19-4304; Rev 0; 10/08

MAX7358 Evaluation Kit

Evaluates: MAX7356/MAX7357/MAX7358

General Description

The MAX7358 evaluation kit (EV kit) provides a proven design to evaluate the MAX7358 eight-channel I²C switch/multiplexer. The EV kit also includes Windows® 2000/XP- and Windows Vista®-compatible software that provides a simple graphical user interface (GUI) for exercising the features of the MAX7358.

The MAX7358 EV kit has a built-in USB interface, allowing a PC to access the internal registers of the MAX7358, as well as providing power for the EV kit.

The MAX7358 EV kit PCB comes with a MAX7358EUG+ installed. The EV kit can also be used to evaluate the MAX7356 and MAX7357 by replacing the MAX7358 (U1). Contact the factory for free samples of the pin-compatible MAX7356EUG+ or MAX7357EUG+ devices.

Features

- **Windows 2000/XP- and Windows Vista (32-Bit)-Compatible Software**
- **USB-PC Connection (Cable Included)**
- **USB Powered**
- **Lead-Free and RoHS Compliant**
- **Proven PCB Layout**
- **Fully Assembled and Tested**

Ordering Information

PART	TYPE
MAX7358EVKIT+	EV Kit

+Denotes lead-free and RoHS compliant.

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2, C4, C6, C8–C11, C15, C18, C19, C20	12	0.1µF ±10%, 16V X7R ceramic capacitors (0603) Murata GRM188R71C104K
C3, C5, C7, C21	4	10µF ±10%, 10V X5R ceramic capacitors (0805) Murata GRM21BR61A106K
C12	1	0.033µF ±10%, 25V X7R ceramic capacitor (0603) Murata GRM188R71E333K
C13, C14	2	22pF ±5%, 50V C0G ceramic capacitors (0603) Murata GRM1885C1H220J
C16, C17	2	10pF ±5%, 50V C0G ceramic capacitors (0603) Murata GRM1885C1H100J
D1, D2	2	Red LEDs (0603)
D3	1	Green LED (0603)
FB1, FB2	2	220Ω, 200mA ferrite beads (0603) Murata BLM18AG221SN1D
J1, J2	2	Single-row (1 x 12) 12-pin headers
J3	1	USB type-B female receptacle
JU1–JU16	16	4-pin headers
JU17, JU18, JU19	3	3-pin headers
JU20–JU24	5	2-pin headers
Q1	1	n-channel MOSFET (SOT23)
R1–R18, R28	19	4.7kΩ ±5% resistors (0603)
R19, R25	2	130Ω ±5% resistors (0603)
R20, R21	2	27Ω ±5% resistors (0603)
R22	1	1.5kΩ ±5% resistor (0603)
R23	1	2.2kΩ ±5% resistor (0603)
R24	1	10kΩ ±5% resistor (0603)
R26	1	100Ω ±5% resistor (0603)
R27	1	470Ω ±5% resistor (0603)
U1	1	1-to-8 I²C bus switch/multiplexer (24 TSSOP) Maxim MAX7358EUG+
U2–U9	8	Digital temperature sensors (8 SO) Maxim MAX6634MSA+
U10	1	LDO regulator (5 SC70) Maxim MAX8511EXK25+
U11	1	LDO regulator (5 SC70) Maxim MAX8511EXK33+
U12	1	Microcontroller (68 QFN-EP*) Maxim MAXQ2000-RAX+
U13	1	USB-to-UART converter (32 TQFP)
U14	1	93C46 type 3-wire EEPROM (8 SO)
Y1	1	6MHz crystal (HCM49) Hong Kong X'tals SSL6000000E18FAF
Y2	1	16MHz crystal (HCM49) Hong Kong X'tals SSM1600000E18FAF
—	24	Shunts
—	1	PCB: MAX7358 Evaluation Kit+

**EP = Exposed pad.*

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Component Suppliers

SUPPLIER	PHONE	WEBSITE
Hong Kong X'tals Ltd.	852-35112388	www.hongkongcrystal.com
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com

Note: *Indicate that you are using the MAX7358, MAX7357, or MAX7356 when contacting these component suppliers.*

MAX7358 EV Kit Files

FILE	DESCRIPTION
INSTALL.EXE	Installs the EV kit files on your computer
MAX7358.EXE	Application program
FTD2XX.INF	USB device driver file
UNINST.INI	Uninstalls the EV kit software
USB_Driver_Help.PDF	USB driver installation help file

Quick Start

Required Equipment

Before beginning, the following equipment is needed:

- MAX7358 EV kit (USB cable included)
- A user-supplied Windows 2000/XP- or Windows Vista-compatible PC with a spare USB port

Note: In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the EV kit software. Text in **bold and underlined** refers to items from the Windows operating system.

Procedure

1) Visit **www.maxim-ic.com/evkitsoftware** to download the latest version of the EV kit software, 7358Rxx.ZIP. Save the EV kit software to a temporary folder and uncompress the ZIP file.
2) Install the EV kit software on your computer by running the INSTALL.EXE program inside the temporary folder. The program files are copied and icons are created in the Windows **Start | Programs** menu.
3) Verify that all jumpers are in their default positions, as shown in Table 1.
4) Connect the USB cable from the PC to the EV kit board. A **Building Driver Database** window pops up in addition to a **New Hardware Found** message when installing the USB driver for the first time. If you do not see a window that is similar to the one described above after 30 seconds, remove the USB cable from the board and reconnect it. Administrator privileges are required to install the USB device driver on Windows.
5) Follow the directions of the **Add New Hardware Wizard** to install the USB device driver. Choose the **Search for the best driver for your device** option. Specify the location of the device driver to be **C:\Program Files\MAX7358** (default installation directory) using the **Browse** button. During device driver installation, Windows may show a warning message indicating that the device driver Maxim uses does not contain a digital signature. This is not an error condition and it is safe to proceed with installation. Refer to the USB_Driver_Help.PDF document included with the software for additional information.
6) Verify that the EV kit's LED D2 turns on red, indicating that the USB is communicating to the EV kit board.
7) Start the MAX7358 EV kit software by opening its icon in the **Start | Programs** menu. The EV kit software main window appears, as shown in Figure 1.
8) Switch to the **Lock-up Detection Demo** tab sheet. Press the **Start Demo** button. Observe that the EV kit D1 turns on red according to the demo procedure.

Detailed Description of Software

The software main window includes five tabs: **Registers 0x00 ~ 0x02**, **Registers 0x03 ~ 0x06**, **View Register Map**, **MUX Operation Demo**, and **Lock-up Detection Demo**. At the bottom of the window, there is an **I2C Address:** drop-down list, an **I2C Speed** group box, a **Change to Enhanced Mode** button, and a **POR Reset** button.

The **Registers 0x00 ~ 0x02** and **Registers 0x03 ~ 0x06** tab sheets allow users to write or read all of the registers in the MAX7358.

The **Registers 0x00 ~ 0x02** tab sheet contains switch control, configuration, and flush-out sequence registers. The **Registers 0x03 ~ 0x06** tab sheet contains lock-up indication, traffic prior to lock-up, and stuck-high fault registers.

Press the **Read All Registers** button on the **View Register Map** tab sheet to read all of the accessible registers in the MAX7358 at one time.

Press the **Read Ch_** button on the **MUX Operation Demo** tab sheet to read the temperature sensor connected to the corresponding MAX7358 I²C channel.

Press the **Start Demo** button on the **Lock-up Detection Demo** tab sheet to start a demonstration of lock-up conditions on switches 0–3. The demo procedure is listed on the software GUI.

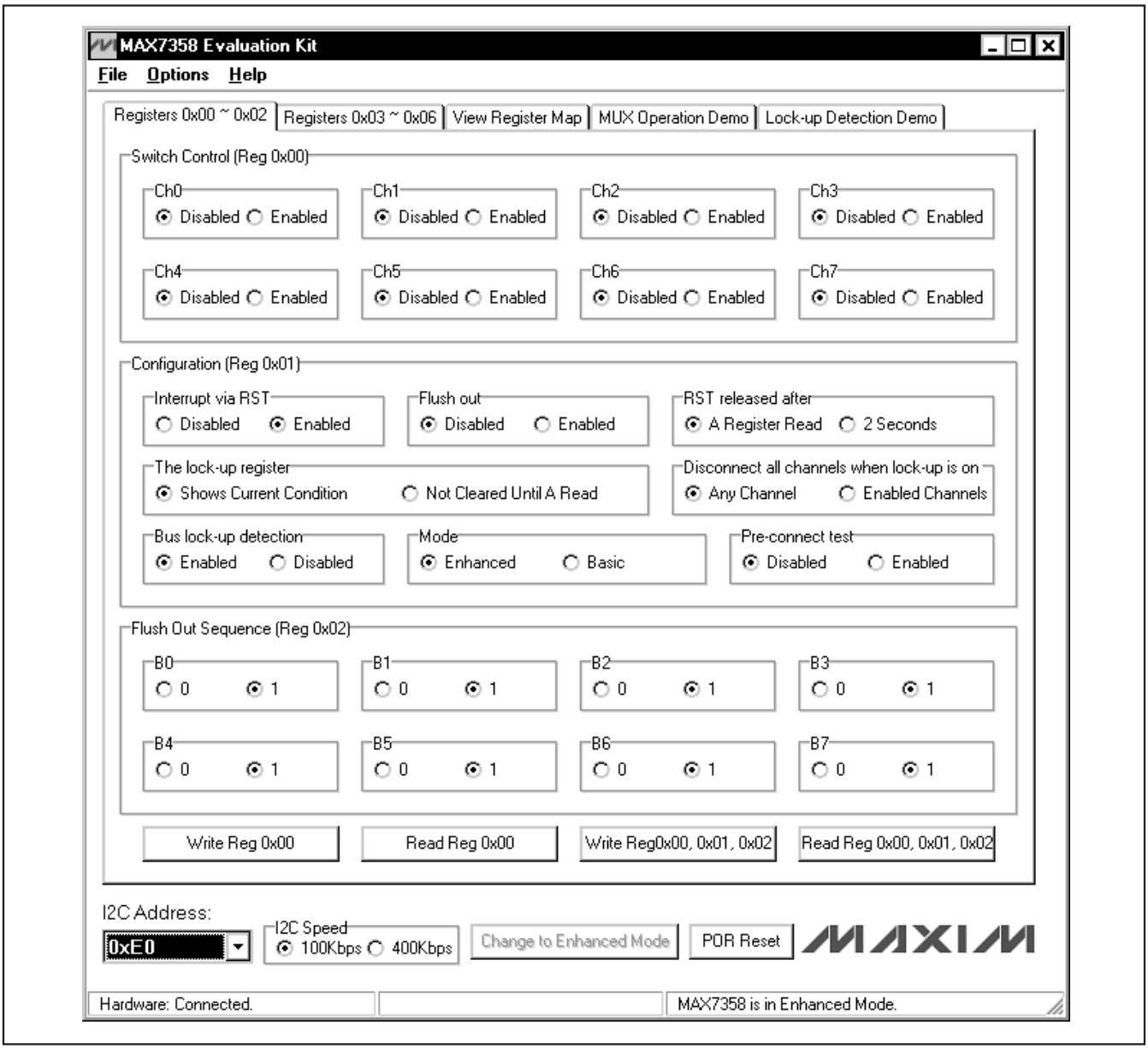

Figure 1. Software Main Window (Registers 0x00 ~ 0x02 Tab)

I2C Address Drop-Down List

Configure the MAX7358 slave address by selecting the appropriate address in the **I2C Address:** drop-down list.

POR Reset Button

Press the **POR Reset** button to re-establish the connection between the EV kit software and the MAX7358 EV kit hardware. The software GUI is reset to the POR state.

Software Menu Bar

There are three menu items on the menu bar: **File**, **Options**, and **Help**.

Select **File | Exit** to exit the application.

Select **Options | Interface (Advanced User)** to bring up the **Advanced User Interface** window, as shown in Figure 2. This interface allows I²C commands to be entered manually.

The **Help** menu item gives information about the MAX7358 EV kit software.

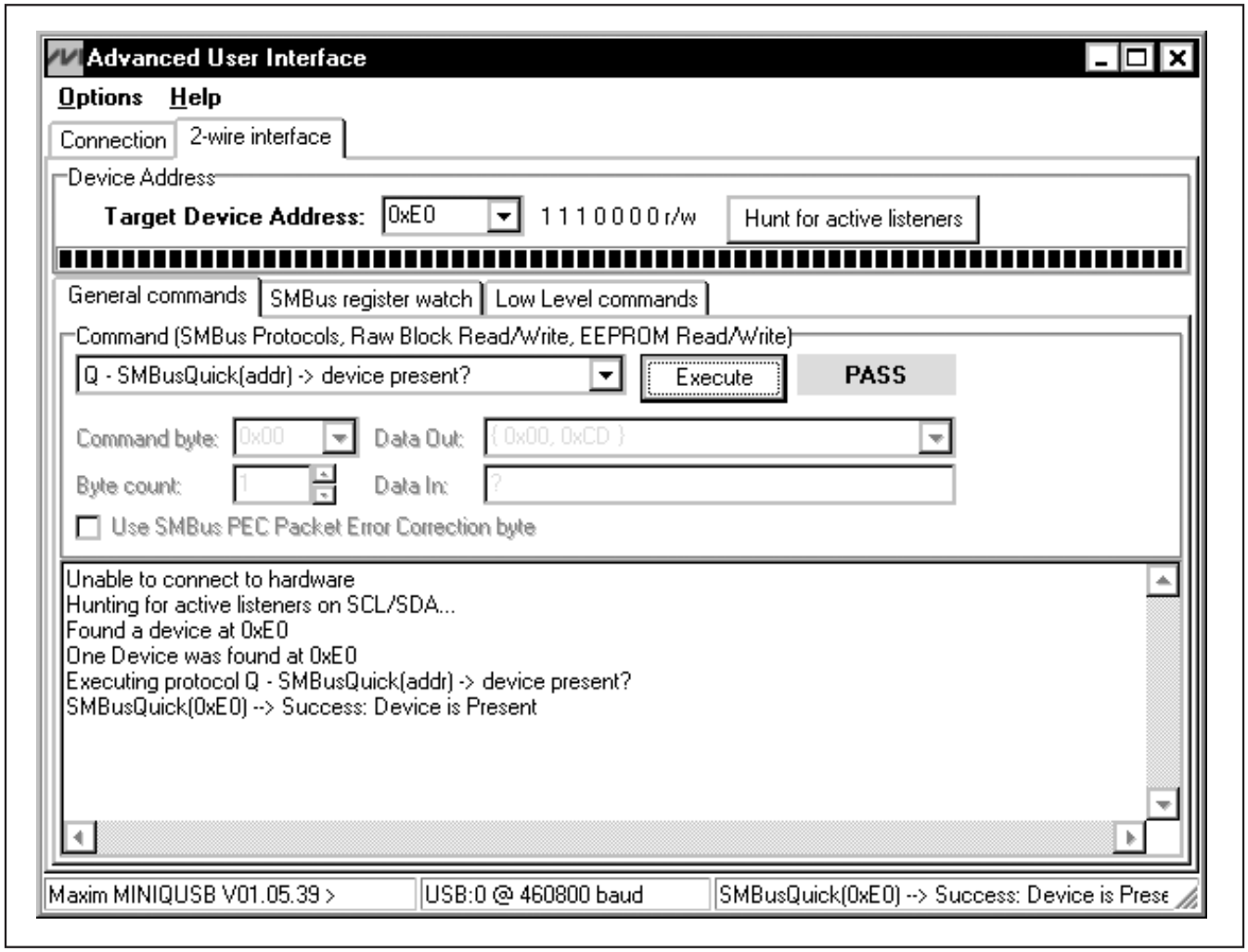

Figure 2. Advanced User Interface Window (2-Wire Interface Tab)

_Detailed Description of Hardware

The MAX7358 eight-channel I²C switch/multiplexer expands the main I²C bus to any combination of eight extended I²C buses. The MAX7358 EV kit board provides a proven layout for evaluating the device. The EV kit comes with a MAX7358EUG+ installed.

Power Supplies

By default, the MAX7358 VDD is powered by a MAX8511 3.3V LDO. VDD can also be supplied externally through corresponding on-board pads. The preinstalled shunt on jumper JU20 should be removed before connecting an external power supply.

Channel Connections

All channels SD0–SD7/SC0–SC7 are by default connected to I²C-compatible temperature sensors (MAX6634). They can also be connected to VDD to generate a stuck-high condition, or to GND to generate a lock-up condition.

SD0, SD1, SD3 and SC0, SC1, SC3 Connections

To simulate a lock-up condition, the MAX7358 SD0, SD1, SD3 and SC0, SC1, SC3 lines are connected to the GPIO pins on the on-board microcontroller. The microcontroller sets the individual GPIO pins to output low during the ch0-ch3 lock-up demo procedure. The microcontroller sets the GPIO pins to input (with a weak pullup resistor to VDD) during normal operation.

User-Supplied I²C Interface

To operate the MAX7358 EV kit with a user-supplied I²C interface, connect SDA, SCL, and GND lines from the user-supplied I²C interface to the SDA, SCL, and GND header pins on the MAX7358 EV kit. The shunts on JU22, JU23, and JU24 should be removed.

Table 1. MAX7358 EV Kit Jumper Descriptions (JU1–JU24)

JUMPER	SHUNT POSITION	DESCRIPTION
JU1–JU16	1-2	MAX7358 SC_ and SD_ connected to VDD
	1-3*	MAX7358 SC_ and SD_ connected to the on-board temp sensor I²C buses
	1-4	MAX7358 SC_ and SD_ connected to GND
JU17	1-2	MAX7358 A0 connected to VDD
	2-3*	MAX7358 A0 connected to GND
JU18	1-2	MAX7358 A1 connected to VDD
	2-3*	MAX7358 A1 connected to GND
JU19	1-2	MAX7358 A2 connected to VDD
	2-3*	MAX7358 A2 connected to GND
JU20	1-2*	MAX7358 VDD provided by the on-board 3.3V power supply
	Open	MAX7358 VDD applied externally through VDD pad
JU21	1-2*	Temp sensor VS provided by the on-board 3.3V power supply
	Open	Temp sensor VS applied externally through VS pad
JU22	1-2*	MAX7358 SDA connected to the on-board I²C master SDA line
	Open	MAX7358 SDA disconnected from the on-board I²C master SDA line
JU23	1-2*	MAX7358 SCL connected to the on-board I²C master SCL line
	Open	MAX7358 SCL disconnected from the on-board I²C master SCL line
JU24	1-2*	MAX7358 $\overline{RST}/\overline{INT}$ connected to the on-board microcontroller GPIO pin
	Open	MAX7358 $\overline{RST}/\overline{INT}$ disconnected from the on-board microcontroller GPIO pin

**Default position.*

MAX7358 Evaluation Kit

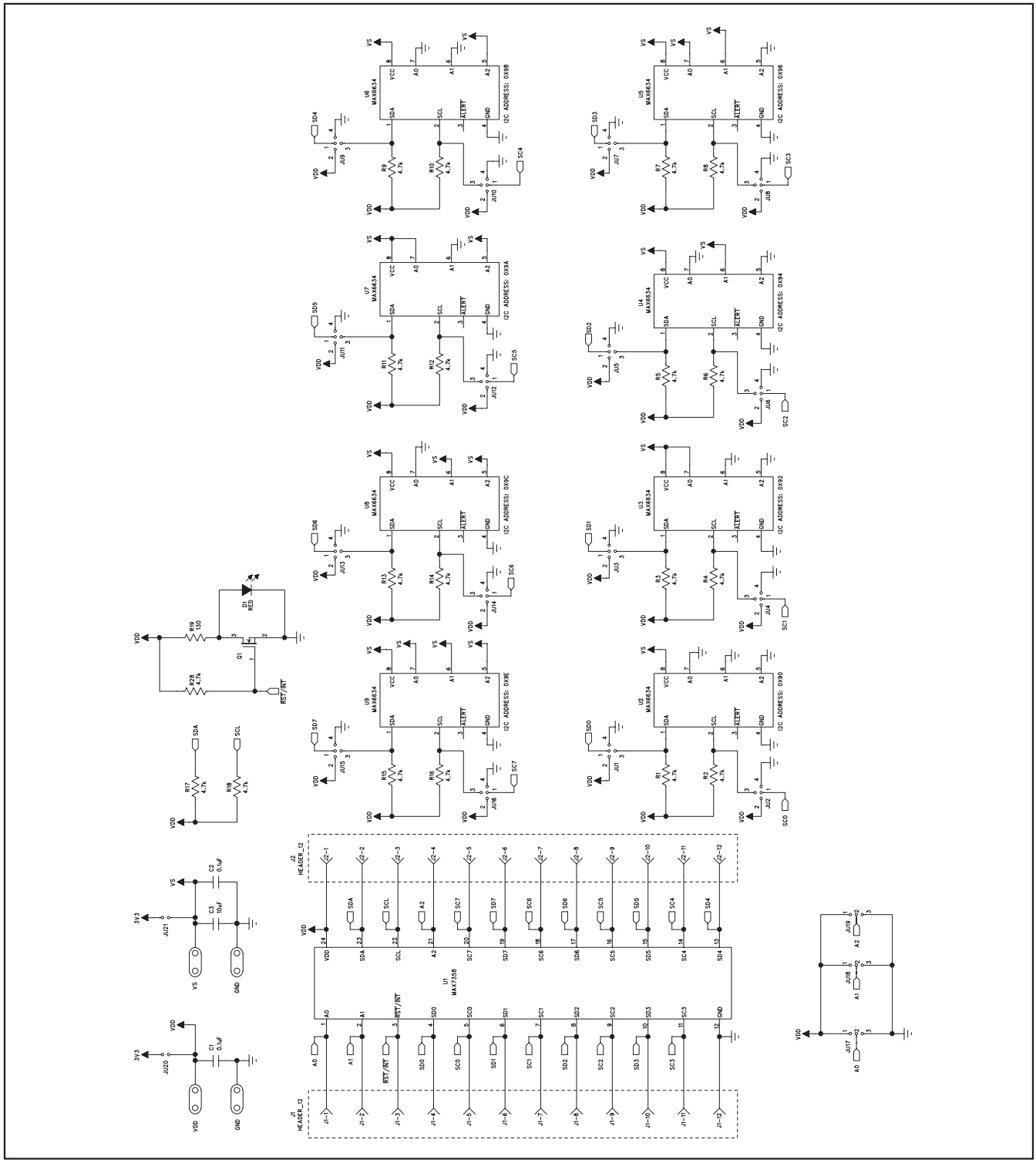

Figure 3a. MAX7358 EV Kit Schematic (Sheet 1 of 2)

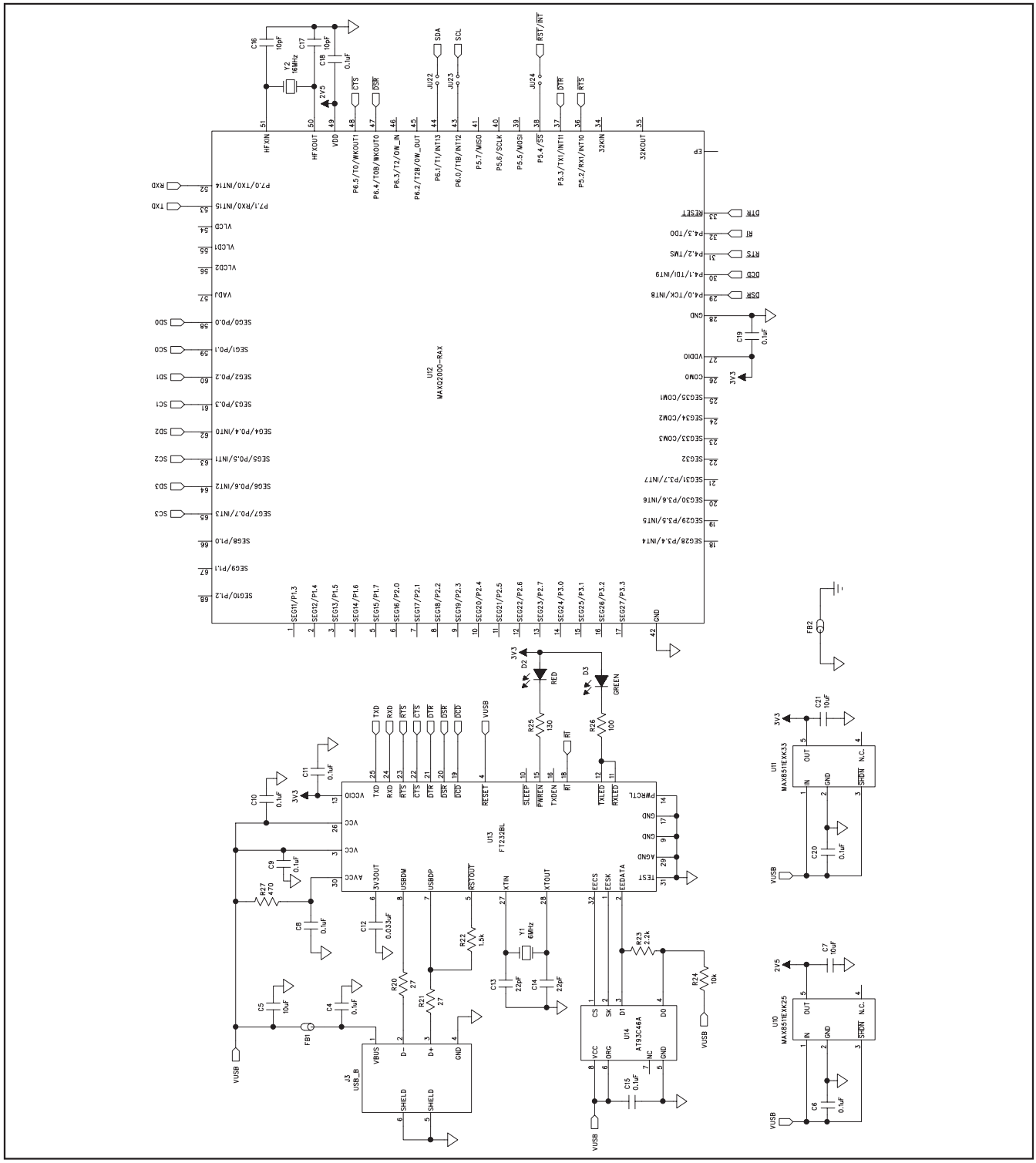

Figure 3b. MAX7358 EV Kit Schematic (Sheet 2 of 2)

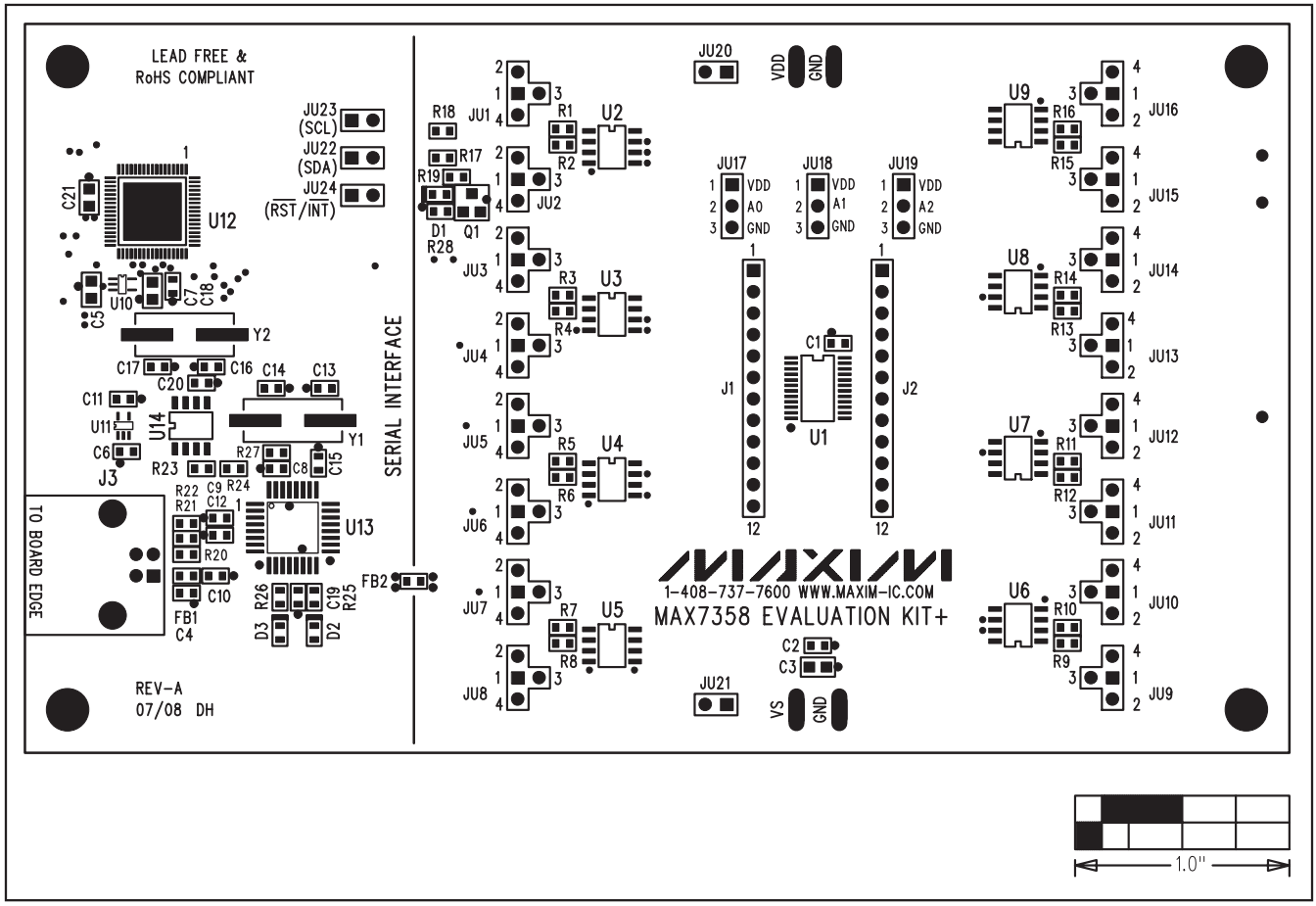

Figure 4. MAX7358 EV Kit Component Placement Guide—Component Side

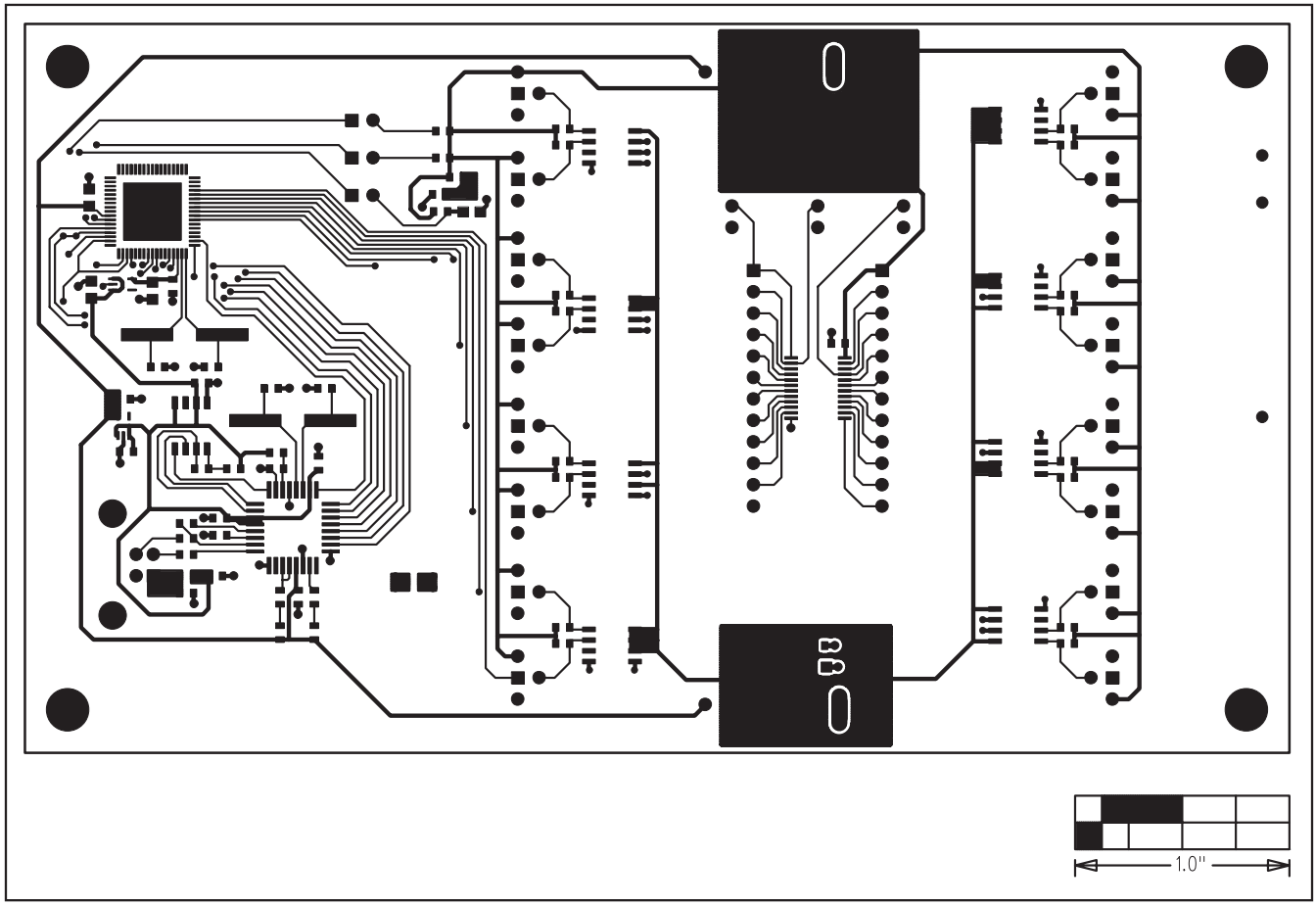

Figure 5. MAX7358 EV Kit PCB Layout—Component Side

MAX7358 Evaluation Kit

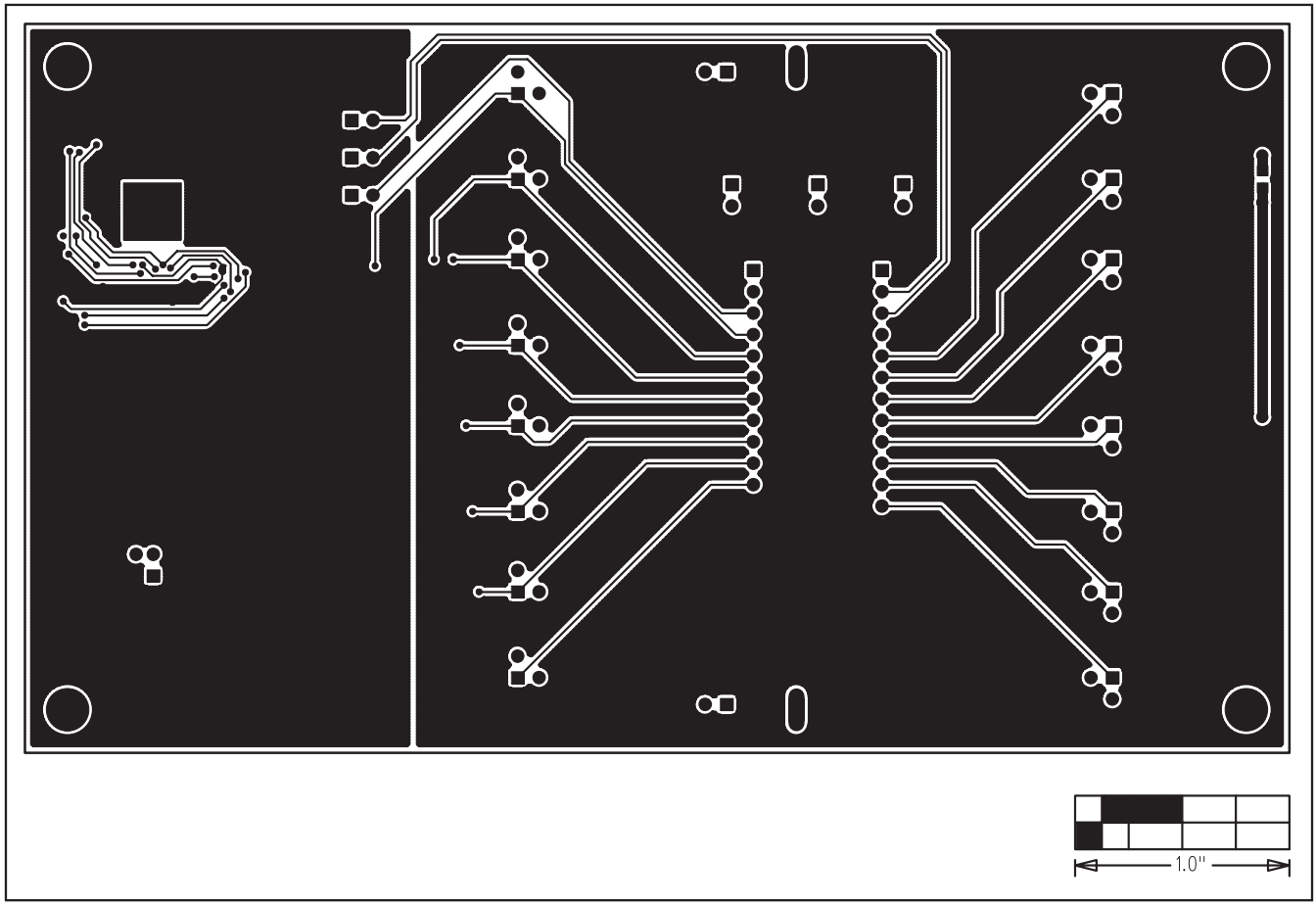

Figure 6. MAX7358 EV Kit PCB Layout—Solder Side

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