

Analog, Mixed Signal and Power Management

# MC34845

## 6-channel LED backlight driver with integrated power supply

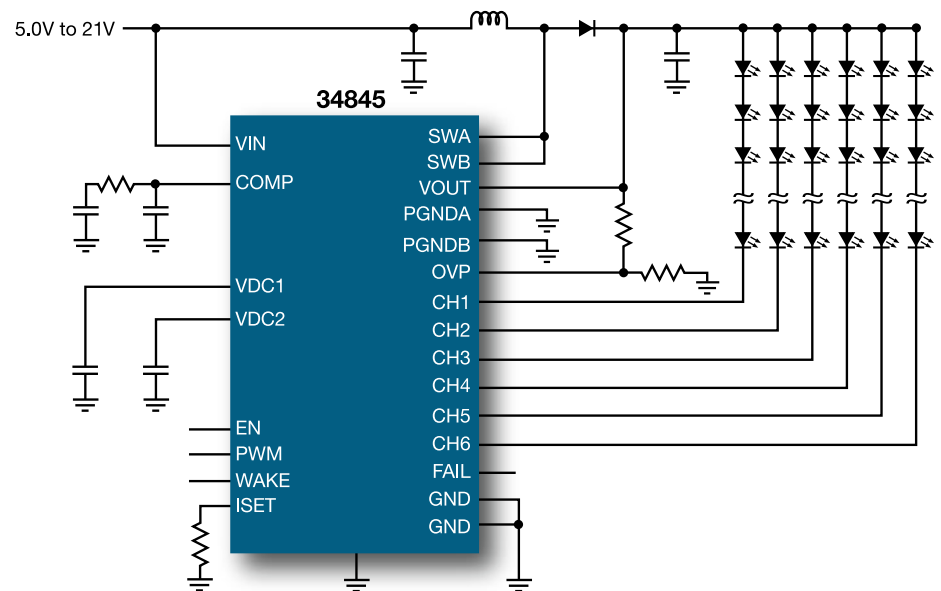
### MC34845 Applications

- PC notebooks
- Netbooks
- GPS screens
- Portable DVDs
- Picture frames
- Smaller screen televisions
- Gaming consoles
- Industrial/instrumentation displays
- Health care device displays

Freescalé's MC34845 is a 6-channel light emitting diode (LED) driver with integrated boost converter for use in liquid crystal display (LCD) backlights. Capable of driving up to 96 LEDs, the MC34845 is suitable for notebook displays from 10- to 17-inch and larger, as well as general applications with screens of seven inches or larger requiring up to 10W LED backlight power.

The highly integrated MC34845 requires very few external components to provide a complete backlight driver solution. The internal boost power supply generates the required output

### MC34845 Application Circuit



voltage needed to drive the LEDs. A dynamic headroom control (DHC) circuit detects the voltage required to drive each string of LEDs and sets the boost output accordingly, reducing power dissipation and increasing overall

efficiency of the system. By integrating the boost FET, the MC34845 provides for simplified design while improving device performance.

The high-speed drivers feature highly accurate current matching of  $\pm 2$  percent, while also providing for very fast turn on and turn off times of  $\sim 50$  ns. This allows a very narrow minimum pulse, which increases dimming range and provides for higher linearity. The PWM waveform of the outputs is controlled directly by the PWM input signal on the PWM pin.

The MC34845 incorporates a number of power saving techniques to increase the battery life in portable equipment. In addition to a low operating supply current, the device features a shut down mode where supply current is cut to just 2  $\mu$ A. This enables direct connection to the battery without a sequential supply switch, reducing cost and improving efficiency. The mode can be selected using the enable pin, or the device can be configured to enter the low current mode when the PWM signal is low for a certain period.

LED fault detection modes are also incorporated for short circuit and open circuit scenarios. If an LED string is open circuit, the MC34845 disables that string and continues to drive the remaining string. If an LED is shorted, the current drivers automatically compensate for it. If multiple LEDs are shorted, the string is disabled. When the device is reset, the MC34845 will re-try driving the strings. The MC34845 also incorporates user programmable over-voltage protection (OVP), over-current protection (OCP) and under-voltage lockout (UVLO).

### Orderable Part

Part Number	Temperature Ranges	Package
MC34845AEP/R2	-40°C to +85°C	24-pin TQFN, EP
MC34845EP/R2	-40°C to +85°C	24-pin TQFN, EP

### Development Tools

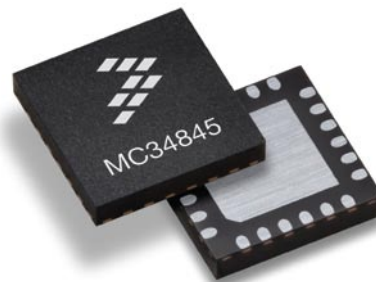
Part Number	Description
KIT34845EPEVME	LED backlight driver evaluation board
KITLEDBKLT16EVBE	LED load board

### Documentation

Document Number	Description	Type
MC34845	6-channel LED backlight driver with integrated power supply	Data Sheet
SG1002	Analog, mixed signal and power management	Selector Guide
AN1902	Quad Flat Pack No-Lead (QFN) Micro Dual Flat Pack No-Lead ( $\mu$ DFN)	Application Note

### MC34845 Key Features

- Input voltage of 5.0V to 21V
- Output voltage up to 60V
- Dynamic headroom control (DHC)
- 2.0A integrated boost FET
- Boost switching frequency
  - o 600 KHz (MC34845)
  - o 1.2 MHz (MC34845A)
- 90 percent efficiency (DC:DC)
- 6-channel current mirror with  $\pm 2$  percent
- Up to 30 mA LED current per channel
- Direct PWM input control
  - o PWM frequency up to 100 kHz
  - o 50,000:1 dimming resolution
  - o 200 ns minimum pulse
- User-programmable OVP
- LED short/open protection
- Over-temperature/over-current protection
- Under-voltage lockout
- 24-pin 4 mm x 4 mm x 0.65 mm TQFN package



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