19-4958; Rev 0; 9/09

MAX14532E Evaluation Kit

Evaluates: MAX14532E

General Description

The MAX14532E evaluation kit (EV kit) provides a proven design to evaluate the MAX14532E high ESD-protected DP3T switch. The EV kit is designed to demonstrate the MAX14532E 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 audio connector. The MAX14532E EV kit PCB comes with a MAX14532EEWC+ installed.

Features

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

Ordering Information

PART	TYPE
MAX14532EEVKIT+	EV Kit

+Denotes lead(Pb)-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, C10, C11	0	Not installed, ceramic capacitors (1210)
C9	1	1uF ±10%, 16V X7R ceramic capacitor (0603) Murata GRM188R71C105K
D1	1	Red LED (0603) Panasonic LNJ214R8ARA
D2	1	200mA, 30V Schottky diode (SOT23) Diodes, Inc. BAT54C
FB1	1	220Ω at 100MHz, 200mA ferrite bead (0603) Murata BLM18AG221SN1D
FB2, FB3	0	Not installed, ferrite beads (0603)
J1–J4	4	Mini USB type-AB right-angle receptacles
J5, J6	2	3.5mm stereo headphone jacks
JU1–JU4	4	3-pin headers
R1	1	270Ω ±5% resistor (0603)
R2	0	Not installed, resistor (0603)
U1	1	DP3T USB, audio switch (12 WLP) Maxim MAX14532EEWC+ (Top Mark: AAU)
U2	1	3V LDO regulator (5 SC70) Maxim MAX8510EXK30+ (Top Mark: +ADT)
—	4	Shunts (JU1–JU4) Sullins STC02SYAN
—	1	PCB: MAX14532E EVALUATION KIT+

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Diodes, Inc.	805-446-4800	www.diodes.com
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
Panasonic Corp	800-344-2112	www.panasonic.com

Note: *Indicate that you are using the MAX14532E when contacting these component suppliers.*

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Quick Start

Required Equipment

- One 5V power supply
- One 3V power supply
- MAX14532E EV kit (one USB type-A female-to-mini USB type-B 5-pin male adapter)
- USB high-speed A-to-B cables, 6ft
- User-supplied Windows® 2000, Windows XP®, or Windows Vista® 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)

Procedure

The MAX14532E 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) Apply the 5V supply positive and negative terminals at the +5V and GND PCB pads, respectively.
3) Apply the 3V power-supply positive and negative terminals to the VIO and GND PCB pads, respectively.
4) Enable the 5V and 3V power-supply outputs.
5) Verify that red LED D1 is on.
6) Connect the USB type-A female-to-mini USB type-B 5-pin male adapter to port J1.
7) Connect the USB cable from the PC to the USB adapter connected at port J1.
8) Connect a USB 2.0 device to the EV kit port J2 connector.
9) Verify that the USB 2.0 device is detected by the PC (VBUS detection mode).

Table 1. Default Shunt Positions

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

Detailed Description of Hardware

The MAX14532E EV kit provides a proven layout for the MAX14532E and demonstrates the devices used in USB 2.0 Hi-Speed switching applications. The EV kit provides four mini type-AB USB port connectors (J1–J4) and two stereo audio input/output connectors (J5, J6). The EV kit requires multiple power supplies to power the MAX14532E VCC and to set the proper logic levels at the MAX14532E IC digital inputs. An additional MAX8510 (U2) LDO regulator is available to operate the MAX14532E VCC at 3V.

The MAX14532E EV kit routes multiplexed signals to/from the mini USB ports (J2, J3, and J4) to mini USB port J1. Audio signals can also be routed to/from audio connectors J5 and J6 by installing the included ceramic capacitors at the C7, C8, C10, and C11 PCB footprints. When connecting a USB peripheral device at ports J3 or J4, the respective DC-blocking capacitors should not be installed. When interfacing an audio jack at connector J5 or J6, a USB peripheral device should not be connected at ports J3 or J4, respectively.

Jumpers JU2 and JU3 are used as digital control for the MAX14532E CB0 and CB1 inputs. Jumper JU4 is used for VBUS detection, when connecting port J1 to a USB port, which automatically routes the signal to port J2 upon receiving a valid VBUS signal. All USB signal traces are 90Ω differential controlled-impedance traces.

Power Supplies

Jumper JU1 provides two options for powering the MAX14532E VCC input. VCC operates either from a user-supplied 2.7V to 5.5V power supply connected at the EXT_VCC and GND PCB pads or from the output of the 3V LDO regulator (MAX8510). The external power supply connected at EXT_VCC, in conjunction with ferrite beads FB1, FB2, and FB3, must be used when J2, J3, and J4 are peripheral sides, respectively. The MAX8510 can be powered by port J2, J3, or J4 when the ports are connected to an active USB port or when 5V is applied at the +5V and GND PCB pads. See Table 2 for proper jumper configuration.

The VIO and GND PCB pads are available to set the proper high and low logic levels at the MAX14532E IC CB0 and CB1 digital inputs. Apply an external power

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Table 2. VCC Power-Supply Configuration (JU1)

SHUNT POSITION	VCC SUPPLY	MAX14532E VCC SOURCE
1-2*	On-board supply	Device powered by on-board 3V linear regulator (MAX8510)
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. USB Signal Routing (JU2, JU3, JU4)

SHUNT POSITION			USB SIGNAL ROUTING
JU3	JU2	JU4	
2-3	1-2	Not installed	MAX14532E switch off
2-3	2-3	Not installed	J1 signal routed to J2
1-2	1-2	Not installed	J1 signal routed to J3 or J5
1-2*	1-2*	Not installed	J1 signal routed to J4 or J6

**Default position.*

Table 4. VBUS Detection (JU4)

SHUNT POSITION			VBUS DETECTION FUNCTION	USB SIGNAL ROUTING
JU3	JU2	JU4		
1-2*	X	Installed*	VBUS detection enabled	VBUS > V_{VBDET}: J1signal routed to J2 VBUS < V_{VBDET}: J1 signal routed to J4 or J6
X	X	Not installed	VBUS detection disabled	Dependent on jumpers JU2 and JU3 configuration (see Table 3)

**Default position.*

X = Don't care.

supply from the 1.8V to 5.5V voltage range at the VIO and GND PCB pads.

The +5V and GND PCB pads are available to supply mini USB type-AB ports J2, J3, and J4 with a 5V bus power when the connectors are not interfaced to a peripheral side of USB port.

USB Switch Control

The multiplexed signals from the mini type-AB USB port J1 are routed to/from mini type-AB USB ports J2, J3, and J4 or to/from audio connectors J5 and J6, depending on the state of the 3T switch CB0 and CB1 inputs.

Jumpers JU2 and JU3 are used to set the logic level at the MAX14532E CB0 and CB1 inputs, respectively. Jumper JU4 is used for either VBUS detection or setting CB0. See Table 3 for proper routing of the signals applied at connectors J1–J6.

Note: When connecting a USB peripheral device at ports J3 or J4, the respective DC-blocking capacitors should not be installed. When interfacing an audio jack at connector J5 or J6, a USB peripheral device should not be connected at ports J3 or J4, respectively.

VBUS Detection (JU4)

Jumper JU4 and port J1 are used for VBUS detection when interfacing connector J1 directly to a USB port. Install a shunt at jumper JU4 to enable the VBUS detection function. See Table 4 for proper jumper JU4 configuration for enabling the MAX14532E IC VBUS detection function, as well as JU2 and JU3 positions. Also, refer to the MAX14531E–MAX14534E IC data sheet for the specified VBUS detect threshold (V_{VBDET}) and additional information.

MAX14532E Evaluation Kit

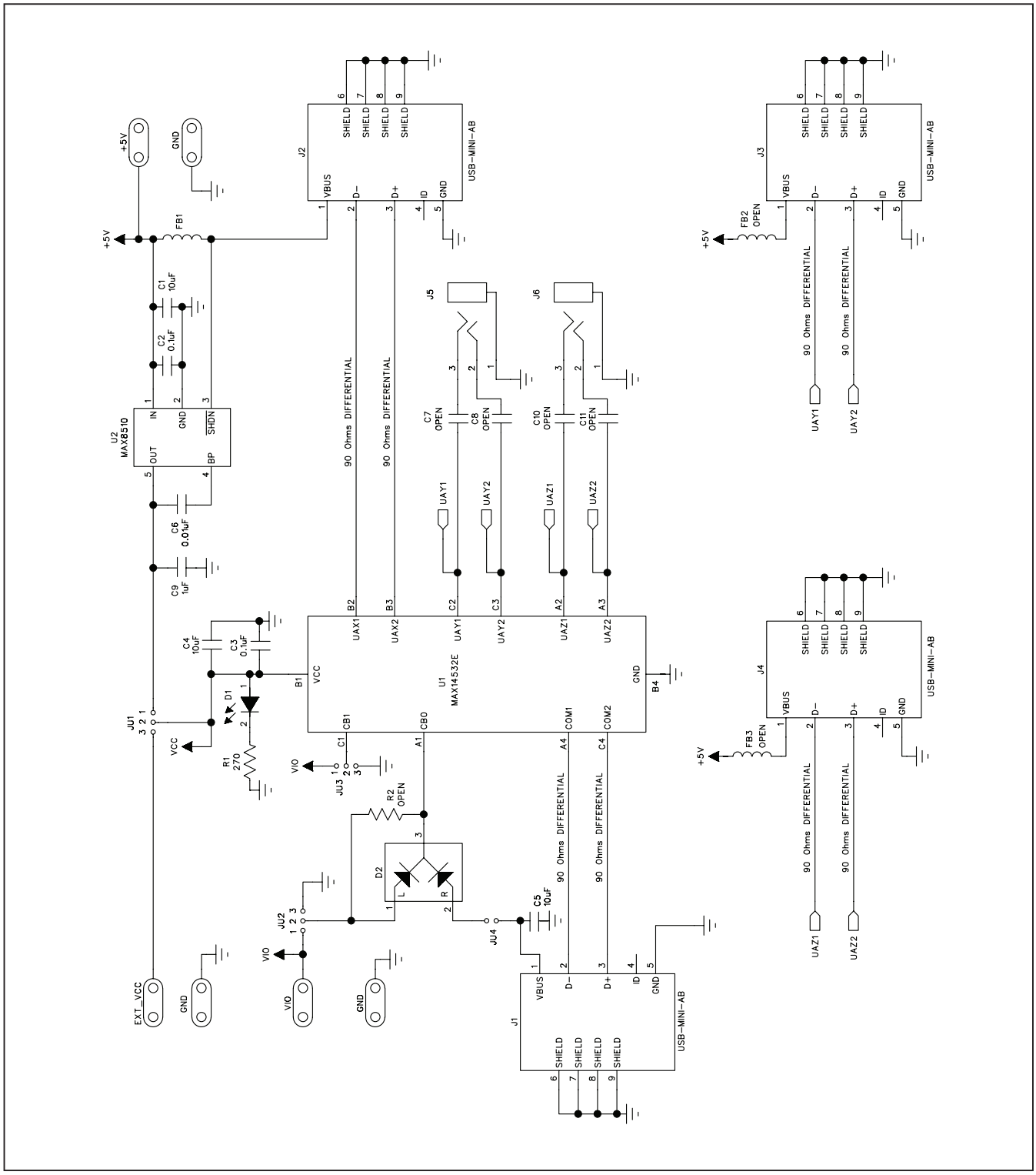

Figure 1. MAX14532E EV Kit Schematic

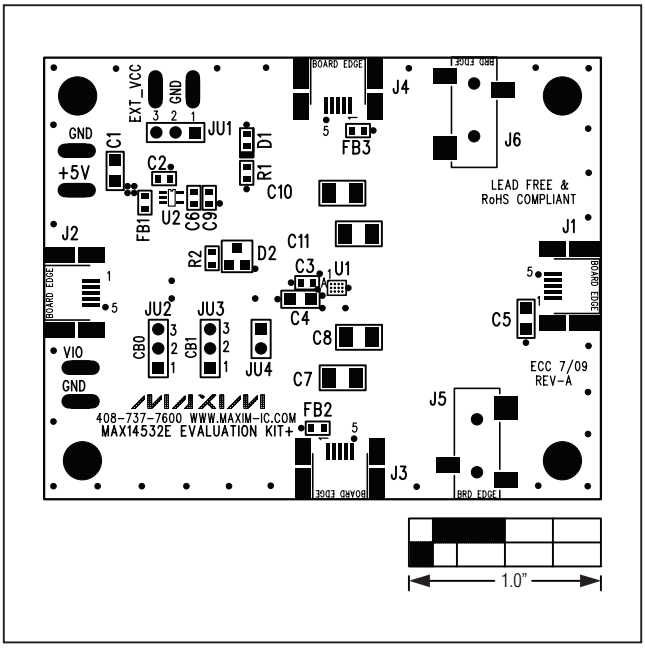

Figure 2. MAX14532E EV Kit Component Placement Guide—Component Side

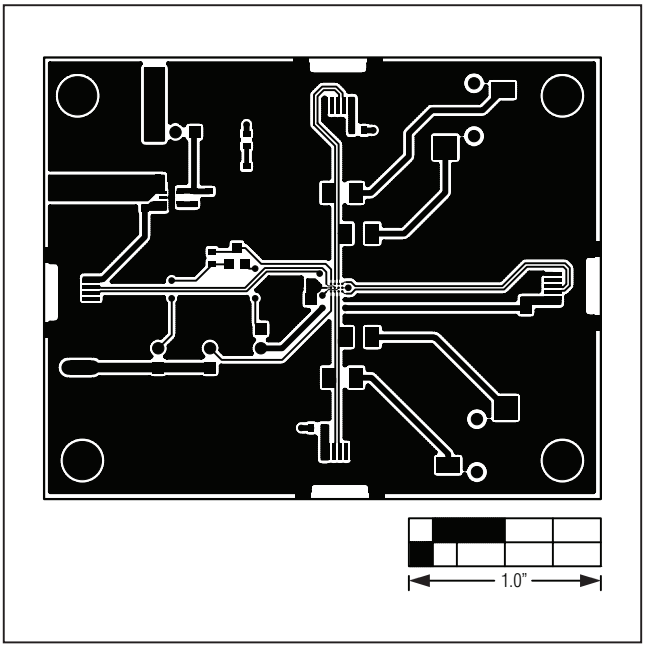

Figure 3. MAX14532E EV Kit PCB Layout—Component Side

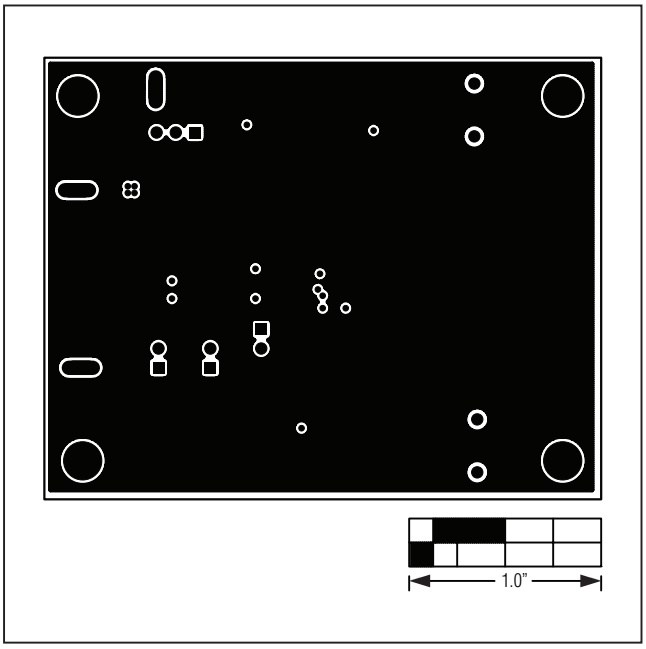

Figure 4. MAX14532E EV Kit PCB Layout—Inner Layer 2

MAX14532E Evaluation Kit

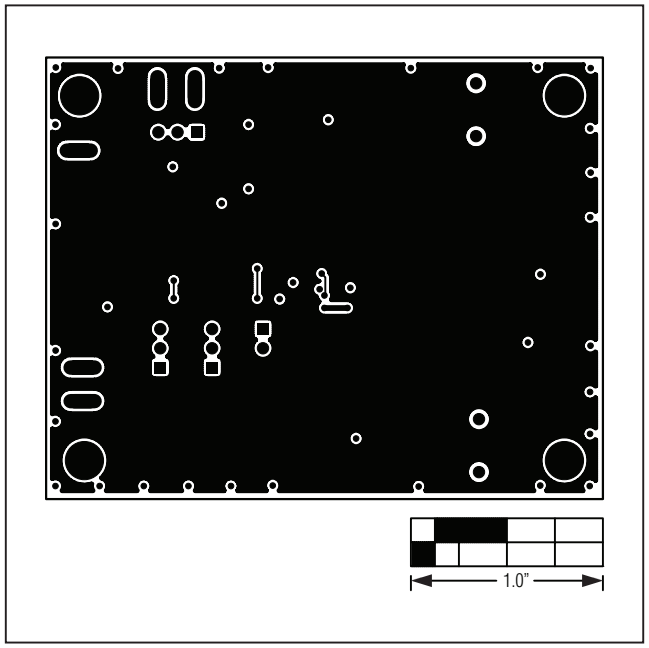

Figure 5. MAX14532E EV Kit PCB Layout—Inner Layer 3

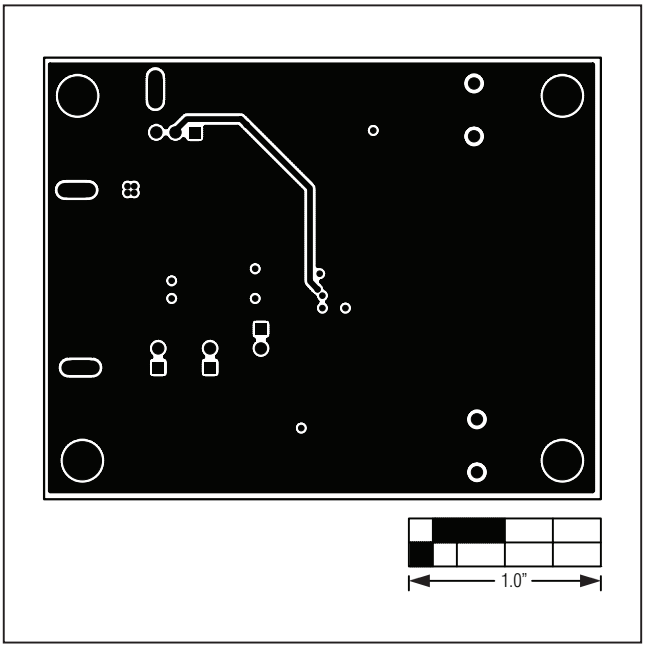

Figure 6. MAX14532E EV Kit PCB Layout—Solder Side