

General Description

The AL5816Q 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.

AL5816Q 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.

AL5816Q is available in SOT25 package and is Automotive-Compliant, qualified to AEC-Q100 Grade 1, supporting PPAP documentation.

Applications

- Automotive Rear Lamps
- Automotive Interior Lamps
- Automotive Instrumentation Illumination
- Automotive Position Lamps
- Automotive License Plate Illumination

Key Features

- Qualified to AEC-Q100 Grade 1
- Wide Input Voltage Range from 4.5V to 60V
- Low Reference Voltage (VFB = 0.2V)
- 5% 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

AL5816QEV1 Specifications

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

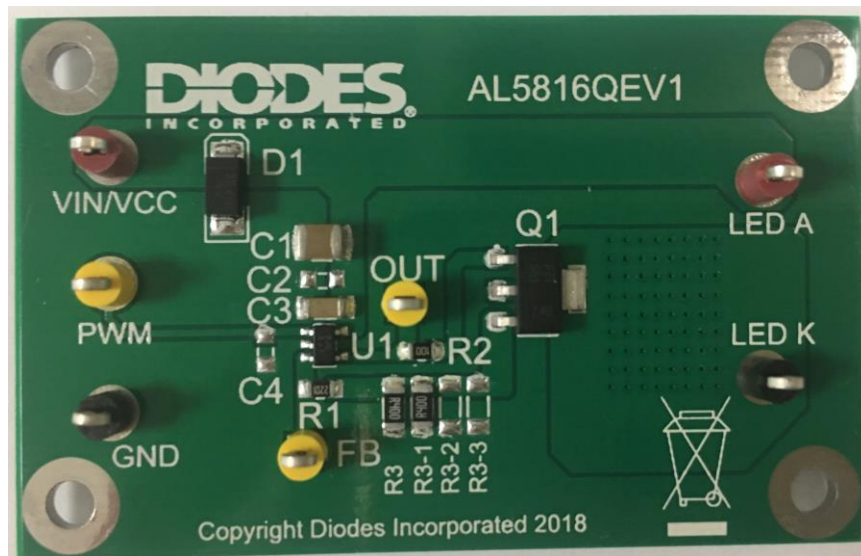


Figure 1: Top View

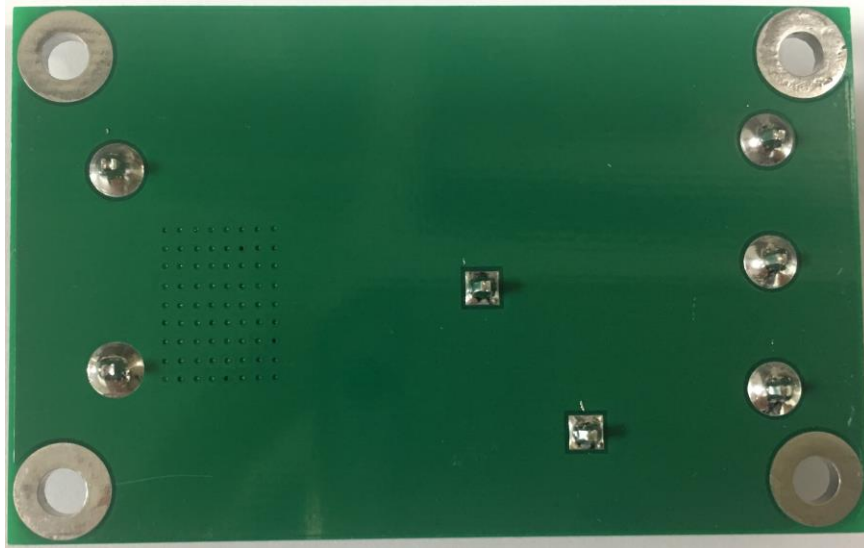


Figure 2: Bottom View

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 Layout

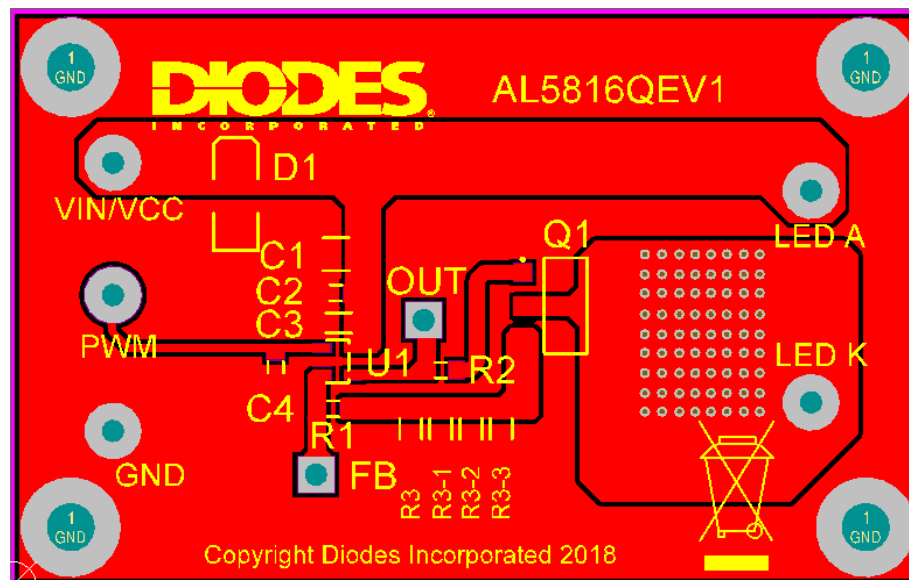


Figure 5: PCB Board Layout Top View

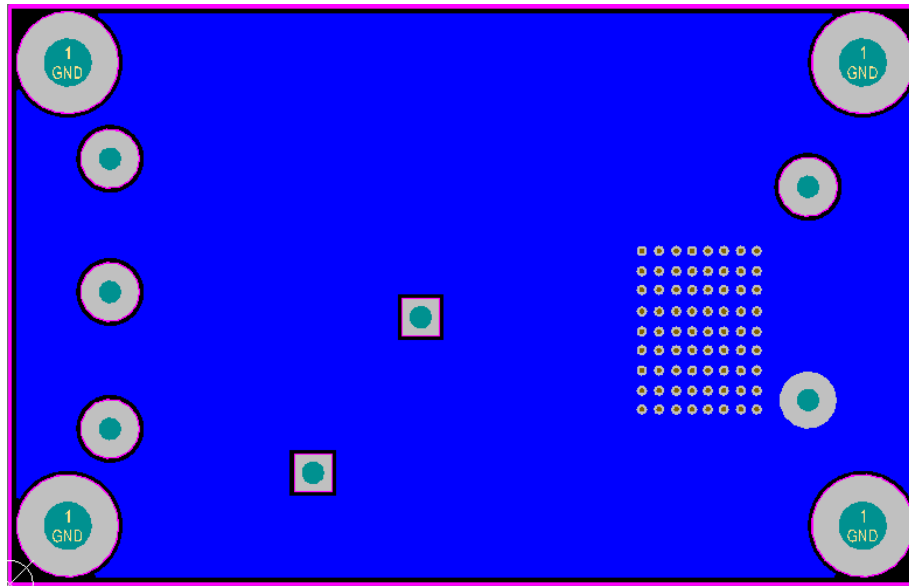


Figure 6: PCB Board Layout Bottom View

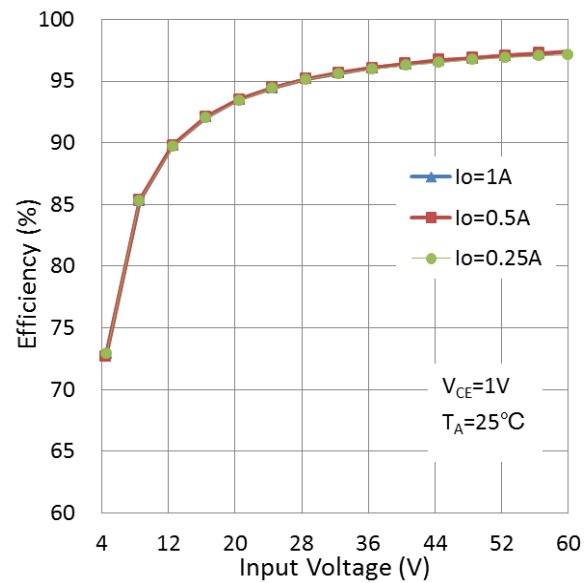
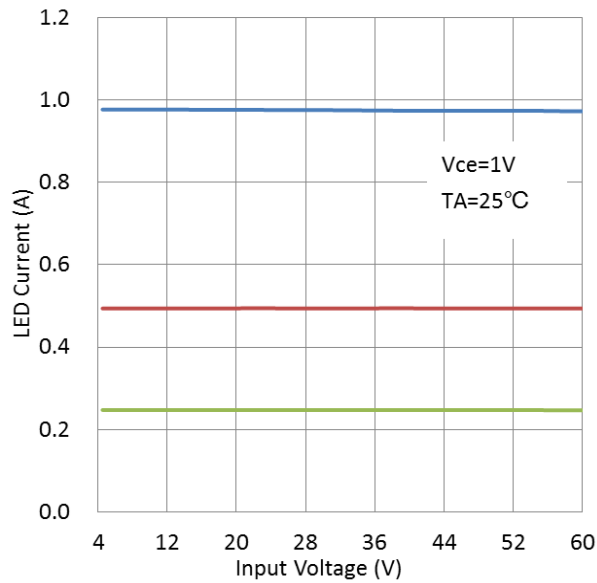
Quick Start Guide

1. Ensure that the DC source for VIN is switched OFF or disconnected, and the PWM signal generator is also switched OFF or not connected.
2. Connect the anode wire of external LED string to LED A of the evaluation board.
3. Connect the cathode wire of external LED string to LED K of the evaluation board.
4. Connect two DC line wires to the VIN and GND terminals on the evaluation board.
5. Connect the PWM signal to the PWM terminal and set the frequency, amplitude and duty cycle of the PWM signal.
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 and the PWM signal. LED string should light up with LED.

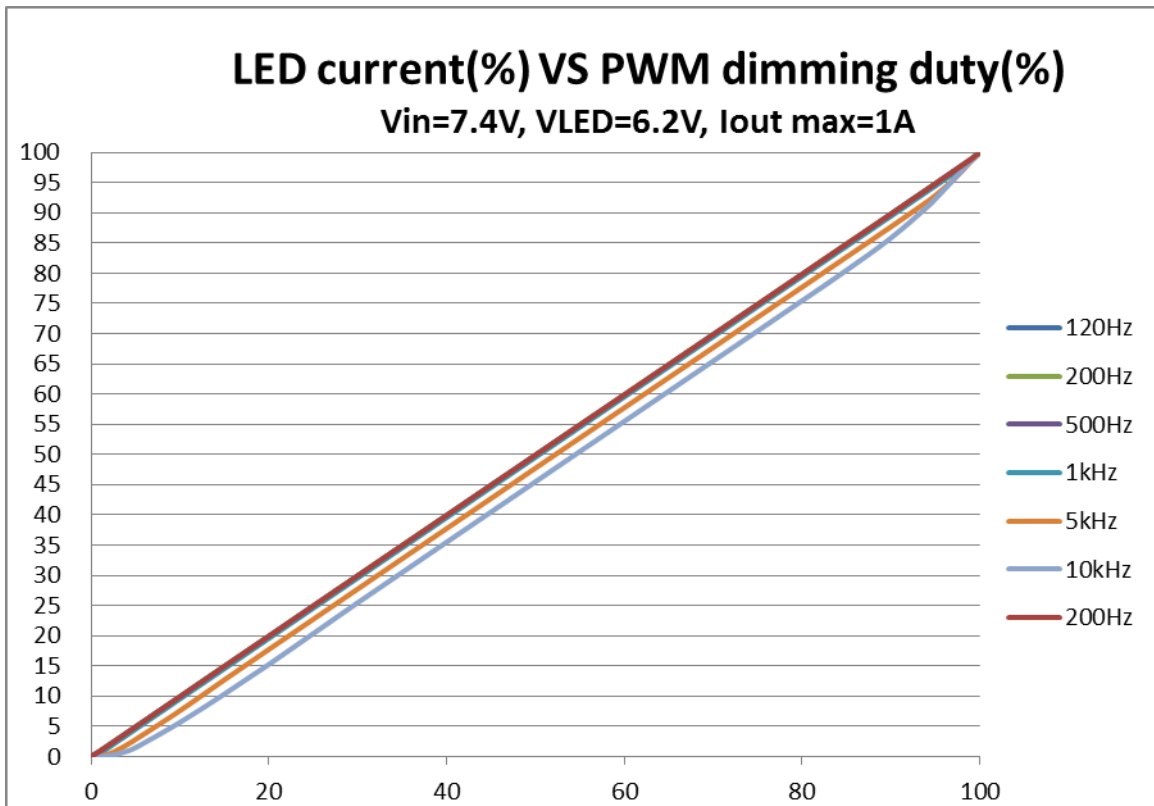
Bill of Material

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
D1	SMAJ60A, 60V TVS,Diodes	SMA
Q1	FZT651QTA, 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	AL5816QW5-7, Diodes Inc.	SOT25

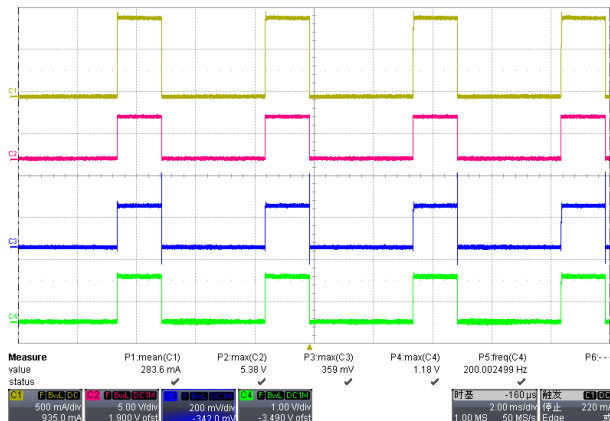
Functional Performance



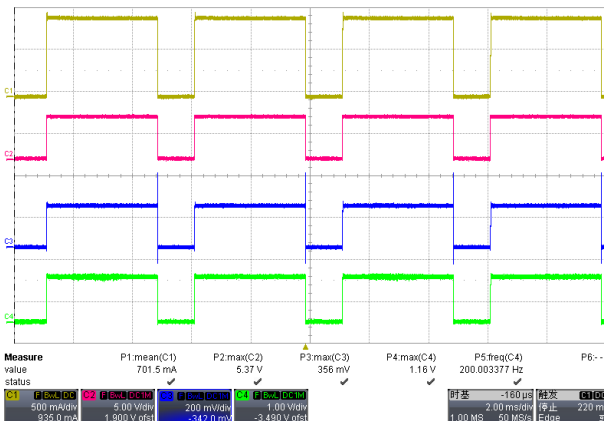
Dimming curve



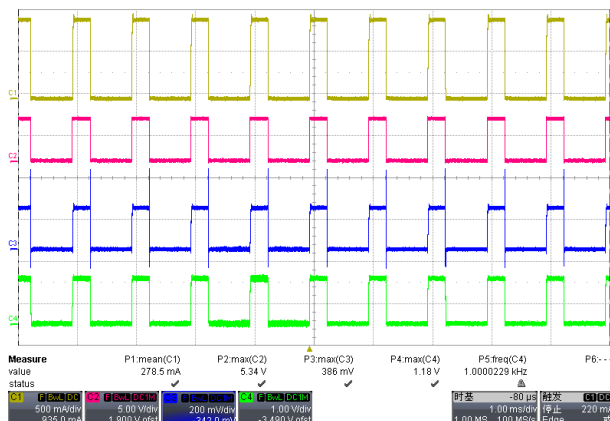
Dimming Waveform



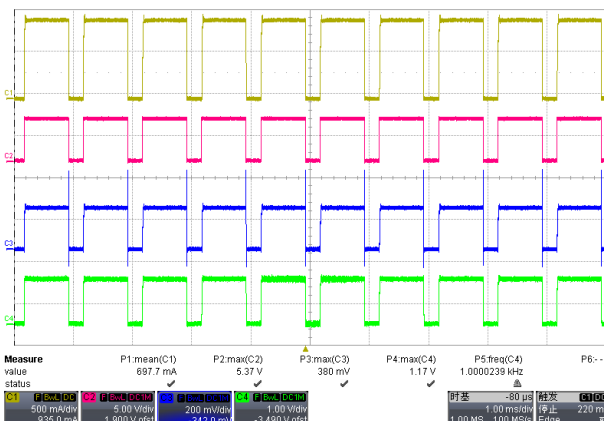
Frequency=200Hz, duty=30%



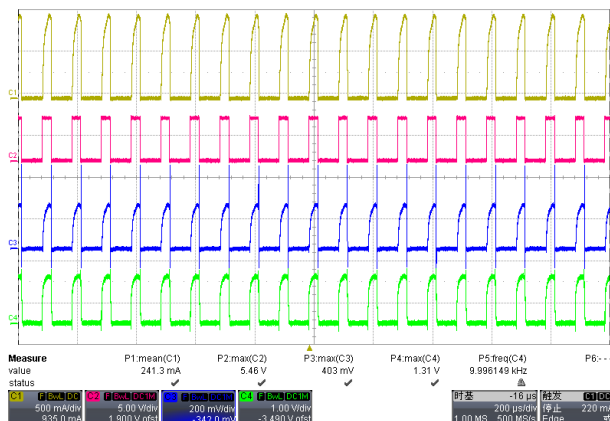
Frequency=200Hz, duty=70%



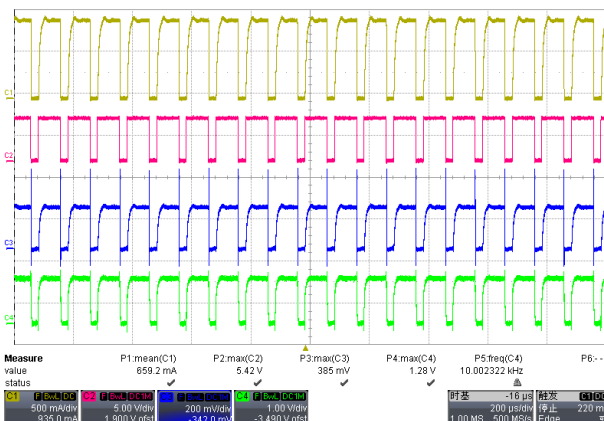
Frequency=1kHz, duty=30%



Frequency=1kHz, duty=70%

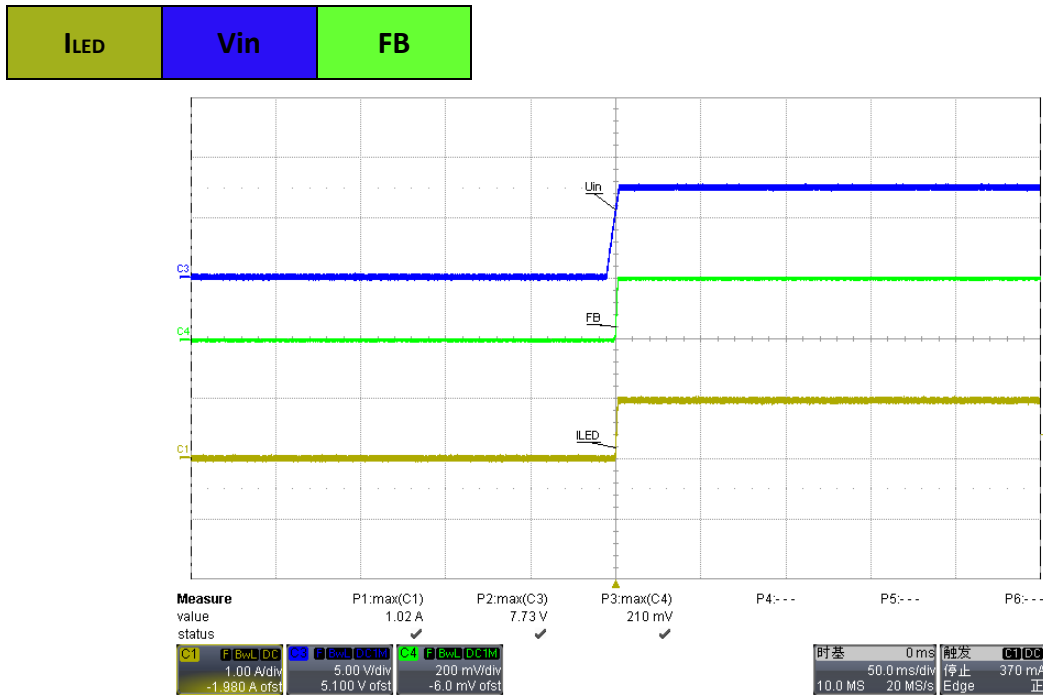


Frequency=10kHz, duty=30%



Frequency=10kHz, duty=70%

Startup sequence



$V_{out}=6.2V, V_{in}=7.4V, I_{out}=1A$

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