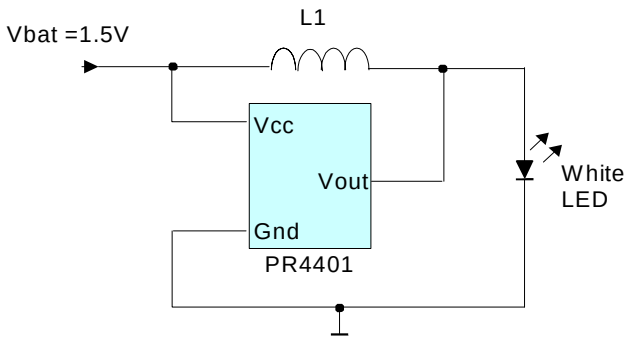
0.9V-Step-Up White LED Driver PR4401
Requires Only One External Component

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



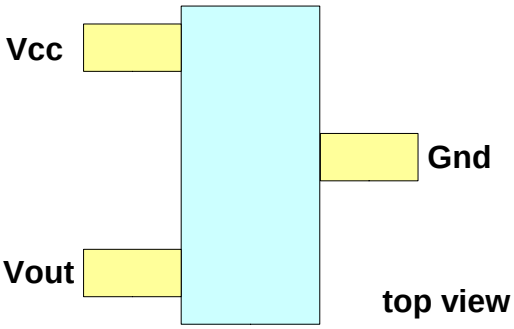
The inductance L1 can be varied between 10 and 22 µH:

Recommendation for inductance L1

Inductance L1	*For*
22 µH	Maximum efficiency
10 µH	Maximum brightness

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

Battery	*Battery Lifetime, typical* *L1= 22µH, LED mean current 12mA*	*Battery Lifetime, typical* *L1= 10µH, LED mean current 23mA*
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

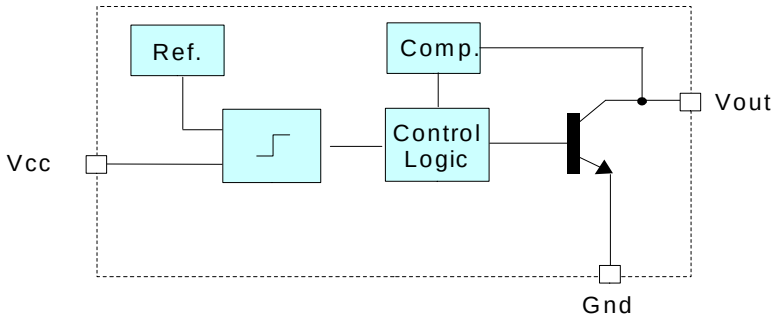
Parameter	Min	Typ	Max	Units
V_{CC}	-0.3		8	V
Peak Output Current			300	mA
Operating Temperature Range			85	°C
Storage Temperature Range	-55		150	°C
Electrostatic Discharge (ESD) Protection	2			kV

Electrical Characteristics

Vcc=1.5V, Ta = 25°C, one LED connected, unless otherwise noted.

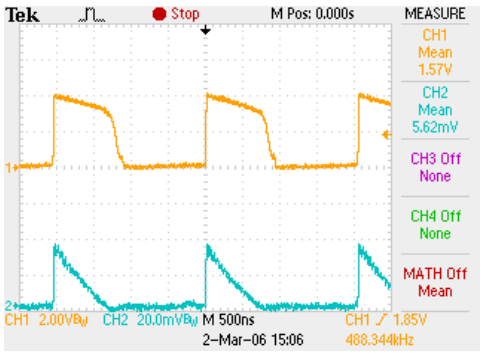
Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage, min. operating min. startup max. operating			0.7 0.9 2.0		V V V
LED Mean Current measured with L1 type LQH32CN Murata	L1 = 22 µH L1 = 10 µH		12 23		mA
Switching Frequency			500		kHz
Quiescent supply current	Vcc > 950mV Vcc = 600mV Vcc = 400mV		4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

Block Diagram

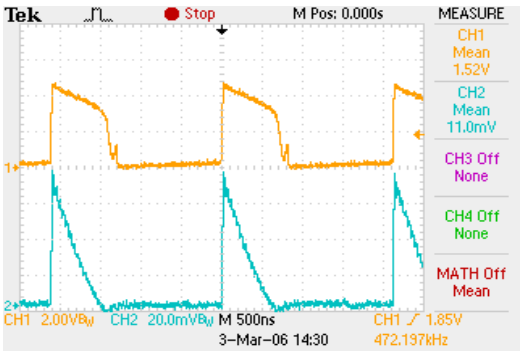


Oscilloscope Displays

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



with L1 = 22 µH

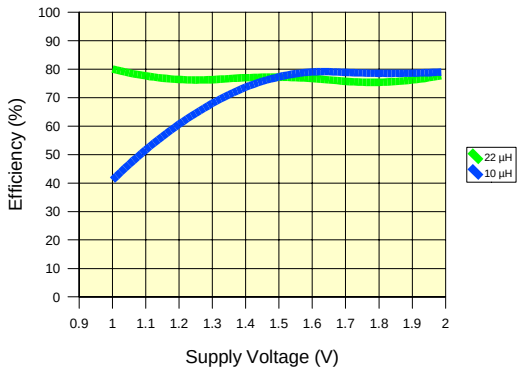


L1 = 10 µH

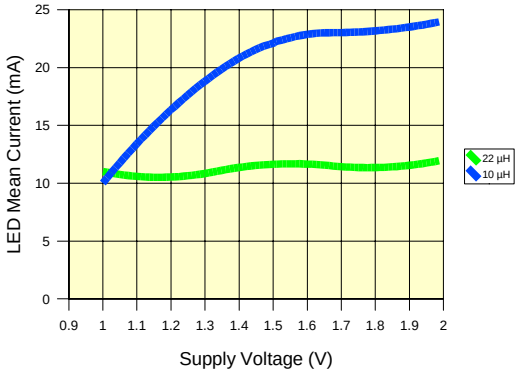
Typical Characteristics

(Ta = 23°C, one LED connected)

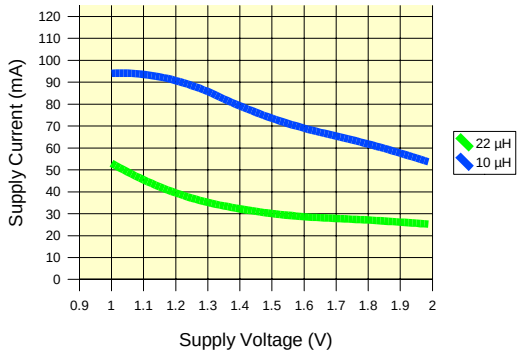
Efficiency vs. Supply Voltage



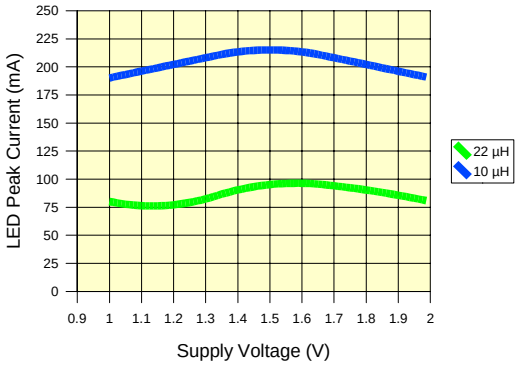
LED Mean Current vs. Supply Voltage



Supply Current vs. Supply Voltage

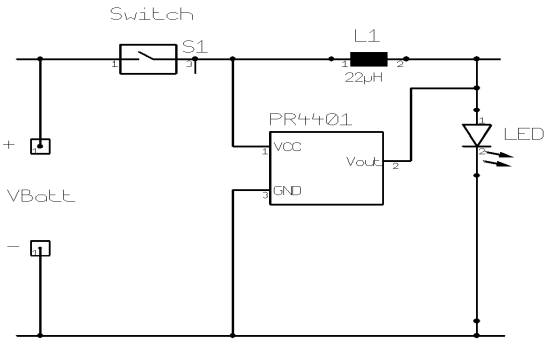


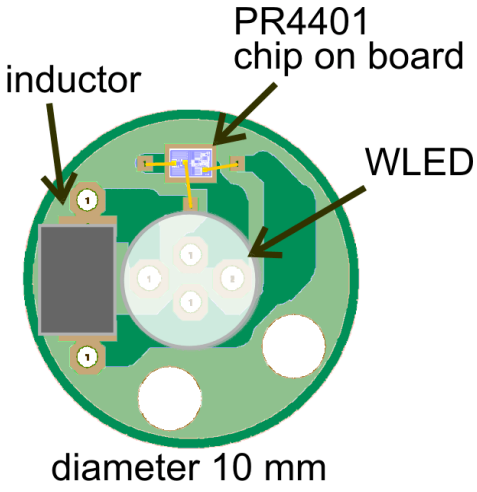
LED Peak Current vs. Supply Voltage

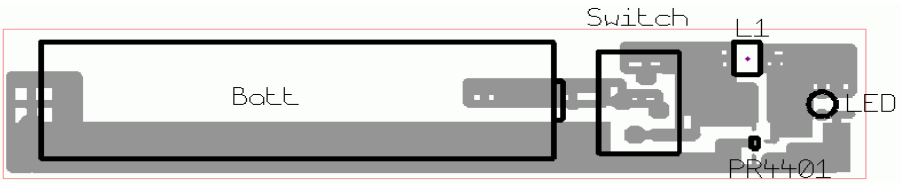


Typical Applications

Demo boards in chip on board technique

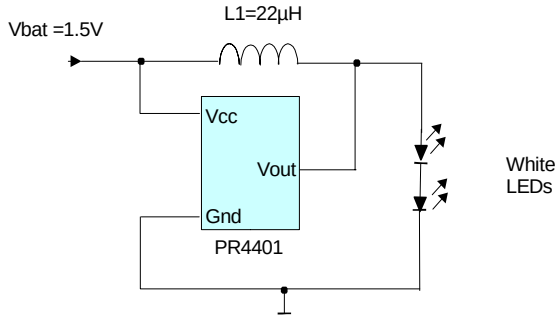




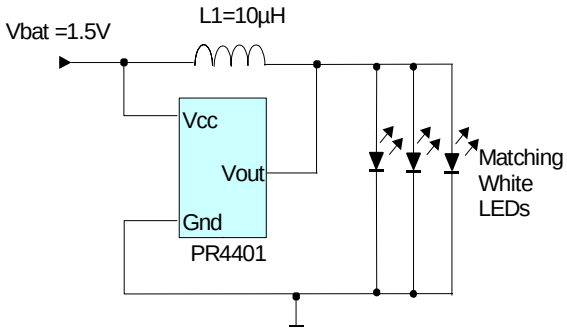


Board Size: 95 x 17 mm

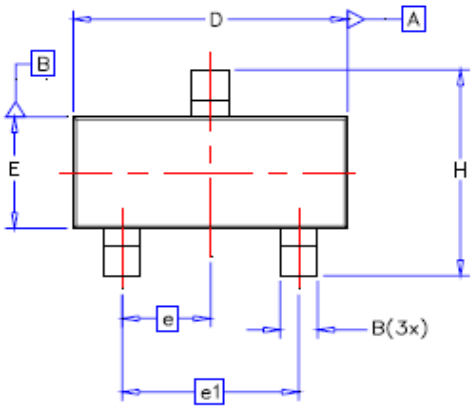
Connecting two LEDs in Series



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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