

General Description

The MAX1556 evaluation kit (EV kit) is a fully assembled and tested circuit board that evaluates the MAX1556 and MAX1557 PWM step-down DC-DC converters. The circuit operates from 2.6V to 5.5V. The MAX1556 delivers up to 1.2A and has pin-selectable 1.8V, 2.5V, 3.3V, and adjustable output. The MAX1557 delivers up to 600mA and has pin-selectable 1V, 1.3V, 1.5V, and adjustable output. Each circuit features an on-board shutdown control.

Features

- Up to 97% Efficiency
- 95% Efficiency at 1mA Load Current
- 1MHz PWM Switching Frequency
- Tiny Inductors
- Pin-Selectable Output Voltages
 - MAX1556: 3.3V, 2.5V, 1.8V, and Adjustable
 - MAX1557: 1.5V, 1.3V, 1.0V, and Adjustable
- 1.2A Guaranteed Output Current (MAX1556)
- Voltage Positioning Optimizes Load-Transient Response
- Low 16 μ A Quiescent Current
- Low 27 μ A Quiescent Current in Dropout
- Low 0.1 μ A Shutdown Current
- Analog Soft-Start with Zero Overshoot Current
- Small, 10-Pin, 3mm x 3mm TDFN Package
- Fully Assembled and Tested

Quick Start

Recommended Equipment

- MAX1556 EV kit
- Variable DC power supply capable of supplying up to 5.5V at 1.2A
- Voltmeter (DMM)

Procedure (MAX1556ETB)

The EV kit is fully assembled and tested. Follow the steps below to verify board operation:

- 1) Select the desired output voltage with JU1–JU3 (see Table 1). The EV kit is preset to a 1.8V output.

- 2) Connect the positive terminal of the voltmeter to the PCB pad labeled OUT. Connect the ground terminal of the voltmeter to the PCB pad labeled GND nearest the OUT PCB pad. Connect a load from OUT to the GND PCB pad closest to OUT.
- 3) Preset the power supply to between 2.6V and 5.5V, and turn the power supply off. **Do not turn on the power supply until all connections are completed.**
- 4) Connect the positive power-supply terminal to the PCB pad labeled IN. Connect the power-supply ground to the PCB pad labeled GND nearest the IN PCB pad.
- 5) Turn on the power supply and verify the output voltage is the desired voltage from setting JU1, JU2, and JU3 (the default is 1.8V).

Procedure (MAX1557ETB)

The EV kit is fully assembled and tested. Follow the steps below to verify board operation:

- 1) Select the desired output voltage with JU4–JU6 (see Table 2). The EV kit is preset to a 1.0V output.
- 2) Connect the positive terminal of the voltmeter to the PCB pad labeled OUT2. Connect the ground terminal of the voltmeter to the PCB pad labeled GND2 nearest the OUT2 PCB pad. Connect a load from OUT2 to the GND2 C pad closest to OUT2.
- 3) Preset the power supply to between 2.6V and 5.5V, and turn the power supply off. **Do not turn on the power supply until all connections are completed.**
- 4) Connect the positive power-supply terminal to the PCB pad labeled IN2. Connect the power-supply ground to the p PCB pad labeled GND2 nearest the IN2 PCB pad.
- 5) Turn on the power supply and verify that the output voltage is the desired voltage from setting JU4, JU5, and JU6 (the default is 1.0V).

Ordering Information

PART	TYPE
MAX1556EVKIT	EV Kit

Detailed Description

The MAX1556 EV kit contains two separate PWM step-down DC-DC converter circuits. Either circuit can be powered from a DC power supply with a 2.6V to 5.5V input range. The top and bottom circuit are separate from each other and do not share a common ground plane.

The top circuit (MAX1556) provides pin-selectable output voltages of 3.3V, 2.5V, 1.8V, and adjustable at 1.2A.

The bottom circuit (MAX1557) provides pin-selectable output voltages of 1.5V, 1.3V, 1.0V, and adjustable at 600mA.

Pin-Selectable Output Voltages

The MAX1556 output voltage is selected with JU1 and JU2, as shown in Table 1.

The MAX1557 output voltage is selected with JU4 and JU5, as shown in Table 2.

Evaluating Other Output Voltages

The EV kit comes with the MAX1556 preset to a 1.8V output and the MAX1557 preset to a 1V output. To evaluate other voltages besides the preset values, set the MAX1556

(or MAX1557) to adjustable mode. The footprints for the feedback resistors are available on the backside of the EV kit. Refer to the *Adjusting the Output Voltage* section in the MAX1556 IC data sheet for a detailed description on calculating these feedback resistor values for the desired output voltage. Resistor R1 for the MAX1556 circuit (R3 on MAX1557) is shorted on the EV kit. This short must be cut prior to the placement of a resistor on the footprint. Resistor R2 for the MAX1556 circuit (R4 for MAX1557) is open and requires no modification before placing a resistor on the footprint.

External Shutdown Control

The EV kit comes preset with $\overline{\text{SHDN}}$ and $\overline{\text{SHDN2}}$ pulled high so that the MAX1556 and MAX1557 are enabled when the input voltage is applied. To operate the shutdown control from an external signal, remove the shunt on JU3 for the MAX1556 (JU6 for the MAX1557). Apply a logic high to SHDN to enable the MAX1556, or apply a logic low to SHDN to shut down the MAX1556. Apply a logic high to $\overline{\text{SHDN2}}$ to enable the MAX1557, or apply a logic low to shut down the MAX1557.

Table 1. Output-Voltage Selection (MAX1556ETB)

V _{OUT}	SHUNT POSITION		MAX1556 V _{OUT}
	JU2	JU3	
1-2*	1-2*	1-2*	1.8V
1-2	2-3	1-2	2.5V
2-3	1-2	1-2	3.3V
2-3	2-3	1-2	ADJ
—	—	2-3	Shutdown

*Default position is pins 1-2 on JU1, JU2, and JU3,

Table 2. Output-Voltage Selection (MAX1557ETB)

JU4	SHUNT POSITION		MAX1557 V _{OUT}
	JU5	JU6	
1-2*	1-2*	1-2*	1.0V
1-2	2-3	1-2	1.3V
2-3	1-2	1-2	1.5V
2-3	2-3	1-2	ADJ
—	—	2-3	Shutdown

*Default position is pins 1-2 on JU4, JU5, and JU6.

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C6	2	10µF ±10%, 6.3V X5R ceramic capacitors (0805) Murata GRM21BR60J106K or equivalent
C2, C7	2	22µF ±10%, 6.3V X5R ceramic capacitors (1206) Murata GRM31CR60J226K or equivalent
C3, C8	0	Not installed, capacitors (0805)
C4, C9	2	0.001µF ±10%, 50V X7R ceramic capacitors (0402) Murata GRP155R71H102K or equivalent
C5, C10	0	Not installed, capacitors (0603)
C11	1	0.47µF ±10%, 6.3V X5R ceramic capacitor (0402) Murata GRM155R60J474K or equivalent

DESIGNATION	QTY	DESCRIPTION
JU1–JU6	6	3-pin headers
L1	1	3.3µH inductor, 0.084Ω, 1.23A, 4.0mm x 4.0mm x 1.8mm Taiyo Yuden NR4018T3R3M
L2	1	4.7µH inductor, 0.108Ω, 1.2A, 4.0mm x 4.0mm x 1.8mm Taiyo Yuden NR4018T4R7M
R1, R3	0	Shorted on PCB, resistors (0603)
R2, R4	0	Not installed, resistors (0603)
R5	1	100Ω ±1% resistor (0402)
U1	1	PWM step-down DC-DC converter (10 TDFN-EP*) Maxim MAX1556ETB
U2	1	PWM step-down DC-DC converter (10 TDFN-EP*) Maxim MAX1557ETB
—	6	Shunts, position 2
—	1	PCB: MAX1556 EVALUATION KIT

*EP = Exposed pad.

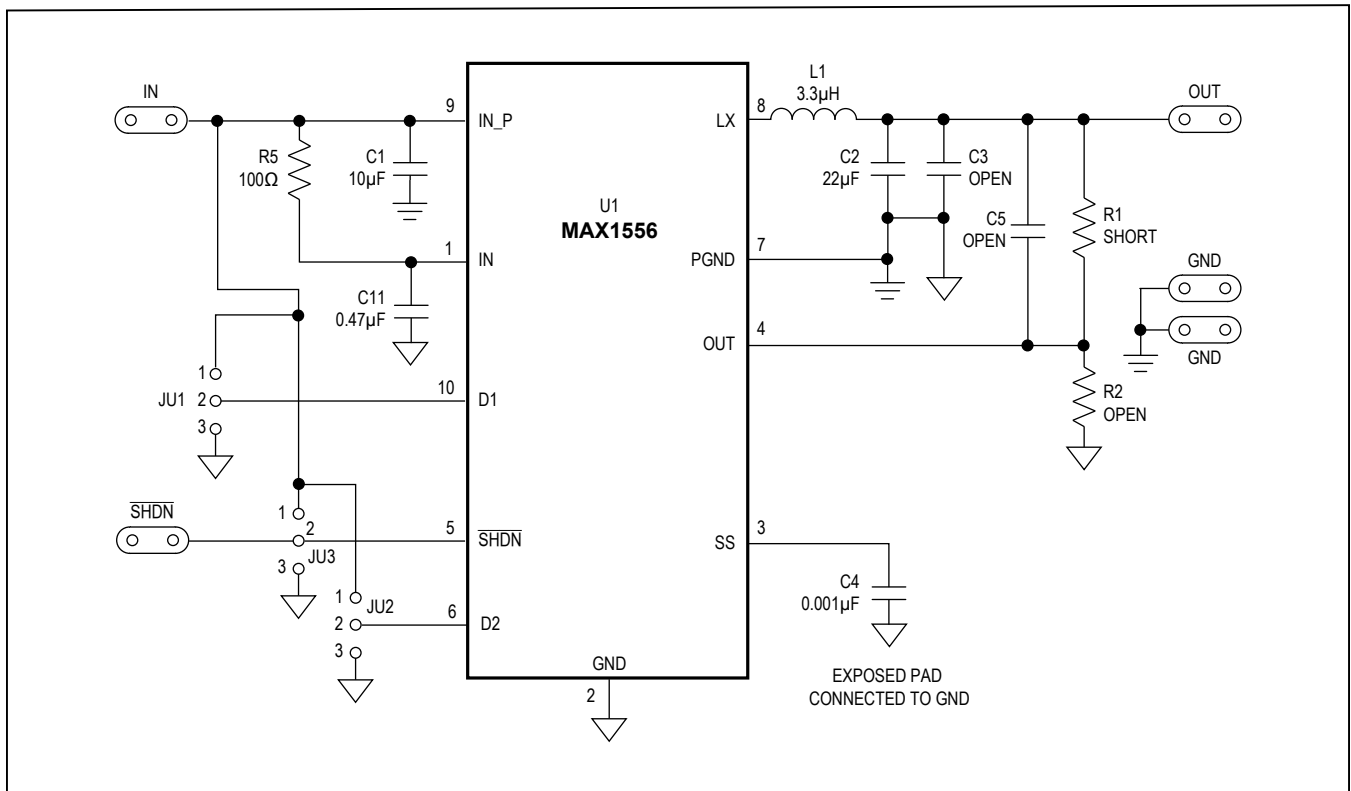


Figure 1a. MAX1556 EV Kit Schematic (MAX1556)

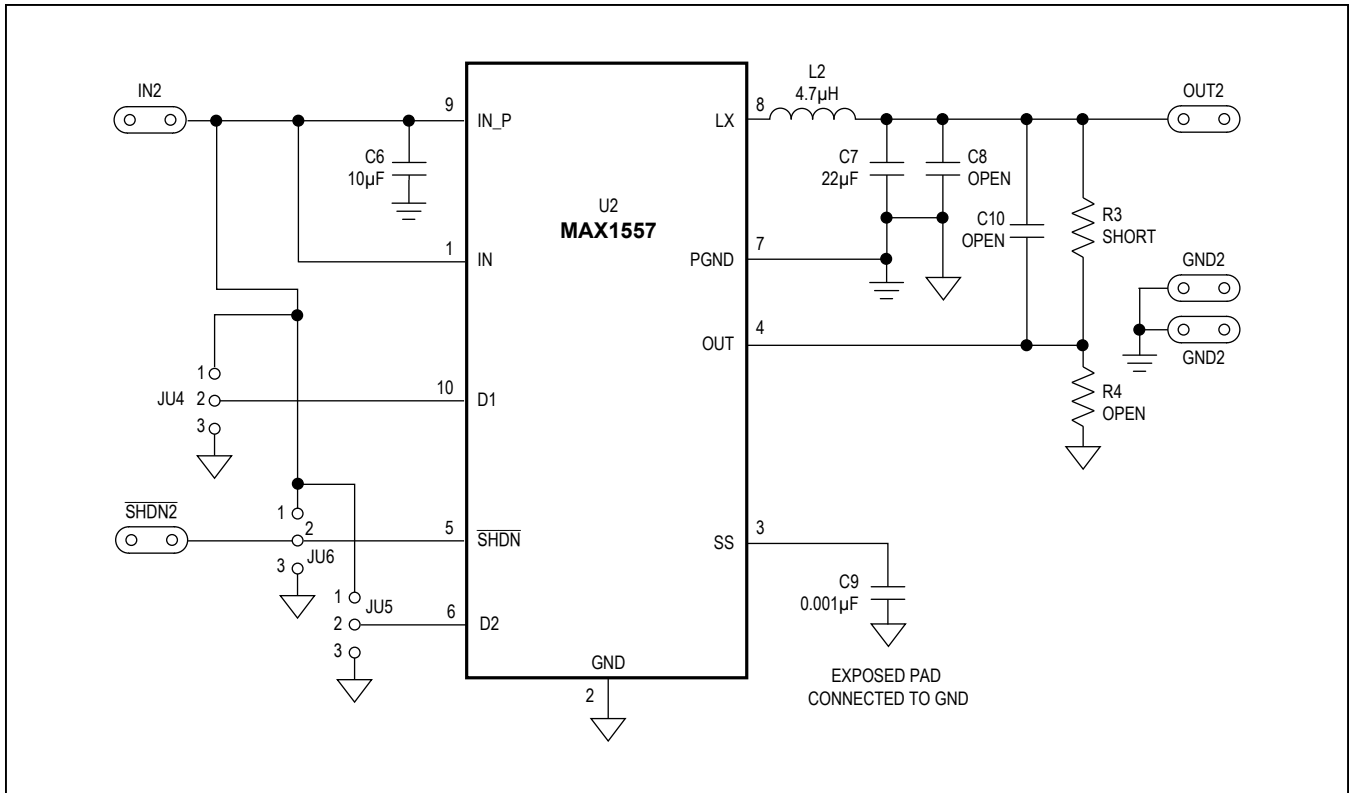


Figure 1b. MAX1556 EV Kit Schematic (MAX1557)

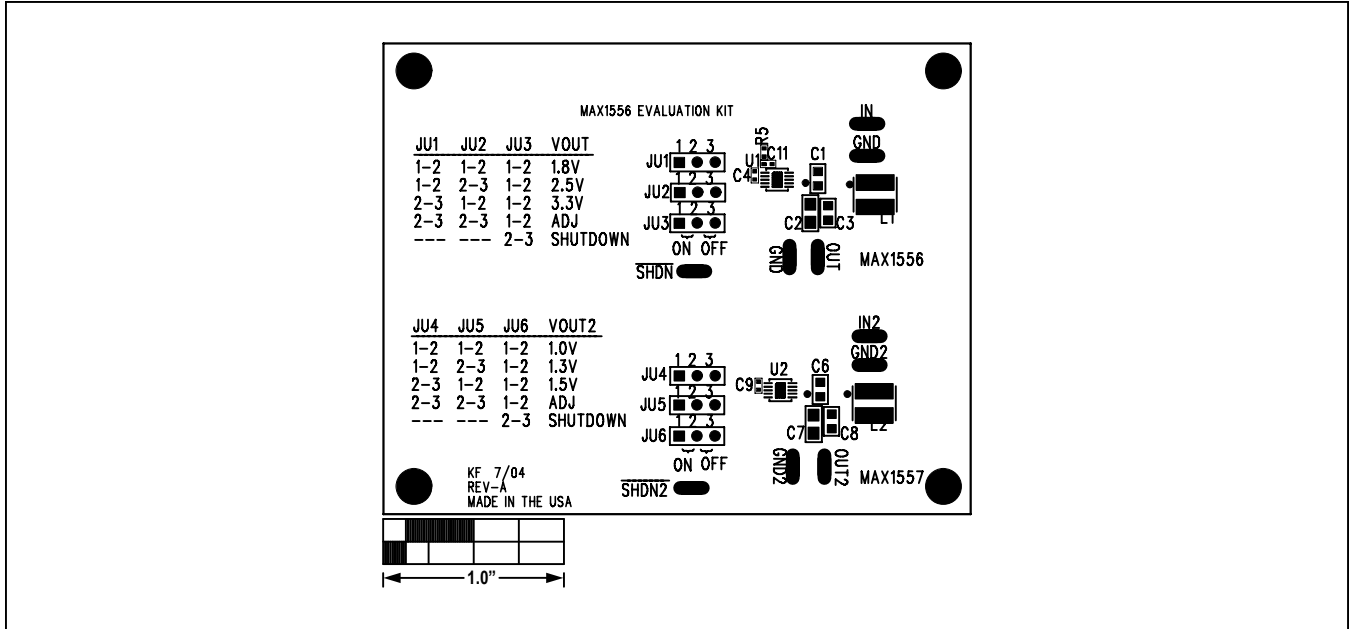


Figure 2. MAX1556 EV Kit Component Placement Guide—Component Side

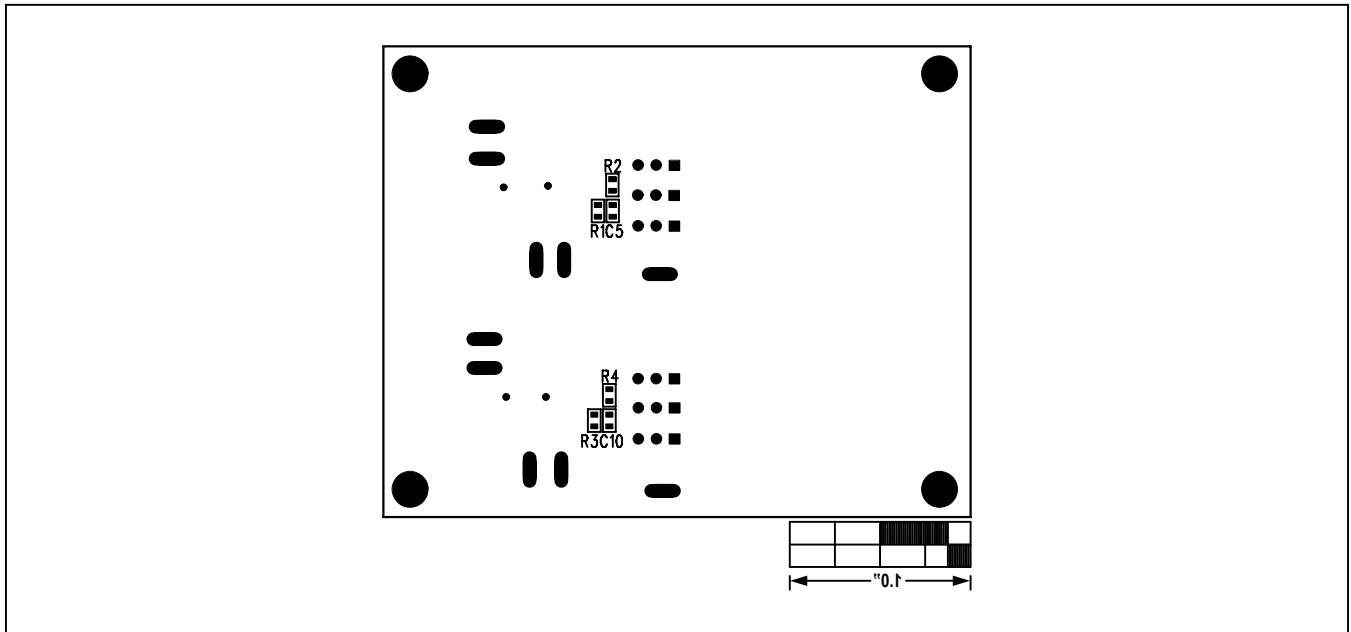


Figure 3. MAX1556 EV Kit Component Placement Guide—Solder Side

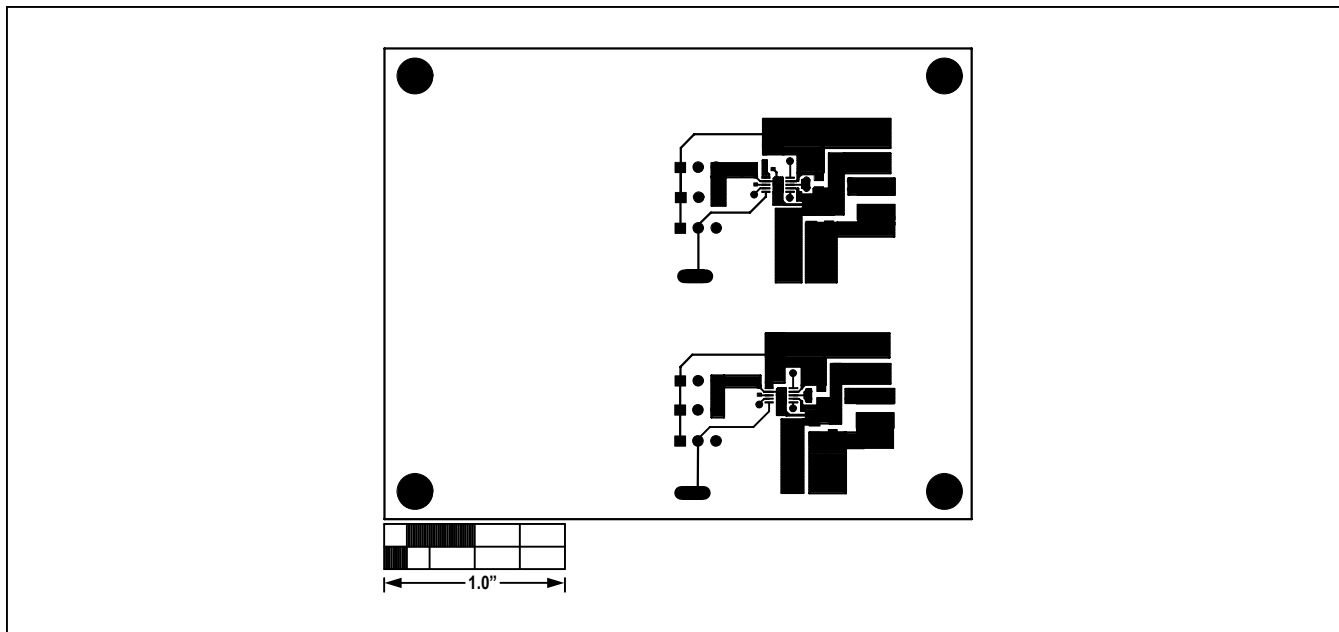


Figure 4. MAX1556 EV Kit PCB—Component Side

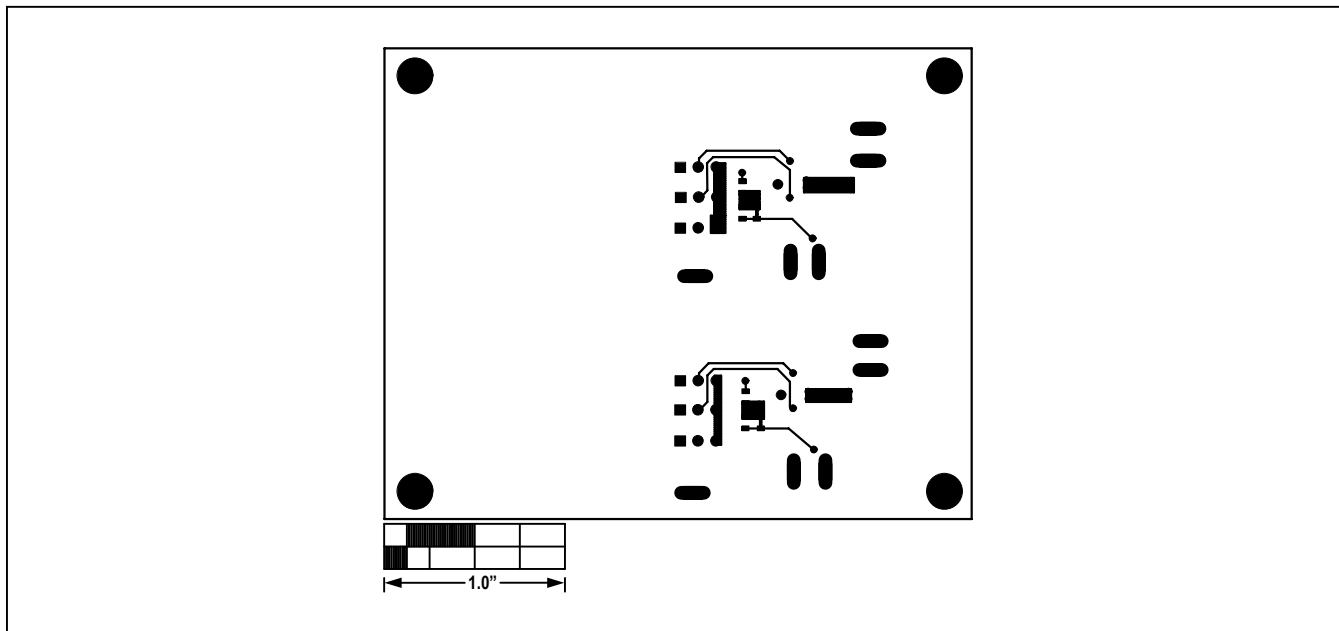


Figure 5. MAX1556 EV Kit PCB Layout—Solder Side

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	9/04	Initial release	—
1	11/14	Updated components L1 and L2 in <i>Component List</i> table and moved it to page 3	1, 3

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