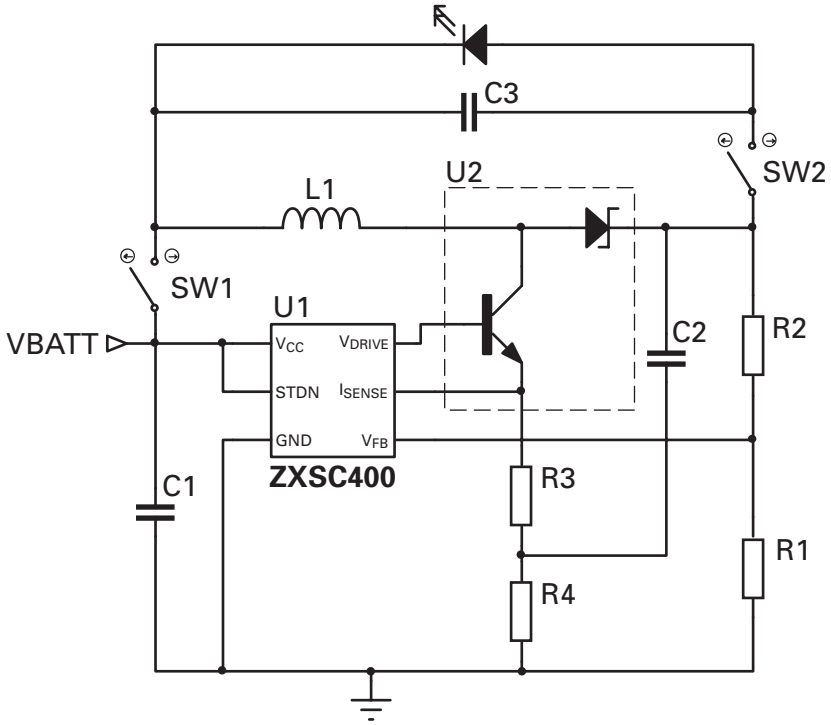
DN74
ZXSC400 Photoflash LED reference design

Description

This design note shows the ZXSC400 driving a Photoflash LED. The input voltage is 3V with a maximum pulsed output current of 1A for 2ms.

A typical schematic diagram is shown in Figure 1.



Charging mode: SW1 closed, SW2 open
Discharging mode: SW1 open, SW2 closed

Figure 1 Schematic diagram

Operation

In charging mode, SW1 is closed and SW2 is open the ZXSC400 is configured as a typical boost converter, charging capacitor C2 up the regulated output voltage set by the ratio of R1 and R2. This is typically 16V. The peak current of the converter (current drawn from the battery) is controlled by R3 plus R4, and is typically 280mA for this application. When C2 is charged to 16V the SW1 is opened and SW2 is closed, converting the ZXSC400 to a step down converter to provide a 1A constant current for 2ms to the photoflash LED. During step down operation, current flows from C2, through the photoflash LED, L1, U2 and is returned to C2 through R3. This means that the peak current is set at a higher value than in charging mode, typically 1A. When the current reaches it's peak value, U2 is switched off and current flows from L1 through the Schottky diode in U2, to the photoflash LED. This cyclic process is repeated until C2 is discharged.

Ref	Value	Part number	Manufacturer	Comments
U1		ZXSC400E6	Zetex	LED Driver in SOT23-6
U2		ZX3CDBS1M832	Zetex	Dual NPN and Schottky
L1	12μH	Generic	Generic	I_{SAT}=1A
R1	10kΩ	Generic	Generic	0805 size
R2	510kΩ	Generic	Generic	0805 size
R3	22mΩ	Generic	Generic	0805 size
R4	100mΩ	Generic	Generic	0805 size
C1	1μF	Generic	Generic	
C2	150μF	Generic	Generic	
C3	1μF	Generic	Generic	

Table 1 Bill of materials

Typical operating waveforms

(For typical application circuit where V_{BATT} = 3V and T_{amb} = 25°C unless otherwise stated)

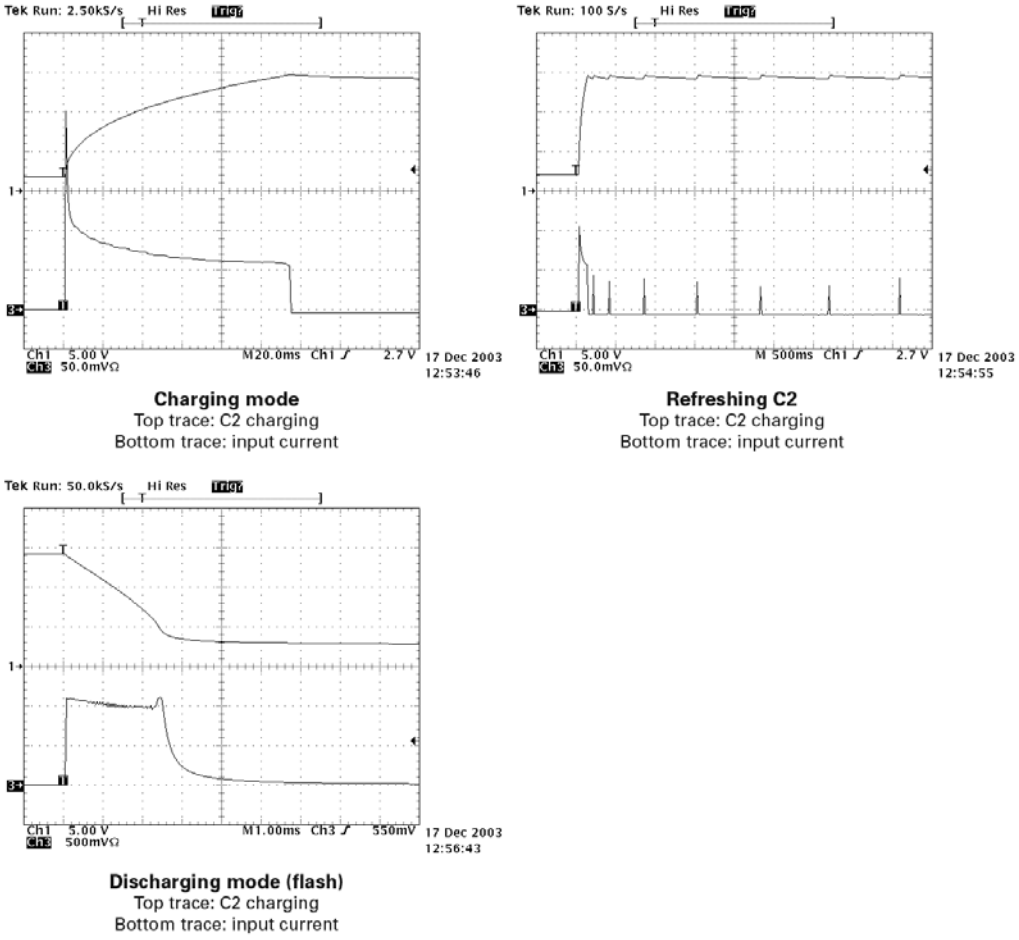


Figure 2 Performance graphs

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