PRODUCT SUMMARY

SKY82896/97: Three-Channel/Two-Channel Boost LED Driver with I²C Interface

Applications

- Smartphones
- Tablets
- Portable media players

Features

- Input voltage range: 2.5 V to 5.5 V
- Three channels with up to 9 LEDs in series (up to 27 LEDs)
  - 30 mA max LED current
  - ±2% current accuracy and ±2% matching
- Backlight power reduction:
  - Output efficiency up to 90%
  - Shutdown current: < 1 μA
- Ultra-high resolution dimming:
  - 10-bit dimming I²C /analog-PWM/direct-PWM
  - 100 Hz to 25 KHz APWM capability
  - 100 Hz to 50 kHz DPWM capability
- Comprehensive system protection:
  - Integrated and programmable over-voltage protection
  - Open/short LED protection, over-temperature and boost over-current protection
- Display system optimization:
  - Programmable fade-in/fade-out
  - Adjustable compensation to optimize image quality
  - PWM options do not require I²C control
  - Separate inputs for APWM and DPWM dimming mixing for up to 20-bit dimming resolution
- Adjustable current limit for smallest inductor
- Ultra-small, low-profile WLCSP (16-bump, 1.956 mm × 1.906 mm) package (MSL1, 260 ºC per JEDEC J-STD-020)

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Description

The SKY82896 is a step-up, three-channel LED driver with an input voltage range of 2.5 V to 5.5 V. The SKY82897 is a two-channel version of the SKY82896. The wide input voltage and high-boost switching frequency allow for a small solution size. Advanced dimming features and minimal external components make this device suitable for LED backlight solutions in single-cell, Li-Ion battery-based applications.

An integrated boost converter provides a high-voltage output for driving up to 30 V. Three precision current sinks are programmable up to 30 mA per string. The 900 kHz switching frequency supports ultra-small, low-profile external components.

The SKY82896/97 supports three different types of dimming:

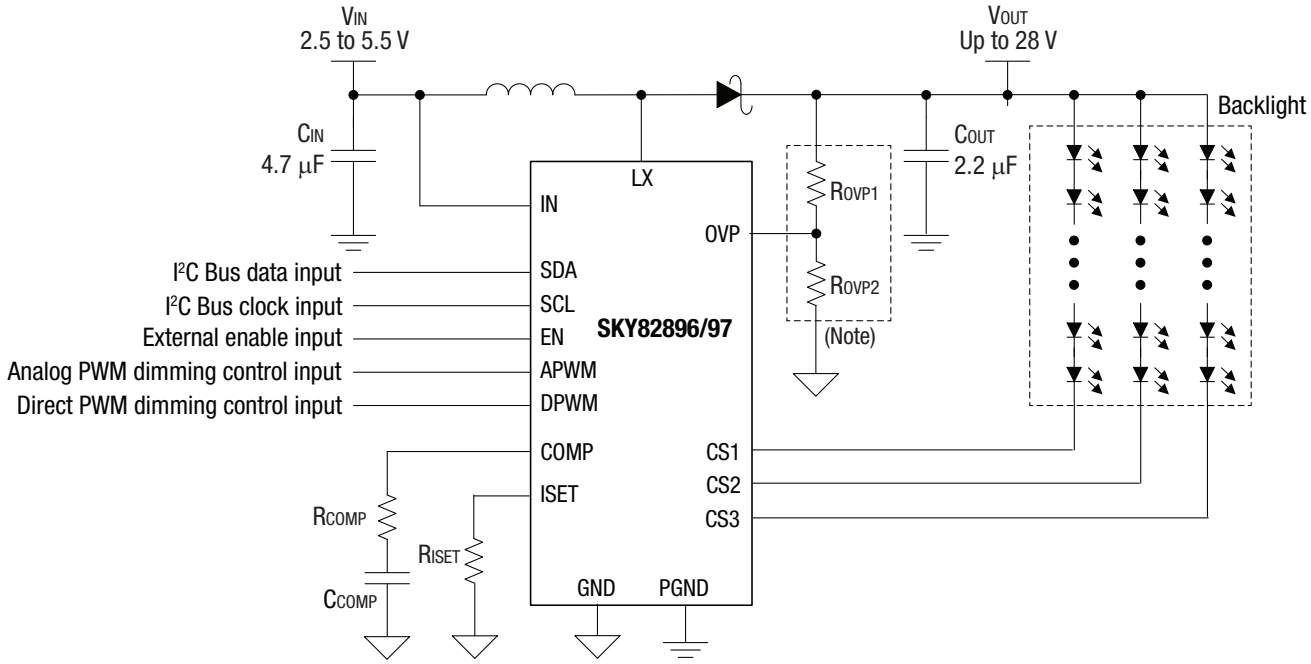
- Direct Pulse Width Modulation (DPWM) dimming receives the input PWM control signal from the PWM pin and generates the PWM output. Frequency and the ON duty are controlled by the input control signal.
- Analog Pulse Width Modulation (APWM) dimming receives the input PWM control signal from the PWM pin and converts the ON duty of the input signal to an LED current control signal.
- I²C dimming adjusts the LED current through the I²C interface.

The APWM dimming input frequency ranges from 100 Hz to 25 kHz, and the DPMW dimming input frequency ranges from 100 Hz to 50 kHz. The minimum output ON duty in DPWM dimming is limited by the minimum on-time (39 ns), which allows 10-bit resolution at 25 kHz DPWM frequency.

The device includes over-temperature protection, programmable over-voltage protection, boost over-current protection, and open/short LED protection.

The SKY82896/97 is available in a space-saving 1.956 mm × 1.906 mm, 16-bump Wafer-Level Chip Scale (WLCSP) package.

A typical application circuit is shown in Figure 1.



Note: External OVP resistors are optional.
Connect the OVP pin to VOUT when external OVP resistors are not used.

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Figure 1. SKY82896/97 Typical Application Circuit

Ordering Information

Model Name	Manufacturing Part Number	Evaluation Board Part Number
SKY82896-11: Three-Channel Boost LED Driver with I²C Interface	SKY82896-11-001	SKY82896-11-EVB
SKY82896-12: Three-Channel Boost LED Driver for PWM Only Control	SKY82896-12-001	SKY82896-12-EVB
SKY82897-11: Two-Channel Boost LED Driver with I²C Interface	SKY82897-11-001	SKY82897-11-EVB
SKY82897-12: Two-Channel Boost LED Driver for PWM Only Control	SKY82897-12-001	SKY82897-12-EVB

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