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AND9013

CAT3661 LED Driver Evaluation Board

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APPLICATION NOTE

Introduction

This document describes the CAT3661 Evaluation board for the ON Semiconductor CAT3661 1−Channel Low−Power Quad−Mode LED Driver. The functionality and major parameters of the CAT3661 can be evaluated with the CAT3661EVAL board.

The CAT3661 is a high efficiency low power quad−mode fractional charge pump that drives one LED up to 5 mA of current.

Additional details can be found in the CAT3661 data sheet.

Board Hardware

The evaluation board consists of one CAT3661 device that drives a white LED.

The VIN test point is connected to the VIN supply of the CAT3661. The voltage range is 2.0 V to 5.5 V.

The device starts when a voltage between 1.3 V and the VIN supply is applied to the EN (enable pin). The EN pin of the device is connected to the EN test point.

The CAT3661 can detect events as Open/Short LED and Low Battery. The circuit has two "open−drain" outputs associated with these events. Each is connected to the "LED Fault" or "LOW BAT." test points. The 'Open/Short LED' and 'Low Battery' fault signals have been enabled with pull−up resistors on the board. The 'Low Battery' voltage trip point has been set to a default value of 2.4 V.
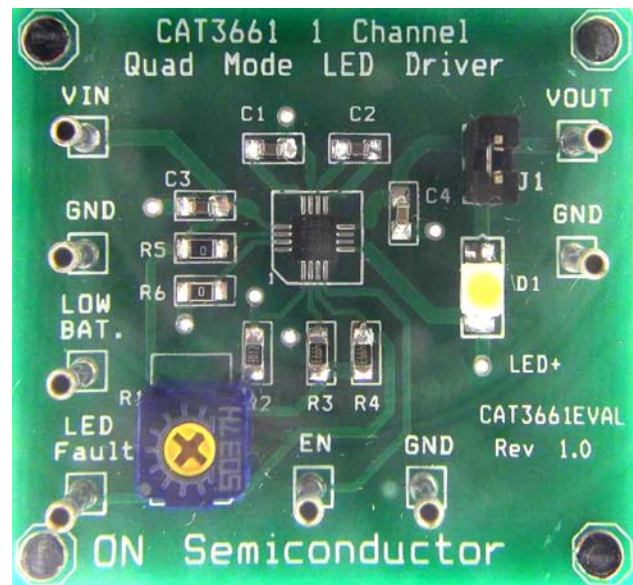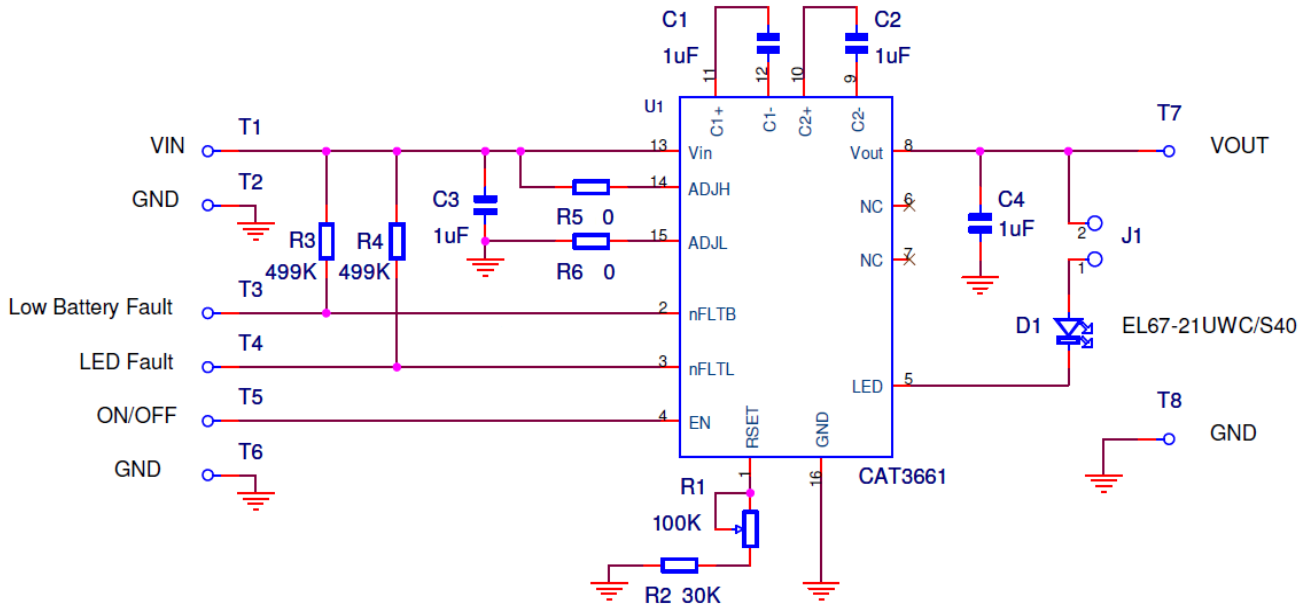

Figure 1. CAT3661EVAL Board

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Figure 2. CAT3661EVAL Board Schematic

Table 1. CAT3661EVAL BOARD LIST OF COMPONENTS

Name	Manufacturer	Description	Part Number	Units
U1	ON Semiconductor	1−Channel Low−Power Quad Mode LED Driver, TQFN−16	CAT3661TD−HV3−GT3	1
C1 − C4	AVX	Ceramic Capacitor 1.0 μF / 10 V, 10%, X5R, 0603	0603ZD105KAT2A	4
R1	Vishay	Trim Pot. 100 kΩ, 10%	T63YB−100K−10%−D06	1
R2	Vishay	SMD Resistor 1/10W, 30 KΩ, 0603 1%	CRCW0603 100 30K 1% e3	1
R3, R4	Yageo	SMD Resistor 1/8W, 499 kΩ, 0805 1%	RC0805FR−07499KL	2
R5, R6	Yageo	SMD Resistor 1/8W, 0 Ω, 0805 1%	RC0805JR−070RL	2
D1	Everlight	White LED, 290mcd,120grd, PLCC	EL67−21UWC/S40	1
T1−T8	MPE Garry	Test points	BL1 x 36PF	8
J1	MPE Garry	2 pin Header connector	ASL040G	1

Operating Procedure

The CAT3661EVAL board can only be configured in stand−alone mode.

Stand−alone

In this configuration, the CAT3661EVAL board is powered from an external supply between the VIN and GND pins.

The enable/shutdown input, EN is set by an external voltage and should be connected between the EN and GND test points.

Quick Test Procedure

1. Required Equipment

- CAT3661EVAL board
- +3V$_{DC}$ power supply
- Ammeter
- Multimeter or voltmeter and ohmmeter

2. Set−up

- Verify that all power supplies are off.
- On the CAT3661EVAL board, verify that a shunt is installed on jumper J1.
- Connect a +3V$_{DC}$ supply between the VIN and GND pins.
- Connect the VIN and EN pins together with a wire.
- Measure the RSET resistance between RSET and the GND test points. Adjust the RSET resistance to 60.7 kΩ.
- Turn on the +3V$_{DC}$ power supply.

3. Operation Verification

- The CAT3661 is operating normally and the output voltage shoud be about 4.4 V.
- Disconnect EN from the VIN. Connect EN to the GND test point to disable the device.
- Remove jumper J1 and install an ammeter between the pin 1 and pin 2 of the jumper to measure the LED current.
- Connect the EN pin to the VIN test point to enable the device.
- Measure the LED current using the ammeter. The LED current should be about 3.0 mA.
- Adjust the potentiometer to increase or decrease the LED current.
- Connect EN test point to GND. The device enters shutdown mode and the output is disabled.
- Turn off the +3V$_{DC}$ power supply.

4. Start / Stop the Demonstration

The user can disable the ouputs by pulling the EN pin to GND. To enable the device, connect the EN pin to +1.3V$_{DC}$ or greater.

At any time the user can stop the demonstration, by pulling the EN pin to GND or by turning off the +3V$_{DC}$ supply.