

General Description

The BCT3511S is a constant frequency charge pump DC/DC converter designed for 1 watt White LED driver with high driving current capability up to 350mA. The BCT3511S has wide input voltage range from 1.8V to 3.6V is intended for use in low cost application where standard batteries are preferred. The mode switching from continuous to flash mode is easily accommodated by main power switch to minimize the risk of battery leakage and corrosion. The internal thermal protection circuit will activate by cutting the output current in half if the chip temperature go above 110 °C.

Features

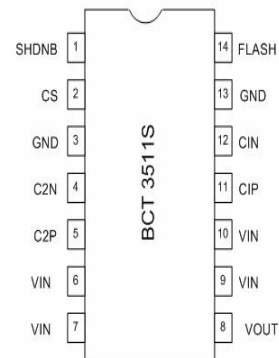
- On chip DC/DC converter
- Wide input voltage range: 1.8V to 3.6V
- Enter flash mode without hardware switch:
Flash mode is enabled by power switch ON, then OFF → ON within ~1 Second
- Maximum output current: 350mA
- Integrated thermal protection circuit
- On Chip Oscillator
- Low power consumption
- Wide operation temperature: -20°C to 70°C
- Output current adjustable by external resistor at pin CS
- Shutdown control pin
- Available in Pb-free SOP14

Applications

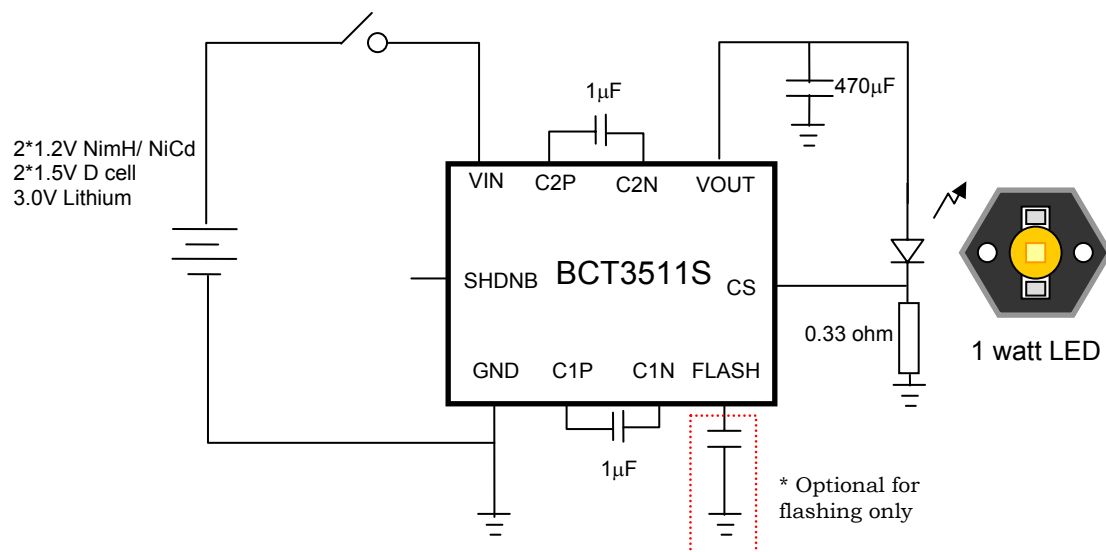
- High power white LED Torch
- White LED driver for mobile phone
- Handheld Electronics
- Lighting Applications

Package

SOP14

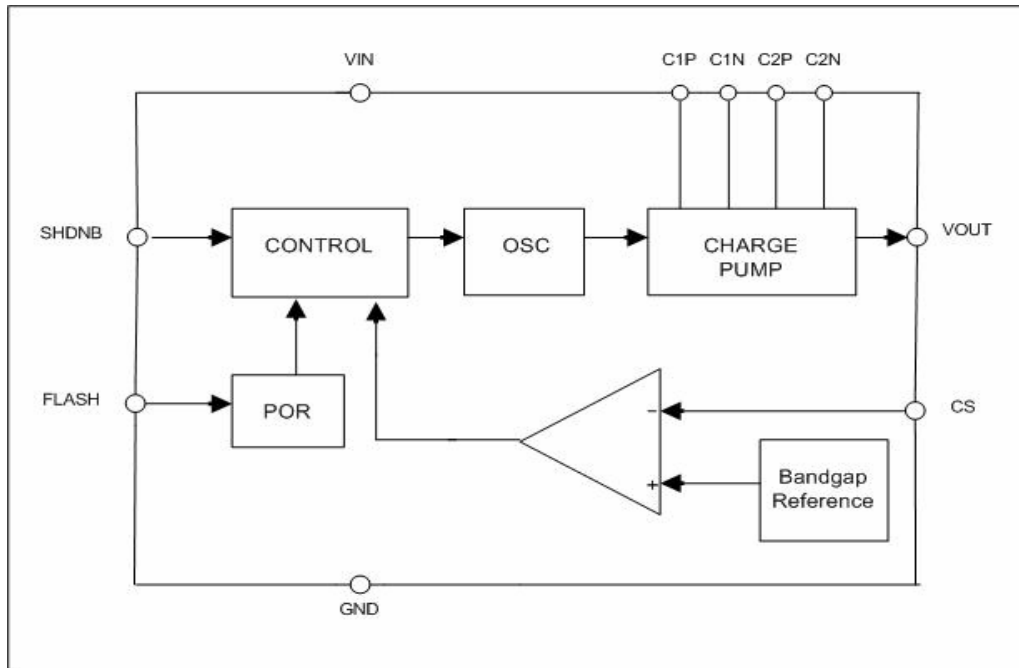


Typical Application Circuit





Block Diagram



Pin Descriptions

Pin Number	Pin Name	I/O	Description
6,7,9	VIN	Power	Input Supply 1.8 – 3.6V
3,13	GND	Power	Ground 0V
1	SHDNB	Input	Chip reset or shutdown (Active Low)
14	FLASH	I/O	Capacitor pin for Flash Mode. To connect a 0.1 μ F ~ 1 μ F capacitor from FLASH to GND
11,12	C1P, C1N	I/O	Charge Pump Flying Capacitor 1 Pins. To connect a 1 μ F capacitor between C1P and C1N
5,4	C2P, C2N	I/O	Charge Pump Flying Capacitor 2 Pins. To connect a 1 μ F capacitor between C2P and C2N
8	VOUT	Output	Charge Pump Output. To connect a 100 μ F ~ 470 μ F capacitor from VOUT to GND
2	CS	Input	Current sense feedback for Regulation Control Loop, feedback voltage = 0.11V



Absolute Maximum Specifications

Rating	Symbol	Value	Unit
Supply voltage range	V_{IN}	-0.3 to 4.3	Volts
Input voltage range	SHDNB	-0.3 to $V_{IN}+0.3$	Volts
Output current Range	I_{OUT}	0 to 350	mA
Output voltage range	V_{OUT}	-0.3 to 8	Volts
Operating temperature range	T_{OPR}	-20 to 70	$^{\circ}C$
Storage temperature range	T_{STR}	-20 to 100	$^{\circ}C$

Electrical Specifications

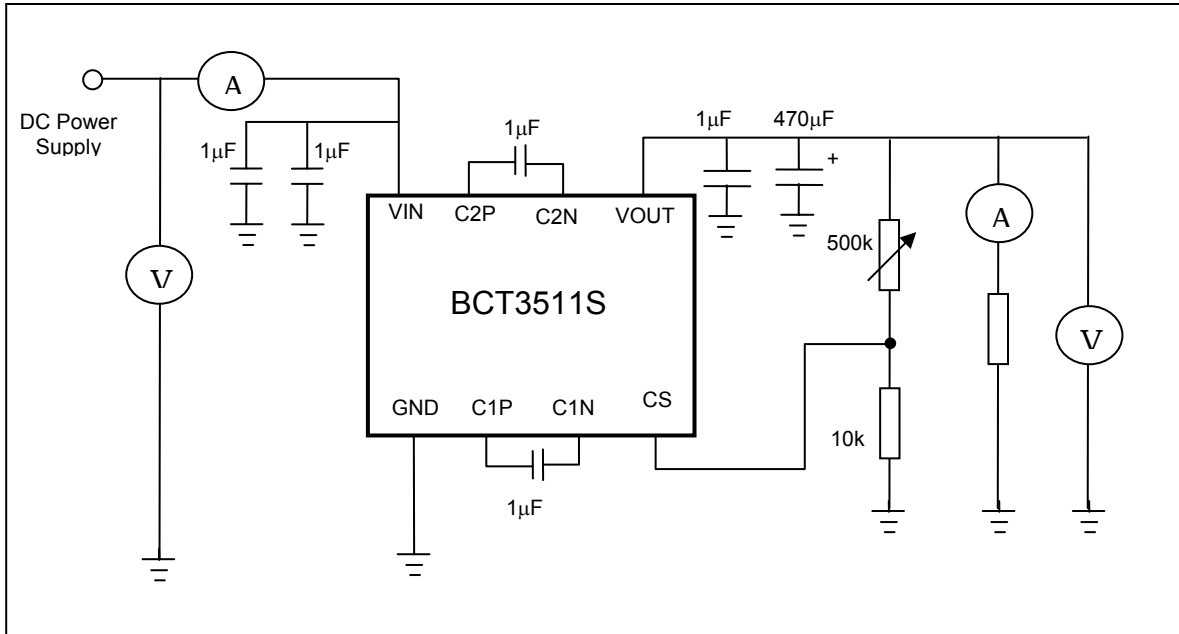
All electrical specifications are specified at $T_{AMBIENT}$ from $-20^{\circ}C$ to $70^{\circ}C$, V_{IN} from 1.8V to 3.6V, unless otherwise specified.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IN}	Input Power Supply		1.8	2.4	3.6	V
I_{CC}	Operating Current	$I_{OUT} = 0mA$ $V_{OUT} = 3.6Volts$		1.1		mA
I_{SHDN}	Shutdown Current	SHDNB= Low $V_{OUT} = 0V$		30		μA
V_{CS}	Feedback Voltage at CS			110		mV
F_{OSC}	Internal Oscillator Frequency			1.0		MHz
V_{IL}	Input Voltage Low for SHDNB		0		0.3	V
V_{IH}	Input Voltage High for SHDNB		$V_{IN}-0.3$		V_{IN}	V
T_j	Junction Temperature			110		$^{\circ}C$

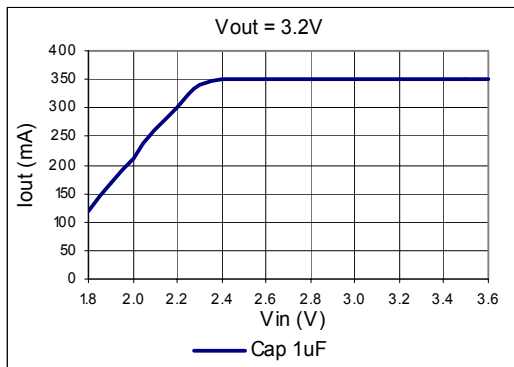


Typical Characteristics

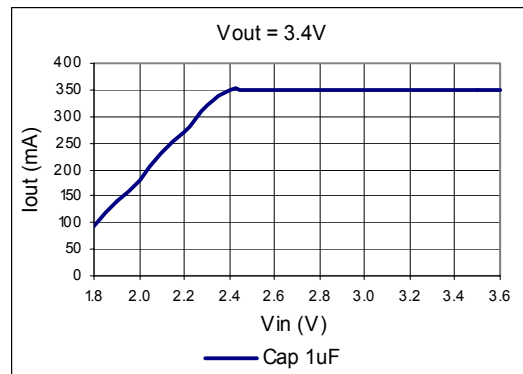
$C1 = C2 = 1\mu\text{F}$, $C(\text{VIN}) = 1\mu\text{F} \parallel 1\mu\text{F}$, $C(\text{VOUT}) = 1\mu\text{F} \parallel 470\mu\text{F}$
 $T_A = 25^\circ\text{C}$, unless otherwise noted



**Max Output Current vs. Supply Voltage
At Vout = 3.2V**

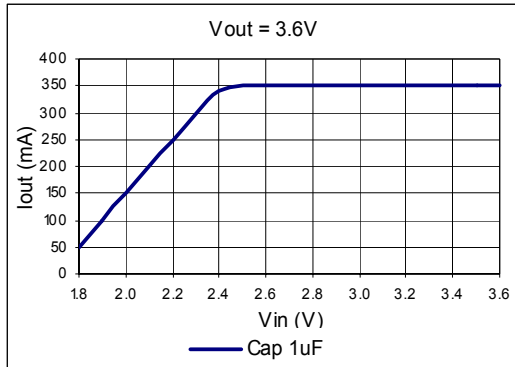


**Max Output Current vs. Supply Voltage
At Vout = 3.4V**

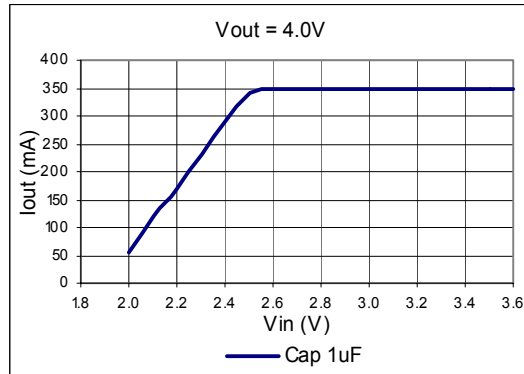


Typical Characteristics (continued)

**Max Output Current vs. Supply Voltage
At Vout = 3.6V**



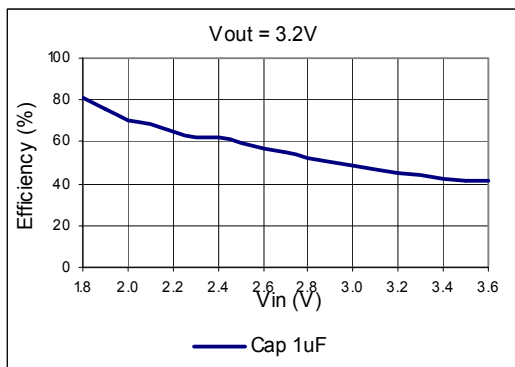
**Max Output Current vs. Supply Voltage
At Vout = 4.0V**



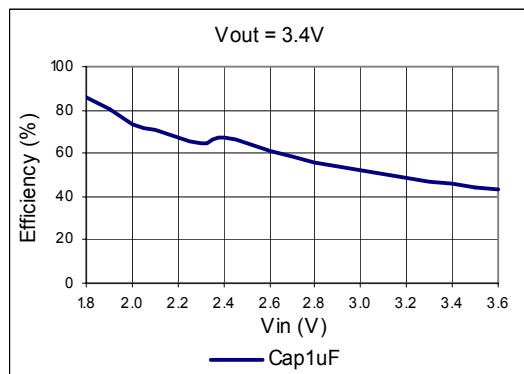
Performance Curves

T_A = 25 °C, unless otherwise noted

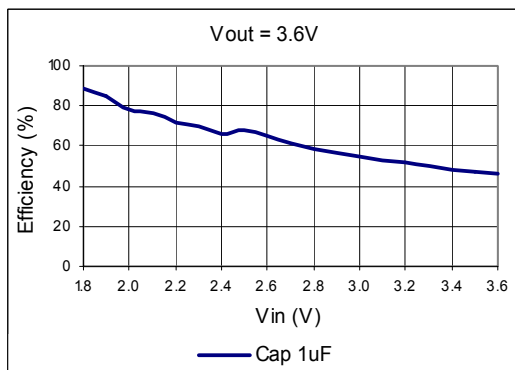
**Power Efficiency vs. Supply Voltage
At Vout = 3.2V**



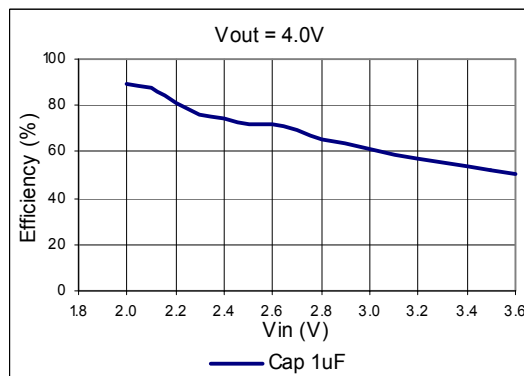
**Power Efficiency vs. Supply Voltage
At Vout = 3.4V**



**Power Efficiency vs. Supply Voltage
At Vout = 3.6V**



**Power Efficiency vs. Supply Voltage
At Vout = 4.0V**

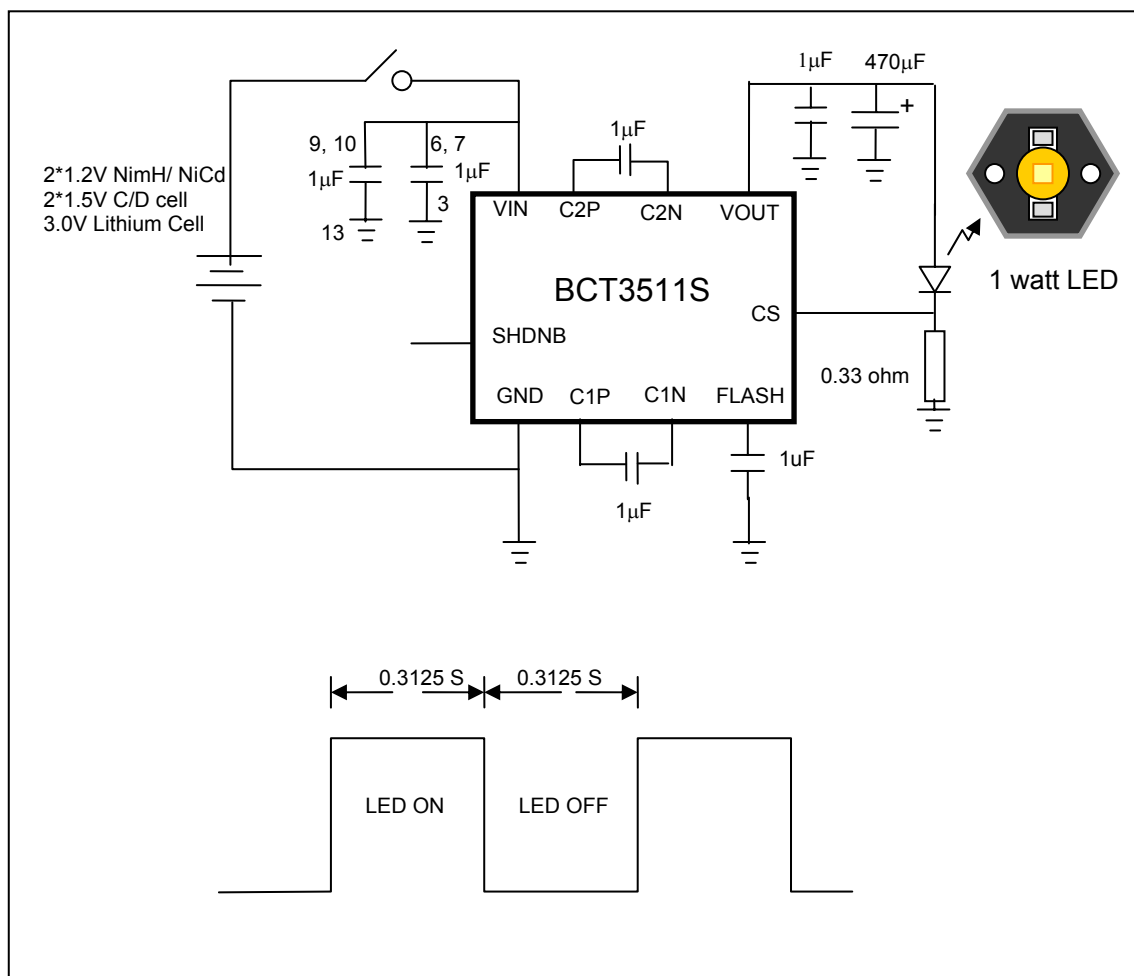


Applications

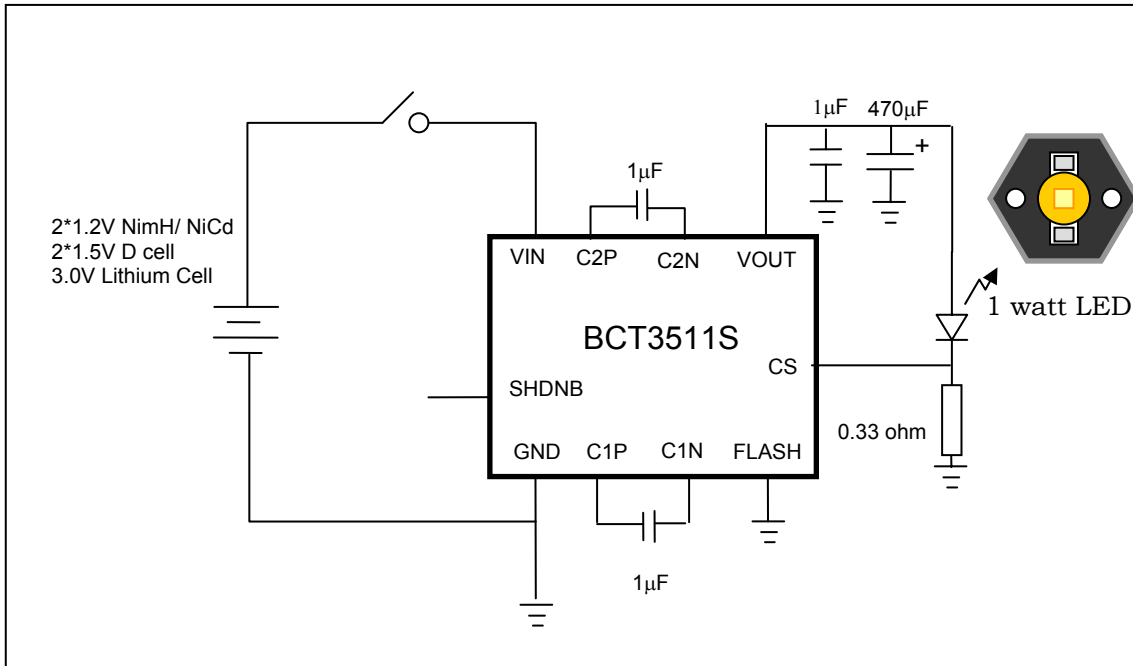
Care should be taken when batteries are connected to the chip. It will damage the chip when batteries are connected with reverse polarity.

1. One Watt White LED Torch with Digital Timer Flash

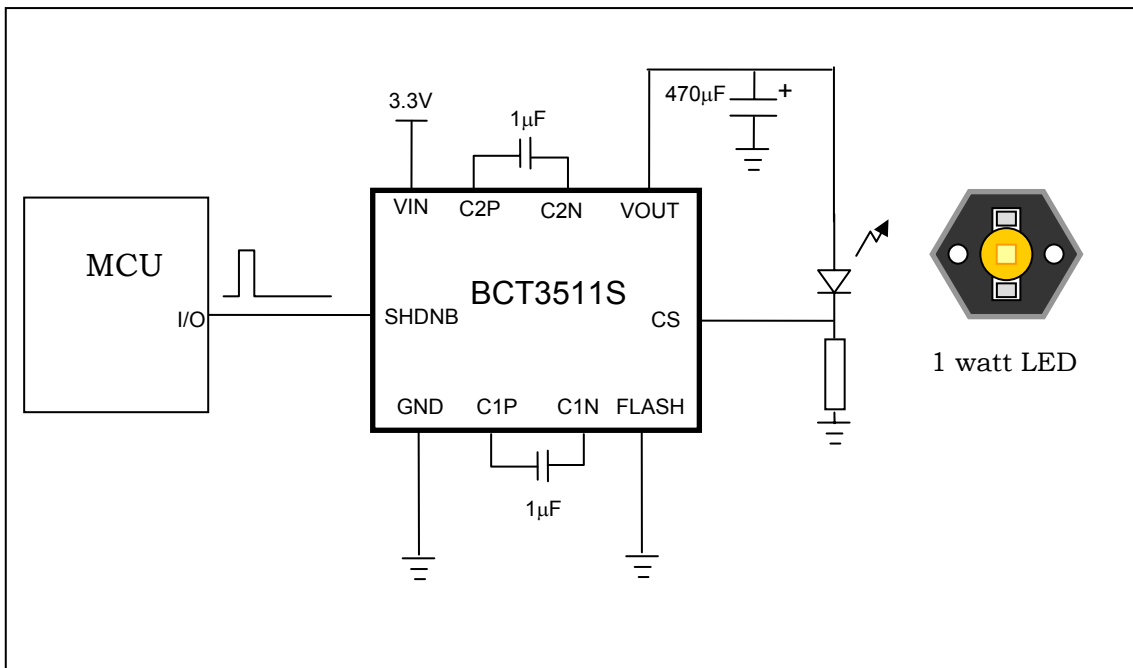
The flash mode is enabled by power switch ON, then OFF → ON within ~1 second. The switching frequency is fixed digitally at 1.6Hz with 50% duty cycle as shown in follow diagram:



2. White LED Torch without Flash

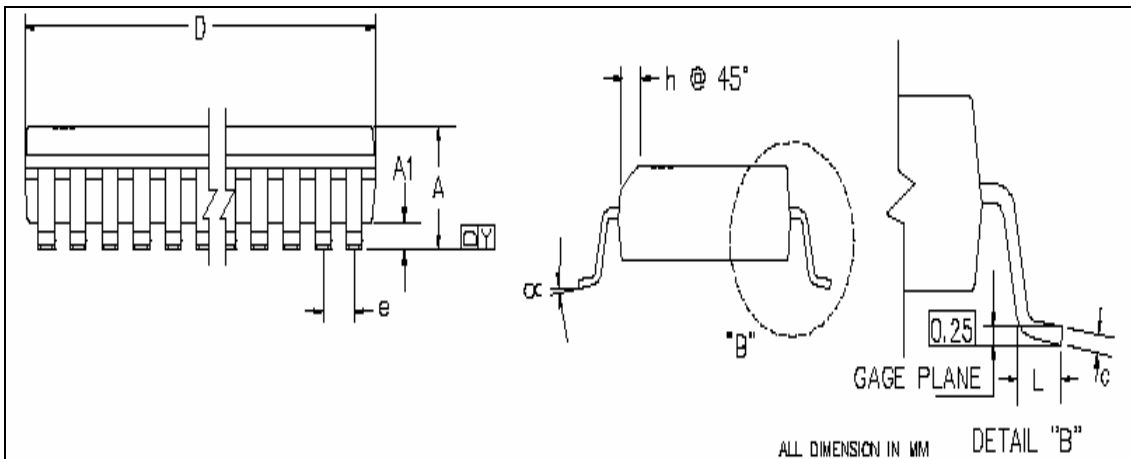
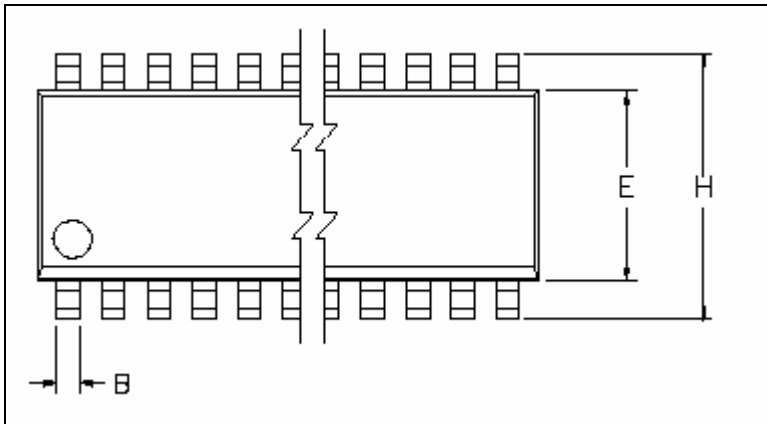


3. White LED Backlight Interface with MCU





Package Information

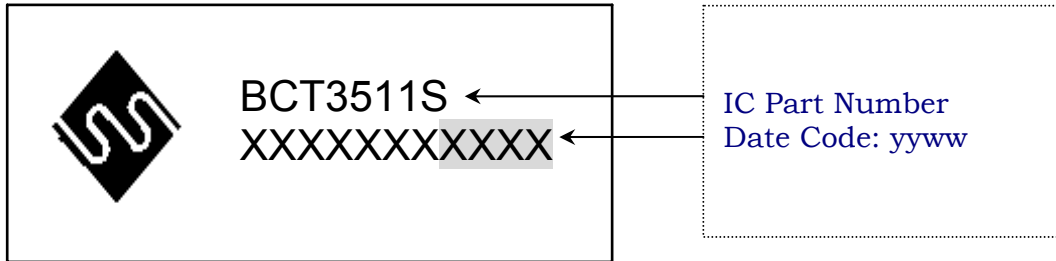


CONTROL DIMENSIONS ARE IN MM

SYMBOL	MILLIMETER			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.35	1.55	1.75	0.053	0.061	0.069
A1	0.10	0.15	0.25	0.004	0.006	0.010
B	0.33	0.42	0.51	0.013	0.016	0.020
C	0.19	0.22	0.25	0.007	0.008	0.010
D14	8.55	8.65	8.75	0.337	0.341	0.344
E	3.80	3.90	4.00	0.150	0.153	0.157
e	1.27 BSC			0.050 BSC		
H	5.80	6.00	6.20	0.228	0.236	0.244
h	0.25	0.40	0.50	0.010	0.016	0.020
L	0.40	0.70	1.27	0.016	0.028	0.050
α	0°	-	8°	0°	-	8°
Y	0	-	0.10	0	-	0.004



Marking Notation / Ordering Information



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