

General Description

The AL5816 is a 5-terminal adjustable constant current linear LED controller offering excellent temperature stability and current capability. It can work with a wide input voltage range from 4.5V to 60V. With its low 200mV current sense FB voltage, it controls the regulation of LED current with minimum power dissipation compared with traditional linear LED drivers. This makes it ideal for medium to high current LEDs.

The device has an internal output drive up to 15mA, which enables it to drive external bipolar transistors or MOSFETs. It also provides the capability to drive longer LED chains with low drop out voltage and multiple LED channels.

AL5816 has the LED current adjusted and controlled by a sense resistor connected across FB pin and GND. The voltage across this resistor is controlled to a precise 0.2V thus controlling the current.

The average LED current can be adjusted by applying a high frequency PWM signal higher than 200Hz to the PWM pin.

AL5816 is available in SOT25 package.

Applications

- Commercial and Industrial Lighting
- Exterior Lighting
- Appliance Lights

Key Features

- Wide Input Voltage Range from 4.5V to 60V
- Low Reference Voltage (VFB = 0.2V)
- 3% Reference Voltage Tolerance over Temperature
- Up to 15mA Driver Capability for Bipolar Transistor
- PWM dimming frequency higher than 200Hz
- Input Under Voltage Lock-out
- Over Temperature Shutdown

Due to similar function, AL5815 and AL5816 have the same evaluation board, please check the identification code on U1 to ensure get the right device. Or check the white mark which is not painted with black ink on the PCB, refer to Figure 2.

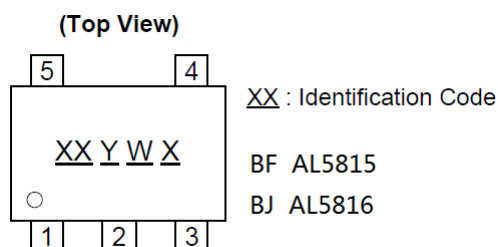


Figure 1: Marking information

AL5816EV1 Specifications

| Parameter | Value |
|----------------|----------------------|
| Input Voltage | 4.5~60Vdc |
| LED Current | 1A |
| Number of LEDs | 1~17pcs |
| XYZ Dimension | 63.3mm x 40mm x 10mm |

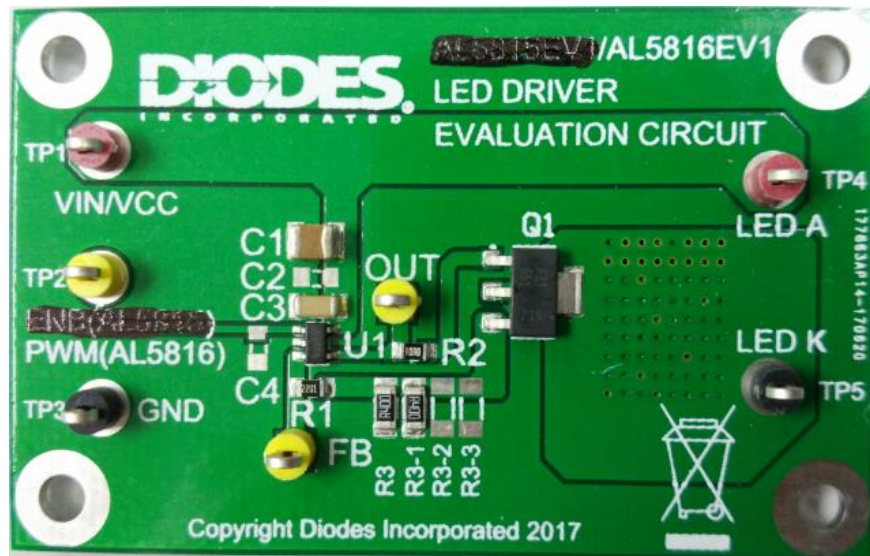


Figure 2: Top View

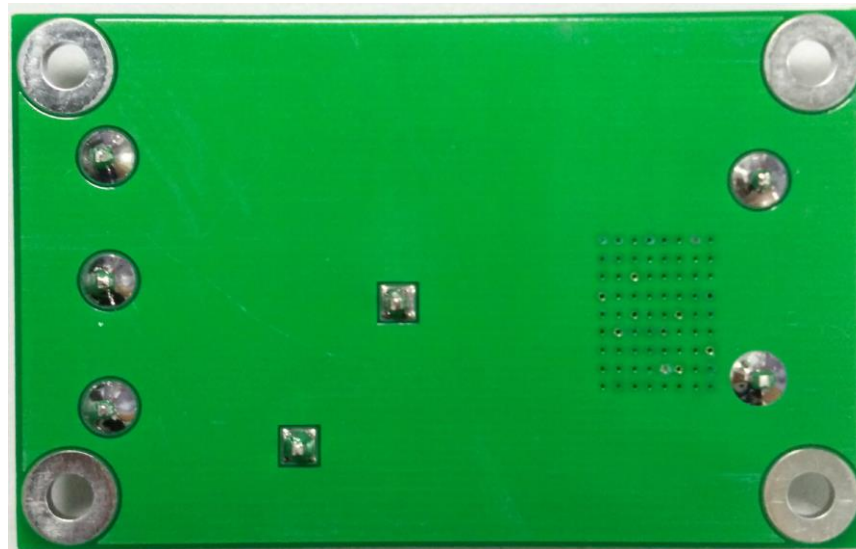


Figure 3: Bottom View

Connection Instructions

Power Supply Input: 4.5~60VDC (VIN, GND)

External LED connection: LED A is for LEDs string anode, and LED K is for cathode

PWM dimming signal input (PWM, GND): Floating and high/ON, low/OFF

Evaluation Board Schematic

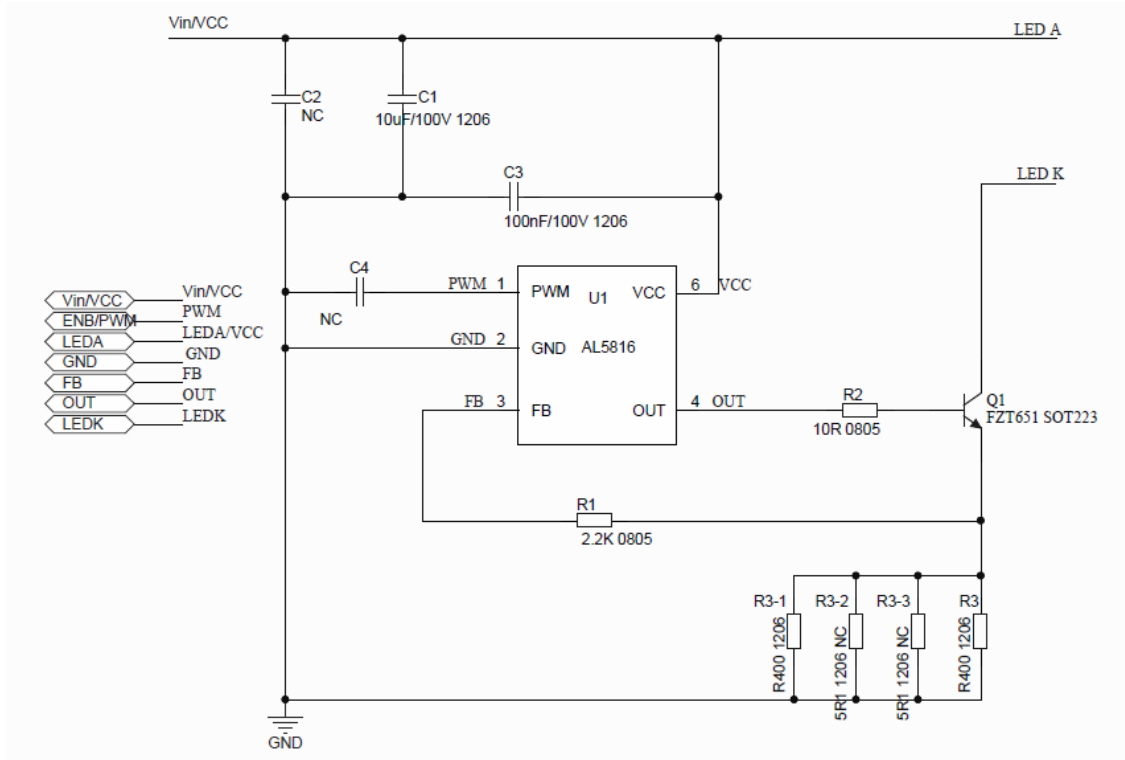


Figure 4: Evaluation Board Schematic

Evaluation Board Layout

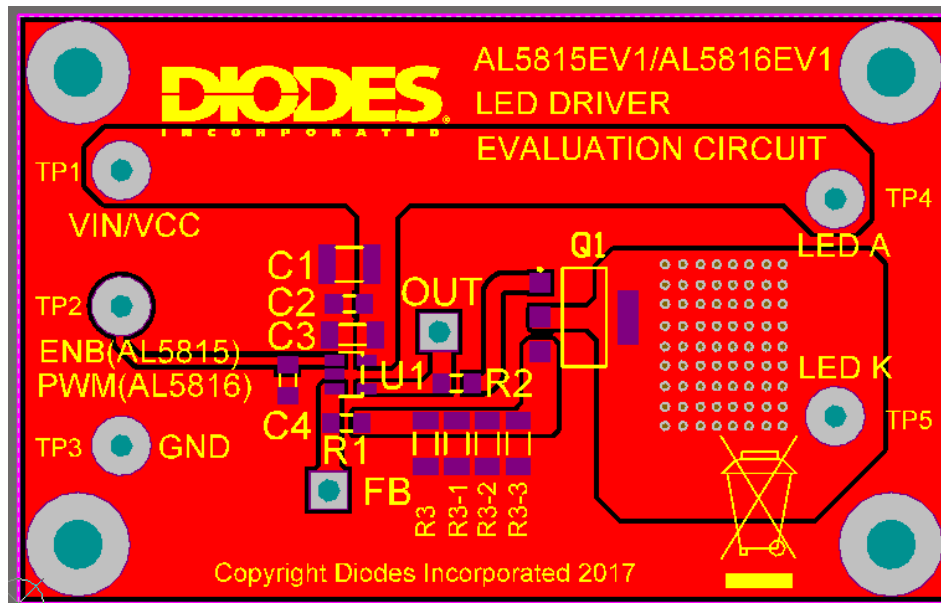


Figure 5: PCB Board Layout Top View

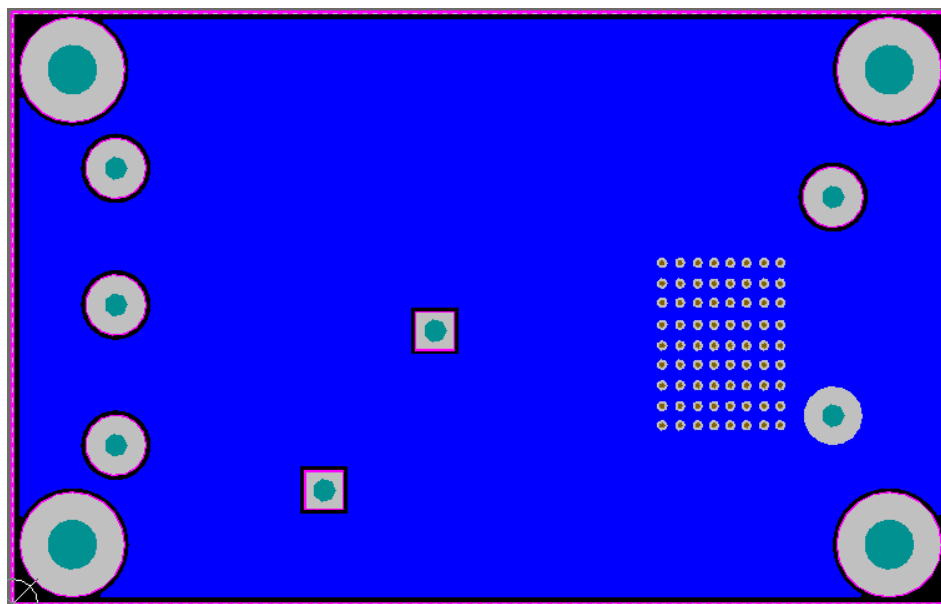


Figure 6: PCB Board Layout Bottom View

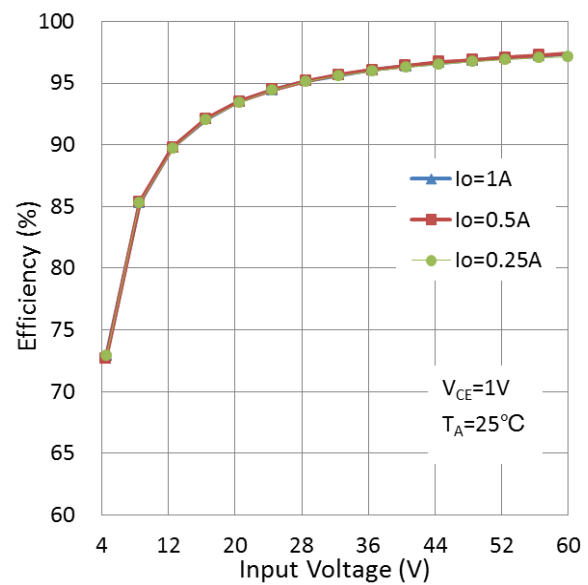
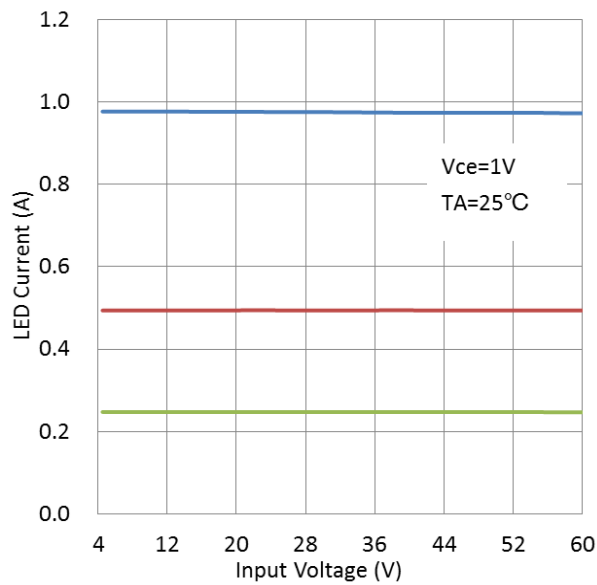
Quick Start Guide

1. By default, the LED current of evaluation board is preset at 1A.
2. Ensure that the DC source is switched OFF or disconnected.
3. Connect the anode wire of external LED string to LED A of the evaluation board.
4. Connect the cathode wire of external LED string to LED K of the evaluation board.
5. Connect two DC line wires to the VIN and GND terminals on the evaluation board.
6. Ensure that the area around the board is clear and safe, and preferably that the board and LEDs are enclosed in a transparent safety cover.
7. Turn on the main switch. LED string should light up with LED.

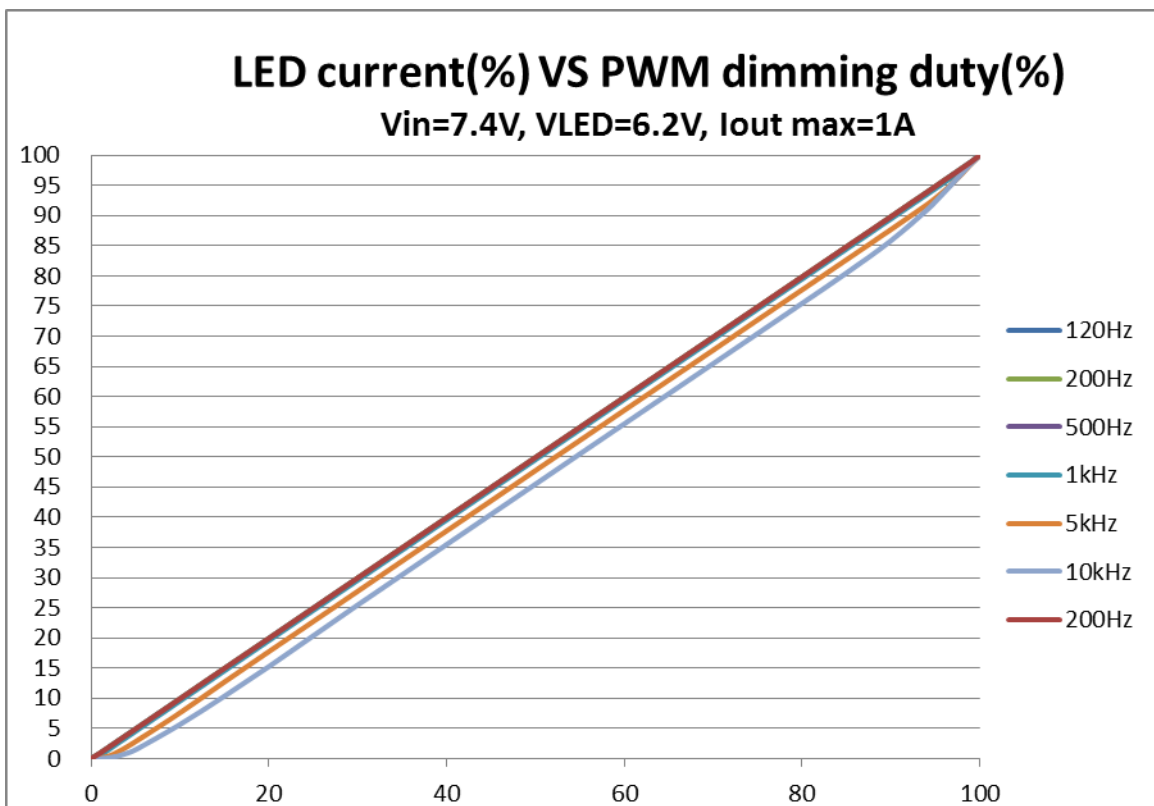
Bill of Material

| Item | Description | Package |
|------|---|---------|
| C1 | Ceramic Cap,10uF/100V, X7R, murata | 1210 |
| C2 | NC | NC |
| C3 | Ceramic Cap,0.1uF/100V, X7R, murata | 1206 |
| C4 | NC | NC |
| Q1 | FZT651TA, 60V/3A, NPN Transistor, Diodes Inc. | SOT223 |
| R1 | SMD Resistor, 2.2K, 5%, 1/8W | 0805 |
| R2 | SMD Resistor, 10R, 5%, 1/8W | 0805 |
| R3 | SMD Resistor, R400, 1%, 1/4W | 1206 |
| R3-1 | SMD Resistor, R400, 1%, 1/4W | 1206 |
| R3-2 | NC | NC |
| R3-3 | NC | NC |
| U1 | AL5816, Diodes Inc. | SOT25 |

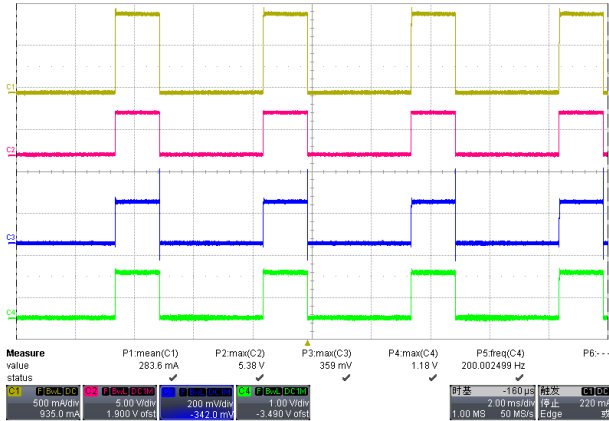
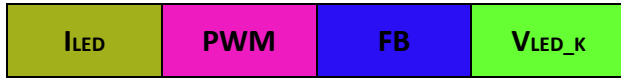
Functional Performance



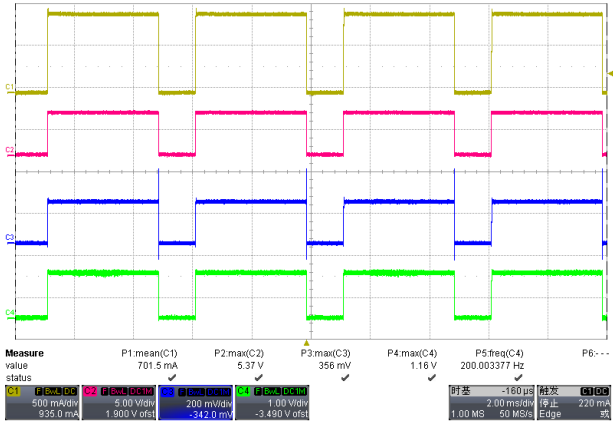
Dimming curve



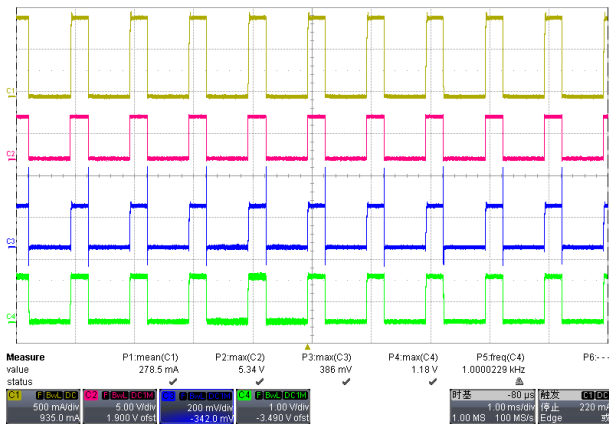
Dimming Waveform



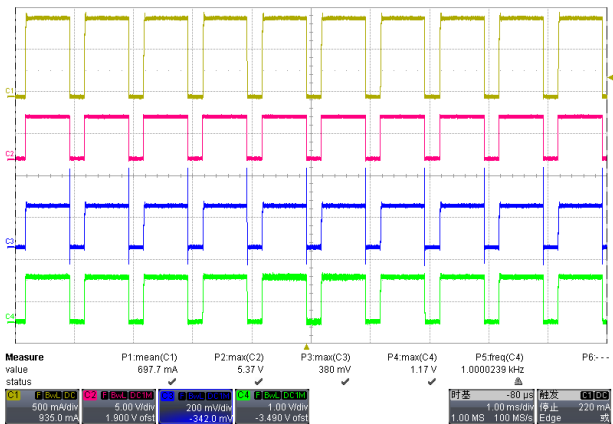
Frequency=200Hz, duty=30%



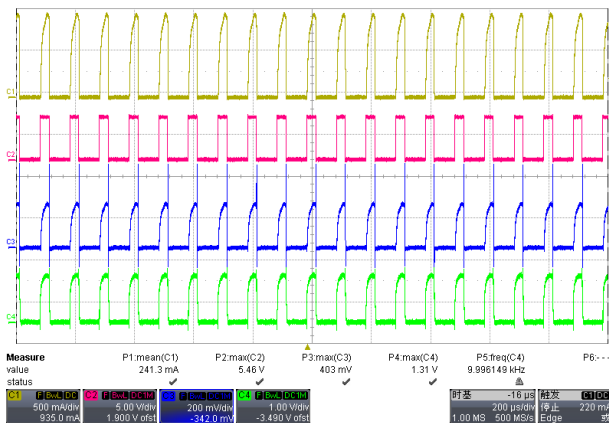
Frequency=200Hz, duty=70%



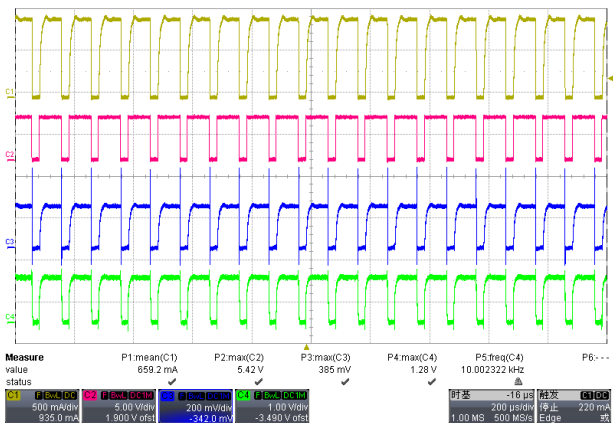
Frequency=1kHz, duty=30%



Frequency=1kHz, duty=70%

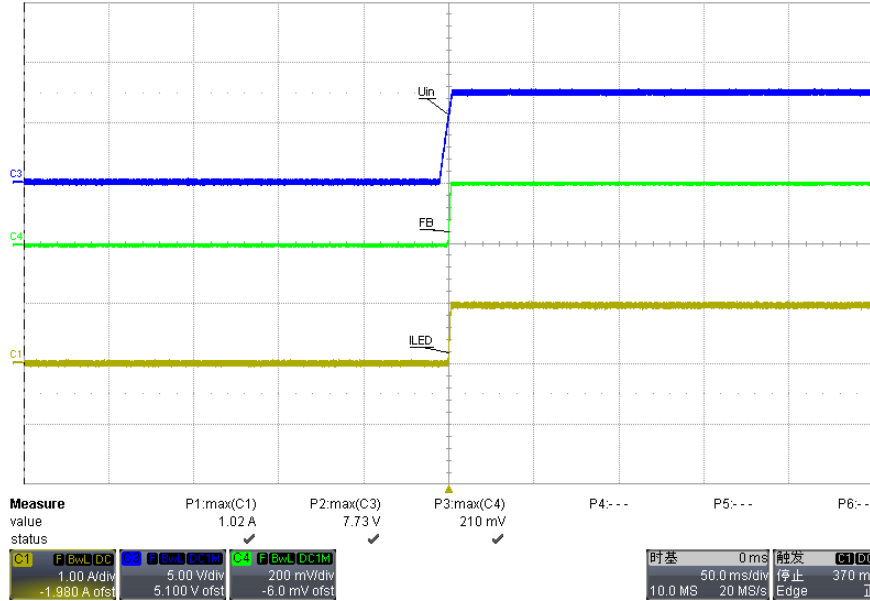


Frequency=10kHz, duty=30%



Frequency=10kHz, duty=70%

Startup sequence



Vout=6.2V, Vin=7.4V, Iout=1A

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