MAX31827 Evaluation System

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General Description

The MAX31827 evaluation system (EV system) demonstrates the MAX31827 I2C temperature switch and sensor with hardware-selectable address and alarm. The EV system includes the MAX31827 evaluation kit (EV kit) and the USB2PMB2 module. Windows® 7/8/8.1/10-compatible software provides a user-friendly interface that demonstrates the features of the MAX31827/8/9. The MAX31827 EV kit comes with the 6-pin WLP MAX31827ANTABRPF+ installed.

Features

- Proven PCB Layout
- Fully Assembled and Tested
- Windows XP, Windows 7/8/8.1/10-Compatible Software

Quick Start

Required Equipment

- MAX31827 EV system (USB cable included)
- Windows PC
- MAX31827GUISetup.msi file

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.

Ordering Information appears at end of data sheet.

MAX31827 EV System Board Photo
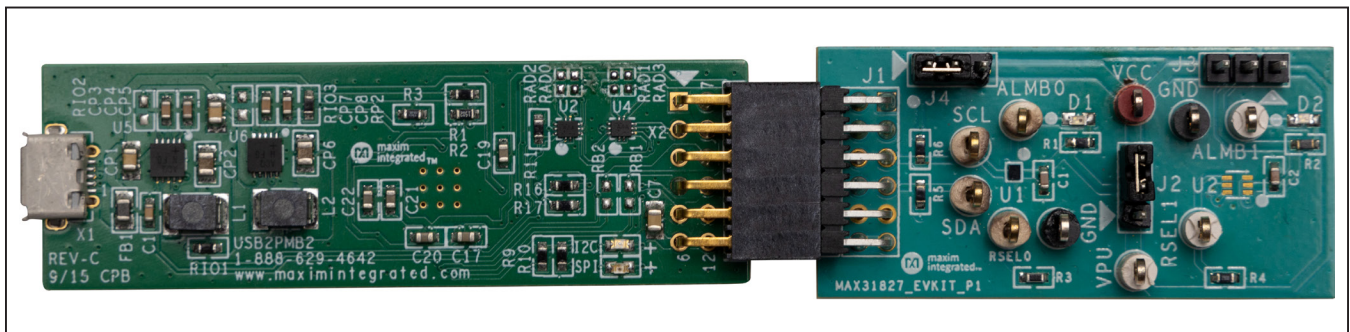
Windows is a registered trademark and registered service mark of Microsoft Corporation.

319-100784; Rev 1; 3/22

Procedure

The EV system is fully assembled and tested. Use the following steps to verify board operation:

1) Install the MAX31827GUISetup.msi software on a computer.
2) Align the connector of the USB2PMB2 with the J1 connector of the MAX31827 EV kit. Figure 1 shows the side view of how the two boards are connected. The USB2PMB2 is on the left and the MAX31827 EV kit is on the right.
3) Verify that the shunts are in the default position as shown in Table 1.
4) Connect the USB cable from the PC to the USB-2PMB2 board.

5) Open the EV kit GUI, MAX31827EVKit.exe (Figure 2).
6) Click the **Scan Adapters** button. Then select the option **PMODxxxxxx** (where xxxxxx is numeric) and click the **Connect** button.
7) Click the **Detect Address** button, and the **0b1000010** bits appear in the **A5-A0** edit box.
8) Adjust the **Conversion** to **111-125ms** within the **Configuration Register** group box.
9) Verify the configuration register is set by clicking the **Read Registers** button.
10) Start evaluating the MAX31827 by clicking the **Start Sampling** button. Figure 3 shows the MAX31827 measuring temperature.
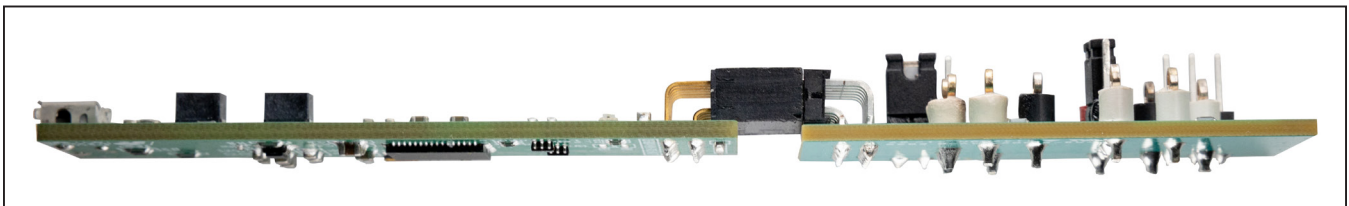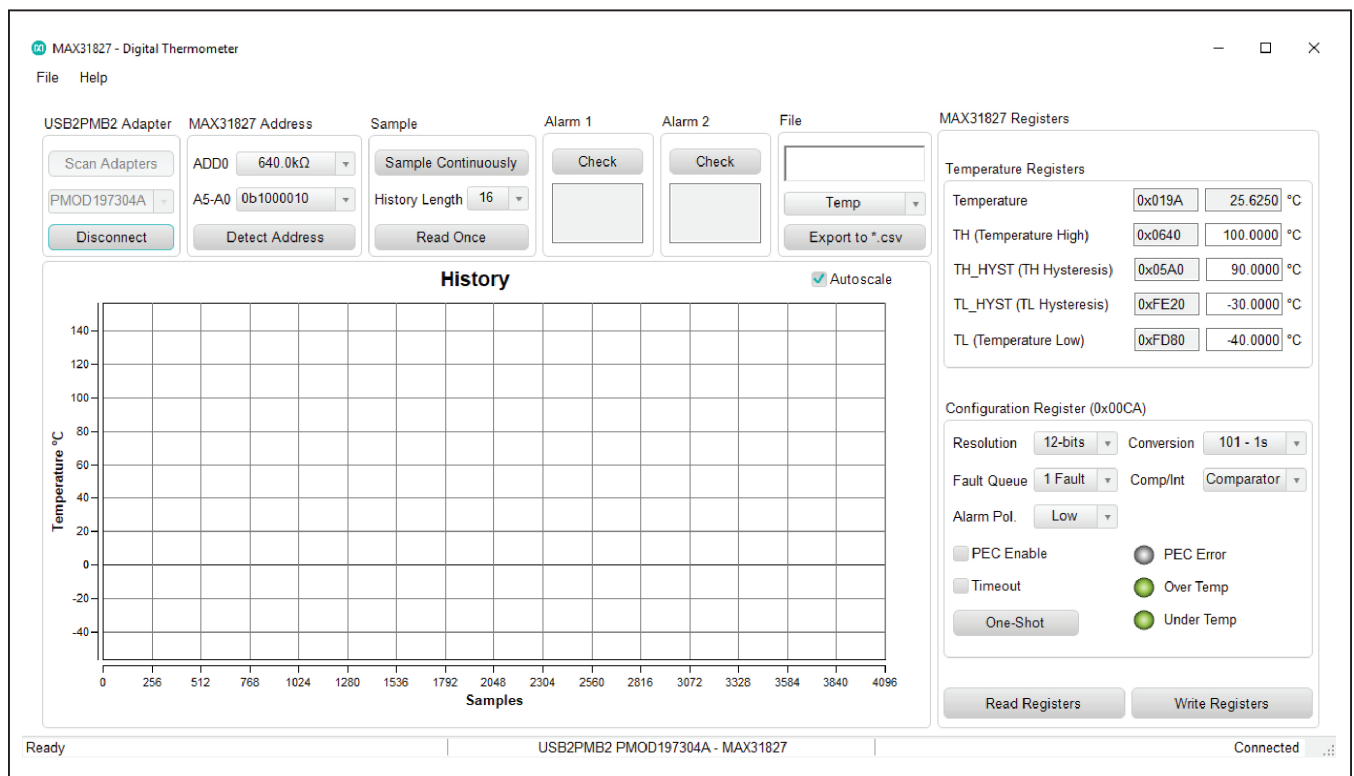

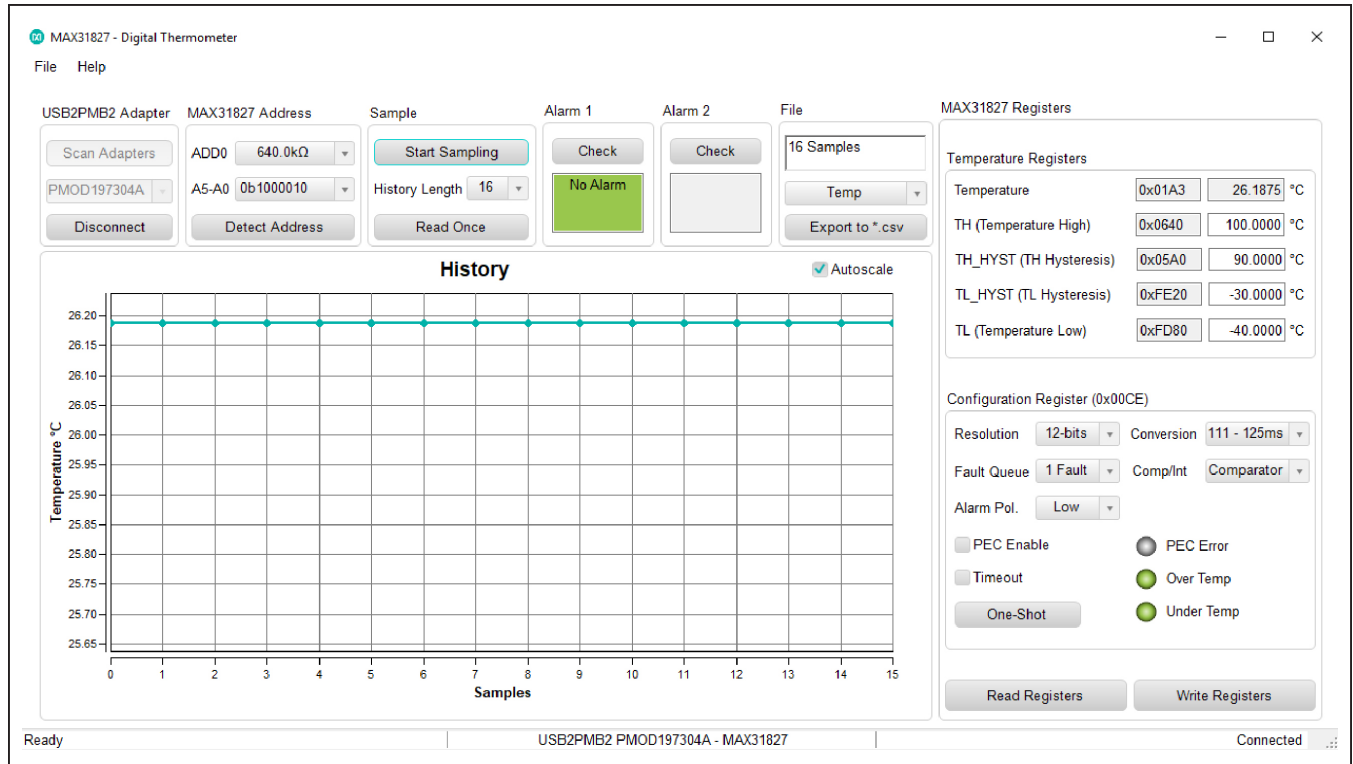Figure 1. MAX31827 Side View

Figure 2. MAX31827 Main Window

Figure 3. Measuring Temperature on the MAX31827

Table 1. Jumper Descriptions

JUMPER	SHUNT POSITION	DESCRIPTION
J2	1-2	User-supplied VPU. Connects VPU to power the MAX31827 (U1).
	2-3*	Connects VCC to power the MAX31827 (U1).
J3	1-2	Not in Use
	2-3*	Not in Use
J4	1-2	Connects VPU to the pullup resistors for SDA and SCL
	2-3*	Connects VCC to the pullup resistors for SDA and SCL

*Default position.

Detailed Description of Software

The main window of the MAX31827 EV kit software contains controls to evaluate the MAX31827 IC.

Configuration Register

The **Configuration Register** groupbox allows the user to select the resolution, conversion rate, alarm polarity, and fault queue. Use the **Resolution** drop-down list to select between 8-, 9-, 10-, and 12-bits resolution. With each resolution, the user can set the desired sampling rate using the options in the **Conversion** drop-down list. The alarm polarity can be adjusted between high-active and low-active. In addition, users can set the fault queue from 1, 2, 4, or 8 consecutive faults.

High and Low Fault

Adjust the **TH (Temperature High)** and **TL (Temperature Low)** edit boxes to the desired temperature threshold. When the desired setting is set, click the **Write Registers** button to apply. When the $\overline{\text{ALARM}}$ output asserts in comparator mode, the **Over Temp** or **Under Temp** indicator displays red until the temperature returns within the threshold range.

When the $\overline{\text{ALARM}}$ output asserts in interrupt mode, the Over Temp or Under Temp indicator displays red until the read is performed on configuration register.

The $\overline{\text{ALARM}}$ also appears at the $\overline{\text{ALARM}}$ pin of the IC. To check if the signal is high or low, use the **Check** button for the alarm status.

Address

The address is determined by the resistor/connection on RSEL pins of the MAX31827. **Detect Address** loads bits to status register. Refer to the IC data sheet for the list of addresses. Addresses are displayed on the **A5-A0** drop-down list. Once the desired address is selected, click the **Set Address** button to apply.

Temperature

The temperature is displayed in the graph, hexadecimal code, and converted temperature by clicking on the **Start Sampling Continuously** or **Read Once** button.

Logging Data

The temperature and raw code can be saved to a file. Click the **Export to *.CSV** button before collecting data.

Detailed Description of Hardware

The MAX31827 EV system demonstrates the MAX31827, I2C temperature sensor with address and alarm. The USB2PMB2 module and the EV kit complete the system.

User-Supplied I^{2}C and I/O

To evaluate the EV kit with a user-supplied I2C bus, the connector J1 is a PMod™-compatible connector. If the master does not have a PMod-compatible connector, then make connection directly to the SCL and SDA test points. Make sure the return ground is same. See Table 1 for jumper user-supplied VCC.

The MAX31827 is powered through USB by default when a PMod-compatible master module is connected to the J1 connector of the EV kit. If the user-supplied VCC is used, a PMod master module is not allowed on the J1 connector. In this case, apply a voltage between +1.6V and +3.6V at the VCC test point and ground is connected at the GND test point.

User-Supplied VPU

The J2 jumper allows the user to apply their own pullup voltage. When a shunt is on the 1-2 position, apply a voltage between +1.6V and +3.6V at the VPU test point and verify the return path is connected at the GND test point.

Ordering Information

PART	TYPE
MAX31827EVSYS1#	EV system (EV kit + Master Board)
MAX31827EVKIT#	EV kit
USB2PMB2#	Master Board

#Denotes RoHS compliance.

*Pmod is a trademark of Digilent Inc.*

MAX31827 EV System Bill of Materials

| ITEM	QTY	REF DES	MAXINV	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	7	ALMB0, ALMB1, RSEL0, RSEL1, SCL, SDA, VPU	02-TPCOMP5007-00	5007	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; WHITE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST
2	2	C1, C2	20-000U1-03	885012206071; CGJ3E2X7R1E104K080AA; C1608X7R1E104K080AA; C0603C104K3RAC; GRM188R71E104KA01; C1608X7R1E104K; 06033C104KAT2A; CGA3E2X7R1E104K080AA	WURTH ELECTRONICS INC; TDK; TDK; KEMET; AVX; TDK	0.1UF	CAPACITOR; SMT; 0603; CERAMIC; 0.1uF; 25V; 10%; X7R; -55degC to + 125degC; +/-15% from -55degC to +125degC
3	2	D1, D2	30-LTSTC190CKT-00	LTST-C190CKT	LITE-ON ELECTRONICS INC.	LTST-C190CKT	DIODE; LED; STANDARD; RED; SMT (0603); PIV=5.0V; IF=0.04A; -55 DEGC TO +85 DEGC
4	2	GND, GND1	02-TPCOMP5006-00	5006	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST
5	1	J1	01-TSW10608SDRA12P-17	TSW-106-08-S-D-RA	SAMTEC	TSW-106-08-S-D-RA	CONNECTOR; THROUGH HOLE; DOUBLE ROW; RIGHT ANGLE; 12PINS; THIS PART IS DEDICATED FOR PMOD PERIPHERAL BOARD
6	3	J2-J4	01-TSW10307TS3P-17	TSW-103-07-T-S	SAMTEC	TSW-103-07-T-S	CONNECTOR; THROUGH HOLE; TSW SERIES; SINGLE ROW; STRAIGHT; 3PINS
7	2	R1, R2	80-0001K-24	CRCW06031K00FK; ERJ-EKF1001; CR0603AFX-1001ELF	VISHAY; PANASONIC; BOURNS	1K	RESISTOR; 0603; 1K; 1%; 100PPM; 0.10W; THICK FILM
8	1	R3	80-0634K-10	ERJ-3EKF6343	PANASONIC	634K	RES; SMT (0603); 634K; 1%; +/- 100PPM/DEGC; 0.1W
9	1	R4	80-080K6-24	CRCW060380K6FK; ERJ-3EKF8062; RC0603FR-0780K6L	VISHAY; PANASONIC; YAGEO	80.6K	RESISTOR; 0603; 80.6K OHM; 1%; 100PPM; 0.10W; METAL FILM
10	2	R5, R6	80-004K7-19	CRCW06034K70FK	VISHAY DALE	4.7K	RESISTOR; 0603; 4.7K; 1%; 100PPM; 0.10W; THICK FILM
11	1	U1	00-SAMPLE-01	MAX31827ANTABRPF+	MAXIM	MAX31827ANTABRPF+	EVKIT PART - IC; MAX31827; WLP6; PACKAGE OUTLINE DRAWING: 21-100515; PACKAGE CODE: N61B1+1
12	1	VCC	02-TPCOMP5005-00	5005	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN
13	1	PCB	EPCB31827	MAX31827	MAXIM	PCB	PCB:MAX31827

MAX31827 EV System Schematic

MAX31827 EV System PCB Layouts
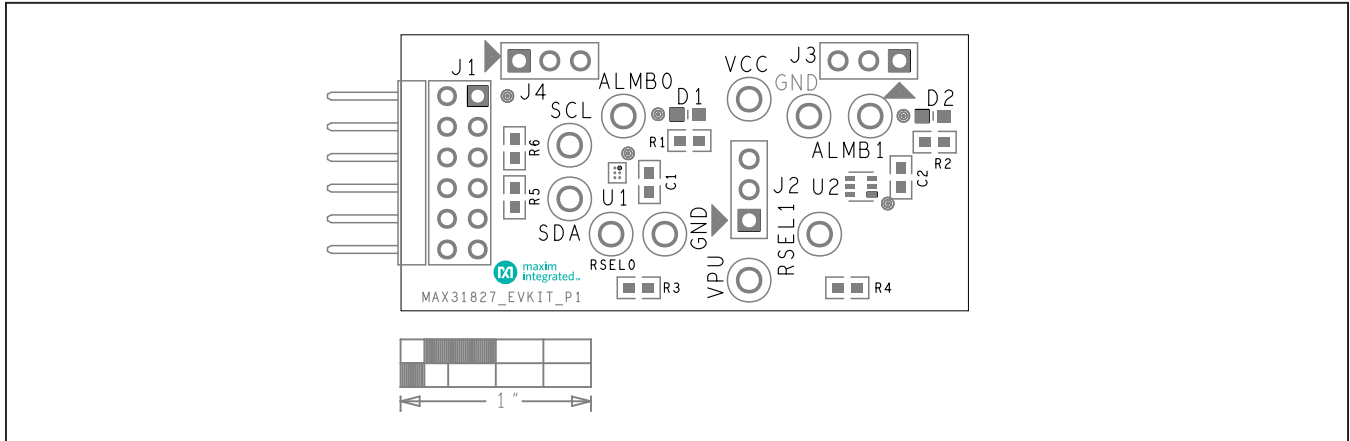
MAX31827 EV System Component Placement Guide—Top Silkscreen
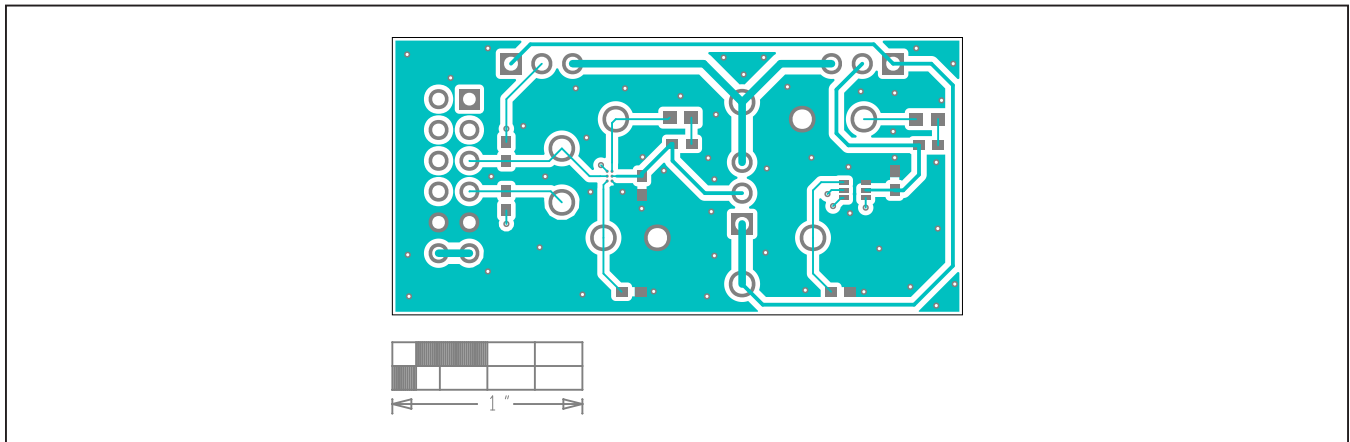
MAX31827 EV System PCB Layout—Top
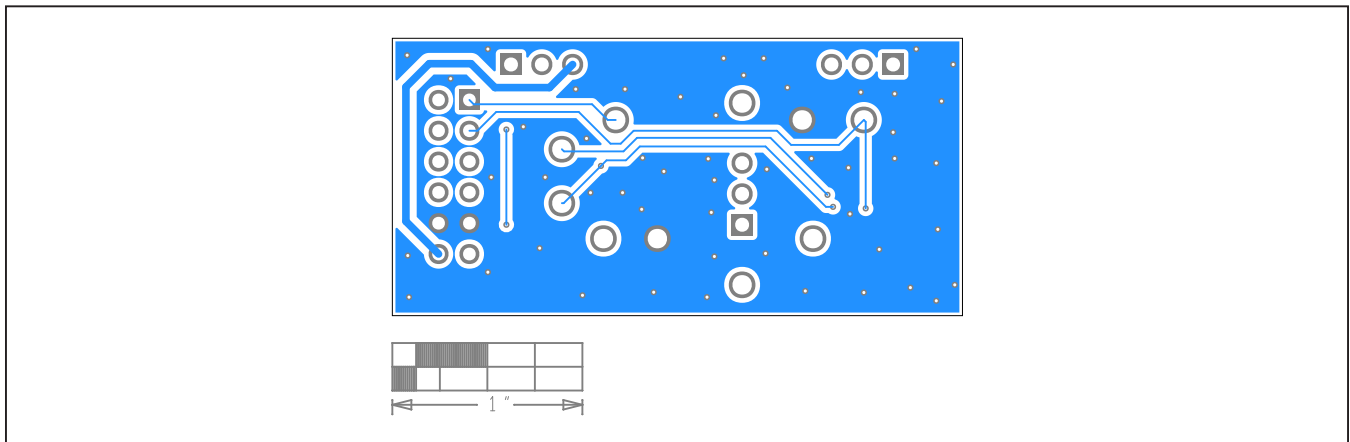
MAX31827 EV System PCB Layout—Bottom