

General Description

The MAX17244 evaluation kit (EV kit) demonstrates the MAX17244 high-voltage, current-mode step-down converter with low operating current. The EV kit operates over a wide 6V to 36V input range and the output is set for 5V at 2.5A. The EV Kit switching frequency is set at 1.66MHz

The EV kit comes with the MAX17244ETESA+ installed.

Features

- Wide 6V to 36V Input Supply Range
- Forced-PWM or Skip-Mode Operation
- Configurable Switching Frequency
- Current-Mode Controller with Force-PWM and Skip Modes
- 86% Peak Efficiency at 12V Input in Skip-Mode
- 89% Peak Efficiency at 12V Input in Forced-PWM
- FSYNC Input and Power-Good Output
- Proven 4-Layer 2oz Copper PCB Layout
- Demonstrates 1065mil x 795mil Solution Size
- Fully Assembled and Tested

Table 1. EN Configuration (JU1)

SHUNT POSITION	DESCRIPTION
1-2*	Connects the EN pin to the voltage at SUP for normal operation.
2-3	Connects the EN pin to ground to enter shutdown mode.

*Default position.

Table 2. Mode of Operation (JU2)

SHUNT POSITION	MODE PIN	MODE
1-2*	Connected to BIAS	Forced-PWM mode
2-3	Connected to AGND	Skip mode
Not installed	Connected to an external clock	Forced-PWM mode (device syncs to an external clock)

*Default position.

Quick Start

Required Equipment

- MAX17244 EV kit
- 14V, 1A DC power supply
- Electronic load capable of 2.5A
- Digital voltmeter (DVM)

Procedure

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

- 1) Verify that jumpers JU1 and JU2 are in their default positions, as shown in [Table 1](#) and [Table 2](#).
- 2) Connect the power supply between the EXT_VBAT and nearest PGND banana jacks.
- 3) Connect the 2.5A electronic load between the OUT and nearest PGND banana jacks.
- 4) Connect the DVM between the OUT and nearest PGND banana jacks.
- 5) Turn on the power supply.
- 6) Enable the electronic load.
- 7) Verify that the voltage at the OUT test point is approximately 5V.

Note: When a high input voltage or high load current is applied continuously, an external cooling fan may be required to prevent MAX17244 from shutting down due to overtemperature.

Ordering Information appears at end of data sheet.



Detailed Description of Hardware

The EV kit demonstrates the MAX17244 high-voltage, high-frequency, step-down converter with low operating current. The EV kit operates over a wide 6V to 36V input range and the output is set for 5V at 2.5A.

Enable (EN)

Place a shunt in the 1-2 position on jumper JU1 for normal operation. To place the device into shutdown mode, move the shunt on JU1 to the 2-3 position.

Synchronization Input (FSYNC)

The EV kit features jumper JU2 to control the synchronization input (FSYNC). Connect FSYNC to AGND to enable skip-mode operation. Connect to BIAS or to an external clock to enable fixed-frequency forced-PWM mode operation.

The device can be synchronized to an external signal applied to FSYNC. To use an external clock, uninstall the shunt on JU2 and apply the signal at the FSYNC test point. The external clock frequency at FSYNC can be higher or lower than the internal clock by 20%. Ensure that the duty cycle of the external clock used has a minimum 100ns pulse width.

Synchronizing Output (SYNCOUT)

The EV kit provides a test point EXT_5V to pull up the open-drain SYNCOUT to an external 5V supply. SYNCOUT is a 180° out-of-phase clock output relative to the internal oscillator at SYNCOUT to create cascaded power supplies with multiple MAX17244s.

Setting the Switching Frequency (FOSC)

The EV kit switching frequency is set to 1.66MHz by the resistor, R_{FOSC} (R2), connected from F_{OSC} to AGND. Refer to the *Internal Oscillation* section in the MAX17244 IC data sheet for the equation and/or a graphical approach to selecting the correct R_{FOSC} (R2) value.

Power-Good Output (PGOOD)

The EV kit provides a PGOOD test point to monitor the status of the device output. PGOOD asserts when V_{OUT} rises above 95% of its regulation voltage. PGOOD deasserts when V_{OUT} drops below 92% of its regulation voltage.

Output

Connect FB to BIAS for a fixed +5V (EV kit default output) output voltage. To set the output to other voltages between 1V and 10V, remove R12 and connect a resistive-divider from output (OUT) to FB to AGND. Use the following formula to determine the R4 and R6 of the resistive-divider network:

$$R4 = R6 \times \left(\frac{V_{OUT}}{V_{FB}} - 1 \right)$$

where V_{FB} = 1V.

Component Suppliers

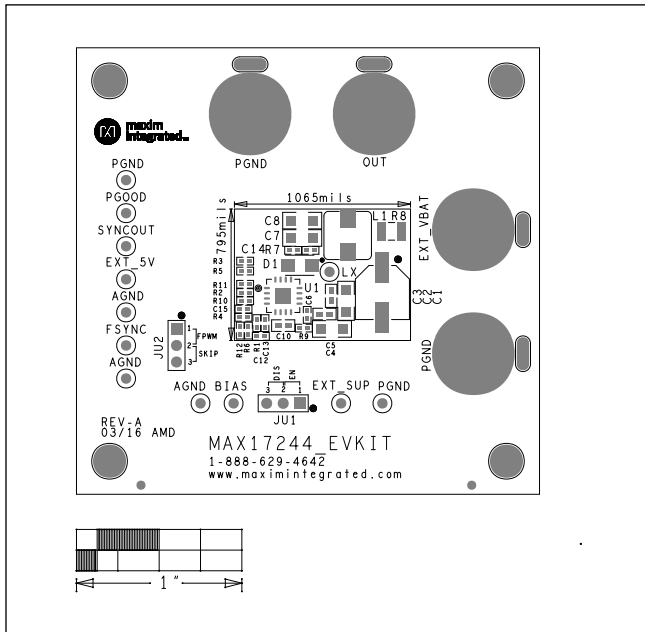
SUPPLIER	WEBSITE
Murata Americas	www.murata.com
Panasonic Corp.	www.panasonic.com
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Taiyo Yuden	www.taiyo-yuden.com
NXP Semiconductors	www.nxp.com

Note: Indicate that you are using the MAX17244 when contacting these component suppliers.

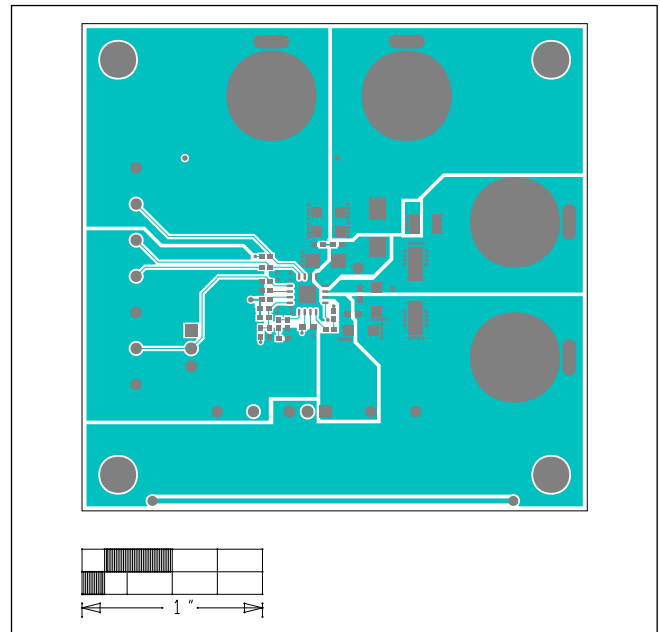
MAX17244 EV Kit Bill of Materials

Item	Component Description	Qty	Reference Designators	Manufacturer	Part Number
0001	Testpoints, Black	5	AGND (2x), PGND (3x)	Keystone	5001
0002	Testpoints, Red	7	BIAS, EXT_SUP, EXT_5V, FSYNC, LX, /PGOOD, SYNCOUT	Keystone	5000
0003	47uF 20%, 50V aluminum electrolytic capacitor (8x10.2mm)	1	C1	Panasonic	EEE-TG1H470UP
0004	4.7uF 10%, 50V X7R ceramic capacitor (1206)	2	C2, C4	Taiyo Yuden	UMK316AB7475KL
0005	0.1uF 10%, 50V X7R ceramic capacitor (0603)	2	C3, C5	Murata	GCM188R71H104KA57D
0006	0.1uF 10%, 16V X7R ceramic capacitor (0402)	1	C6	Murata	GRM155R71C104K
0007	22uF 10%, 10V X7R ceramic capacitors (1206)	2	C7, C8	Samsung Electro	CL31B226KPHNNNE
0008	2.2uF 10%, 10V X7R ceramic capacitor (0603)	1	C10	Murata	GRM188R71A225K
0009	1000pF 10% 50V X7R ceramic capacitor (0402)	1	C12	Murata	GRM155R71H102K
0010	10pF 5% 50V C0G ceramic capacitor (0402)	1	C13	Murata	GRM1555C1H100J
0011	3A, 60V Schottky diode (SOD128)	1	D1	NXP	PMEG6030ETP
0012	JACKS, BANNANA, UNINSULATED, PANEL MOUNT	4	EXT_VBAT, OUT, PGND (2x)	JOHNSON	108-0740-001
0013	3 pin headers, 2.54mm, Comes in 36-40 Pin Strips (CUT TO FIT)	2	JU1, JU2	SULLINS	PEC36SAAN
0014	2.2uH, 13A inductor (7mm x 6.9mm)	1	L1	Würth Electronics	744311220
0015	20k ohms 1% resistor (0402)	1	R1	Any	Any
0016	16.5k ohms 1% resistor (0402)	1	R2	Any	Any
0017	10k ohms 5% resistor (0402)	1	R3	Any	Any
0018	1k ohms 5% resistor (0402)	1	R5	Any	Any
0019	0 ohms 5% resistor (1210)	1	R8	Any	Any
0020	0 ohms 5% resistor (0402)	3	R9, R10, R12	Any	Any
0021	100k ohms 5% resistor (0402)	1	R11	Any	Any
0022	Shunts	2	SU1, SU2	Kyocera	SX1100-B
0023	Step-down Converter (16 TQFN-EP 5x5x0.8mm)	1	U1	Maxim	MAX17244ETESA+
0024	PC board: MAX17244 EV KIT	1	2 oz. Cu	CMR	MAX17244 EV KIT
0025	Not installed, ceramic capacitor (0402)	0	C14, C15		
0026	Not installed, resistor (0402)	0	R4, R6, R7		
0027	Not installed, resistor (0603)	0	R13		
0028	Maxim pads	0	EXT_VBAT, OUT, PGND (2x)		

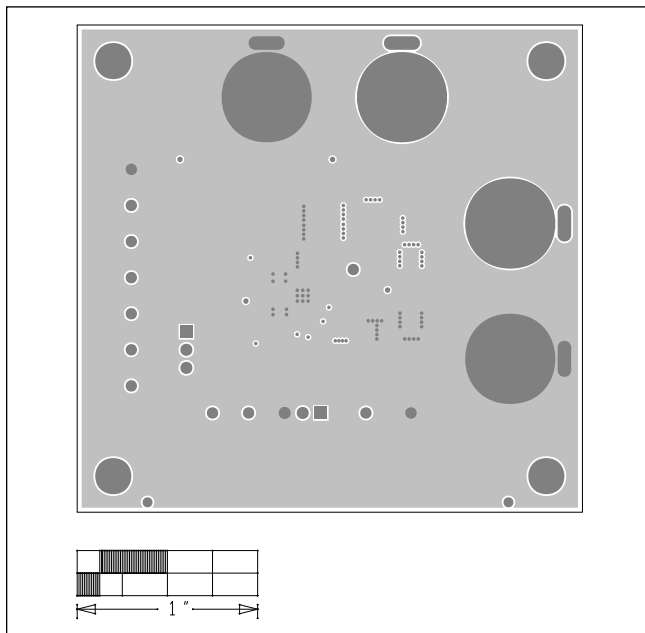
MAX17244 EV Kit PCB Layout Diagrams



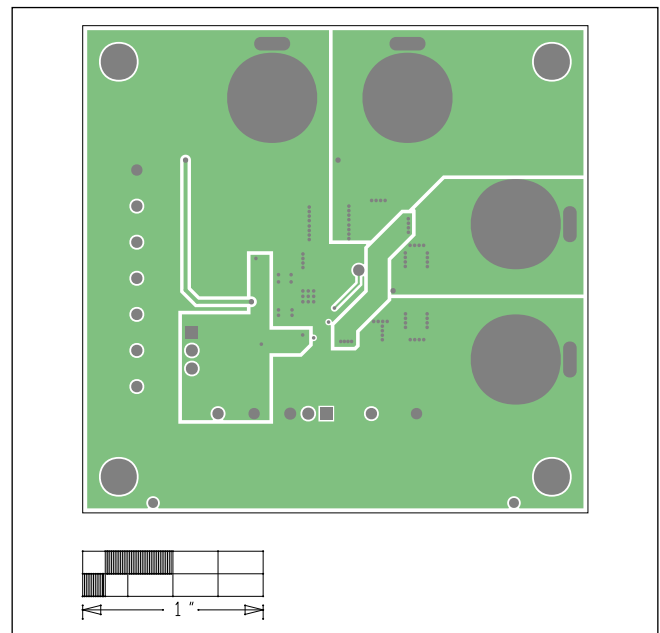
MAX17244 EV Kit—Top Silkscreen



MAX17244 EV Kit—Top

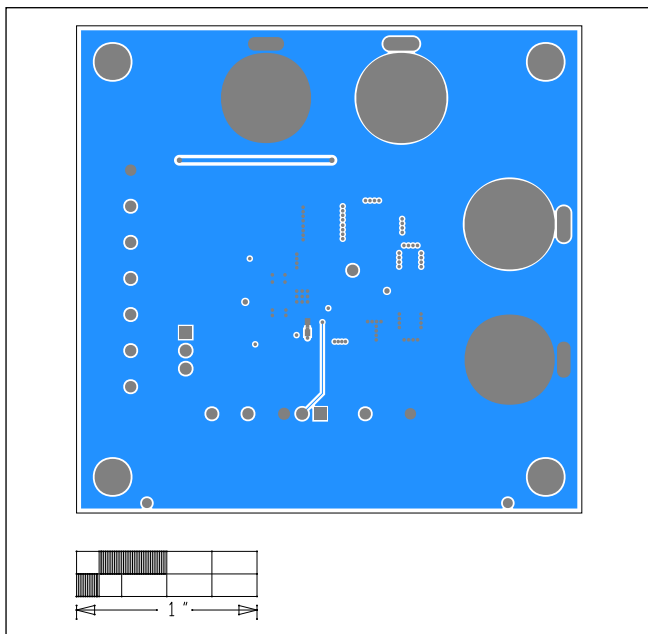


MAX17244 EV Kit—Layer 2

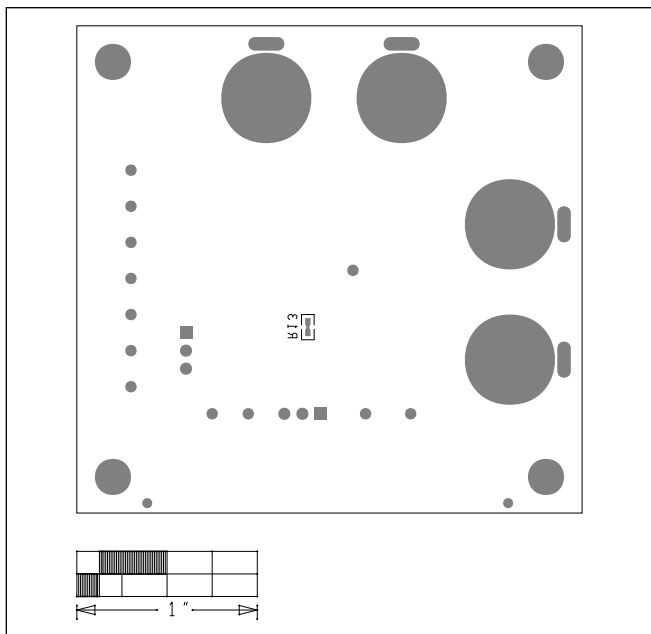


MAX17244 EV Kit—Layer 3

MAX17244 EV Kit PCB Layout Diagrams (continued)

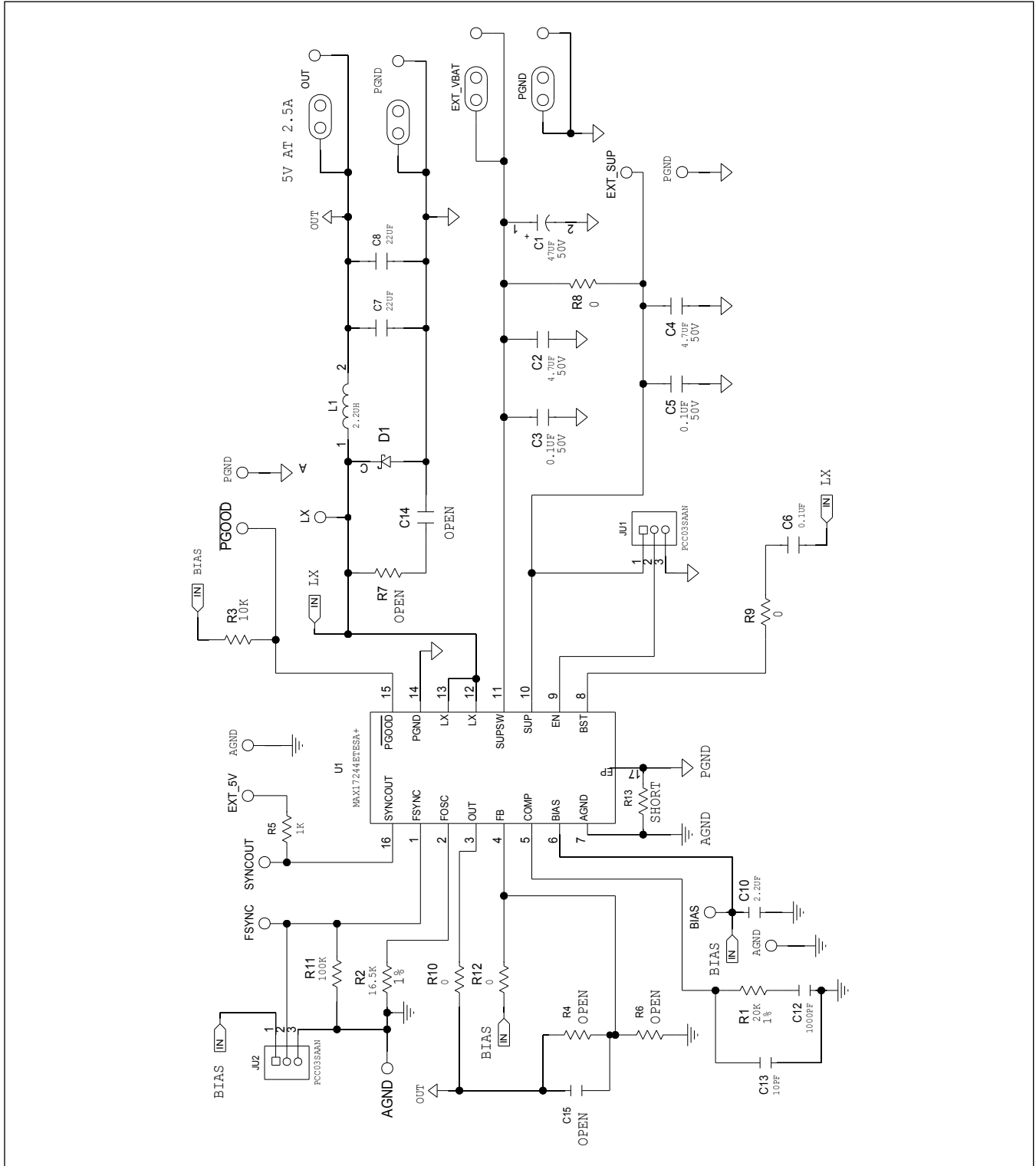


MAX17244 EV Kit—Bottom

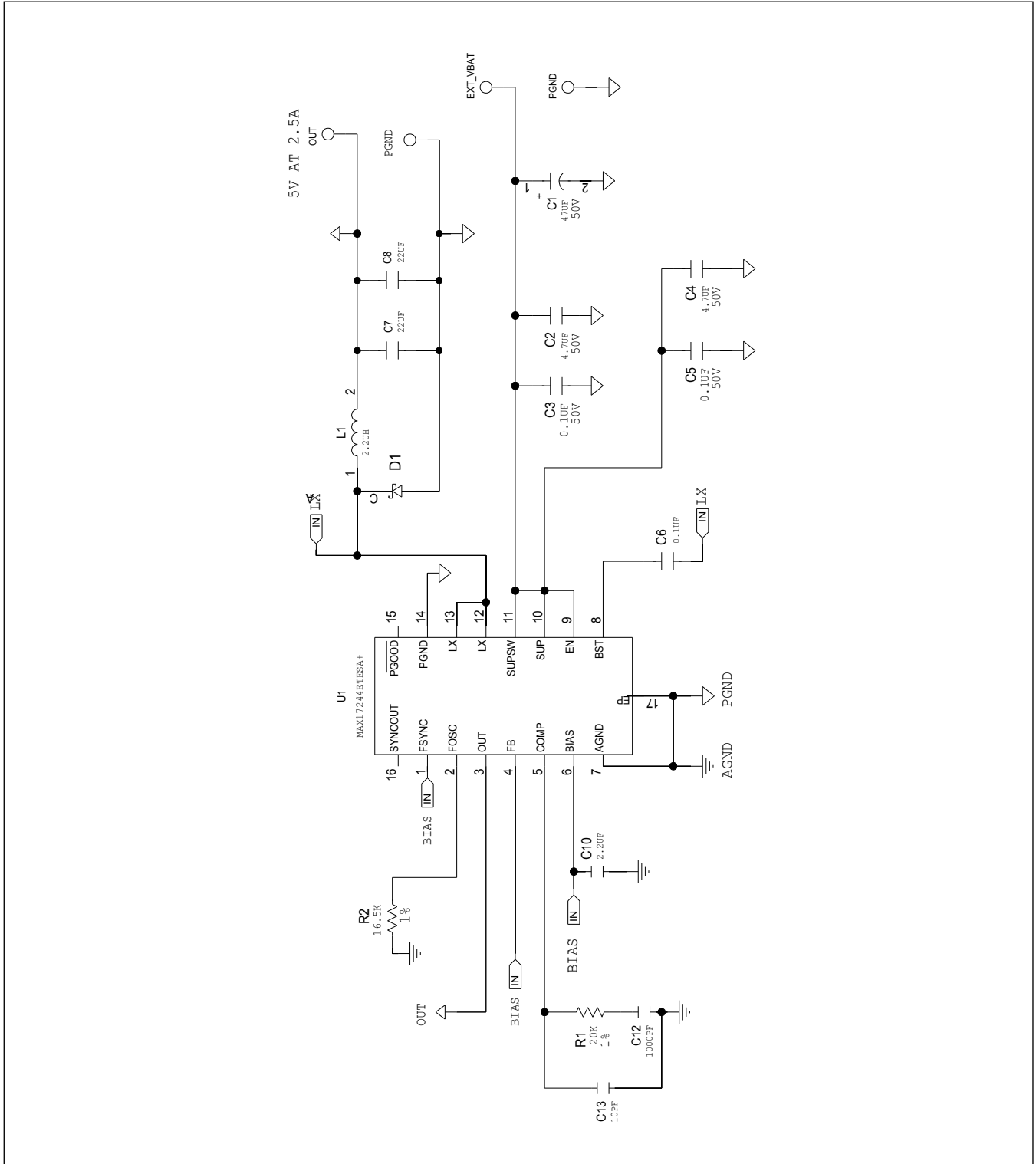


MAX17244 EV Kit—Bottom Silkscreen

MAX17244 EV Kit Schematic



MAX17244 EV Kit Minimal Component Schematic



Ordering Information

PART	TYPE
MAX17244EVKIT#	EV Kit

#Denotes RoHS compliant.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	3/16	Initial release	—
1	3/17	Updated <i>General Description</i> and <i>Setting the Switching Frequency (FOSC)</i> sections	1–2

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