

# IS31LT3170 10-TO-150mA CONSTANT-CURRENT LED DRIVER

## DESCRIPTION

The IS31LT3170 is adjustable constant current linear devices with excellent temperature stability. A single resistor is all that is required to set the operating current from 10mA to 150mA. The devices can operate from an input voltage from 5V to 42V with minimal voltage headroom of 0.6V. Designed with a low dropout voltage; the device can drive LED strings close to the supply voltage.

As a current sink, it is ideal for LED lighting applications or as power supply current limiters.

## FEATURES

- Low-side current sink
  - Current preset to 10mA
  - Adjustable from 10mA to 150mA with external resistor selection
- Wide input voltage: 5V to 42V
- Up to 1W power dissipation in a small SOT23-6 package
- RoHS compliant (Pb-free) package
- Operating temperature range from -40°C ~ +125°C

## QUICK START

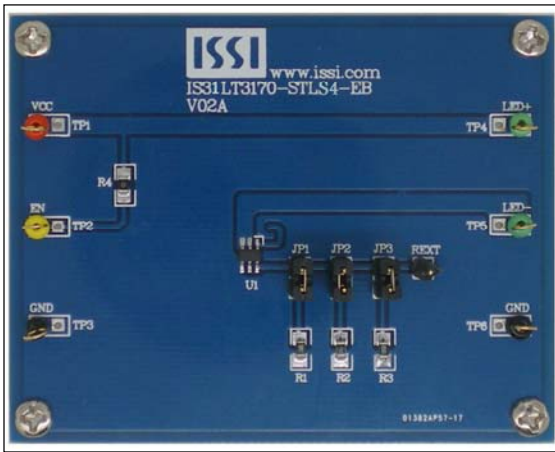


Figure 1: Photo of IS31LT3170 Evaluation Board

## RECOMMENDED EQUIPMENT

- 42V, 500mA DC variable power supply
- 3 HBLEDs connected as a serial string

## ABSOLUTE MAXIMUM RATINGS

- ≤ 42V input voltage

**Caution: Do not exceed the conditions listed above, otherwise the board will be damaged.**

## PROCEDURE

The IS31LT3170 evaluation board is fully assembled and tested. Follow the steps listed below to verify board operation.

**Caution: Do not turn on the power supply until all connections are completed.**

- 1) Connect the ground terminal of the power supply to the GND (TP3) and the positive terminal to the VCC (TP1). Connect the Anode of an external LED string to LED+ (TP4) and its Cathode to LED- (TP5).
- 2) The evaluation board supports eight current levels, selected by JP1, JP2, JP3, see table below. The test point REXT can be used to add an external resistor. The final resistance can be measured with an ohm meter across REXT and GND (TP6) pins. For jumpers (JP1~JP3) Closed=1 and Open=0.

JP1	JP2	JP3	R <sub>EXT</sub> (Ω)
0	0	0	-
0	0	1	100
0	1	0	15
0	1	1	13
1	0	0	8.2
1	0	1	7.6
1	1	0	5.3
1	1	1	5.0

- 3) The 0Ω resistor R4 is installed to connect the EN pin directly to VCC. **Caution: DO NOT** apply a PWM signal to EN pin, otherwise the PWM source may be damaged.

## ORDERING INFORMATION

Part No.	Temperature Range	Package
IS31LT3170-STLS4-EB	-40°C ~ +125°C (Industrial)	SOT-23-6, Lead-free

Table 1: Ordering Information

For pricing, delivery, and ordering information, please contact ISSI's analog marketing team at [analog@issi.com](mailto:analog@issi.com) or (408) 969-6600

## EVALUATION BOARD OPERATION

IS31LT3170 evaluation board drives one string of WLEDs. There are three resistors used for adjusting the output current.

### OUTPUT CURRENT SETTING

IS31LT3170 provides an easy constant current sink solution for LED lighting applications. It uses an external resistor to adjust the LED current from 10mA to 150mA. The LED current can be determined by the Equation (1):

$$I_{SET} = 10 \times \frac{(R_{INT} + R_{EXT})}{R_{EXT}} \quad (1)$$

Where  $R_{INT}$  (106Ω, Typ.) is the device internal resistor and  $R_{EXT}$  is the external resistor.

Paralleling a low tolerance resistor  $R_{EXT}$  with the internal resistor  $R_{INT}$  will improve the overall accuracy of the current sense resistance. The resulting output current will vary slightly lower due to the negative temperature coefficient (NTC) resulting from the self heating of the IS31LT3170.

## HIGH INPUT VOLTAGE APPLICATION

When driving a long string of LEDs whose total forward voltage drop exceeds the IS31LT3170's limit of 42V, it is recommended to stack several LEDs between the EN (TP2) and the LED- (TP5) such that the total forward voltage drop of the stacked LEDs maintains the EN (TP2) voltage >5V and <42V. The remaining string of LEDs can then be placed between LED+ (TP4) and EN (TP2), (Figure 3). The number of stacked LEDs at the EN pin will be limited by the LED's total forward voltage drop (VF) and the supply voltage.

**Caution:** the 0Ω resistor R4 installed on the IS31LT3170 evaluation board must first be removed.

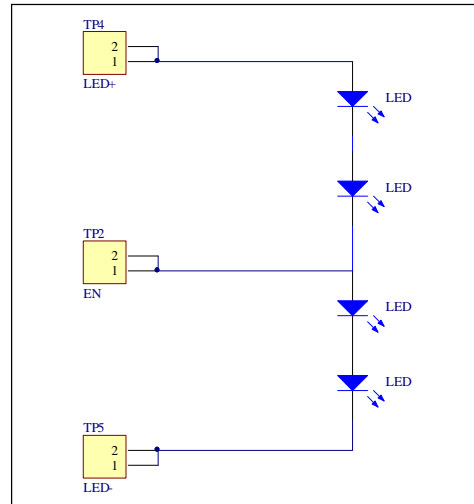


Figure 2: High Input Voltage Application Circuit

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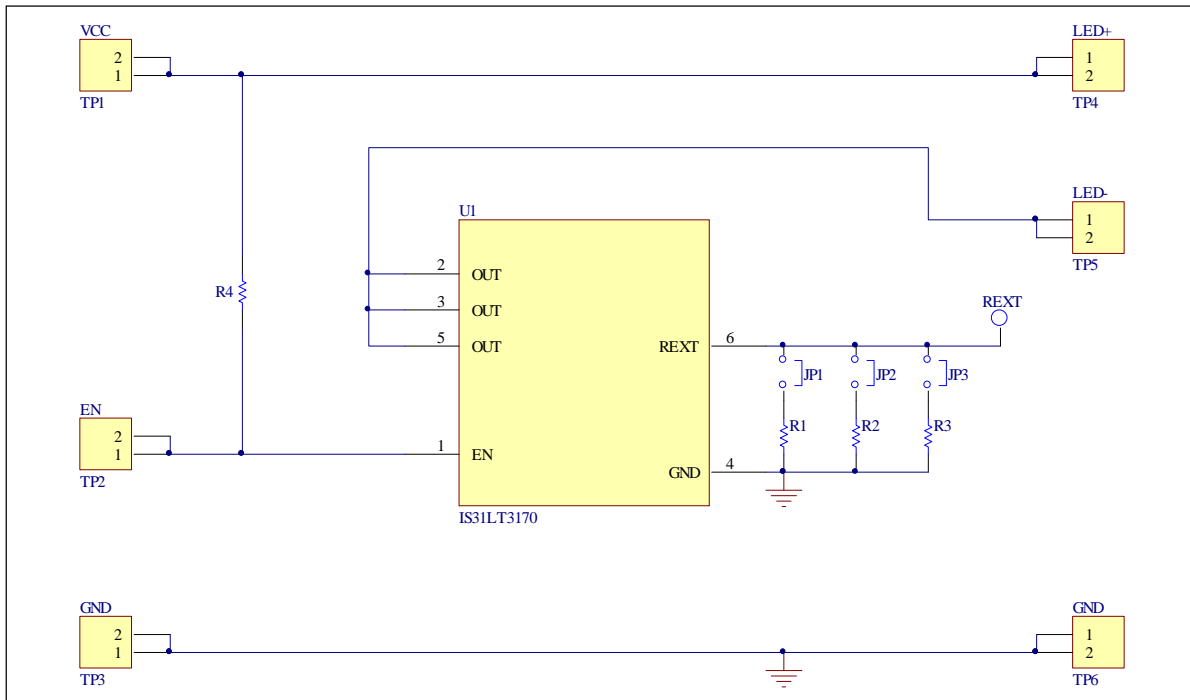
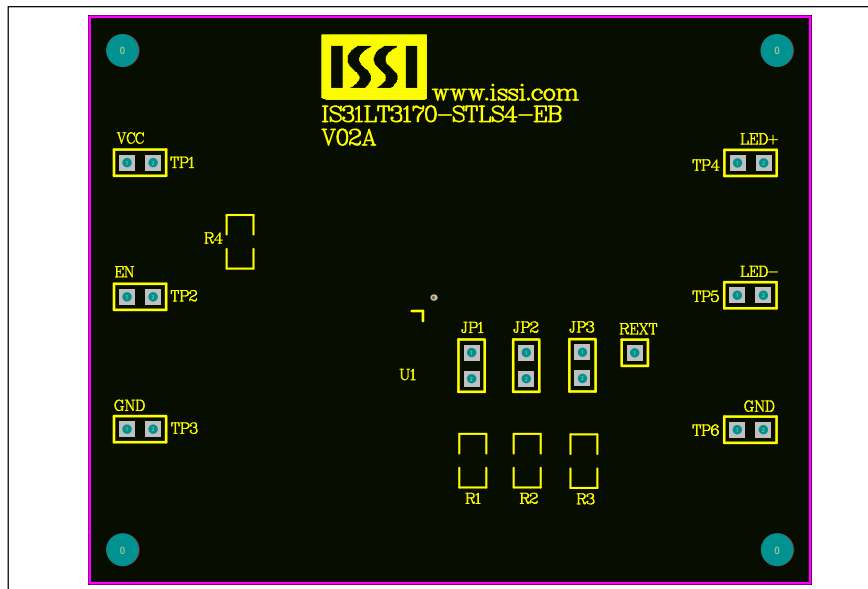


Figure 3: IS31LT3170 Application Schematic

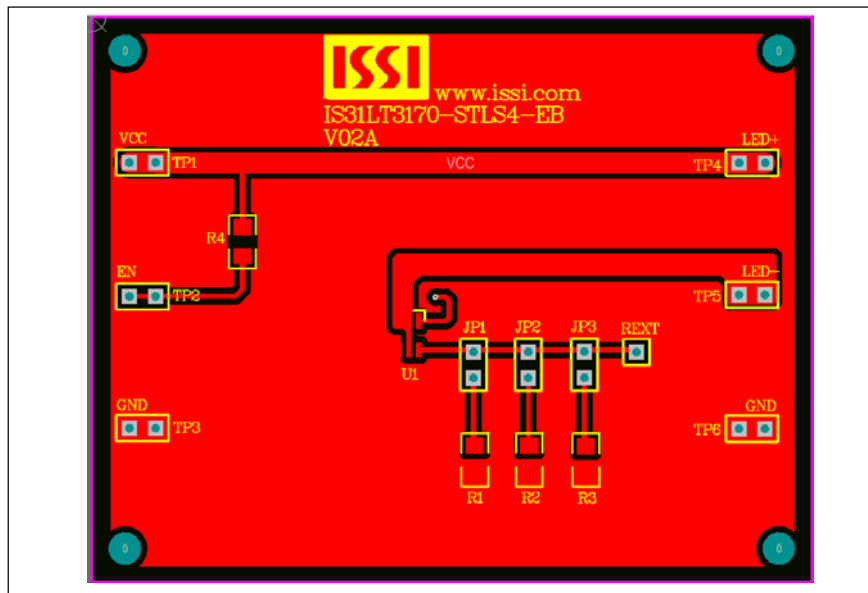
## BILL OF MATERIALS

Name	Symbol	Description	Qty	Supplier	Part No.
LED Driver	U1	LED Driver	1	ISSI	IS31LT3170
Resistor	R1	RES,8R2,1/8W,±1%,SMD	1	YAGEO	RC0805FR-078R2L
Resistor	R2	RES,15R,1/8W,±1%,SMD	1	YAGEO	RC0805FR-0715RL
Resistor	R3	RES,100R,1/8W,±1%,SMD	1	YAGEO	RC0805FR-07100RL
Resistor	R4	RES,0ohm,1/8W,±5%,SMD	1	YAGEO	RL0805JR-0700RL
Jumper	JP1~JP3	Jumper	3		
Test Terminal	TP1~TP6	Test terminal	6		

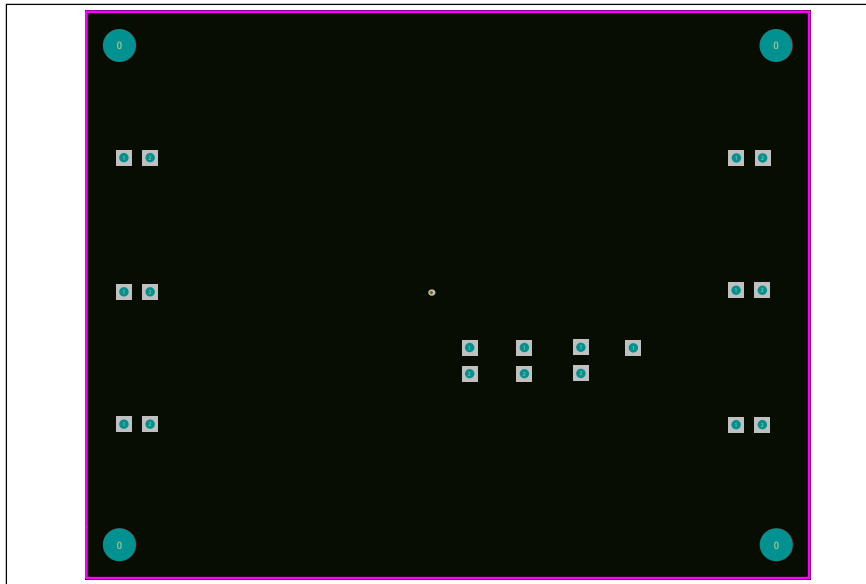
Bill of materials, refer to Figure 3 above.



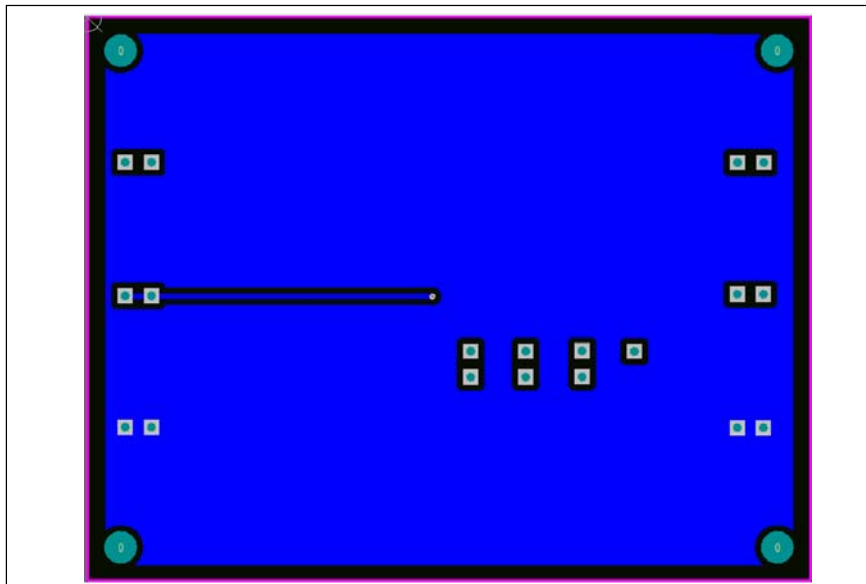
*Figure 4: Board Component Placement Guide - Top Layer*



*Figure 5: Board PCB Layout - Top Layer*



*Figure 6: Board Component Placement Guide - Bottom Layer*



*Figure 7: Board PCB Layout - Bottom Layer*

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