

Analog, Mixed Signal and Power Management

MC34844A

10-channel LED backlight driver with integrated power supply

MC34844A Applications

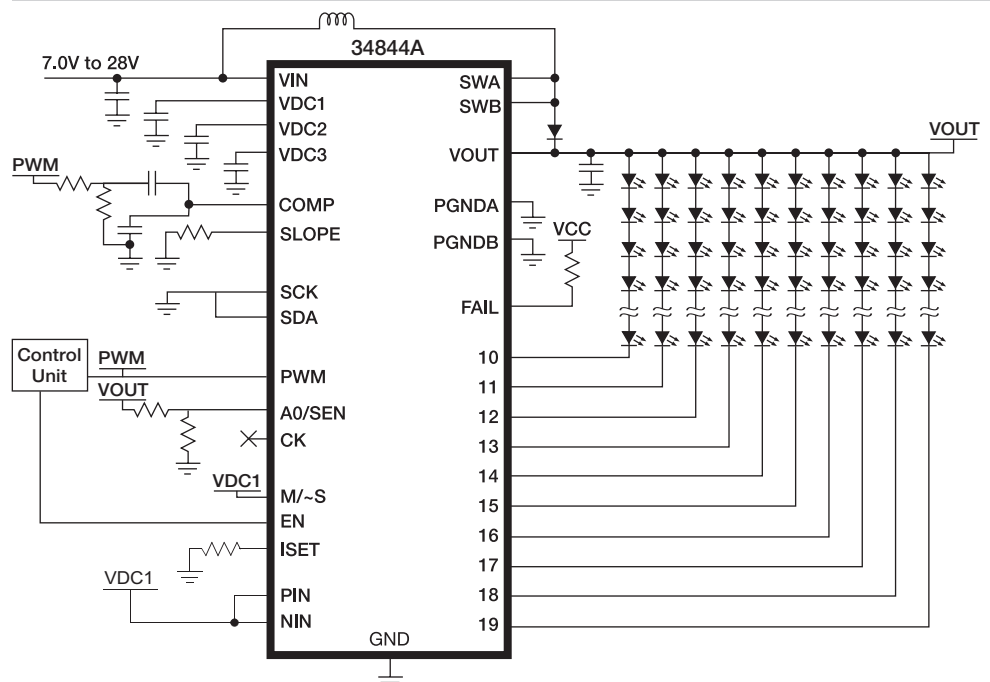
- Monitors and TVs up to 27 inches (larger if using multiple devices)
- PC notebooks
- GPS screens
- Gaming consoles
- Industrial instrumentation displays
- Health care device displays

Freescale's MC34844A is a 10-channel LED driver with integrated boost converter for use in LCD backlights. It is designed to provide LED current control and pulse width modulation (PWM) in monitors from 10 to 27 inches, and a more uniform display and improved image quality through highly accurate LED current matching.

With the capability of driving up to 160 LEDs in 10 parallel strings, the device is capable of driving LED backlights up to 30 watts while supporting PWM, I²C or SM bus control. LED current in the 10 LED channels is matched to within ± 2 percent, and the value is set with a resistor from the ISET pin to ground.

Freescale is the first to combine this level of intelligence in an LED backlight driver. Using an I²C/ SM-bus interface, users can program the LED current, amplitude, PWM frequency, PWM duty cycle for the LEDs, boost switching frequency and boost OVP. The PWM generator

MC34844A Application Circuit



allows for LED dimming, providing an improved picture and longer screen life. The device can also deliver more consistent performance over the lifetime of the LEDs by compensating for optical and temperature degradation.

The MC34844A supports optical/temperature closed loop operation and features LED overtemperature protection, LED open circuit

protection, IC overvoltage protection, overcurrent protection and undervoltage lockout. It also provides ambient light compensation for improved battery life in portable devices such as PC notebooks.

The MC34844A removes the burden on the controller for PWM generation and removes the need for having long PCB traces with PWM signals which can cause noise and electromagnetic compatibility performance issues. Multiple devices can be synchronized for driving more LEDs. The MC34844A can also be used in applications using high-voltage LED strings and high-input voltage with the addition of a single external FET.

MC34844 Key Features

- Input voltage of 7.0V to 28V
- Output voltage up to 60V
- Dynamic Headroom Control
- 2.5A integrated boost FET
- Up to 80 mA LED current per channel
- 90 percent efficiency (DC:DC)
- 10-channel current mirror with ± 2 percent current matching
- I²C/SM bus interface
- 8-bit programmable LED current and dimming resolution
- PWM frequency programmable or synchronizable from 110 Hz to 27 kHz
- User-programmable boost OVP
- LED open failure detection and OTP/OCP/UVLO lockout
- 32 pin 5 mm x 5 mm x 0.8 mm TQFN packaging
- Foot print compatible with the MC34844 10 x 50 mA



32-pin 5 mm x 5 mm x 0.8 mm
TQFN packaging

Parametric Table

Performance	Parameter Typical Values
Outputs (channels)	10 ($\pm 2\%$ current match)
Output voltages	Up to 60V
Operating voltage	7.0–28V
Peak current (per channel)	80 mA
ESD HBM	$\pm 2000V$
Ambient operating temperature	$-40^{\circ}C \leq TA \leq 105^{\circ}C$

Protection

	Detect	Shut Down	Auto Retry	Status Reporting
Short circuit				●
Over temperature	●	●	●	●
Over current	●	●		●
Over voltage	●			●
Under voltage	●	●		●
Open load detect	●			●
Shorted load detect	●			

Selector Guide

Part Number	Temperature Ranges	Package
MC33844AEP/R2	$-40^{\circ}C$ to $+105^{\circ}C$	32-pin TQFN, EP

Tools

Part Number	Description
KIT34844AEPEVBE	LED backlight driver evaluation board Contact Freescale sales
KITLEDKLT16EVBE	LED load board Contact Freescale sales

Documentation

Document Number	Description	Type
MC34844	10-channel LED backlight driver with integrated power supply	Data Sheet
SG1002	Analog, mixed signal and power management	Selector Guide

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