CAT4106AGEVB

CAT4106 LED Driver Evaluation Board User's Manual

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EVAL BOARD USER'S MANUAL

Introduction

This document describes the CAT4106AGEVB evaluation board for the CAT4106 quad-channel DC/DC boost LED driver. The major operating characteristics of the CAT4106 can be measured with this board.

The CAT4106 DC/DC converter is capable of driving up to 4 strings of LEDs with tight matching. This device is designed to drive LED strings up to 36 V. The LED brightness is set by a single resistor from the RSET pin to GND and PWM dimming is available via the EN/PWM pin. Additional information can be found in the CAT4106 data sheet.
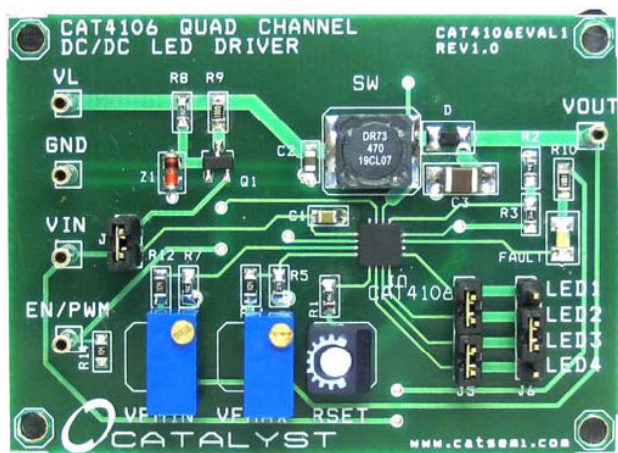

Figure 1. CAT4106AGEVB Board

Operation Procedure

The CAT4106AGEVB board contains one CAT4106 in a typical application circuit. The board can be powered in two different ways. With the J1 jumper in place a single high voltage supply (6 V to 24 V) can be applied between VL and GND. A circuit on board will generate a lower, regulated voltage for the VIN pin (6.2 V – V_{GS} of transistor M1). VIN can also be powered separately by removing the J1 jumper and applying a second voltage to the VIN test point. The voltage at VIN should not exceed 6.0 V.

VFMAX and VFMIN are set by potentiometers R4 and R6 respectively. The VFMIN potentiometer is located closest to the VIN test point. These can be used to set the maximum and minimum allowable forward voltages for any given LED string. For the CAT4106AGEVB, the settings for these potentiometers are calculated as follows:

$$R4 = 69.8 \text{ k}\Omega \times \left(\frac{V_{FMAX}}{1.2 \text{ V}} - 1\right) - 100 \text{ k}\Omega \qquad \text{(eq. 1)}$$

$$R6 = 60 \text{ k}\Omega \times \left(\frac{V_{FMIN}}{1.2 \text{ V}} - 1\right) - 100 \text{ k}\Omega \qquad \text{(eq. 2)}$$

Any open LED conditions will trigger a fault condition. Any short LED conditions will only trigger a fault condition during power-up. A red LED will turn on when a fault condition takes place.

The LED current is set by potentiometer R13 which is labeled RSET on the CAT4106AGEVB. The anode end of each LED string should be connected to VOUT and the cathode ends can be connected at the available header connectors J5 and J6. Placing jumpers on J5 and J6 headers allows to short two or more LED channels together.

EN or PWM input signals can be connected at the EN/PWM test point. The voltage at EN/PWM should not exceed 6.0 V. The CAT4106 can support PWM frequencies up to 2 kHz.
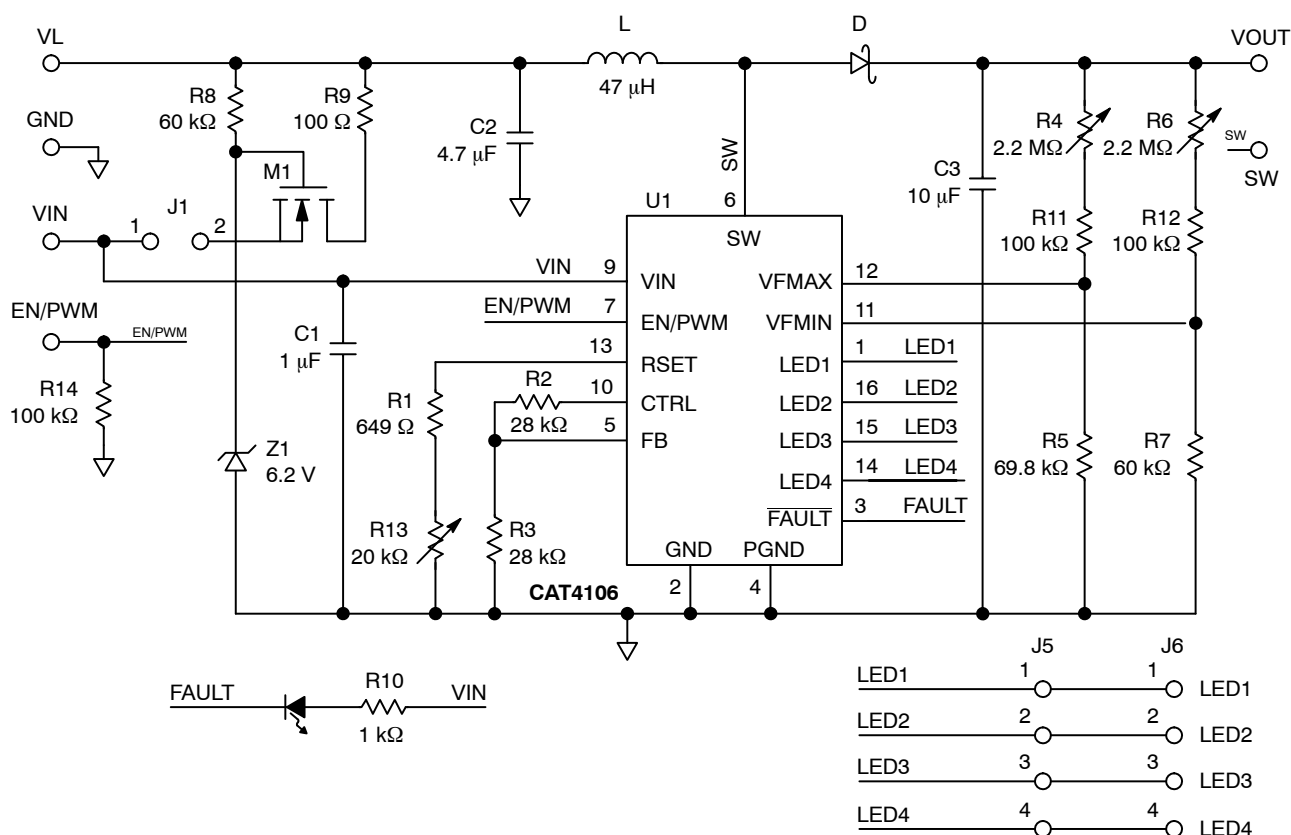
CAT4106AGEVB

Figure 2. CAT4106AGEVB Board Schematic

Table 1. BILL OF MATERIALS

Name	Manufacturer	Description	Part Number	Units
U1	ON Semiconductor	4-Channel Boost LED Driver, 4 mm x 4 mm TQFN	CAT4106	1
C1	AVX	Ceramic Capacitor 1.0 µF/10 V, 10%, X5R, 0603	0603ZD105KAT2A	1
C2	AVX	Ceramic Capacitor 4.7 µF/25 V, 10%, X5R, 1206	12063D475KAT2A	1
C3	Taiyo Yuden	Ceramic Capacitor 10 µF/ 35 V, 10%, X5R, 1210	GMK325BJ106KN-T	1
R1	Yageo	SMT Resistor 0.1 W, 649 Ω, 0603	RC0603FR-07649RL	1
R2, R3	Yageo	SMT Resistor, 0.1 W, 28 kΩ, 0603	RC0603FR-0728KL	2
R4, R6	Vishay	Trimmer Potentiometer, 2.2 MΩ	T93YB225K	2
R5	Yageo	SMT Resistor, 0.1 W, 69.8 kΩ, 0603	RC0603FR-0769K8L	1
R7, R8	Yageo	SMT Resistor, 0.1 W, 60.4 kΩ, 0603	RC0603FR-0760K4L	2
R9	Yageo	SMT Resistor, 0.1 W, 100 Ω, 0603	RC0603FR-07100RL	1
R10	Tyco	SMT Resistor, 0.1 W, 1 kΩ, 0603	RC0603FR-071KL	1
R11, R12, R14	Yageo	SMT Resistor, 0.1 W, 100 kΩ, 0603	RC0603FR-07100KL	3
R13	Vishay	Trimmer Potentiometer, 20 kΩ	T73YE-20K-ND	1
L	Coiltronics	Inductor 47 µH, 1.08 A	DR73-470-R	1
D	NXP	Schottky Diode, 60 V/1 A	PMEG6010CEJ T/R	1
M1	ON Semiconductor	N-Channel MOSFET, 60 V/115 mA	2N7002L	1
Z1	ON Semiconductor	Zener Diode, 6.2 V	MM3Z6V2	1
J1, J2	Tyco	2 Pin Header Connector 0.1" Pitch	640452-2	2
J5, J6	Tyco	4 Pin Header Connector 0.1" Pitch	640452-4	2
	Mil-Max	Pin Receptacle (Test Points)	#0149-0-15-01-30-14-04-0 (or equiv)	6
	LiteOn	SMT Red LED	LTST-T970KRKT	1

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