

PE23108

Document Category: Product Brief



High-Efficiency LED Backlight Driver

General Description

The PE23108 is an ultra-high efficiency DC-DC converter solution with integrated programmable current sinks that drive up to eight strings of LEDs. The PE23108 integrates all MOSFETs and their control and driver circuitry. With its proprietary architecture, the PE23108 provides the highest efficiency—up to 96%—possible in a compact 3.445 mm x 2.095 mm WLCSP 30-pin package. The unique two-stage architecture enables a small and low-profile solution size aligned to the needs of the latest mobile products.

Features

- Synchronous DC-DC converter with integrated FETs
- 2- and 3-cell Li-ion battery input voltage for LED boost: 4.5V to 15V
- 2.7V to 5.5V IC input voltage
- Proprietary architecture for ultra-high LED efficiency, up to 96%
- Integrated output disconnect switch
- Up to 42V output for maximum flexibility in assignment of LEDs to strings and selection of LED forward voltage
- Up to 12-bit dimming resolution with an additional 3-bit dithering
- Linear/logarithmic analog and PWM dimming for maximum flexibility and resolution
- Phase-shifted PWM dimming among active strings to minimize audible noise
- LED brightness ramp up/down control with programmable ramp rate and linear/ logarithmic ramp profiles
- 1 MHz I²C 6.0-compatible serial interface to program the brightness
- Extensive programming capability with non-volatile memory for storing user register settings
- Eight independently enabled current sinks, up to 33 mA per current sink
- External PWM input for fine dimming resolution
- 0.5% current matching at 20 mA per current sink
- Wide range of input and output voltages with 2x charge pump ratio
- Selectable boost switching frequency from 179 kHz to 1.43 MHz

- Extensive fault protection, including boost over-current protection, output short circuit protection, output over-voltage protection, LED open and short protection, and thermal shutdown

Applications

Typical applications for 2- and 3-cell platforms include the following:

- 8”-17” FHD/UHD + LCD backlight panels
- Ultrabooks, ultraportables, and notebooks
- 2-in-1, convertible, and detachable notebooks
- Full-size tablet computers
- LCD panels
- Ultra-thin form factor mobile platforms

Efficiency

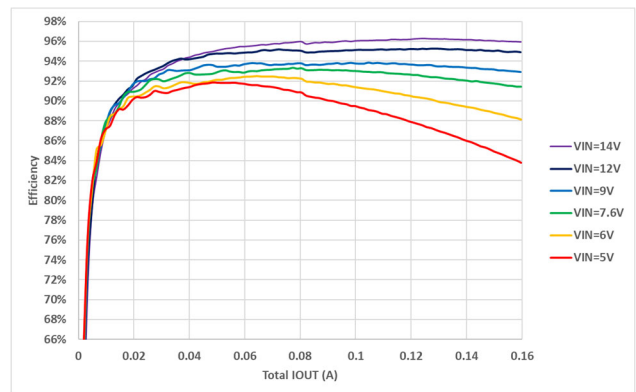


Figure 1. Typical Boost Efficiency – 8p12s, 20 mA, 715 kHz

Application

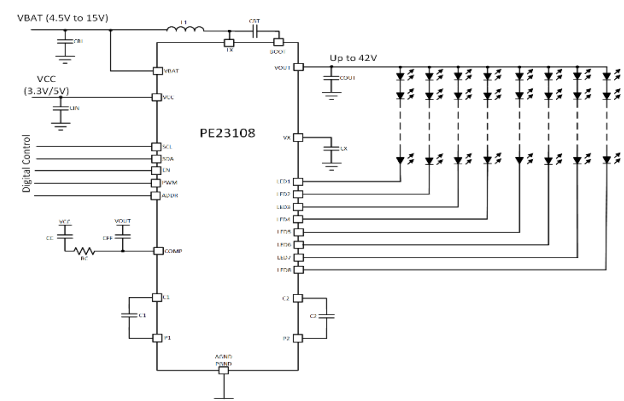


Figure 2. Typical Application Circuit

Application Schematic

Figure 3 shows the PE23108 detailed application schematic.

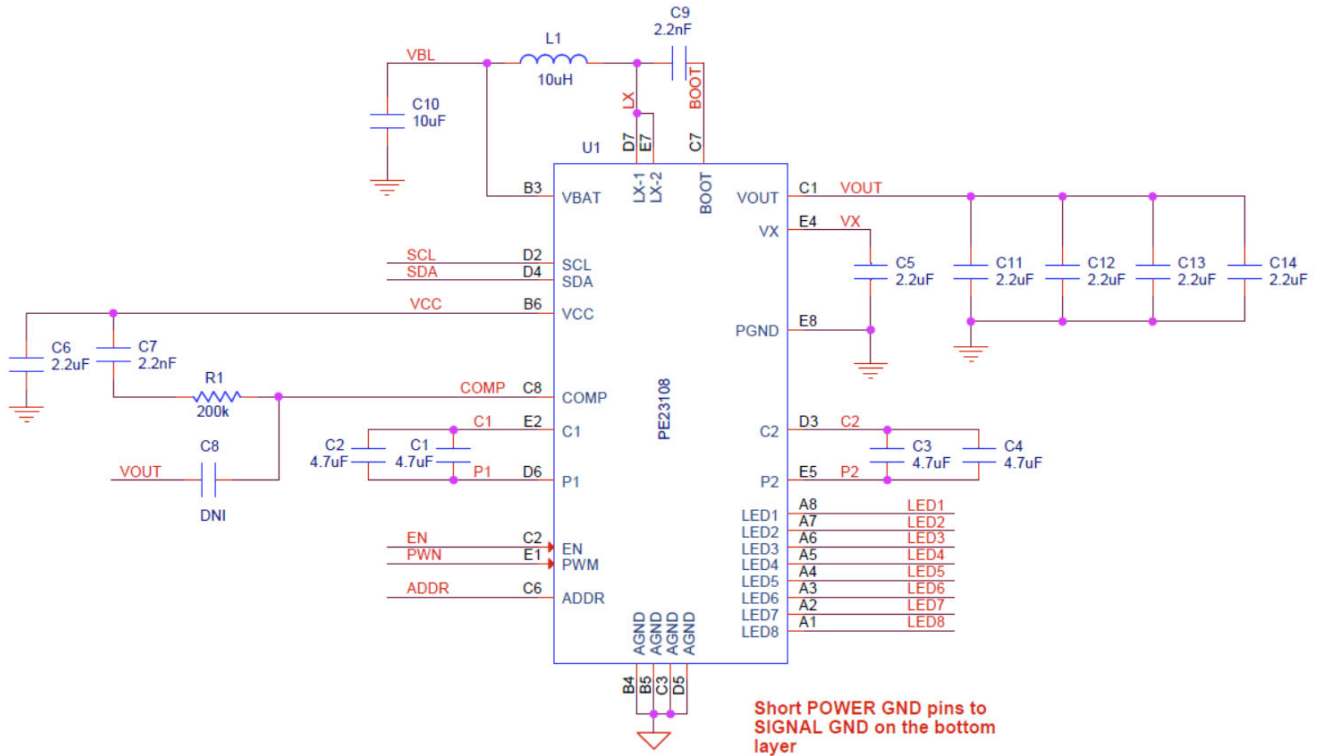


Figure 3. PE23108 Application Schematic

Application Circuit Part List

Table 1 lists the recommended part numbers. Components in this part list are optimized for 8P12S or higher applications. For an optimized selection based on your application, contact pSemi.

Table 1. Recommended Parts

Component	Value	Part Size	Mfg. Part Number
C1, C2, C3, C4 ⁽¹⁾	4.7 μ F 35V X5R or better	0603	GRM188R6YA475KE15D
C5, C6	2.2 μ F 25V X5R or better	0402	GRM155C81E225KE11D
C7 ⁽³⁾ , C9	2.2 nF 50V X5R or better	0402	GRM155R71H222KA01D
C8 ⁽³⁾	DNI	0402	–
C10 ⁽²⁾	10 μ F 25V X5R or better	0603	GRM188R61E106MA73J
C11, C12, C13, C14 ⁽⁴⁾	2.2 μ F 50V X5R or better	0603	GRM188R61H225ME11D
L1 ⁽³⁾	10 μ H	3.2 mm x 2.5 mm x 1.2 mm	DFE322512F-100M
R1 ⁽³⁾	200 k Ω	0201	–

Notes:

- Quantity and value are based on effective capacitance per applications. pSemi recommends a total of >0.7- μ F efficiency capacitance on the C1 and C2 pins at the bias voltage.
- Value might require an adjustment based on the proximity of the input source to eliminate input voltage ringing.
- For an optimized selection based on your application, contact pSemi.
- Value might require an adjustment based on loading, boost switching frequency, and inductor selection to reduce output voltage ripple.

Ordering Information

Table 2 lists the PE23108 order codes and shipping methods.

Table 2. PE23108 Order Codes and Shipping Methods

Order Codes	Description	Packaging	Shipping Method
PE23108A-R	High-Efficiency LED Backlight Driver	3.445 mm x 2.095 mm WLCSP on tape and reel	5000 units/large tape and reel
PE23108A-V	High-Efficiency LED Backlight Driver	3.445 mm x 2.095 mm WLCSP on tape and reel	250 units/small tape and reel
PE23108A-G	High-Efficiency LED Backlight Driver	3.445 mm x 2.095 mm WLCSP	10 units/sample waffle tray

Document Categories

Advance Information

The product is in a formative or design stage. The datasheet contains design target specifications for product development. Specifications and features may change in any manner without notice.

Preliminary Specification

The datasheet contains preliminary data. Additional data may be added at a later date. pSemi reserves the right to change specifications at any time without notice in order to supply the best possible product.

Product Specification

The datasheet contains final data. In the event pSemi decides to change the specifications, pSemi will notify customers of the intended changes by issuing a Customer Notification Form (CNF).

Product Brief

This document contains a shortened version of the datasheet. For the full datasheet, contact sales@psemi.com.

Sales Contact

For additional information, contact Sales at sales@psemi.com.

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