

MAX17682EVKIT# Evaluation Kit

Evaluates: MAX17682 for Isolated +12V Output Configuration

General Description

The MAX17682 EV kit 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 16V to 42V and uses primary-side feedback to regulate the output voltage. The EV kit has isolated output, programmed to +12V at 750mA, with 10% output voltage regulation.

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

Features

- 16V to 42V Input Voltage Range
- +12V, 750mA Continuous Current
- EN/UVLO Input
- 200kHz Switching Frequency
- 91% 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 750mA 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 +12V.

- 1) Verify that 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 750mA resistive load across the +12V PCB pad and the GND0 PCB pad.
- 4) Connect a DMM configured in voltmeter mode across the +12V PCB pad and the nearest GND0 PCB pad.
- 5) Enable the input power supply.
- 6) Verify that output voltage is at +12V (with allowable tolerance of 10%) with respect to GND0.
- 7) If required, vary the input voltage from 16V to 42V, and the load current from 0mA to 750mA and verify that output voltage is at +12V (with allowable tolerance of 10%).

Detailed Description

The MAX17682EVKITA 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 +12V, 750mA voltages from a 16V to 42V input supply. The EV kit features a forced-PWM control scheme that provides constant switching-frequency of 200 kHz 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

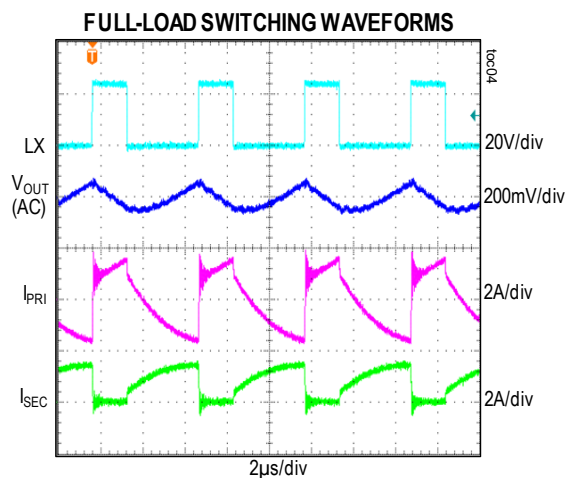
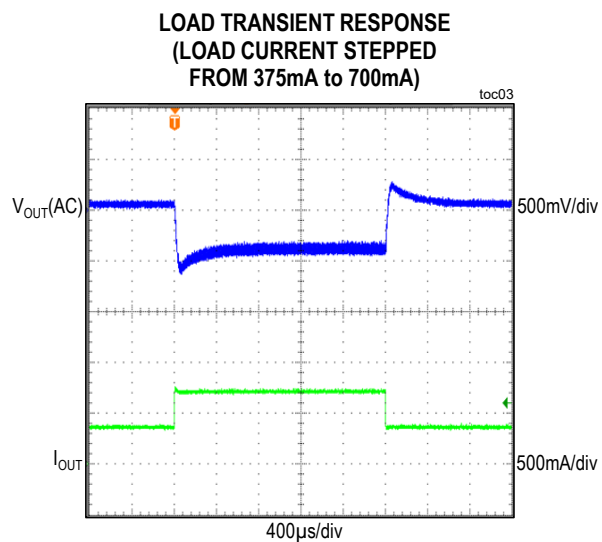
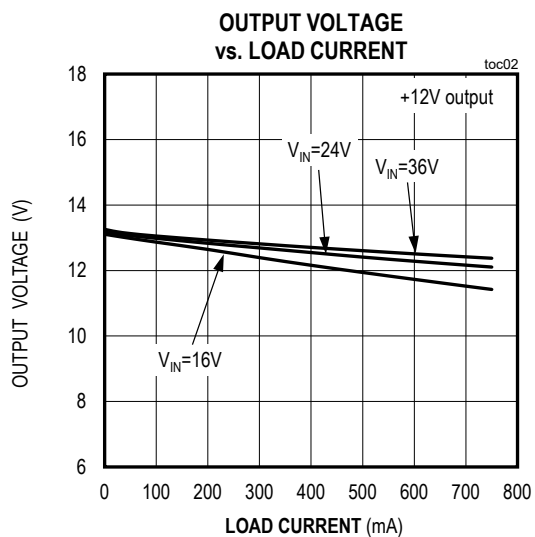
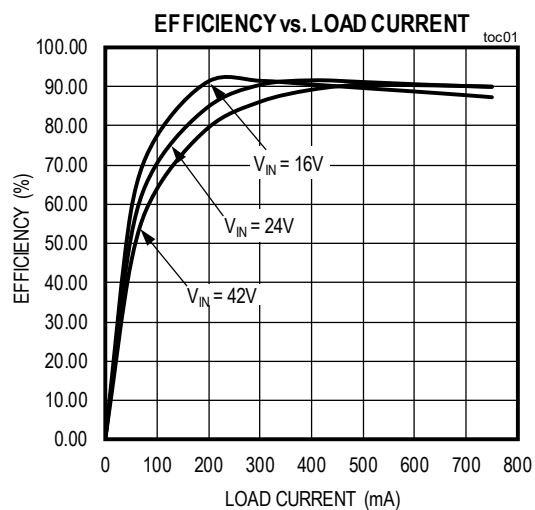
SHUNT POSITION	EN/UVLO PIN	V _{OUT} OUTPUT
J1		
1-2	Connected to V _{IN}	Always Enabled
2-3	Connected to GND	Always Disabled
Open*	Connected to midpoint of R1, R2 resistor-divider	Enabled at V _{IN} ≥ 15V

*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 +12V rail is healthy, U2 sinks the minimum load current required to regulate the output voltages within ±10% regulation.

EV Kit Performance Report



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Component Suppliers

SUPPLIER	WEBSITE
Wurth Electronik	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.

Ordering Information

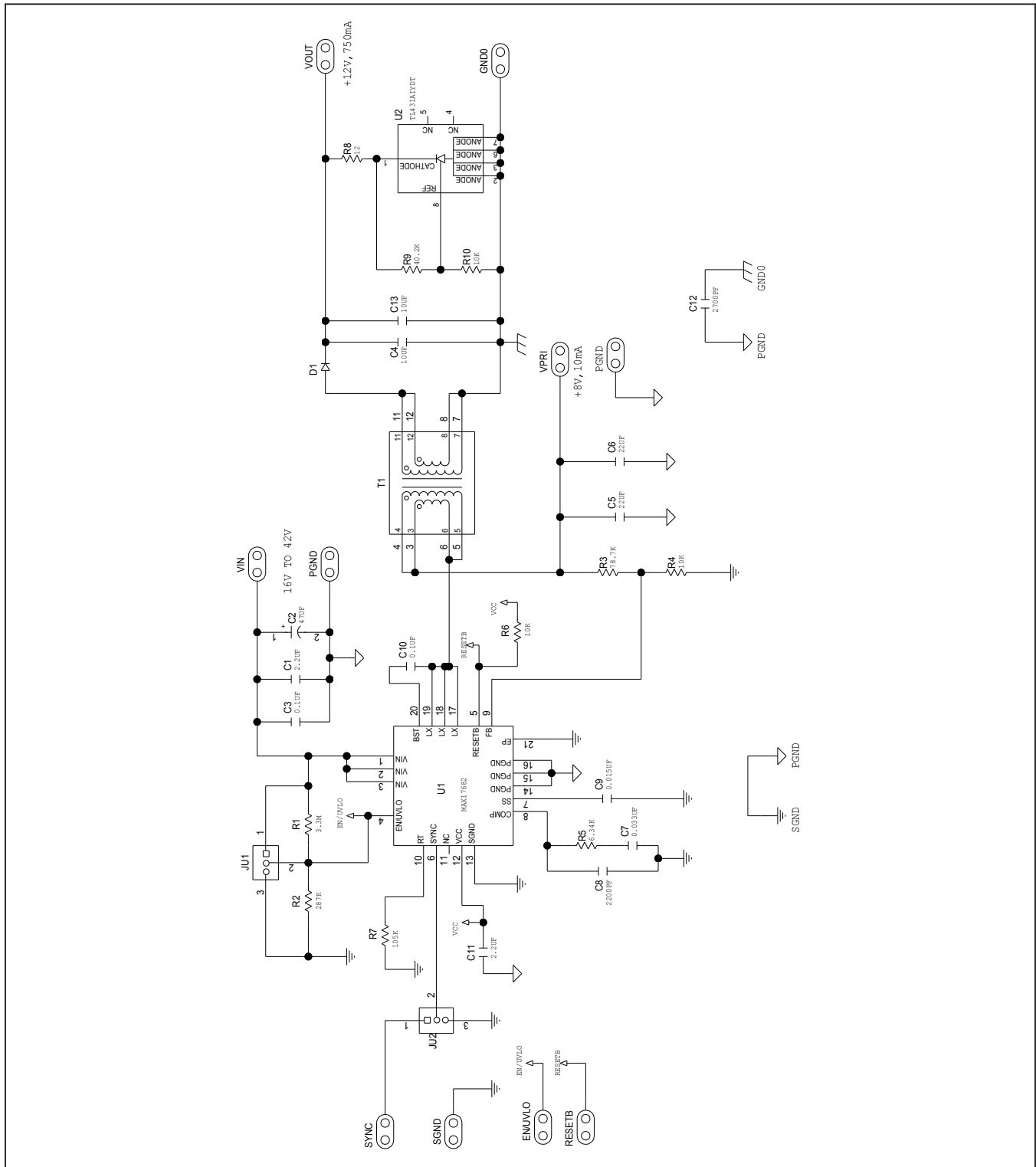
PART	TYPE
MAX17682EVKIT#	EVKIT

#Denotes RoHS compliant.

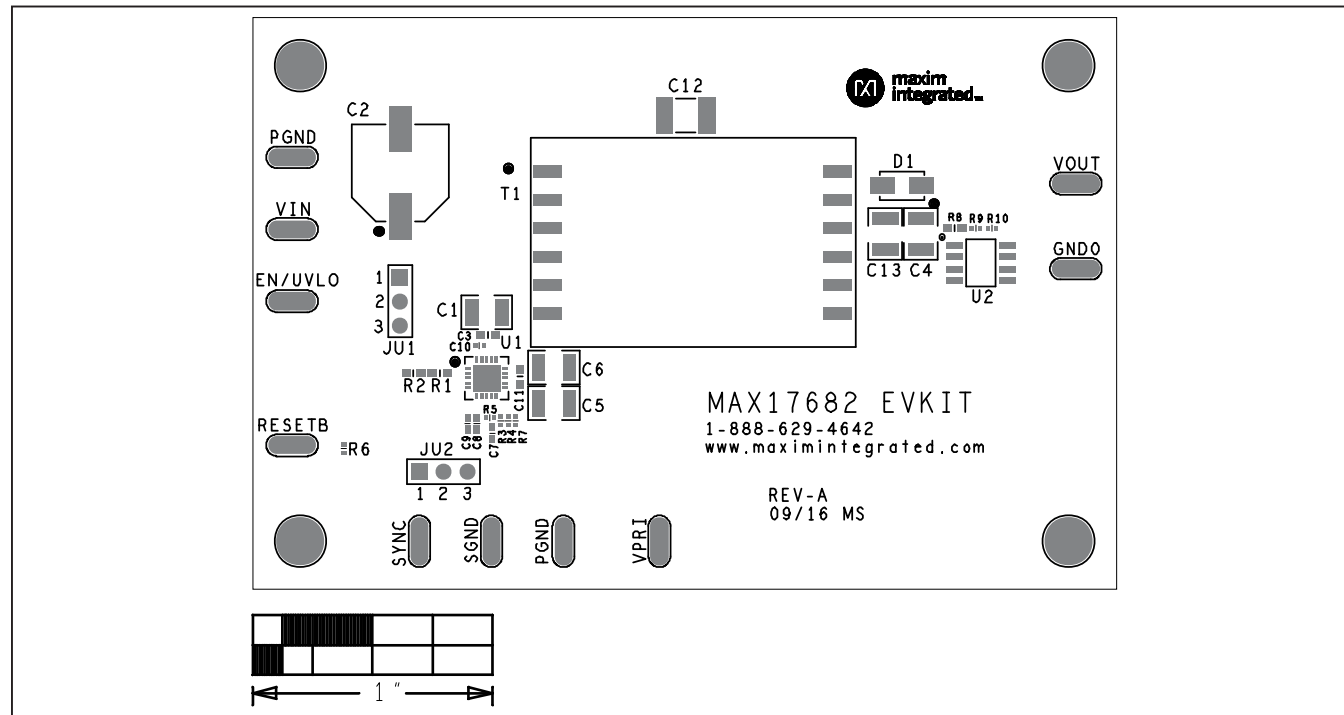
MAX17682 EV Kit Bill of Materials

S NO	Designation	Qty	Description	Manufacturer Partnumber-1	Manufacturer Partnumber-2	Manufacturer Partnumber-3
1	C1	1	2.2μF±10%, 100V, X7R Ceramic capacitor (1210)	Murata GRM32ER72A225KA35	TDK CGA6N3X7R2A225K230	
2	C2	1	47μF, 20%, 80V, ALUMINUM ELECTROLYTIC CAPACITOR 6.60*6.60mm,	Panasonic EEE-FK1K470P		
3	C3	1	0.1μF±10%, 100V, X7R ceramic capacitor (0603)	Murata GRM188R72A104KA35	TDK CC0603KRX7R0BB104	
4	C4, C13	2	10μF±10%, 16V, X7R ceramic capacitor (1210)	Murata GRM32DR71C106KA01	TDK C3225X7R1C106K	KEMET C1210C106K4RAC
5	C5, C6	2	22μF±20%, 10V, X7R ceramic capacitor (1210)	Murata GRM32ER71A226ME20		
6	C7	1	0.033μF±5%, 25V, X7R ceramic capacitor (0402)	Murata GRM155R71E333KA88		
7	C8	1	2200pF±10%, 50V, X7R ceramic capacitor (0402)	Murata GRM155R71H222JA01		
8	C9	1	0.015uF±10%, 16V, X7R ceramic capacitor (0402)	Murata GRM155R71C153KA01	KEMET C0402C153K4RAC	
9	C10	1	0.1uF±10%, 16V, X7R ceramic capacitor (0402)	Murata GRM155R61C104KA88		
10	C11	1	2.2uF±10%, 10V, X7R ceramic capacitor (0603)	Murata GRM188R71A225KE15	SAMSUNG CL10B225KP8NNN	
11	C12	1	2700pF±10%, 3000V, X7R ceramic capacitor (1812)	AVX 1812HC272KAZ1A		
12	D1	1	Diode, 200V/3A, SMA	Taiwan Semiconductor Corporation SK320A R3G		
13	JU1, JU2	2	3-pin headers	SULLINS ELECTRONICS CORP PEC03SAAN		
14	R1	1	3.3M Ohm±1% resistor (0603)	VISHAY DALE CRCW0603M30FK		
15	R2	1	287K Ohm±1% resistor (0603)	VISHAY DALE CRCW0603287KFK		
16	R3	1	78.7K Ohm±1% resistor (0402)	VISHAY DALE CRCW040278K7FK		
17	R4, R6, R10	3	10kΩ ±1% resistor (0402)	VISHAY DALE CRCW040210K0FK	YAGEO PHICOMP RC0402FR-0710K	
18	R5	1	6.34kΩ ±1% resistor (0402)	VISHAY DALE CRCW04026K34FK		
19	R8	1	12Ω ±1% resistor (0603)	VISHAY DALE RCS060312R0FK		
20	R9	1	40.2kΩ ±1% resistor (0402)	VISHAY DALE CRCW040240K2FK		
21	R7	1	105kΩ ±1% resistor (0402)	VISHAY DALE CRCW0402105KFK		
22	T1	1	EVKIT PART-TRANSFORMER; SMT; 1.67:1	WURTH ELECTRONICS INC. 750343160		
23	U1	1	MAX17682 TQFN10 4*4mm Iso buck DC-DC converter	MAX17682		
24	U2	1	Shunt regulator SOT25	ST MICROELECTRONICS TL431AIYDT		
25	SU1, SU2	2	See Jumper Table	SULLINS ELECTRONICS CORP - STC025YAN		
26	VIN, GND0, PGND, SGND, SYNC, VOUT, VPRI, PGND1, RESETB, EN/UVLO	10	Test Loops	WEICO WIRE - 9020 BUSS		

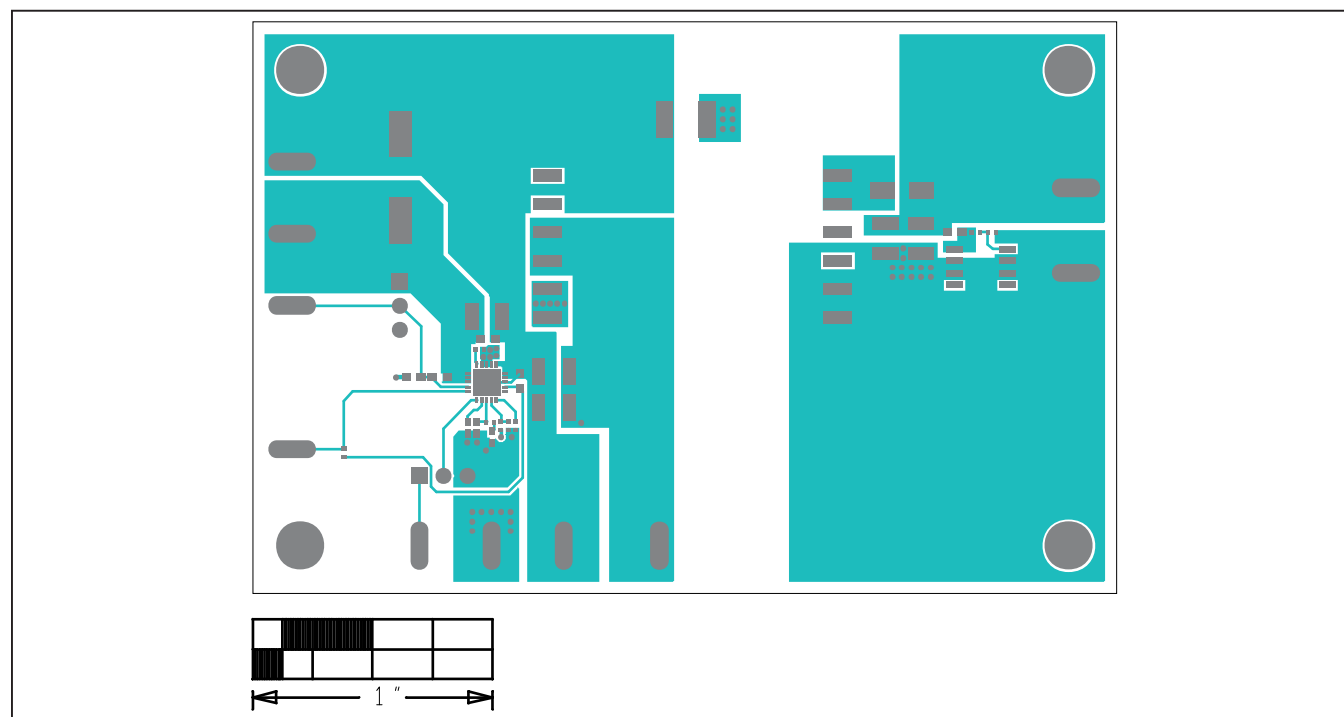
MAX17682 EV Kit Schematics



MAX17682 EV Kit PCB Layout Diagrams

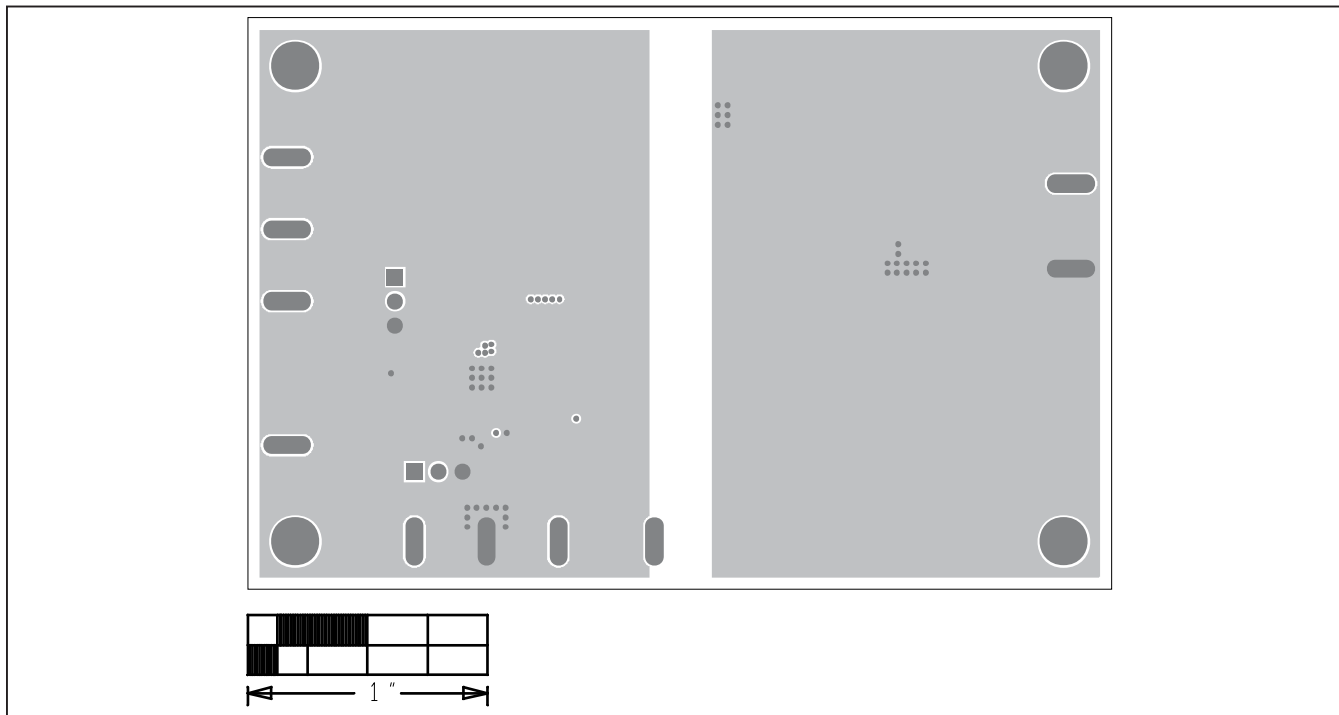


MAX17682 EV Kit—Top Silkscreen

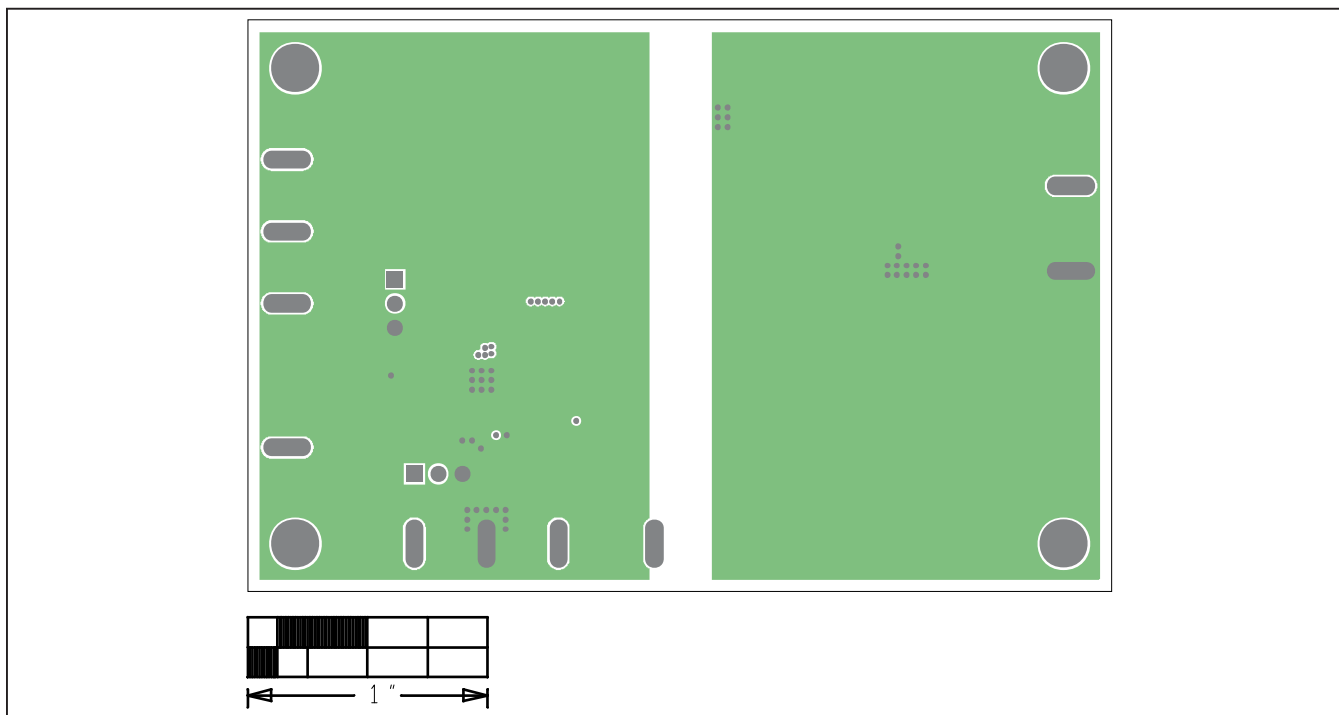


MAX17682 EV Kit—Top

MAX17682 EV PCB Layout Diagrams (continued)

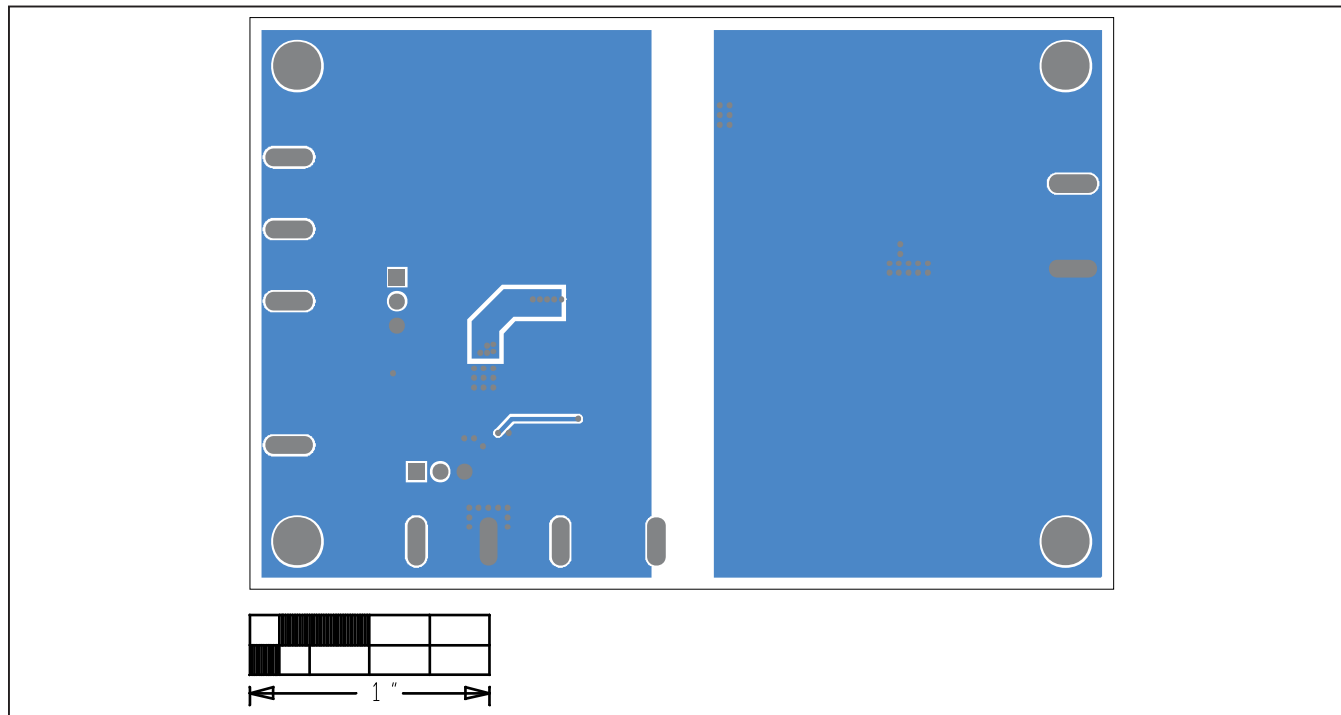


MAX17682 EV Kit—Level 2 SGND



MAX17682 EV Kit—Level 3 SGND

MAX17682 EV Kit PCB Layout Diagrams (continued)



MAX17682EV—Bottom

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	3/17	Initial release	—
1	4/18	Updated title and <i>Bill of Materials</i> .	1–9

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