

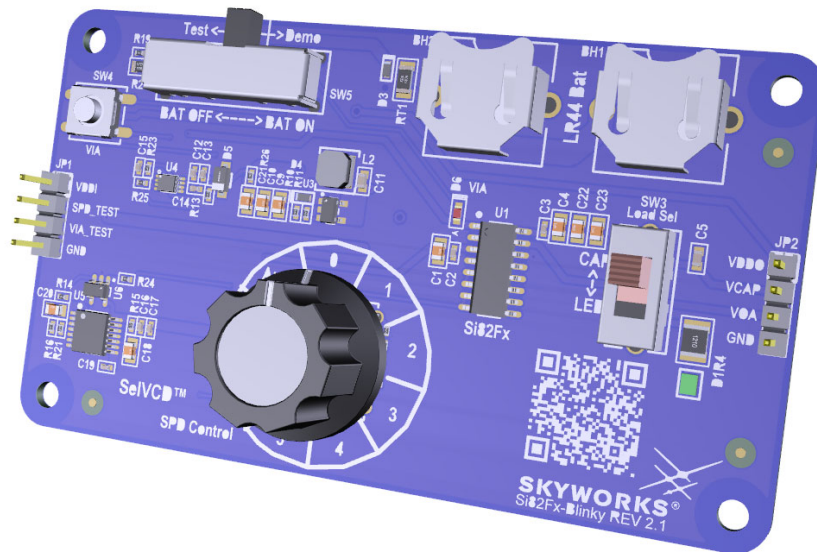
## UG527: SelVCD™ Blinky Demo Board User Guide

Introducing Skyworks demo boards showcasing the revolutionary Selectable Variable Current Drive (SelVCD™); Si82Fx-Blinky and Si82Cx-Blinky. These are portable devices that help users visualize the SelVCD™ technique, which allows the Si82Fx and Si82Cx IsoDrivers to dynamically control their output current at a constant sourcing or sinking rate. Learn more about SelVCD™ [here](#).

Blinky demonstrates all eight current “speed” settings of the SelVCD™ IsoDrivers via the brightness intensity of an LED controlled by a rotary switch, with the numbers 0 to 7 indicating lowest-to-highest LED brightness. Each switch setting activates a connection to a resistor in an array, which, in turn, connects to the SPD± pins of the SelVCD™ IsoDriver. There is also an “Aux” setting, which allows for rapid, back-and-forth cycling through all output current settings of the SelVCD™ IsoDriver, thereby causing the LED to pulsate.

### Features

- Visual demonstration of SelVCD™
- Interactive output current selection



## 1. Demo Quick Start

1. Insert two LR44 batteries into BH1 and BH2, ensuring that the positive side faces towards the user.
2. Slide SW5 from the “BAT OFF/Test” position to the “BAT ON/Demo” position.
3. Ensure that SW3 (Load Sel) has the LED selected as the load.
4. Rotate the “SPD Control” knob, and select different SPD settings (the green LED brightness will change depending on the selected output current of the IsoDriver).
5. Rotate the “SPD Control” knob to the Aux position to allow the green LED to pulsate.
6. To turn off the board, slide SW5 to the “BAT OFF/Test” position.\*

\***Note:** To conserve battery life, remove the batteries before storage.

## 2. Functional Description

The IsoDrivers employ an innovative output driver architecture known as SelVCD™. The output driver functions as a constant current source ensuring consistent output current regardless of gate drive voltage, temperature, or semiconductor process variations. The SPD control knob, SW2 (the rotary switch), adjusts the output current setting from SPD±0 to SPD±7. These SPD settings correspond to different resistors placed on the SPD pins for selecting the desired output current. See the [Si82Fx Data Sheet](#) for more details on SelVCD™.

In “Demo” mode, the additional Aux mode allows the user to transmit a triangle wave to the SPD± pin. The triangle wave allows the device to sequentially transition through each SPD setting and causes the load LED to pulsate.

The device's VI/VIA pin is fed by a 120 Hz, 10 µs period pulse. D6 (Red LED) is connected to the VI/VIA pin and shows that the output is not being pulse-width modulated to control the LED brightness.

When rotating the SPD control knob, you may notice a brief increase in LED brightness. This phenomenon occurs because SW2 functions as a break-before-make switch. When transitioning from one SPD setting to another, the output current source on the SPD± pins briefly encounters an open circuit. As a result, the pin voltage rises to the internal voltage rail of the current source, corresponding to the selected level of SPD± 7. This selects the maximum current output for the IsoDriver and briefly increases the brightness of the LED. For instance, when turning the switch from SPD± 0 to SPD± 1, the device experiences the sequence SPD± 0 → SPD± 7 → SPD± 1. It is important to note that this behavior is solely due to the design of SW2 and is not an issue with the IsoDriver.

There are two versions of the SelVCD™ Blinky boards. The boards are functionally equivalent, however the Si82Cx model boards employ a single channel gate driver and the Si82Fx versions are a dual channel gate driver. Only a single channel is used for the Si82Fx versions.

For Si82Cx-Blinky model boards, upon turning on the board with the "SPD Control" knob set to AUX, there will be a brief period where the green LED turns off. The triangle waveform upon startup exceeds the SPD± pin's disable threshold, but will reach a steady state that is below the disable threshold.

### 3. Test Mode Description

When SW5 is switched to the “BAT OFF/Test” position, the board allows users to input their own power supplies and test stimuli to the device. By switching SW3 to the “CAP” load, a load capacitor is placed on the output of the device. To apply stimuli and monitor input and output voltages, use JP1 and JP2, which can be populated with 1x4 0.1” headers for ease of connectivity. Keep in mind that the SPD control switch remains active, allowing the user to select from SPD± 0 to SPD± 7. However, if a user desires to input their own stimulus on the SPD± pins, “Aux” should be chosen to connect JP1's SPD\_TEST signal to the device.

In addition, SW4 serves as a convenient means of generating a stimulus to VI/VIA without requiring a function generator. However, keep in mind the following points:

- SW3 should be set to the “CAP” option when in Test mode.
- If SW3 has the LED option selected, pressing SW4 may cause the IsoDriver to go into thermal shutdown. This behavior occurs because the LED effectively acts as a short to ground, continuously sinking current. The same applies if any relatively long pulse is sent to VI/VIA. In Test mode, it is always recommended to select the “CAP” option on SW3.

## 4. Si82Cx

### 4.1. Si82Cx Top Layer View of Board

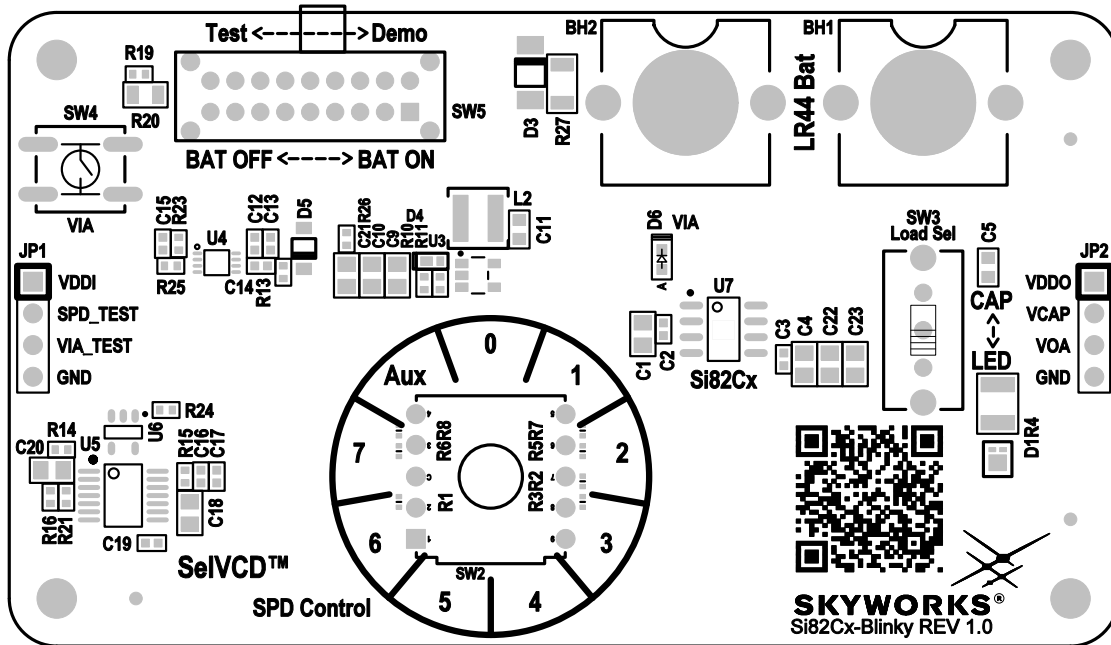


Figure 1. Si82Cx Top Layer View

### 4.2. Si82Cx Bottom Layer View of Board

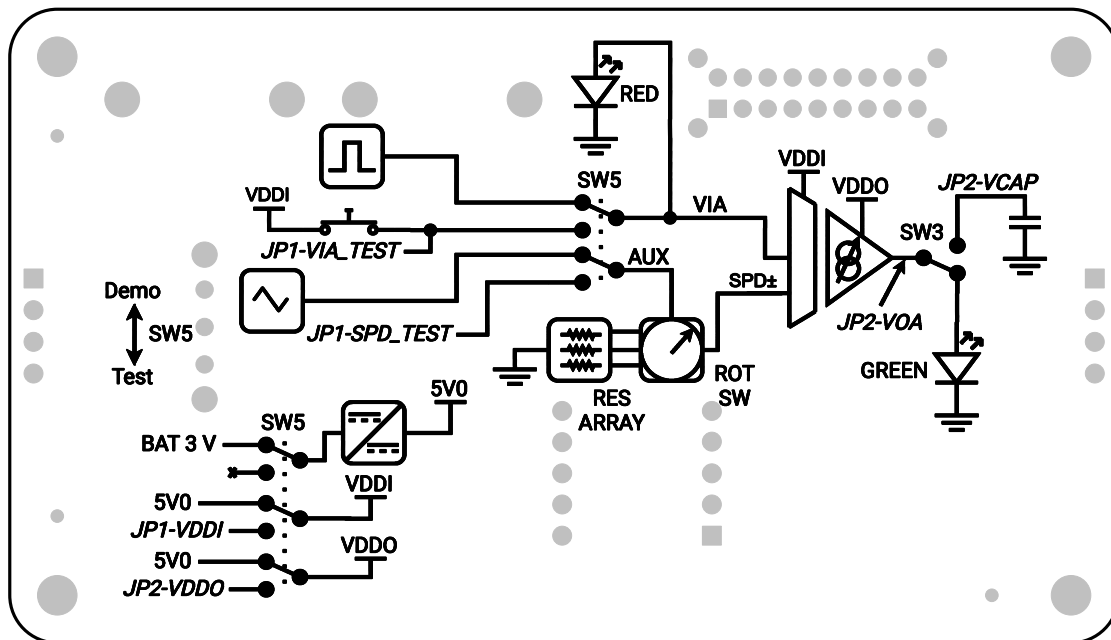


Figure 2. Si82Cx Bottom Layer View

### 4.3. Si82Cx Schematics

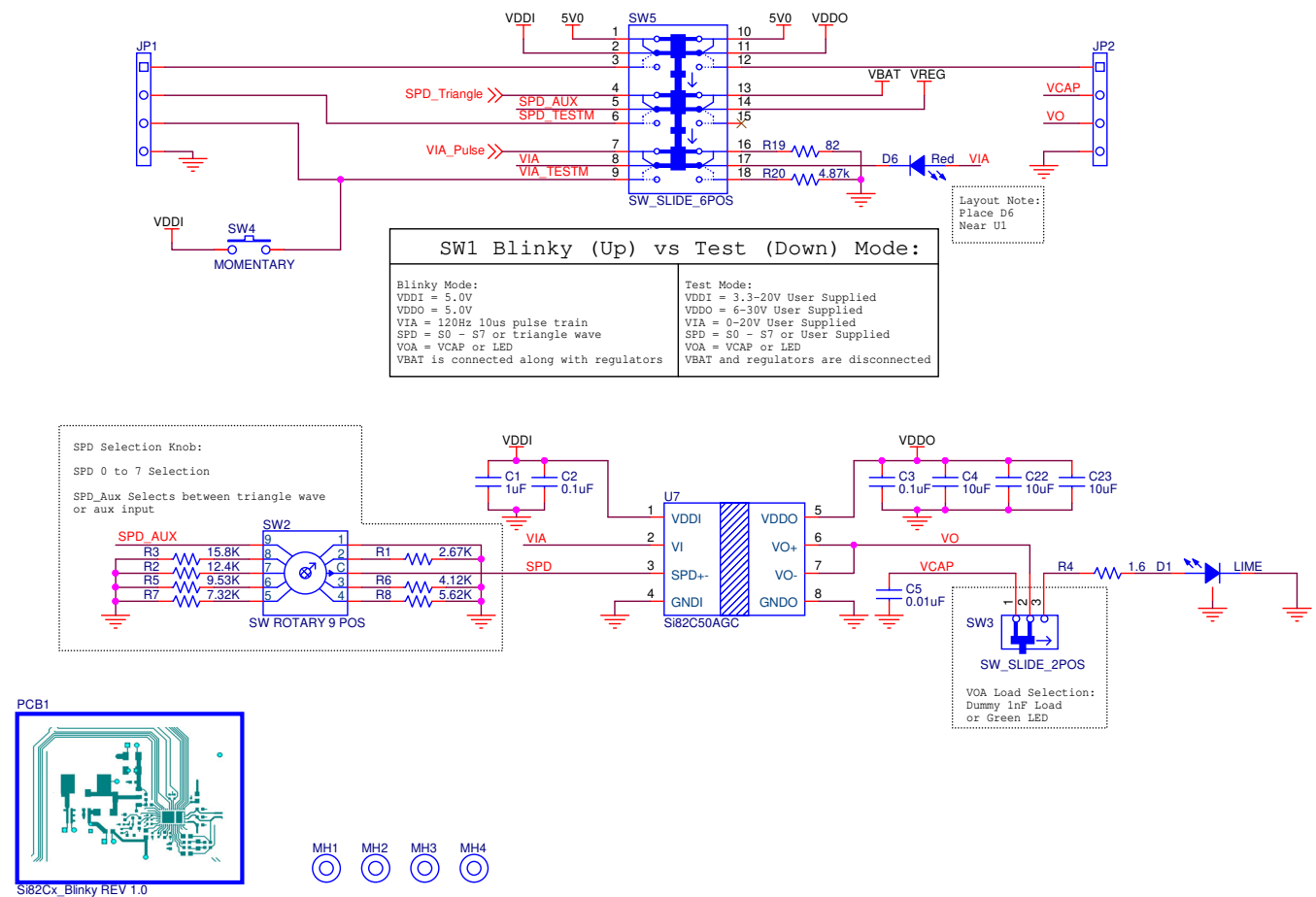


Figure 3. Si82Cx Gate Driver Circuit

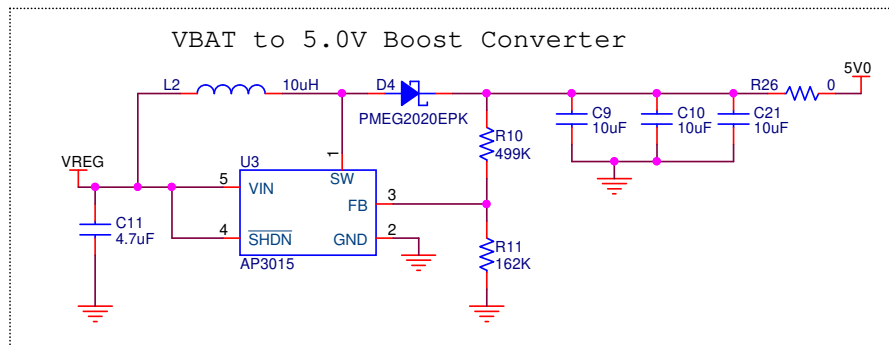
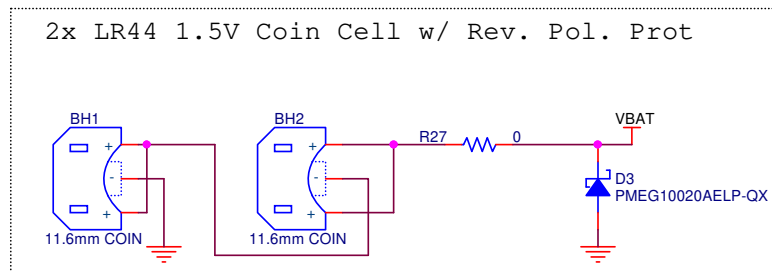


Figure 4. Si82Cx Power Circuit

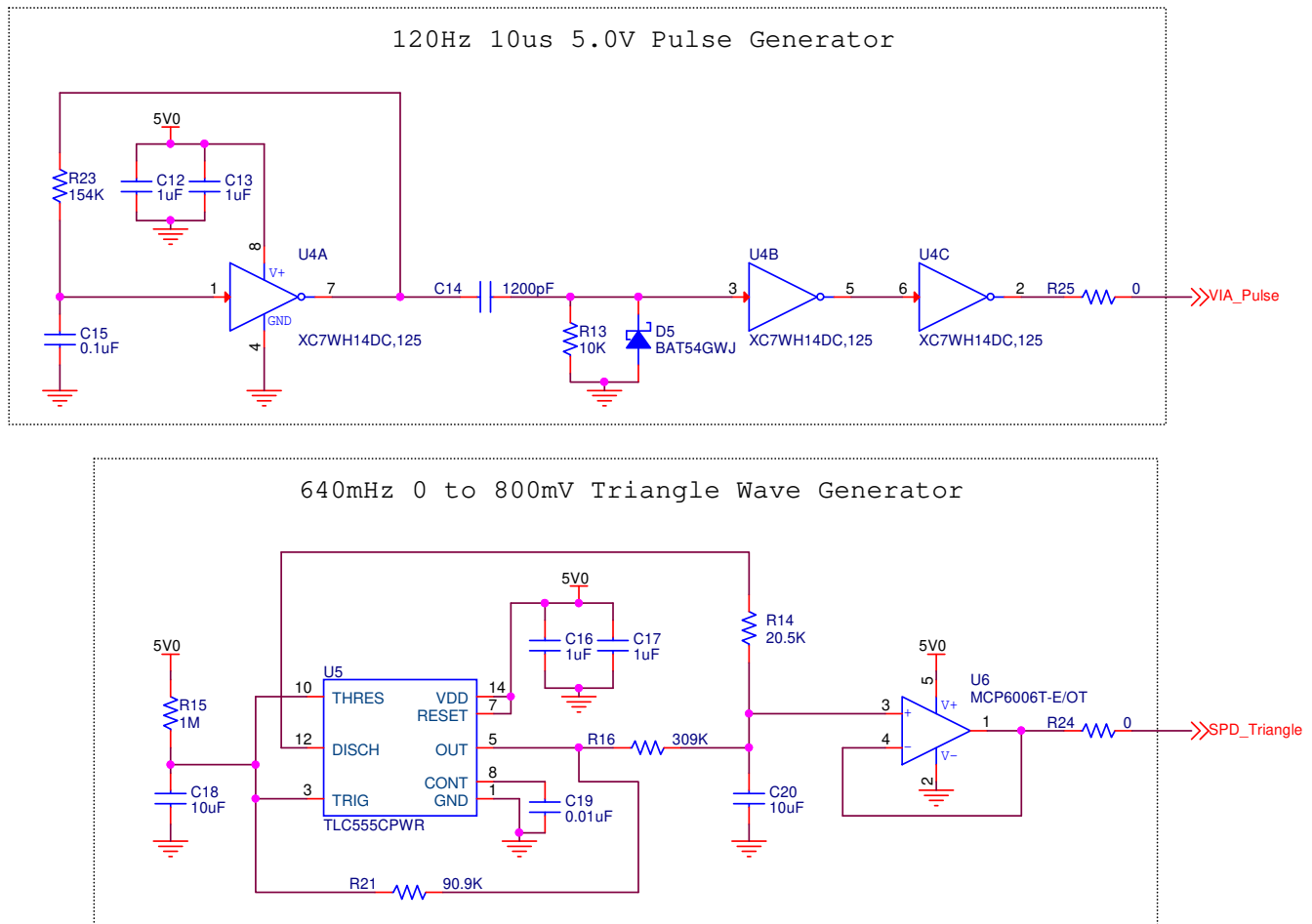


Figure 5. Si82Cx Wave Generator Circuit

## 5. Si82Fx

### 5.1. Si82Fx Top Layer View of Board

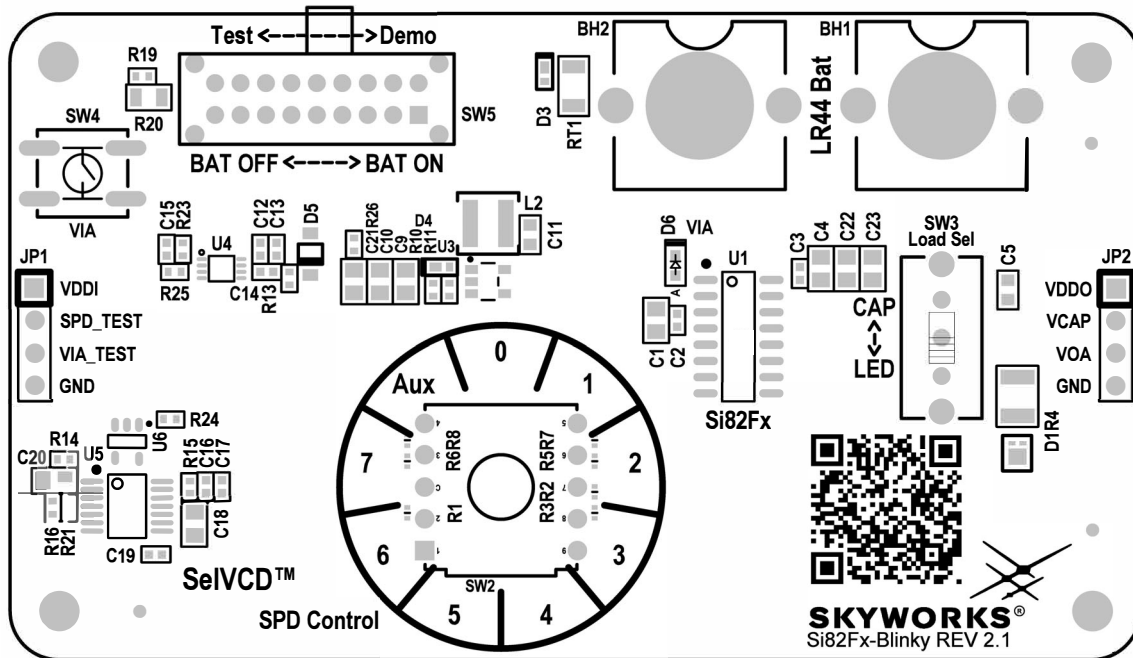


Figure 6. Si82Fx Top Layer View

### 5.2. Si82Fx Bottom Layer View of Board

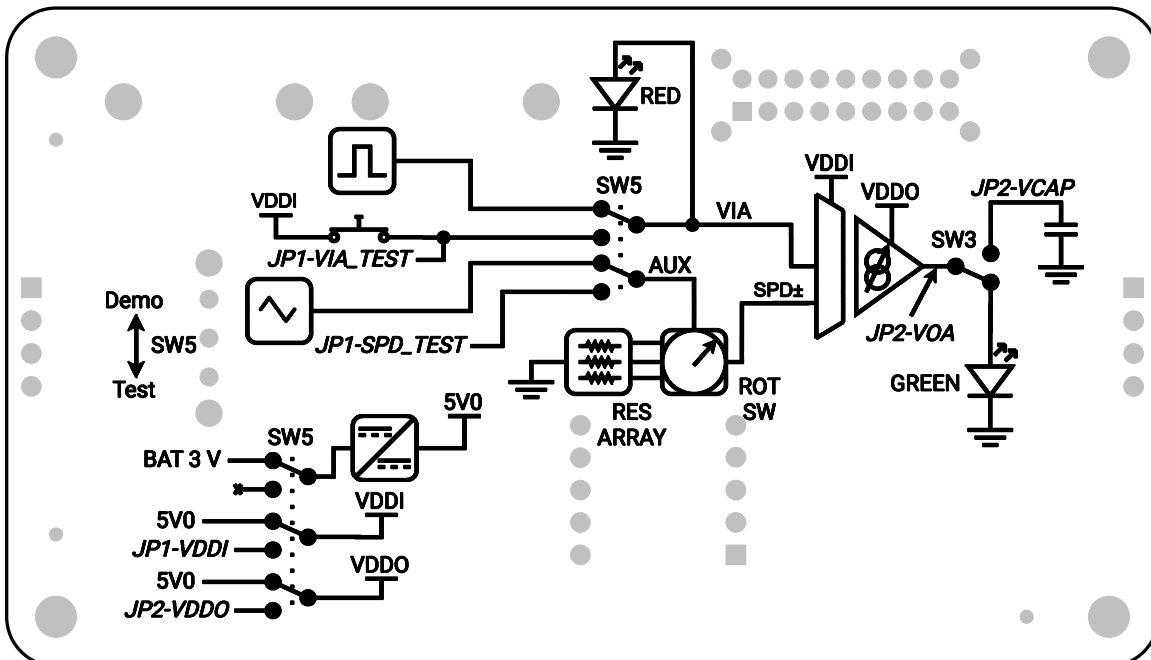


Figure 7. Si82Fx Bottom Layer View

## 5.3. Si82Fx Schematics

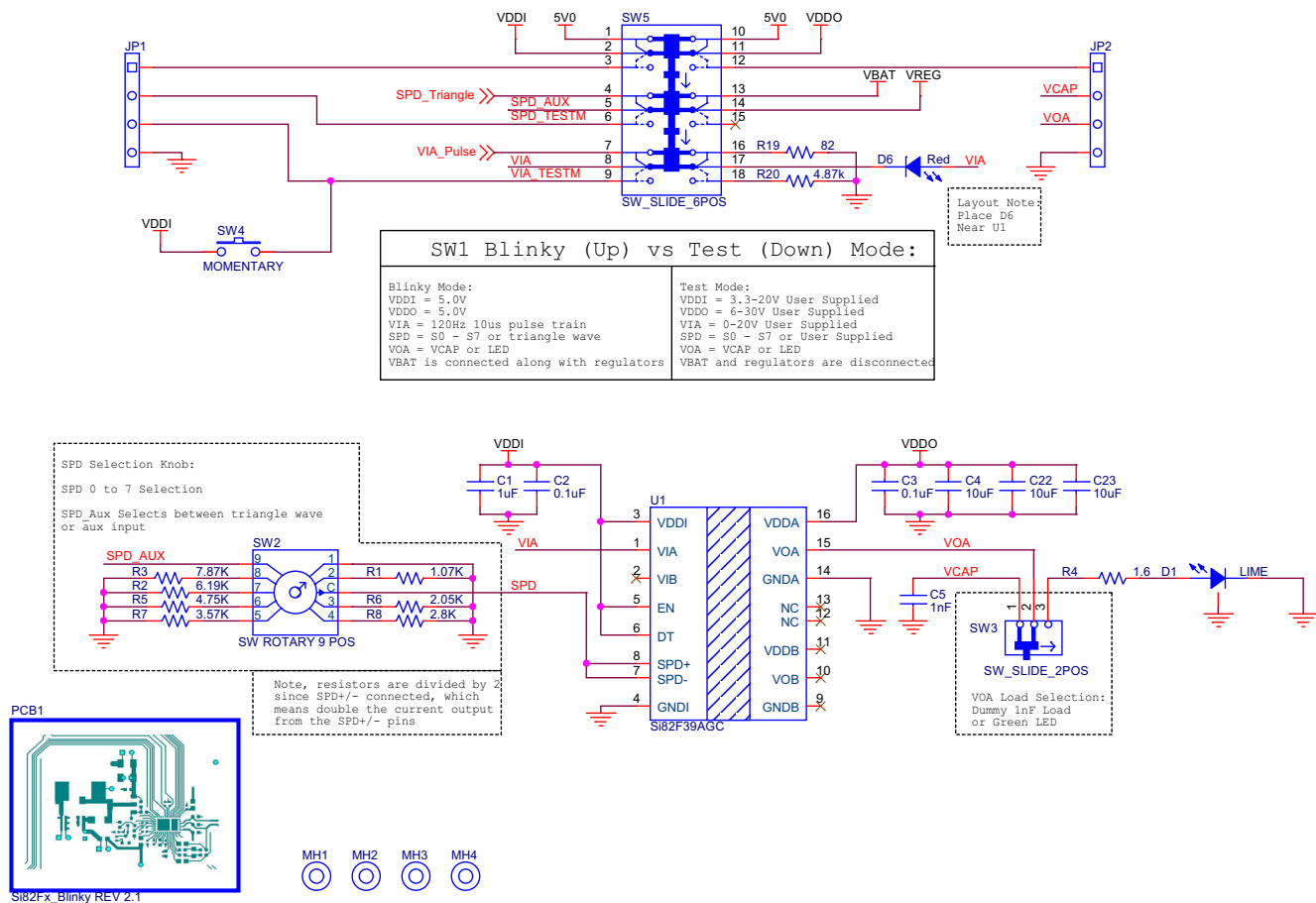


Figure 8. Si82Fx Gate Driver Circuit

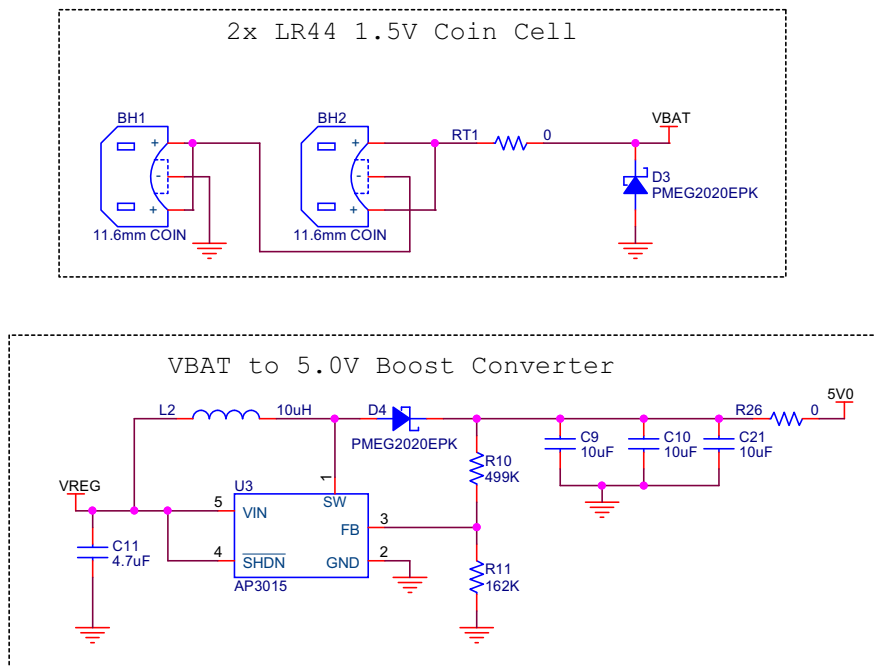


Figure 9. Si82Fx Power Circuit

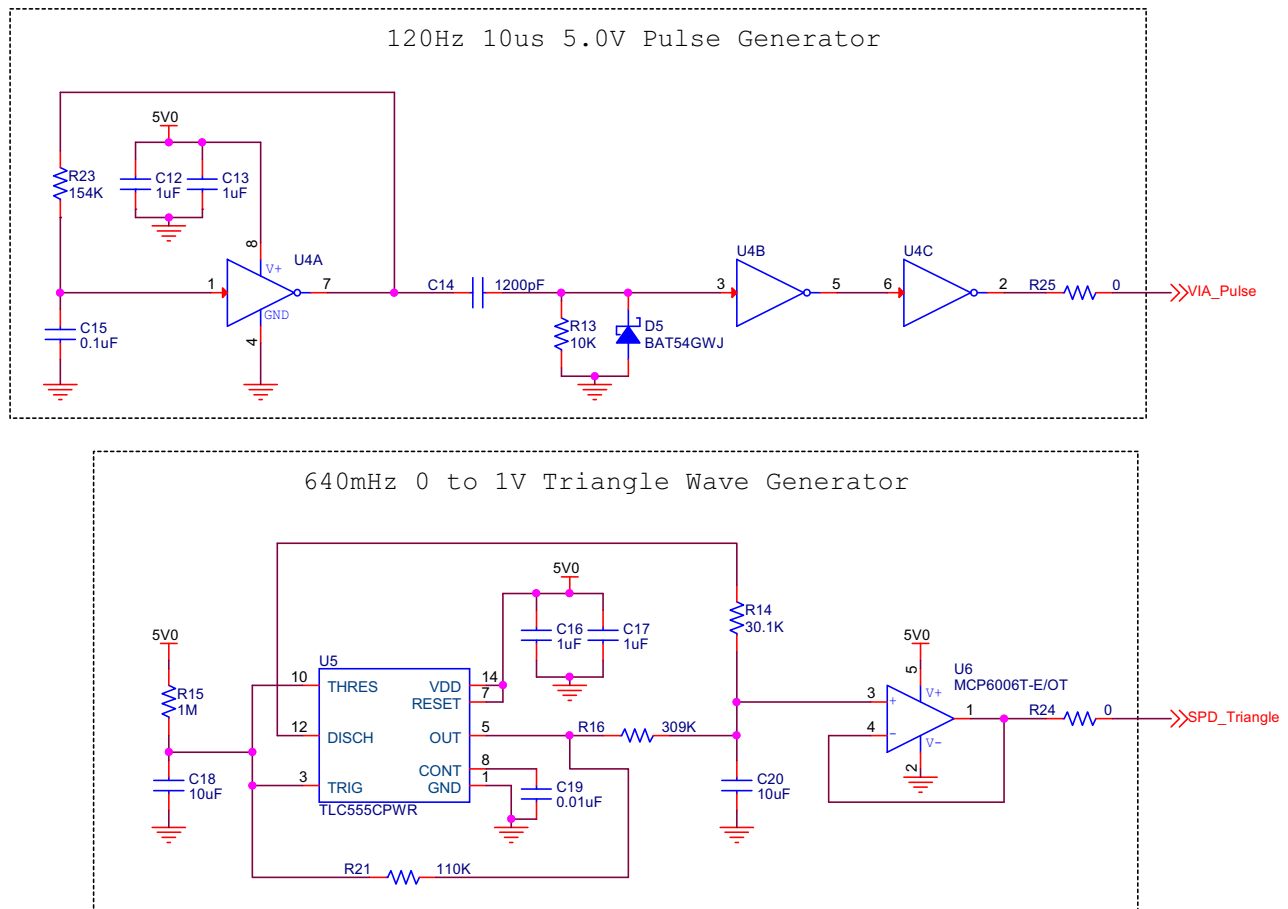


Figure 10. Si82Fx Wave Generator Circuit

Copyright © 2024, Skyworks Solutions, Inc. All Rights Reserved.

Information in this document is provided in connection with Skyworks Solutions, Inc. ("Skyworks") products or services. These materials, including the information contained herein, are provided by Skyworks as a service to its customers and may be used for informational purposes only by the customer. Skyworks assumes no responsibility for errors or omissions in these materials or the information contained herein. Skyworks may change its documentation, products, services, specifications or product descriptions at any time, without notice. Skyworks makes no commitment to update the materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

No license, whether express, implied, by estoppel or otherwise, is granted to any intellectual property rights by this document. Skyworks assumes no liability for any materials, products or information provided hereunder, including the sale, distribution, reproduction or use of Skyworks products, information or materials, except as may be provided in Skyworks' Terms and Conditions of Sale.

THE MATERIALS, PRODUCTS AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. SKYWORKS DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. SKYWORKS SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Skyworks products are not intended for use in medical, lifesaving or life-sustaining applications, or other equipment in which the failure of the Skyworks products could lead to personal injury, death, physical or environmental damage. Skyworks customers using or selling Skyworks products for use in such applications do so at their own risk and agree to fully indemnify Skyworks for any damages resulting from such improper use or sale.

Customers are responsible for their products and applications using Skyworks products, which may deviate from published specifications as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Skyworks assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Skyworks products outside of Skyworks' published specifications or parameters.

Skyworks, the Skyworks symbol, Sky5®, SkyOne®, SkyBlue™, Skyworks Green™, ClockBuilder®, DSPLL®, ISOmodem®, ProSLIC®, SiPHY®, and RFelC® are trademarks or registered trademarks of Skyworks Solutions, Inc. or its subsidiaries in the United States and other countries. Third-party brands and names are for identification purposes only and are the property of their respective owners. Additional information, including relevant terms and conditions, posted at [www.skyworksin.com](http://www.skyworksin.com), are incorporated by reference.