 1. MAX4297 EV Kit Schematic

MAX4297 Evaluation Kit

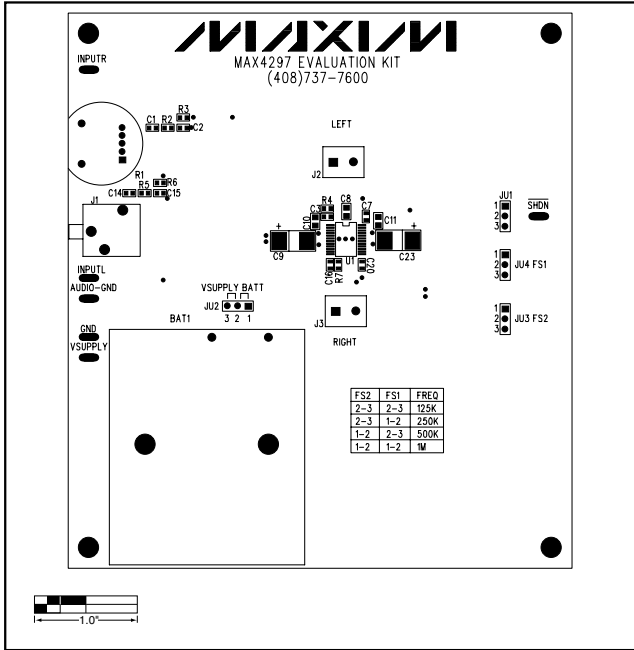


Figure 2. MAX4297 EV Kit Component Placement Guide—Component Side

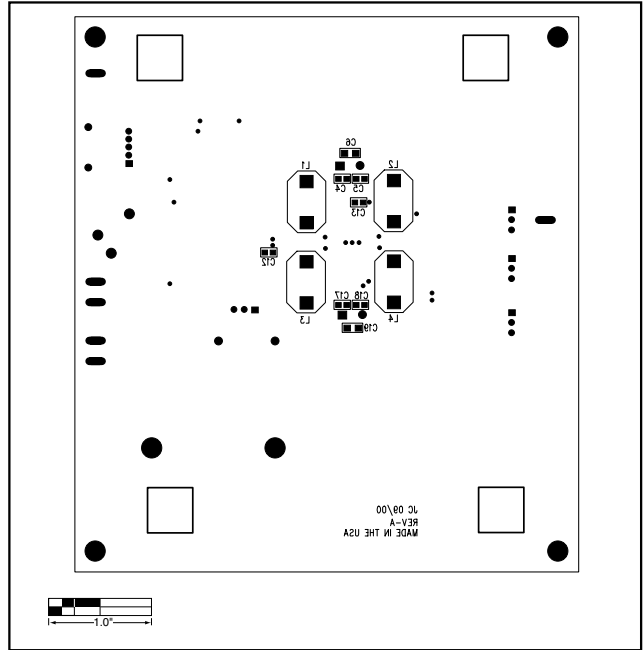


Figure 3. MAX4297 EV Kit Component Placement Guide—Solder Side

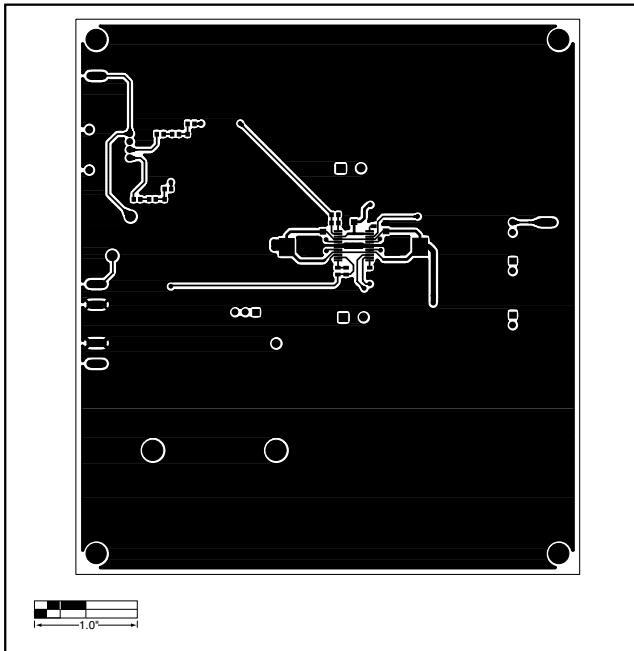


Figure 4. MAX4297 EV Kit PC Board Layout—Component Side

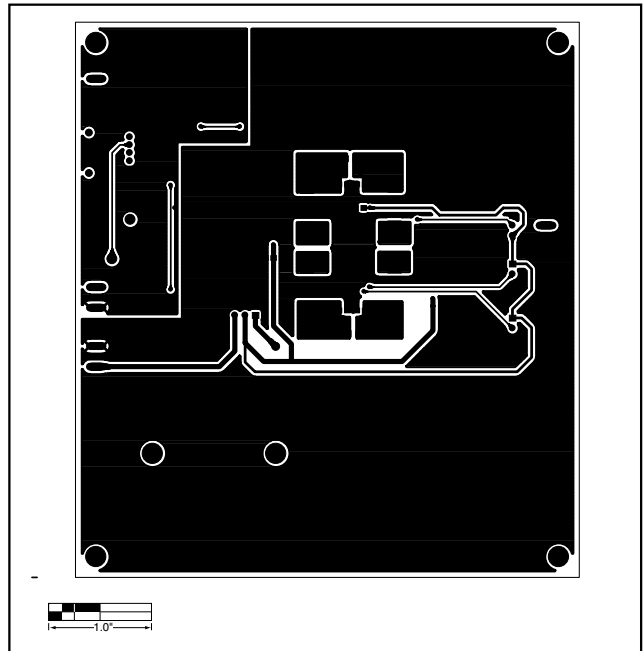


Figure 5. MAX4297 EV Kit PC Board Layout—Soldier Side

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