

### General Description

The AL5815 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.

AL5815 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 AL5815 has an enable (ENB) pin. Bringing ENB low to enable the device and turn on external transistor. Bringing ENB high puts the device into a low quiescent current shutdown state. The AL5815 has a turn on delay built in which makes sure there is not a high current surge at startup. The average LED current can be adjusted by applying a low frequency PWM signal less than 200Hz to the ENB pin.

If PWM dimming higher than 200Hz is required the AL5816 has replaced the enable pin with a PWM pin. This device can run at frequencies greater than 200Hz. AL5815 is available in SOT25 package.

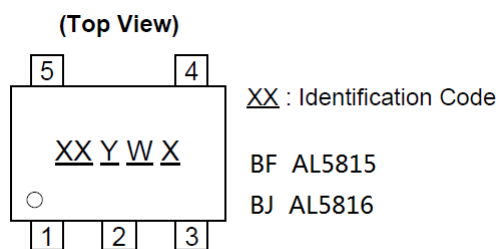
### Applications

- 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
- Low Standby Current
- 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**  
**AL5815EV1 Specifications**

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

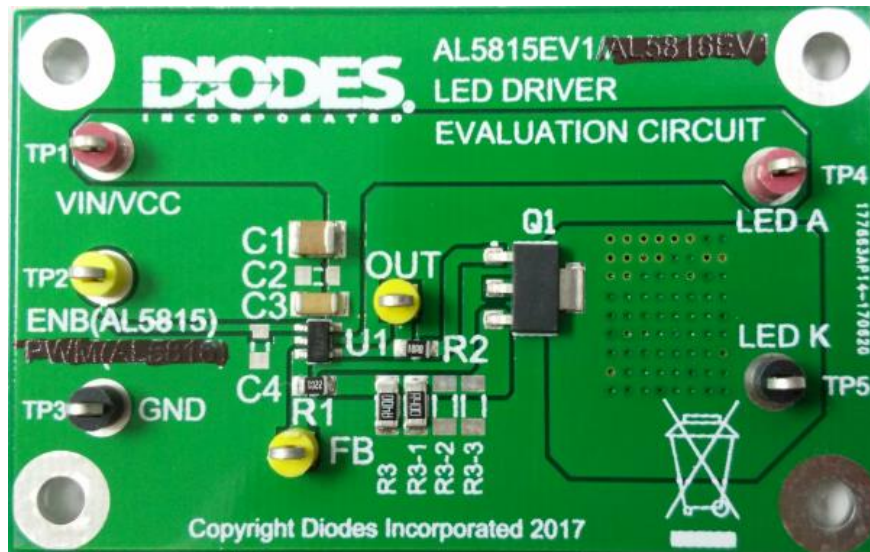


Figure 2: Top View

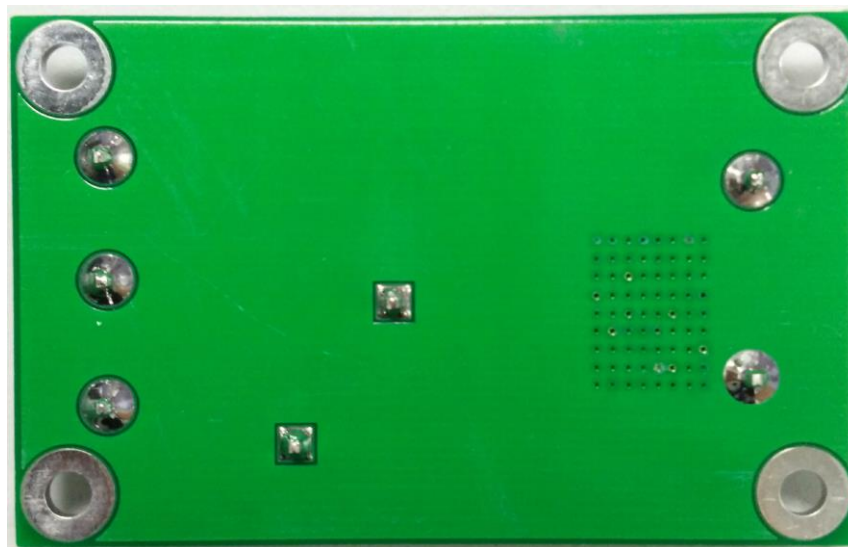


Figure 3: Bottom View

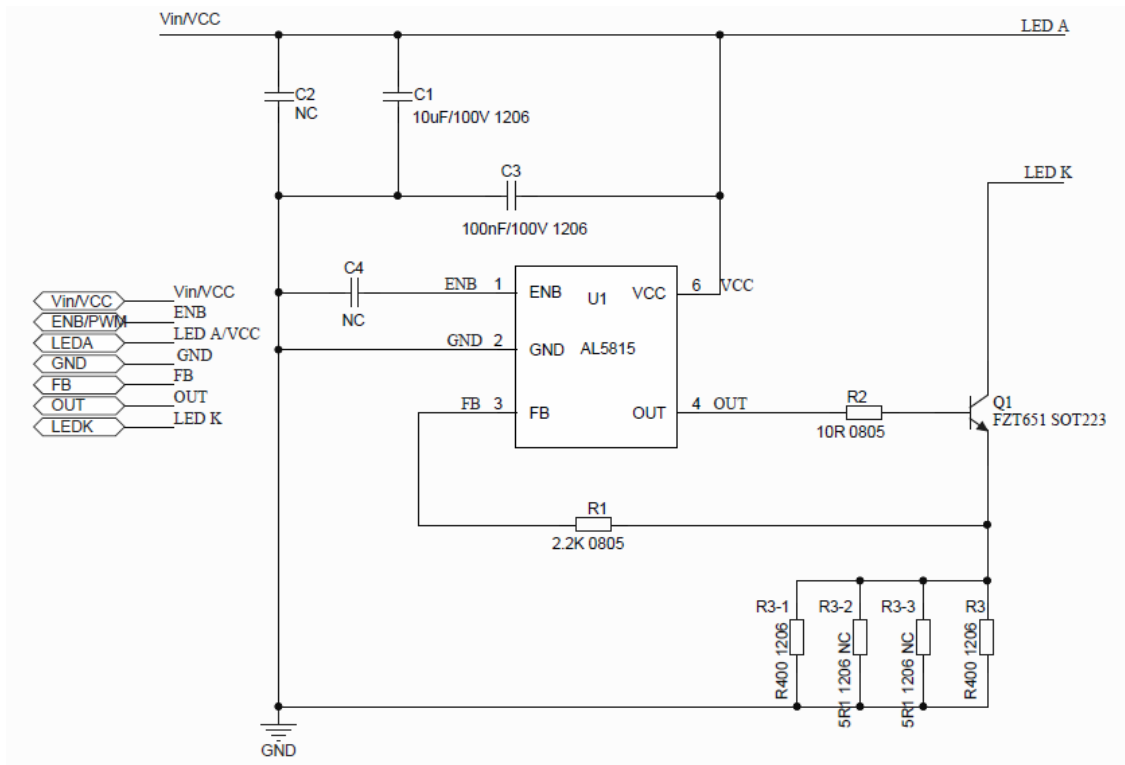
### Connection Instructions

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

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

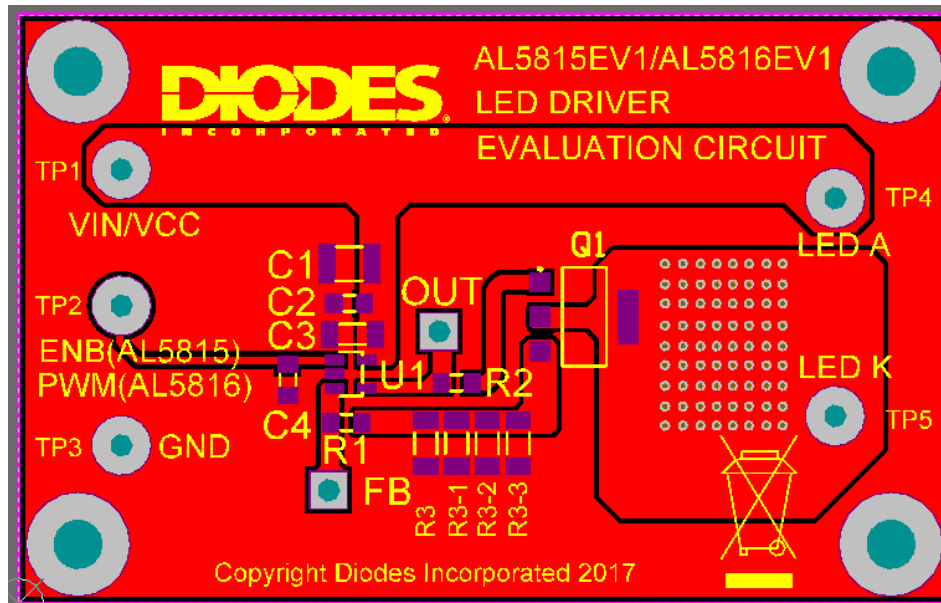
Device enabling signal input (ENB, GND): Floating and low/ON, high/OFF.

**Evaluation Board Schematic**

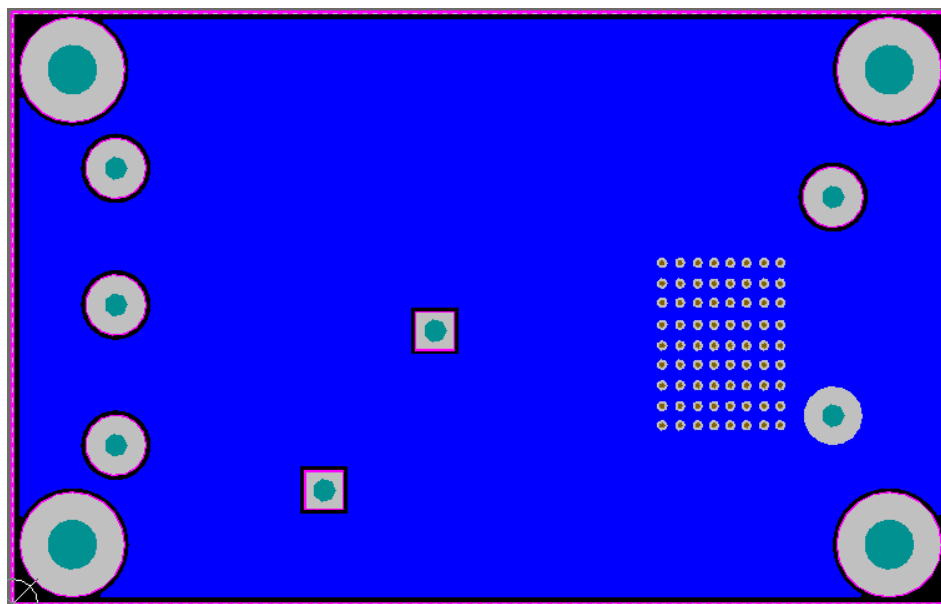


**Figure 4: Evaluation Board Schematic**

**Evaluation Board Layout**



**Figure 5: PCB Board Layout Top View**



**Figure 6: PCB Board Layout Bottom View**

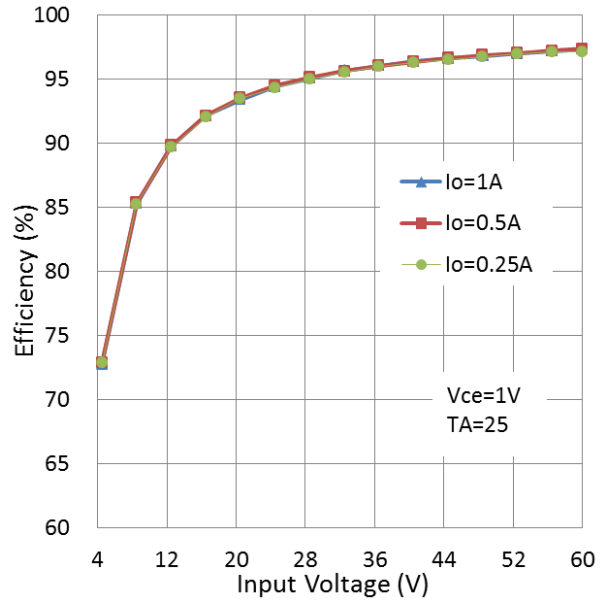
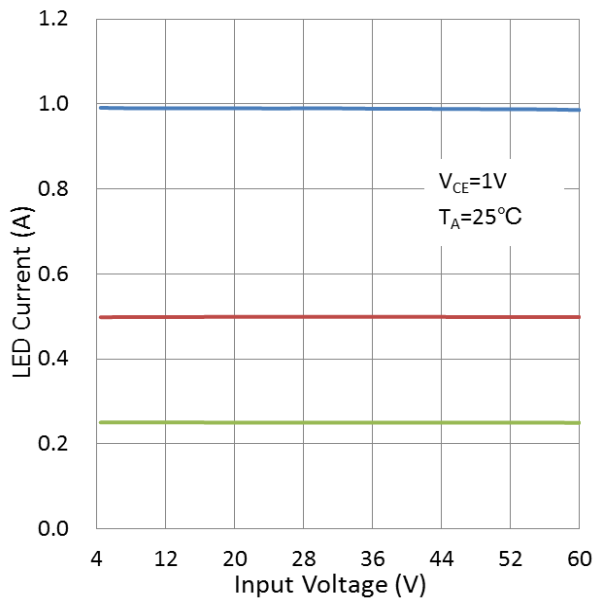
### Quick Start Guide

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.

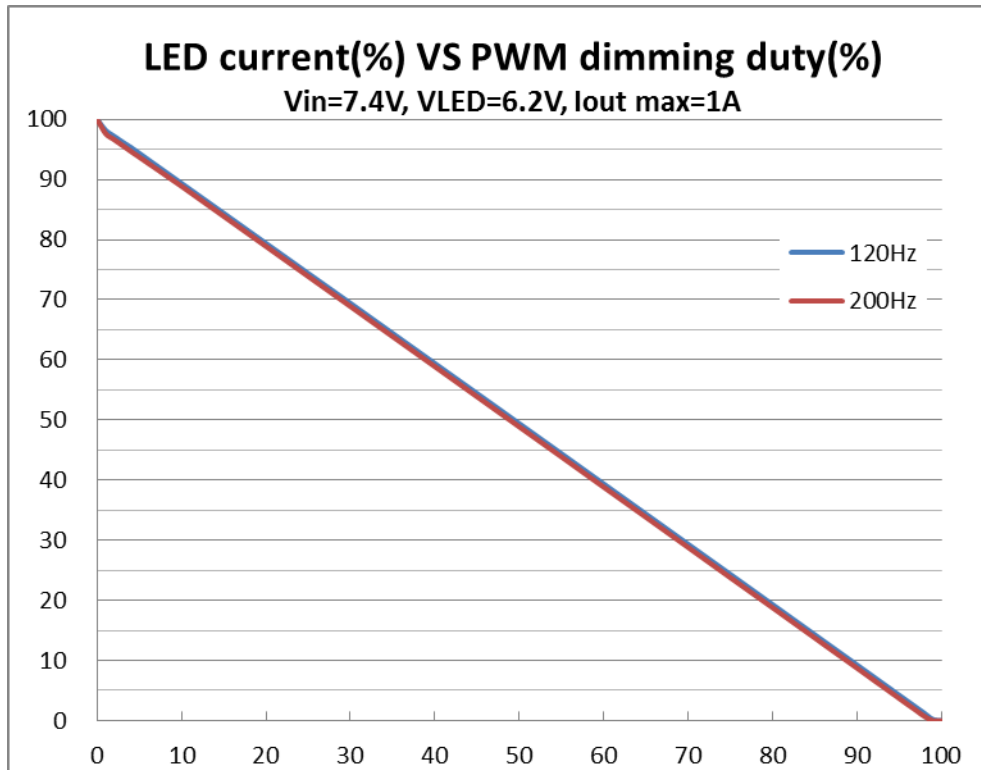
### Bill of Material

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	AL5815, Diodes Inc.	SOT25

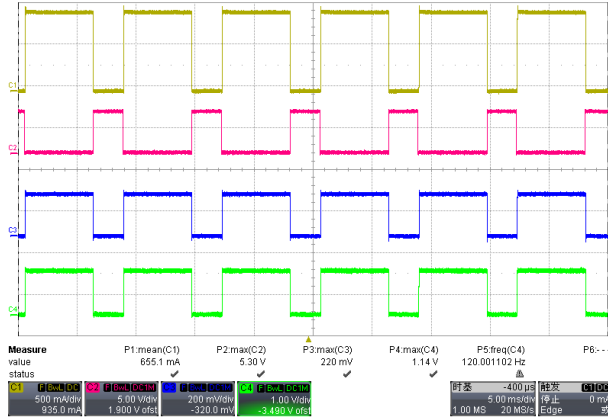
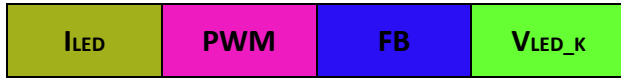
**Functional Performance**



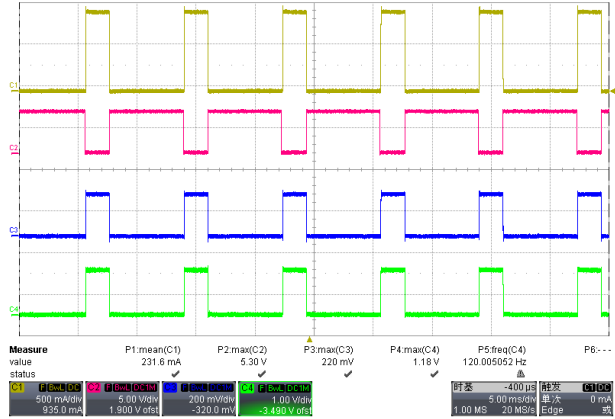
**Dimming curve**



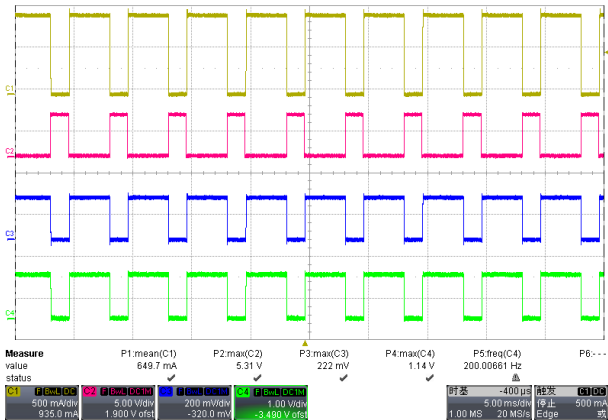
**Dimming waveform**



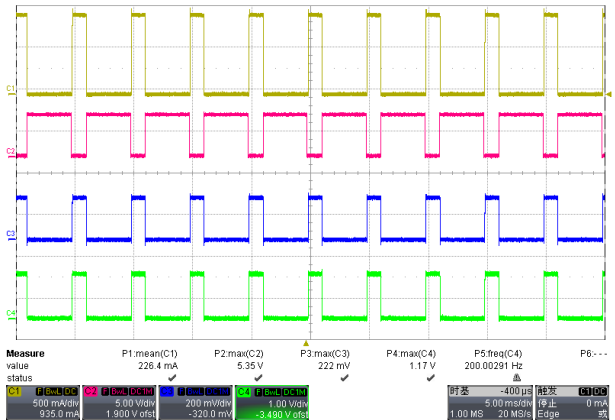
Frequency=120Hz, duty=30%



Frequency=120Hz, duty=70%

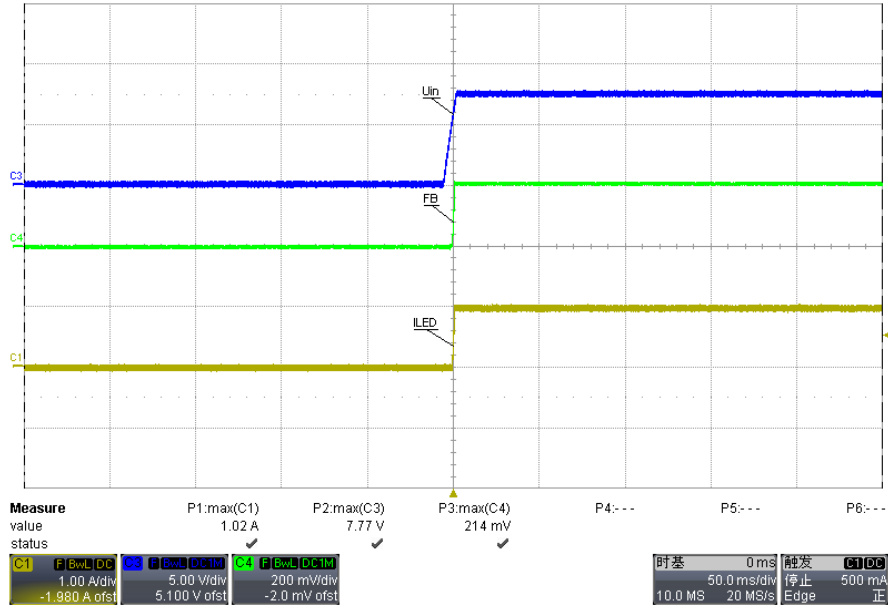


Frequency=200Hz, duty=30%



Frequency=200Hz, duty=70%

Startup sequence



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

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