

LTC3218
400mA Single Wire Camera
LED Charge Pump

DESCRIPTION

WARNING!

Do not look directly at operating LED.

This circuit produces light that can damage eyes.

Demonstration circuit 1030 is a 400mA Single Wire Camera LED Charge Pump featuring the LTC3218. This circuit will provide 50mA of continuous torch current or a flash current at 300mA or 400mA. The LTC3218 has a built-in 2-second flash timer to protect the LED in case of faults during flash mode.

The LTC3218 is a low-noise, high current charge pump capable of flashing a Camera LED up to 400mA. The LTC3218 design requires only three capacitors and one program resistor to provide a complete Camera Driver circuit with one torch and two flash current settings. A second programming resistor may be used to provide a wider range of LED torch and flash current settings. Pressing the ENT push button, SW1, enables torch

mode. Pressing the ENF push button, SW2, enables flash mode. Pressing both ENT and ENF push buttons enables the high intensity flash mode. Pulse generator(s) may be connected to the ENF and/or ENT terminals to better control the pulse timing for evaluation of flash and current performance.

Built-in soft-start circuit prevents excessive inrush currents during start up. The LED output current is regulated using an internal high side resistor allowing the LED cathode to be connected directly to ground. The Charge Pump Output (CPO) voltage is monitored and automatically switches to 2X mode only when a dropout has been detected to optimize efficiency. Refer to the LTC3218 datasheet for more information on this device.

Design files for this circuit board are available. Call the LTC factory.

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PERFORMANCE SUMMARY Specifications are at $T_A = 25^\circ\text{C}$

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN} Input Supply Range		2.9		4.5	V
I_{VIN} Shutdown Current	ENF = ENT = LOW, $V_{CPO} = 0V$		1.1	3	μA
I_{VIN} Operating Current	$I_{CPO} = 0mA$, 1X Mode		980		μA
	$I_{CPO} = 0mA$, 2X Mode		6.7		mA
I_{LED} Torch Current	ENT = HIGH, ENF = LOW		45		mA
I_{LED} Flash Current	ENT = LOW, ENF = HIGH		290		mA
I_{LED} High Flash Current	ENT = HIGH, ENF = HIGH		390		mA
I_{LED} Dropout Voltage (V_{ILED})	Mode Switching Threshold, $V_{CPO} - V_{ILED}$, $I_{LED} = 100mA$		7		mV
Minimum LED Forward Voltage	$I_{LED} = 50mA$	2.2			V
Charge Pump Output Clamp Voltage			5.3		V

QUICK START PROCEDURE

Demonstration circuit 1030 is easy to set up to evaluate the performance of the LTC3218. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

NOTE. When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the V_{IN} or V_{OUT} and GND terminals. See Figure 2 for proper scope probe technique.

1. With power off, connect a variable +5V, 1A input power supply in series with an ammeter to V_{IN} and GND. For best stability and noise performance, use the shortest leads possible between the board and the supply. Capacitor C4 has been placed on the board to assist in offsetting the effects of long power supply leads.
2. Turn on the power at the input and set the supply to 4.5V.

NOTE. Make sure that the input voltage does not exceed 6V.

3. Press and hold the ENT push button, SW1, and observe that the LED illuminates.
4. Press and hold the ENF push button, SW2, and observe the LED illuminates brightly for two seconds. The two-second timer turns off the LED.
5. Press and hold both the ENT and ENF push buttons simultaneously. Observe that the LED illuminates even brighter for two seconds. The two-second timer again turns off the LED.
6. Try steps 3 through 5 with V_{IN} Voltages of 3.6V and 3.0V. Observe when the device drops out, the charge pump automatically switches to 2X mode and the input current doubles.

NOTE. The ENT and ENF push buttons do not have any de-bounce circuitry and may cause the part to switch to 2X mode. For better control of the ENT and ENF pins, connect a pulse generator to the ENT and ENF terminals. Make sure these terminals do not exceed $V_{IN} + 0.3V$.

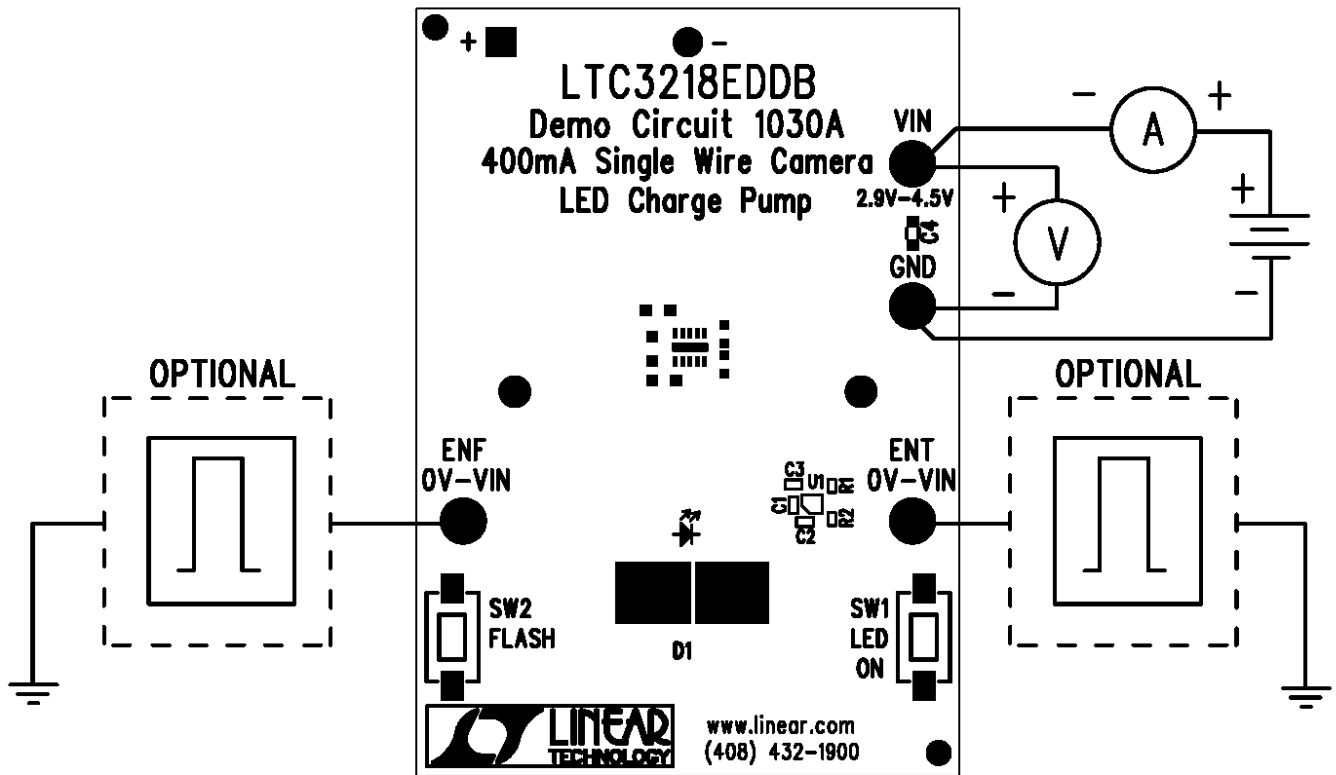


Figure 1. Proper Measurement Equipment Setup

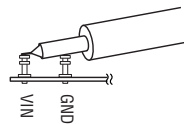
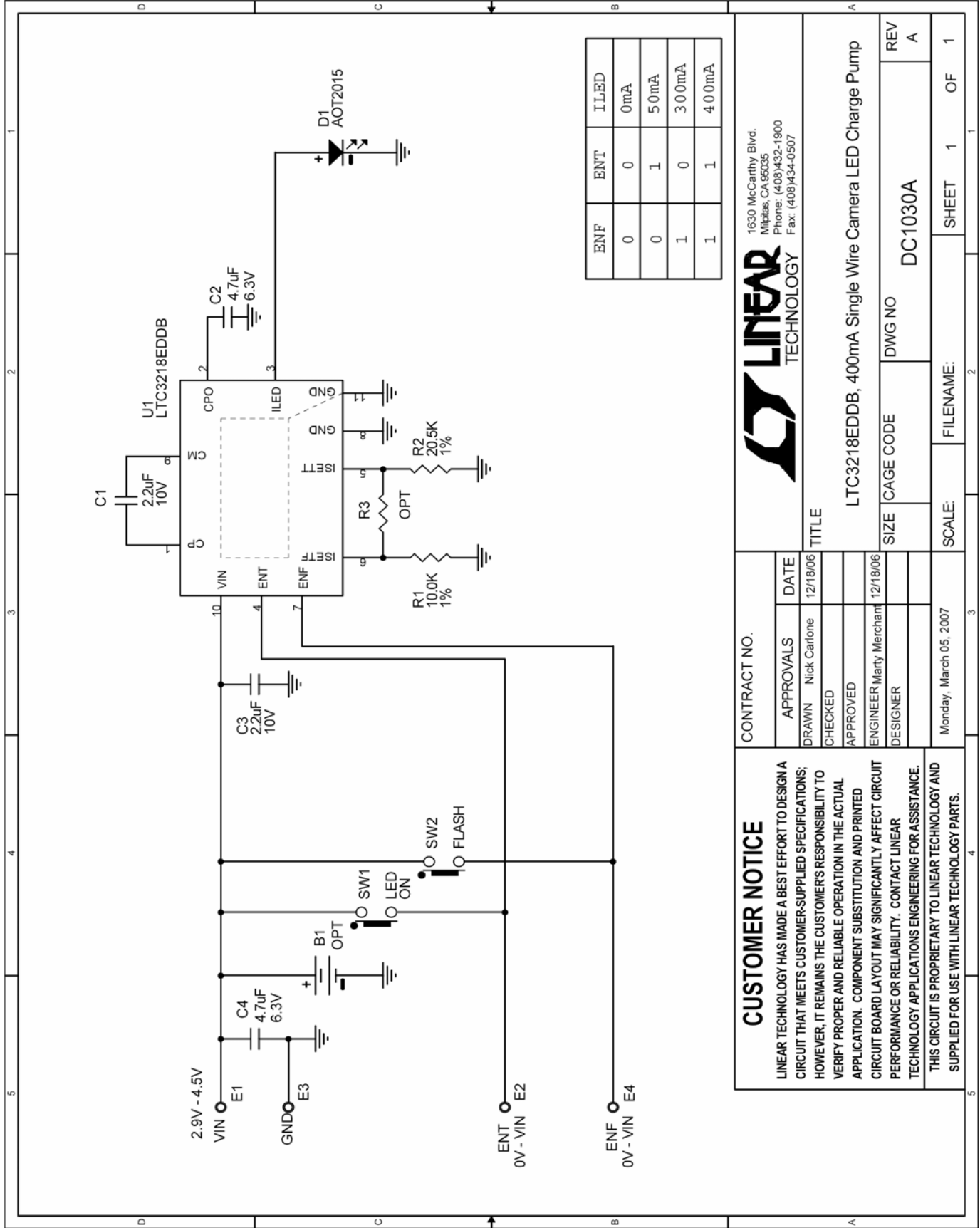


Figure 2. Measuring Input or Output Ripple



CONTRACT NO.

APPROVALS	DATE
DRAWN Nick Carlone	12/18/06
CHECKED	
APPROVED	
ENGINEER Marty Merchant	12/18/06
DESIGNER	

Monday, March 05, 2007

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TITLE
LTC3218EDDB, 400mA Single Wire Camera LED Charge Pump

SIZE CAGE CODE DWG NO DC1030A REV A

SCALE: FILENAME: SHEET 1 OF 1

CUSTOMER NOTICE

LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.

THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.

Item	Qty	Ref - Des	Desc	Manufacturer's Part Number
REQUIRED CIRCUIT COMPONENTS:				
1	2	C1, C3	CAP, X5R, 2.2uF, 10V 10% 0603	MURATA, GRM188R61A225KE34D
2	1	C2	CAP, X5R, 4.7uF, 6.3V 20% 0603	TDK, C1608X5R0J475M
3	1	D1	LED, SMT WHITE	AOT, AOT-2015HPW-1751B
4	1	R1	RES, 10.0K OHMS 1% 1/16W 0402	VISHAY, CRCW04021002F
5	1	R2	RES, 20.5K OHMS 1% 1/16W 0402	VISHAY, CRCW04022052F
6	1	U1	IC, 400mA CAMERA LED CHARGE PUMP	LINEAR TECH., LTC3218EDDB
ADDITIONAL DEMO BOARD CIRCUIT COMPONENTS:				
1	1	C4	CAP, X5R 4.7uF 6.3V 20% 0603	TDK, C1608X5R0J475M
2	2	SW1, SW2	SWITCH, PUSH BUTTON	PANASONIC, EVQPPFA25
HARDWARE FOR DEMO BOARD ONLY:				
1	4	E1-E4	TURRET, TESTPOINT	MILL-MAX, 2308-02
2	0	B1 (OPTIONAL)	3-AAA Battery Holder	KEYSTONE, 2479