

ARC3C0845/ARC3C0845W

Document Category: Product Brief



High-Efficiency LED Backlight Driver

General Description

The ARC3C0845/ARC3C0845W is an ultra-high efficiency DC-DC converter solution with integrated programmable current sinks that drive up to eight strings of LEDs. The ARC3C0845/ARC3C0845W integrates all MOSFETs and their control and driver circuitry. With its proprietary architecture, the ARC3C0845/ARC3C0845W provides the highest efficiency—up to 96%—possible in a compact 3.44 mm x 2.415 mm WLCSP 40-pin package (ARC3C0845W) or 4 mm x 4 mm 32-pin QFN package (ARC3C0845). The high switching frequency 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
- Proprietary architecture for ultra-high LED efficiency, above 88% over the operating range
- Integrated output disconnect switch
- Up to 45V 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
- LED brightness ramp up/down control with programmable ramp rate and linear/logarithmic ramp profiles
- Phase-shifted PWM dimming among active strings to minimize audible noise
- 1 MHz I²C 6.0-compatible serial interface to program the brightness, or an external resistor on ISET pin to set the maximum brightness
- Extensive programming capability with non-volatile memory for storing user register settings
- Eight independently enabled current sinks, up to 43 mA per current sink
- External PWM input for fine dimming resolution
- 0.5% current matching at 30 mA per current sink
- Wide range of input and output voltages with 2x charge pump ratio

- Selectable boost switching frequency from 320 kHz to 2.6 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

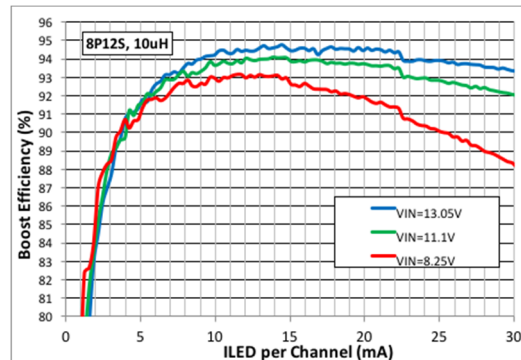


Figure 1. Typical Boost Efficiency – 8p12s

Application

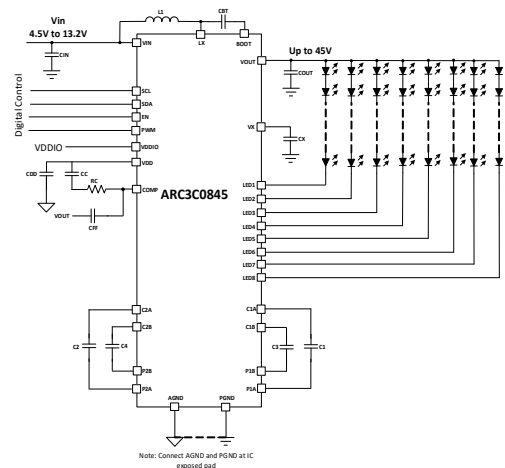


Figure 2. Typical Application Circuit

Application Schematic

Figure 3 shows the ARC3C0845/ARC3C0845W detailed application schematic. For compensation details, contact pSemi.

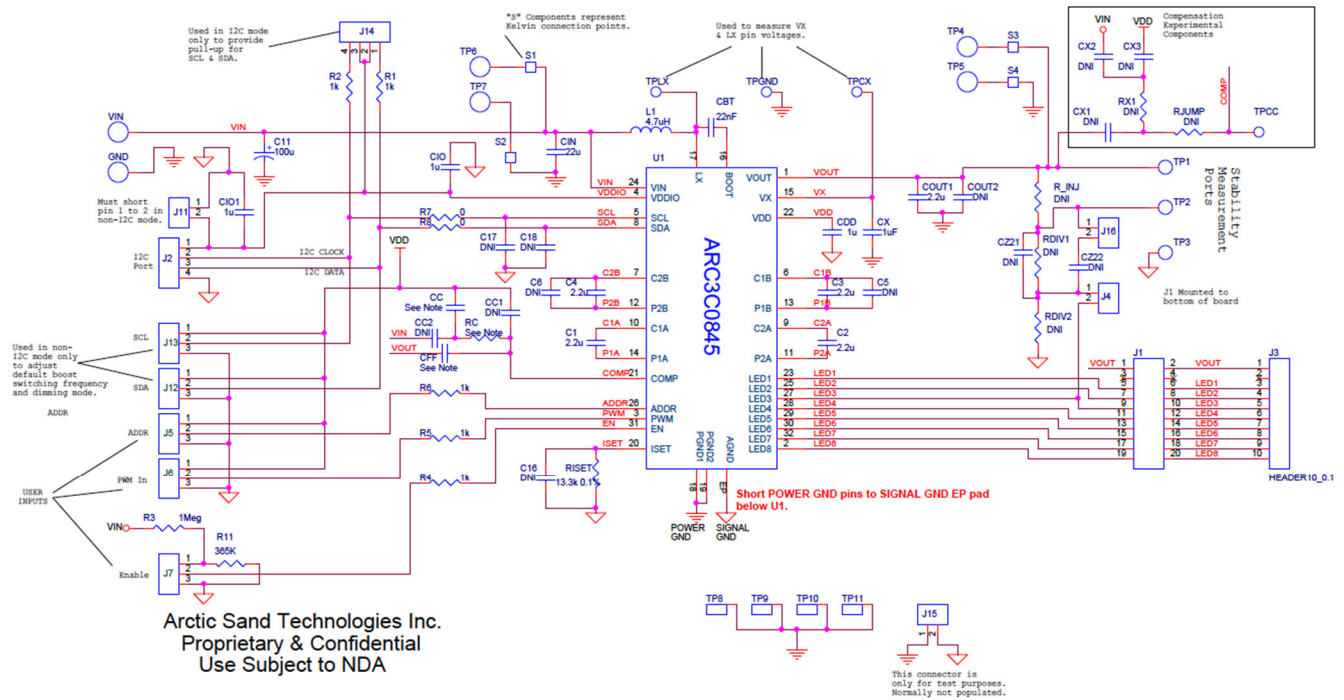


Figure 3. ARC3C0845/ARC3C0845W Detailed Application Schematic

Application Circuit Part List

Table 1 lists the recommended part numbers.

Table 1. Recommended Parts⁽¹⁾

Component	Value	Part Size	Mfg. Part Number
CBT	22 nF 50V X7R	0402	GRM155R71H223KA12D
CX	1 μ F 35V X5R	0402	GRM155R6YA105KE11
C3, C4	2.2 μ F 50V X5R	1206	GJ8319R61H225KA12
C1, C2	2.2 μ F 25V X5R	0805	C2012X5R1E225K085AC
CIN ⁽²⁾	1.0 μ F 16V X5R	0603	GRM188R61C105KA12D
CC ⁽³⁾	–	0201	–
CFF ⁽³⁾	–	0201	–
COUT	2.2 μ F 50V X5R	1206	GJ8319R61H225KA12
CDD, CIO	1 μ F 10V X5R	0402	GRM155R61A105KE15D
L1 ⁽³⁾	4.7 μ H	3.2 mm x 2.5 mm x 1.2 mm	DFE322512F-4R7M
RISSET	13.3 k Ω	0402	Use tighter than 1% tolerance
RC ⁽³⁾	–	0201	–

Notes:

1. Components in this part list are optimized for 8P12S or higher applications. For an optimized selection based on your application, contact pSemi.
2. Value might require an adjustment based on proximity of the input source to eliminate input voltage ringing.
3. For an optimized selection based on your application, contact pSemi.

Ordering Information

Table 2 lists the ARC3C0845/ARC3C0845W order codes and shipping methods.

Table 2. ARC3C0845/ARC3C0845W Order Codes and Shipping Methods

Order Codes	Description	Packaging	Shipping Method
ARC3C0845-R	High-Efficiency LED Backlight Driver	4 mm x 4 mm QFN, 32-pin	5000 units/large tape and reel
ARC3C0845-V			250 units/small tape and reel
ARC3C0845-G			10 units/sample waffle tray
ARC3C0845W-R	High-Efficiency LED Backlight Driver	3.44 mm x 2.415 mm WLCSP, 40-pin	5000 units/large tape and reel
ARC3C0845W-V			250 units/small tape and reel
ARC3C0845W-G			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.

Disclaimers

The information in this document is believed to be reliable. However, pSemi assumes no liability for the use of this information. Use shall be entirely at the user's own risk. No patent rights or licenses to any circuits described in this document are implied or granted to any third party. pSemi's products are not designed or intended for use in devices or systems intended for surgical implant, or in other applications intended to support or sustain life, or in any application in which the failure of the pSemi product could create a situation in which personal injury or death might occur. pSemi assumes no liability for damages, including consequential or incidental damages, arising out of the use of its products in such applications.

Patent Statement

pSemi products are protected under one or more of the following U.S. patents: patents.psemi.com

Copyright and Trademark

©2020–2025, pSemi Corporation. All rights reserved. The Peregrine Semiconductor name, Peregrine Semiconductor logo and UltraCMOS are registered trademarks and the pSemi name, pSemi logo, HaRP and DuNE are trademarks of pSemi Corporation in the U.S. and other countries.