

## 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

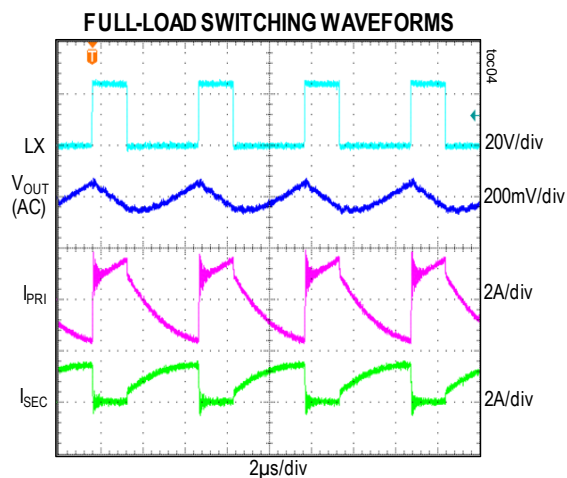
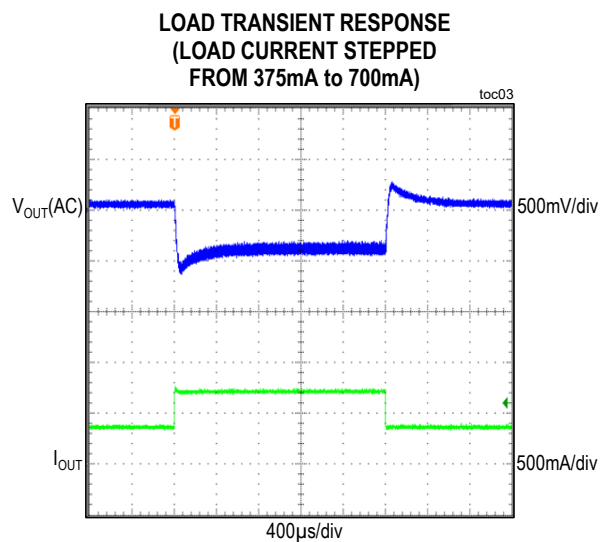
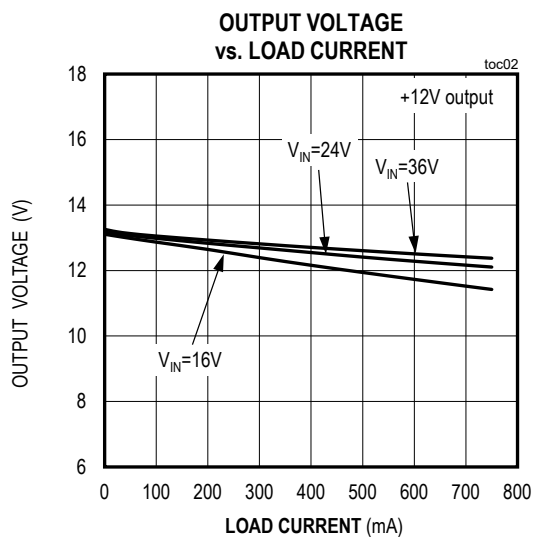
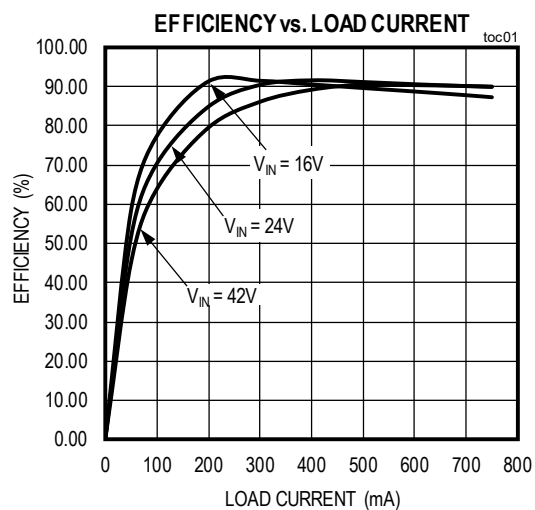
| SHUNT POSITION | EN/UVLO PIN                                      | V <sub>OUT</sub> OUTPUT          |
|----------------|--------------------------------------------------|----------------------------------|
| J1             |                                                  |                     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



# MAX17682EVKIT# Evaluation Kit

Evaluates: MAX17682 for Isolated +12V  
Output Configuration

## 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

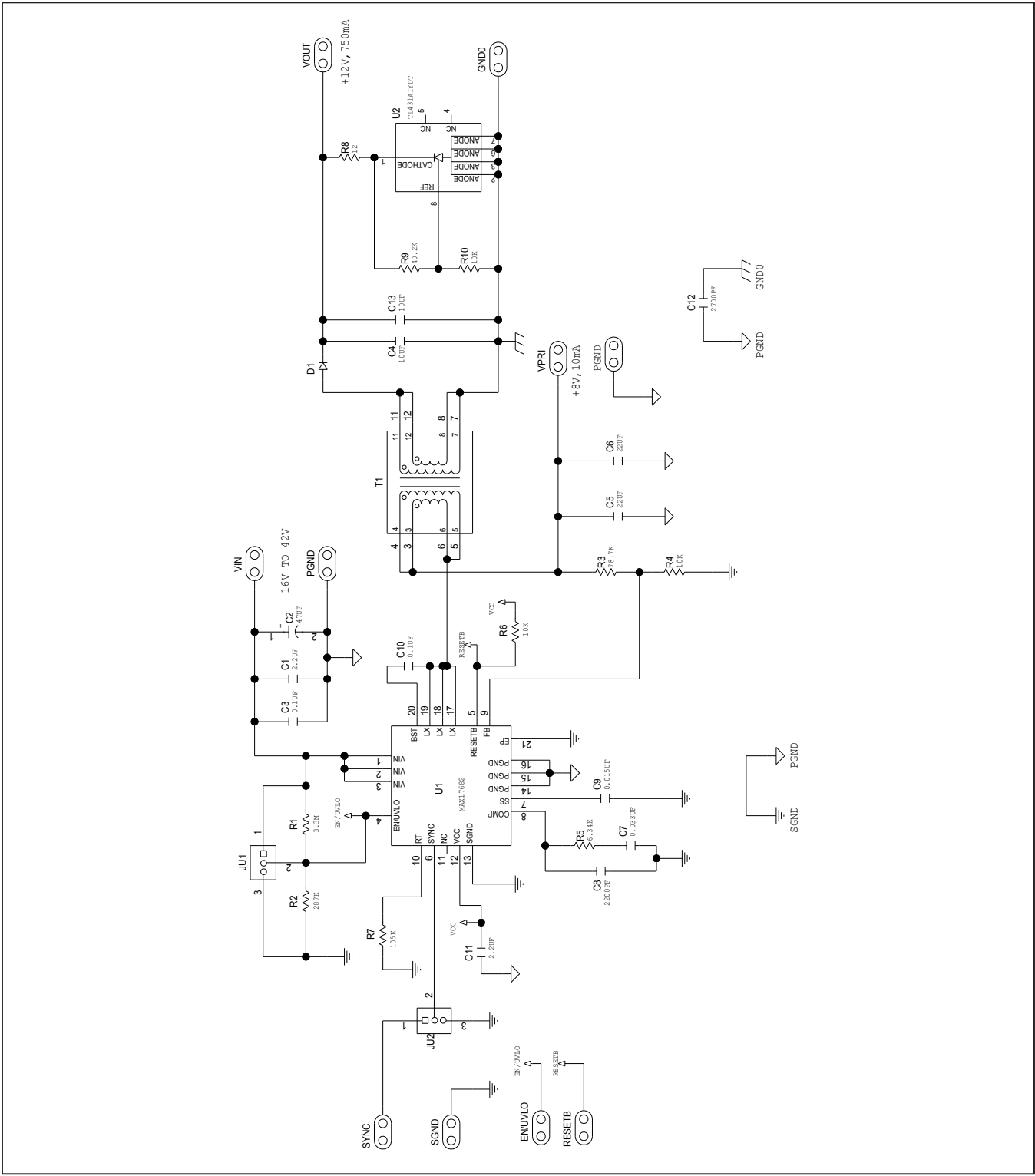
| PART           | TYPE  |
|----------------|-------|
| MAX17682EVKIT# | EVKIT |

#Denotes RoHS compliant.

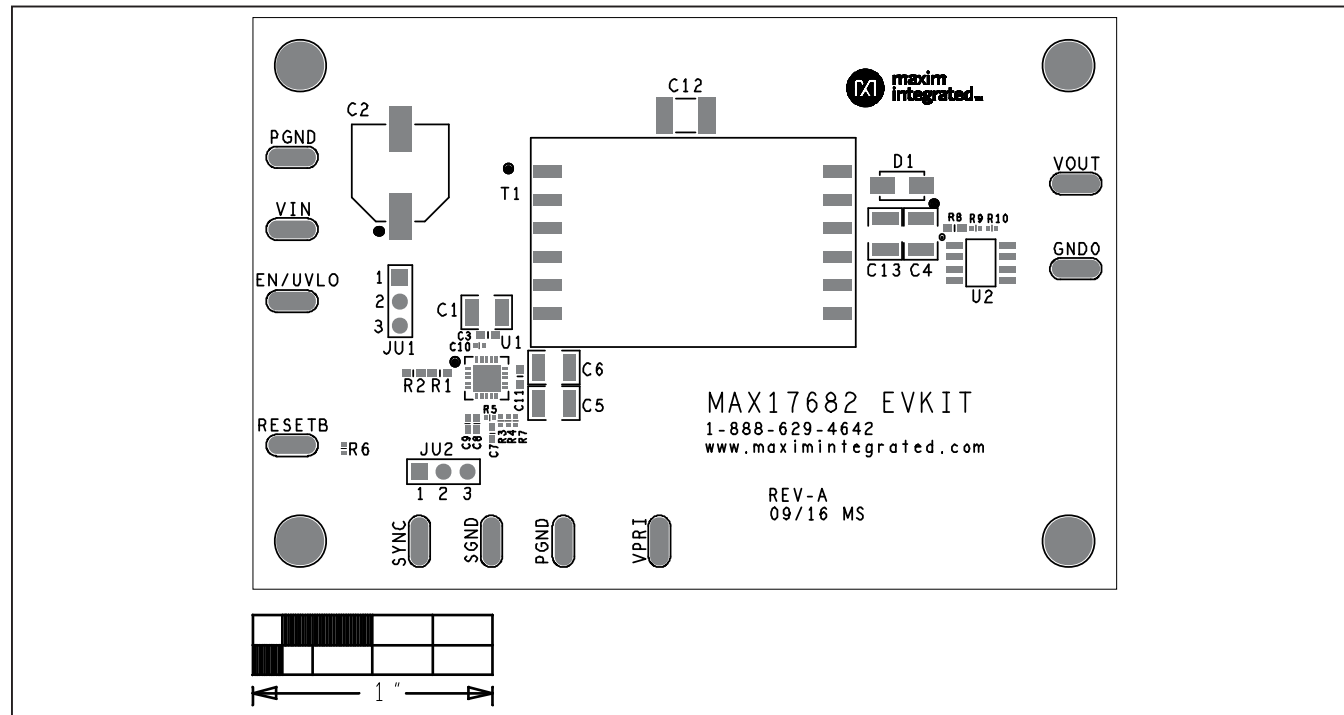
## MAX17682 EV Kit Bill of Materials

| 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                      |                              |                           |

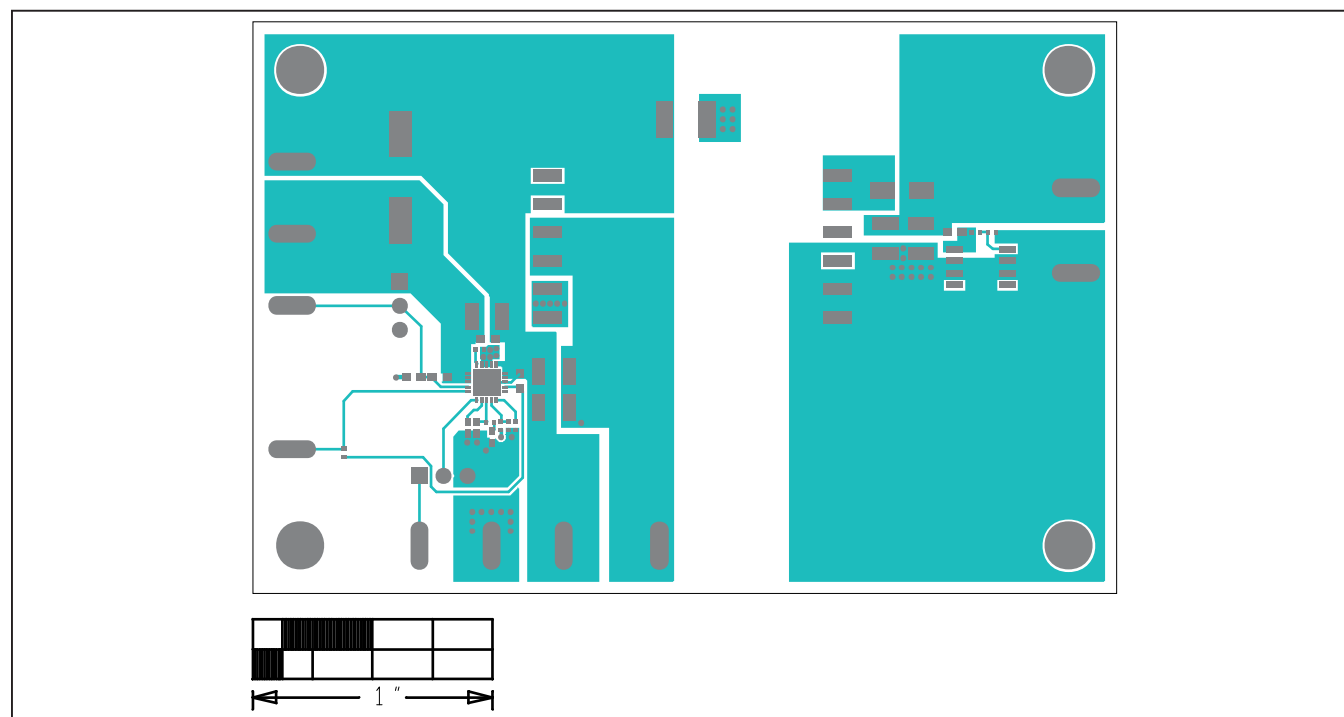
MAX17682 EV Kit Schematics



## MAX17682 EV Kit PCB Layout Diagrams

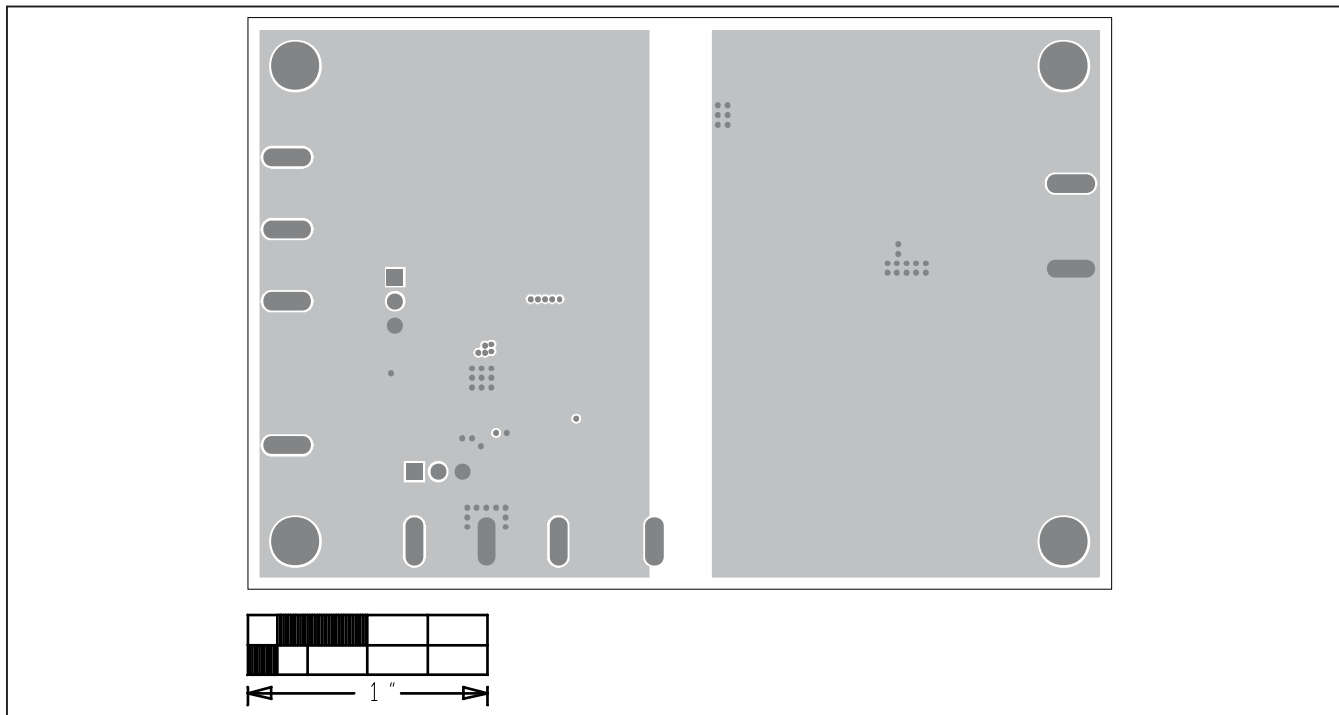


MAX17682 EV Kit—Top Silkscreen

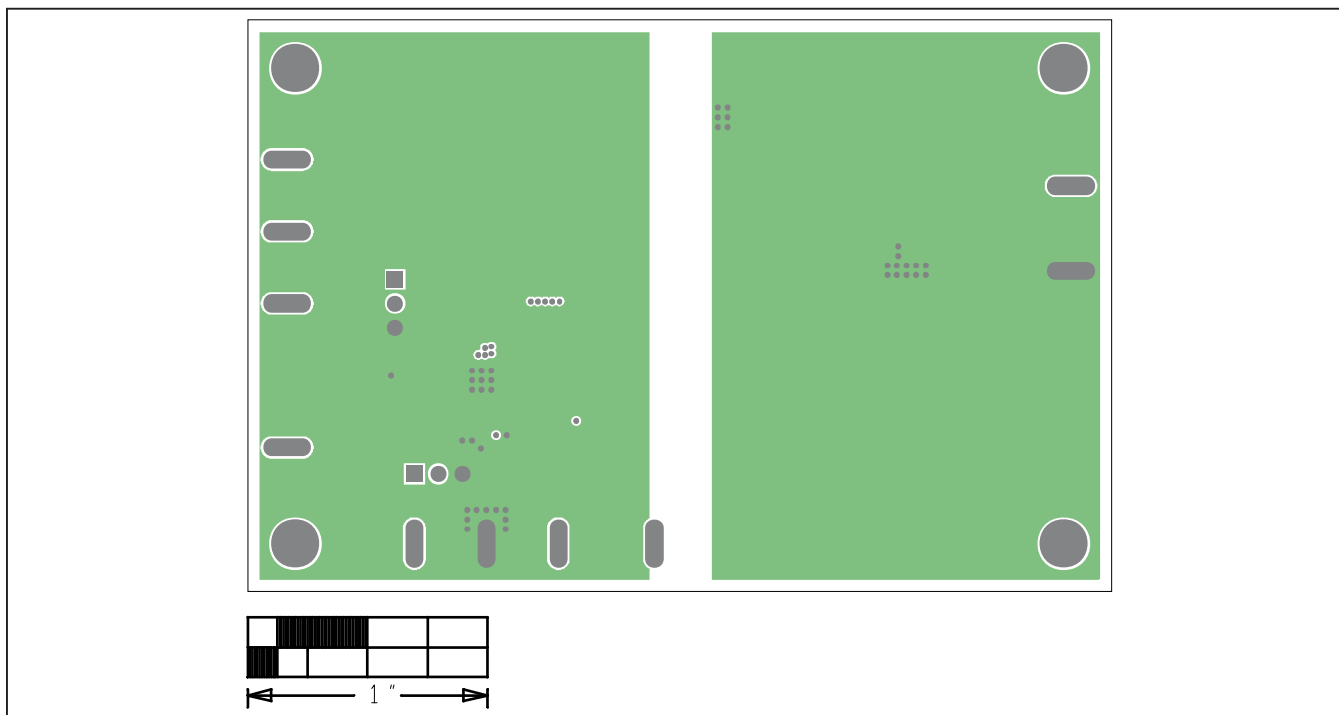


MAX17682 EV Kit—Top

## MAX17682 EV PCB Layout Diagrams (continued)

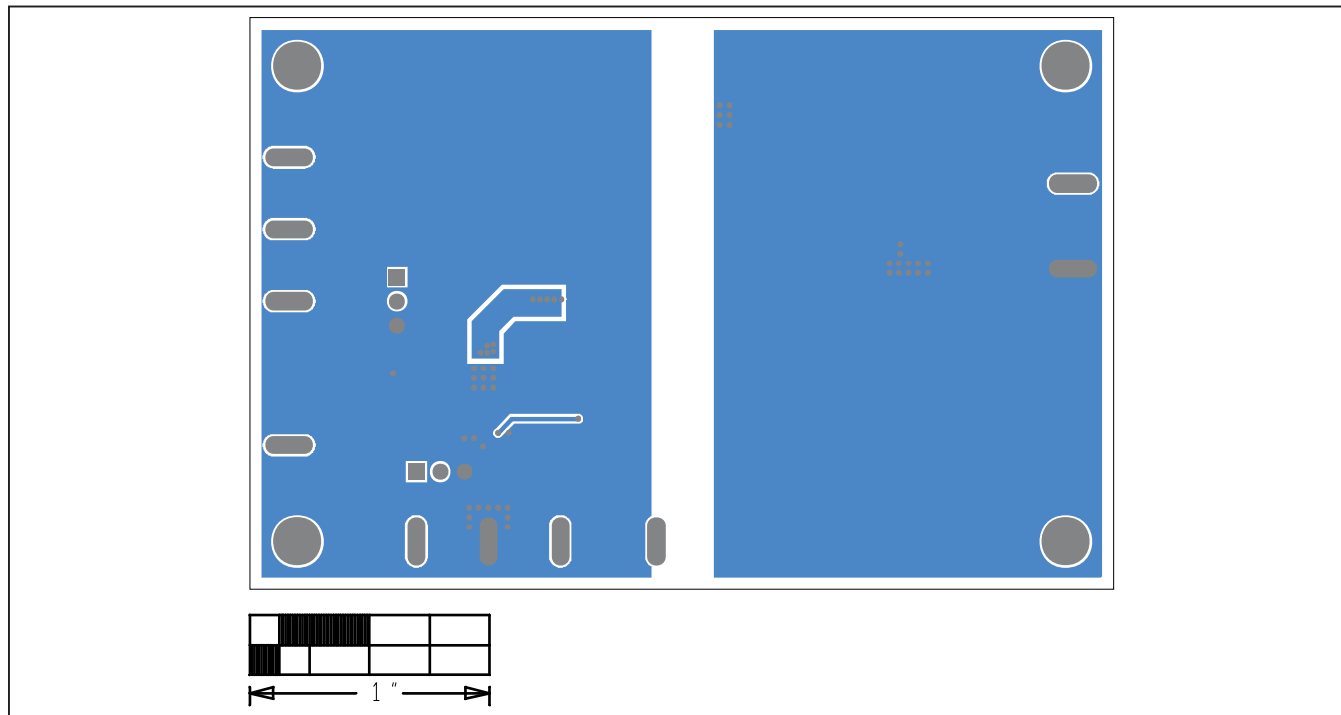


MAX17682 EV Kit—Level 2 SGND



MAX17682 EV Kit—Level 3 SGND

## MAX17682 EV Kit PCB Layout Diagrams (continued)



MAX17682EV—Bottom

## Revision History

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

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](http://www.maximintegrated.com).

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