MAX13036 Evaluation Kit/ Evaluation System

Evaluate: MAX13036

General Description

The MAX13036 evaluation kit (EV kit) is a fully assembled and tested printed circuit board (PCB) that demonstrates the capabilities of the MAX13036 contact monitor. The MAX13036 EV kit also includes Windows® 98SE/2000/XP-compatible software that provides a simple graphical user interface (GUI) for exercising the features of the MAX13036.

The MAX13036 evaluation system (EV system) includes a MAX13036 EV kit and a Maxim CMAXQUSB serial-interface board.

The CMAXQUSB board connects to a PC's USB port and allows the transfer of SPI commands to the MAX13036 EV kit.

Features

- 7V to 27V Operating Voltage Range
- Proven PCB Layout
- Windows 98SE/2000/XP-Compatible Evaluation Software
- Fully Assembled and Tested
- EV System: USB-PC Connection

MAX13036 EV Kit Files

FILE	DESCRIPTION
INSTALL.EXE	Installs the EV kit files on your computer
MAX13036.EXE	Application program
FTD2XX.INF	USB device driver file
UNINST.INI	Uninstalls the EV kit software
TROUBLESHOOTING_USB.PDF	USB driver installation help file

Windows and Windows XP are registered trademarks and registered service marks of Microsoft Corporation.

Quick Start

Recommended Equipment

- One 12V DC power supply for VBAT
- MAX13036 EV system
  - MAX13036 EV kit
  - Maxim CMAXQUSB interface board (USB cable included)
- A user-supplied Windows 98SE/2000/XP 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 98SE/2000/XP operating system.

Procedure

The MAX13036 EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on the power supply until all connections are completed.**

1) Visit www.maximintegrated.com/evkitsoftware to download the latest version of the EV kit software, 13036Rxx.ZIP.
2) Install the MAX13036 evaluation software on your computer by running the INSTALL.EXE program. The program files are copied and icons are created in the Windows **Start** menu.
3) On the CMAXQUSB command module, ensure that the shunt of JU1 is in the 5V position.

Ordering Information

PART	TYPE	INTERFACE
MAX13036EVKIT+	EV kit	User-supplied SPI interface
MAX13036EVCMAXQU+	EV system	CMAXQUSB interface board

+Denotes a lead(Pb)-free/RoHS-compliant EV kit.

***Note:** The MAX13036 EV kit software is designed for use with the complete EV system. The EV system includes both the Maxim CMAXQUSB board and the EV kit. If the Windows software will not be used, the EV kit board can be purchased without the Maxim CMAXQUSB board.*

19-0925; Rev 1; 5/15

maxim integrated™

4) For the MAX13036 EV kit, make sure the shunts of all jumpers are in the following default positions:
   JU1: (Open)
   JU2: (1-2)
5) Carefully connect the boards by aligning the MAX13036 EV kit's 40-pin connector with the 40-pin connector of the CMAXQUSB board. Gently press them together. The two boards should be flush against each other.
6) Connect and turn on the 12V DC power supply.
7) Switch S9 to **Power On** position.
8) Connect the USB cable from the PC to the CMAXQUSB board. If the CMAXQUSB board has not been previously installed, a **Building Driver Database** window pops up in addition to a **New Hardware Found** message. If you do not see a window that is similar to the one described above after 30 seconds, remove the USB cable from the CMAXQUSB and reconnect it. Administrator privileges are required to install the USB device driver on Windows 2000 and XP. Refer to the TROUBLESHOOTING_USB.PDF document included with the software if you have any problems during this step.
9) 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\MAX13036** (default installation directory) using the **Browse** button.
10) Start the MAX13036 EV kit software by opening its icon in the **Start** menu. The GUI main window appears, as shown in Figure 1.
11) Change the position of switches S1–S8 on the EV kit board and observe the **Switch Status** change on the software GUI window.

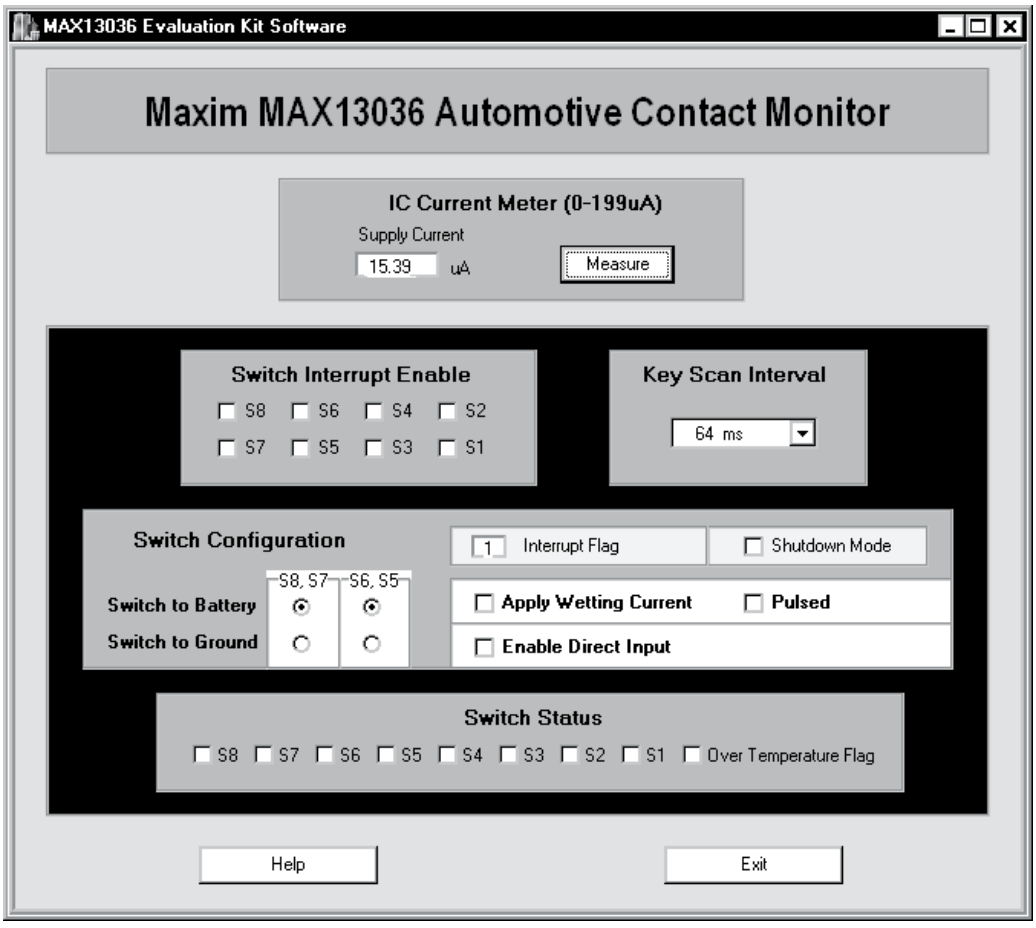


Figure 1. MAX13036 Evaluation Software Main Window

Detailed Description of Software

To start the MAX13036 EV kit software, double-click the MAX13036 EV kit icon that is created during installation. The GUI main window appears, as shown in Figure 1.

There are five panels on the MAX13036 EV kit GUI software: **IC Current Meter (0-199µA), Switch Interrupt Enable, Key Scan Interval, Switch Configuration,** and **Switch Status**.

There are three buttons on the EV kit GUI software: **Reconnect**, **Help**, and **Exit**. However, the **Reconnect** button only appears in **Demo Mode**.

IC Current Meter Panel

By pressing the **Measure** button on the **IC Current Meter (0-199µA)** panel shown in Figure 1, the operating current of the MAX13036 will be displayed. The measuring range of this meter is from 0 to 199µA. The **Measure** button will be grayed out (disabled) if the **Apply Wetting Current** checkbox on the **Switch Configuration** panel has been checked.

Switch Interrupt Enable Panel

The **Switch Interrupt Enable** panel contains eight checkboxes (**S1–S8**) that individually control the interrupt enable bit of each switch.

Key Scan Interval Panel

The pulldown menu on the **Key Scan Interval** panel is used to program the scanning-time period. Please refer to the MAX13036 IC data sheet for a detailed description.

Switch Configuration Panel

The **Switch Configuration** panel contains the **Shutdown Mode** checkbox, **Apply Wetting Current**, **Pulsed**, and **Enable Direct Input** checkboxes. It also contains radio buttons that control the polarity of **S8, S7** and **S6, S5**.

The **Interrupt Flag** shows the current status of the MAX13036 $\overline{INT}$ pin. The **Shutdown Mode** checkbox controls the MAX13036 $\overline{SD}$ pin. **Apply Wetting Current**, **Pulsed**, and **Enable Direct Input** checkboxes individually control the internal corresponding control bit.

Reconnect, Help, and Exit Buttons

Press the **Reconnect** button to reestablish the connection between the EV kit GUI software and MAX13036 EV kit hardware. **Note:** This button only appears in **Demo Mode**.

Press the Help button to show the MAX13036 EV kit software version and Maxim's website information.

Press the Exit button to quit the MAX13036 EV kit GUI software.

Detailed Description of Hardware

The MAX13036 is an contact monitor. The MAX13036 EV kit board provides a proven layout for evaluating the MAX13036. The EV kit comes with a MAX13036ATI+ installed.

Hysteresis Jumper (JU1)

The MAX13036 hysteresis function is controlled by jumper JU1, as shown in Table 1. Refer to the IC data sheet for a detailed description.

Power Supplies

The MAX13036 EV kit can be powered from two 9V batteries connected to battery connectors BAT1 and BAT2, or from a user-supplied 7V to 27V power supply connected to VBAT. There is an optional power-on indicator LED (D3) on the EV kit board. Jumper JU2, as shown in Table 2, determines whether this indicator is enabled or disabled

Toggle Switches

S1–S4 are two-position switches. S5–S8 are three-position switches, with the OFF position in the center.

Table 1. Hysteresis Jumper Configuration (JU1)

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	1-2	Hysteresis set by resistor R2
	Open*	Hysteresis fixed at 0.16V x V_{BATREF}

**Default position.*

Table 2. Power-On Indicator D3 Configuration (JU2)

JUMPER	SHUNT POSITION	DESCRIPTION
JU2	1-2*	D3 enabled
	Open	D3 disabled

**Default position.*

Component Lists

MAX13036EV System

PART	QTY	DESCRIPTION
MAX13036EVKIT+	1	MAX13036 EV kit
CMAXQUSB+	1	Serial-interface board

MAX13036EV Kit

DESIGNATION	QTY	DESCRIPTION
BAT1, BAT2	2	Vertical 9V snap-on connectors
C1–C6	6	0.01µF ±10%, 50V X7R ceramic capacitors (0603) TDK C1608X7R1H103K
C7	1	1000pF ±10%, 50V C0G ceramic capacitor (0603) TDK C1608C0G1H102K
C8, C9, C10, C20	4	0.1µF ±10%, 50V X7R ceramic capacitors (0603) TDK C1608X7R1H104K
C11–C15	5	1µF ±10%, 16V X7R ceramic capacitors (0603) TDK C1608X7R1C105K
C16	1	2.2µF ±10%, 16V X7R ceramic capacitor (0805) TDK C2012X7R1C225K
C17, C18	2	47µF ±20%, 50V electrolytic capacitors (D8) Panasonic EEE-FK1H470XP
C19	0	Not installed, capacitor (0603)
C21–C28	0	Not installed, capacitors (0603)
D1, D2	2	100V, 200mA diode (SOD-123) Central CMHD4448
D3	1	Green LED (0603)
F1, F2	2	60V, 0.14A Raychem polyswitches
J1	1	2 x 20 right-angle socket
J2	0	Not installed, 5-pin header
J3	0	Not installed, 6-pin header
JU1, JU2	2	2-pin single-row headers
JU3	1	Not installed
N1	1	N-channel MOSFET (SOT-23) Fairchild FDN359AN_NL
R1	1	1kΩ ±1% resistor (through hole), lead free
R2	1	91kΩ ±5% resistor (0603), lead free
R3	1	200kΩ ±5% resistor (0603), lead free
R4	1	953Ω ±1% resistor (0603), lead free
R5	1	1kΩ ±1% resistor (0603), lead free
R6	1	24kΩ ±1% resistor (0603), lead free
R7	1	100kΩ ±1% resistor (0603), lead free
R8, R9	2	1MΩ ±1% resistors (0603), lead free
R10	1	2kΩ ±5% resistor (0603), lead free
S1–S4, S9	5	SPDT toggle switches (ON-None-ON)
S5–S8	4	SPDT toggle switches (ON-OFF-ON)
U1	1	MAX13036ATI+ (28-pin TQFN-EP, 5mm x 5mm x 0.8mm)
U2	1	MAX4238ASA+ (8-pin SO)
U3	1	MAX6143AASA50+ (8-pin SO)
U4	1	MAX1162AEUB+ (10-pin µMAX®)
U5	1	MAX5084ATT+ (6-pin TDFN)
U6	1	Dual 2-input AND gate
—	1	PCB: MAX13036 EVALUATION KIT+

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Central Semiconductor	631-435-1110	www.centralsemi.com
Panasonic Corp.	800-344-2112	www.panasonic.com
TDK Corp.	847-803-6100	www.component.tdk.com

Note: *Indicate that you are using the MAX13036 when contacting these component suppliers.*

µMAX is a registered trademark of Maxim Integrated Products, Inc.

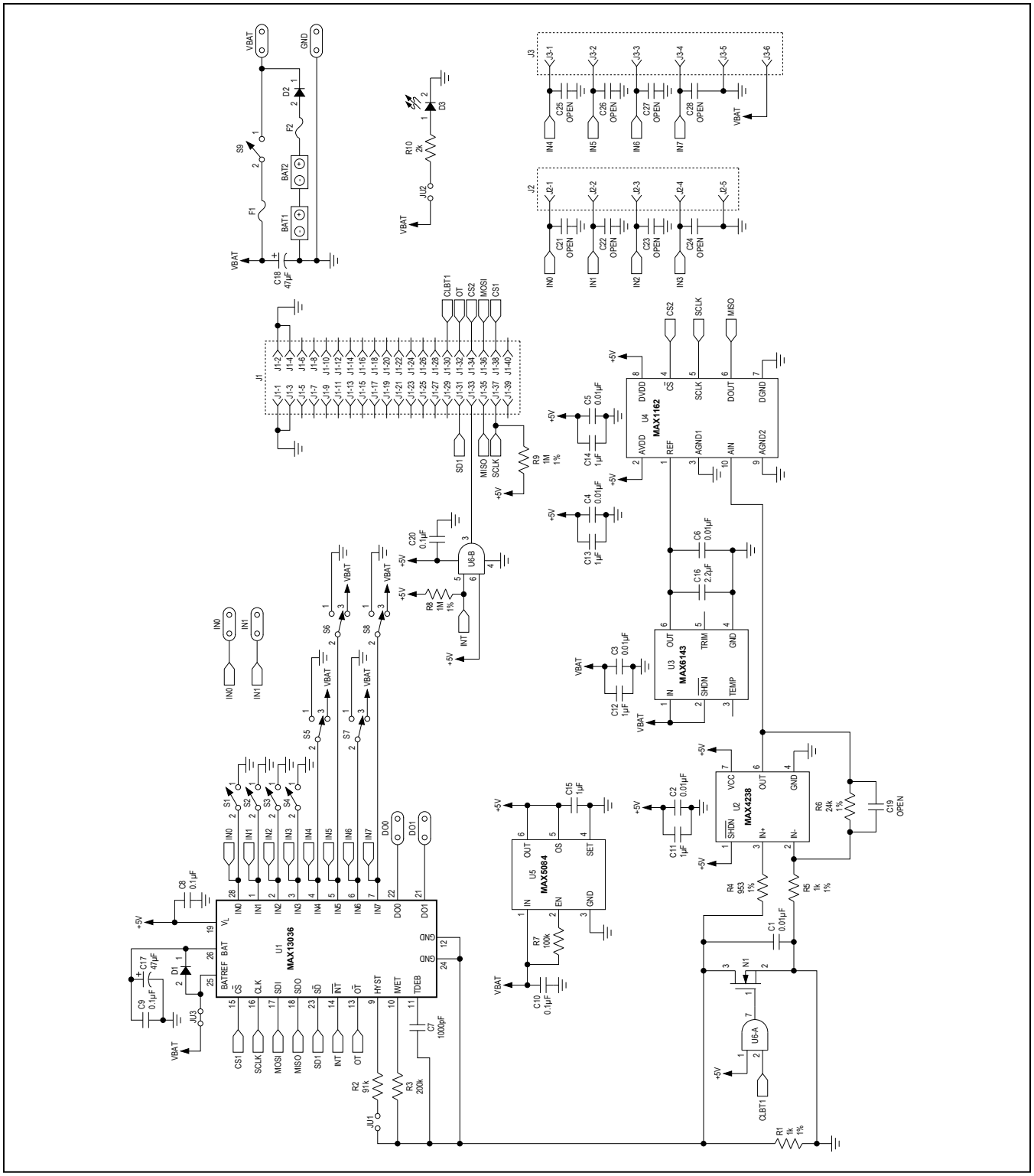


Figure 2. MAX13036 EV Kit Schematic

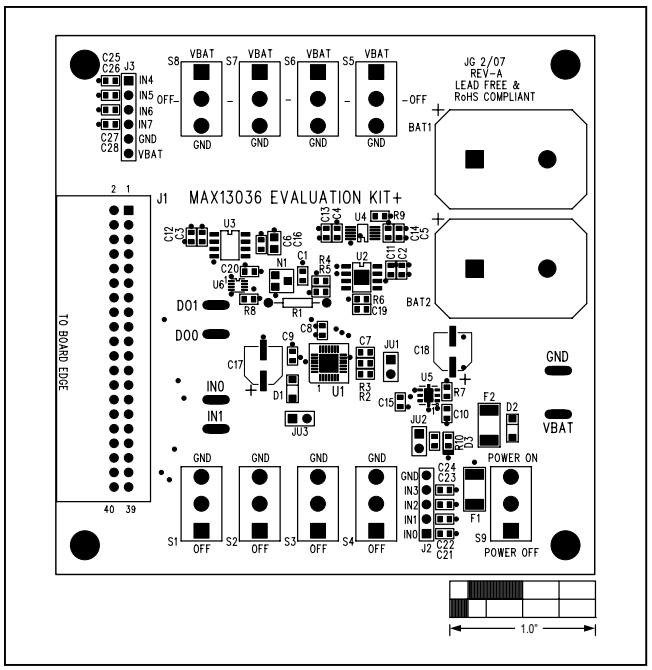


Figure 3. MAX13036 EV Kit Component Placement Guide—Component Side

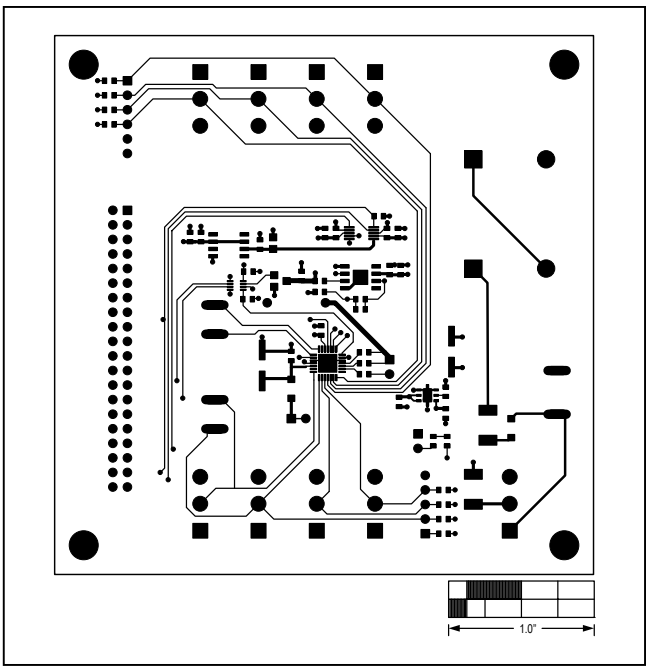


Figure 4. MAX13036 EV Kit PCB Layout—Component Side

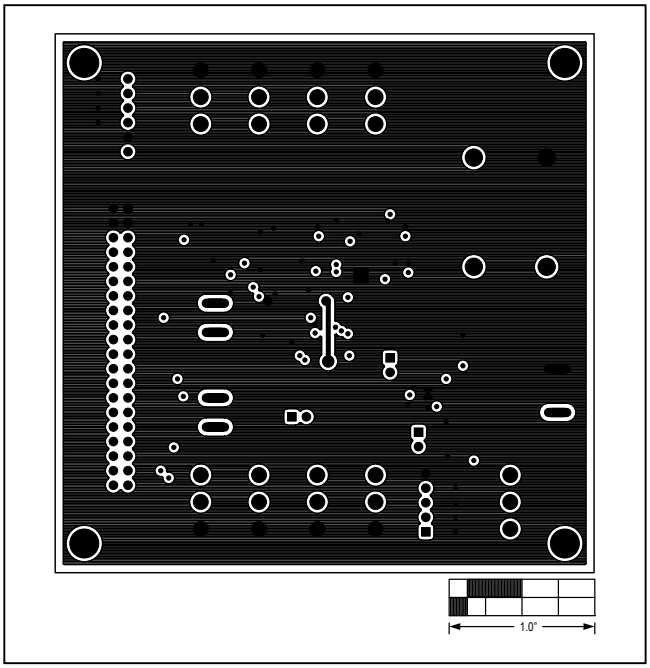


Figure 5. MAX13036 EV Kit PCB Layout—Layer 2 (GND)

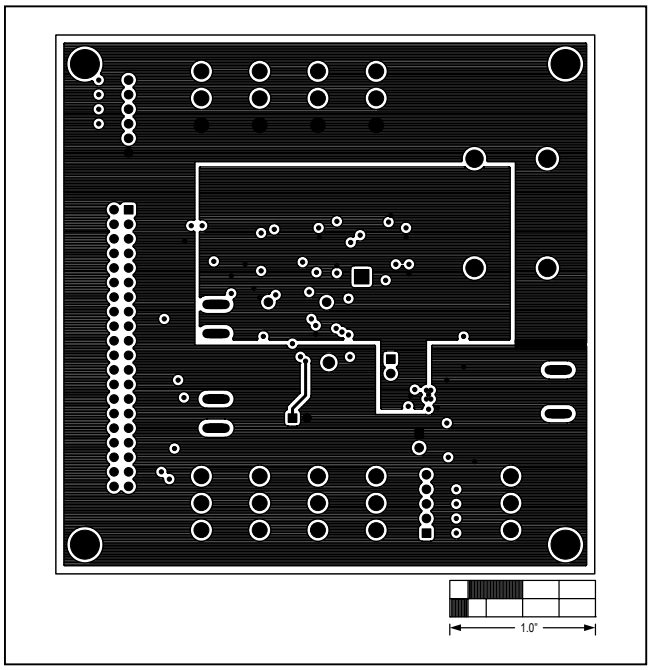


Figure 6. MAX13036 EV Kit PCB Layout—Layer 3 (Power)

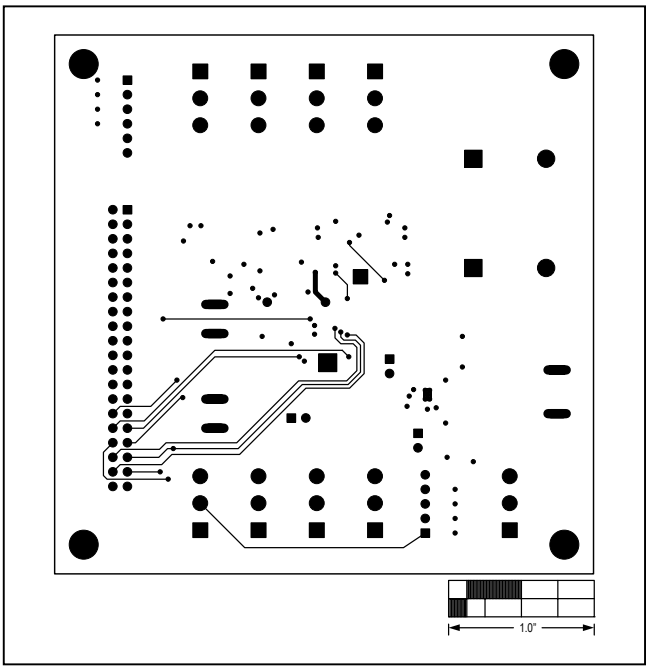


Figure 7. MAX13036 EV Kit PCB Layout—Solder Side

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/07	Initial release	—
1	5/15	Deleted automotive references in *General Description* section; moved *Component List* and *Component Suppliers* tables to page 4; added *Revision History* table; rebranded with new Maxim logo	1–8

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at www.maximintegrated.com.

Maxim Integrated cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim Integrated product. No circuit patent licenses are implied. Maxim Integrated reserves the right to change the circuitry and specifications without notice at any time.