

General Description

The AL5890 is a two terminal constant current linear LED driver and it provides a cost-effective solution. It offers an excellent temperature stability and the current accuracy $<\pm 2.0\text{mA}$ (typ.) over a wide voltage range. The AL5890 simplifies the design for linear LED drivers allowing it to be designed as a high or low-side constant current regulator without any external components.

The AL5890 turns on immediately and can swing from 7V up to 400V enabling it drive long LED chains. The floating ground, 400V Voltage rating between Input and Output pins designed to withstand the high peak voltage incurred in DC and offline applications.

The AL5890 is available in thermally robust package PowerDI[®]123 (Type B), SOT89 and TO252 (Standard) packages.

Key Features

- Low Minimum Operating Voltage (7V to 400V)
- -40°C to 125°C Temperature Range
- $<\pm 2.0\text{mA}$ LED Current Accuracy
- PDI123, SOT89, and TO252 packages

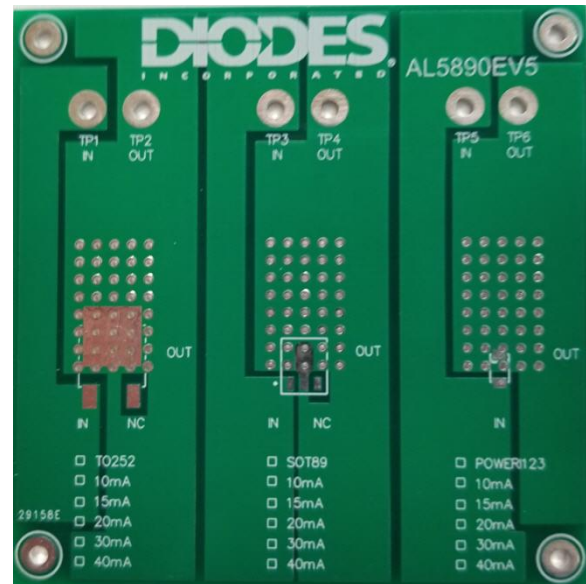
Applications

- Constant LED Current Driver
- Isolated Offline LED Converters
- LED Signs
- Instrumentation Illumination

Specifications

Parameter	Value
Input Voltage	7V – 400V
LED Current Options	10 to 40mA
XY Dimension	2.5" x 2.5"
ROHS Compliance	Yes

Top-View EVM (AL5890EV5)



AL5890EV5 (TO252) or (SOT89) or (PDI123)

Evaluation Board Connection Setup

(AC Configuration)

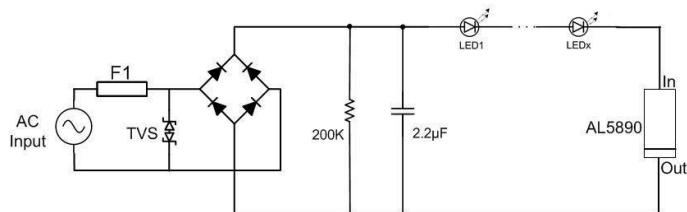


Figure 1. Low Side AC Application

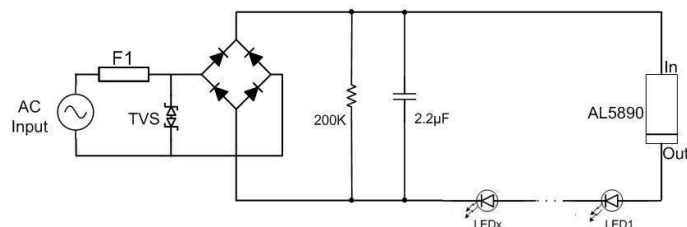


Figure 2. High Side AC Application

The AL5890 can also be used at the high side of the IC, see Figure 1 and 2. The minimum system input voltage can be calculated by: $V_{IN(MIN)} = V_{LED_CHAIN} + 7V$, Where V_{LED_CHAIN} is the LED chain voltage.

(DC Configuration)

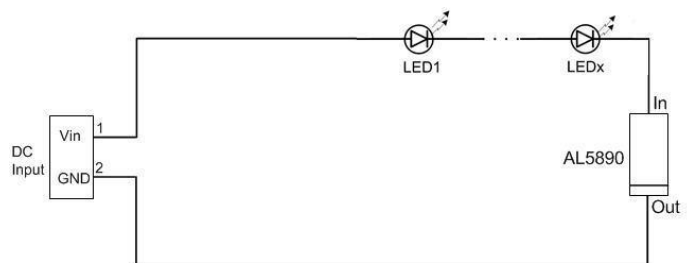


Figure 3. Low Side DC Application

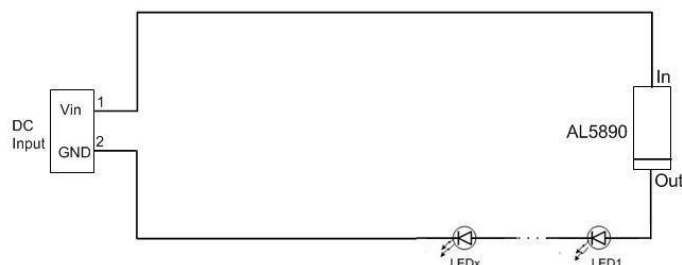


Figure 4. High Side DC Application

High Current Requirement in Parallel Configuration

The LED current can be increased by connecting two or more AL5890 in parallel as Figure 5.

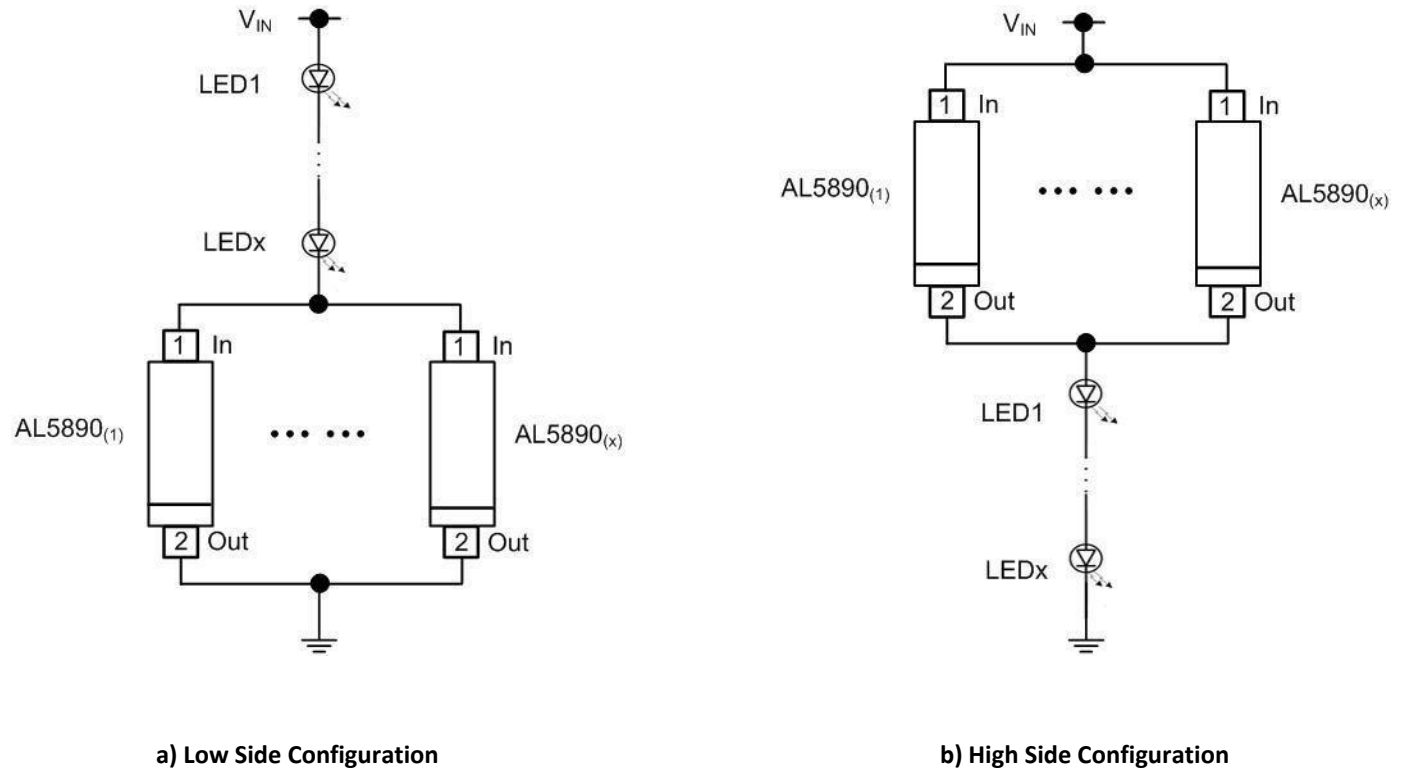
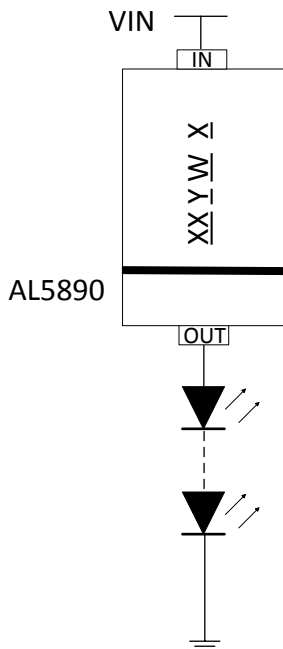


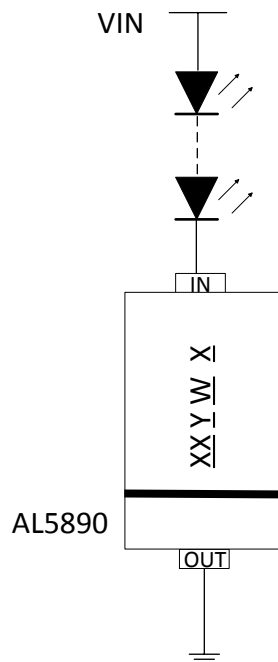
Figure 5. Parallel Configuration of AL5890

Schematic

For AL5890EV5 (PDI123)



Low side configuration

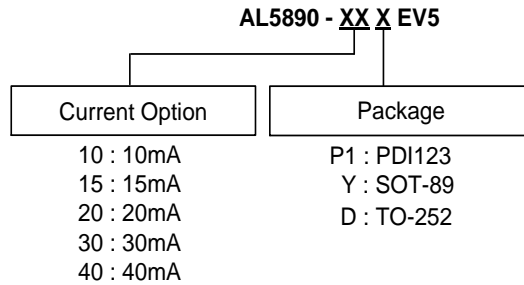


High side configuration

Bill of Material

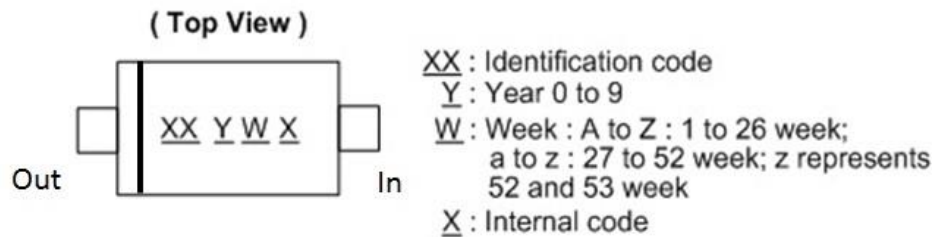
#	Name	Quantity	Part number	Manufacturer	Description
1	U1	1	AL5890-xxP1-13 or AL5890-xxY-13 or AL5890-xxD-13	Diodes Inc	Constant Current Regulator in PDI123 or SOT-89 or TO252

Ordering Information



Marking Information

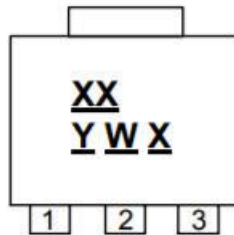
(1) PowerDI123 (Type B)



Part Number	Package	Identification Code
AL5890-10P1-13	PowerDI123 (Type B)	B2
AL5890-15P1-13	PowerDI123 (Type B)	B3
AL5890-20P1-13	PowerDI123 (Type B)	B4
AL5890-30P1-13	PowerDI123 (Type B)	B5
AL5890-40P1-13	PowerDI123 (Type B)	B6

(2) SOT-89

(Top View)

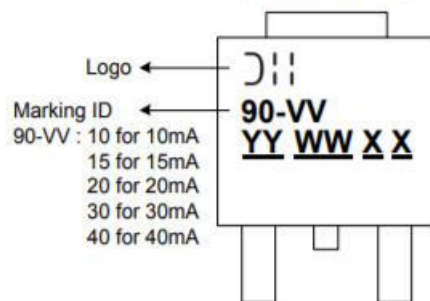


XX : Identification code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
 a~z : 27~52 week;
 z represents 52 and 53 week
X : Internal code

Part Number	Package	Identification Code
AL5890-10Y-13	SOT89	B2
AL5890-15Y-13	SOT89	B3
AL5890-20Y-13	SOT89	B4
AL5890-30Y-13	SOT89	B5
AL5890-40Y-13	SOT89	B6

(3) TO252 (Standard)

(Top View)



YY : Year : 01 to 09
WW : Week : 01 to 52, 52 represents
 52 and 53 week
XX : Internal Code

Part Number	Package	Identification Code
AL5890-10D-13	TO252 (Standard)	B2
AL5890-15D-13	TO252 (Standard)	B3
AL5890-20D-13	TO252 (Standard)	B4
AL5890-30D-13	TO252 (Standard)	B5
AL5890-40D-13	TO252 (Standard)	B6

Typical Performance Characteristics (20mA) PDI options

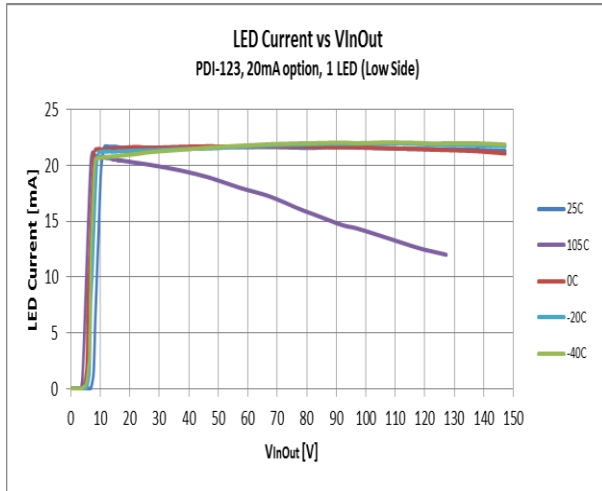


Figure 6. LED Current vs. VinOut

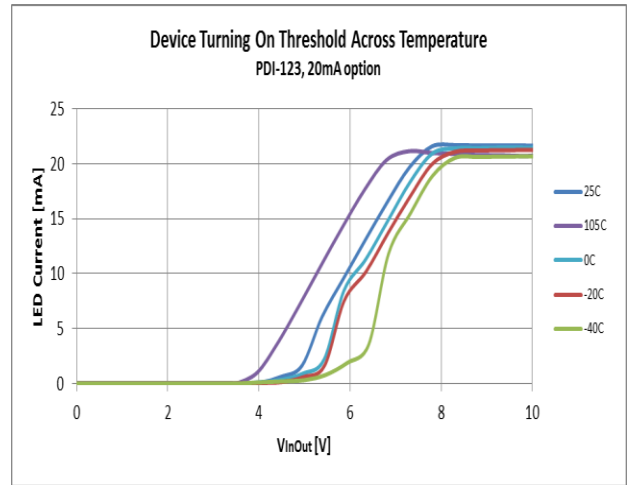


Figure 7. Startup Minimum Operating Voltage

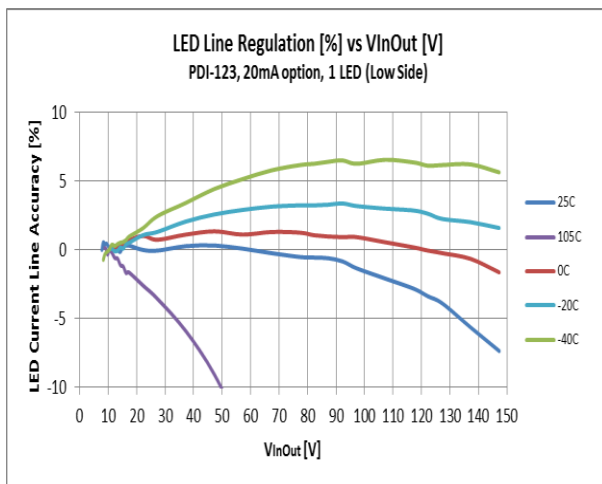


Figure 8. LED Line Regulation (%) vs. VinOut across Temp

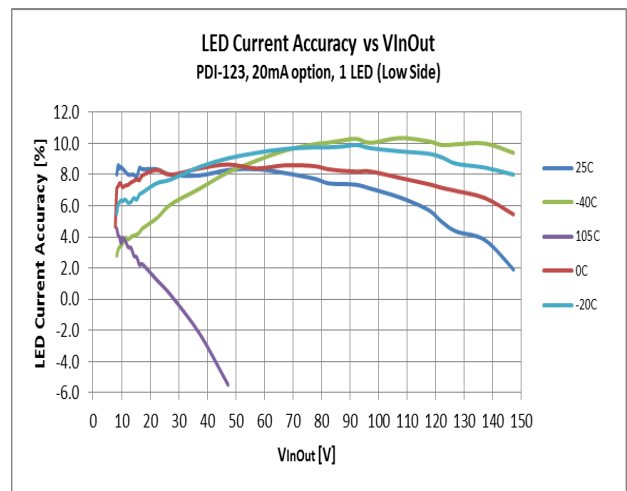


Figure 9 LED Current Accuracy (%) vs. VinOut across Temp

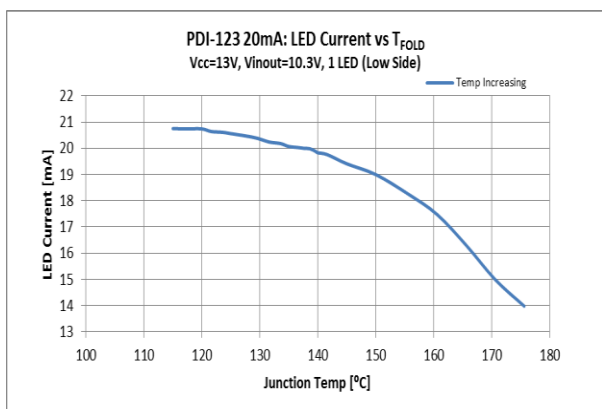


Figure 10. LED Current (mA) vs. Thermal Foldback

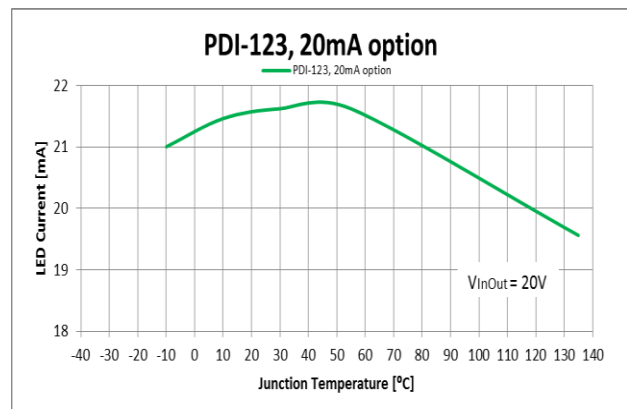


Figure 11. LED Current (mA) vs. Junction Temp, VinOut = 20V

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