



SPECIFICATIONS

BCT3521Q

DC/DC Controller for High Current LED Camera Flash

A BlueChips ASSP

Version 1.0

1st Dec., 2004



All Rights Reserved.

Specifications are subject to changes without notification.

@ Copyright 2002 BlueChips Technology Pte Ltd, Silicon Solutions Division.

3 International Business Park, #03-18/19/20 Nordic European Centre, Singapore 609927. Tel: +65-6890-6938

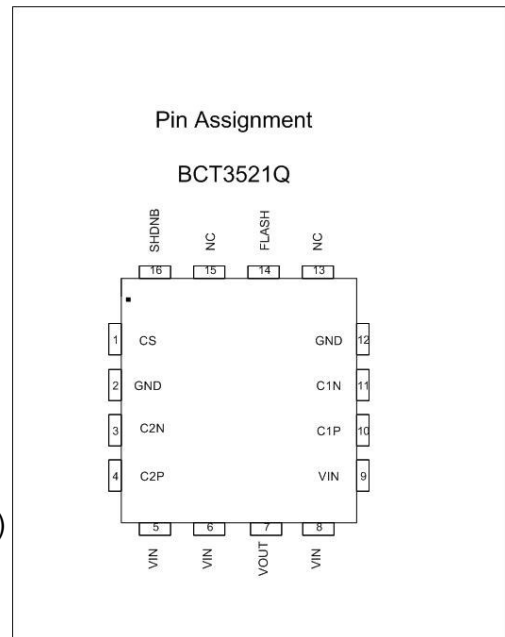
Fax: +65-6896-0928. Http://www.bluechipstech.com. Email: solutions@bluechipstech.com

General Description

The BCT3521Q is a constant frequency charge pump DC/DC converter designed for low-end digital camera flash. BCT3521Q has high current driving capability up to 350mA continuous DC current and 450mA pulsed current. The LED brightness which is proportional to the forward current can be easily set by the external resistor at the pin "CS" of BCT3521Q. Incorporated with external ceramic capacitors, BCT3521Q can slimly fit into the space limited design to replace conventional discharge lamps. In addition, 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 with current mode control
- Wide input voltage range: 1.8V to 3.6V
- Maximum continuous DC current: 350mA
- Maximum pulsed output current: 450mA (Duration < 200mS)
- Integrated thermal protection circuit
- Output current adjustable by external resistor at pin CS
- On Chip Oscillator
- Low power consumption
- Wide operation temperature: -20°C to 70°C
- Available in QFN16L package (3mm x 3mm)



Applications

- Camera flash in mobile phone, PDAs
- Camera flash in low end digital camera
- Emergency light, Flash Light

Block Diagram

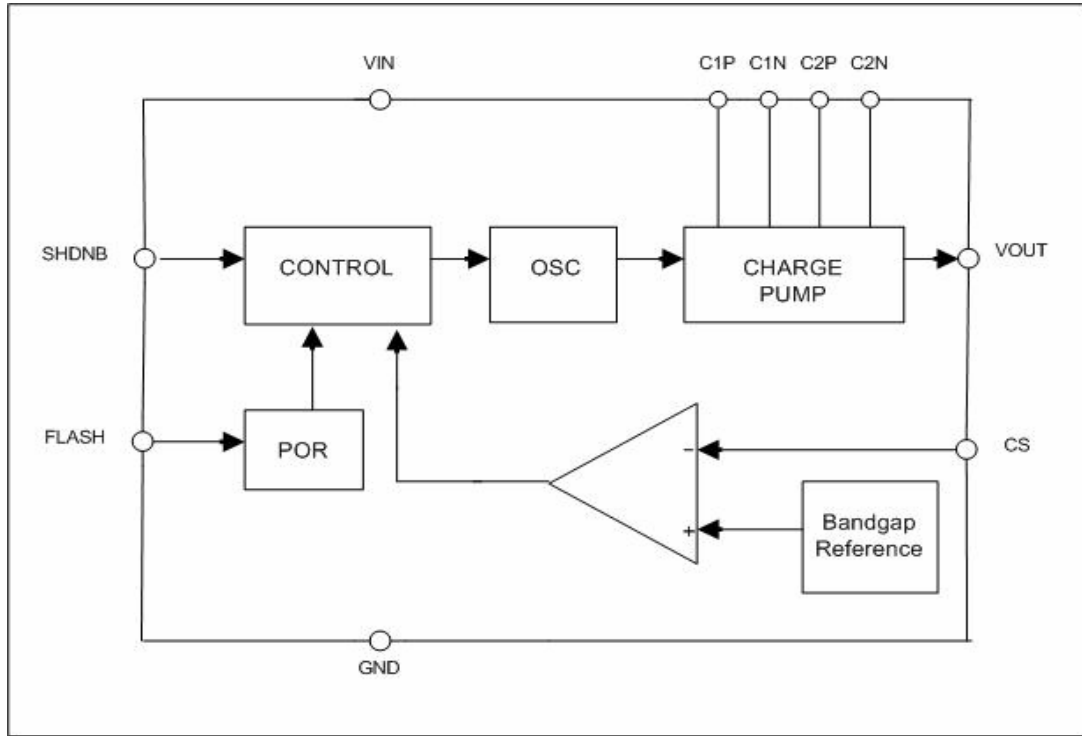


Figure 1: Block Diagram of BCT3521Q

Typical Application Circuit

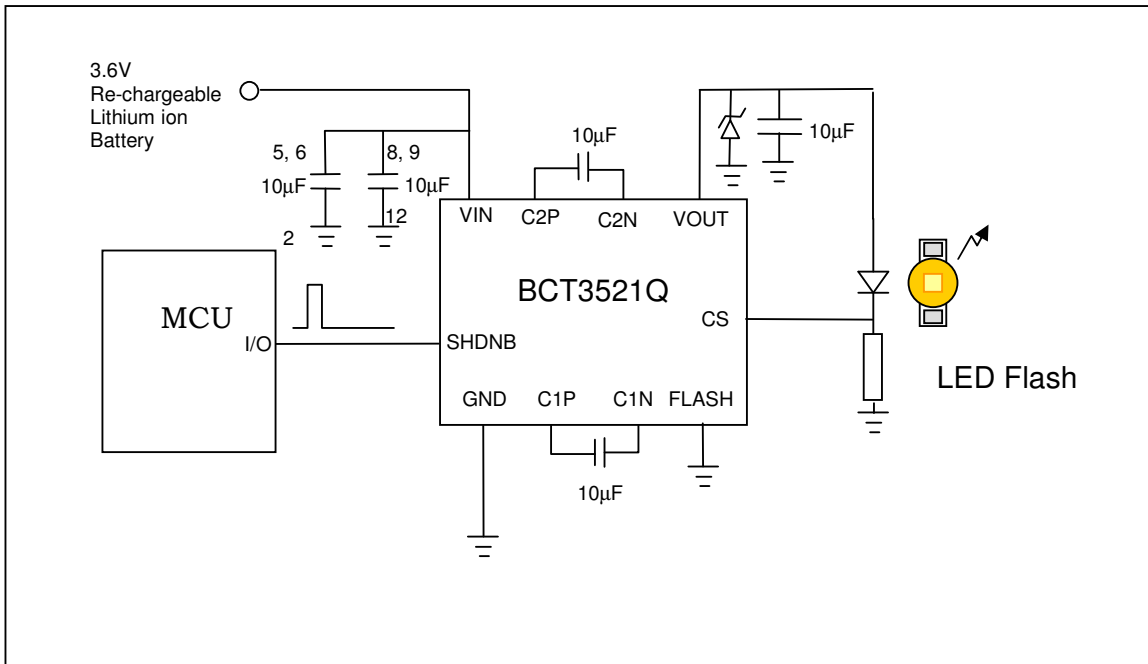


Figure 2: Typical Application Diagram of BCT3521Q

Pin Description

Pin Name	Description	I/O
VIN	Input Supply 1.8 – 3.6V	Power
GND	Ground 0V	Power
SHDNB	Chip reset or shutdown (Active Low)	Input
FLASH	Capacitor pin for Flash Mode with internally fixed frequency and duty cycle. Connect to VIN :1.6Hz , 50% duty cycle Connect to GND: Disable Flash Mode:	I/O
C1P, C1N	Charge Pump Flying Capacitor 1 Pins. To connect a 1 μ F ~ 10 μ F capacitor between C1P and C1N	I/O
C2P, C2N	Charge Pump Flying Capacitor 2 Pins. To connect a 1 μ F ~ 10 μ F capacitor between C2P and C2N	I/O
VOUT	Charge Pump Output. To connect a 10 μ F capacitor from VOUT to GND	Output
CS	Current sense feedback for Regulation Control Loop, feedback voltage = 0.11V	Input

Absolute Maximum Specifications

Rating	Symbol	Value	Unit
Supply voltage range	V_{IN}	-0.3 to 4.5	Volts
Input voltage range	SHDNB	-0.3 to $V_{IN}+0.3$	Volts
Output current Range	I_{OUTDC}	0 to 350	mA
Maximum output Pulsed current	$I_{OUTPeak}$ (duration<200mS)	450	mA
Output voltage range	V_{OUT}	-0.3 to $V_{IN} +0.3$	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	$V_{OUT}=0V$		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		$^{\circ}C$

Applications

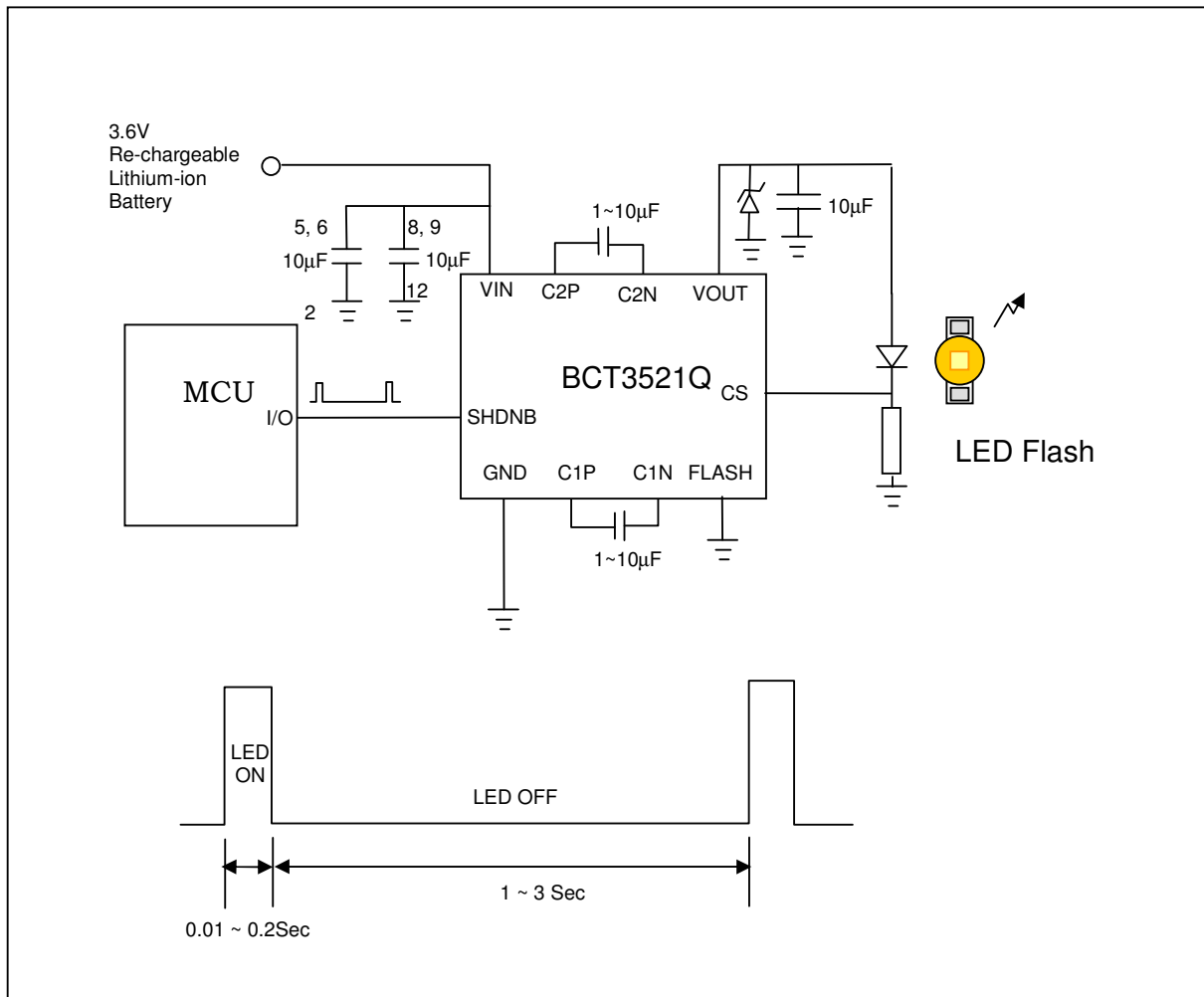
Care should be taken when batteries are connected to the chip. It will damage the chip when batteries are connected with reverse polarity.

External protection device should add at pin VOUT to avoid over-voltage situation when VIN go above 3.6V.

A huge current will drawn by BCT3521 when the chip is enable and pulse the LED, sufficient power decoupling capacitor should place closed to the MCU to maintain her operation voltage.

1. LED Camera Flash Light

The duration of flash LED ON and OFF time is controlled by MCU at pin SHDNB. A continuous light output for taking movie can be simulated by repeated pulse at frequency of < 2KHz.



2. LED Flash Light with two current setting

Sometime, two levels of current settings are generally required for digital camera to take either still picture or movie. Two levels of the LED forward currents can be selected by using the following circuit; the low value of the DC current can be selected by turn on M1 and turn off M2. The high value of pulsed current can be selected by turn on M2 and turn off M1.

