

High Efficiency 2-Channel HB LED Driver with I²C Interface and Direct PWM Dimming

POWER MANAGEMENT

Features

- Input Voltage — 4.5V to 27V
- Output Voltage — Up to 50V
- Step-up (Boost) Controller
 - Ultra-Fast Transient Response (<100μs)
 - Programmable Switching Frequency
- Linear Current Sinks
 - 2 Strings, up to 240mA/String
 - Current Matching ±1%
 - Current Accuracy ±2%
- PWM Dimming
 - Direct PWM Dimming, 1000:1 at 1KHz
 - Input Dimming Frequency 100Hz-30kHz
- 5-Bits Analog Dimming
- I²C Interface
 - Fault Status — Open/Short LED, UVLO, OTP
- Protection Features
 - Open/Shorted LED(s) and adjustable OVP
 - Over-Temperature and UVLO Shutdown Protection
- 4mm X 4mm 20-pin QFN Package

Applications

- Ultrabooks™, All-in-One PCs, Monitors, Automotive-Display Backlighting
- Backlighting for Mid-Size Displays

Description

The SC5014A is a 2-channel, highly integrated, high-efficiency step-up (boost) HB LED driver designed to reduce the thickness of mid-size LCD displays. It features a wide input voltage range (4.5V to 27V), direct PWM dimming, analog dimming, a flexible output configuration, an I²C interface, and numerous protection features.

The SC5014A exhibits 2% to 4% higher efficiency when using the same size inductors as existing LED drivers. But, unlike existing devices, it can also operate with inductors that are up to 10x smaller without sacrificing efficiency. This part can also use very low-profile inductors (as small as 2.2μH, 1mm height), which allows LED drivers to be built directly into the LCD panel to enable ultra-thin displays.

The boost controller, with programmable switching frequency from 200kHz to 2.2MHz, maximizes efficiency by dynamically minimizing the output voltage while maintaining LED string current accuracy. It provides excellent line and load response with no external compensation components. An external resistor adjusts the current from 40-240mA per string.

Typical Application Circuit

