



# MAX14535E Evaluation Kit

## General Description

The MAX14535E evaluation kit (EV kit) demonstrates the MAX14535E double-pole/double-throw (DPDT) analog switch featuring negative signal capability, low on-resistance ( $0.135\Omega$  RON), and input shunt resistors on the NO\_ terminals for click-and-pop reduction in portable audio applications. The IC features a space-saving ultra-thin QFN package. The EV kit can operate from a +2.4V to +5.5V DC power supply and comes configured to operate from USB power.

## Features

- ◆ Input Shunt Resistors for Built-In Click-and-Pop Reduction
- ◆ Low  $0.135\Omega$  On-Resistance (RON)
- ◆ -1.5V to Min (3V or VCC) Analog Signal Capability
- ◆ +2.4V to +5.5V DC Supply Operation
- ◆ Demonstrates USB Power Operation
- ◆ Lead(Pb)-Free and RoHS Compliant
- ◆ Fully Assembled and Tested

## Ordering Information

PART	TYPE
MAX14535EEVKIT+	EV Kit

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

## Component List

DESIGNATION	QTY	DESCRIPTION
C1, C3–C7	6	0.1 $\mu$ F $\pm$ 10%, 16V X7R ceramic capacitors (0603) Murata GRM188R71C104K
C2	1	10 $\mu$ F $\pm$ 10%, 10V X7R ceramic capacitor (0805) Murata GRM21BR71A106K
FB1	0	Not installed, ferrite-bead inductor (0603)
JU1, JU2, JU3	3	3-pin headers

DESIGNATION	QTY	DESCRIPTION
OUT	1	Stereo headphone jack (3.5mm)
R1–R4	4	0 $\Omega$ $\pm$ 5% resistors (1206)
USB	1	USB type-B right-angle receptacle
U1	1	DPDT analog switch (10 UTQFN) Maxim MAX14535EEVB+ (Top Mark: AAS)
—	3	Shunts (JU1, JU2, JU3)
—	1	PCB: MAX14535E Evaluation Kit+

## Component Supplier

SUPPLIER	PHONE	WEBSITE
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com

**Note:** Indicate that you are using the MAX14535E when contacting this component supplier.

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## Quick Start

### Required Equipment

- User-supplied PC with a spare USB port
- A-to-B USB cable
- One stereo headphone
- Two audio signal sources ranging between -1.5V and +3V

### Procedure

The MAX14535E EV kit is fully assembled and tested. Follow the steps below to verify board operation.

**Caution: Do not connect a signal to the NO\_1, NO\_2, NC\_1, or NC\_2 PCB pads until a powered USB cable is connected to the USB receptacle or until power is supplied across the VIN and GND PCB pads.**

- 1) Connect the **powered** USB cable from the computer to the EV kit's USB receptacle.
- 2) Verify that shunts are installed as follows:
  - JU1: Pins 1-2 (USB power)
  - JU2: Pins 1-2 (switches enabled)
  - JU3: Pins 2-3 (NC\_ terminals selected)
- 3) Verify that the audio source outputs are disabled.
- 4) Connect one audio source's right channel to the NC\_1 PCB pad, the left channel to the NC\_2 PCB pad, and the audio ground return to the nearby GND PCB pad.
- 5) Connect the other audio source's right channel to the NO\_1 PCB pad, the left channel to the NO\_2 PCB pad, and the audio ground return to the nearby GND PCB pad.
- 6) Plug the headphone into the OUT headphone jack.
- 7) Enable the audio sources.
- 8) Verify that the headphone is playing the audio

source connected to the NC\_1 and NC\_2 PCB pads.

- 9) Move the jumper JU3 shunt to pins 1-2.

- 10) Verify that the headphone is playing the audio source connected to the NO\_1 and NO\_2 PCB pads.

## Detailed Description of Hardware

The MAX14535E evaluation kit (EV kit) demonstrates the MAX14535E DPDT analog switch in a 1.4mm x 1.8mm, 10-pin ultra-thin QFN package specified for operating over the -40°C to +85°C extended temperature range. The IC features internal input shunt resistors on the NO\_ terminals. This provides coupling capacitors a place to discharge while the switch is set to the NC\_ terminals providing click-and-pop reduction without additional parts in portable audio applications. The IC features low 0.135Ω RON resistance. An active-high enable pin (EN) sets the switches to either high-impedance mode or normal operation. The COM1, COM2, NC\_1, NC\_2, NO\_1, and NO\_2 PCB pads can pass up to ±300mA of continuous current through the MAX14535E IC. The EV kit can operate from a +2.4V to +5.5V DC power supply and also comes configured to operate from USB power.

The user may install optional input resistors in place of the default 0Ω resistors (R1–R4). PCB pads COM1, COM2, and GND provide access to the headphone jack OUT signals.

### Power Supply

Jumper JU1 provides two options for powering the MAX14535E VCC supply input. VCC can operate from a user-supplied +2.4V to +5.5V DC power supply connected across the VIN and GND PCB pads or from a +5V USB power source. See Table 1 to configure the VCC supply options using jumper JU1.

**Table 1. Power Supply Configuration (JU1)**

SHUNT POSITION	VCC PIN CONNECTION	MAX14535E VCC POWER
1-2*	+5V	Connect a <b>powered</b> USB cable to the USB receptacle. VCC set to +5V USB power.**
2-3	VIN PCB pad	User-provided DC power supply. VCC range: +2.4V to +5.5V**

\*Default position.

\*\*Do not connect a signal to the NO\_1, NO\_2, NC\_1, or NC\_2 PCB pads until a powered USB cable is connected to the USB receptacle, or until power is supplied across the VIN and GND PCB pads

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## Switch Enable

Jumper JU2 configures the MAX14535E enable input (EN). The EN signal can also be driven by an external controller using the EN and nearby GND PCB pads. To use an external controller, remove capacitor C6. See Table 2 to set EN using jumper JU2.

## Digital Control

Jumper JU3 configures the MAX14535E digital-control bit (CB). The CB input sets the position of the switches to either the NO\_ or NC\_ terminals. The CB signal can also be driven by an external controller using the CB and nearby GND PCB pads. To use an external controller, remove capacitor C7. See Table 3 to set CB using jumper JU3.

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**Table 2. Switch Enable Configuration (JU2)**

SHUNT POSITION	EN PIN CONNECTION	SWITCH ENABLE
1-2*	VCC	Switch enabled
2-3	GND	Switch set to high impedance
—	EN PCB pad	Driven by external controller; remove capacitor C6

\*Default position.

**Table 3. Digital Control Configuration (JU3)**

SHUNT POSITION	CB PIN CONNECTION	SWITCH POSITION
1-2	VCC	NO_
2-3*	GND	NC_
—	CB PCB pad	Driven by external controller; remove capacitor C7

\*Default position.



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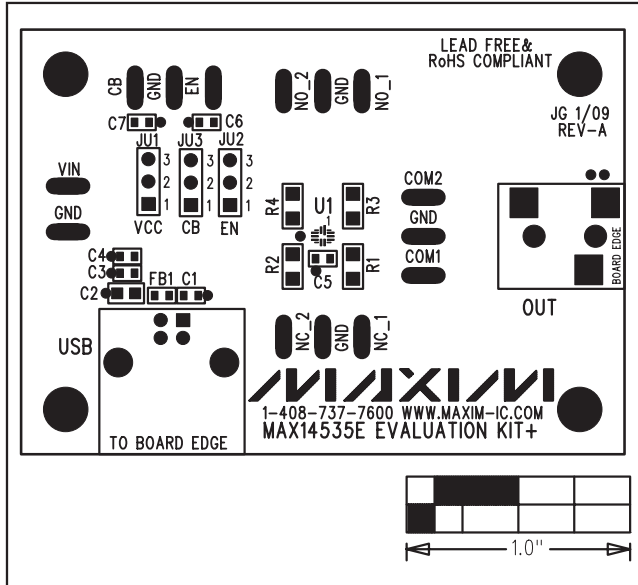


Figure 2. MAX14535E EV Kit Component Placement Guide—Component Side

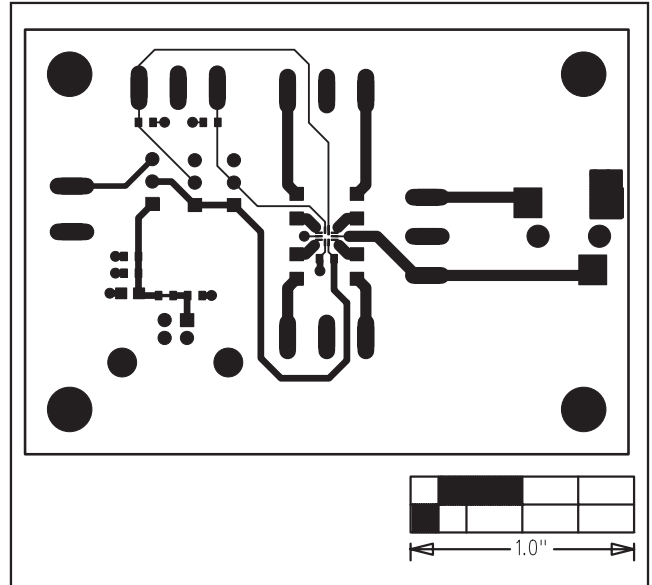


Figure 3. MAX14535E EV Kit PCB Layout—Component Side

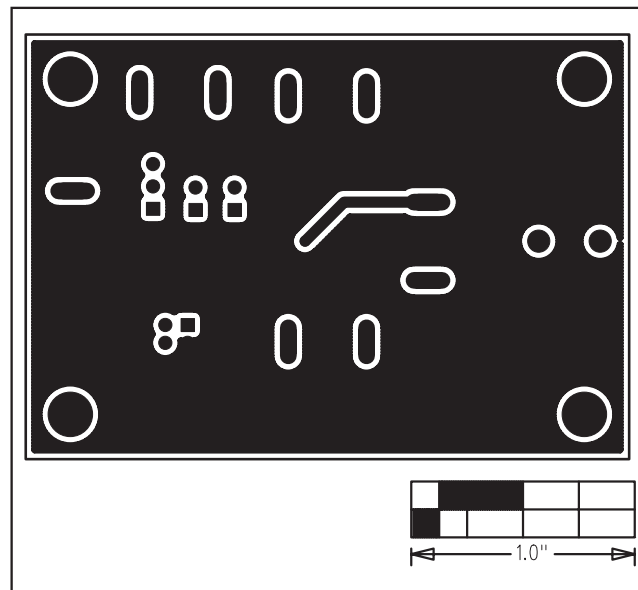


Figure 4. MAX14535E EV Kit PCB Layout—Solder Side

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