

General Description

The MAX17682 EV kit B is a fully assembled and tested circuit board that demonstrates the performance of the MAX17682 high-efficiency, iso-buck DC-DC Converter. The EV kit operates over a wide input-voltage range of 17V to 36V and uses primary-side feedback to regulate the output voltage. The EV kit has isolated output, programmed to +24V at 400mA, with 10% output voltage regulation.

The EV kit comes installed with the MAX17682 in a 20-pin (4mm x 4mm) TDFN package.

Features

- 17V to 36V Input Voltage Range
- +24V, 400mA Continuous Current
- EN/UVLO Input
- 250kHz Switching Frequency
- 96% Peak Efficiency
- Overcurrent Protection
- No Optocoupler
- Delivers up to 10W Output Power
- Overtemperature Protection
- Proven PCB layout

[Ordering Information](#) appears at end of data sheet.

Quick Start

Recommended Equipment

- One 15V - 60V DC, 1A Power Supply
- One resistive load 400mA sink capacity
- Two Digital Multimeters (DMM)

Caution: Do not turn on the power supply until all connections are completed.

Procedure

The EV kit comes with the default secondary output programmed to +24V.

- 1) Verify that the J1 is open
- 2) Set the power supply output to 24V. Disable the power supply
- 3) Connect the positive terminal of the power supply to the VIN PCB pad and the negative terminal to the nearest PGND PCB pad. Connect a 400mA resistive load across the +24V PCB pad and the GND0 PCB pad.
- 4) Connect a DMM configured in voltmeter mode across the +24V PCB pad and the nearest GND0 PCB pad.
- 5) Enable the input power supply.
- 6) Verify that output voltage is at +24V (with allowable tolerance of 10%) with respect to GND0.
- 7) If required, vary the input voltage from 17V to 36V, and the load current from 40mA to 400mA and verify that output voltage is at +24V (with allowable tolerance of 10%).

Detailed Description

The MAX17682EVKITB evaluation kit (EV kit) is a fully assembled and tested circuit board that demonstrates the performance of the MAX17682 high-efficiency, iso-buck, DC-DC converter designed to provide an isolated power up to 10W. The EV kit generates +24V, 400mA voltages from a 17V to 36V input supply. The EV kit features a forced-PWM control scheme that provides constant switching-frequency of 250kHz operation at all load and line conditions.

The EV Kit includes an EN/UVLO PCB pad to monitor and program the EN/UVLO pin of the MAX17682. The VPRI PCB pad helps measure the regulated primary output voltage (V_{PRI}). An additional RESETB PCB pad is available for monitoring the health of primary output voltage (V_{PRI}). RESETB pulls low if FB voltage drops below 92%(typ) of its set value and RESETB goes high impedance 1024 clock cycles after FB voltage rises above 95% of its set value. The programmable soft-start feature allows users to reduce the input inrush current.

The iso-buck is a synchronous-buck-converter-based topology, useful for generating isolated outputs at low power level without using an opto-coupler. The detailed procedure for setting the soft-start time, ENABLE/UVLO divider, primary output voltage (V_{PRI}) selection, adjusting the primary output voltage, primary inductance selection, turns-ratio selection, output capacitor selection, output diode selection and external loop compensation are given in MAX17682 IC data sheet.

Enable Control (J1)

The EN/UVLO pin on the device serves as an on/off control while also allowing the user to program the input undervoltage lockout (UVLO) threshold. Jumper J1 configures the EV kit's output for turn-on/turn-off control. Install a shunt across jumper J1 pins 2-3 to disable VOUT. See [Table 1](#) for proper J1 jumper configurations.

Table 1. Enable Control (EN/UVLO) (J1) Jumper Settings

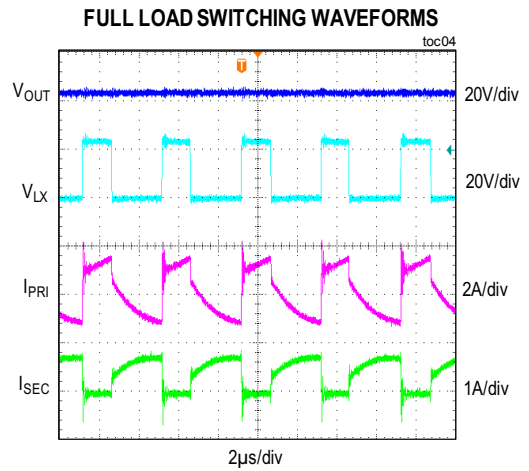
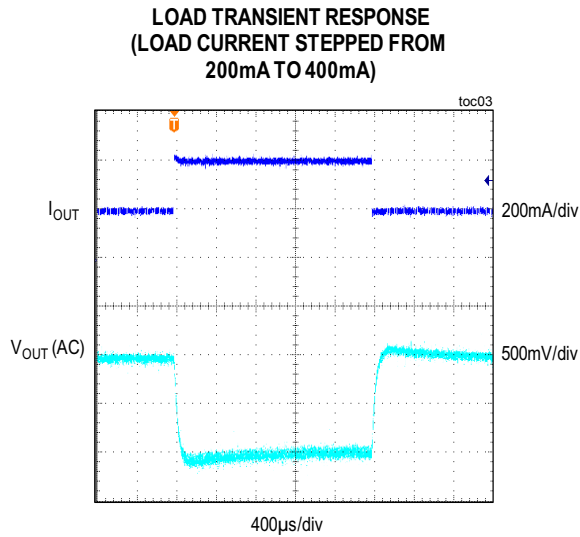
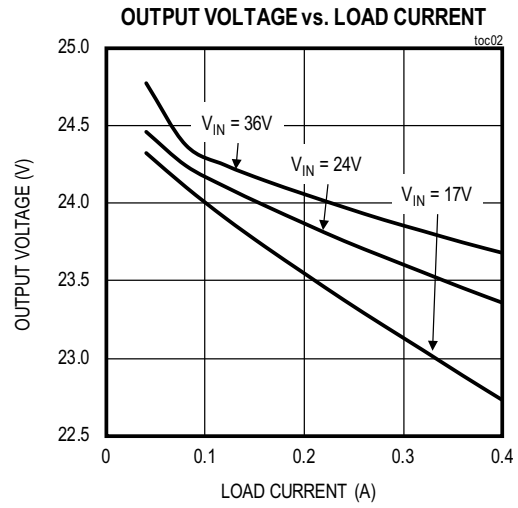
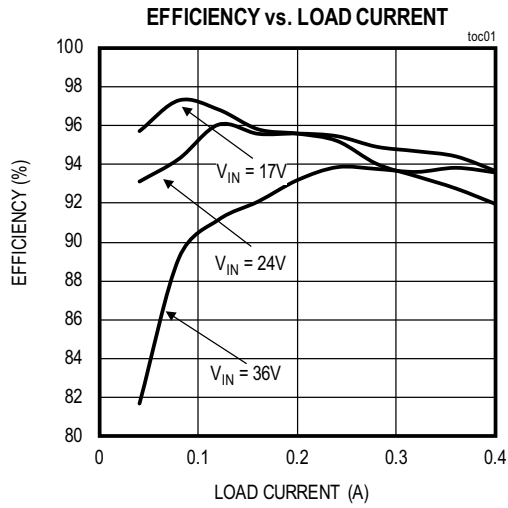
SHUNT POSITION	EN/UVLO PIN	V _{OUT} OUTPUT
1-2	Connected to V _{IN}	Always Enabled
2-3	Connected to GND	Always Disabled
Open*	Connected to midpoint of R1, R2 resistor-divider	Enabled at V _{IN} ≥ 15V

*Default position.

Note 1: The secondary output diodes D1 is rated to carry short-circuit current only for few hundredths of a millisecond and is not rated to carry the continuous short-circuit current.

Note 2: The iso-buck converter typically needs 10% minimum load to regulate the output voltage. In this design when the +24V rail is healthy, U2 sinks the minimum load current required to regulate the output voltages within ±10% regulation.

EV Kit B Performance Report



Component Suppliers

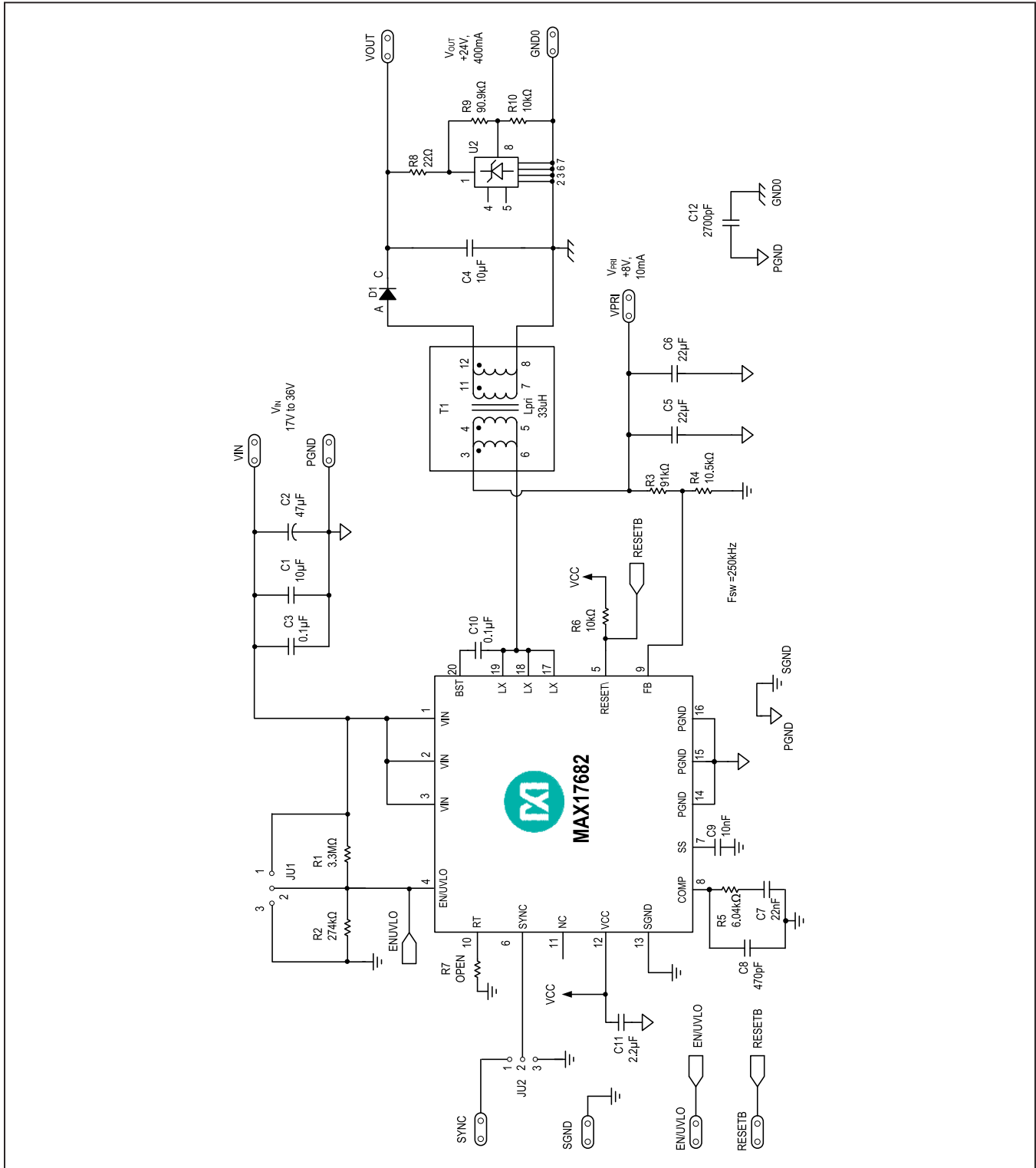
SUPPLIER	WEBSITE
Würth Elektronik	www.we-online.com
Murata Americas	www.murataamericas.com
Panasonic Corp.	www.panasonic.com

Note: Indicate that you are using the MAX17682 when contacting these component suppliers.

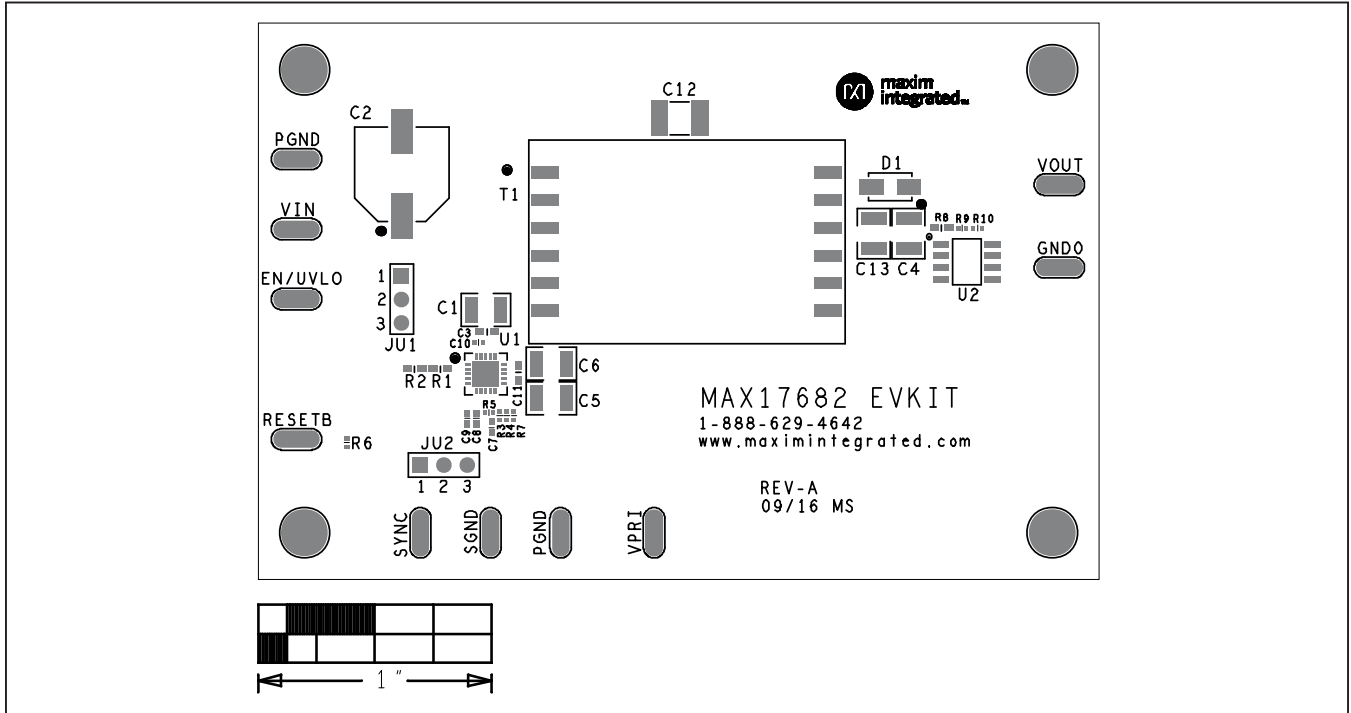
MAX17682 EV Kit B Bill of Materials

S. No.	Designation	Quantity	Description	Manufacturer Part No.
1	C1	1	10 μ F \pm 10%, 50V X7R	Murata GRM32ER71H106KA12
2	C2	1	47 μ F, 80V aluminum electrolytic capacitor	Panasonic EEEFK1K470P
3	C3	1	0.10 μ F \pm 10% , 100V X7R	Murata GRM319R72A104KA01
4	C5,C6	2	22 μ F \pm 10%, 16V X7R	Murata GRM32ER71C226KEA8
5	C4	1	10 μ F \pm 10%, 35V X7R	Murata GRM32ER7YA106MA12
6	C7	1	22nF \pm 10%, 25V, X7R	Murata GRM155R71E223KA61D
7	C8	1	470pF \pm 10%, 50V, X7R	Murata GRM155R71H471KA01D
8	C9	1	10nF \pm 10%, 25V, X7R	Murata GRM155R71E103KA01J
9	C10	1	0.1 μ F \pm 10%, 16V X7R	Murata GRM155R71C104K
10	C11	1	2.2 μ F \pm 10%, 10V X7R	Murata GRM188R71A225K
11	C12	1	2700PF 3KV X7R	AVX 1812HC272KAZ1A
12	T1	1	33 μ H	Würth Elektronik Inc. 750343672
13	D1	1	Diode Schottky 200V 1A	Micro Commercial Co. SMD1200PL-TP
14	U1	1	MAX17682 TQFN10 4*4mm Iso buck DC-DC converter	MAX17682
15	U2	1	Shunt regulator SOT25	ST MICROELECTRONICS TL431AIYDT
16	R1	1	3.3M OHM 1% 1/10W	Vishay CRCW06033M30FKEB
17	R2	1	274K OHM 1% 1/10W	Vishay CRCW0603240KFKEB
18	R3	1	91K OHM 1% 1/16W	Vishay CRCW040278K7FKED
19	R10	1	10K OHM 1% 1/16W	Vishay CRCW040210K0FKEE
20	R4	1	10.5K OHM 1% 1/16W	Vishay CRCW040210K0FKEE
21	R5	1	6.04K OHM 1% 1/16W	Vishay CRCW04026K04FKED
22	R6	1	10K OHM 1% 1/16W	Vishay CRCW040210K0FKEE
23	R7	1	OPEN	--
24	R8	1	22 OHM 1% 1/10W	Panasonic ERJ-2RKF22R0X
25	R9	1	90.9K OHM 1% 1/16W	Vishay CRCW040290K9FKED
26	R10	1	10K OHM 1% 1/16W	Vishay CRCW040210K0JNEE

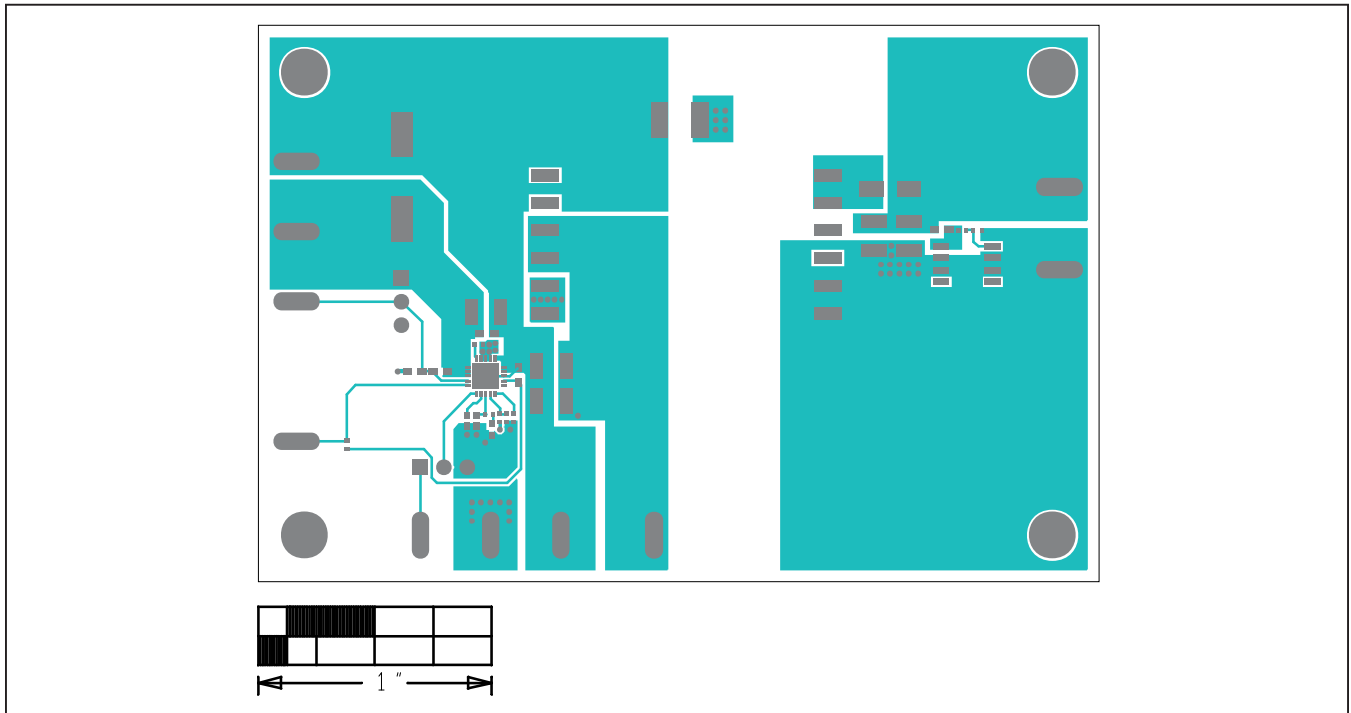
MAX17682 EV Kit B Schematics



MAX17682 EV Kit B PCB Layout Diagrams

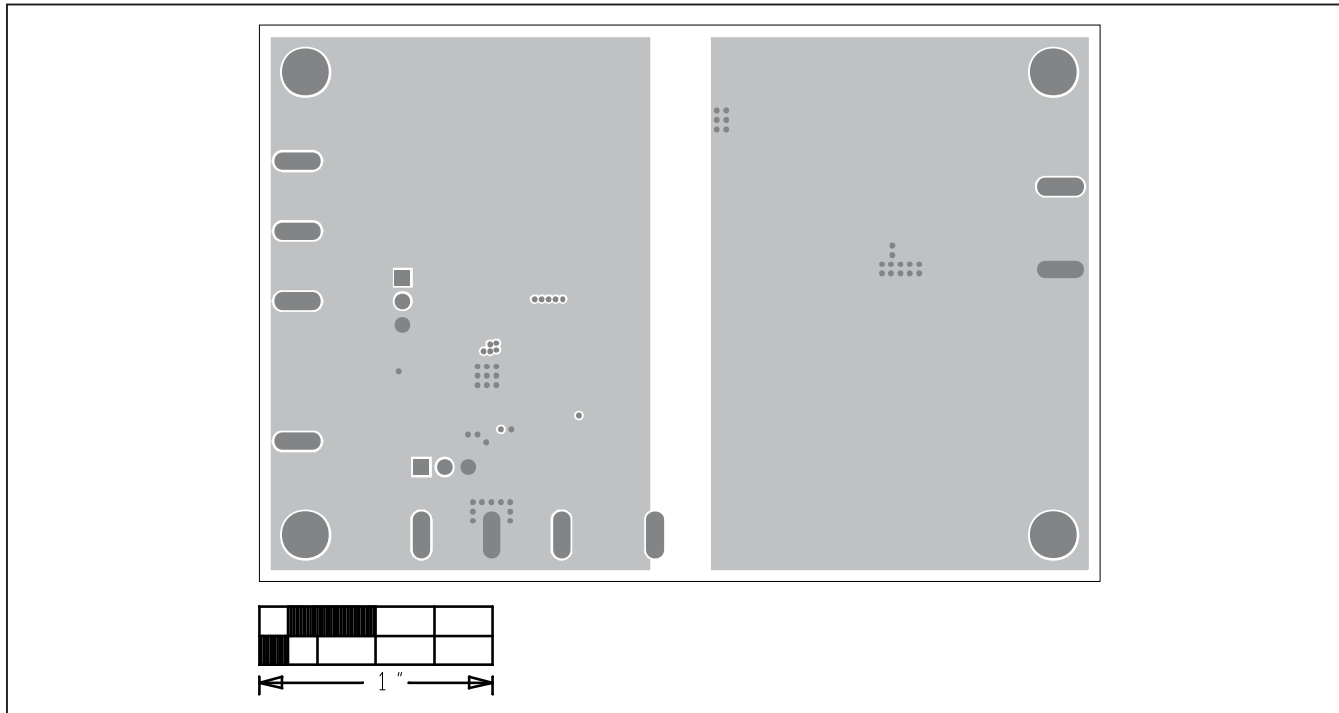


MAX17682 EV Kit B—Top Silkscreen

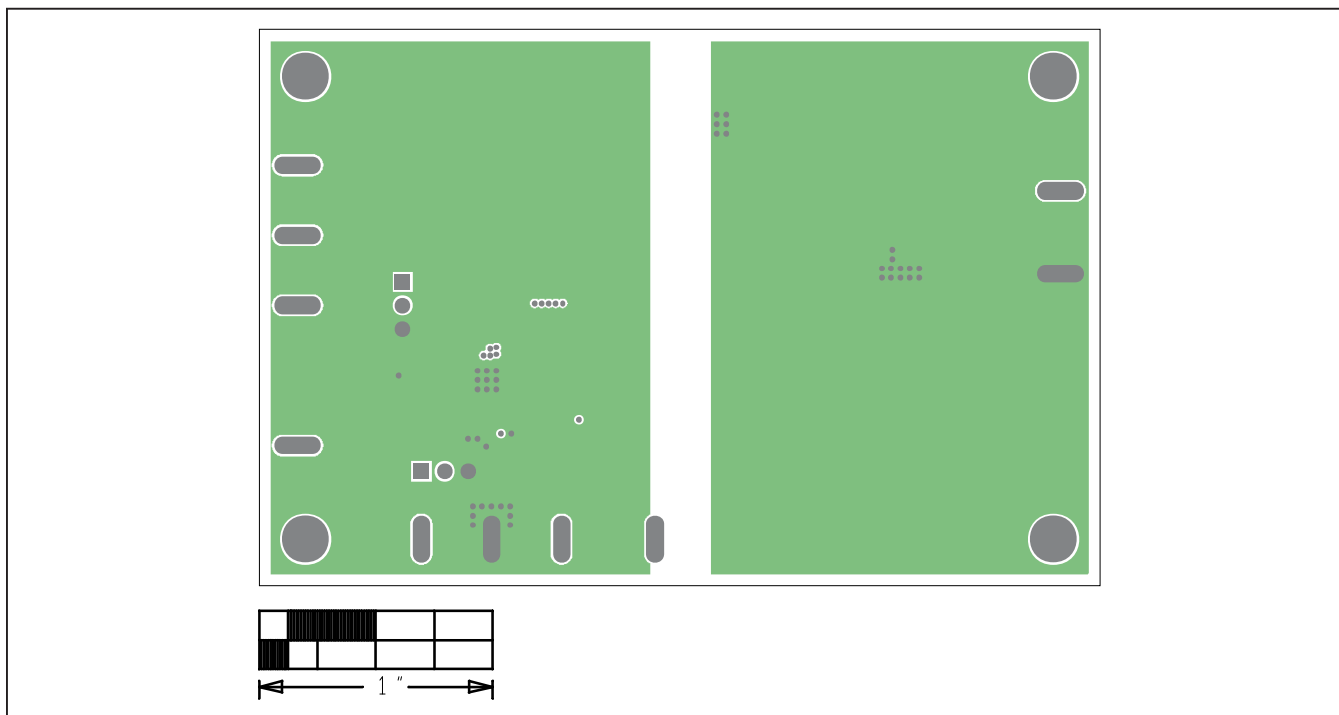


MAX17682 EV Kit B—Top

MAX17682 EV Kit B PCB Layout Diagrams (continued)

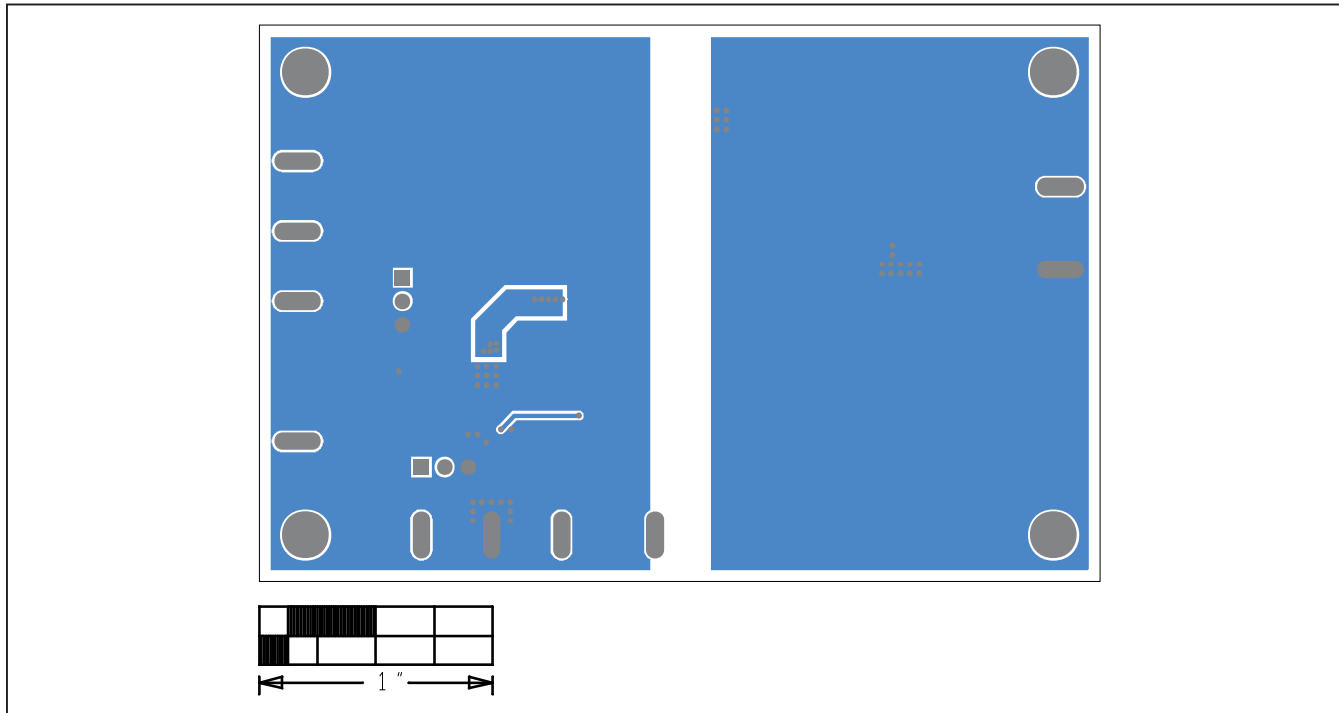


MAX17682 EV Kit B—Level 2 SGND



MAX17682 EV Kit B—Level 3 SGND

MAX17682 EV Kit B PCB Layout Diagrams (continued)



MAX17682EV Kit B—Bottom

Ordering Information

PART	TYPE
MAX17682EVKITB#	EVKIT

#Denotes RoHS compliant.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	1/18	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.

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