CAT4201AGEVB

CAT4201 LED Driver Evaluation Board User's Manual

ON Semiconductor®

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EVAL BOARD USER'S MANUAL

Introduction

This document describes the CAT4201AGEVB evaluation board for the CAT4201 high efficiency step-down LED driver. Boards equipped with a 9 V 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 350 mA from a power supply up to 28 V. 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 CAT4201AGEVB for PWM dimming.

Operation Procedure

The CAT4201AGEVB 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 3 V. LED current can be set from 70 mA to 350 mA 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 1 V.

Device Demonstration

To set up the CAT4201AGEVB for demonstrations, the board should be configured for normal operation with a 9 V 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.

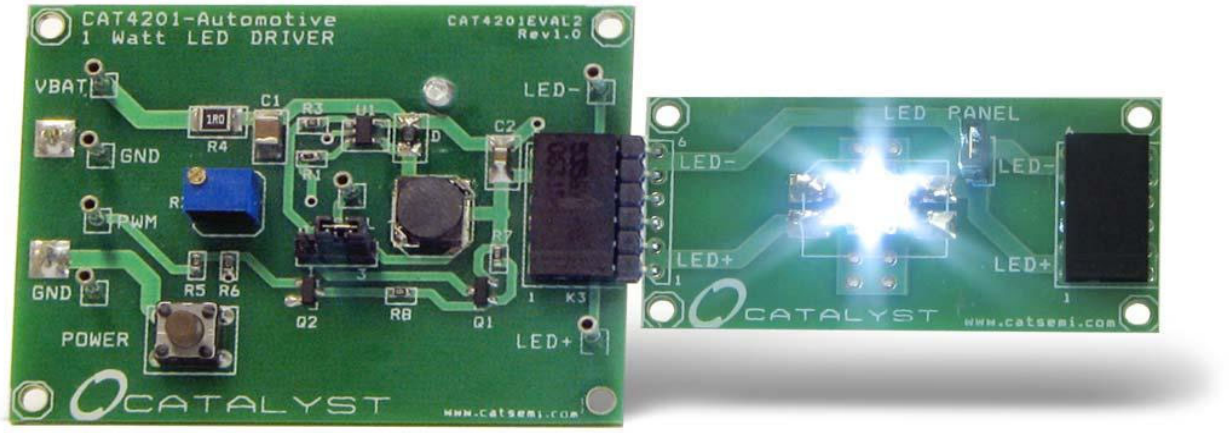


Figure 1. CAT4201AGEVB with LED Module

SCHEMATIC

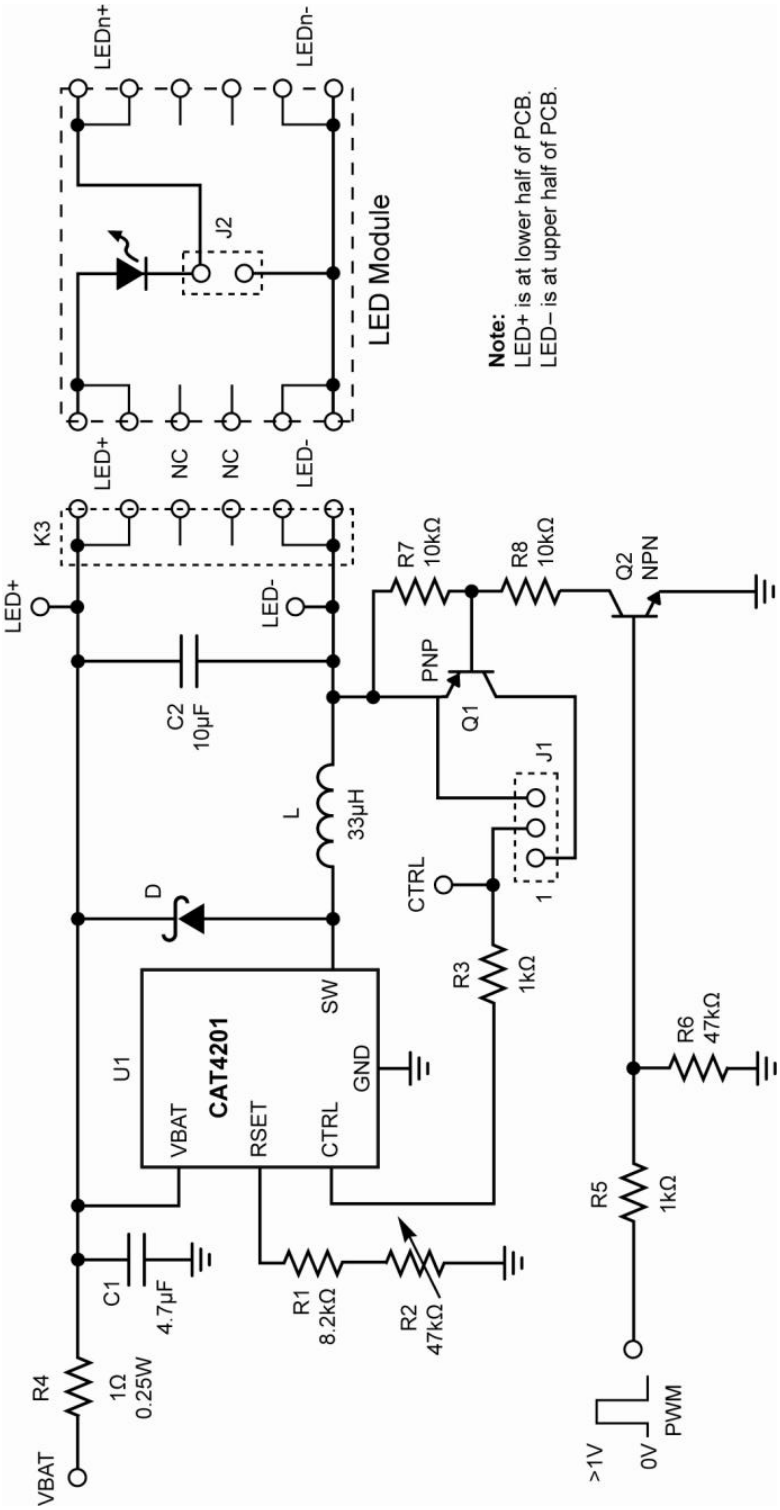


Figure 2. CAT4201AGEVB Schematic

TEST PROCEDURE FOR THE CAT4201AGEVB EVALUATION BOARD

Introduction

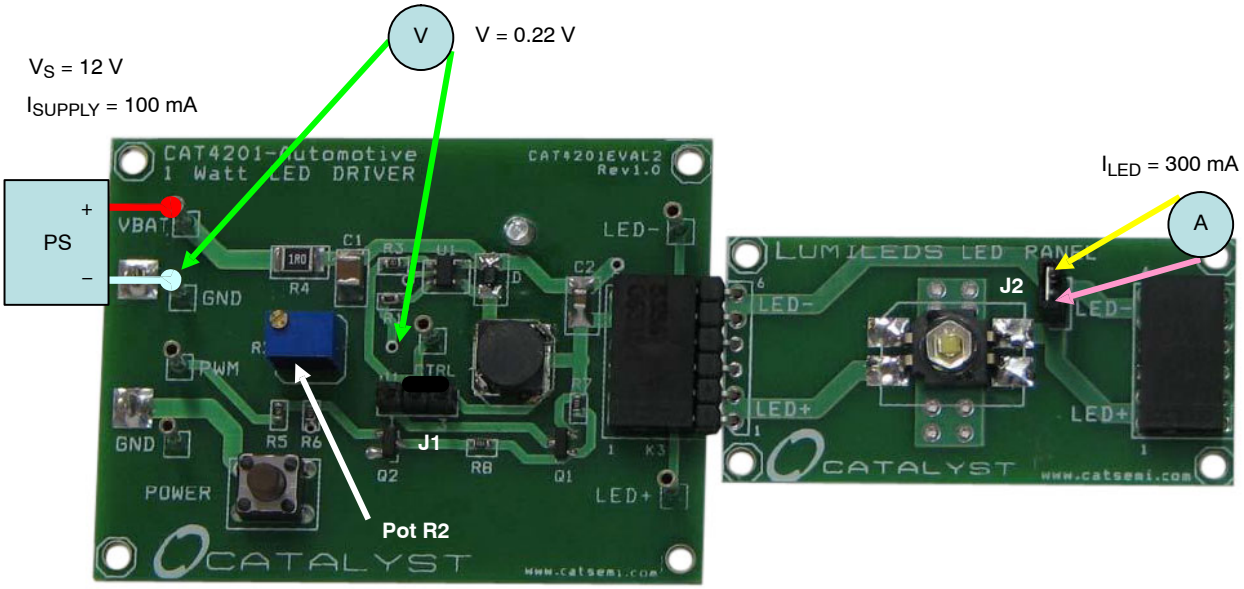
This document describes the test procedure for the CAT4201 evaluation board. The test procedure must be followed step-by-step in order to verify that the evaluation board is fully functional.

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) = 12 V 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.

Figure 3. CAT4201AGEVB Test Set-up

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 0.22 V.
6. Measure the LED current (A).
7. The LED current must be between: 270 mA ≤ I_{LED} ≤ 330 mA.
8. Measure the supply current on the power supply.
9. The supply current must be between: 90 mA ≤ I_{SUPPLY} ≤ 115 mA.
10. Turn off the power supply (PS).
11. Disconnect the CAT4201 evaluation board.

Table 1. CAT4201AGEVB BILL OF MATERIALS

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

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