AS3824

16-Channel White LED Controller for LCD Backlight

The AS3824 is a 16 channel high precision LED controller for use in LCD-backlight panels. Dynamic power feedback controls the external power supply to guarantee best efficiency. One high accurate global 10 bit DAC can be used to set the LED current as well as each channel has its own additional 8 bit DAC to boost the dynamic range of LED Backlight systems.

Each channel is equipped with an independent PWM generator which can also be synchronized to an external synchronization signal (VSYNC).

A fast mode supports minimum PWM duty cycle operation which helps to further reduce the energy consumption of modern LED Backlight systems.

The PWM generator clock can be generated internally (DPLL) or an external clock source can be connected to the HSYNC input.

Built-in safety features include thermal shutdown as well as open and short LED detection. The device is programmable via serial interface (SPI).

Features

- Supports all LED backlight topologies
  - No limit of VLED or ILED, device is not exposed to high voltage/high current
- Optimum power savings through local dimming
  - 16 fully flexible 12 bit PWM generators (period, high time, delay, reverse)
- One global highly accurate 10 bit DAC which sets the LED current (±0.5% accuracy)
- High dynamic range boost function
  - 16 independent 8 bit DACs can be used to boost/decrease LED current within certain frames
- Global dimming mode option
  - AS3824E/E1 are pre-programmed as external PWM mode (DPWM mode), V_{SYNC} pin is used as PWM input. AS3824A/A1 are pre-programmed as SPI mode
- VSYNC and HSYNC inputs, as well as integrated digital PLL for synchronization with TV frame
- Lowest BOM
  - Due to 2 pin concept of the output channel: no HV protection, no cascade FETs
- Feedback function is compatible to every DC-DC architecture and configurable via SPI
- Short/OPEN LED detection, temperature shutdown, register lock/unlock, SPI transfer checksum

Applications

- HD TVs
- UHD TVs
- LCD Monitors

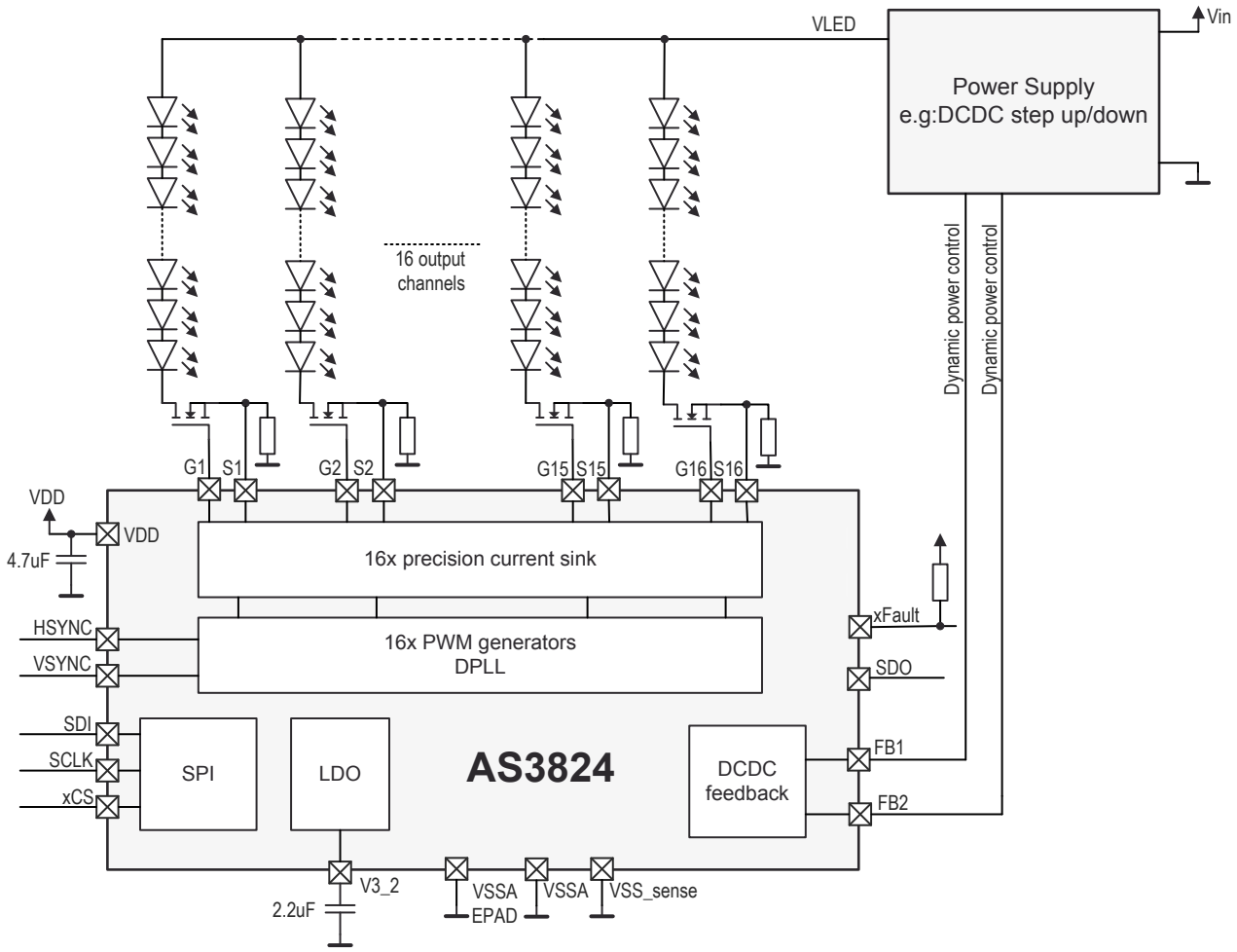

Figure 1. AS3824 Typical Application