

## 0.9V-Step-Up White LED Driver PR4401 Requires Only One External Component

The PR4401 is a single cell step-up converter for white LEDs operating from a supply voltage of less than 0.9V. Only one external inductor is needed for operation of up to three white LEDs. This makes the PR4401 ideal for use in low-cost or small-sized applications such as LED flashlights or LCD backlighting for portable devices.

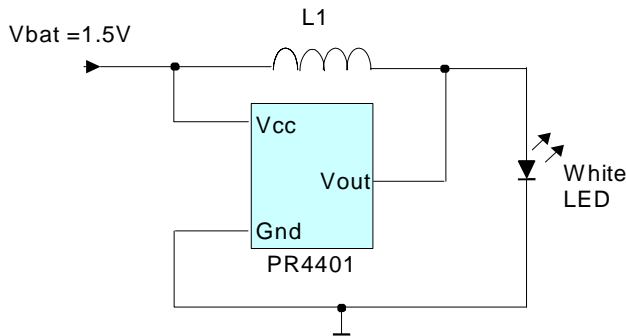
### Features

- Minimum operating voltage 0.9V
- 300mA peak output current
- only one external component required
- Battery deep discharge protection

### Applications

- Small-sized LED torches
- LCD backlighting
- LED displays

### Typical Application



The inductance L1 can be varied between 10 and 22  $\mu\text{H}$ :

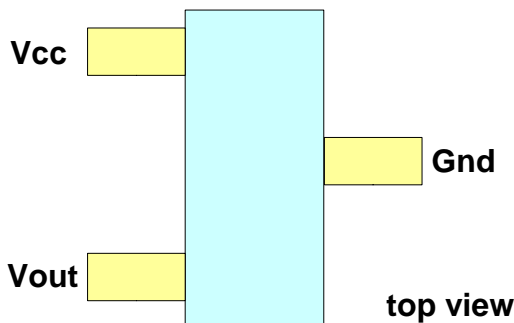
Recommendation for inductance L1

Inductance L1	For
22 $\mu\text{H}$	Maximum efficiency
10 $\mu\text{H}$	Maximum brightness

### Approximate Battery Lifetime

one white LED connected, measured with single 1.5V TDK Alkaline battery

Battery	Battery Lifetime, typical <i>L1= 22<math>\mu\text{H}</math>, LED mean current 12mA</i>	Battery Lifetime, typical <i>L1= 10<math>\mu\text{H}</math>, LED mean current 23mA</i>
AA	55 h	27 h
AAA	22 h	8 h



### Pin Description

PIN Name	PIN Function Description
Vcc	Supply voltage
Vout	Output voltage, LED connection
Gnd	Ground connection

Package SOT23-3 or COB on request

## Absolute Maximum Ratings

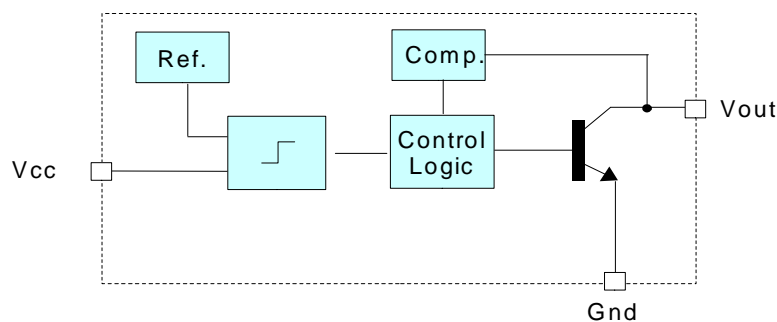
Parameter	Min	Typ	Max	Units
V <sub>CC</sub>	-0.3		8	V
Peak Output Current			300	mA
Operating Temperature Range			85	°C
Storage Temperature Range	-55		150	°C
Electrostatic Discharge (ESD) Protection	2			kV

## Electrical Characteristics

V<sub>CC</sub>=1.5V, T<sub>a</sub> = 25°C, one LED connected, unless otherwise noted.

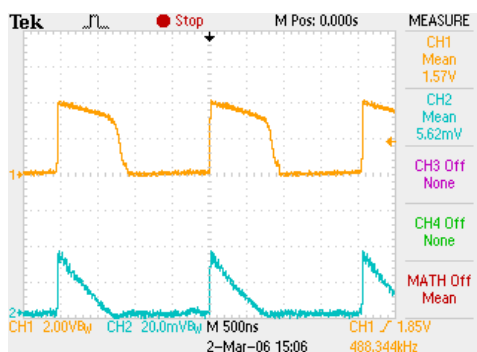
Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage, min. operating min. startup max. operating			0.7 0.9 2.0		V V V
LED Mean Current measured with L1 type LQH32CN Murata	L1 = 22 μH L1 = 10 μH		12 23		mA
Switching Frequency			500		kHz
Quiescent supply current	V <sub>CC</sub> > 950mV V <sub>CC</sub> = 600mV V <sub>CC</sub> = 400mV		4 50 10		mA μA μA
Efficiency			80		%
V <sub>out</sub>		V <sub>CC</sub>		16	V

## Block Diagram

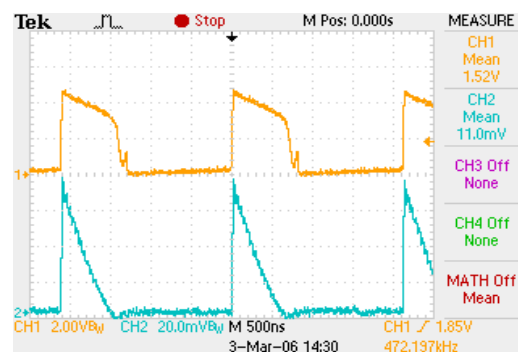


## Oscilloscope Displays

LED voltage (CH1) and LED current (CH2, over 0.5 Ohm resistor)



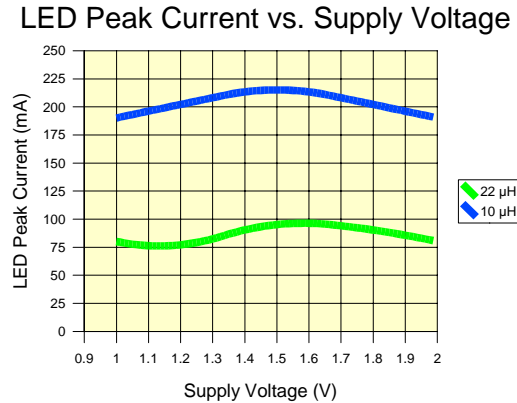
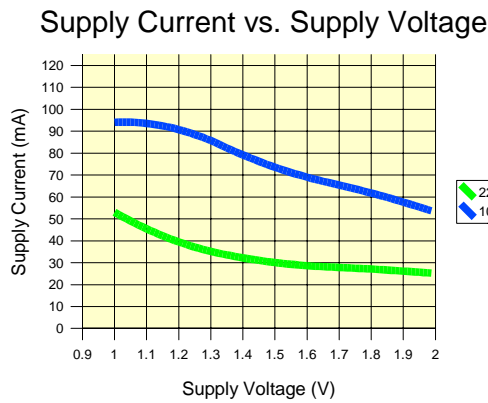
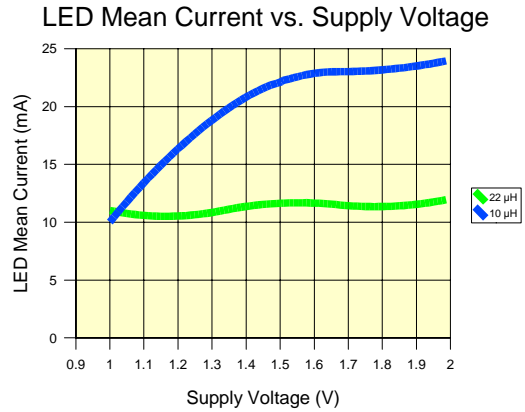
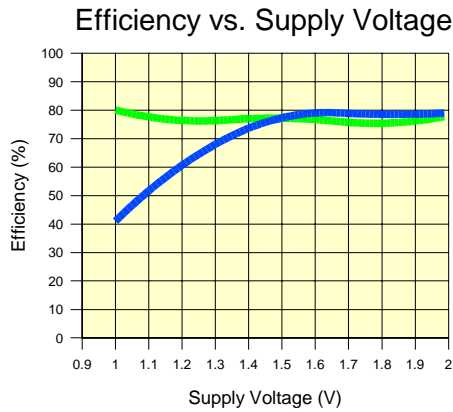
with L1 = 22 μH



L1 = 10 μH

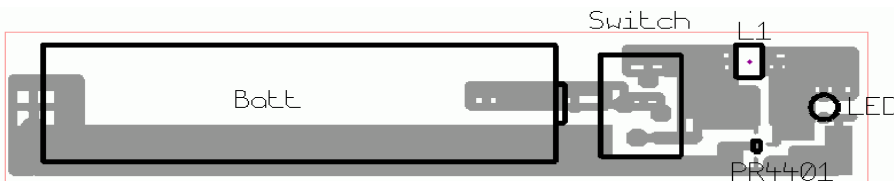
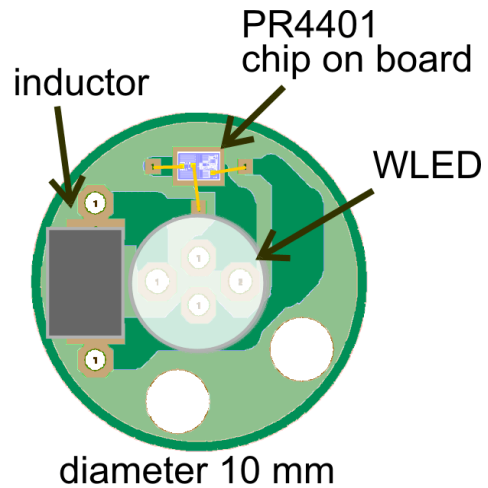
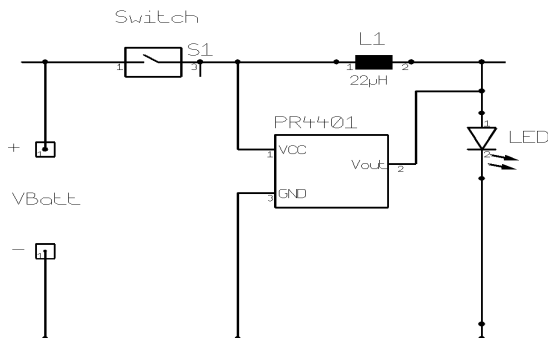
## Typical Characteristics

(Ta = 23°C, one LED connected)



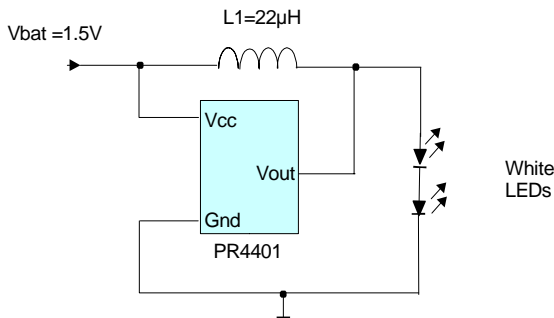
## Typical Applications

Demo boards in chip on board technique

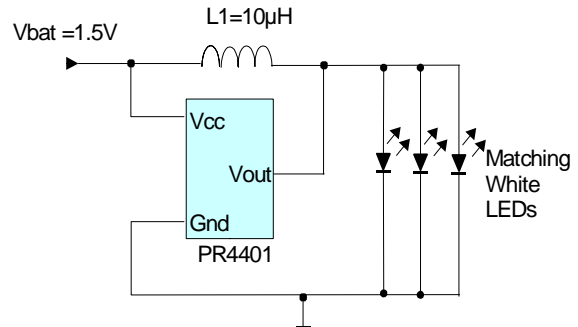


**Board Size: 95 x 17 mm**

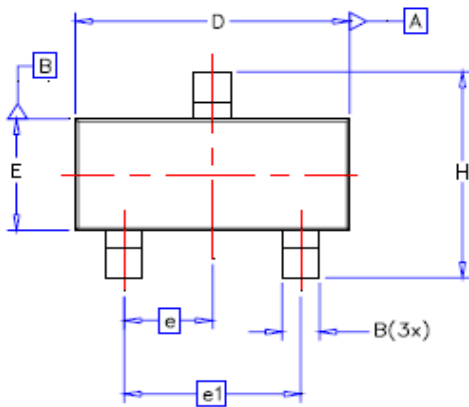
## Connecting two LEDs in Series



## Connecting three LEDs in Parallel



## Available Packages



### Typical Dimensions

B = 0.40 mm    D = 2.92 mm  
 E = 1.30 mm    H = 2.37 mm  
 e1 = 1.92 mm

**PR 4401 SOT23 package** (PR4401 in die form on request)

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