19-4268; Rev 0; 9/08

MAX14508E Evaluation Kit

General Description

The MAX14508E evaluation kit (EV kit) provides a proven design to evaluate the MAX14508E high-ESD-protected double-pole/double-throw (DPDT) switch. The EV kit is designed to demonstrate the MAX14508E used in USB 2.0 Hi-Speed-compliant switching applications. The EV kit routes a multiplexed signal from one USB port to another USB port or an audio connector.

The MAX14508E EV kit PCB comes with a MAX14508EEVB+ installed. Contact the factory for free samples of the pin-compatible MAX14509EEVB+, MAX14510EEVB+, MAX14511EEVB+, or MAX14509AEEVB+ devices.

Features

- **USB Powered (Cable Included)**
- **Complete USB 2.0 Hi-Speed (480Mbps) Switching Circuit**
- **Lead-Free and RoHS Compliant**
- **Proven PCB Layout**
- **Fully Assembled and Tested**

Ordering Information

PART	TYPE
MAX14508EEVKIT+	EV Kit

+Denotes lead-free and RoHS compliant.

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C4, C5	3	10µF ±10%, 16V X7R ceramic capacitors (1206) Murata GRM31CR71C106K
C2, C3	2	0.1µF ±10%, 16V X7R ceramic capacitors (0603) Murata GRM188R71C104K
C6	1	0.01µF±10%, 16V X7R ceramic capacitor (0603) Murata GRM188R71C103K
C7, C8	2	220µF±10%, 6.3V low-ESR tantalum capacitors (D size) KEMET B45197A1227K409
C9	1	1µF ±10%, 16V X7R ceramic capacitor (0603) Murata GRM188R71C105K
D1	1	Red LED (0603)
FB1	1	220Ω at 100MHz, 200mA ferrite bead (0603) Murata BLM18AG221SN1D

DESIGNATION	QTY	DESCRIPTION
J1	1	Mini USB type-AB right angle receptacle
J2	1	USB type-B right-angle receptacle
J3	1	Stereo headphone jack (3.5mm)
JU1–JU4	4	3-pin headers
R1	1	270Ω ±5% resistor (0603)
R2	0	Not installed, resistor (0603)
U1	1	DPDT USB 2.0 switch (10 UTQFN) Maxim MAX14508EEVB+
U2	1	3V LDO regulator (5 SC70) Maxim MAX8510EXK30+
—	4	Shunts
—	1	USB Hi-Speed A-to-B cable, 6ft
—	1	USB type-A female-to-mini USB type-B 5-pin male adapter
—	1	Stereo 3.5mm male-to-male adapter
—	1	PCB: MAX14508E Evaluation Kit+

Component Suppliers

SUPPLIER	PHONE	WEBSITE
KEMET Corp.	864-963-6300	www.kemet.com
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com

Note: *Indicate that you are using the MAX14508E, MAX14509E, MAX14510E, MAX14511E, or MAX14509AE when contacting these component suppliers.*

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Quick Start

Recommended Equipment

Before beginning, the following equipment is needed:

- MAX14508E EV kit (A USB cable, a USB type-A female-to-mini USB type-B 5-pin male adapter, and a stereo 3.5mm male-to-male adapter are included)
- One user-supplied Windows® 2000/XP/Vista®-compatible PC with a spare Hi-Speed USB port
- One USB 2.0 Hi-Speed/full-speed peripheral device (e.g., USB 2.0 flash drive)
- One stereo audio source (e.g., MP3 player)
- One pair of stereo headphones with a 3.5mm male connector

Procedure

The MAX14508E EV kit is fully assembled and tested. Follow the steps below to verify board operation:

1) Verify that all jumpers (JU1–JU4) are in their default positions, as shown in Table 1.
2) Connect the USB cable from the PC to the type-B USB port (J2) on the EV kit.
3) Connect the USB 2.0 device to J1 on the EV kit through a USB type-A female-to-mini USB type-B 5-pin male adapter if needed.
4) Verify that the USB 2.0 device is detected by the PC.
5) Remove the USB 2.0 device from J1.
6) Apply the stereo audio source outputs on J1 (pins 2-3). Connect the ground loop of the audio source to J1 (pin 4).
7) Connect the stereo headphones to J3 on the EV kit.
8) Place a shunt on JU3 across pins 1-2.
9) Verify that audio is output on the headphones.

Table 1. Default Shunt Positions

JUMPER	SHUNT POSITION
JU1	1-2
JU2	1-2
JU3	2-3
JU4	1-2

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Detailed Description of Hardware

The MAX14508E EV kit provides a proven layout for the MAX14508E and demonstrates the devices used in USB 2.0 Hi-Speed switching applications. The EV kit provides one mini type-AB (J1) and one type-B (J2) USB port. The EV kit also provides one stereo audio input/output connector (J3).

The MAX14508E routes multiplexed signals from the mini type-AB USB port to the type-B USB port or the audio connector, depending on the setting of the CB pin. All signal traces in the USB application circuit are 90Ω differential controlled impedance traces.

Power Supplies

The EV kit is powered from the type-B USB port (J2) by default. Jumper JU1 selects the power supply for the MAX14508E (VCC), either from an on-board regulated 3V supply or an external supply. See Table 2 for jumper JU1 description. Jumper JU2 selects the power supply for the mini type-AB USB port, either from the type-B USB port bus power or an external supply. See Table 3 for JU2 description.

Table 2. Jumper JU1 Description

SHUNT POSITION	VCC SUPPLY	DESCRIPTION
1-2*	On-board supply	Device powered by on-board linear regulator (3V)
2-3	External supply	Device powered by user-supplied 2.7V to 5V power supply connected to the EXT_VCC and GND pads

**Default position.*

Table 3. Jumper JU2 Description

SHUNT POSITION	MINI TYPE-AB USB PORT BUS POWER	DESCRIPTION
1-2*	On-board Supply	Mini type-AB USB port powered by type-B USB port
2-3	External Supply	Mini type-AB USB port powered by user-supplied 5V power supply connected to the EXT_5V and GND pads

**Default position.*

USB Switch Control (CB/AOR)

The multiplexed signals from the mini type-AB USB port are routed to the type-B USB port or the audio connector, depending on the state of the DPDT switch. The DPDT switch is controlled through pin 8 (CB for the MAX14508E, MAX14509E, and MAX14509AE; AOR for the MAX14510E and MAX14511E). Jumper JU3 sets the logic of pin 8. See Table 4 for JU3 description.

Device Enable (EN) and VBUS Detection (VB)

The MAX14508E/MAX14509E/MAX14509AE are enabled/disabled by the logic setting of EN (pin 9). For the MAX14510E and MAX14511E, pin 9 is used as a VBUS detection input (VB). See Table 5 for JU4 description.

Table 4. Jumper JU3 Description

SHUNT POSITION	CB/AOR PIN	DESCRIPTION
1-2	Connected to VCC	For MAX14508E/MAX14509E/MAX14509AE: Drive CB high to connect COM_ to ANO_. For MAX14510E/MAX14511E: Drive AOR high to connect COM_ to ANO_.
2-3*	Connected to GND	For MAX14508E/MAX14509E/MAX14509AE: Drive CB low to connect COM_ to UNC_. For MAX14510E/MAX14511E: Drive AOR low to have VB control the switch.

**Default position.*

Table 5. Jumper JU4 Description

SHUNT POSITION	EN/VB PIN	DESCRIPTION
1-2*	EN connected to VCC	For MAX14508E/MAX14509E/MAX14509AE: Drive EN high for normal operation.
2-3	EN connected to GND	For MAX14508E/MAX14509E/MAX14509AE: Drive EN low to put switches in high impedance.
Open	VB connected to VBUS	For MAX14510E/MAX14511E: Remove the shunt on JU4 and install a 0Ω resistor on R2 to connect VB to VBUS of J2.

**Default position.*

MAX14508E Evaluation Kit

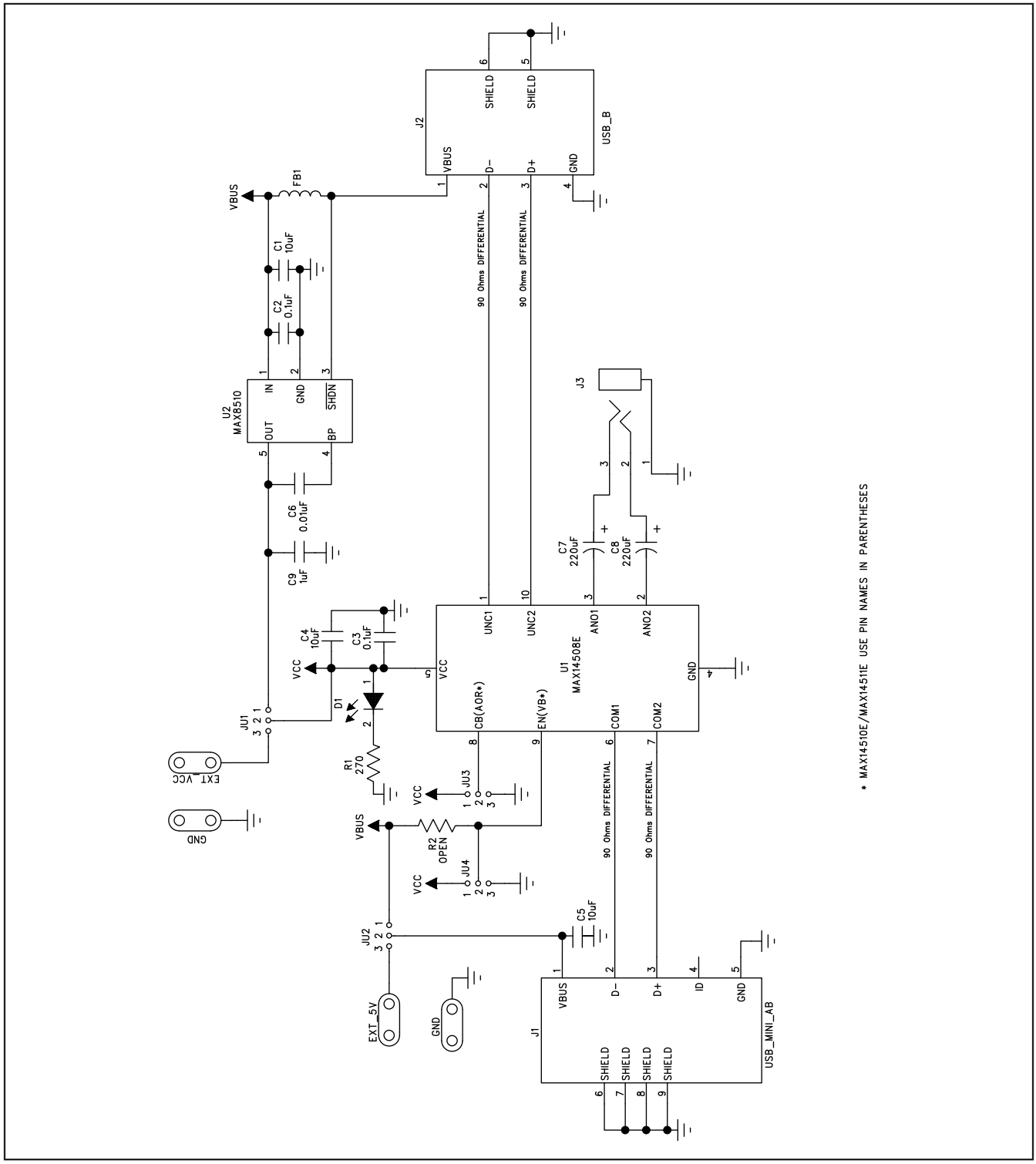

Figure 1. MAX14508E EV Kit Schematic

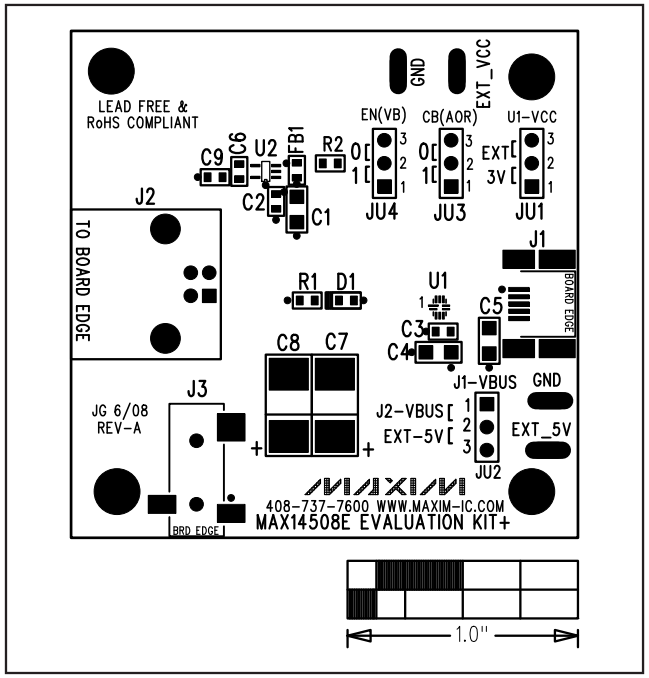

Figure 2. MAX14508E EV Kit Component Placement Guide—Component Side

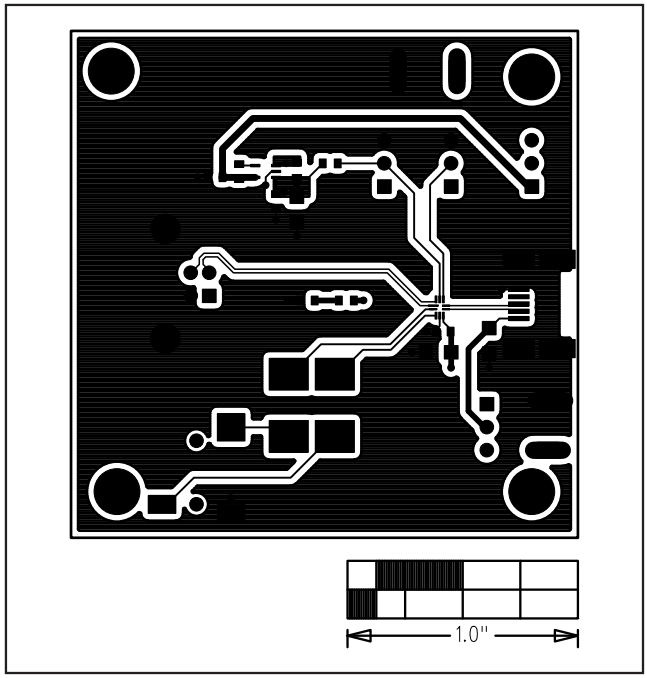

Figure 3. MAX14508E EV Kit PCB Layout—Component Side

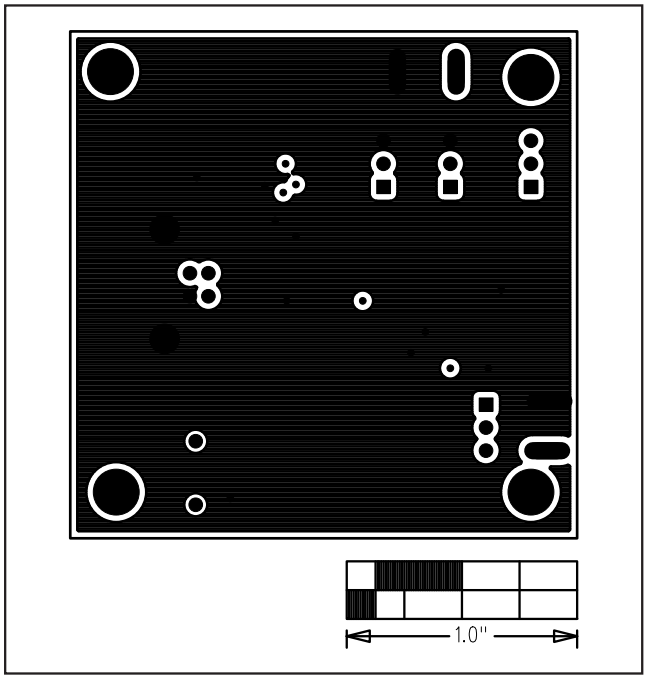

Figure 4. MAX14508E EV Kit PCB Layout—Inner Layer 2

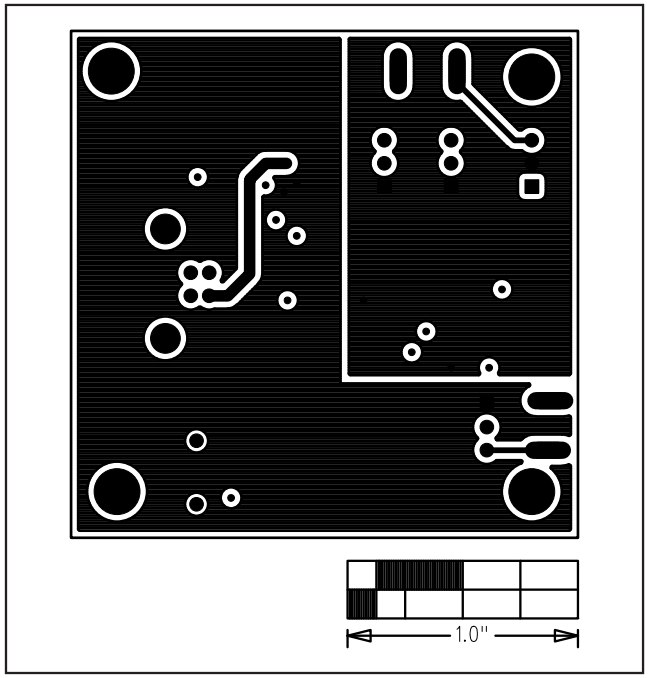

Figure 5. MAX14508E EV Kit PCB Layout—Inner Layer 3

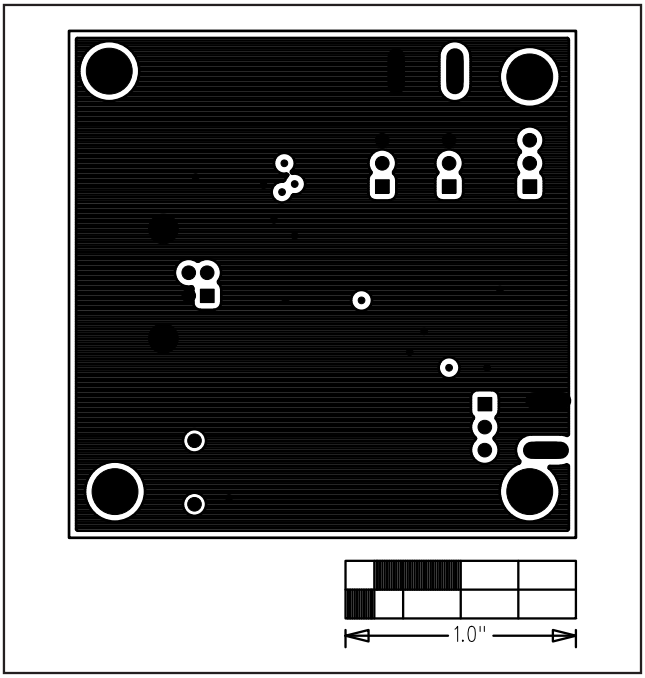

Figure 6. MAX14508E EV Kit PCB Layout—Solder Side