



MAX8896 Evaluation Kit

Evaluates: MAX8896

General Description

The MAX8896 evaluation kit (EV kit) is a fully assembled and tested circuit for evaluating the MAX8896 dual step-down converter with low-dropout (LDO) linear regulator. The MAX8896 EV kit operates from a 2.7V to 5.5V power supply or battery. The PA step-down output regulates to 2.5 times the voltage at REFIN (0.2V to 1.7V) and provides 700mA drive capability. RFOUT (step-down regulator followed by LDO) regulates to 2.8V and provides 200mA drive capability.

Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	0.1 μ F \pm 10%, 16V X7R ceramic capacitor (0402) TDK C1005X7R1C104K Murata GRM155R71C104K
C2, C5	2	4.7 μ F \pm 20%, 6.3V X5R ceramic capacitors (0603) TDK C1608X5R0J475M or 4.7 μ F \pm 10%, 6.3V X5R ceramic capacitors (0603) Murata GRM188R60J475K
C3	1	1000pF \pm 5%, 50V COG ceramic capacitor (0402) Murata GRM1555C1H102J
C4	1	0.22 μ F \pm 10%, 6.3V X5R ceramic capacitor (0402) TDK C1005X5R0J224K Murata GRM155R60J224K
C6, C8	0	Not installed, 1 μ F \pm 10%, 6.3V X5R ceramic capacitors (0402) TDK C1005X5R0J105K
C7	1	1 μ F \pm 10%, 6.3V X5R ceramic capacitor (0402) TDK C1005X5R0J105K Murata GRM155R60J105K
C9, C10	2	2.2 μ F \pm 20%, 6.3V X5R ceramic capacitors (0603) TDK C1608X5R0J225M Murata GRM185R60J225K
JU1, JU2, JU3	3	2-pin headers, 0.1in
L1	1	4.7 μ H \pm 20%, 0.95A, 72m Ω inductor (3.2mm x 3.0mm x 1.8mm max) TOKO 1072AS-4R7M (DE2818C)

Features

- ◆ **PA Step-Down Converter (OUT1)**
 - 7.5 μ s (typ) Settling Time for 0.5V to 1V Output Voltage Change
 - Dynamic Output-Voltage Setting from 0.5V to VBATT
 - 140m Ω Bypass pFET and 100% Duty Cycle for Low Dropout
 - 2MHz Switching Frequency
 - Low Output-Voltage Ripple
 - 700mA (min) Output Drive Capability
 - 2% Gain Accuracy
 - Tiny External Components
- ◆ **RF Step-Down Converter (OUT2)**
 - 2MHz Fixed Switching Frequency
 - 94% Peak Efficiency
 - 100% Duty Cycle
 - 2% Output Accuracy Over Load, Line, and Temperature
 - 200mA (min) Output Drive Capability
 - Tiny External Components
- ◆ **Low-Noise LDO**
 - Guaranteed 200mA Output
 - High 65dB (typ) PSRR
 - Fixed Output Voltage
 - Low Noise (16 μ V_{RMS}, typ)
- ◆ **Simple Logic ON/OFF Controls**
- ◆ **Low 0.1 μ A Shutdown Current**
- ◆ **2.7V to 5.5V Supply Voltage Range**
- ◆ **Thermal Shutdown**
- ◆ **Fully Assembled and Tested**

Ordering Information

PART	TYPE
MAX8896EVKIT+	EV Kit

+Denotes lead(Pb)-free and RoHS compliant.



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Component List (continued)

DESIGNATION	QTY	DESCRIPTION
L2	1	2.2 μ H \pm 20%, 0.55A, 300m Ω inductor (0805) (1.0mm height) Taiyo Yuden BRL2012T 2R2M
L3	0	Not installed, inductor
TP1	1	Test point
U1	1	Dual PWM step-down converter (16 UCSP, 0.5mm pitch) Maxim MAX8896EREE+T
—	3	Shunts, 2-position
—	1	PCB: MAX8896 EVALUATION KIT+

Quick Start

Recommended Equipment

- 2.7V to 5.5V power supply or battery able to deliver 1A
- Voltage reference (or power supply) capable of providing 0.2V to 1.7V
- Voltmeter
- Loads (resistors or electronic load):
 - Load 1 between 0 to 700mA or no less than 7 Ω
 - Load 2 between 0 to 200mA or no less than 14 Ω

Procedure

The MAX8896 EV kit is fully assembled and tested. Follow the steps below to verify board operation:

- 1) Preset the power supply to 3.6V.
- 2) Preset the voltage reference to between 0.2V and 1.7V.
- 3) Turn off the power supply and voltage reference. **Do not turn on until all connections are completed.**

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
Taiyo Yuden	800-348-2496	www.t-yuden.com
TDK Corp.	847-803-6100	www.component.tdk.com
TOKO America, Inc.	847-297-0070	www.tokoam.com

Note: Indicate that you are using the MAX8896 when contacting these component suppliers.

- 4) Remove the shunts from jumpers JU1, JU2, and JU3.
- 5) Connect the positive power-supply terminal to the EV kit pad labeled BATT+.
- 6) Connect the negative power-supply terminal to the EV kit pad labeled BATT-.
- 7) Connect the positive voltage reference terminal to the EV kit pad labeled REFIN.
- 8) Connect the negative voltage reference terminal to the EV kit pad labeled AGND.
- 9) If desired, connect load 1 from PAOUT to PGND1, and connect load 2 from RFOUT to PGND2.
- 10) Turn on the power supply and voltage reference.
- 11) Install a shunt on jumper JU1.
- 12) With the voltmeter, verify that the voltage from PAOUT to PGND1 is approximately 2.5 times the reference voltage.
- 13) Install a shunt on jumper JU2 or JU3.
- 14) With the voltmeter, verify that the voltage from RFOUT to PGND2 is 2.8V.

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Detailed Description of Hardware

PAOUT

The PA step-down output regulates to 2.5 times the voltage at REFIN and provides 700mA drive capability. REFIN must connect to an external reference supply between 0.2V and 1.7V. Connect the ground of the reference supply to the AGND pad. **Do not use AGND as a power ground connection.**

PAOUT is enabled when jumper JU1 is shorted.

RFOUT

RFOUT is the output of a low-noise LDO regulator powered from the 3.1V output of step-down regulator OUT2. RFOUT regulates to 2.8V and provides 200mA drive current capability.

RFOUT is enabled when either jumper JU2 or JU3 is shorted.

An optional Pi filter (C6, C8, and L3) can be installed to further reduce noise on the RF output. Typical component values are 1 μ F for C6 and C8 and 4.7 μ H for L3. The RFOUTF pad is the filtered output.

Driving Enable Inputs from External Logic

To drive the enable inputs from an external logic source, remove the jumpers (JU1, JU2, and JU3). Connect the logic signal to pin 2 (left) of the corresponding jumper (JU1 for PAEN, JU2 for RFEN1, or JU3 for RFEN2). Connect the signal ground to one of the PGND_ pads. Refer to the *Electrical Characteristics* section in the MAX8896 IC data sheet for the required logic levels.

Table 1. Jumper Settings (JU1, JU2, JU3)

JUMPER	SHUNT POSITION	
	OPEN	1-2
JU1	PAOUT is disabled	PAOUT is enabled
JU2	When neither of these jumpers is installed, RFOUT is disabled	When either or both of these jumpers are installed, RFOUT is enabled
JU3		

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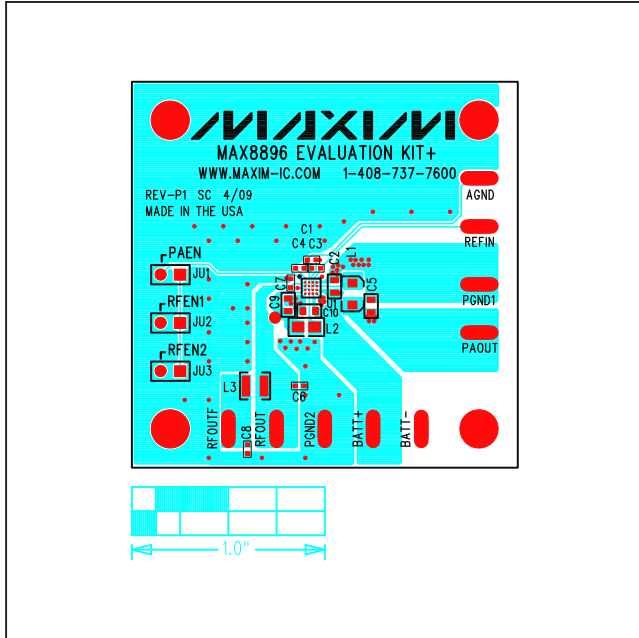


Figure 2. MAX8896 EV Kit Component Placement

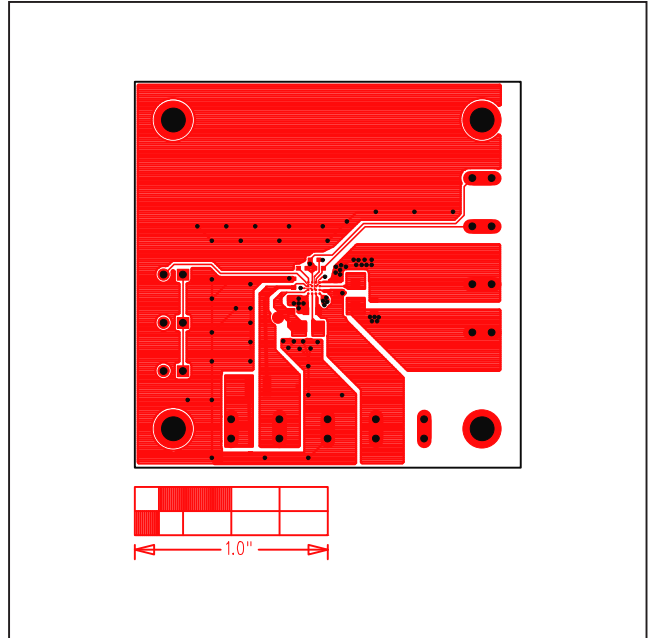


Figure 3. MAX8896 EV Kit Layout—Component Side

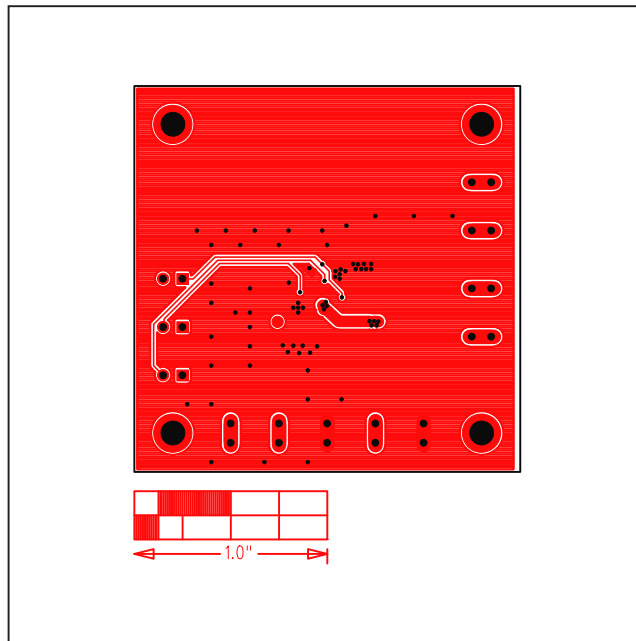


Figure 4. MAX8896 EV Kit Layout—Solder Side

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