High integration & efficiency for multi-channel LED control

Equipped with DC/DC boost converters, this compact yet highly integrated LED driver delivers full dimming with superior accuracy and linearity, and very high efficiency.

**Key features**
- 3-channel LED driver
- Up to 150 mA per channel (when 3 channels used, depending on application thermal constraints)
- Integrated boost converters and current sources
- Three PWM inputs, one internal PWM generator, programmable via I²C (up to 14 bits/24 kHz)
- LED strings up to 75 V
- 2% channel accuracy
- High efficiency: up to 94%
- All power FETs integrated
- Adaptive thermal protection
- Low-power operation
- HVQFN40 package

**Applications**
- LED backlights in TV and computer displays
- Multi-channel general lighting

The NXP UBA3077’s high level of integration creates a very compact, slim design that requires few external components. There are three internal boost converter MOSFETs and three internal PWM switches. The device supports LED strings of up to 75 V. Using independent channels removes any dependencies on LED string voltage matching. Additional features, including adaptive temperature protection, ensure reliable operation.

**DC/DC boost converter**
Each of the three independent channels has a dedicated DC/DC boost converter. Each channel also has a dedicated PWM input and a PWM switch. All of the power MOS devices are integrated on-chip, for lower overall cost. LED characteristics are not included in the boost converters because their performance doesn’t depend on LED string voltage matching.

Current matching between channels is ±2%. The LED current per channel can be up to 150 mA, depending on the Tamb and the thermal design of the application, assuming all three channels are used. The converters support a full range of fault detection and protection features, including adaptive temperature protection.
**High-accuracy deep dimming**

The UBA3077 offers 14-bit PWM dimming. Deep dimming down to 1% with PWM frequency up to 24 kHz can be achieved with high precision. Advanced features such as slope compensation and usage of true current sources allow very high accuracy of the dynamic LED current. This improves the light quality. It also provides a seamless and straightforward integration path for any video processor, without requiring a complex compensation scheme.

**Very high efficiency**

The device delivers efficiency of up to 94%. It supports PWM duty cycles from 0.1 to 100%, and uses a 24 V power supply. To save energy, it enters a power-saving mode when all PWM signals stay LOW for longer than 1 second.

**Demo board**

To give designer’s a head start on development, the UBA3077 is available in a demo board for LED backlighting.

**Typical UBA3077 application diagram**