MAX77831 Evaluation Kit

General Description

The MAX77831 evaluation kit (EV kit) provides a proven design to evaluate the MAX77831, a 7A switching current, high-efficiency, high-performance buck-boost regulator that only operates in forced-PWM (FPWM) mode. The IC is capable of 2.5V to 16V input and dynamically adjustable output between 4.5V to 15V when using internal feedback resistors, or between 3V to 15V when using external feedback resistors. The EV kit is factory-configured as internal feedback with the default startup output voltage at 5V. Other startup voltage can be achieved with external feedback resistors. Output voltage can be adjusted dynamically through the I^{2}C serial interface.

The I/O pins are available to support the I^{2}C serial interface, Enable function, and Interrupt/Power-OK indicator. The I^{2}C slave address, switching current limit, and feedback configuration can be adjusted by changing the R$_{SEL}$ resistor value (R9). The MAXUSB_INTERFACE# allows the use of Windows®-based software with a friendly graphical user interface (GUI) as well as a detailed register-based interface to exercise all the features of the IC. The IC installed on the EV kit is the MAX77831BEWB+T.

Benefits and Features

- Proven PCB Reference Design and Layout Benefit
- Fully Assembled and Tested
- Sense Points for High-Accuracy Measurements
- Accessible Test Point Pins for EN, POKB/INTB, V$_{IO}$, and the I^{2}C Serial Interface SCL, SDA
- MAXUSB_INTERFACE# Allows Easy Communication with a Windows PC
- GUI Software that Drives the I^{2}C Serial Interface for Optional Software Control
- Startup Output Voltage Adjustable Through External Feedback Resistors
- Output Voltage Dynamically Adjustable Through the I^{2}C Serial Interface
- I^{2}C Slave Address, Switching Current Limit, and Feedback Configuration Adjustable Using R$_{SEL}$ (R9)

Ordering Information **appears at end of data sheet.**

MAX77831 EV Kit Specifications

SPECIFICATION	TEST CONDITION	MIN	TYP	MAX	UNIT
Input Voltage		2.5		16	V
Output Voltage	Internal Feedback	4.5		15	V
	External Feedback	3		15	V
Default Output Voltage	Internal Feedback		5		V
Switching Current Limit			7		A
Peak Efficiency	V$_{IN}$ = 4V, V$_{OUT}$ = 5V, 700mA Load		97.0		%

Windows is a registered trademark of Microsoft Corp.
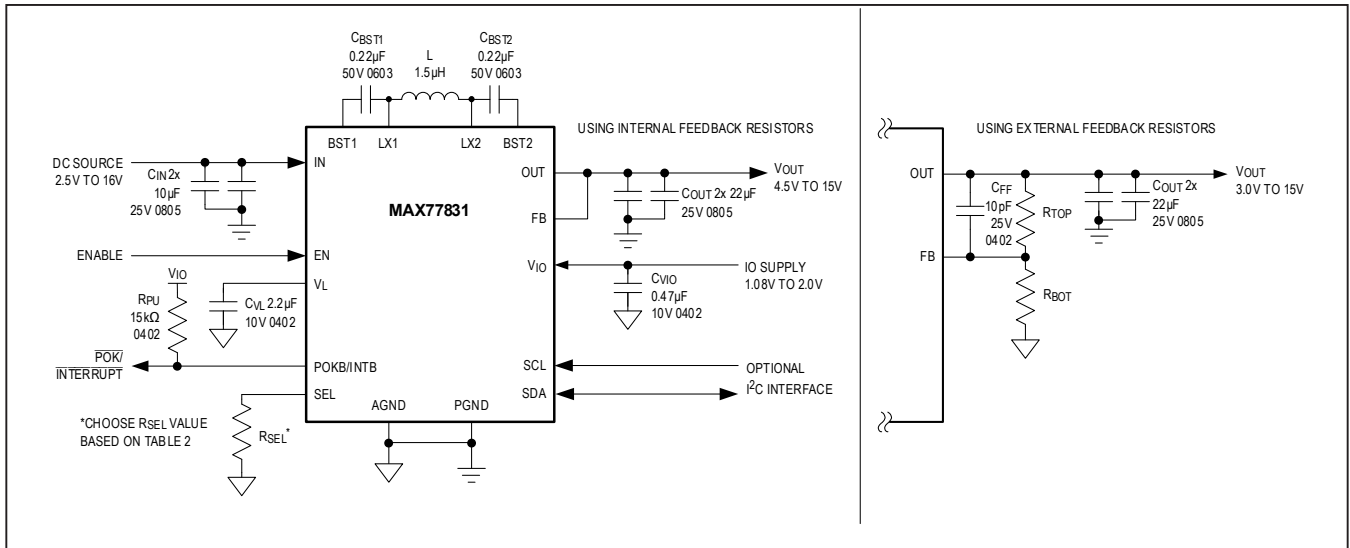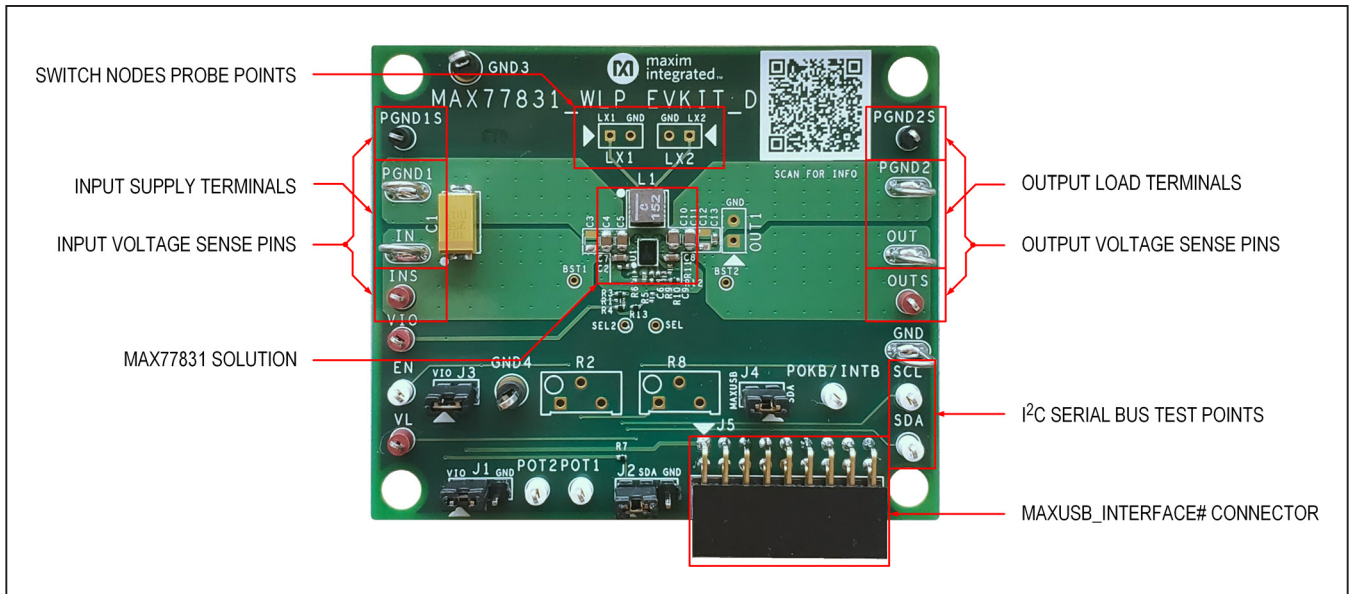
Figure 1. Application Circuit for MAX77831

Figure 2. MAX77831 EV Kit Photo

EV Kit Default Configuration

With the default jumper settings listed in Table 1 and the EV kit component values of R_{SEL} (R9) = 0Ω, R_{TOP} (R10) = 0Ω, and R_{BOT} (R11) = OPEN, the MAX77831 EV kit is configured with the following settings:

● Internal Feedback

● Switching Current Limit = 7.0A

● I2C Slave Address (7-bit) = 0x66

● Switching Frequency = 1.8MHz (adjustable only through the I2C)

● I2C Line Connected to MAXUSB_INTERFACE#

See the *EV Kit Hardware* section to change the EV kit configuration.

Quick Start

Required Equipment

● MAX77831 EV Kit

● Adjustable DC Power Supply

● A 1.8V DC Power Supply

● Digital Multi-Meters

● Electronic Load

● MAXUSB_INTERFACE# for I2C Serial Interface (Optional)

● USB Type-A to Micro-USB Cable (Optional)

● Windows-based PC with MAX77831 EV Kit GUI (Optional)

Procedure

The EV kit is fully assembled and tested. Perform the following steps to verify board operation. Use twisted wires of appropriate gauge (20 AWG) that are as short as possible to connect the load and power sources.

1) Ensure that the EV kit has the correct jumper settings, as shown in Table 1.

2) Connect a DVM to the INS and PGND1S sense pins to measure input voltage.

3) Connect a DVM to the OUTS and PGND2S sense pins to measure output voltage.

4) Apply a power supply set to 1.8V (100mA current limit) across VIO and GND terminals of the EV kit. Turn on the power supply.

5) Apply a power supply set to 0V (1.5A current limit) through an ammeter across the IN and PGND1 terminals of the EV kit. Turn the supply on and increase the voltage to 7.6V.

6) Confirm the DVM connected to OUTS and PGND2S reads the default output voltage of the EV kit (5V). Confirm the ammeter reads the expected input supply current (about 12mA).

7) Now that the EV kit is confirmed working, short out the series ammeter and increase the current limit on the power supply connected across IN and PGND1. Connect an electronic load across the OUT and PGND2 terminals to evaluate the performance of the MAX77831 buck-boost regulator.

The next steps of the procedure use the EV kit GUI and MAXUSB_INTERFACE# to evaluate the MAX77831's I2C serial interface. If evaluation of the I2C serial interface is not required, you may skip the following steps. The EV kit includes on-board 2.2kΩ pullup resistors (R4 and R7) to V_{IO}.

8) Install GUI software. Visit the product webpage at **https://www.maximintegrated.com/products/MAX77831WEVKIT** and navigate to Design Resources to download the latest version of the EV kit software. Save the EV kit software installation file to a temporary folder and decompress the ZIP file. Run the .EXE file and follow the on-screen instructions to complete installation.

Table 1. Default Shunt Positions and Jumper Description

JUMPER	NODE	SHUNT POSITION	FUNCTION
J1	EN	1-2*	Connects EN to V_{IO} (logic-high, enables MAX77831).
		2-3	Connects EN to AGND (logic-low, disables MAX77831).
J2	SDA	1-2*	Pulls SDA up to V_{IO} through R7 (2.2kΩ).
		2-3	Connects SDA to AGND.
J3	MAXUSB_VIO	1-2*	Connects MAXUSB_INTERFACE# V_{IO} to EV kit V_{IO}.
J4	MAXUSB_SDA	1-2*	Connects MAXUSB_INTERFACE# SDA to EV kit SDA.
R3	MAXUSB_SCL	0Ω installed*	Connects MAXUSB_INTERFACE# SCL to EV kit SCL.

*Default position

9) Turn off the 1.8V V_{IO} power supply and input power supply connected in step 4 and step 5.

10) Disconnect the 1.8V V_{IO} power supply connected in step 4 from the EV kit. The MAXUSB_INTERFACE# has an on-board LDO to supply 1.8V to V_{IO}.

11) Ensure the SW1 and SW2 switches on the MAXUSB_INTERFACE# are set to the ON position. This enables I2C mode on the MAXUSB_INTERFACE#.

12) **Important:** Ensure the VL Jumper on the MAX-USB_INTERFACE# (J5) is set to 1.8V. This sets the MAXUSB_INTERFACE# V_{IO} voltage. Setting this incorrectly to 3.3V could potentially damage the MAX77831 IC.

13) Connect the MAXUSB_INTERFACE# to the MAX77831 EV kit. Connect the MAXUSB_INTER-FACE# to your PC's USB port using a USB Type-A to Micro-USB Cable.

14) Turn on the input power supply.

15) Open the GUI and click the **Device** button in the menu bar. Click the **Connect** button in the **Device** button's drop-down list. Wait for the device to respond, and in the **Synchronize** window, press the **Connect and Read** button.

16) Drag the slide bar in the *Output Voltage Configuration* section to change the output voltage and click Write.

17) Confirm with a DVM that the software instruction to change output voltage was successful. If so, the I2C serial interface is confirmed as working.

This concludes the Quick Start procedure. Users are now encouraged to further explore the device and its register settings with the GUI software. For more information on the GUI, see the *EV Kit Software* section.

EV Kit Hardware

The MAX77831 EV kit demonstrates the MAX77831 buck-boost regulator. It regulates output from input voltage ranges from 2.5V to 16V. The programmable output range is from 4.5V to 15V with internal feedback resistors, or from 3V to 15V with external feedback resistors. The EV kit is suited with a general DC input. Table 1 lists jumpers and associated functions that are available on the EV kit.

R_{SEL} Configuration Resistor

The MAX77831 includes an SEL pin to set the I2C slave address, switching current limit, and feedback configuration. A resistor with a tolerance of 1% (or better) should be chosen for R9, which is the SEL pin configuration resistor R_{SEL}. The default R_{SEL} value installed on the EV kit is 0Ω. See Table 2 for the nominal R_{SEL} values and their corresponding settings. The switching current limit is also adjustable dynamically through the I2C serial interface

when the MAX77831 is enabled. See the *EV Kit Software* section for more information.

Output Voltage Configuration

By default, the EV kit is configured to use internal feedback resistors, with 5V default startup output voltage and an output voltage range from 4.5V to 15V. To achieve a different default startup output voltage other than 5V, or to achieve a lower minimum output voltage range down to 3V, external feedback resistors are required. To change the EV kit to the external feedback configuration, replace the feedback resistors R_{TOP} (R10) and R_{BOT} (R11) with appropriate value resistors (use resistors with 1% tolerance or better) and adjust R_{SEL} (R9) accordingly to select the external feedback option. It is also recommended to install a 10pF feed-forward capacitor on C9 when using external feedback.

To select appropriate external feedback resistor values, first choose R_{TOP} (R10) to be between 150kΩ and 330kΩ. Then calculate the value of R_{BOT} (R11) for a desired startup output voltage with the following equation:

$$V_{OUT} = \frac{R_{BOT} \times V_{REF}}{V_{OUT} - V_{REF}}$$

where V_{REF} is 0.333V and V_{OUT} is the desired startup output voltage. Note that the output voltage cannot exceed the maximum output voltage 15V. The recommended external feedback resistor values for common output voltage are listed in Table 3.

After startup, the output voltage can be adjusted dynamically using the I2C serial interface. See the *EV Kit Software* section for more information. When using internal feedback, output voltage ranges between 4.5V and 15V in 73.5mV steps. When using external feedback, output voltage range and step size vary based on the external feedback resistor values. To calculate output voltage range, use the following equation and plug in the minimum V_{REF} of 0.299V and maximum V_{REF} of 1V:

$$V_{OUT} = \frac{V_{REF}}{R_{BOT}} \times (R_{BOT} + R_{TOP})$$

Output voltage step size can be calculated with the following equation:

$$V_{OUT\_STEP} = \frac{4.9mV}{R_{BOT}} \times (R_{BOT} + R_{TOP})$$

Programmable output voltage ranges and output voltage step sizes for each recommended external feedback resistor pairs are listed in Table 3.

Table 2. MAX77831 R_{SEL} Selection Table

R_{SEL} (Ω)	FEEDBACK RESISTOR SELECTION	TYPICAL I_{LIM} (A)	I²C SLAVE ADDRESS (7-BIT)	R_{SEL} (Ω)	FEEDBACK RESISTOR SELECTION	TYPICAL I_{LIM} (A)	I²C SLAVE ADDRESS (7-BIT)
0*			110 0110 (0x66)	3740			110 0110 (0x66)
200			110 0111 (0x67)	8060			110 0111 (0x67)
309		7.0	110 1110 (0x6E)	12400		7.0	110 1110 (0x6E)
422			110 1111 (0x6F)	16900			110 1111 (0x6F)
536			110 0110 (0x66)	21500			110 0110 (0x66)
649			110 0111 (0x67)	26100			110 0111 (0x67)
768		5.6	110 1110 (0x6E)	30900		5.6	110 1110 (0x6E)
909	Internal Feedback Resistors		110 1111 (0x6F)	36500	External Feedback Resistors		110 1111 (0x6F)
1050			110 0110 (0x66)	42200			110 0110 (0x66)
1210			110 0111 (0x67)	48700			110 0111 (0x67)
1400		3.8	110 1110 (0x6E)	56200		3.8	110 1110 (0x6E)
1620			110 1111 (0x6F)	64900			110 1111 (0x6F)
1870			110 0110 (0x66)	75000			110 0110 (0x66)
2150			110 0111 (0x67)	86600			110 0111 (0x67)
2490		1.72	110 1110 (0x6E)	100000		1.72	110 1110 (0x6E)
2870			110 1111 (0x6F)	OPEN			110 1111 (0x6F)

Default value installed on the EV kit

Table 3. Feedback Resistor Value Recommendations

DEFAULT V_{REF} (V)	R_{TOP} R10 (kΩ)	R_{BOT} R11 (kΩ)	STARTUP V_{OUT} (V)	PROGRAMMABLE V_{OUT} RANGE (V)	V_{OUT} STEP SIZE (mV)
	160	20	3	3.0 to 9.0	44.1
	178	20	3.3	3.0 to 9.9	48.5
0.333	Internal Feedback Resistors		5	4.5 to 15	73.5
	312	12	9	8.1 to 15	132.3
	232	6.65	12	10.7 to 15	175.8
	234	5.3	15	13.5 to 15	221.2

MAXUSB_INTERFACE#

The MAXUSB_INTERFACE# along with the companion EV kit GUI software allows users to easily change the MAX77831's register settings with a Windows PC. Before connecting the MAXUSB_INTERFACE# to the EV kit's MAXUSB_INTERFACE# connector (J5), make sure the MAXUSB_INTERFACE# is configured with the following settings:

● SW1, SW2 to ON Position (This enables I²C mode on the MAXUSB_INTERFACE#.)

● VL Jumper (J5) to 1.8V (This sets the MAXUSB_ INTERFACE# VIO voltage.)

• **Warning:** Setting this incorrectly to 3.3V could potentially damage the MAX77831 IC.

The MAXUSB_INTERFACE# also includes an on-board LDO that can supply necessary voltage to V_{IO}. If you are using the MAXUSB_INTERFACE#, disconnect any external V_{IO} supply from the EV kit, and make sure header jumpers J3, J4, and 0Ω jumper R3 are installed to connect the MAXUSB_INTERFACE# to the EV kit.

External I²C Bus

To connect to the external I²C serial bus and not use the MAXUSB_INTERFACE#, unplug the MAXUSB_INTERFACE# from the MAX77831 EV kit's MAXUSB_INTERFACE# connector (J5), and remove header jumpers J3, J4, and 0Ω jumper R3 to isolate the MAXUSB_INTERFACE# connector from the EV kit. Apply an external I/O supply to V_{IO} pin. Make sure the external I²C serial bus's logic voltage level is compatible to the MAX77831's I/O logic voltage level. Refer to the MAX77831 IC data sheet for the appropriate I/O logic voltage level.

High Temperature Testing

The MAX77831 is rated for operation under junction temperatures up to +125°C. Note that not all components on the EV kit are rated for temperatures this high. Some ceramic capacitors experience extra leakage when put under temperatures higher than they are rated for, and supply current readings for the IC might be larger than expected. The MAXUSB_INTERFACE# is also not rated for +125°C. Double check the components on the EV kit if testing at +125°C ambient or junction temperatures. Consider replacing these components if IC operation at +125°C ambient or junction temperature is an important use case.

List of capacitors not rated for +125°C:

● C10, C11 (OUT capacitors)

Critical Node Measurement (OUT and LX)

The EV kit comes with probe points for measuring critical nodes OUT1, LX1, and LX2. See Figure 2 for their locations on the EV kit. Use these probe points to eliminate as much noise as possible when measuring the critical nodes. To ensure best results, use a very short ground wire from the ground sleeve of the scope probe to the GND side of the probe point, and use the bare tip of the probe directly to the signal side of the probe point (Figure 3).

Following these guidelines gives the most accurate results when measuring parameters such as output voltage ripple, switching waveforms, and load transient response.

Efficiency Measurement (INS, OUTS)

The EV kit also comes with sense pins for accurately measuring input voltage (INS, PGND1S) and output voltage (OUTS, PGND2S). See Figure 2 for their locations on the EV kit. For most accurate efficiency, load regulation, and line regulation measurements, use these sense pins to measure input and output voltages.

Warning: These sense pins are only for measuring voltages. Do not connect input supply to input sense pins and do not connect electronic load to output sense pins, as these sense pins are not designed to have current running through them. Doing so damages the EV kit.

Use input supply terminals for connecting to input supply and use output terminals for connecting to electronic load as shown in Figure 2.
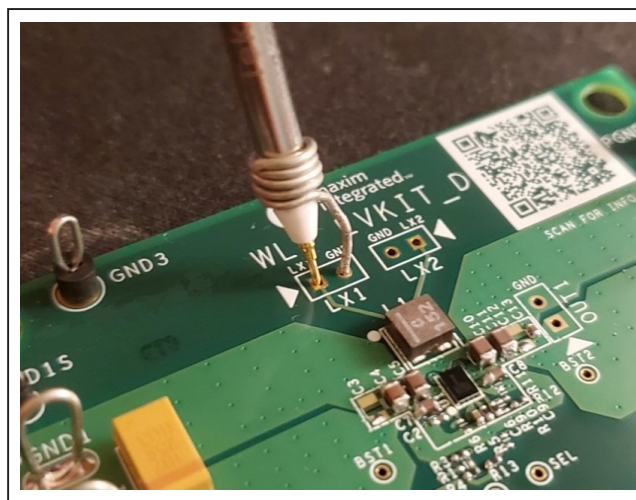

Figure 3. Probing Critical Nodes

Table 4. Usage of Critical Test Points

LOAD TRANSIENT, OUTPUT RIPPLE	LOAD REGULATION, LINE REGULATION, V_{OUT} ACCURACY	EFFICIENCY		SWITCHING NODE	
		OUTPUT VOLTAGE	INPUT VOLTAGE	LX1	LX2
V_{OUT} (OUT1)	V_{OUT} (OUTS, PGND2S)	V_{OUT} (OUTS, PGND2S)	V_{IN} (INS, PGND1S)	LX1 (LX1)	LX2 (LX2)

EV Kit Software

The graphical user interface (GUI) software allows for quick, easy, and thorough evaluation of the MAX77831. The GUI along with the MAXUSB_INTERFACE# drives I2C communication with the EV kit. Every control in the GUI corresponds directly to a register within MAX77831. Refer to *Register Map* section of the *MAX77831 IC data sheet* for a complete description of the registers. See Figure 4 for a screenshot of the GUI upon first opening.

Installation

Visit the product webpage at **https://www.maximintegrated.com/products/MAX77831WEVKIT** and navigate to Design Resources to download the latest version of the EV kit software. Save the EV kit software installation file to a temporary folder and decompress the ZIP file. Run the .EXE installer and follow the on-screen instructions to complete the installation.

Windows Driver

After plugging in the MAXUSB_INTERFACE# to the PC with a Micro-USB cable for the first time, wait about 30 seconds for Windows to automatically install the necessary drivers.

Connecting GUI to MAXUSB_INTERFACE#

After opening the GUI, click **Device** in the upper left corner of the GUI window. Click **Connect** in the drop-down menu.

If you have multiple MAXUSB_INTERFACE# adapters or FTDI devices connected to your PC, the **Port Synchronization** menu appears (Figure 5). Select the port corresponding to the MAXUSB_INTERFACE# attached to the MAX77831 EV kit and click **Connect**.

The **Device Synchronization** menu opens (Figure 6) once the MAX77831 IC responds (voltages on IN pin and V_{IO} pin must be valid on the MAX77831 IC for it to respond). The I2C address shown is the MAX77831 IC's 7-bit slave address. The address shown changes depending on the EV kit's R_{SEL} configuration. See the EV Kit Hardware *RSEL Configuration Resistor* section if you wish to change the address. Click **Connect and Read**. The text at the bottom right of the GUI window changes from "MAXUSB is Disconnected" to "MAXUSB is Connected."
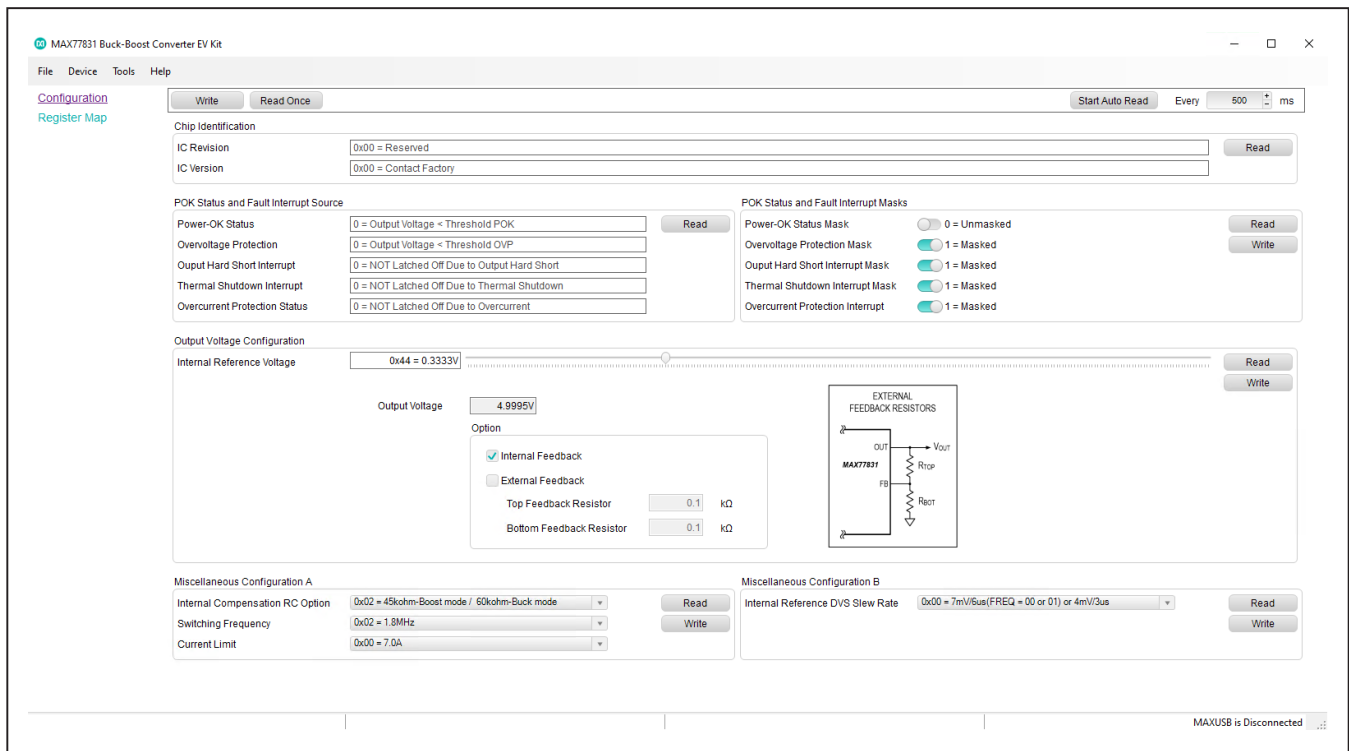
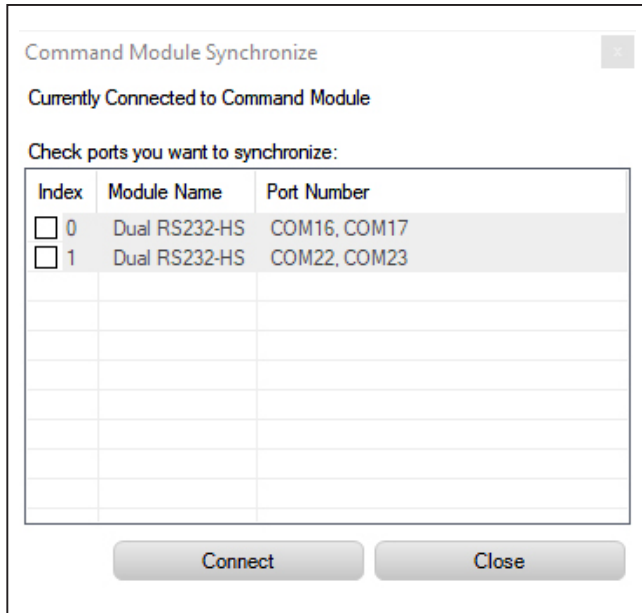Figure 4. MAX77831 EV Kit GUI Software Configuration Tab
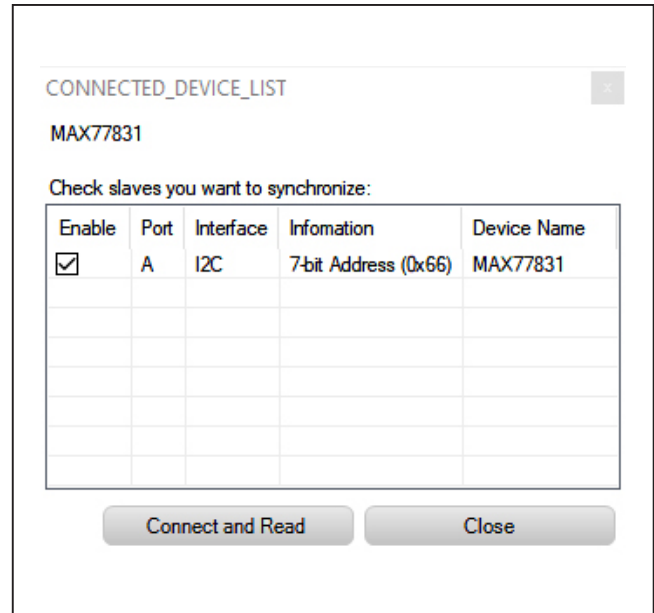
Figure 5. Port Synchronization Menu

Figure 6. Device Synchronization Menu

Configuration

The Configuration tab (Figure 4) displays information and status of the IC on the EV Kit as well as all available register settings. It is divided into different sections: Chip Identification, POK Status and Fault Interrupts, Output Voltage Configuration, and Miscellaneous Configuration.

Click **Read Once** located on the top of the GUI window to obtain all setting values currently stored on all the MAX77831's registers. After changing the setting values in the GUI software, click **Write** on the top of the GUI window to apply all settings to the MAX77831's registers. Alternatively, click **Read** on each setting section to obtain the setting values of that particular section currently stored on the MAX77831's registers. After changing the setting values in the GUI software, click **Write** in the corresponding setting section to apply the new settings for that particular section to the MAX77831's registers.

The Chip Identification section (Figure 7) displays the revision and version information of the MAX77831 IC on the EV Kit. Click **Read** to obtain information from the IC.

The POK Status and Fault Interrupt Source section (Figure 8) displays the power-OK status and any fault conditions detected on the MAX77831 IC, which are stored in the INT_SRC register. Periodically check the POK Status and Fault Interrupt Source section during evaluation to monitor the status of power-OK (POK), overvoltage protection (OVP), output hard-short, thermal shutdown (THS), and overcurrent protection (OCP). Click **Read** to obtain the latest status from the IC.

The POK Status and Fault Interrupt Masks section (Figure 9) configures the reflection of the bits in INT_SRC to the POKB/INTB pin. If a bit is masked, its status in the INT_SRC register is not shown on the POKB/INTB pin. Refer to the Power-OK Monitor and Fault Interrupts section in the IC datasheet for more information about the operation of the POKB/INTB pin. Click **Read** to obtain the setting stored on the IC and click **Write** to apply new settings to the IC.

Figure 7. Configuration Tab - Chip Identification Section

Figure 8. Configuration Tab - POK Status and Fault Interrupt Source Section

Figure 9. Configuration Tab - POK Status and Fault Interrupt Masks Section

The *Output Voltage Configuration* section (Figure 10) configures the EV kit IC's output voltage. The output voltage is changed by adjusting the internal reference voltage. Drag the slider to the desired internal reference voltage (or output voltage) and click **Write** to change the output voltage. Clicking **Read** returns the programmed internal reference voltage (or output voltage) to the GUI.

To make evaluation easier, the GUI software displays the corresponding output voltage value in the **Output Voltage** textbox based on the value in the Internal Reference Voltage slider. To obtain the correct value, check the **Internal Feedback** or **External Feedback** checkbox corresponding to the EV kit configuration. For external feedback configuration, enter the chosen feedback resistor values in the **Top Feedback Resistor** and **Bottom Feedback Resistor** textboxes to allow correct calculation of the corresponding output voltage to be displayed on the GUI software.

Note: Changing the Internal Feedback or External Feedback checkboxes (Figure 10) does NOT change the feedback configuration on the EV kit. It is only for calculating and displaying the correct output voltage value on the GUI software. If you wish to change the EV kit's feedback configuration, see the EV Kit Hardware *Output Voltage Configuration* section for details.

The Miscellaneous Configuration sections (Figure 11) show the remaining register settings of the MAX77831. Use these sections to control internal compensation resistance, switching frequency, switching current limit, and output voltage change slew rate (using the internal reference voltage DVS slew rate). Refer to the MAX77831 IC data sheet for more information on each available setting. Click **Read** to obtain the setting stored on the IC and click **Write** to apply new settings to the IC.
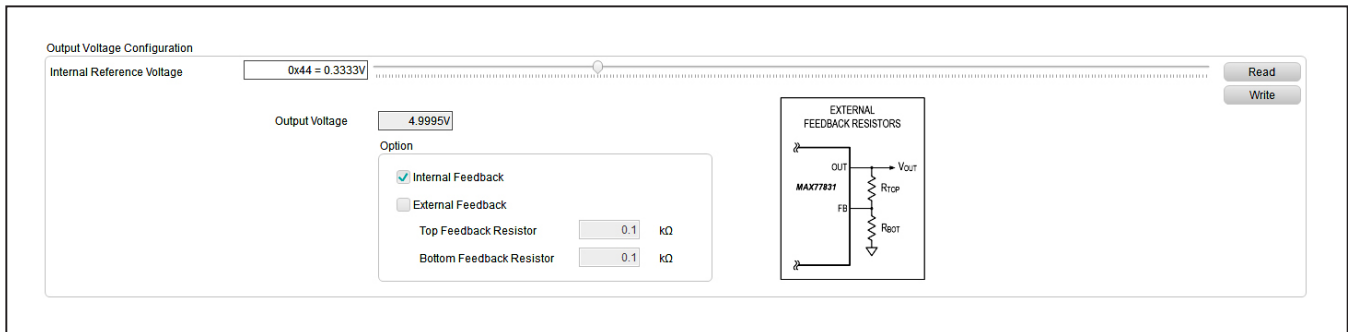

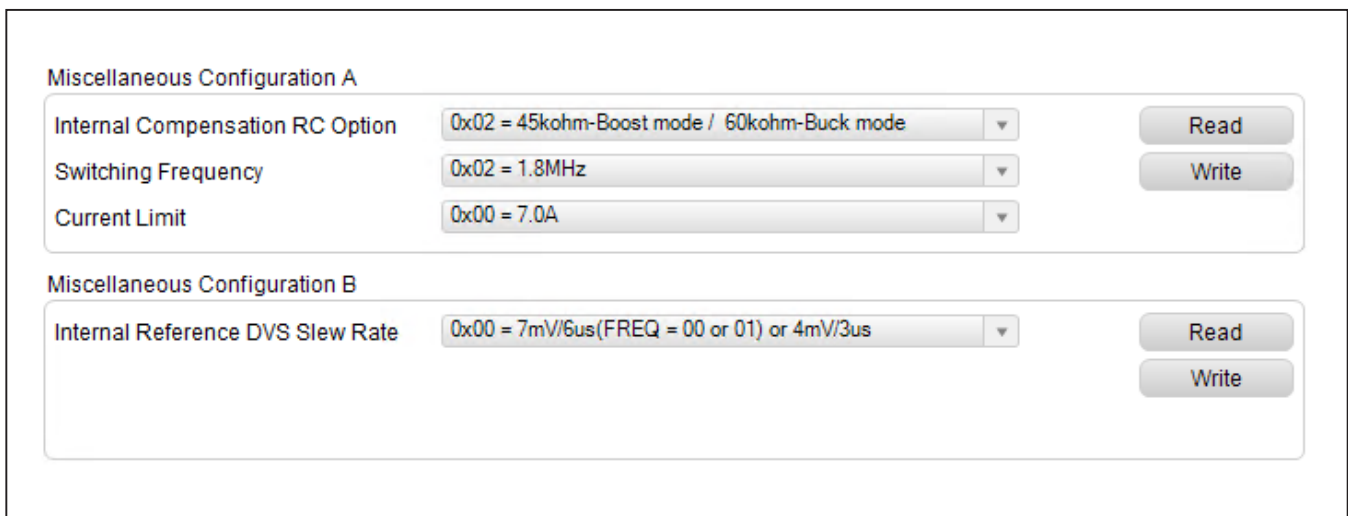*Figure 10. Configuration Tab - Output Voltage Configuration Section*

Figure 11. Configuration Tab - Miscellaneous Configuration Sections

Register Map

The Register Map tab provides an overview of all the MAX77831 registers and the values currently stored on them. Clicking on an individual bit shows the name and description of the specific bitfield.

Layout Guidelines

Careful circuit board layout is critical to achieve low switching power losses and clean stable operation. The EV kit also serves a Maxim recommended layout of the MAX77831. If the POK or fault interrupt functionality is desired, the high-density interconnect (HDI) PCB is required to route to the POKB/INTB pin. Otherwise, the HDI PCB is recommended but not required. Figure 13 and Figure 14 show example non-HDI and HDI PCB layouts for the MAX77831 WLP package. Use the provided layout files for guidance when designing with the IC. The IC data sheet contains a list of useful tips and guidelines for achieving the best possible layout. They are repeated here for convenience:

- Place the input capacitors (C_{IN}) and output capacitors (C_{OUT}) immediately next to the IN pin and OUT pin of the IC, respectively. Since the IC operates at a high switching frequency, this placement is critical for minimizing parasitic inductance within the input and output current loops, which can cause high voltage spikes and can damage the internal switching MOSFETs.

- Place the inductor next to the LX bumps (as close as possible) and make the traces between the LX bumps and the inductor short and wide to minimize PCB trace impedance. Excessive PCB impedance reduces converter efficiency. When routing LX traces on a separate layer (as in the examples), make sure to include enough vias to minimize trace impedance. Routing LX traces on multiple layers is recommended to further reduce trace impedance. Furthermore, do not make LX traces take up an excessive amount of area. The voltage on this node switches very quickly and additional area creates more radiated emissions.
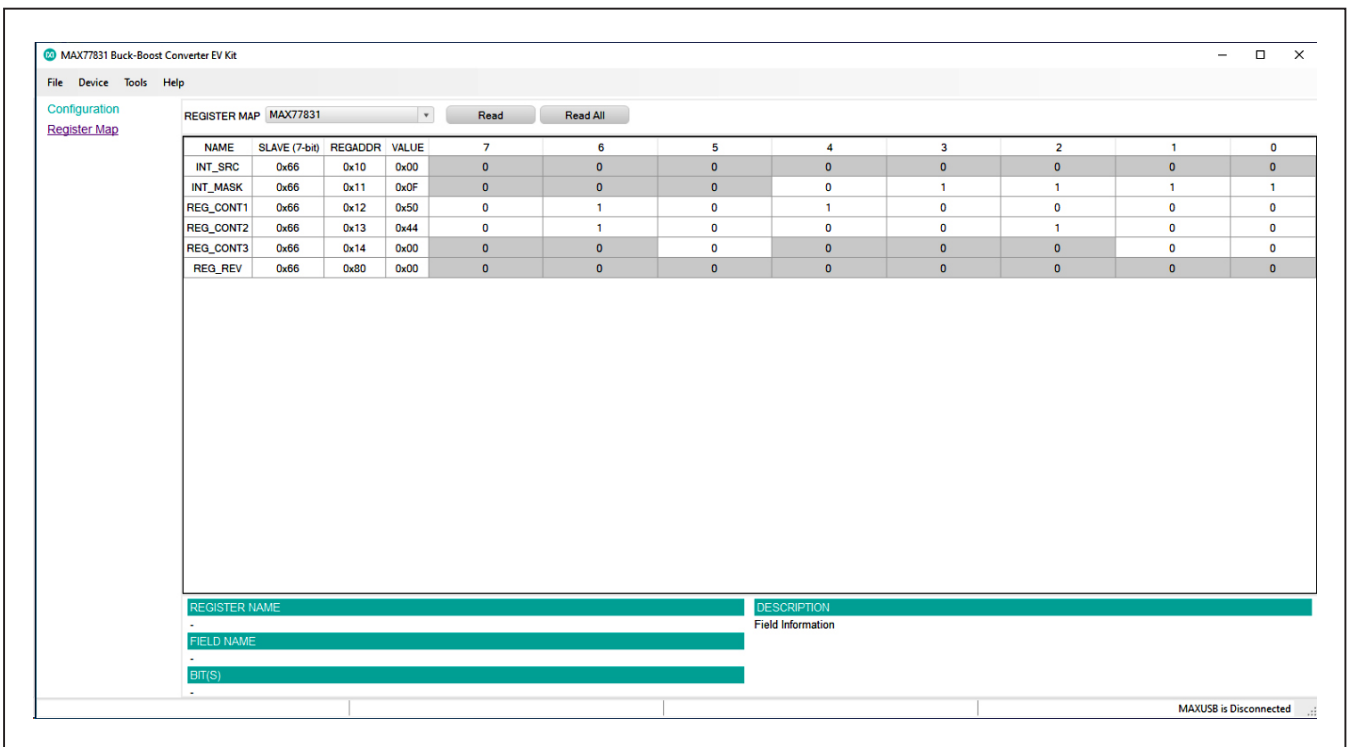

Figure 12. EV Kit GUI Software Register Map Tab

- Route LX nodes to the corresponding bootstrap capacitor (C_{BST}) as short as possible. Prioritize C_{BST} placement to reduce trace length to the IC.

- Connect the inner PGND bumps to the low-impedance ground plane on the PCB with vias placed next to the bumps. Do not create PGND islands, as PGND islands risk interrupting the hot loops. Connect AGND and AGND island to the low-impedance ground plane

on the PCB (the same net as PGND).

- Keep the power traces and load connections short and wide. This is essential for high converter efficiency.

- Do not neglect ceramic capacitor DC voltage derating. Choose capacitor values and case sizes carefully. Refer to the Output Capacitor Selection section in the MAX77831 IC datasheet and **Tutorial 5527** for more information.
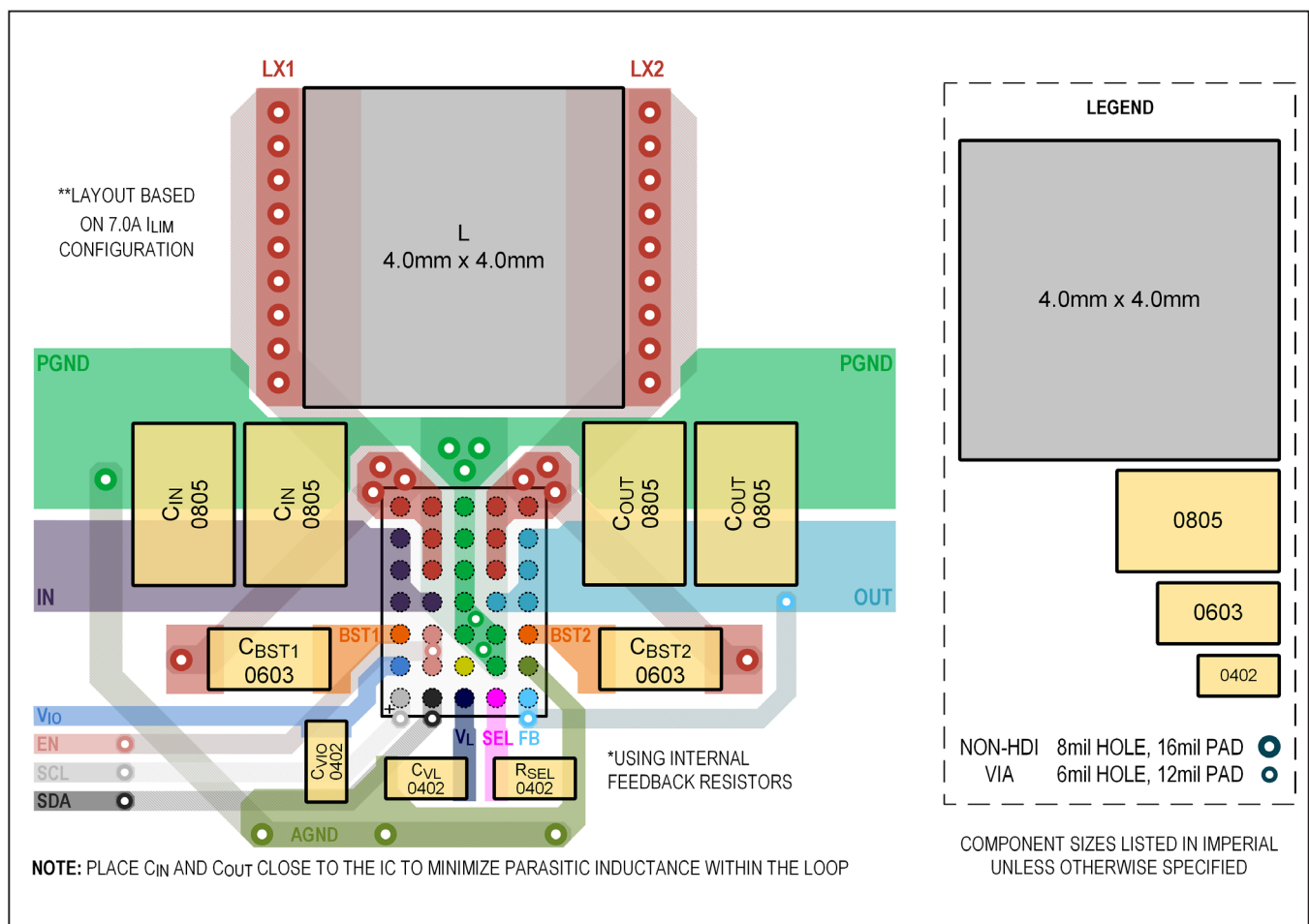
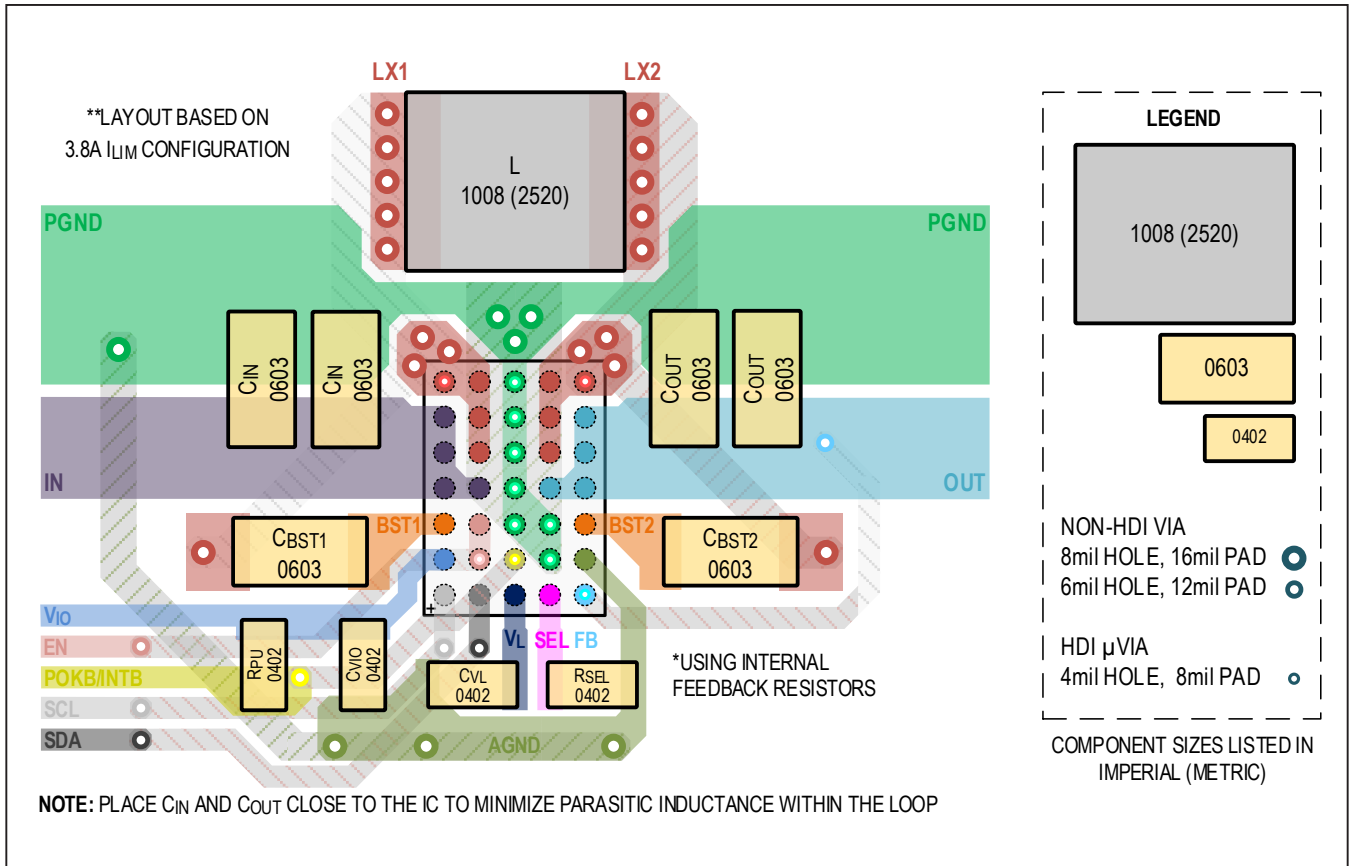*Figure 13. Non-HDI PCB Layout Recommendation (with 4mm x 4mm inductor and without POKB/INTB)*

Figure 14. HDI PCB Layout Recommendation (with 2520 Inductor and POKB/INTB)

Ordering Information

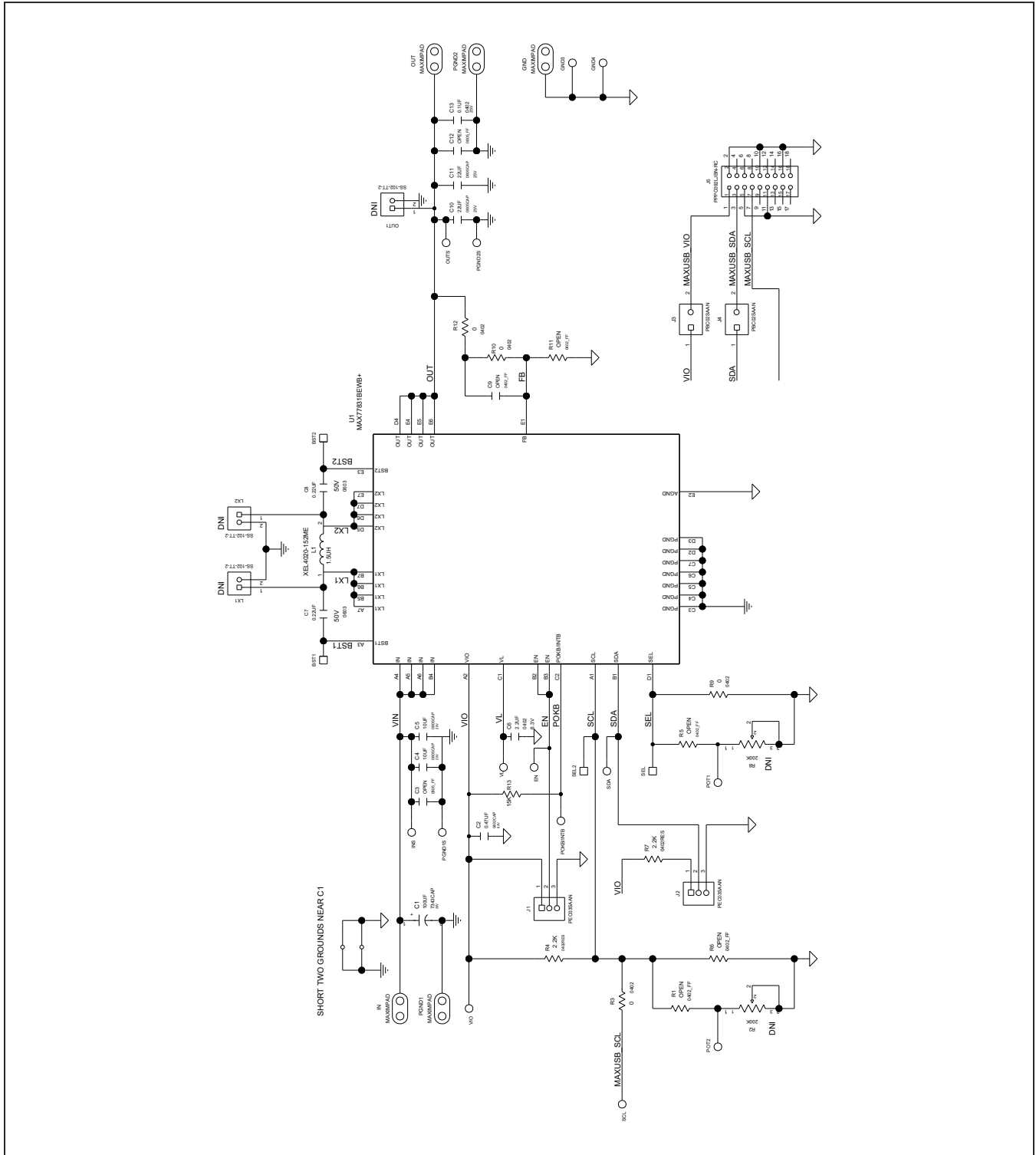| PART	U1 IC	DEFAULT OUTPUT VOLTAGE	TYPE
MAX77831WEVKIT#	MAX77831BEWB+T	5V	EV Kit

#Denotes a RoHS-compliant device that may include lead that is exempt under the RoHS requirements.
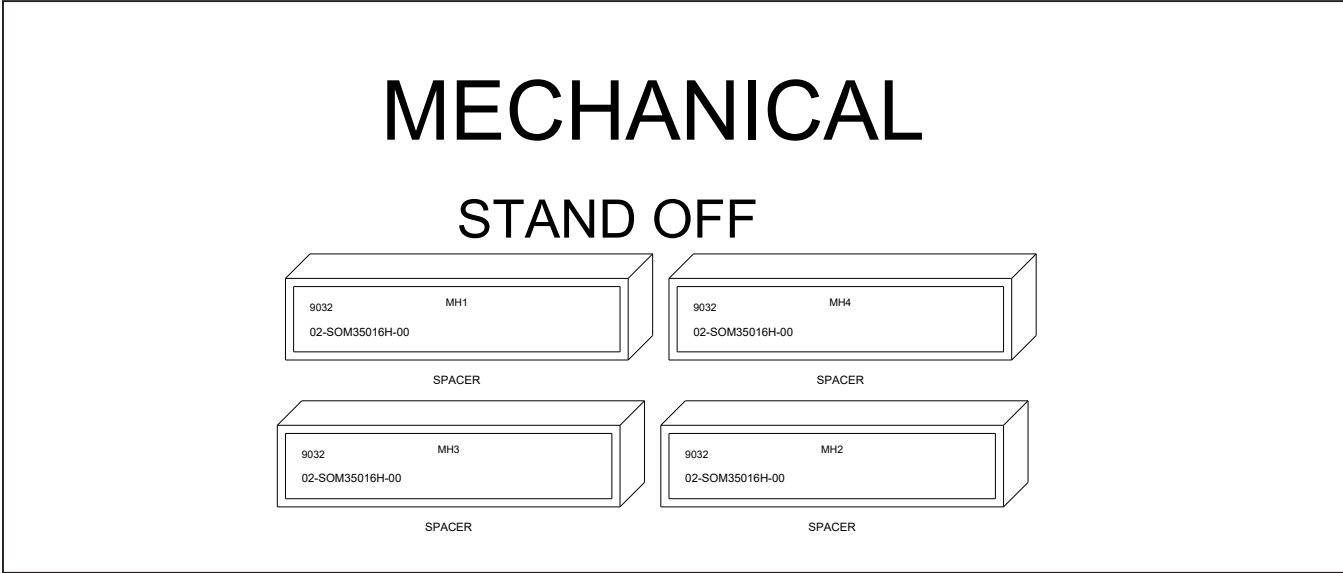
+Denotes a lead(Pb)-free/RoHS-compliant package.

MAX77831 EV Kit Bill of Materials

REF_DES	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
C1	1	T491X107K025A	KEMET	100µF	CAPACITOR; SMT (7343-43); TANTALUM CHIP; 100µF; 25V; TOL = 10%
C2	1	JMK105B7474KVHF	TAIYO YUDEN	0.47µF	CAP; SMT (0402); 0.47µF; 10%; 6.3V; X7R; CERAMIC CHIP
C4, C5	2	GRM21BC71E106KE11	MURATA	10µF	CAPACITOR; SMT (0805); CERAMIC CHIP; 10µF; 25V; TOL = 10%; TG = -55°C TO +125°C; TC = X7S
C6	1	C1005X7S0J225K050BC; GRM155C70J225KE11	TDK;MURATA	2.2µF	CAPACITOR; SMT (0402); CERAMIC CHIP; 2.2µF; 6.3V; TOL = 10%; MODEL = C SERIES; TG = -55°C TO +125°C; TC = X7S
C7, C8	2	GCJ188R71H224KA01	MURATA	0.22µF	CAP; SMT (0603); 0.22µF; 10%; 50V; X7R; CERAMIC CHIP
C10, C11	2	C2012X5R1E226M125AC; CL21A226MAQNNN	TDK; SAMSUNG ELECTRO-MECHANICS	22µF	CAPACITOR; SMT (0805); CERAMIC CHIP; 22µF; 25V; TOL = 20%; TG = -55°C TO +85°C; TC = X5R
C13	1	GRM155R71E104KE14; C1005X7R1E104K050BB; TMK105B7104KVH; CGJ2B3X7R1E104K050BB	MURATA;TDK; TAIYO YUDEN;TDK	0.1µF	CAP; SMT (0402); 0.1µF; 0.1; 25V; X7R; CERAMIC CHIP
EN, POKB/INTB, POT1, POT2, SCL, SDA	6	5002	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER;
GND, IN, OUT, PGND1, PGND2	5	9020 BUSS	WEICO WIRE	MAXIMPAD	EVK KIT PARTS; MAXIM PAD; WIRE; NATURAL; SOLID; WEICO WIRE; SOFT DRAWN BUS TYPE-S; 20AWG
GND3, GND4	2	5011	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.125IN; TOTAL LENGTH = 0.445IN; BOARD HOLE = 0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
INS, OUTS, VIO, VL	4	5000	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
J1, J2	2	PEC03SAAN	SULLINS ELECTRONICS CORP.	PEC03SAAN	EVKIT PART-CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS; -65°C TO +125°C;
J3, J4	2	PBC02SAAN	SULLINS ELECTRONICS CORP.	PBC02SAAN	EVKIT PART-CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS; -65°C TO +125°C;
J5	1	PPPC092LJBN-RC	SULLINS ELECTRONICS CORP.	PPPC092LJBN-RC	CONNECTOR; FEMALE; THROUGH HOLE; PPP SERIES; RIGHT ANGLE; 18PINS
L1	1	XEL4020-152ME	COILCRAFT	1.5UH	INDUCTOR; SMT; COMPOSITE; 1.5µH; 20%; 7.5A
MH1-MH4	4	9032	KEYSTONE	9032	MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON
PGND1S, PGND2S	2	5001	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
R3, R9, R10, R12	4	ERJ-2GE0R00	PANASONIC	0	RESISTOR; 0402; 0Ω; 0%; JUMPER; 0.10W; THICK FILM
R4, R7	2	CRCW04022K20FK; RC0402FR-072K2L	VISHAY DALE; YAGEO PHICOMP	2.2K	RESISTOR, 0402, 2.2KΩ, 1%, 100PPM, 0.0625W, THICK FILM
R13	1	ERJ-2RKF1502	PANASONIC	15K	RESISTOR; 0402; 15KΩ; 1%; 100PPM; 0.1W; THICK FILM
U1	1	MAX77831BEWB+	MAXIM	MAX77831BEWB+	EVKIT PART - IC; MAX77831BEWB+; PACKAGE OUTLINE DRAWING: 21-100367; PACKAGE CODE: W352A2+1; WLP35
PACK-OUT	1	MAXUSB_ INTERFACE#	MAXIM	MAXUSB_ INTERFACE#	ASSEMBLED BOARD
PCB	1	MAX77831WLP	MAXIM	PCB	PCB:MAX77831WLP
LX1, LX2, OUT1	DNP	SS-102-TT-2	SAMTEC	SS-102-TT-2	IC-SOCKET; SIP; STRAIGHT; PRECISION MACHINED SOCKET STRIP; OPEN FRAME; 2PINS; 100MIL
R2, R8	DNP	3296Y-1-204LF	BOURNS	200K	RESISTOR; THROUGH HOLE-RADIAL LEAD; 3296 SERIES; 200KΩ; 10%; 100PPM; 0.5W
C3, C12	DNP	N/A	N/A	OPEN	CAPACITOR; SMT (0805); OPEN; FORMFACTOR
C9	DNP	N/A	N/A	OPEN	CAPACITOR; SMT (0402); OPEN; FORMFACTOR
R1, R5, R6, R11	DNP	N/A	N/A	OPEN	RESISTOR; 0402; OPEN; FORMFACTOR
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MAX77831 EV Kit Schematic Diagram

MAX77831 EV Kit Schematic Diagram

MECHANICAL

STAND OFF

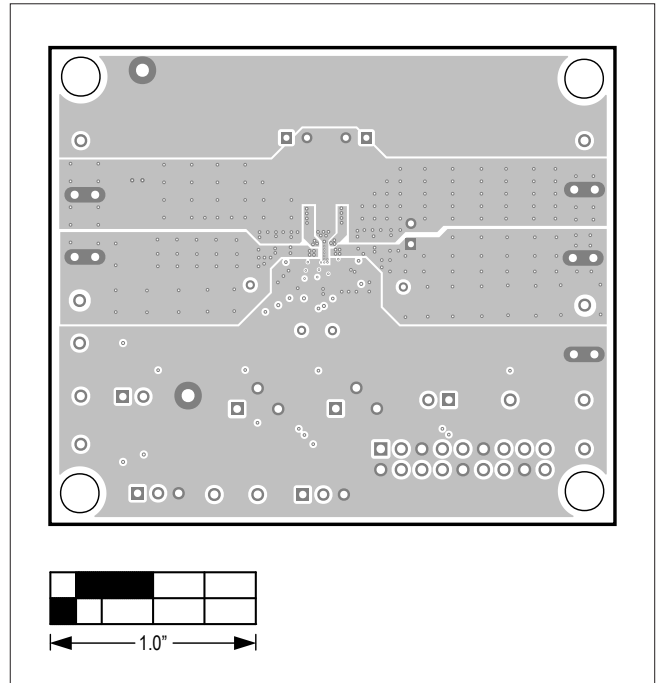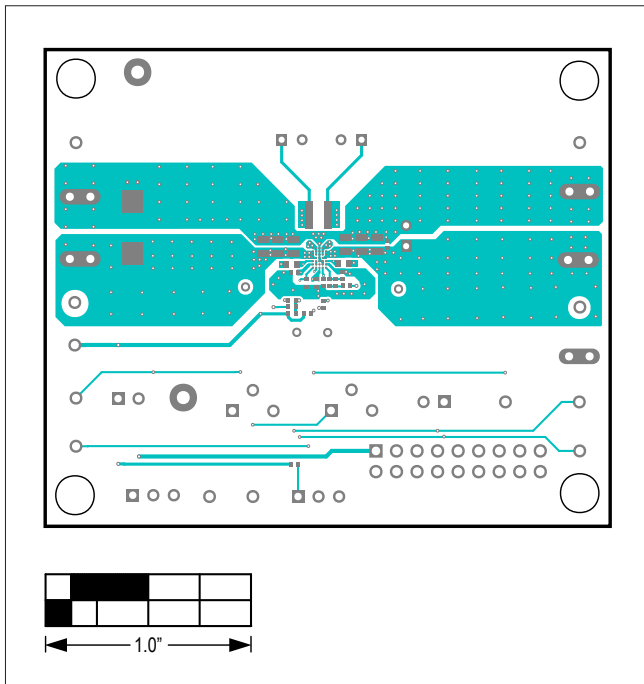|	
9032 MH1 02-SOM35016H-00 SPACER	9032 MH4 02-SOM35016H-00 SPACER
9032 MH3 02-SOM35016H-00 SPACER	9032 MH2 02-SOM35016H-00 SPACER

MAX77831 EV Kit PCB Layout Diagrams
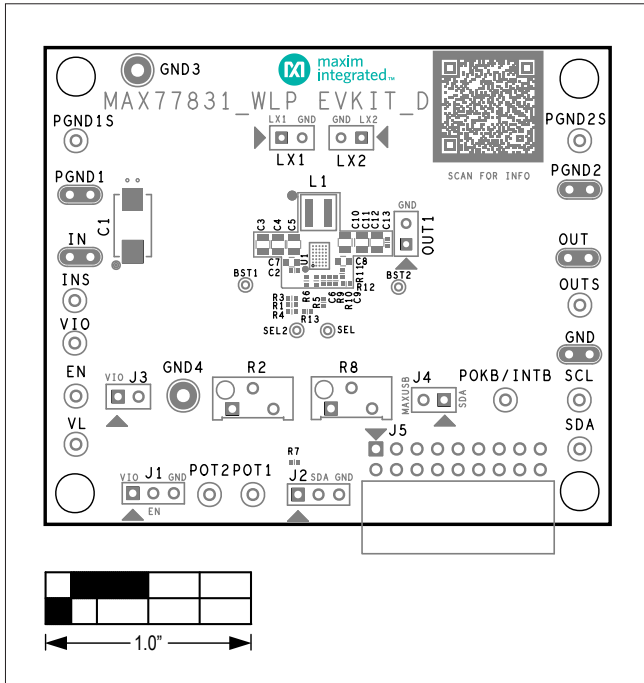
MAX77831 EV Kit PCB Layout — Top Silkscreen
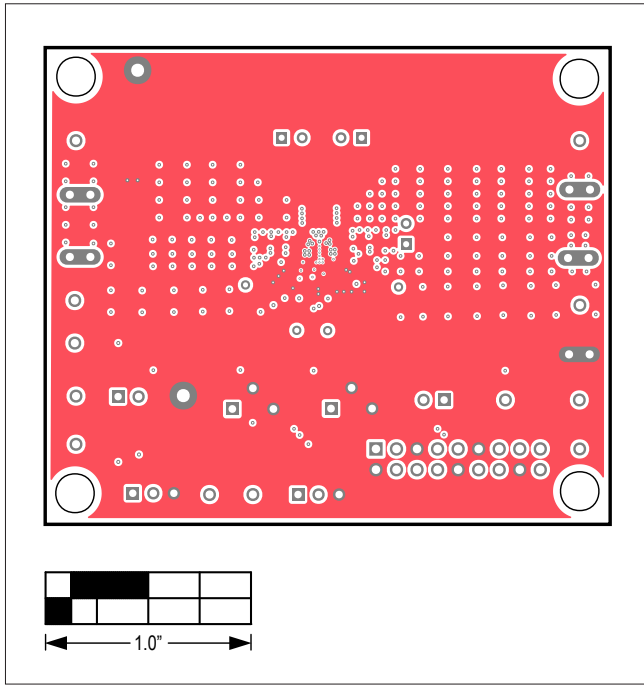

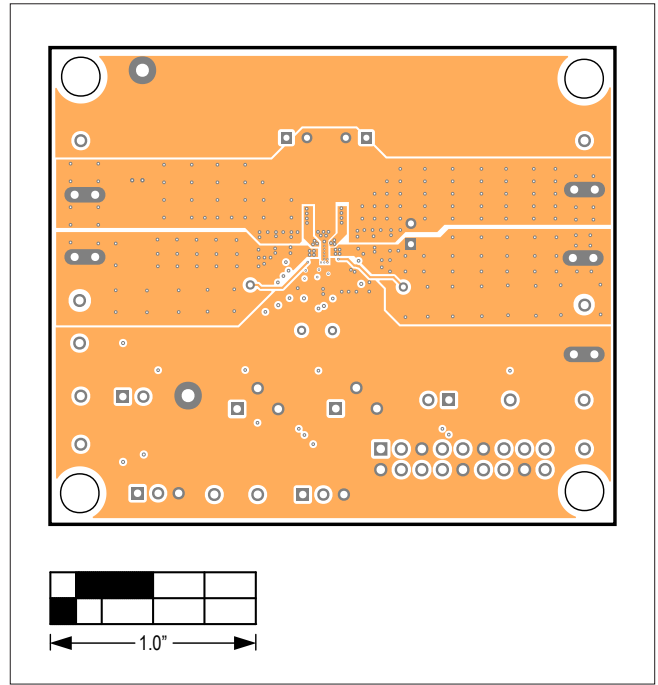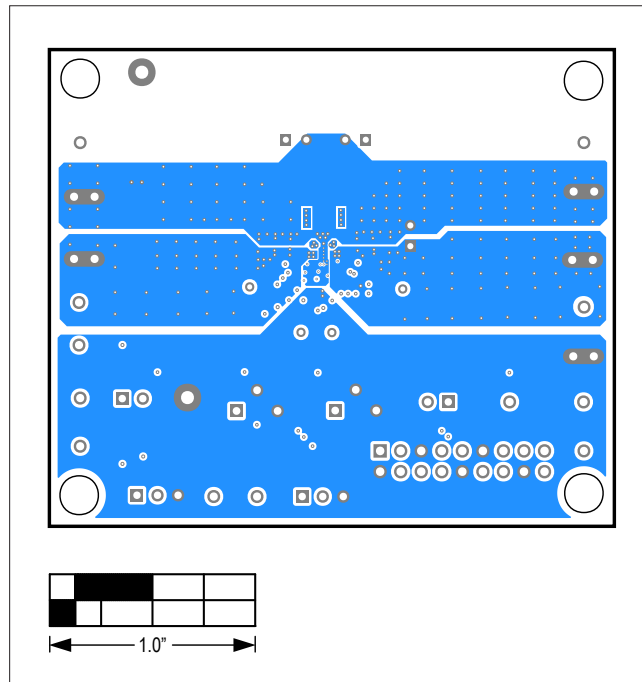*MAX77831 EV Kit PCB Layout — Internal 2*

MAX77831 EV Kit PCB Layout — Top View
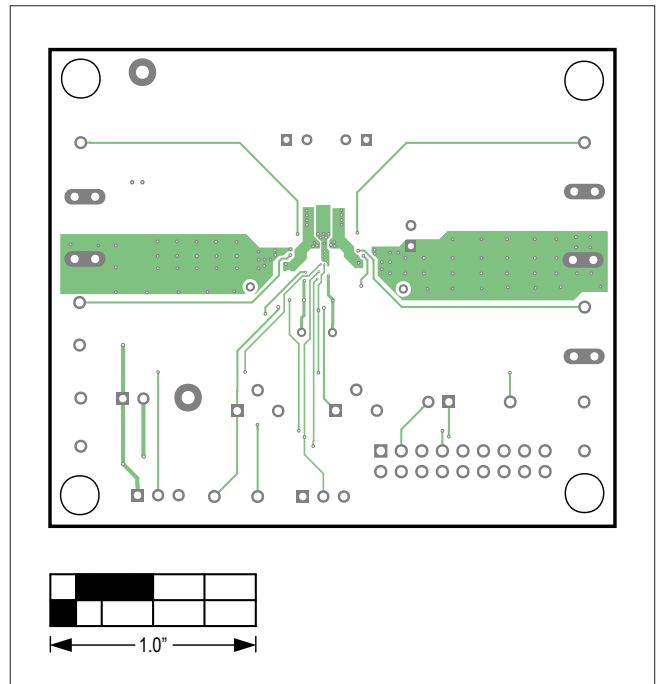
MAX77831 EV Kit PCB Layout — Internal 3

MAX77831 EV Kit PCB Layout Diagrams (continued)

MAX77831 EV Kit PCB Layout — Internal 4

MAX77831 EV Kit PCB Layout — Internal 5

MAX77831 EV Kit PCB Layout — Bottom View

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	9/20	Initial release	—
1	9/21	Updated *General Description* and *Benefits and Features* sections, *MAX77831 EV Kit Specifications* table, Figure 2, updated *EV Kit Default Configuration, Quick Start*, Table 1, Table 3, updated *MAXUSB_INTERFACE#, External I²C Bus, High Temperature Testing, Critical Node Measurement (OUT and LX)*, and *EV Kit Software*, added Figure 3 and Table 4, updated *Windows Driver* and *Connecting GUI to MAXUSB_INTERFACE#* sections	1–7

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