

MAX14585 Evaluation Kit

Evaluates: MAX14585/MAX14585A

General Description

The MAX14585 evaluation kit (EV kit) provides a proven design to evaluate the MAX14585 high-ESD-protected double-pole/double-throw (DPDT) switch. The EV kit is designed to demonstrate the MAX14585 used in USB 2.0 Hi-Speed-compliant switching applications. The EV kit circuit routes a multiplexed signal from one USB port to another USB port and routes an audio signal to a headphone jack.

The EV kit PCB comes with a MAX14585EVB+ installed and can also be used to evaluate the MAX14585A.

Features

- ◆ USB Powered (Cable Included) or External Power Supplies
- ◆ Complete USB 2.0 Hi-Speed (480Mbps) Switching Circuit
- ◆ Routes Data/Audio Signals
- ◆ RoHS Compliant
- ◆ Proven PCB Layout
- ◆ Fully Assembled and Tested

Ordering Information appears at end of data sheet.

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2, C9	3	0.1 μ F \pm 10%, 50V X5R ceramic capacitors (0603) Murata GRM188R71H104K
C3, C10	2	1 μ F \pm 10%, 35V X5R ceramic capacitors (0603) Taiyo Yuden GMK107BJ105K
C4	1	10 μ F \pm 10%, 35V X7R ceramic capacitor (1206) Taiyo Yuden GMK316BJ106K
C5	0	Not installed, ceramic capacitor (0805)
C6, C7	2	220 μ F \pm 10%, 6.3V low-ESR tantalum capacitors (Case D) KEMET B45197A1227K409
C8	1	2.2 μ F \pm 10%, 6.3V X5R ceramic capacitor (0603) TDK C1608X5R0J225K
D1	1	Red LED (0603)
FB1, FB2, FB3	3	Ferrite beads (0603) Murata BLM18AG221SN1D
GND	2	Black test points
J1	1	USB micro-B right-angle connector

DESIGNATION	QTY	DESCRIPTION
J2, J4	2	USB type-A right-angle connectors
J3	1	3.5mm audio jack connector
JU1, JU2, JU4, JU5, JU6	5	3-pin headers
JU3	1	4-pin header
R1	1	270 Ω \pm 5% resistor (0805)
R2, R3	0	Not installed, resistors (0603)
R4, R5	2	0 Ω \pm 5% resistors (0805)
TP1	1	Red test point
TP2	1	White test point
U1	1	DPDT negative-rail switch (10 UTQFN) Maxim MAX14585EVB+ (Top Mark: AAY)
U2	1	3.3V LDO regulator (8 SO-EP) Maxim MAX15006AASA+
—	1	USB type-A male cable to USB micro-B cable
—	6	Shunts (JU1–JU6)
—	1	PCB: MAX14585 EVALUATION KIT

MAX14585 Evaluation Kit

Evaluates: MAX14585/MAX14585A

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
Taiyo Yuden	800-348-2496	www.t-yuden.com
TDK Corp.	847-803-6100	www.component.tdk.com

Note: Indicate that you are using the MAX14585 when contacting these component suppliers.

Quick Start

Required Equipment

- MAX14585 EV kit (USB type-A-to-USB-micro-B cable and stereo 3.5mm male-to-male adapter are included)
- 5V, 100mA DC power supply
- User-supplied PC with a spare Hi-speed USB port
- Up to two USB 2.0 Hi-speed/full-speed peripheral devices (e.g., USB 2.0 flash drive)
- Stereo audio source (e.g., MP3 player)
- Pair of stereo headphones

Procedure

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

- 1) Verify that shunts are installed in their default positions, as shown in Table 1.
- 2) Connect the USB cable from the PC to the micro-B USB connector J1 on the EV kit.
- 3) Verify that LED D1 is on.
- 4) Connect a USB 2.0 device to the USB type-A connector (J2).
- 5) Verify that the USB 2.0 device is detected by the PC.
- 6) Place a shunt across pins 1-2 of jumper JU3.
- 7) Connect a USB 2.0 device to the USB type-A connector (J4).
- 8) Verify that the USB 2.0 device is detected by the PC.
- 9) The EV kit is now ready for further testing.

Table 1. Default Jumper Settings

JUMPER	SHUNT POSITION
JU1, JU2, JU5, JU6	1-2
JU3	1-3
JU4	2-3

Detailed Description of Hardware

The MAX14585 EV kit provides a proven layout for the MAX14585 and demonstrates devices used in USB 2.0 Hi-speed switching applications. The EV kit provides one micro-B (J1) and two type-A (J2, J4) USB connectors. The EV kit also provides one 3.5mm stereo audio input/output connector (J3). The EV kit requires an active USB port or an external 5V DC supply for operation.

The device features a VBUS detection (VB) input that can handle voltages up to 30V and automatically switches the USB signal path to port J2 upon detection of a valid VBUS voltage. When operating the EV kit with VCC voltages less than 2.7V, the VB input also serves as a secondary input power source used to power the device (VB > 4.5V).

The EV kit routes bidirectional signals from type-A USB connectors J2 and J4 to micro-B USB connector J1. The device's ANO_ channels feature a -1.8V negative signal capability and can be used to route audio signals from audio connector J3 to test points TP1, TP2, and GND. Capacitors C6 and C7 provide DC blocking of the audio signals applied at connector J3. The device features internal shunt resistors on the audio path to reduce clicks and pops heard at the output. See the *Interfacing Audio Signals* section for additional information. All data signal traces to USB ports J1, J2, and J4 are 90Ω differential controlled-impedance traces.

The EV kit can also be used to evaluate the MAX14585A, with IC replacement of U1.

Power Supplies

The EV kit derives its power from USB port J1 or an external voltage applied at the EXT_5V and GND PCB pads. The VBUS and EXT_5V power planes set the 5V USB port voltages for ports J2 and J4 and set the input-voltage source for the MAX15006A LDO regulator (U2).

Place a shunt across pins 1-2 on jumper JU1 to operate the EV kit using port J1 bus power. Install a shunt across pins 2-3 to operate the EV kit using an external 5V supply. See Table 2 for JU1 configuration.

MAX14585 Evaluation Kit

Evaluates: MAX14585/MAX14585A

VCC Power Supply

Jumper JU2 selects the power source for the device's VCC input using the on-board regulated 3.3V LDO (U2) or an external supply applied at the EXT_VCC and GND PCB pads. LED D1 illuminates when a valid voltage is applied at VCC. See Table 3 for jumper JU2 configuration.

The device's VB input can also be used as the main power source for the device when a voltage is not applied at the VCC input. Under this condition, LED D1 is off.

Ports J2 and J4 Input Power Configuration

Jumpers JU5 and JU6 select the bus power source for the J2 and J4 USB ports, respectively. The ports are powered from the VBUS or EXT_5V power planes. See Tables 4 and 5 for configuring ports J2 and J4 power source.

USB Switch Control (AOR, VB)

The multiplexed signals from the micro type-B USB port J1 are routed to/from type-A USB ports J2 and J4, depending on the state of the AOR and VB inputs. Audio signals can also be routed from the 3.5mm jack (J3) to test points TP1, TP2, and GND. Jumper JU3 is used for VBUS detection and for setting the logic level at the VB input. Jumper JU4 is used to set the logic level at the AOR input. See Table 6 for jumper configurations for routing of the signals applied at connectors J1, J2, and J3.

Resistors R4 and R5 should be removed when connecting a USB peripheral device at port J4 for routing data signals. For optimal data performance, remove test points TP1 and TP2.

Table 2. Input Power Configuration (JU1)

SHUNT POSITION	INPUT POWER SOURCE	EV KIT POWERED BY
1-2*	VBUS	USB port J1.
2-3	EXT_5V	User-supplied 5V power supply connected to the EXT_5V and GND PCB pads.

*Default position.

Table 3. VCC Input Selection (JU2)

SHUNT POSITION	VCC PIN	VCC POWERED BY
1-2*	Connected to U2 output	On-board 3.3V LDO regulator.
2-3	Connected to EXT_VCC	User-supplied 2.7V to 5.5V power supply connected to the EXT_VCC and GND PCB pads.
Not installed	Disconnected	Device powered by J2 bus voltage; shunt installed across pins 1-3 of jumper JU3 (see Table 6).

*Default position.

Table 4. Port J2 VBUS Power Source (JU5)

SHUNT POSITION	J2 VBUS PIN	PORT J2 POWERED BY
1-2*	Connected to port J1 power bus	Port J1.
2-3	Connected to EXT_5V	User-supplied 5V power supply connected to the EXT_5V and GND PCB pads.

*Default position.

Table 5. Port J4 VBUS Power Source (JU6)

SHUNT POSITION	J4 VBUS PIN	PORT J4 POWERED BY
1-2*	Connected to port J1 power bus	Port J1.
2-3	Connected to EXT_5V	User-supplied 5V power supply connected to the EXT_5V and GND PCB pads.

*Default position.

MAX14585 Evaluation Kit

Evaluates: MAX14585/MAX14585A

Table 6. USB and Audio Signal Routing (JU3, JU4)

SHUNT POSITION		USB AND AUDIO SIGNAL ROUTING
JU3 (VB)	JU4 (AOR)	
1-2	1-2	J4 data signal routed to J1 or J3 audio signal routed to test points TP1, TP2, and GND.
	2-3	J2 signal routed to J1.
1-3* See Table 3 (JU2)	1-2	J4 data signal routed to J1 or J3 audio signal routed to test points TP1, TP2, and GND.
	2-3*	J2 signal routed to J1.
1-4	X	J4 data signal routed to J1 or J3 audio signal routed to test points TP1, TP2, and GND.

*Default position.

X = Don't care.

Interfacing Audio Signals

The EV kit requires an external 5V supply applied at the EXT_5V and GND PCB pads when evaluating audio signals. When evaluating audio signals at connector J3, disconnect port J1 from the PC USB port and verify that a USB peripheral device is not connected at port J4.

Audio signals are routed from audio connector J3 to test points TP1, TP2, and GND. Apply the headphone left, right, and ground connections to the TP1, TP2, and GND test points, respectively. Insert an audio source at connector J3. Verify that the audio signal is present at the headphone.

VBUS Detection Operation (VB)

The device features a VBUS detection input (VB), which connects the signal at J4 or J3 to J1 or the test points, respectively, when VB exceeds the 3.3V threshold. The VB input can also be used as the power source for the device when VB > 4.5V and a valid voltage source is not present at the VCC input. The VB input is capable of handling voltages up to 28V for higher VBUS applications.

MAX14585 Evaluation Kit

Evaluates: MAX14585/MAX14585A

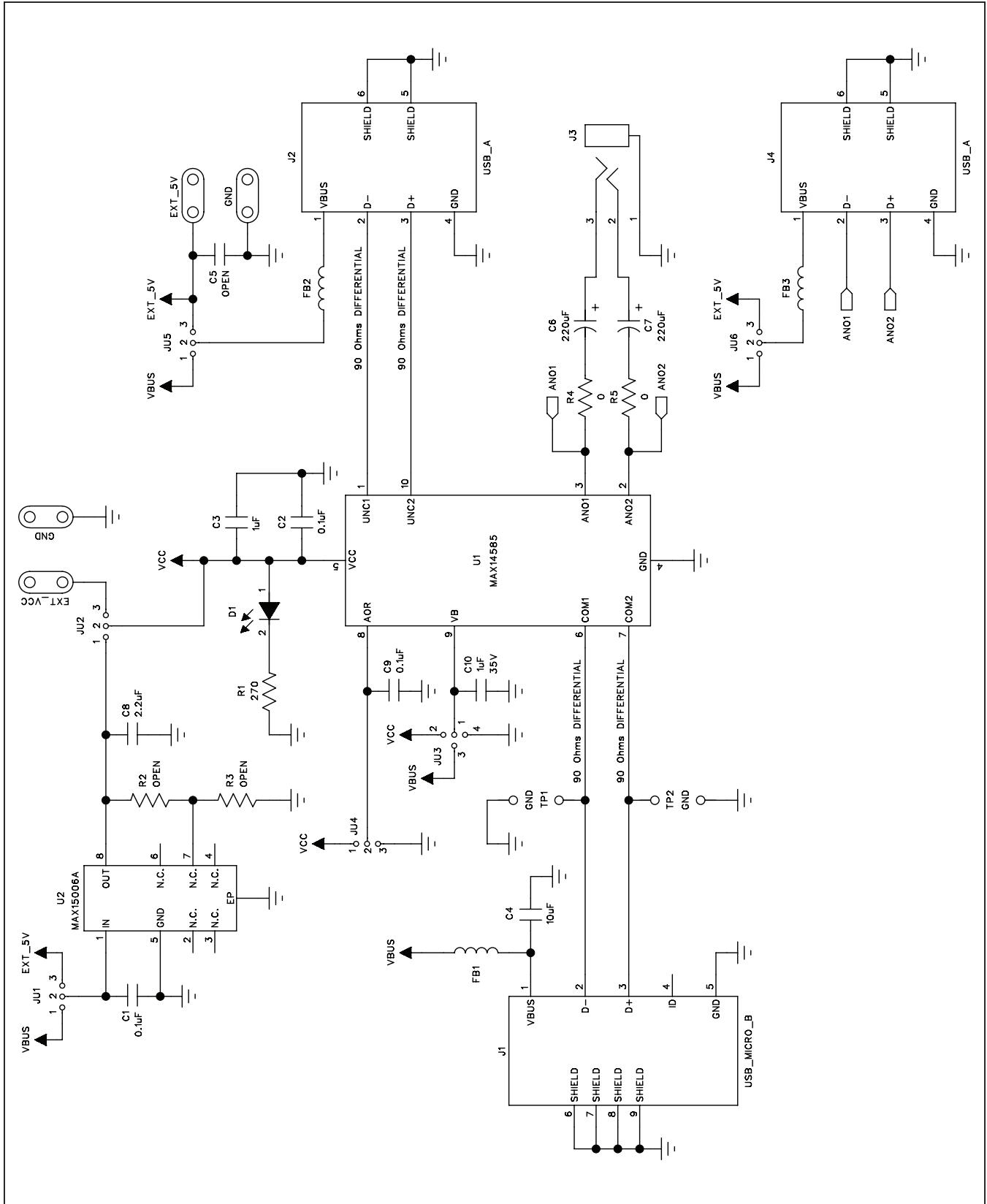


Figure 1. MAX14585 EV Kit Schematic

MAX14585 Evaluation Kit

Evaluates: MAX14585/MAX14585A

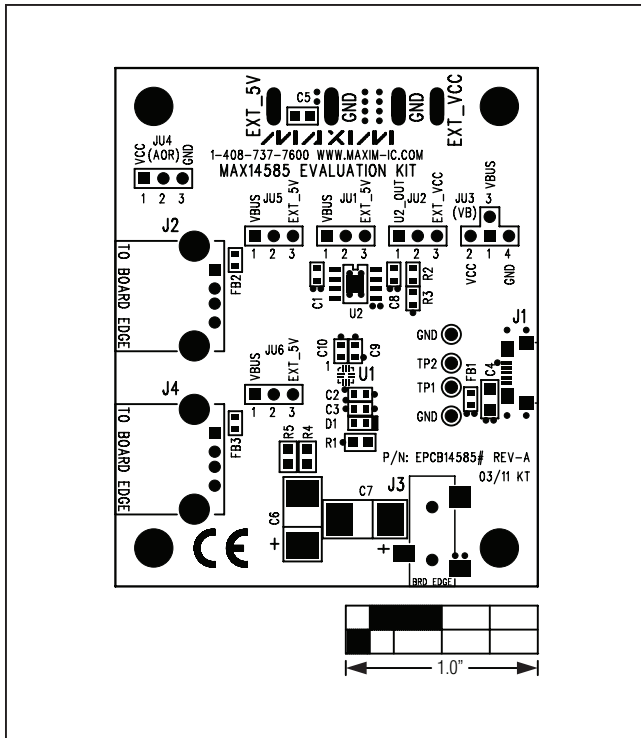


Figure 2. MAX14585 EV Kit Component Placement Guide—Component Side

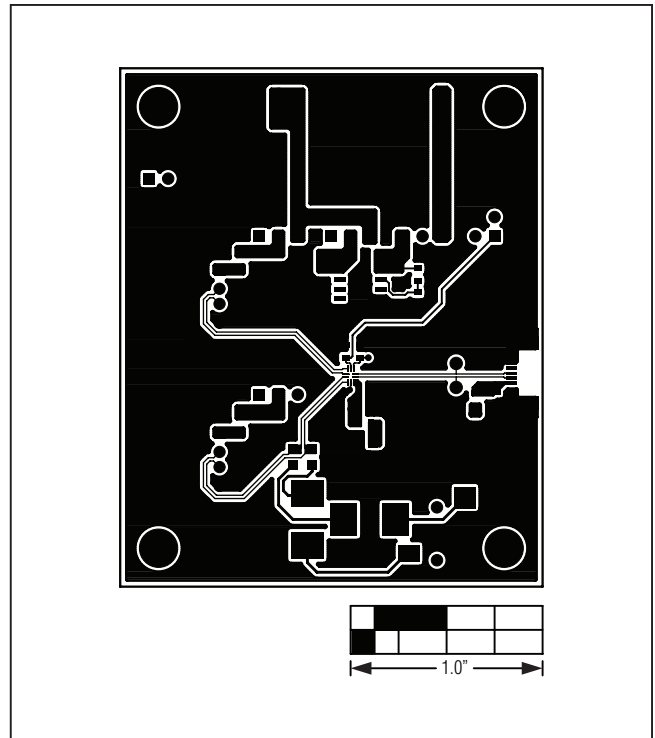


Figure 3. MAX14585 EV Kit PCB Layout—Component Side

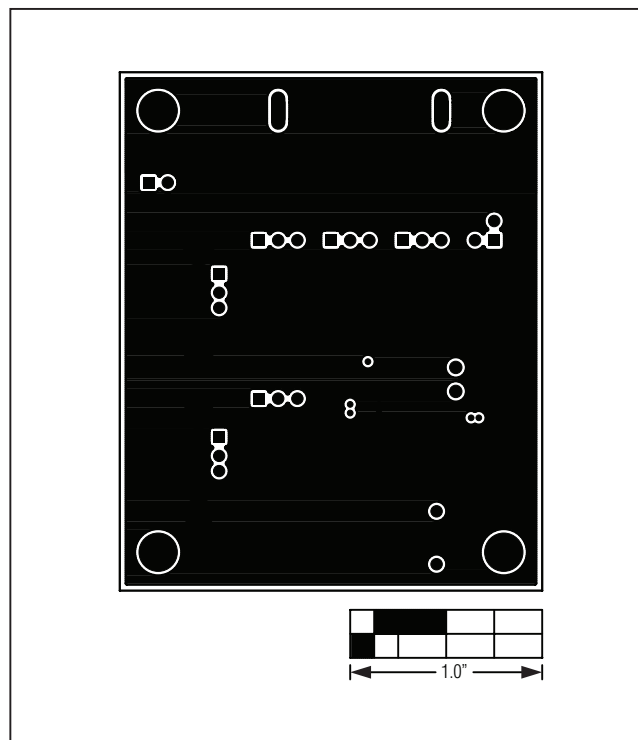


Figure 4. MAX14585 EV Kit PCB Layout—Inner Layer 2

MAX14585 Evaluation Kit

Evaluates: MAX14585/MAX14585A

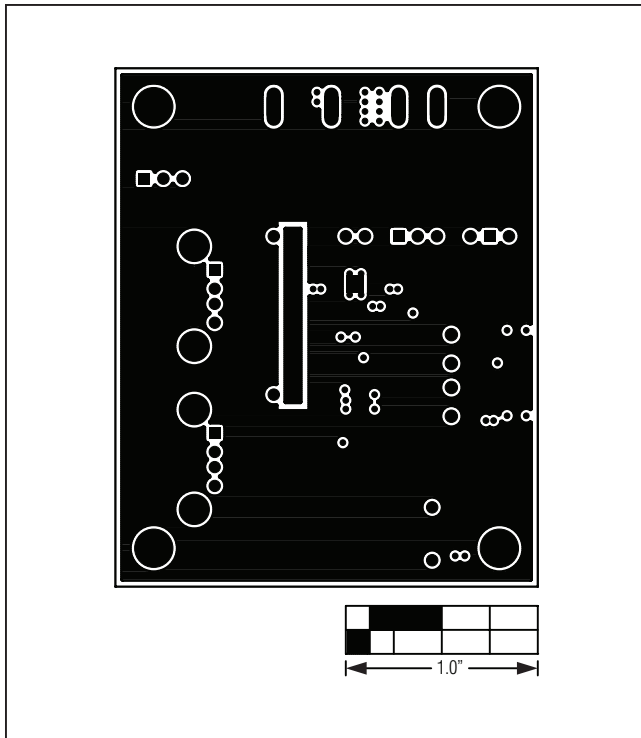


Figure 5. MAX14585 EV Kit PCB Layout—Inner Layer 3

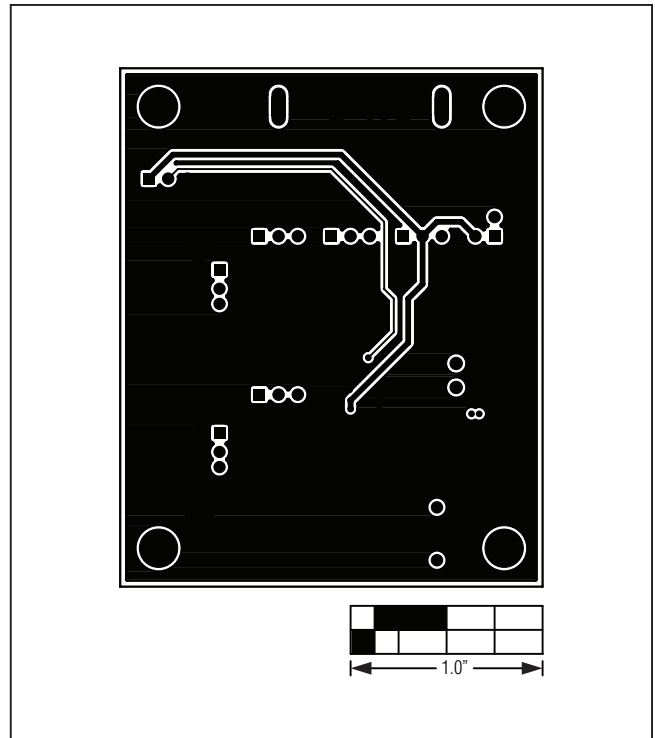


Figure 6. MAX14585 EV Kit PCB Layout—Solder Side

MAX14585 Evaluation Kit

Evaluates: MAX14585/MAX14585A

Ordering Information

PART	TYPE
MAX14585EVKIT#	EV Kit

#Denotes RoHS compliant.

MAX14585 Evaluation Kit

Evaluates: MAX14585/MAX14585A

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	6/11	Initial release	—

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