

AL8400EV1 EVALUATION BOARD USER GUIDE

DESCRIPTION

The AL8400EV1, Figure 1, is a double sided evaluation board for the AL8400 linear LED driver. The evaluation board is preset to drive 150mA through the LED string, the maximum number of which depends on their total forward voltage drop.

The operating voltage is between 4 and 18 volts, depending on the LED string to be driven. Higher voltages for longer LED strings can be used by tapping off the board Vin from an intermediate point in the LED string.

Note: The evaluation board does not have reverse supply protection.

The sense resistor R2 of 300mΩ sets the LEDs nominal current at 150mA.

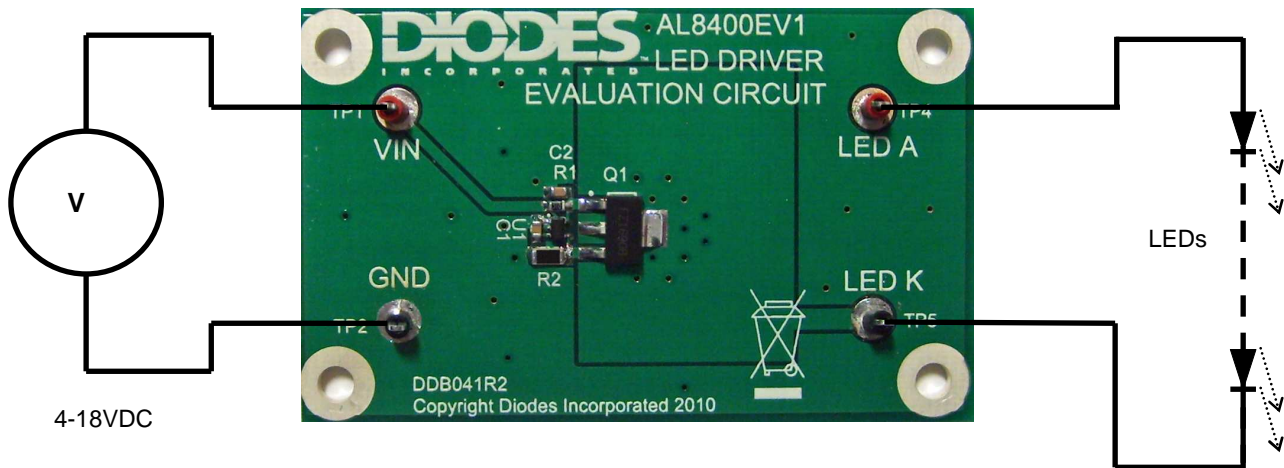


Figure 1: AL8400EV1 evaluation board and connection diagram

| AL8400EV1 Connection Point Definition | |
|---------------------------------------|---|
| Name | Description |
| Vin | Positive supply voltage. 4 to 18V |
| GND | Supply Ground (0V) |
| LED A | LED A connects to the external LED string anode |
| LED K | LED K connects to the external LED string cathode |

AL8400 DEVICE DESCRIPTION

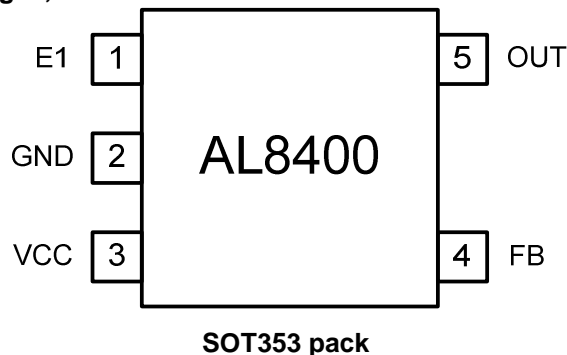
The AL8400 is a 5-terminal adjustable Linear LED driver controller offering excellent temperature stability and output handling capability. The AL8400 simplifies the design of linear and isolated LED drivers. With its low 0.2V FB pin, it controls the regulation of LED current with minimal power dissipation when compared to traditional linear LED drivers. This makes it ideal for medium to high current LED driving.

AL8400 DEVICE FEATURES

- Low reference voltage ($V_{FB} = 0.2V$)
- -40 to 125°C temperature range
- 3% Reference voltage tolerance at 25°C
- Low temperature drift
- 0.2V to 18V open-collector output
- High power supply rejection (>45dB at 300kHz)

DEVICE APPLICATIONS

- Isolated offline LED converters
- Linear LED driver
- LED signs
- Instrumentation illumination

AL8400 Device Packages, Pin and Definitions**AL8805 Device Pin Definition**

| Name | Pin No | Description |
|-----------------|--------|---|
| E1 | 1 | Emitter connection. Connect to GND. |
| GND | 2 | Analog Ground: Ground return for reference and amplifier. Connect to E1. |
| V _{CC} | 3 | Supply Input. Connect a 0.47μF ceramic capacitor close to the device from VCC to GND. |
| FB | 4 | Feedback Input. Regulates to 200mV nominal. |
| OUT | 5 | Output. Connect a capacitor close to device between OUT and GND. |

ORDERING INFORMATION

| EVALBOARD ORDER NUMBER |
|------------------------|
| AL8400EV1 |

| DEVICE ORDER NUMBER |
|---------------------|
| AL8400SE-7 |

Please note: Evaluation boards are subject to availability and qualified sales leads.

AL8400EV1 EVALUATION BOARD REFERENCE DESIGN

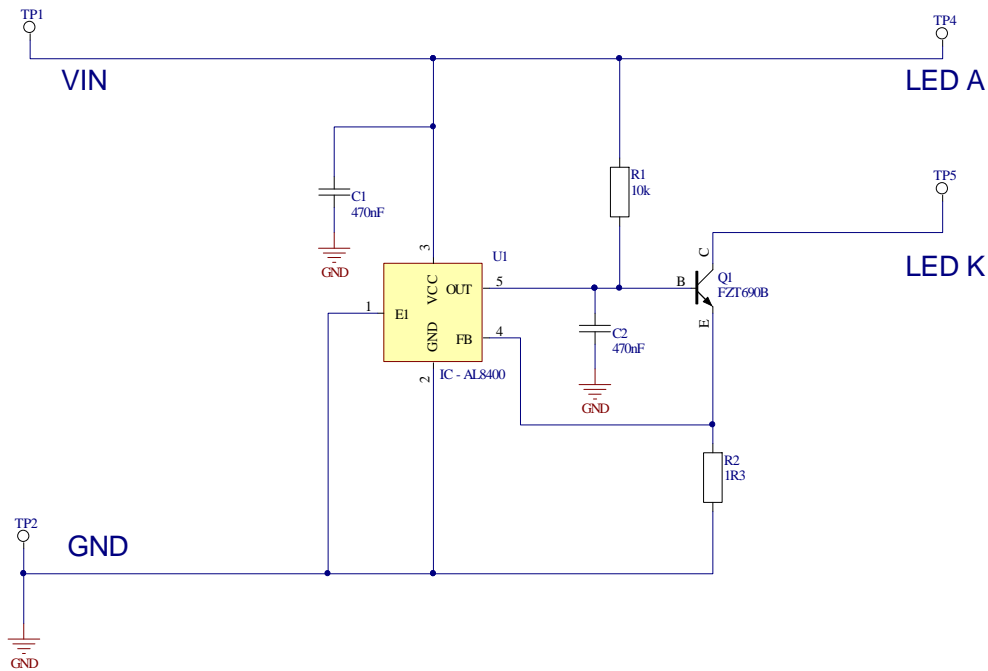


Figure 2: AL8400EV1 Schematic

The AL8400 provides a simple linear LED driver in the form of a constant current circuit. The device will drive the base of the external transistor, Q1, appropriately to maintain a voltage of 0.2V at the FB pin. Choosing the value of R2 allows the current in the LED string (and through Q1 and R2) to be selected.

The board comes preset to 150mA LED current with R2 at 1.3ohms:

$$I_{LED} = 0.2 \div 1.3 = 0.154A$$

The AL8400 will tolerate a maximum voltage of 18V at its VCC input, but it can be used over an extended voltage range by taking Vin from an intermediate point in the LED String:

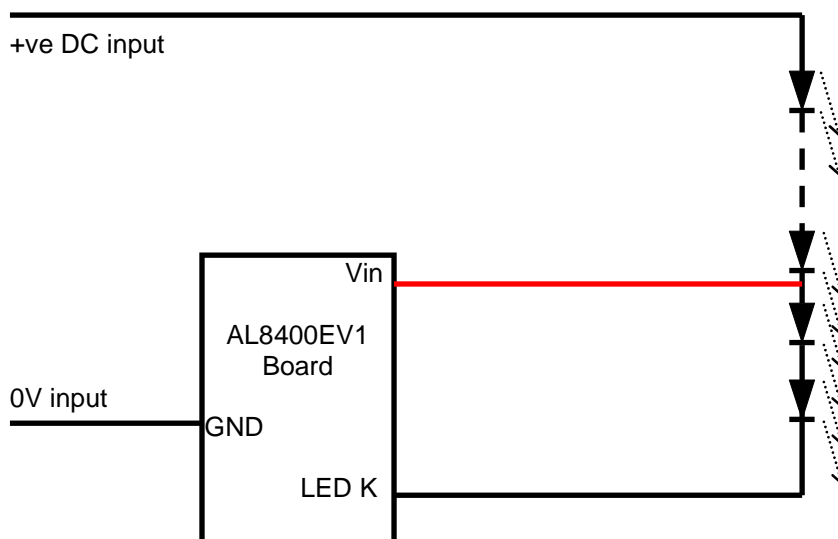


Figure 3: Extended Voltage Range connection diagram

Bill of Materials

| QUANTITY | PCB IDENT | VALUE | DESCRIPTION | SUGGESTED SOURCE |
|-----------------|------------------|--------------|------------------------|-------------------------|
| 1 | N/A | DDB041R1 | PCB | Diodes Zetex |
| 1 | U1 | AL8400 | | Diodes Zetex |
| 1 | Q1 | FZT690B | | Diodes Zetex |
| 2 | C1,C2 | 470nF | 0603 Ceramic Capacitor | Generic |
| 1 | R1 | 10k | 0603 Resistor | Generic |
| 1 | R2 | 1R3 | 1206 Resistor | Generic |

Circuit Accuracy.

The accuracy of the circuit is determined by the accuracy of the device (+/- 5% over temp) and the accuracy of the current sensing resistor (Typ +/- 1%).

For the circuit as set the nominal current is 154mA ($0.2/1.3 = 0.15384\dots$). The worst cases are 163mA ($0.210/1.287 = 0.16317\dots$) and 144mA ($0.19/1.313 = 0.14470\dots$). This gives approx 10mA possible variation over the nominal 154mA, about 6.5%.

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