

MAXIM

MAX8561 Evaluation Kit

General Description

The MAX8561 evaluation kit (EV kit) demonstrates the MAX8561/MAX8562s' up to 4MHz pulse-width modulated (PWM) step-down DC-DC converters. The two circuits are optimized for powering the DSP/microprocessor or the power amplifiers (PAs) in wireless applications. The MAX8561 circuit provides two adjustable output voltages in the 0.6V to 2.5V range from a 2.7V to 5.5V input, and can deliver 500mA of load current. In comparison, the MAX8562 circuit provides an adjustable voltage in the 0.6V to 2.5V range and a bypass mode where the output voltage is shorted to the input by an external MOSFET.

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX8561EVKIT	0°C to +70°C	8 Thin DFN (3mm x 3mm)

Features

- ◆ 2.7V to 5.5V Input Voltage Range
- ◆ 0.6V to 2.5V Adjustable Output Voltage Range
- ◆ VOUT1 = 1.8V/1.5V at 500mA (MAX8561)
- ◆ VOUT2 = 1.2V at 400mA or Bypass Mode (MAX8562)
- ◆ 2MHz PWM Switching Frequency (MAX8561)
- ◆ 4MHz PWM Switching Frequency (MAX8562)
- ◆ 0.1µA (typ) Shutdown Current
- ◆ Surface-Mount Construction
- ◆ Fully Assembled and Tested

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C4	2	4.7µF ±10%, 6.3V X5R ceramic capacitors (0603) TDK C1608X5R0J475K
C2, C5	2	2.2µF ±10%, 6.3V X5R ceramic capacitors (0603) Taiyo Yuden JMK107BJ225KA or TDK C1608X5R0J225K
C3	1	150pF ±5%, 50V C0G ceramic capacitor (0603) TDK C1608C0G1H151JT or equivalent
C6	1	100pF ±5%, 50V C0G ceramic capacitor (0603) TDK C1608C0G1H101JT or equivalent
JU1–JU4	4	3-pin headers
L1	1	2.2µH inductor Murata LQH32CN2R2M51

DESIGNATION	QTY	DESCRIPTION
L2	1	1.0µH inductor (0806) Taiyo Yuden LB2016B1R0M
P1	1	P-channel MOSFET (SC70) Vishay Si1417EDH (top mark BB)
R1	1	150kΩ ±1% resistor (0603)
R2	1	301kΩ ±1% resistor (0603)
R3, R4, R5	3	100kΩ ±1% resistors (0603)
U1	1	MAX8561ETA (8-pin thin DFN 3mm x 3mm) top mark AHD
U2	1	MAX8562ETA (8-pin thin DFN 3mm x 3mm) top mark AHE
U3	0	Not installed
None	4	Shunts
None	1	MAX8561/MAX8562 PC board

Component Suppliers

SUPPLIER	PHONE	FAX	WEBSITE
Murata	770-436-1300	770-436-3030	www.murata.com
Taiyo Yuden	800-348-2496	847-925-0899	www.t-yuden.com
TDK	847-803-6100	847-390-4405	www.component.tdk.com
Vishay	203-268-6261	203-452-5670	www.vishay.com

Note: Please indicate that you are using the MAX8561/MAX8562 when contacting these component suppliers.

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Quick Start

The MAX8561 EV kit is a fully assembled and tested surface-mount board. Follow the steps below for board operation. **Do not turn on the power supply until all connections are completed:**

- 1) Verify that a shunt is connected across pins 1 and 2 of jumper JU1/JU3 (output enabled).
- 2) Verify that a shunt is connected across pins 2 and 3 of jumper JU2/JU4.
- 3) Connect a voltmeter across the VOUT1/VOUT2 and the GND1/GND2 pads to monitor the output voltage(s).
- 4) Connect a 2.7V to 5.5V power supply to the BATT1/BATT2 pad. Connect the power-supply ground terminal to the GND1/GND2 pad.
- 5) Turn on the power supply and verify that VOUT1 = 1.5V/VOUT2 = 1.2V.

Detailed Description

The MAX8561 EV kit circuit board demonstrates both the MAX8561 (upper circuit) and the MAX8562 (lower circuit). The MAX8561 circuit is optimized for DSP or micro-processor application, and its switching frequency is set at approximately 2MHz. The MAX8562 circuit is optimized to power the PA in wireless applications, and its switching frequency is set to 4MHz. The EV kit requires a power supply in the 2.7V to 5.5V range. The EV kit board features jumpers that enable the user to configure the shutdown mode and open-drain output control.

Shutdown Mode

The EV kit contains jumpers JU1 and JU3 to allow the user to switch the MAX8561 and MAX8562 converters from enable to shutdown mode. Shutdown mode reduces the supply current to 0.1μA (typ) and sets the output voltage to 0V. See Table 1 for JU1 and JU3 configurations.

Open-Drain Control

Jumper JU2 allows the user to set VOUT1 at either 1.8V or 1.5V. Jumper JU4 allows the user to enable the converter to regulate at 1.2V or set the output voltage VOUT2 to equal the input voltage BATT2 under the bypass mode. See Table 2 for JU2 and JU4 configurations.

Evaluating Other Voltage Outputs

The MAX8561 EV kit circuit board comes with two independent circuits, the MAX8561 (upper circuit) and the MAX8562 (lower circuit). The MAX8561 circuit can provide two adjustable output voltages, and the EV kit default voltages of VOUT1 are set at 1.8V and 1.5V. To evaluate other voltages at VOUT1, use 150kΩ at R1, and calculate R2 and R3 using the following two equations:

$$R3 = \frac{R1V_{FB}}{V_{OUT(LOW)} - V_{FB}} \text{ and}$$

$$R2 = \frac{R1}{\frac{V_{OUT(HIGH)}}{V_{FB}} - \frac{R1}{R3} - 1}$$

where $V_{FB} = 0.6V$ and $V_{OUT1(HIGH)}$ and $V_{OUT1(LOW)}$ are the two desired output voltages.

The EV kit default output voltage of VOUT2 is set at 1.2V. To evaluate other voltage outputs on the MAX8562 circuit, keep R4 as 100kΩ. Then R5 is given by:

$$R5 = \frac{R4V_{FB}}{V_{OUT2} - V_{FB}}$$

where $V_{FB} = 0.6V$ and VOUT2 is the desired output voltage.

MAX8561 Evaluation Kit

Evaluates: MAX8561/MAX8562

Table 1. Jumpers JU1 and JU3 Functions ($\overline{\text{SHDN}}$)

JU1/JU3 SHUNT LOCATION	$\overline{\text{SHDN}}$ PIN	MAX8561/MAX8562 OUTPUT
Pins 1 and 2	Connected to BATT_	Output enabled
Pins 2 and 3	Connected to GND	Output disabled
None	Connected to $\overline{\text{SHDN}}$ pad	Output controlled by the user (user-supplied control signal must be connected to $\overline{\text{SHDN}}$ pad)

Table 2. Jumpers JU2 and JU4 Functions (ODI1/ODI2)

JU2/JU4 SHUNT LOCATION	ODI1/ODI2 PIN	MAX8561 OUTPUT	MAX8562 OUTPUT
Pins 1 and 2	Connected to VIN	VOUT1 = 1.8V	VOUT2 = BATT2
Pins 2 and 3	Connected to GND	VOUT1 = 1.5V	VOUT2 = 1.2V
None	Connected to ODI1/ODI2 pad	Output controlled by the user (user-supplied control signal must be connected to ODI1 pad)	Output controlled by the user (user-supplied control signal must be connected to ODI2 pad)

Table 3. Recommended R2 and R3 Values for Typical Dynamic Output Voltages

MAX8561 OUTPUTS		R2 VALUE (k Ω)	R3 VALUE (k Ω)
VOUT1 _{LOW} (V)	VOUT1 _{HIGH} (V)		
0.9	1.3	226	301
1.1	1.3	432	182
0.9	1.5	150	301
1.1	1.5	221	182
1.2	1.5	301	150

Note: R1 = 150k Ω , L1 = 2.2 μ H, and C3 = 150pF.

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Evaluates: MAX8561/MAX8562

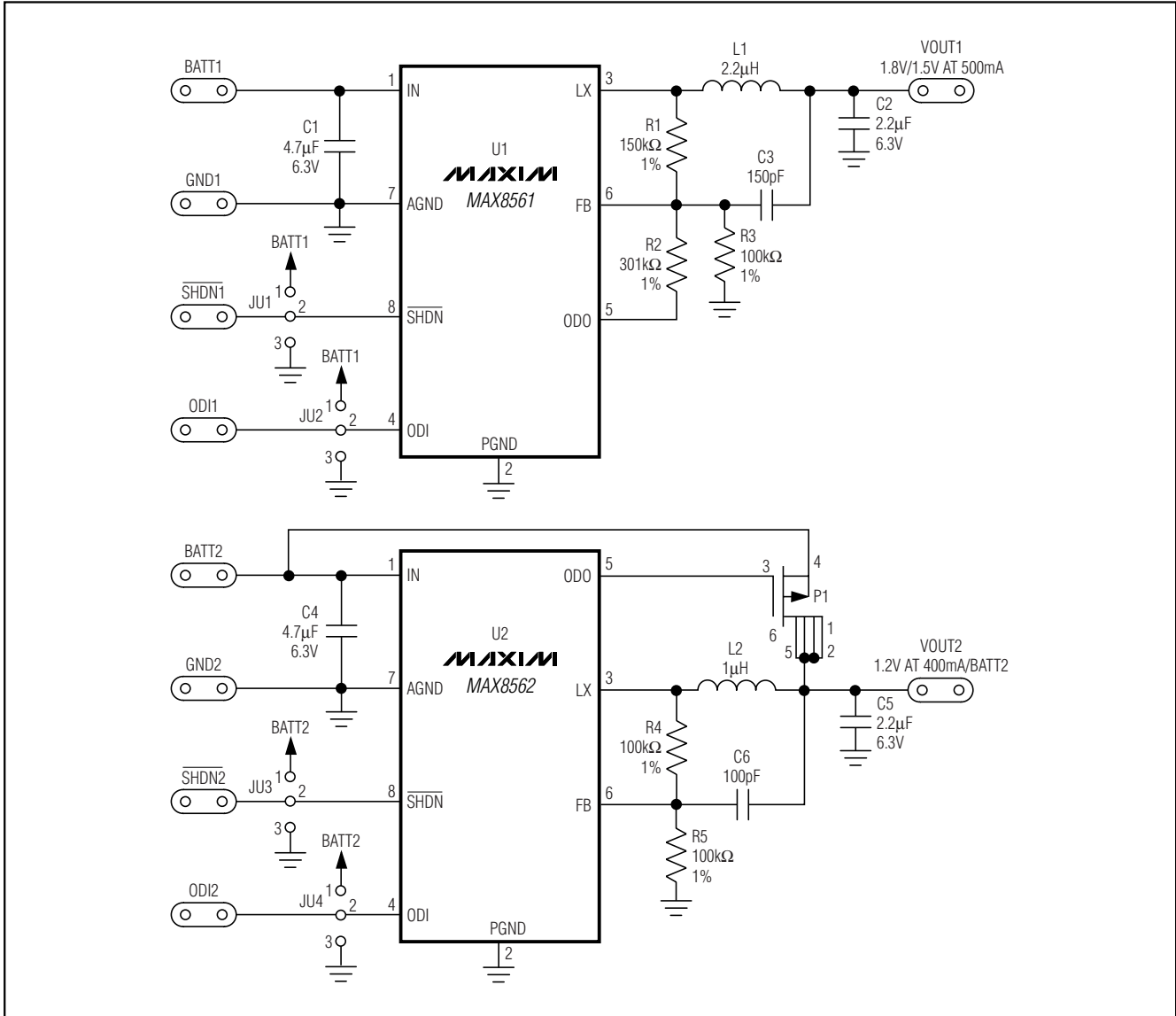


Figure 1. MAX8561 EV Kit Schematic

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Evaluates: MAX8561/MAX8562

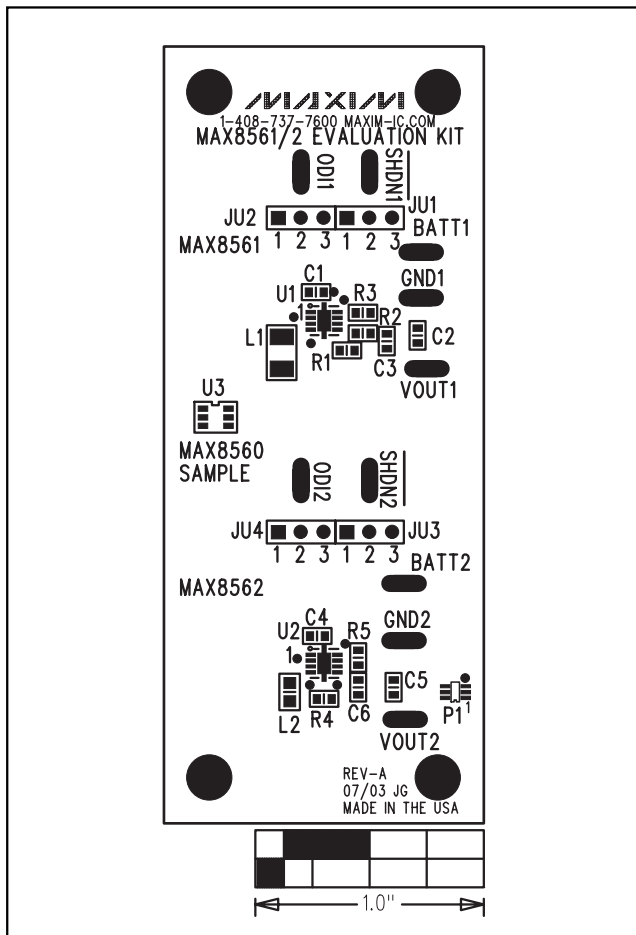


Figure 2. MAX8561 EV Kit Component Placement Guide—Component Side

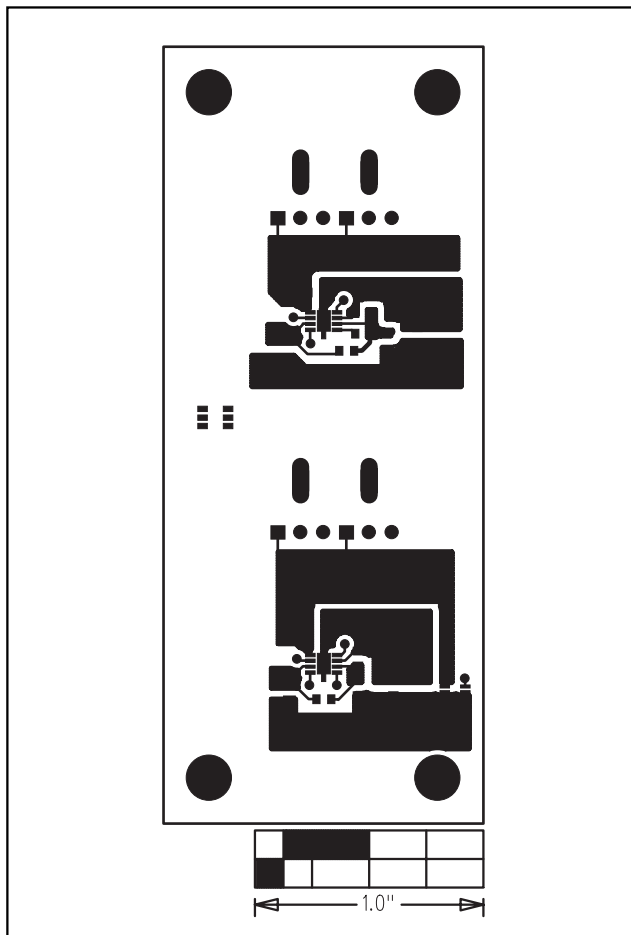


Figure 3. MAX8561 EV Kit PC Board Layout—Component Side

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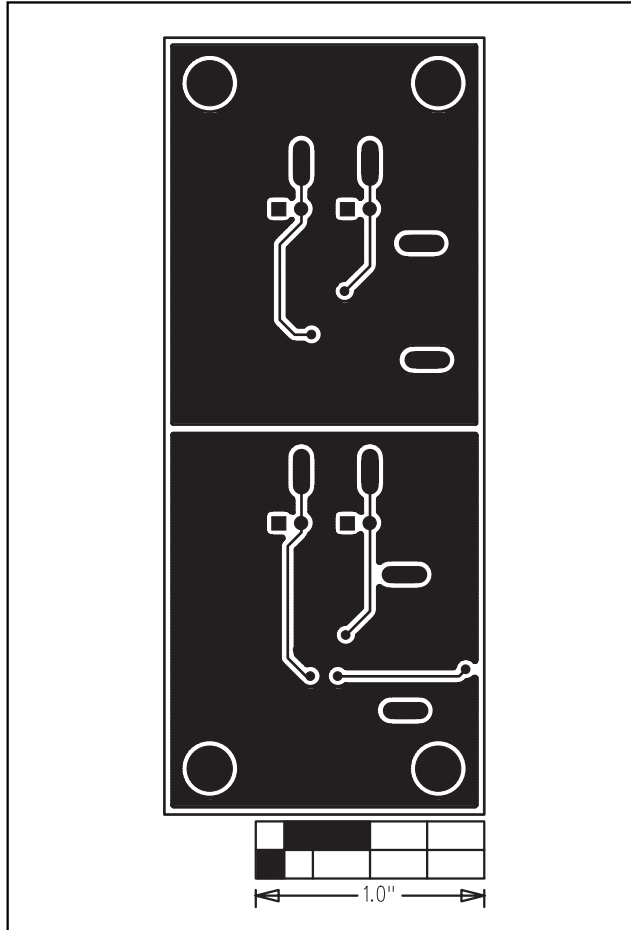


Figure 4. MAX8561 EV Kit PC Board Layout—Solder Side

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