MAX77827 Evaluation Kit

Evaluates: MAX77827

General Description

The MAX77827 evaluation kit (EV kit) provides a proven design to evaluate the MAX77827, a 1.6A buck-boost converter. The IC is capable of 1.8V to 5.5V input and is output voltage adjustable between 2.3 to 5.3V (through SEL pin). The factory default output voltage of this EV kit is set at 3.3V. Output voltage can be adjusted by changing the SEL resistor value (R3). Two GPIO pins are available to support Force PWM and EN functions. The EV kit is compatible with any version of the MAX77827 WLP IC (MAX77827CEWC+ is the default).

Features and Default Settings

- Sense Points for High-Accuracy Measurements
- Accessible Test Points for EN, POK, and OUTS
- Output Voltage Adjustable Through SEL
- FPWM and Skip Mode Configurable (Skip Mode Default)
- UVLO Rising = 2.6V,
  UVLO Falling = 1.9V (MAX77827CEWC+)

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

SPECIFICATION	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage		2.6		5.5	V
Output Voltage	Configurable by SEL resistor R3 (see Table 2).	2.3		5.3	V
Default Output Voltage			3.3		V
Output Current		0		1.6	A
Peak Efficiency	3.3 VIN, 3.3 VOUT, 300mA load			96.0	%

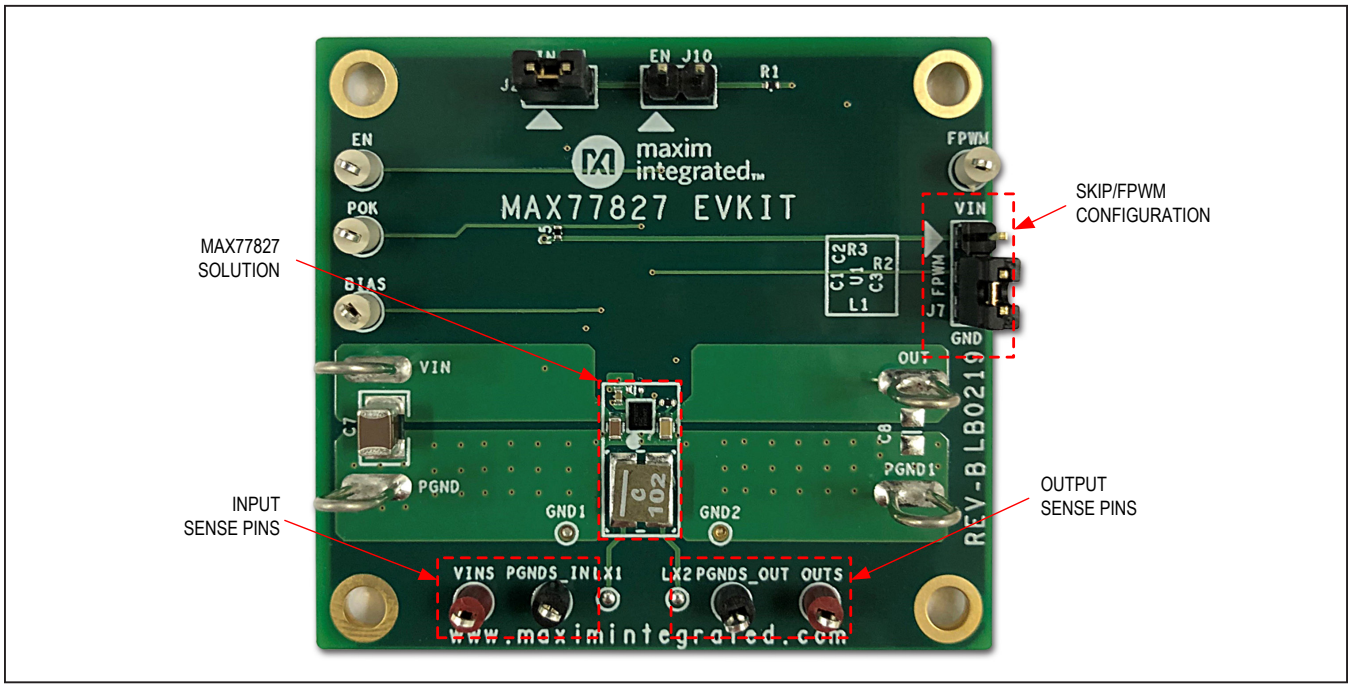


Figure 1. MAX77827 EV Kit Photo

maxim integrated™

Quick Start

Required Equipment

- MAX77827 EV kit
- Adjustable DC power supply
- A 1.8V DC power supply (optional)
- Digital Multi-meters

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation. Use twisted wires of appropriate gauge (20AWG) 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 VINS and PGNDS_IN sense pins to measure input voltage.
3) Connect a DVM to the OUTS and PGNDS_OUT sense pins to measure output voltage.
4) Apply a power supply set to 0V (100mA current limit) across the VIN and PGND terminals of the EV kit. Turn the supply on and increase the voltage to 3.8V.
5) Confirm the DVM connected to OUTS and PGNDS_OUT reads the default output voltage of the EV kit (3.3V).

Table 1. Default Shunt Positions and Jumper Descriptions

JUMPER	NODE OR FUNCTION	SHUNT POSITION	FUNCTION
J2	EN	1-2*	Connects EN to VIN (MAX77827 is enabled by default)
J10	DISABLE	1-2	Connects EN to GND
J7	FPWM	1-2	Enables FPWM function
		2-3*	Enables SKIP mode function

**Default position*

Detailed Description of Hardware

The MAX77827 EV kit demonstrates the MAX77827 buck-boost. It regulates output from input voltage ranges from 1.8V to 5.5V. Programmable output range is from 2.3V to 5.3V with 50mV steps. The EV kit is suited with a general DC input. Table 1 lists jumpers and associated functions that are available on the EV kit.

The MAX77827 includes an SEL pin to configure the output voltage on startup. Resistors with a tolerance of 1% (or better) should be chosen for R3, with nominal values specified in Table 2.

Table 2. MAX77827 RSEL Selection Table

RSEL (KΩ)	VOUT (V)
Open	3.3
909	2.3
768	2.4
634	2.5
536	2.6
452	2.7
383	2.8
324	2.8
267	2.85
226	5.2
191	2.9
162	5.3
133	3
113	3
95.3	3.1
80.6	3.15
66.5	3.15
56.2	3.2
47.5	3.4
40.2	3.45
34	3.5
28	3.6
23.7	3.7
20	3.75
16.9	3.8
14	3.9
11.8	4
10	4.1
8.45	4.2
7.15	4.4
5.9	4.5
4.99	5
Short to GND	3.3

Component List

PART	QTY	MFG PART #	MANUFACTURER	DESCRIPTION
C1	1	C1608X5R1A106K	TDK	10µF ±10%, 10V X5R CERAMIC CAPACITOR (0603)
C2	1	GRM155R70J105MA12	MURATA	1µF ±20%, 6.3V X7R CERAMIC CAPACITOR (0402)
C3	1	C1608X5R1A226M080AC	TDK	22µF ±20%, 10V X5R CERAMIC CAPACITOR (0603)
J2, J10	2	PEC02SAAN	SULLINS ELECTRONICS CORP.	STRAIGHT CONNECTOR, 2 PINS
J7	1	PBC03SAAN	SULLINS ELECTRONICS CORP.	STRAIGHT CONNECTOR, 3 PINS
L1	1	XAL4020-102ME	COILCRAFT	1µH ±20%, ISAT = 9.6A, DCR = 13.25mΩ
R2	1	ANY	ANY	0Ω, RESISTOR (0402)
U1	1	MAX77827CEWC+	MAXIM	BUCK-BOOST (12 WLP), MAX77827CEWC+
Components below this line are outside of the immediate MAX77827 evaluation circuit and solution silkscreen.				
BIAS, EN, FPWM, POK	4	5000	KEYSTONE	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
C7	1	C3225X5R0J107M250AC	TDK	100µF ±20%, 6.3V X7R CERAMIC CAPACITOR (1210)
OUT, PGND, PGND1, VIN	4	9020 BUSS	WEICO WIRE	EVK KIT PARTS; MAXIM PAD; WIRE; NATURAL; SOLID; WEICO WIRE; SOFT DRAWN BUS TYPE-S; 20AWG
R1	1	ANY	ANY	806kΩ ±1%, RESISTOR (0402)
R5	1	ANY	ANY	100kΩ ±1%, RESISTOR (0402)
PCB	1	MAX77827 SOLDERDOWN	MAXIM	PCB:MAX77827SOLDERDOWN
C8	0	N/A	N/A	CAPACITOR; SMT (0805); OPEN; IPC MAXIMUM LAND PATTERN
R3	0	N/A	N/A	RESISTOR; 0402; OPEN; FORMFACTOR

Ordering Information

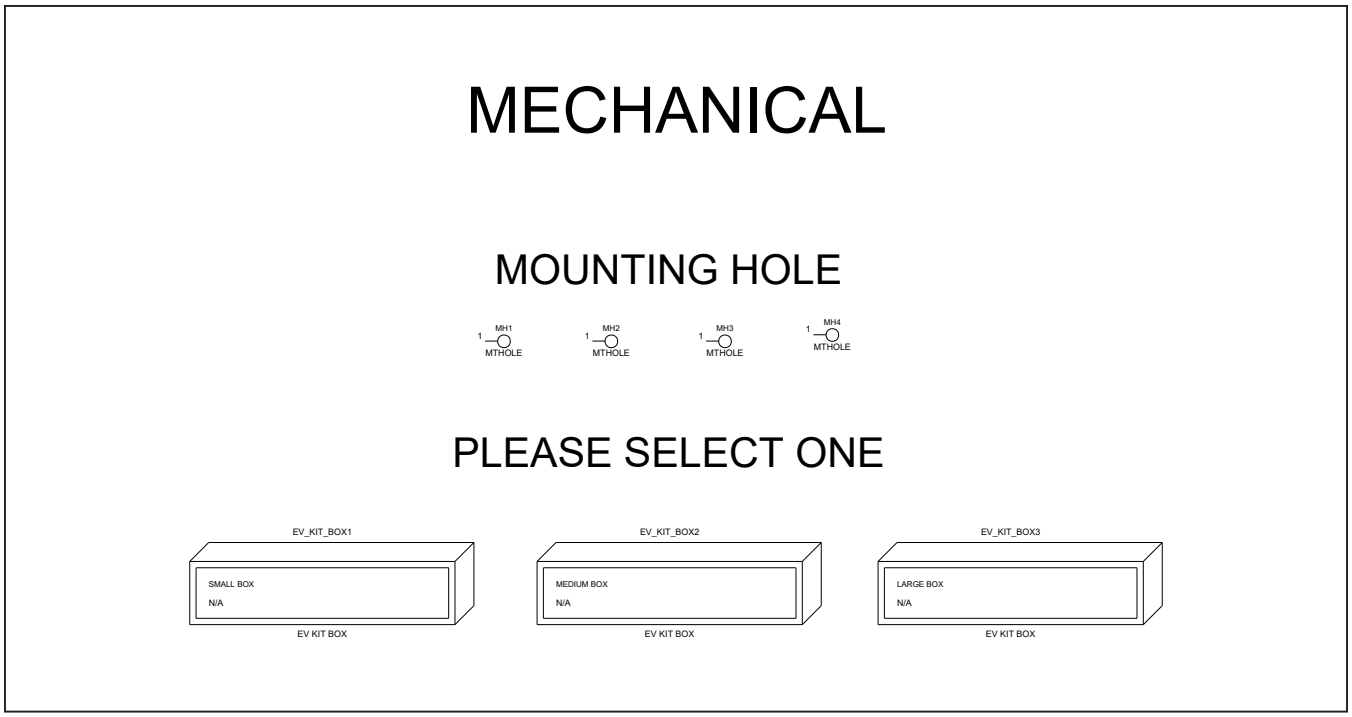
PART	U1 IC	DEFAULT OUTPUT VOLTAGE	UVLO FALLING	UVLO RISING
MAX77827EVKIT#	MAX77827CEWC+	3.3V	1.9V	2.6V

#Denotes a RoHS-compliant device that may include lead that is exempt under the RoHS requirements.

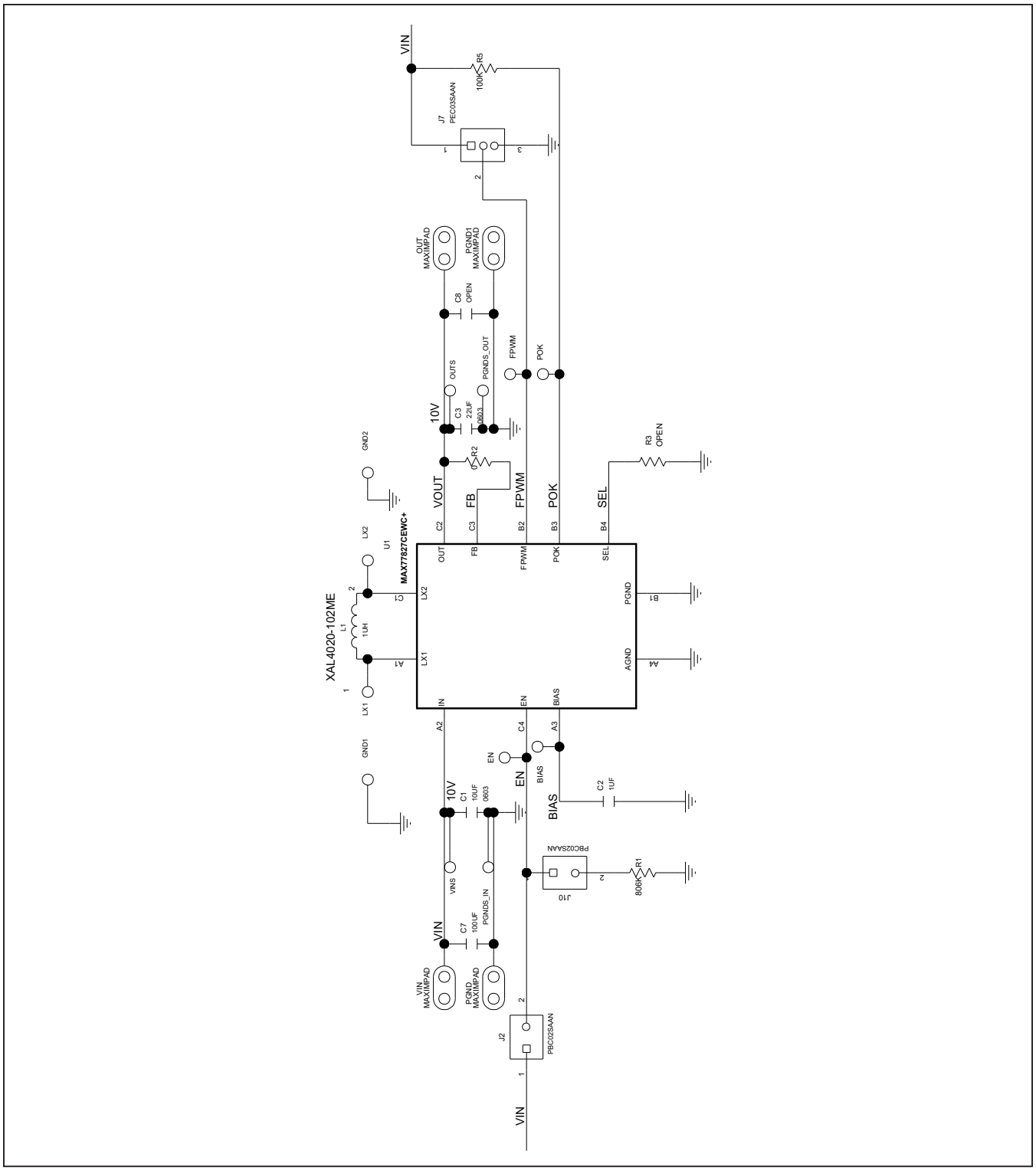
MAX77827 EV Kit Bill of Materials

REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
BIAS, EN, FPWM, POK		4	5002	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER;
C1		1	C1608X5R1A106K080AC	TDK	10UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 10UF; 10V; TOL = 10%; MODEL = ; TG = -55°C TO +85°C; TC = X5R
C2		1	GRM155R70J105MA12	MURATA	1UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 1UF; 6.3V; TOL = 20%; TG = -55°C TO +125°C; TC = X7R
C3		1	C1608X5R1A226M080AC; GRM188R61A226ME15	TDK;MURATA	22UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 22UF; 10V; TOL = 20%; TG = -55°C TO +85°C; TC = X5R
C7		1	C1210C107M9PAC; C1210X5R6R3-107MNE; GRM32ER60J107ME20; C3225X5R0J107M250AC	KEMET;VENKEL LTD.; MURATA;TDK	100UF	CAPACITOR; SMT (1210); CERAMIC CHIP; 100UF; 6.3V; TOL = 20%; TG = -55°C TO +85°C; TC = X5R
J2, J10		2	PBC02SAAN	SULLINS ELECTRONICS CORP.	PBC02SAAN	EVKIT PART-CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS; -65°C TO +125°C;
J7		1	PEC03SAAN	SULLINS ELECTRONICS CORP.	PEC03SAAN	EVKIT PART-CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS; -65°C TO +125°C;
L1		1	XAL4020-102ME	COILCRAFT	1UH	INDUCTOR; SMT; METAL COMPOSITE CORE; 1.0UH; TOL = ±20%; 9.6A
OUT, PGND, PGND1, VIN		4	9020 BUSS	WEICO WIRE	MAXIMPAD	EVK KIT PARTS; MAXIM PAD; WIRE; NATURAL; SOLID; WEICO WIRE; SOFT DRAWN BUS TYPE-S; 20AWG
OUTS, VINS		2	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;
PGNDS_IN, PGNDS_OUT		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;
R1		1	CRCW0402806KFK	VISHAY DALE	806K	RES; SMT (0402); 806K; 1%; ±100PPM/DEGC; 0.063W
R2		1	RC0402JR-070RL; CR0402-16W-000RJT	YAGEO PHYCOMP; VENKEL LTD.	0	RESISTOR; 0402; 0Ω; 5%; JUMPER; 0.063W; THICK FILM
R5		1	CRCW0402100KFK; RC0402FR-07100KL	VISHAY;YAGEO	100K	RESISTOR; 0402; 100K; 1%; 100PPM; 0.0625W; THICK FILM
U1		1	MAX77827CEWC+	MAXIM	MAX77827CEWC+	EVKIT PART-IC; 5.5V INPUT; 1A; TINY BUCK-BOOST CONVERTER; PACKAGE OUTLINE DRAWING: 21-100302; PACKAGE CODE: W121H2+1; WPL12
PCB		1	MAX77827SOLDERDOWN	MAXIM	PCB	PCB:MAX77827SOLDERDOWN
R3	DNP	0	N/A	N/A	OPEN	RESISTOR; 0402; OPEN; FORMFACTOR
C8	DNP	0	N/A	N/A	OPEN	CAPACITOR; SMT (0805); OPEN; IPC MAXIMUM LAND PATTERN

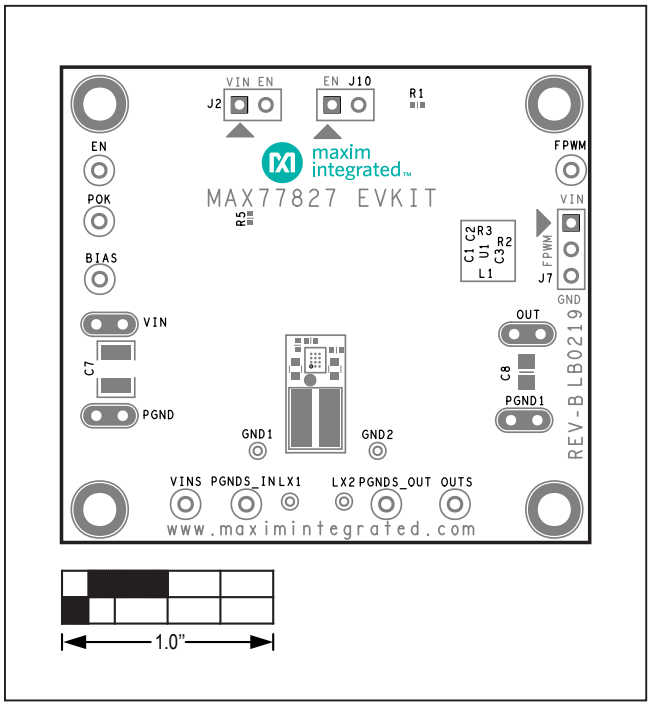
MAX77827 EV Kit Schematic



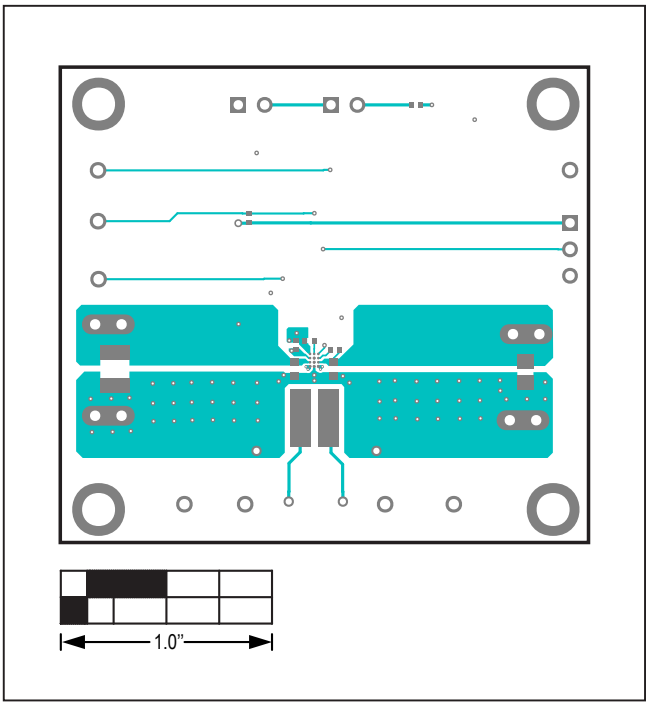
MAX77827 EV Kit Schematic (continued)



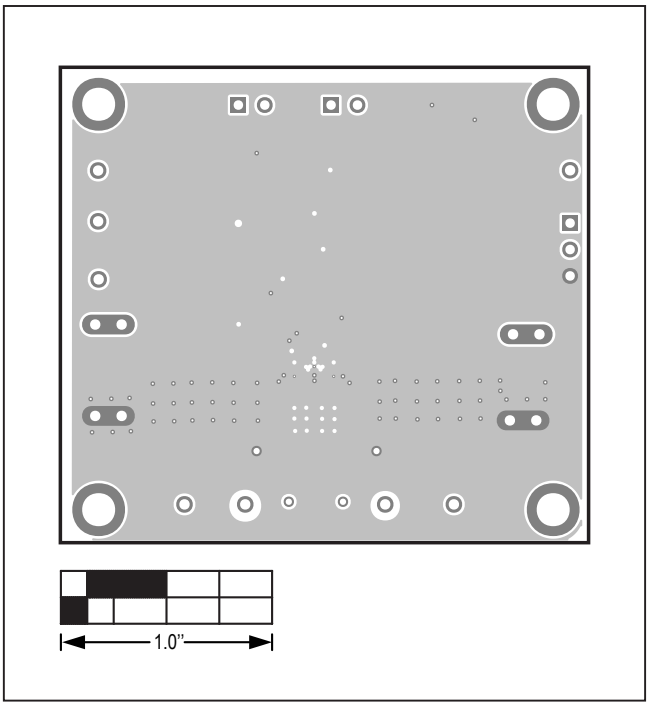
MAX77827 EV Kit PCB Layout Diagrams



MAX77827 EV Kit Component Placement Guide—Top Side

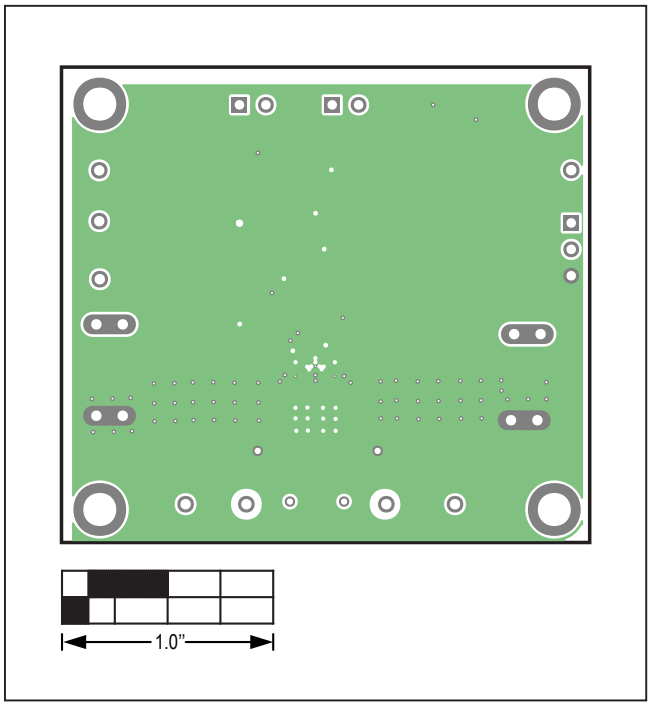


MAX77827 EV Kit PCB Layout—Top Side

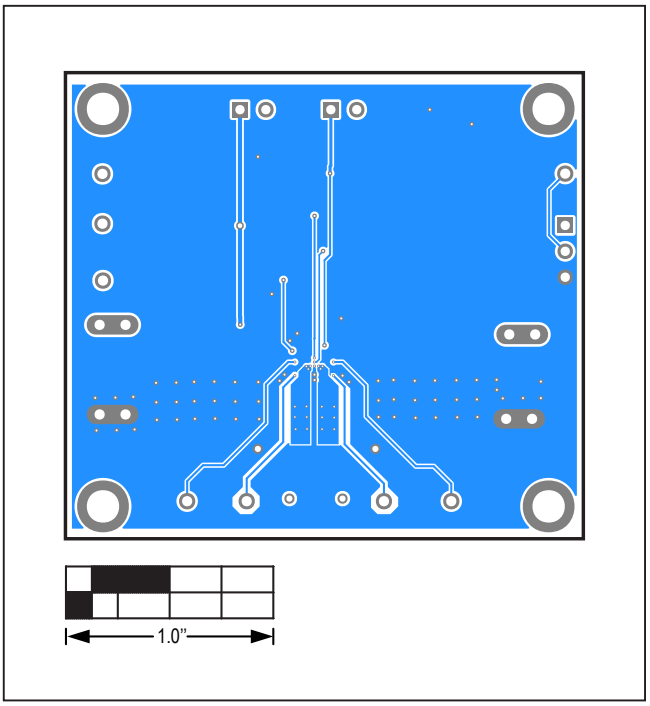


MAX77827 EV Kit PCB Layout—Layer 2

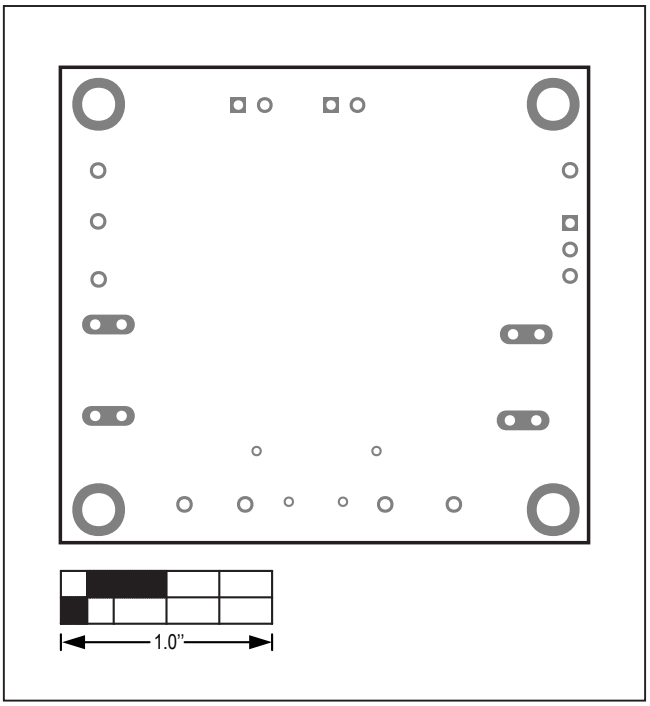
MAX77827 EV Kit PCB Layout Diagrams (continued)



MAX77827 EV Kit PCB Layout—Layer 3



MAX77827 EV Kit PCB Layout—Bottom Layer



MAX77827 EV Kit PCB Layout—Silk Bottom

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	5/19	Initial release	—

For pricing, delivery, and ordering information, please visit Maxim Integrated's online storefront at https://www.maximintegrated.com/en/storefront/storefront.html.

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.

