

# MAXIM

## MAX4295 Evaluation Kit

**Evaluates: MAX4295**

### General Description

The MAX4295 is a mono, switch-mode (Class-D) audio power amplifier intended for multimedia and general-purpose high-power applications. It has greater than 87% efficiency and is capable of delivering 2W maximum continuous power to a 4Ω load.

The MAX4295 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 to be directly connected to any audio source. The EV kit includes a volume control and a terminal block for quick speaker connection.

### 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

### Component List

DESIGNATION	QTY	DESCRIPTION
C1, C8	2	0.1μF, 16V X7R ceramic caps (0603) Taiyo Yuden EMK107BJ104KA or Murata GRM39X7R104K016
C2	1	150pF, 50V NPO ceramic cap (0603)
C3	1	5pF, 50V NPO ceramic cap (0603)
C4, C12, C13, C14	0	Not installed
C5, C6, C7, C9, C10	5	1μF, 10V X7R ceramic caps (0805) Taiyo Yuden LMK212BJ105KG or Murata GRM40X7R105K010
C11	1	330μF, 6.3V POSCAP Sanyo 6TPB330M
J1	1	3.5mm stereo jack
J2	1	2-position terminal block for speaker
JU1, JU2, JU3	3	3-pin jumpers
L1, L2	2	15μH inductors Coilcraft DO3316P153 or Coiltronics UP2B-150
R1	1	10kΩ, thumbwheel potentiometer
R2, R3	2	51kΩ ±5% resistors (0603)
R4	1	100kΩ ±5% resistor (0603)
U1	1	MAX4295EEE (16-pin QSOP)

### Ordering Information

PART	TEMP. RANGE	IC PACKAGE
MAX4295EVKIT	0°C to +70°C	16 QSOP

### 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
Sanyo	619-661-6835	619-661-1055
Taiyo Yuden	408-573-4150	408-573-4159

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## Quick Start

### Required Equipment

- One 4Ω/8Ω speaker
- One DC power supply capable of supplying +2.7V to +5.5V at 1.5A

The MAX4295 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 speaker to terminal blocks J2.
- 2) Connect an audio source, such as a CD player, to stereo jack J1 or the IN and AUDIO-GND pads.
- 3) Set the jumpers to the following positions:
 

JU1: 2–3 (FS2 = low)	}	f <sub>OSC</sub> = 250kHz
JU2: 1–2 (FS1 = high)		
JU3: 1–2 (MAX4295 enabled)		
- 4) Connect a DC power supply to the VCC and GND pads.
- 5) Turn on the audio source.
- 6) Adjust the volume control, if necessary.

## Detailed Description

The MAX4295 EV kit is a mono, 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. 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 MAX4295 set to unity gain. The gain can be increased by changing resistor R4. See the equation below for determining values:

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

To drive a speaker other than 4Ω, replace inductors L1 and L2 and capacitors C6 and C7. Refer to the MAX4295/MAX4297 data sheet for selecting the values.

### Jumper Selection

Jumpers JU1 and JU2 control frequency select pins FS1 and FS2. See Tables 1 and 2 for the shunt positions.

**Note:** The MAX4295 EV kit is optimized for a 250kHz switching frequency. Inductors L1 and L2 and capacitors C6 and C7 may need to be optimized for other switching frequencies. Refer to the MAX4295/MAX4297 data sheet for selecting the values.

Jumper JU3 controls the shutdown pin ( $\overline{\text{SHDN}}$ ) on the MAX4295. See Table 1 for shunt positions.

**Table 1. Jumper Selection**

JUMPER	JUMPER POSITION	FUNCTION
JU1	1–2	Frequency select pin FS2 = VCC.
	2–3*	Frequency select pin FS2 = GND.
JU2	1–2*	Frequency select pin FS1 = VCC.
	2–3	Frequency select pin FS1 = GND.
JU3	1–2*	$\overline{\text{SHDN}}$ = high. MAX4295 enabled.
	2–3	$\overline{\text{SHDN}}$ = low. MAX4295 disabled.
	Open	Drive pad $\overline{\text{SHDN}}$ with an external signal.

\*Default position.

**Table 2. Frequency Selection**

JU1 (FS2)	JU2 (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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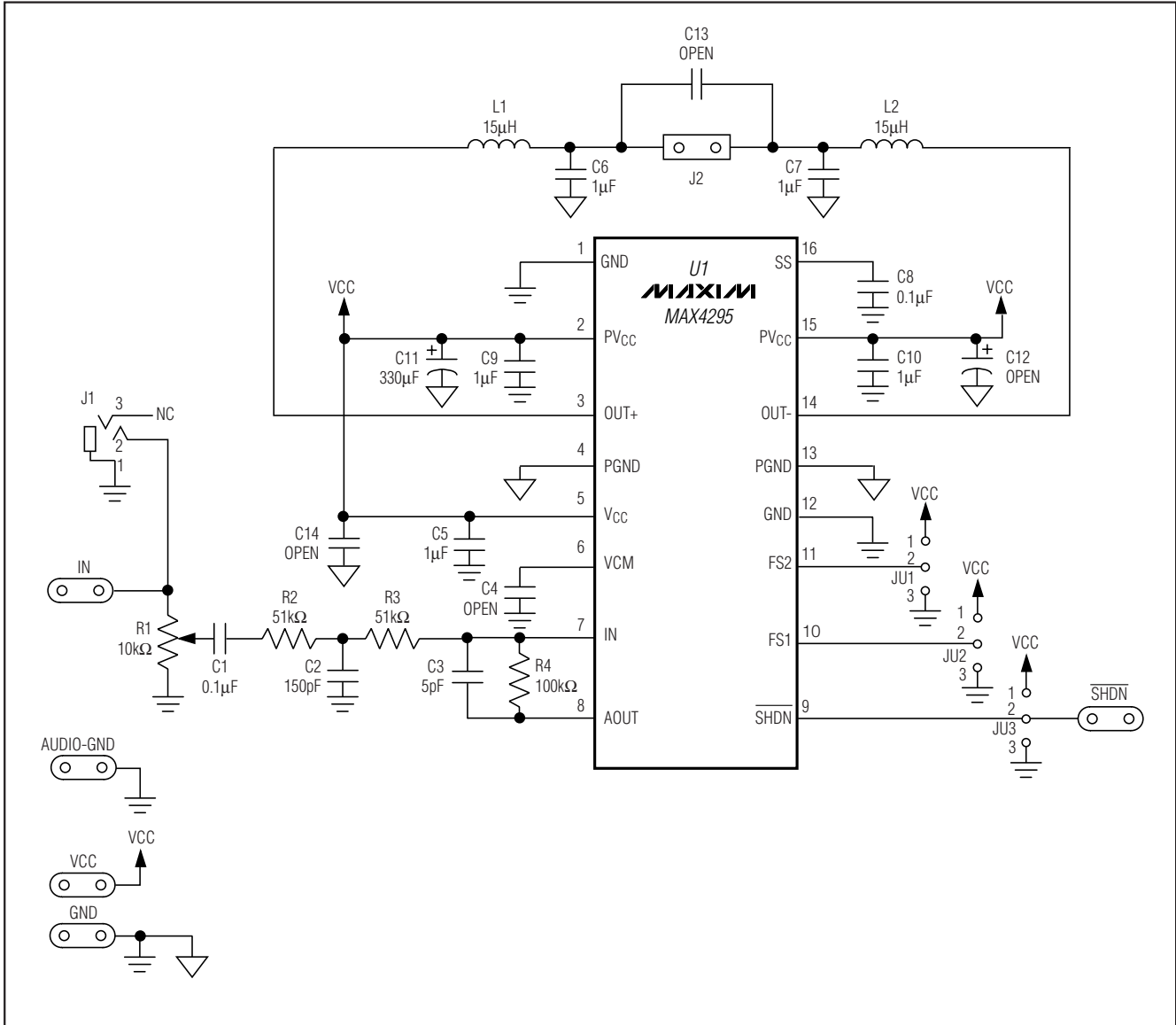


Figure 1. MAX4295 EV Kit Schematic

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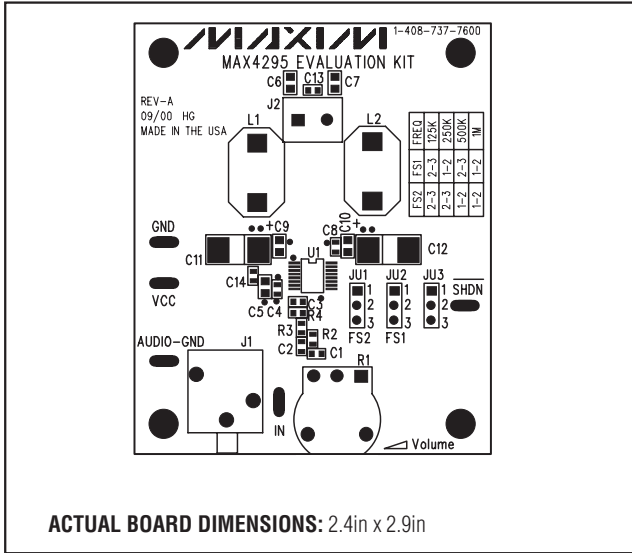


Figure 2. MAX4295 Component Placement Guide—Component Side

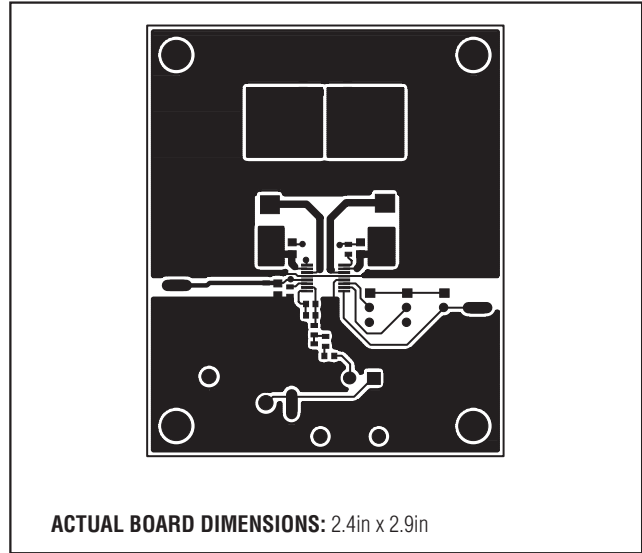


Figure 3. MAX4295 EV Kit PC Board Layout—Component Side

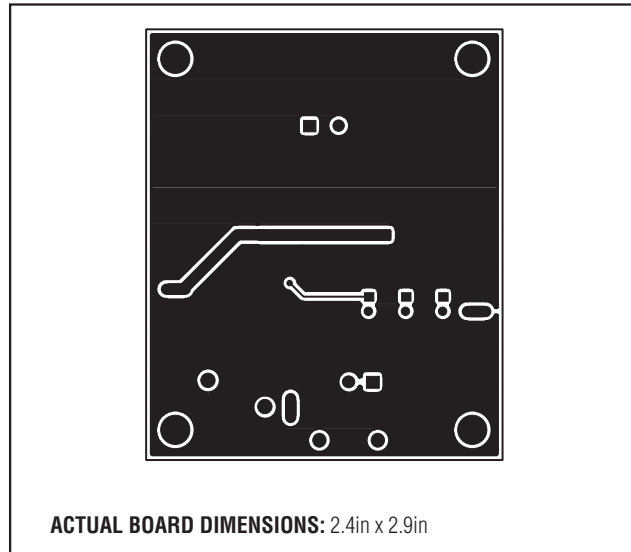


Figure 4. MAX4295 EV Kit PC Board Layout—Solder Side

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