MAX17243 Evaluation Kit with Preset 5V/3A Output

General Description

The MAX17243 evaluation kit (EV kit) demonstrates the MAX17243 high-voltage, current-mode step-down converters with low operating current. The EV kit operates over a wide 5.6V to 36V input range and the output is set for 5V at 3A.

The EV kit comes with the MAX17243ATPA/V+ installed.

Features

- Wide 5.6V to 36V Input Supply Range
- Forced-PWM or Skip-Mode Operation
- Programmable Switching Frequency (2.2MHz Default)
- Power-Good Output
- 4-Layer 2oz Copper
- Proven PCB Layout
- Fully Assembled and Tested

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

Quick Start

Required Equipment

- MAX17243EV kit
- 14V, 2A DC power supply
- Electronic load capable of 3A
- 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 made.**

1) Verify that jumpers JU1–JU4 are in their default positions, as shown in Tables 1–4.
2) Connect the power supply between the VINSUPSW and nearest PGND test points.
3) Connect the 3A electronic load between the OUT and nearest PGND test points.
4) Connect the DVM between the OUT and nearest PGND test points.
5) Turn on the power supply.
6) Enable the electronic load.
7) Verify that the voltage at the OUT test point is approximately 5V.

Table 1. EN Configuration (JU1)

SHUNT POSITION	EN PIN	MODE
1-2*	Connected to SUP	Normal Operation
2-3	Connected to PGND	Shutdown Mode

**Default position.*

Table 2. Operating-Mode and Frequency Control (JU2)

SHUNT POSITION	FSYNC 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.*

Table 3. Spread Spectrum (JU3)

SHUNT POSITION	SPS PIN	MODE
1-2*	Connected to BIAS	Spread-Spectrum Enabled
2-3	Connected to AGND	Spread-Spectrum Disabled

**Default position.*

Table 4. PGOOD (JU4)

SHUNT POSITION	MODE
Installed*	PGOOD pulled high to BIAS
Not installed	PGOOD unconnected

**Default position.*

maxim integrated™

Detailed Description of Hardware

The MAX17243EV kit demonstrates the MAX17243 high-voltage, high-frequency, step-down converter with low operating current. The EV kit operates over a wide 5.6V to 36V input range and the output is set for 5V at 3A. For 24V to 36V operation forced air cooling must be used. Consider thermal and switching efficiency when designing for operation in this input voltage range.

Enable (EN)

Place a shunt in the 1-2 position on 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 JU2 to control the synchronization input (FSYNC). The device synchronizes to an external signal applied to 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.

To use an external clock, uninstall the shunt on JU2 and apply the signal at the FSYNC test point and AGND. 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.

Spread-Spectrum Option (SPS)

The EV kit provides JU3 that allows SPS to be pulled high (BIAS) or pulled low (AGND). Connect SPS high to enable spread spectrum where the operating frequency is varied ±3% centered on FOSC. Connect SPS low to disable the spread-spectrum feature.

Setting the Switching Frequency (FOSC)

The EV kit switches at 2.2MHz by default, and the switching frequency is set by a resistor, R_{FOSC} (R4), connected from F_{OSC} to AGND. Refer to TOC08 in the *Typical Operating Characteristics* section of the MAX17243 IC data sheet for the correct R_{FOSC} (R4) 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 92.5% of its regulation voltage. R5 pulls PGOOD up to BIAS with respect to AGND.

Output

Resistor R6 connects FB to BIAS for a fixed +5V (EV kit default output) or a fixed +3.3V output voltage. To set the output to other voltages between 1V and 10V, connect a resistive divider from output (OUT) to FB to AGND. Use the following equation to determine the R7 and R8 of the resistive divider network:

$$R7 = R8 \times \left(\frac{V_{OUT}}{V_{FB}} - 1 \right)$$

where V_{FB} = 1V and R8 is ≤ 500kΩ.

Operation at 400kHz Switching Frequency

For 400kHz switching frequency, the following components must be changed to:

- R4 = 73.2kΩ
- L1 = 6.8µH (recommend Coilcraft XAL5050-682MEB)
- R1 = 16.5kΩ
- C10 = 4,700pF
- C11 = 6.8pF

Additional capacitance on C7 and C8 may be needed, depending on transient performance.

Component Suppliers

SUPPLIER	WEBSITE
Coilcraft Inc.	www.coilcraft.com
Murata Americas	www.murata.com
Panasonic Corp.	www.panasonic.com
Würth Electronik GmbH & Co. KG	www.we-online.com
TDK Corporation	www.tdk.com

Note: *Indicate that you are using the MAX17243 when contacting these component suppliers.*

Component Information, PCB Layout, and Schematics

See the following links for component information, PCB layout diagrams, and schematics.

- **MAX17243 EV BOM**
- **MAX17243 EV PCB Layout**
- **MAX17243 EV Schematic**
- **MAX17243 EV Minimal Component Schematic**

Ordering Information

PART	TYPE
MAX17243EVKIT#	EV Kit

#Denotes RoHS compliant.

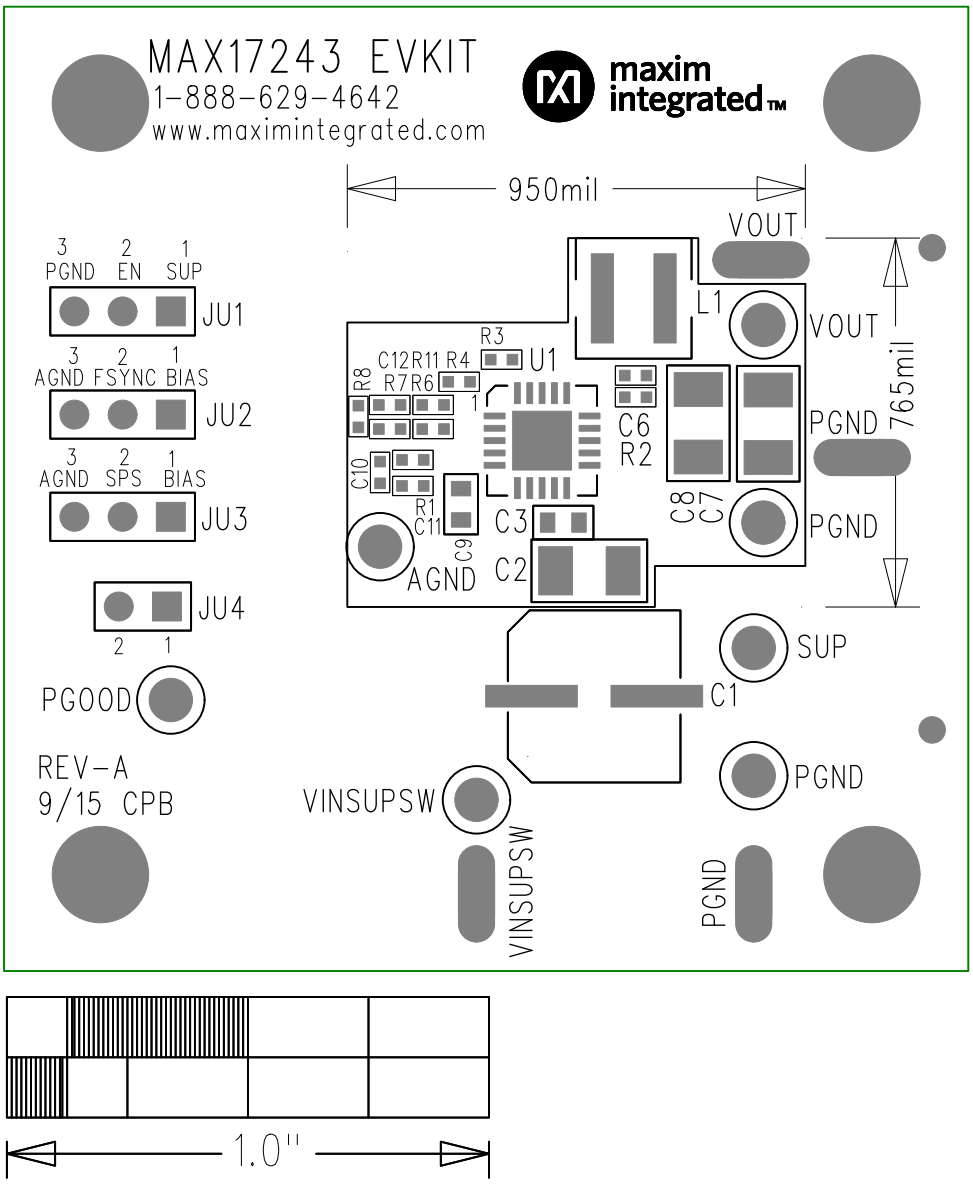
Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/16	Initial release	—

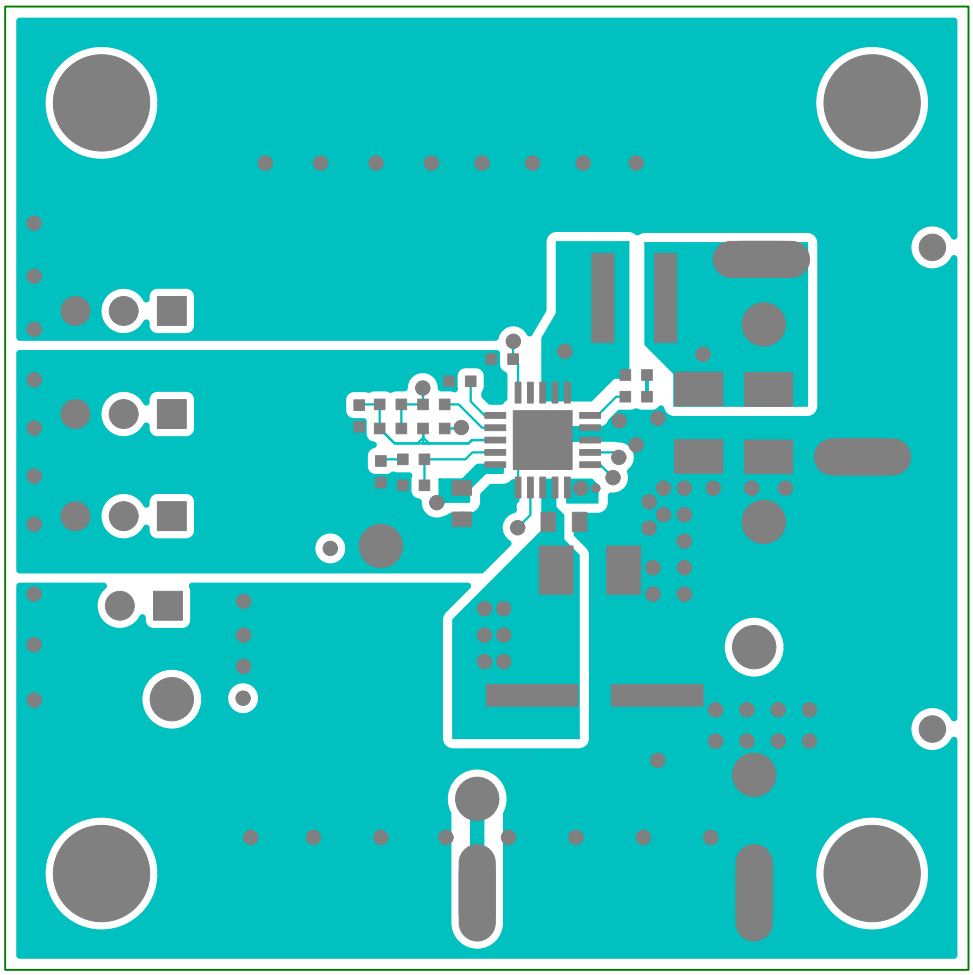
For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at www.maximintegrated.com.

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.

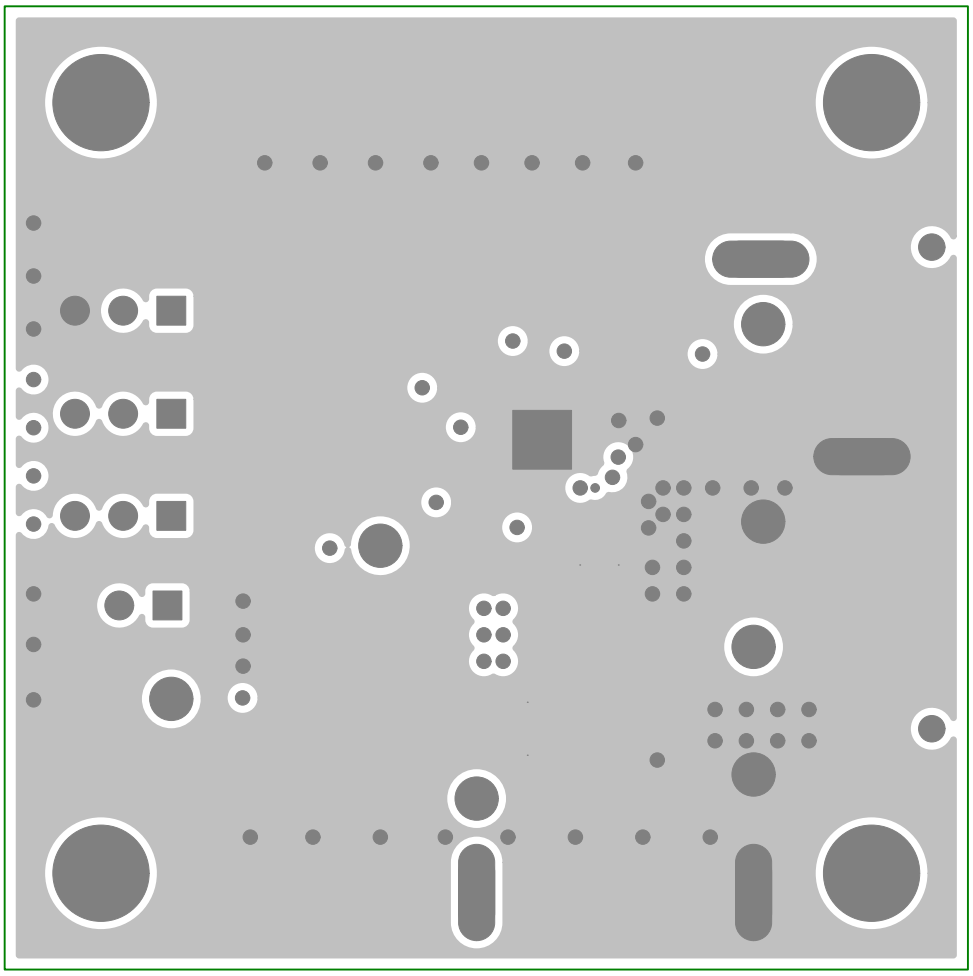
MAX17243EVKIT#: Rev A			
Parent Number	**Component Description**	**QTY Per**	**Remarks (Reference Designators)**
MAX17243EVKIT#	47uF, 50V aluminum electrolytic capacitor (E)	1	C1
	4.7uF 10%, 50V X7R ceramic capacitor (1210)	1	C2
	0.1uF 10%, 50V X7R ceramic capacitor (0603)	2	C3, C5
	2.2uF 10%, 50V X7R ceramic capacitor (0805)	1	C4
	0.1uF 10%, 50V X7R ceramic capacitor (0402)	1	C6
	22uF 10%, 10V X7R ceramic capacitors (1210)	2	C7, C8
	2.2uF 10%, 10V X7R ceramic capacitor (0603)	1	C9
	1000pF 10% 50V X7R ceramic capacitor (0402)	1	C10
	10pF 5% 50V C0G ceramic capacitor (0402)	1	C11
	Multipurpose test points, red	4	PGOOD
	Multipurpose test points, black	3	PGND, PGND, AGND
	3 pin header, 2.54MM, Comes in 36-40 Pin Strips (CUT TO FIT)	3	JU1-JU3
	2 pin header, 2.54MM, Comes in 36-40 Pin Strips (CUT TO FIT)	1	JU4
	2.2uH, 9.2A Shielded Power inductor	1	L1
	20.0k ohms 1% resistor (0402)	1	R1
	0 ohms 5% resistor (0402)	3	R2, R6, R11
	100k ohms 5% resistor (0402)	1	R3
	12.1k ohms 1% resistor (0402)	1	R4
	10k ohms 5% resistor (0402)	1	R5
	0 ohms 5% resistor (1210)	1	R9
	220kHz to 2.2MHz, 3A Fully Integrated Step-down Converter (20 TQFN-EP)	1	U1
	Shunts	4	
	PC board: MAX17243 EVALUATION KIT	1	2 oz.
	Not installed, ceramic capacitor (0603)	0	C13
	Not installed, ceramic capacitor (0402)	0	C12, C14, C15, C16, C17
	Not Installed, Ferrite Bead (1206)	0	L2
	Not installed, resistor (0402)	0	R7, R8, R10



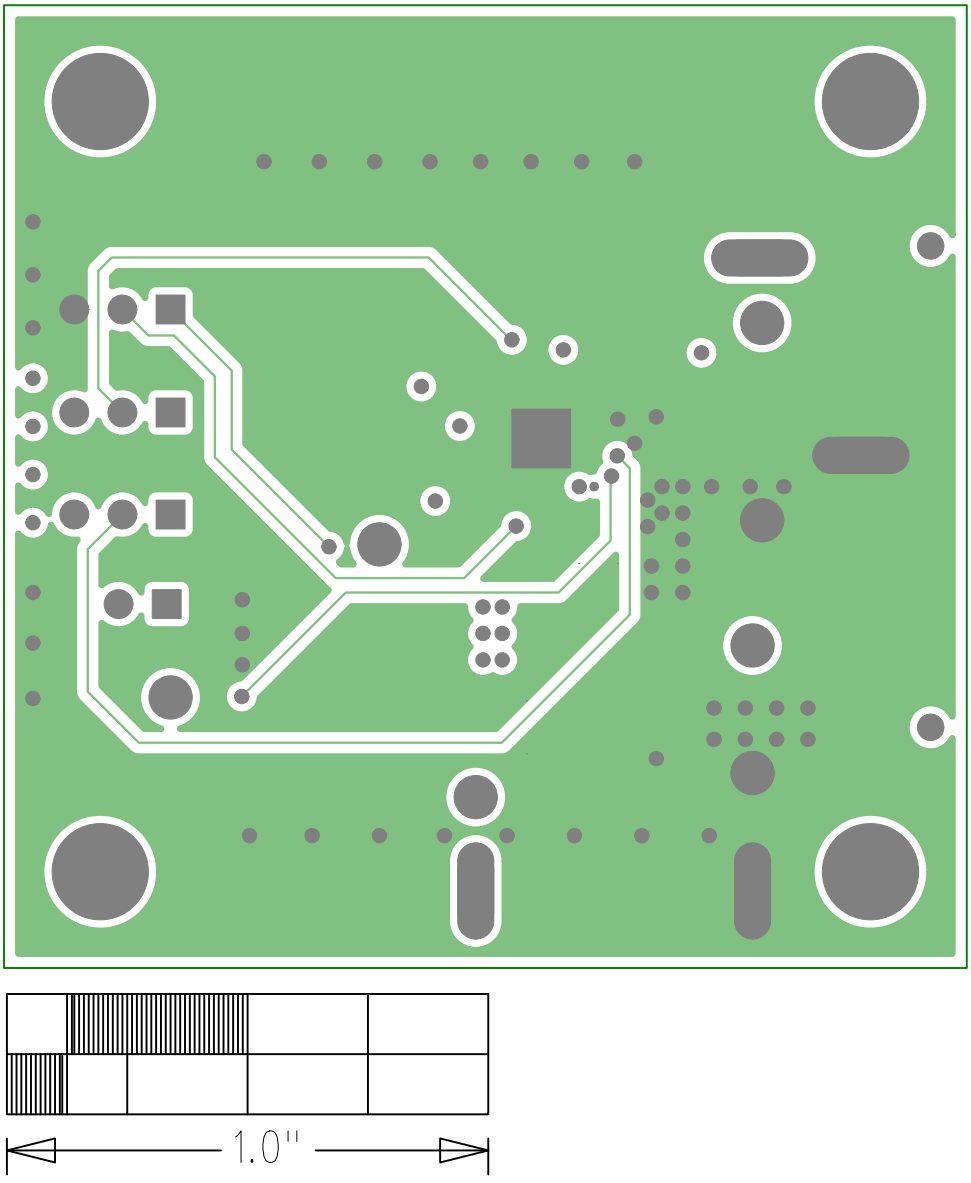
TOP SILKSCREEN



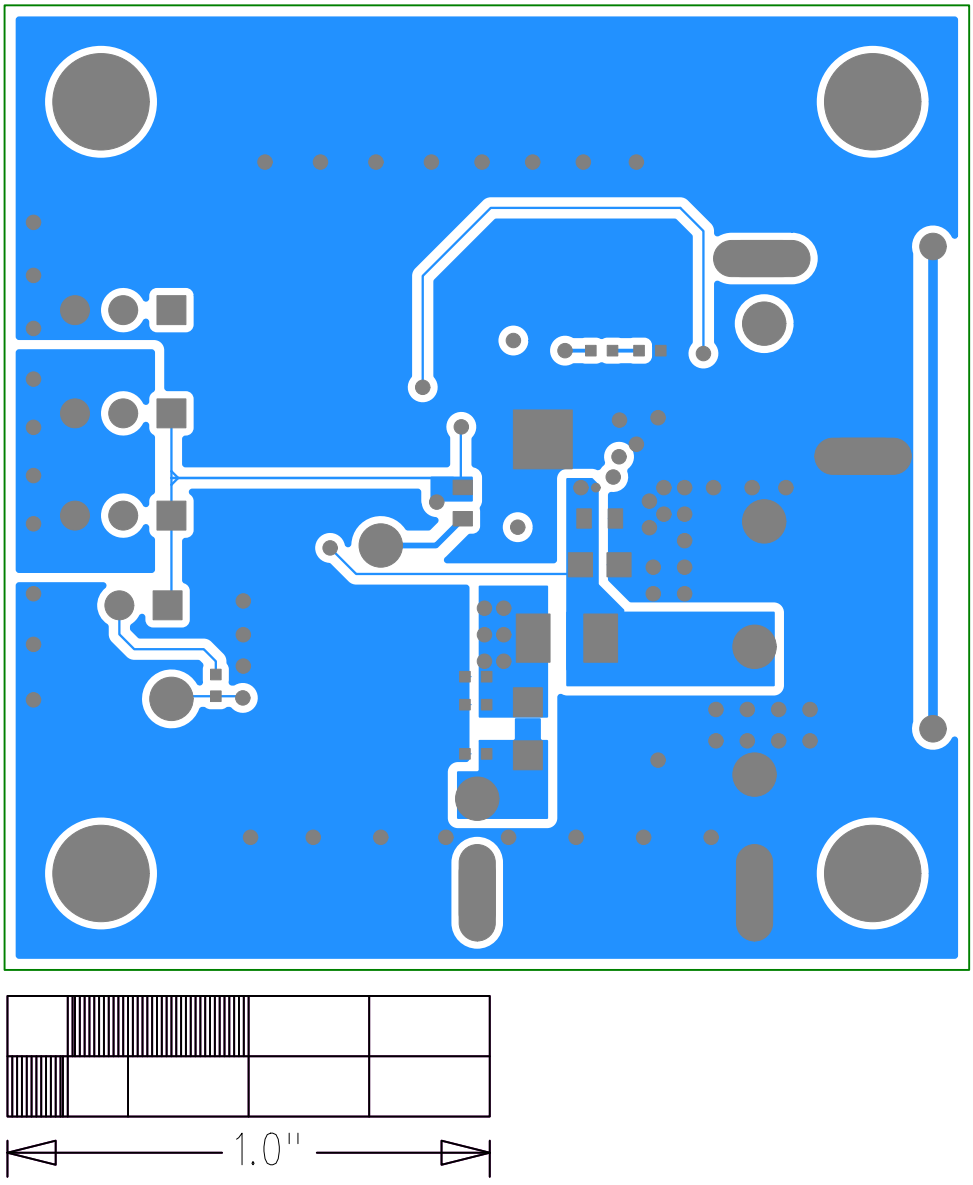
COMPONENT SIDE



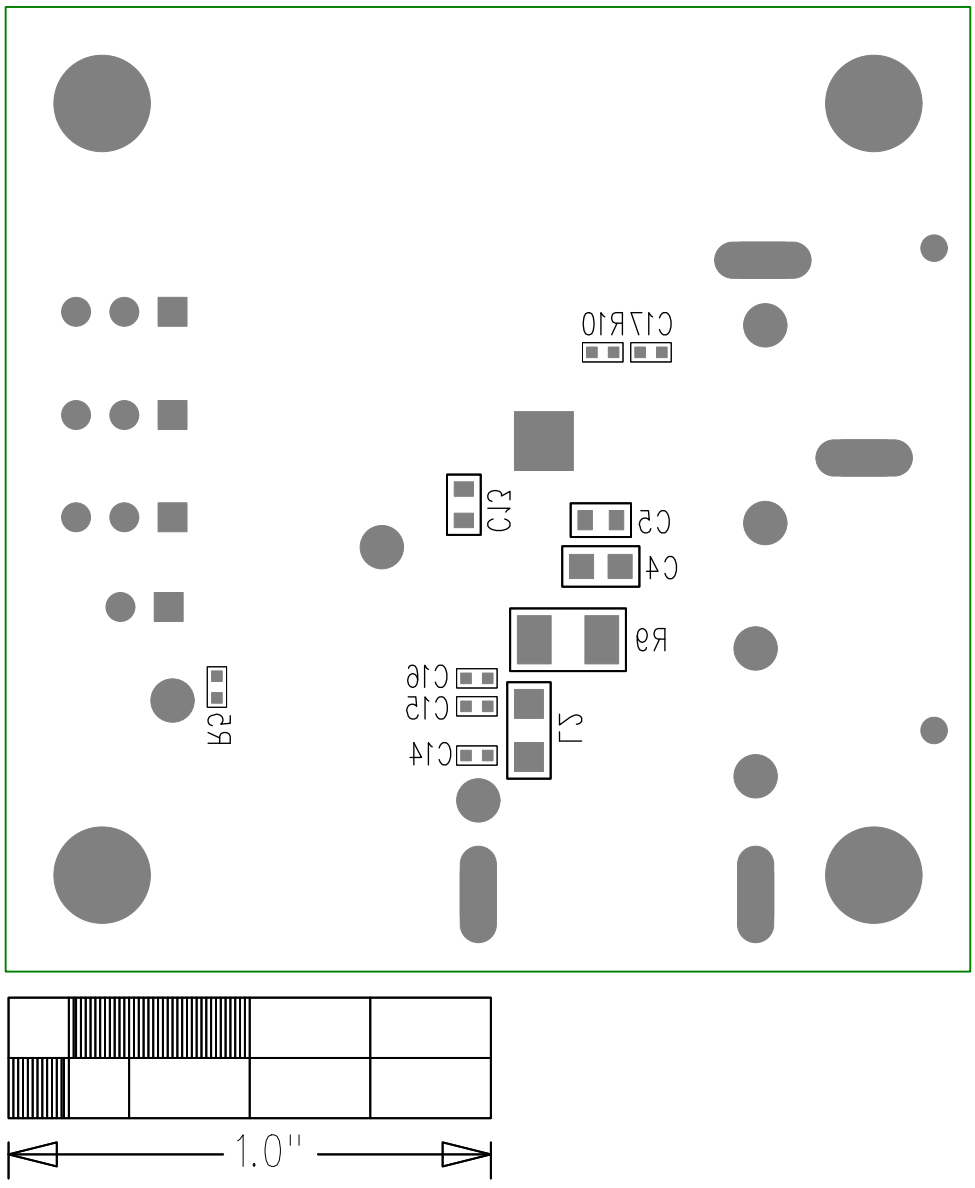
LAYER 2 PGND



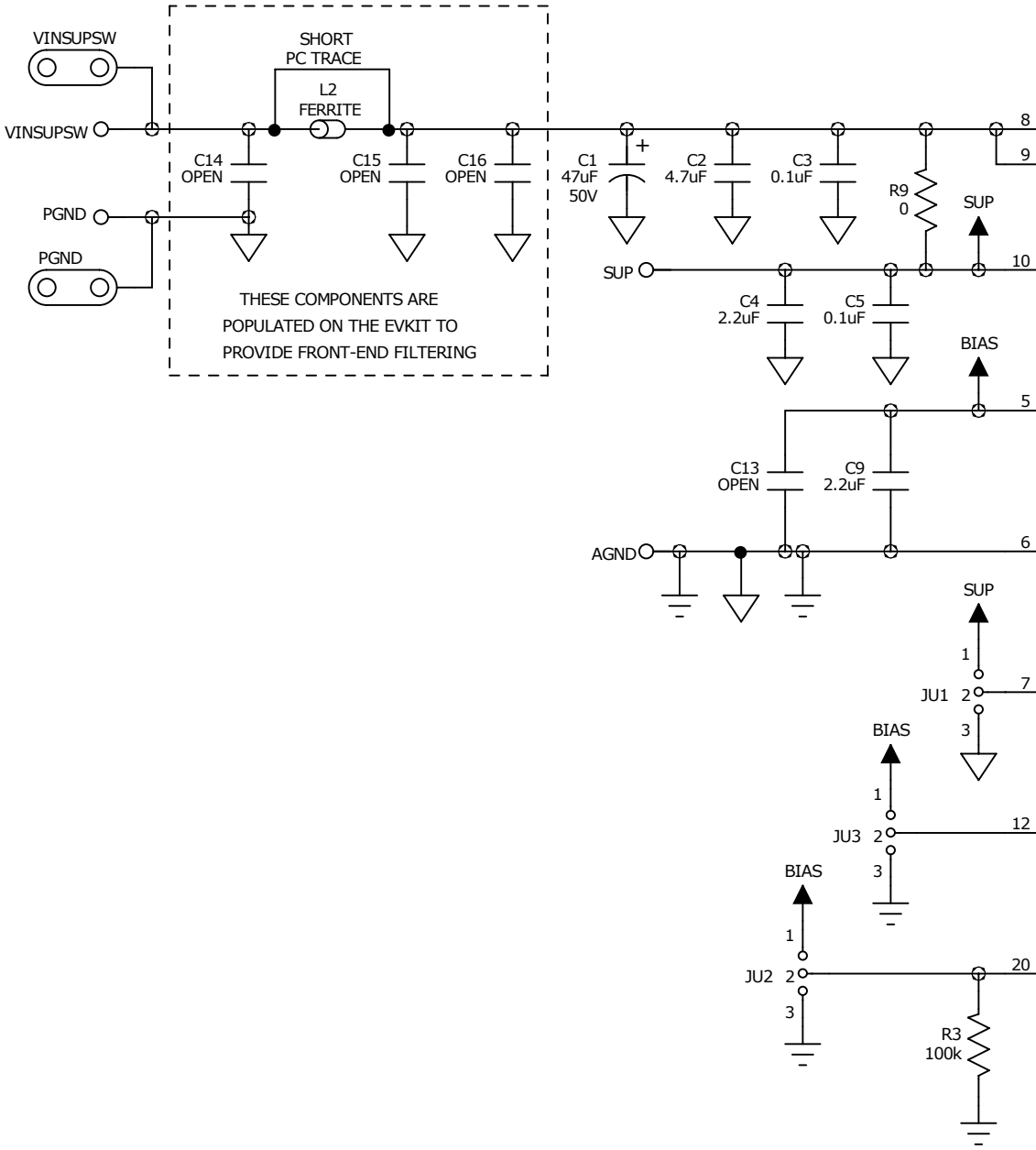
LAYER 3 SIGNAL, PGND



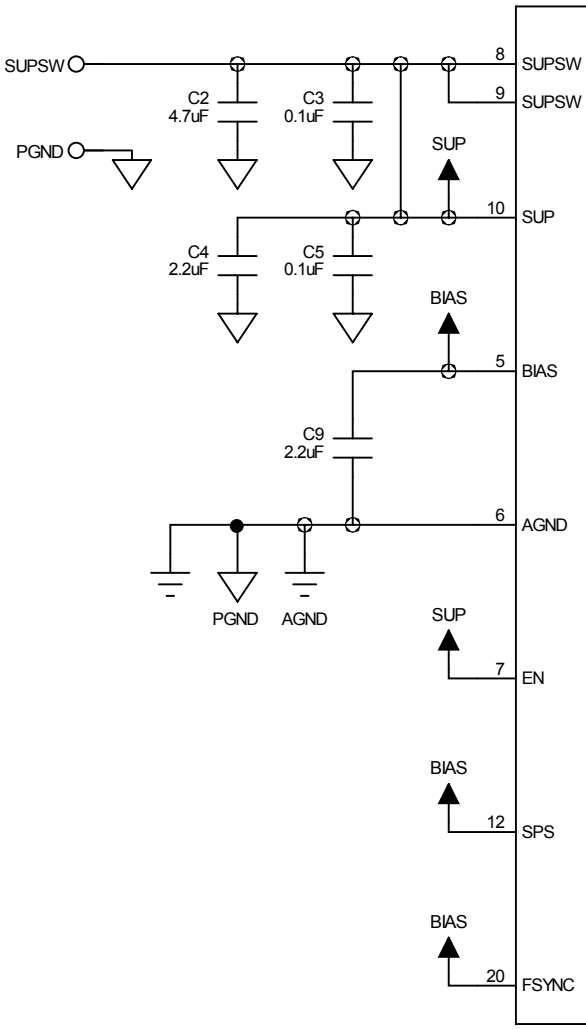
SOLDER SIDE



BOTTOM SILKSCREEN


VINSUPSW
VINSUPSW
PGND
PGND
SHORT
PC TRACE
L2
FERRITE
C14
OPEN
C15
OPEN
C16
OPEN
THESE COMPONENTS ARE
POPULATED ON THE EVKIT TO
PROVIDE FRONT-END FILTERING
C1
47uF
50V
C2
4.7uF
C3
0.1uF
R9
0
SUP
SUP
C4
2.2uF
C5
0.1uF
BIAS
C13
OPEN
C9
2.2uF
AGND
SUP
JU1
BIAS
JU3
BIAS
JU2
R3
100k
8
9
10
5
6
1
2
3
7
1
2
3
12
1
2
3
20

SCHEMATIC



R
12.1
1%

MINIMAL

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Power Management IC Development Tools ***category:***

Click to view products by Maxim ***manufacturer:***

Other Similar products are found below :

EVB-EP5348UI MIC23451-AAAYFL EV MIC5281YMME EV 124352-HMC860LP3E DA9063-EVAL ADP122-3.3-EVALZ ADP130-0.8-EVALZ ADP130-1.8-EVALZ ADP1740-1.5-EVALZ ADP1870-0.3-EVALZ ADP1874-0.3-EVALZ ADP199CB-EVALZ ADP2102-1.25-EVALZ ADP2102-1.875EVALZ ADP2102-1.8-EVALZ ADP2102-2-EVALZ ADP2102-3-EVALZ ADP2102-4-EVALZ AS3606-DB BQ25010EVM BQ3055EVM ISLUSBI2CKIT1Z LP38512TS-1.8EV EVAL-ADM1186-1MBZ EVAL-ADM1186-2MBZ ADP122UJZ-REDYKIT ADP166Z-REDYKIT ADP170-1.8-EVALZ ADP171-EVALZ ADP1853-EVALZ ADP1873-0.3-EVALZ ADP198CP-EVALZ ADP2102-1.0-EVALZ ADP2102-1-EVALZ ADP2107-1.8-EVALZ ADP5020CP-EVALZ CC-ACC-DBMX-51 ATPL230A-EK MIC23250-S4YMT EV MIC26603YJL EV MIC33050-SYHL EV TPS60100EVM-131 TPS65010EVM-230 TPS71933-28EVM-213 TPS72728YFFEVM-407 TPS79318YEQEVM UCC28810EVM-002 XILINXPWR-083 LMR22007YMINI-EVM LP38501ATJ-EV