

1A Backlight and Camera LED Power Charge Pump

1 General Description

The AS3683 is a low-noise, high-current 1A charge pump designed for camera flash LEDs and LCD backlighting applications. The current sinks are capable of driving up to 960mA of load current.

The AS3683 integrates two independent current source blocks for driving a single flash LED (CURR₁₁ to CURR₁₃) with up to 480mA, and general purpose LEDs (CURR₂ to CURR₄) with up to 160mA/LED. The general purpose LEDs are controlled individually and can be used for backlighting, but also in support of an RGB funlight or a movie indicator lamp. To meet high-flash current requirements (up to 960mA), both current source blocks can be connected together (CURR₁₁ to CURR₁₃ and CURR₂ to CURR₄).

The AS3683 utilizes austriamicrosystems's patent-pending Intelligent Adaptive Mode Setting (IAMS) to switch between 1:1, 1:1.5, and 1:2 modes. In combination with very-low-drop-out current sinks, the device achieves high efficiency over the full single-cell Li+ battery voltage range. The charge pump operates at a fixed frequency of 1MHz allowing for tiny external components and its design ensures low EMI and low input-ripple.

The ultra-flexible brightness control scheme allows for simple adaptation of the device to different system architectures.

In Softflash Mode the device is controlled by an I2C interface. In these modes the LED brightness, flash duration, GPIOs and various charge pump states are controlled by internal register settings. The GPIO pins can act as programmable input or output pins and can also be set to trigger preview and flash light directly by a camera module.

In Hardflash mode the LED brightness is controlled by the Enable pins. These programming pins can be used as simple enable pins, or as PWM input, again offering ample flexibility for setting the LED brightness.

2 Key Features

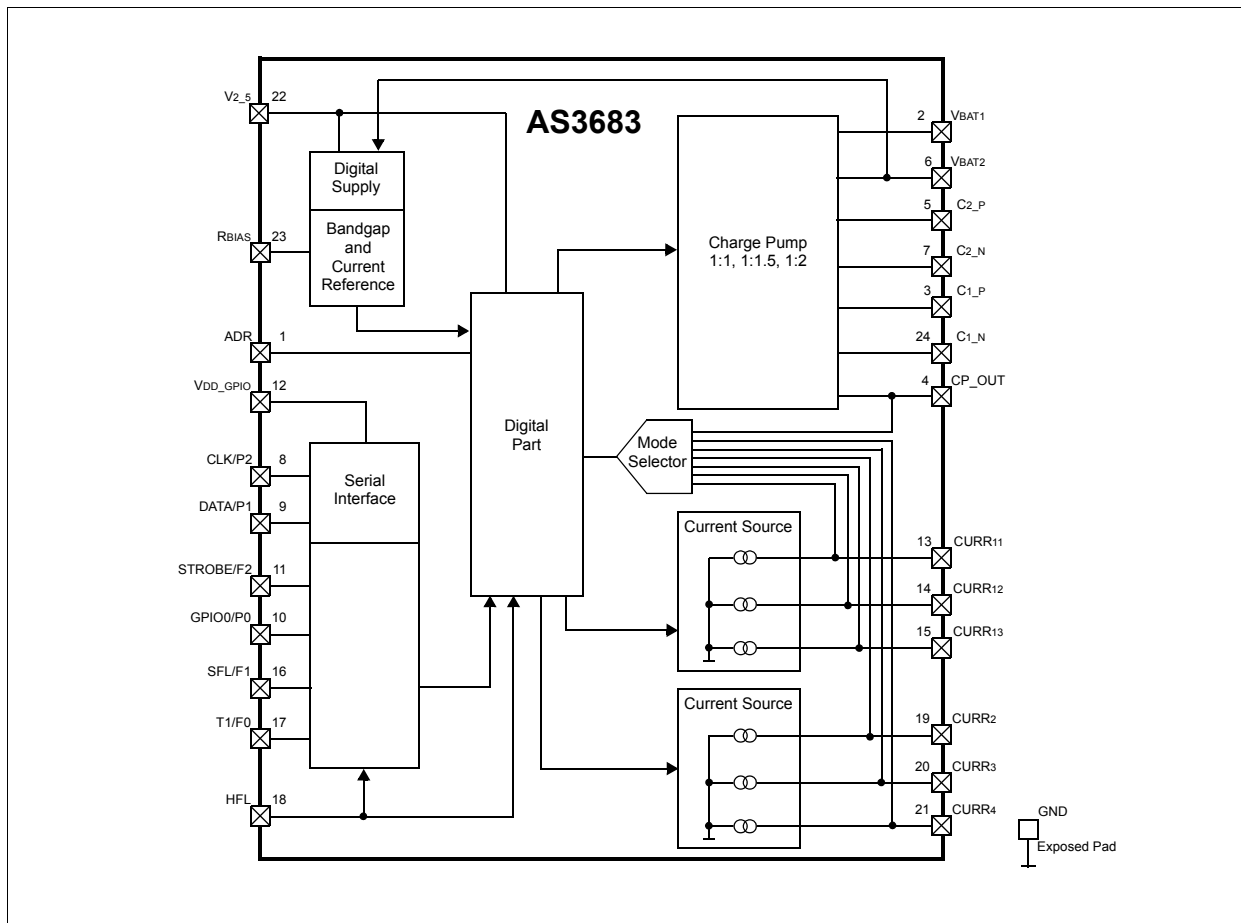
- High-Power 1A Charge Pump
 - 1:1, 1:1.5, and 1:2 Intelligent Adaptive Mode Setting (IAMS)
 - Efficiency up to 95%
 - Soft Start to Reduce Inrush Current
 - Low-Noise Constant-Frequency Operation
- Current Sinks
 - 400mA Continuous Current (@V_{IN} = 3.2 to 5V, V_{OUT} = 5V)
 - Up to 960mA Pulsed Flash Current
 - Programmable: 0 to 160mA, 0.625mA Resolution
- Flexible Brightness Control
 - Three 0 to 160mA LEDs
 - Individually Addressable via I2C Interface
- 2 Operating Modes
 - Softflash Mode (I2C Interface)
 - Hardflash Mode (Dedicated Control Pins)
- 2 General Purpose Inputs/Outputs in Softflash Mode
 - Digital Input, Output, and Tristate
 - Programmable Pull-Up and Pull-Down
 - Strobe Pin can be used for Camera Flash Control
- LED Disconnect in Shutdown
- Open LED Detection
- Low Stand-By Current (6µA), Interface Fully Operating
- Low Shut-Down Current (0.2µA)
- Wide Battery Supply Range: 3.0 to 5.5V
- Thermal Protection
- 24-Pin, Small Form-Factor QFN Package
 - 4 x 4 x 0.85mm, 0.5mm Pitch
 - Enhanced Thermal Characteristics

3 Application

Lighting management for cameras, mobile telephones, PDAs, and other 1-cell Li+ or 3-cell NiMH powered devices.

4 Block Diagram

Figure 1. AS3683 Block Diagram



5 Application Diagrams

Figure 2. Softflash Mode Application Diagram

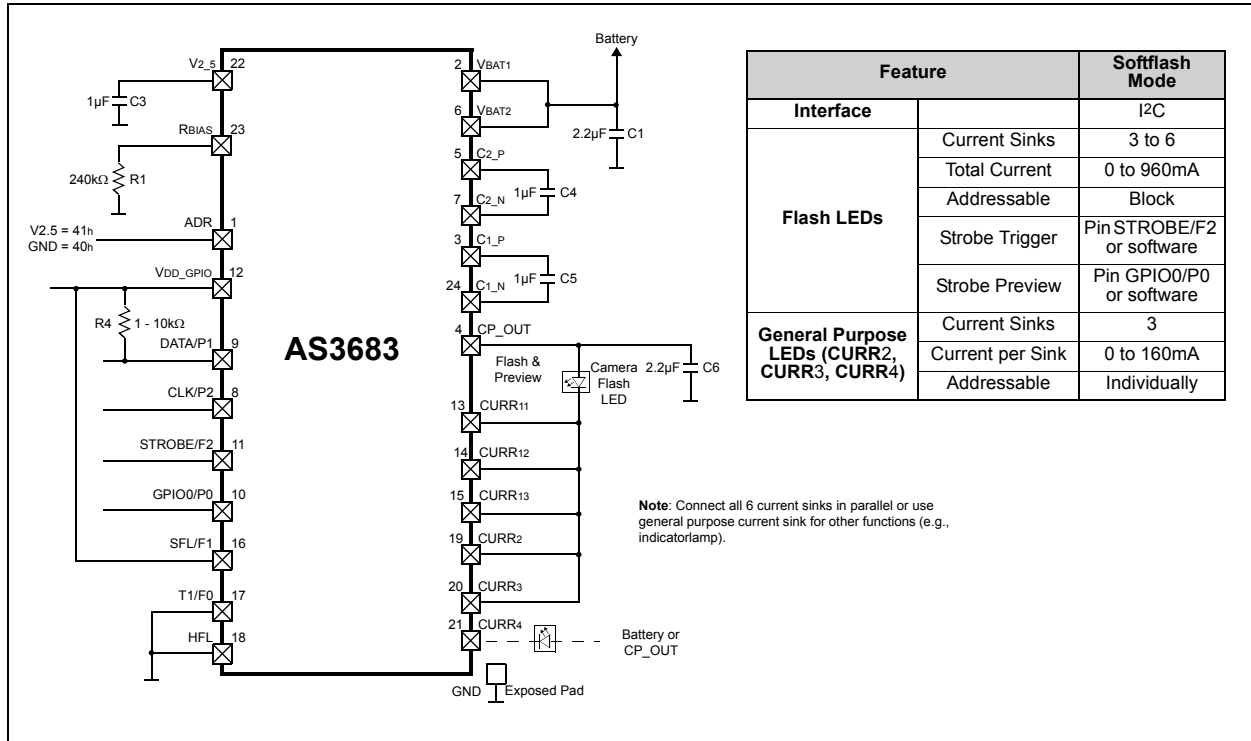
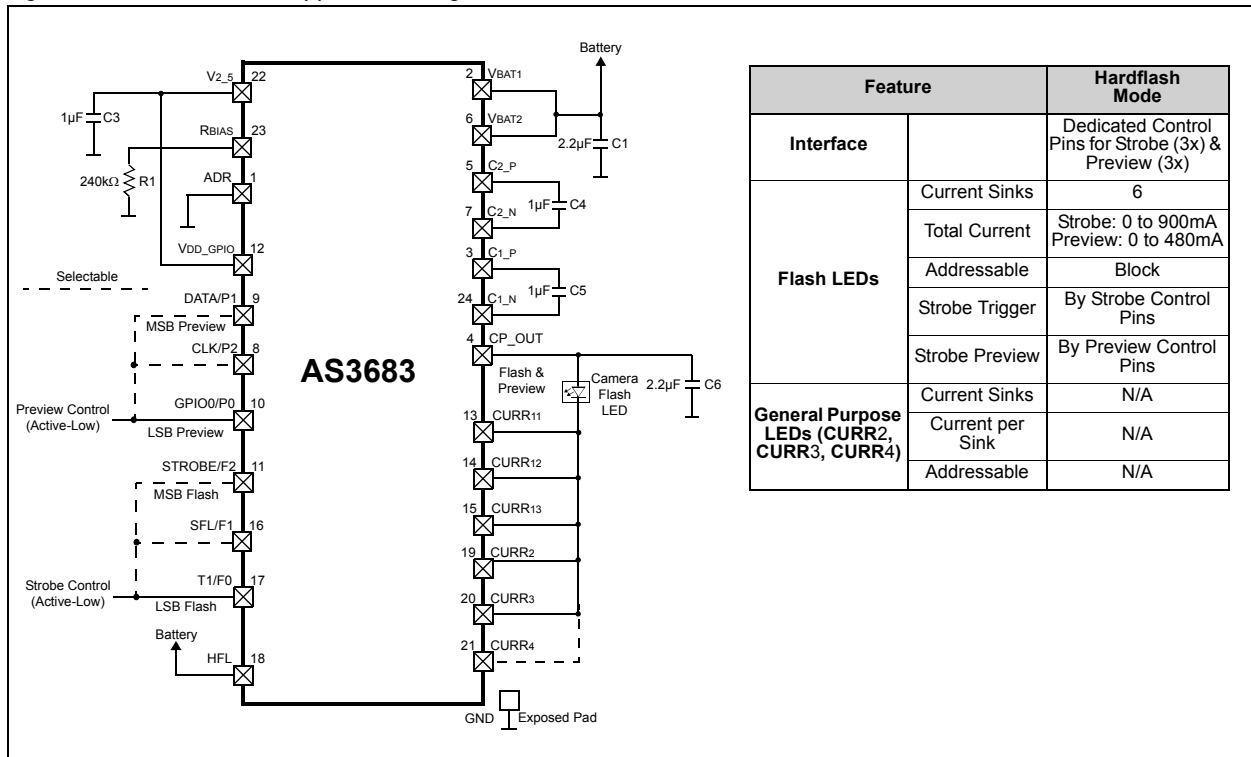


Figure 3. Hardflash Mode Application Diagram



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