ON Semiconductor

CAT4201 LED Driver Evaluation Board Manual

INTRODUCTION

This document describes the CAT4201EVAL2 evaluation board for the CAT4201 high efficiency step-down LED driver. Boards equipped with a 9V battery and separate LED module can be used for demonstrations (see Figure 1).

The CAT4201 is a high efficiency step-down LED driver from Catalyst Semiconductor. This device is designed to drive high brightness LEDs up to 350mA from a power supply up to 28V. The LED brightness is controlled by a single resistor from the RSET pin to GND. Analog dimming and idle mode control are available through the CTRL input. An external circuit is provided on the CAT4201EVAL2 for PWM dimming.

OPERATION PROCEDURE

The CAT4201EVAL2 board has two modes of operation. The first is normal operation and the second is operation with PWM dimming. Normal operation is set by placing jumper J1 in the right side position with pins 2 and 3 tied together. In this mode, the CTRL pin is pulled up to the LED cathode (LED-). The LED(s) will be at full brightness as long as the CTRL pin is greater than 3V. LED current can be set from 70mA to 350mA by adjusting potentiometer R2.

To set the board for PWM dimming, jumper J1 should be placed in the left side position with pins 1 and 2 tied together. A PWM signal can be applied to the PWM pin to dim the LED brightness. The amplitude of the PWM signal should be greater than 1V.

DEVICE DEMONSTRATION

To set up the CAT4201EVAL2 for demonstrations, the board should be configured for normal operation with a 9V battery securely placed in the holder. A separate LED module should also be plugged into the 6-pin connector, as shown in Figure 1. To turn on the LED, press and hold the *POWER* button. The LED will turn off once the button is released.

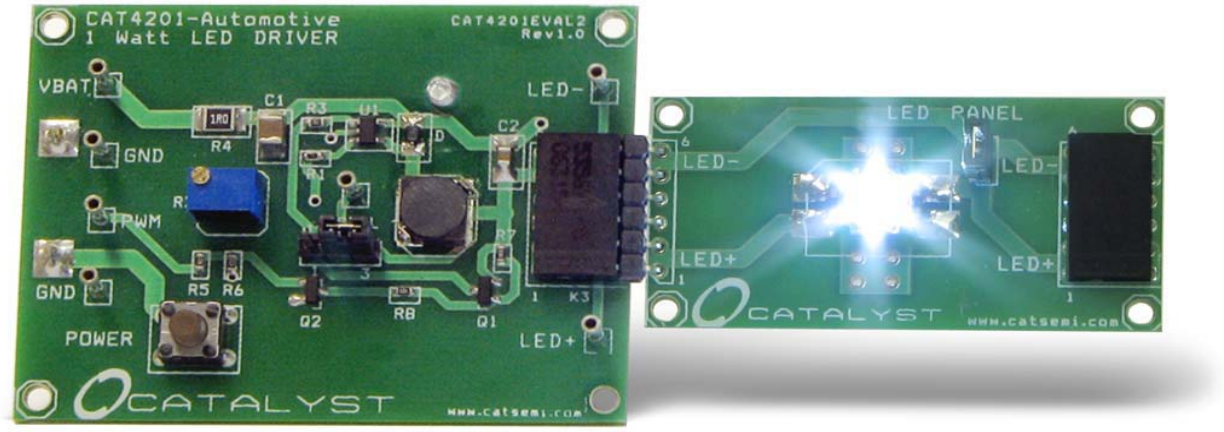


Figure 1. CAT4201AGEVB with LED Module

CAT4201EVAL2

SCHEMATIC

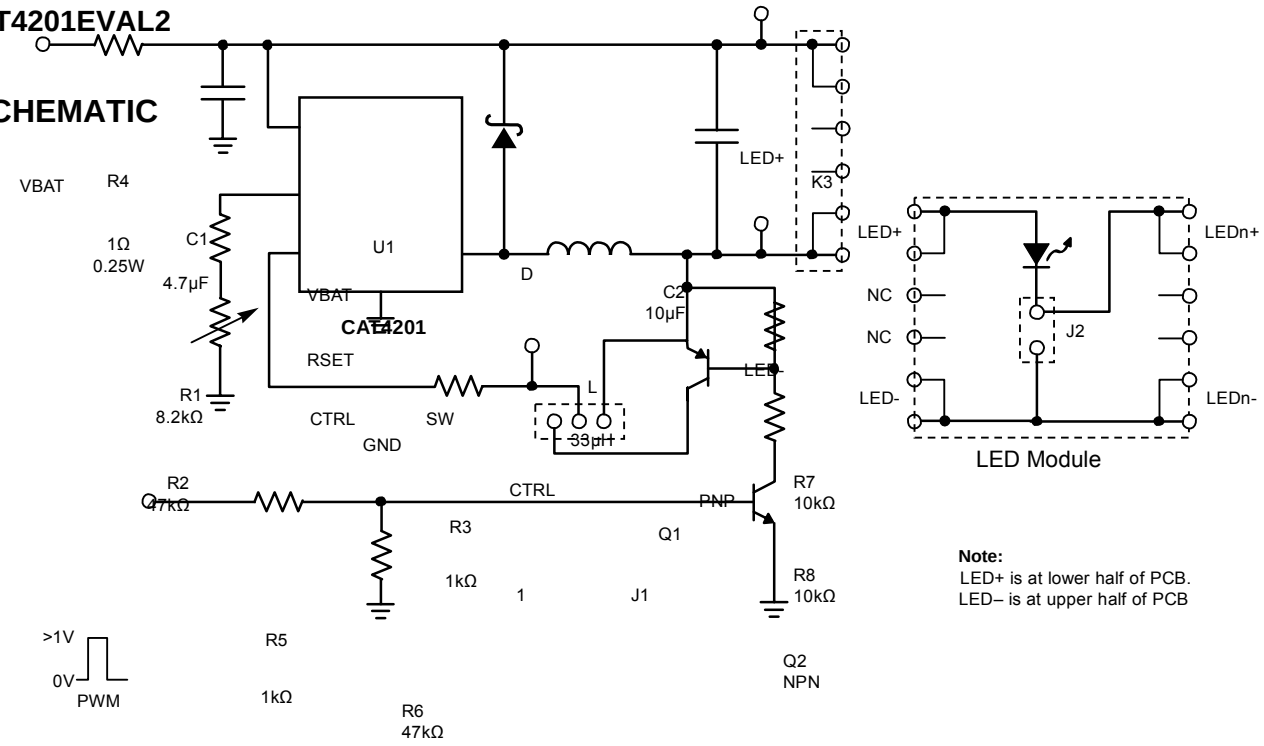


Figure 2. CAT4201AGEVB Schematic

BILL OF MATERIALS

Name	Manufacturer	Description	Part Number	Units
U1	On Semi	High Efficiency Step-Down LED Driver, SOT-23-5	CAT4201	1
Q1	On Semi	PNP Bipolar Transistor -45V / -500mA, SOT-23	BC807-25LT1G	1
Q2	On Semi	NPN Bipolar Transistor 45V / 100mA, SOT-23	BC847CLT1G	1
D	Central Semi	Schottky Diode 40V / 500mA, Size SOD-323	CMDSH05-4	1
C1	Murata	Ceramic Capacitor 4.7µF/ 50V, X7R, Size 1210	GRM32ER71H475KA88L	1
C2	Taiyo Yuden	Ceramic Capacitor 10µF / 35V, X5R, Size 1210	GMK325BJ106KN-T	1
L	Sumida	Inductor 33µH, low DCR, 0.97A	CDRH6D28-330	1
R1	Yageo	SMT Resistor 1/10W, 8.2kΩ, 0603	9C06031A8201FKHFT	1
R2	Vishay	Trim Pot. 47kΩ	T63YB473K	1
R3,R5	Yageo	SMT Resistor 1/10W, 1kΩ, 0603	9T06031A1001FBHFT	2
R4	Panasonic	SMT Resistor 1Ω / 500mW Size 1210	ERJ-P14J1R0U	1
R6	Yageo	SMT Resistor 1/10W, 47kΩ, 0603	9T06031A4702FBHFT	1
R7, R8	Yageo	SMT Resistor 1/10W, 10kΩ, 0603	9T06031A1002FBHFT	2
J1	Tyco	3 Pin Header Connector 0.1" Pitch	640452-3	1
J2	Tyco	2 Pin Header Connector 0.1" Pitch	640452-2	1
K3	Tyco	6 Pin Header Receptacle 0.1" Pitch	535676-5	1
	HDK	SPST Pushbutton Switch (not shown in schematic)	KSM0631A	1
	Keystone	9V Battery Holder (optional)	1294	1

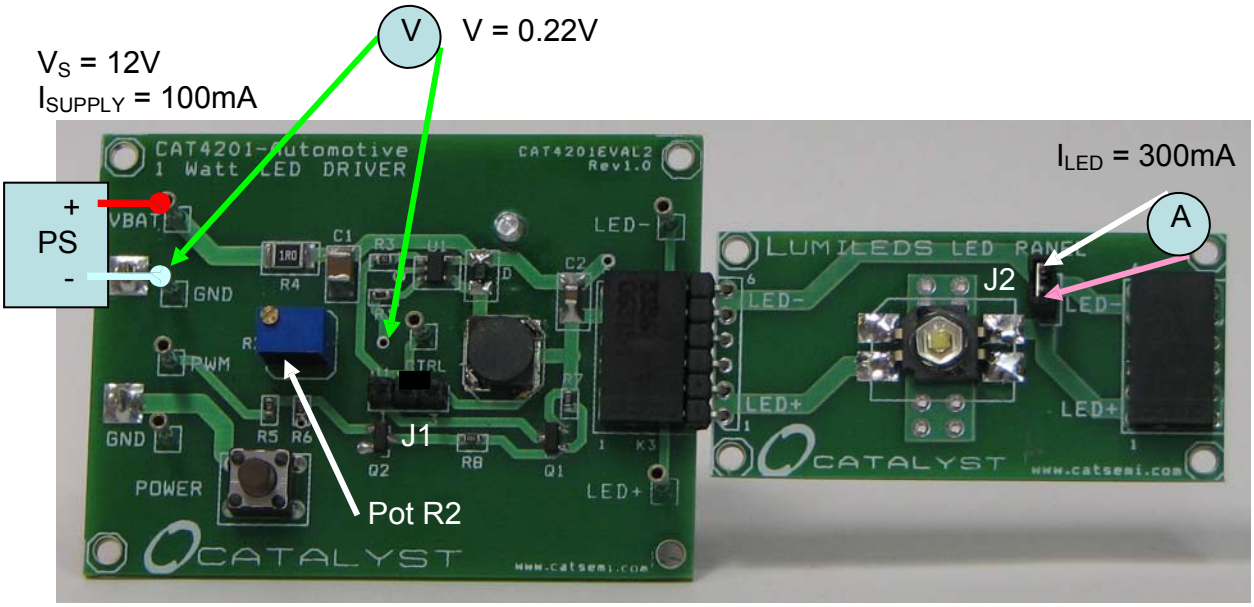
Test Procedure for the CAT4201AGEVB Evaluation Board

Introduction

This document describes the test procedure for the CAT4201 evaluation board. The test procedure must be followed step-by step in order to verify that the evaluation board is fully functional.

Test set-up

The CAT4201 evaluation board must have the jumper J1 installed between pins 2 and 3 (right position).
The test set-up uses the LED module plugged into the CAT4201 evaluation board.
The LED current is measured by removing the LED module jumper J2 and connecting an ammeter (A) between those two pins, see figure below.



Legend:

- ƒ (PS) = 12V DC power supply, connected between GND and VBAT
- ƒ (A) = Ammeter, connected to LED module across J2 connector (jumper removed)
- ƒ (V) = Voltmeter, connected between R1/R2 midpoint and GND

Note: The LED of the LED module is very bright and should be covered for eye protection.

Test Procedure

The test procedure is achieved by following the sequence below step-by-step.

1. Connect the voltmeter (V) between R1/R2 midpoint and GND.
2. Connect the power supply (PS) between VBAT (+) and GND (-).
3. Turn the power supply on.
4. Measure the voltage on voltmeter (V).
5. Turn the potentiometer R2 and adjust until voltage is **0.22V**.
6. Measure the LED current (A).
7. The LED current must be between: **270mA** $\leq$ $\mathbf{I_{LED}}$ $\leq$ **330mA**.
8. Measure the supply current on the power supply.
9. The supply current must be between: **90mA** $\leq$ $\mathbf{I_{SUPPLY}}$ $\leq$ **115mA**.
10. Turn off the power supply (PS).
11. Disconnect the CAT4201 evaluation board.