

MAX8848Z Evaluation Kit

Evaluates: MAX8847Y/MAX8847Z/ MAX8848Y/MAX8848Z

General Description

The MAX8848Z evaluation kit (EV kit) is a fully assembled and tested PCB that demonstrates the MAX8848Z high-performance negative charge pump. The MAX8848Z integrates an inverting charge pump and 7 current regulators capable of 24mA each to drive up to 7 white LEDs (WLEDs). The EV kit operates from a 2.7V to 5.5V input supply range and includes two pulse generators that are used for testing the MAX8847Y/MAX8848Y single-wire, serial-pulse dimming feature. The EV kit can also evaluate the MAX8847Y, MAX8847Z, and MAX8848Y. To evaluate the MAX8847Y, MAX8847Z, or MAX8848Y, request a free sample when ordering the EV kit.

Features

- ◆ Negative 1x/1.5x Charge Pump
- ◆ Adaptive Current Regulators
- ◆ Independent Voltage Supply for Each LED
- ◆ 24mA to 0.1mA Serial-Pulse Dimming (MAX8847Y/MAX8848Y)
- ◆ 24mA to 0mA PWM Dimming (MAX8847Z/MAX8848Z)
- ◆ 2% (max) LED Current Accuracy, 1% (typ) Matching
- ◆ Low 120µA Quiescent Current
- ◆ Low 0.4µA Shutdown Current
- ◆ Inrush Current Limit
- ◆ Temperature Derating Function
- ◆ 16-Pin, 3mm x 3mm Thin QFN Package
- ◆ Tiny External Components
- ◆ Fully Assembled and Tested

Ordering Information

| PART | TYPE |
|----------------|--------|
| MAX8848ZEVKIT+ | EV Kit |

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

Component List

| DESIGNATION | QTY | DESCRIPTION |
|-------------|-----|---|
| C1-C4 | 4 | 1µF ±20%, 10V X5R ceramic capacitors (0603) TDK C1608X5R1A105K |
| C5 | 1 | 0.22µF ±10%, 10V X5R ceramic capacitor (0402) Murata GRM155R61A224KE19 |
| C6, C8 | 2 | 2.2µF ±10%, 6.3V X5R ceramic capacitors (0603) TDK C1608X5R0J225K |
| C7, C9 | 2 | 1000pF ±10%, 50V X7R ceramic capacitors (0402) TDK C1005X7R1H102K |
| D1-D7 | 7 | White LEDs Nichia NSCW215T OSRAM LW Y1SG |

| DESIGNATION | QTY | DESCRIPTION |
|--------------------|-----|---|
| D8, D9 | 2 | 100mA, 30V Schottky diodes (SOD523) Central Semi CMOS-3 |
| JU1, JU2, JU4, JU5 | 4 | 2-pin headers, 0.1in centers Sullins PEC36SAAN Digi-Key S1012E-36-ND |
| JU3, JU6, JU7, JU8 | 4 | 3-pin headers, 0.1in centers Sullins PEC36SAAN Digi-Key S1012E-36-ND |
| R1, R2 | 2 | 2.2kΩ ±5% resistors (0402) |
| S1, S2 | 2 | Momentary pushbutton switches Panasonic EVQ-PHP03T Digi-Key P8002STR-ND |
| U1 | 1 | Negative charge pump (16 TQFN-EP*) Maxim MAX8848ZETE+ |

*EP = Exposed pad.

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Component List (continued)

| DESIGNATION | QTY | DESCRIPTION |
|-------------|-----|--|
| U2, U3 | 2 | Single-switch debouncer (4 SOT143) Maxim MAX6816EUS+T (Top Mark: KABA) |

| DESIGNATION | QTY | DESCRIPTION |
|-------------|-----|--|
| — | 8 | Shunts (JU1–JU8) Sullins STC02SYAN Digi-Key S9000-ND or equivalent |
| — | 1 | PCB: MAX8848Z EVALUATION KIT+ |

Component Suppliers

| SUPPLIER | PHONE | WEBSITE |
|--|--------------|-----------------------------|
| Central Semiconductor Corp. | 631-435-1110 | www.centralsemi.com |
| Digi-Key Corp. | 800-344-4539 | www.digikey.com |
| Murata Electronics North America, Inc. | 770-436-1300 | www.murata-northamerica.com |
| Nichia Corp. | 248-352-6575 | www.nichia.com |
| OSRAM Opto Semiconductor | 888-446-7726 | www.osram-os.com |
| Sullins Electronics Corp. | 760-744-0125 | www.sullinselectronics.com |
| TDK Corp. | 847-803-6100 | www.component.tdk.com |

Note: Indicate that you are using the MAX8848Z when contacting these component suppliers.

Quick Start

Recommended Equipment

- MAX8848Z EV kit
- Variable 6V power supply or a Li+ battery capable of supplying 1A of output current

Procedure

The EV kit is a fully assembled and tested surface-mount board. Follow the steps below to verify board operation.

Caution: Do not turn on the power supply until all connections are made.

- 1) Verify that the jumpers on the EV kit are configured in their default positions, as shown in Table 1.
- 2) Preset the power supply to 3.6V. Turn off the power supply.
- 3) Connect the positive lead of the 3.6V power supply to the IN pad. Connect the negative lead of the 3.6V power supply to the GND pad.
- 4) Turn on the power supply.
- 5) Verify that all the WLEDs (D1–D7) are lit.

Detailed Description

The MAX8848Z EV kit default jumper settings are shown in Table 1.

Evaluating the MAX8847Y/MAX8847Z/MAX8848Y

To evaluate the MAX8847Y, MAX8847Z, and MAX8848Y, carefully remove the MAX8848Z (U1) and install the MAX8847Y, MAX8847Z, or MAX8848Y. Capacitor C5 needs to be removed for the MAX8848Y evaluation. All other components can remain the same. Jumper settings need to be adjusted for different operations on different ICs.

PWM Dimming Control (MAX8847Y/MAX8847Z/MAX8848Z)

Apply an external PWM signal to ENA to set the corresponding LED current that is proportional to the signal duty cycle (0% duty cycle corresponds to zero LED current and 100% duty cycle corresponds to full LED current). The allowed PWM frequency range is between 200Hz and 200kHz. If PWM dimming control is not required, ENA works as a simple on/off control.

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Serial Pulse-Dimming Control (MAX8847Y/MAX8848Y)

On-board pulse generators are provided to evaluate the serial-pulse dimming feature of the MAX8847Y/MAX8848Y. When first enabled, the LEDs are at full brightness. Repeatedly pressing the S1 or S2 switch generates pulses to reduce the LED current from 24mA to 0.1mA in 31 steps, as shown in Table 2. After the current reaches 0.1mA, the next button press restores the LED current to 24mA. Refer to the MAX8847Y/MAX8847Z and MAX8848Y/MAX8848Z IC data sheets for timing diagrams.

To use the ENA on-board pulse generator, remove the JU3 shunt and install shunts on JU1 and JU2. To use the ENB on-board pulse generator, remove the JU6 shunt and install shunts on JU5 and JU4, or across pins 1-2 of JU7.

To use external pulse generators, remove the shunts on jumper JU1, JU4, or JU7 to disconnect the on-board pulse generators. Connect the external pulse generator to the ENA and ENB pads-

Table 1. Default Jumper Settings

| JUMPER | SHUNT POSITION |
|--------|----------------|
| JU1 | Open |
| JU2 | Open |
| JU3 | Pins 1-2 |
| JU4 | Open |
| JU5 | Open |
| JU6 | Open |
| JU7 | Pins 2-3 |
| JU8 | Open |

Table 2. ENA/ENB Serial-Pulse-Dimming Count and Programmed LED_ Currents

| ENA/ENB PULSE COUNT | PROGRAMMED LED CURRENT (mA) | ENA/ENB PULSE COUNT | PROGRAMMED LED CURRENT (mA) |
|---------------------|-----------------------------|---------------------|-----------------------------|
| Startup or EN_ high | 24.0 | 16 | 2.8 |
| 1 | 22.4 | 17 | 2.4 |
| 2 | 20.8 | 18 | 2.0 |
| 3 | 19.2 | 19 | 1.6 |
| 4 | 17.6 | 20 | 1.4 |
| 5 | 16.0 | 21 | 1.2 |
| 6 | 14.4 | 22 | 1.0 |
| 7 | 12.8 | 23 | 0.8 |
| 8 | 11.2 | 24 | 0.7 |
| 9 | 9.6 | 25 | 0.6 |
| 10 | 8.0 | 26 | 0.5 |
| 11 | 6.4 | 27 | 0.4 |
| 12 | 5.6 | 28 | 0.3 |
| 13 | 4.8 | 29 | 0.2 |
| 14 | 4.0 | 30 | 0.1 |
| 15 | 3.2 | 31 | 24.0 |

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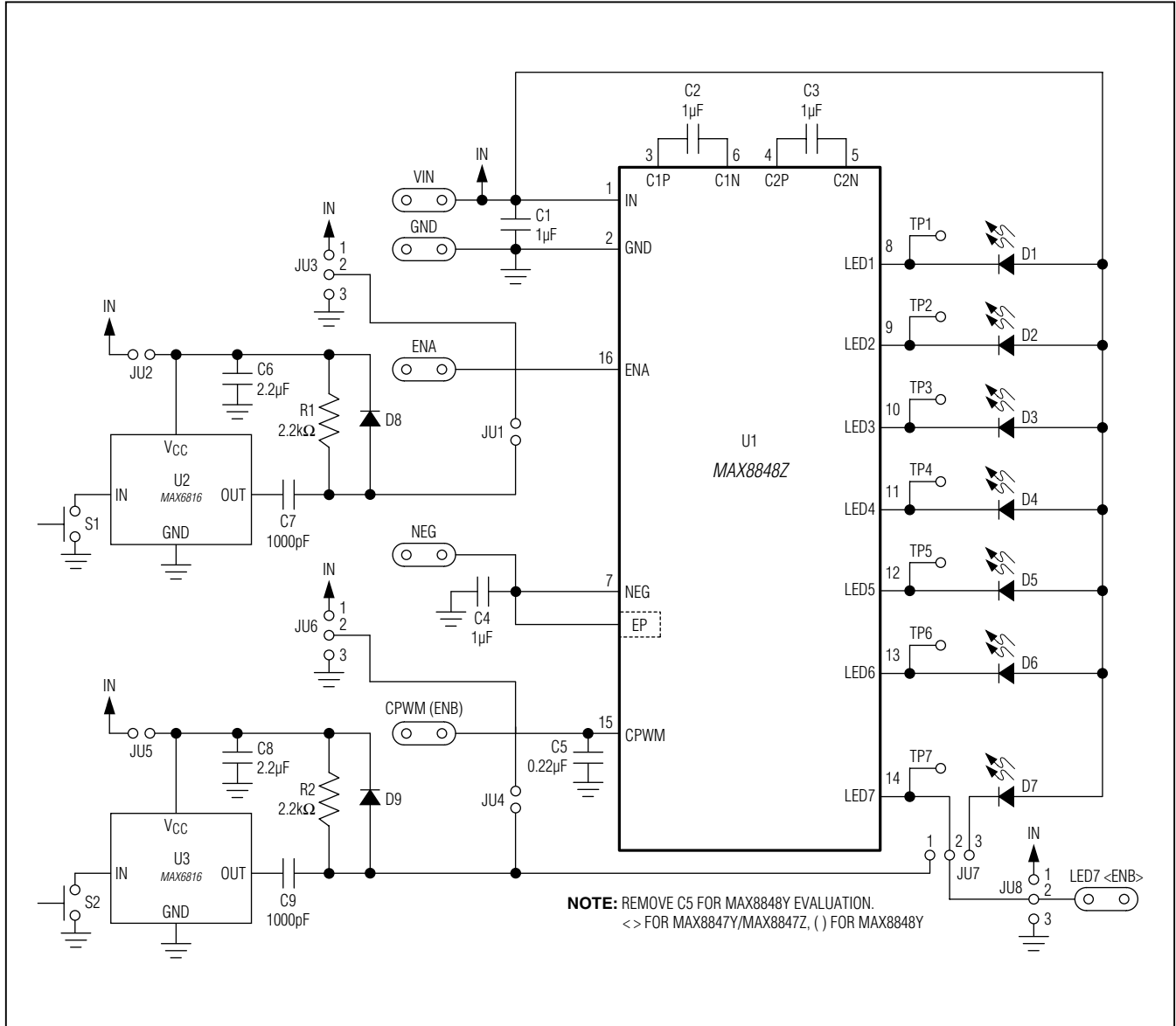


Figure 1. MAX8848Z EV Kit Schematic

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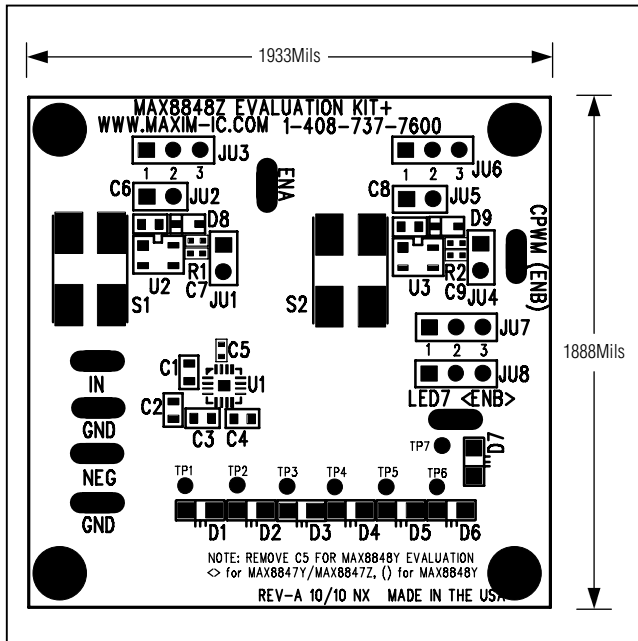


Figure 2. MAX8848Z EV Kit Component Placement Guide—Top Layer

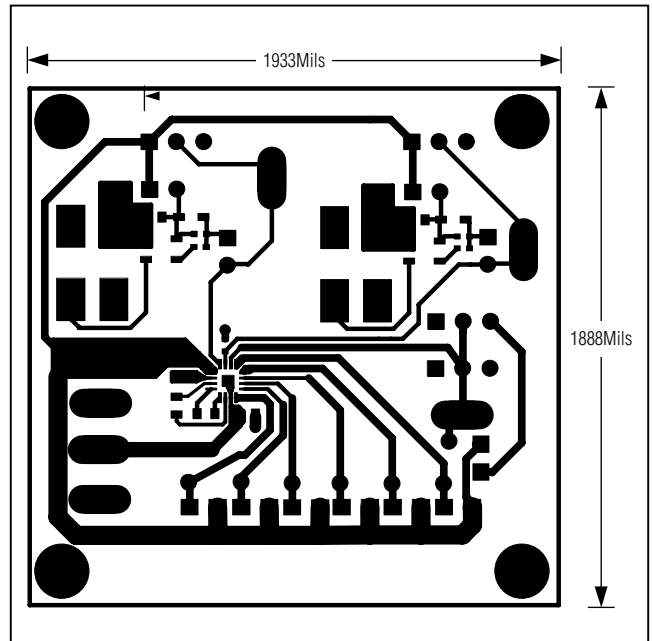


Figure 3. MAX8848Z EV Kit PCB Layout—Top Layer

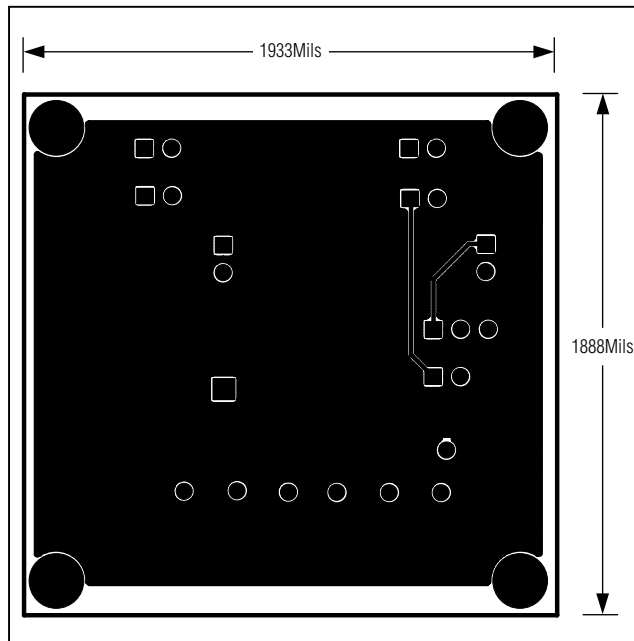


Figure 4. MAX8848Z EV Kit PCB Layout—Bottom Layer

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MAX8848Y/MAX8848Z**

Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|-----------------|---------------|-----------------|---------------|
| 0 | 11/10 | Initial release | — |



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