

# IS31BL3506B 1.0MHZ BOOST CONVERTER WITH 35V INTERNAL MOSFET SWITCH

## DESCRIPTION

IS31BL3506B is a boost converter featuring an integrated MOSFET switch designed for driving series strings of LED or other device. Input operating voltage range is 2.7V~5.5V. The device regulates the LED load current is set using an external, low value sensing resistor. The device adjusts the PWM duty cycle of the switch to maintain the voltage at the FB pin at a value of 0.2V. The IS31BL3506B operates at a constant switching frequency of 1.0MHz to allow for small component size. IS31BL3506B features an over voltage shutdown pin which prevents the output voltage from exceeding 35V (typ.) in the case of an open circuit condition.

## FEATURES

- Supply voltage: 2.7V~5.5V
- Built-in soft start
- Drive series strings of 8 LEDs
- PWM or DC voltage dimming
- Frequency of PWM is 500Hz ~ 500kHz
- 1.0MHz high speed switching frequency
- 200mV feedback voltage
- Integrated high power MOSFET
- Over voltage protection
- -40°C ~ +85°C working temperature range
- SOT23-6 package

## QUICK START

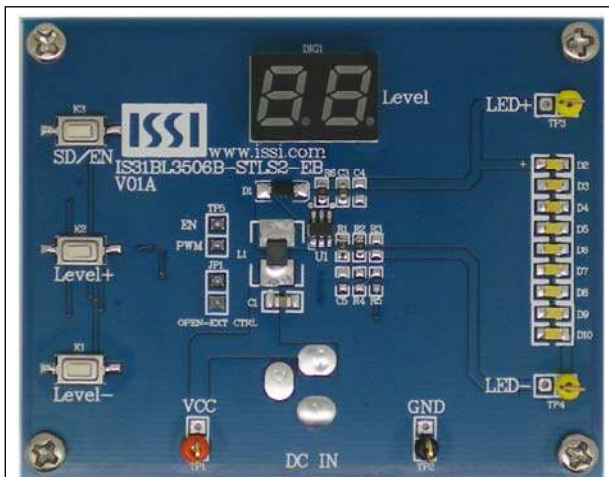


Figure 1: Photo of IS31BL3506B Evaluation Board

## RECOMMENDED EQUIPMENT

- 5.0V, 2A power supply

## ABSOLUTE MAXIMUM RATINGS

- $\leq 5.5V$  power supply

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

## PROCEDURE

The IS31BL3506B evaluation board is fully assembled and tested. Follow the below steps to verify operation.

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

- 1) Connect the Power Supply ground terminal to the PCB GND input pin and the positive terminal to the PCB VCC input pin. Or connect a 5V wall-mount DC power out plug (center power) to the PCB connector (CON1 / DC IN).
- 2) Turn on the power supply and pay attention to the supply current. If the current exceeds 2A, please check for circuit fault.

## EVALUATION BOARD OPERATION

The WLED light intensity is adjusted by the onboard MCU (LPC936) which generates a PWM signal to the IS31BL3506B EN pin 4. There are 32 intensity levels with the lowest set as the power on default. Pressing the Level+ key will increase the intensity level while pressing the Level- key will decrease the level. The 7-segment LED (DIG1) will show the corresponding light intensity level. The SD/EN key is used to toggle between shutdown and enable modes. The LED+ and LED- are test points to monitor the output voltage.

## LED CURRENT SETTING

When the IS31BL3506B is used for LED driving applications, the LED current flows through external feedback resistors  $R_1$  and  $R_2$  to regulate the LED current. The internal feedback regulation point is 0.2V.

The max current is calculated by the following:

$$I_{MAX} = V_{FB} / R_{SET} \quad \text{and} \quad R_{SET} = R_1 / R_2 \quad (R_2=1\Omega \text{ if zero ohm resistor used}).$$
 For accurate LED current, resistors should be 1% or better tolerance.

## SOFTWARE SUPPORT

JP1 is connected by default. Open it to disable the onboard MCU which will place the IS31BL3506B EN pin in High impedance. An external driving signal can then be connected to TP5 connector to control the IS31BL3506B LED driver. Please refer to the SW program for LPC936 code example.

*Please refer to the datasheet to get more information about IS31BL3506B.*

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## ORDERING INFORMATION

| Part No.             | Temperature Range          | Package            |
|----------------------|----------------------------|--------------------|
| IS31BL3506B-STLS2-EB | -40°C ~ +85°C (Industrial) | SOT23-6, Lead-free |

Table1: Ordering Information

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

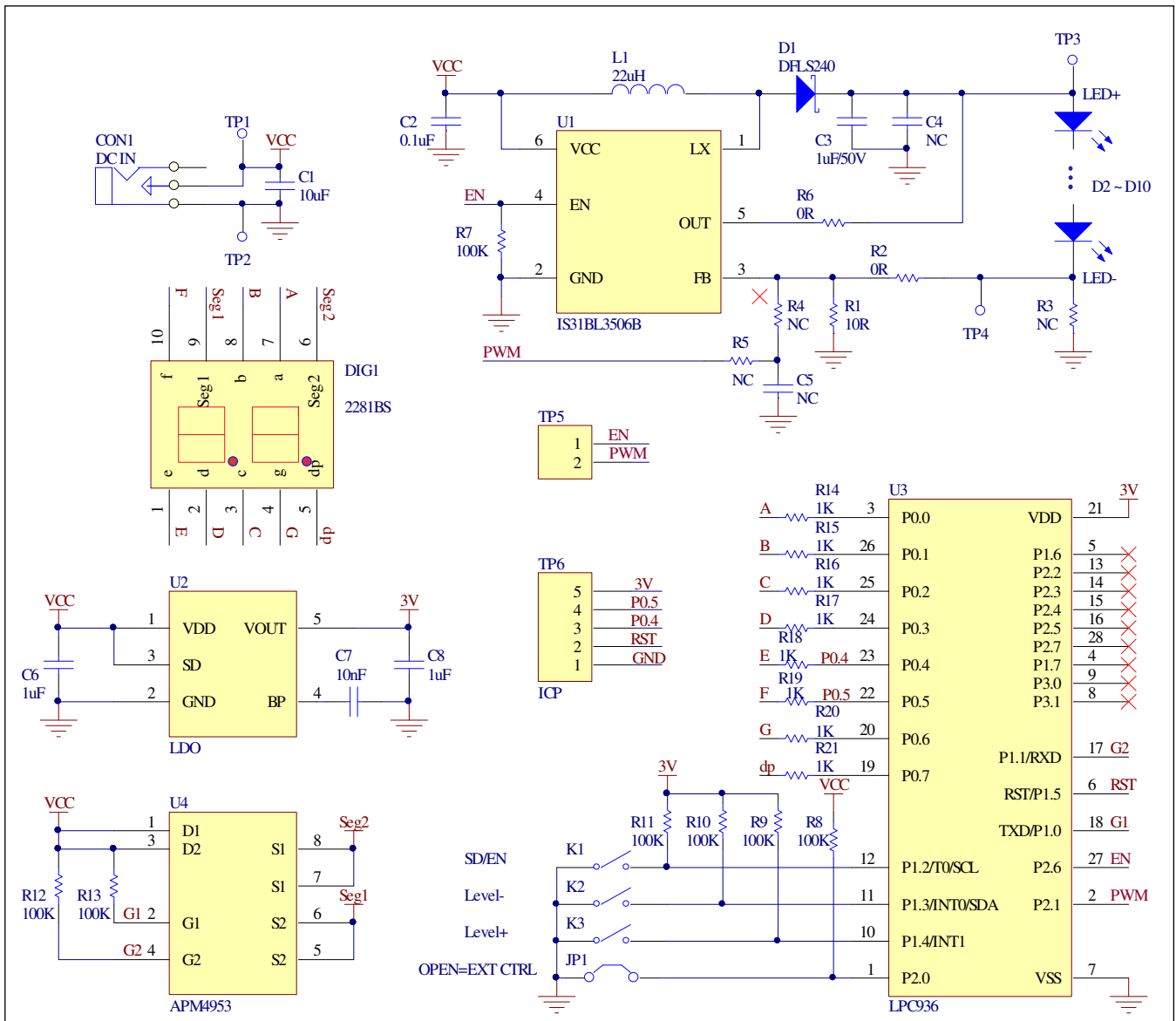


Figure 2: IS31BL3506B Application Schematic

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## BILL OF MATERIALS

| Name       | Symbol         | Description                        | Qty | Supplier  | Part No.            |
|------------|----------------|------------------------------------|-----|-----------|---------------------|
| LED Driver | U1             | FxLED boost converter driver       | 1   | Lumissil  | IS31BL3506B         |
| LDO        | U2             | Low-dropout regulator              | 1   | PAM       | PAM3101             |
| MCU        | U3             | Microcontroller                    | 1   | NXP       | LPC936              |
| PMOS       | U4             | Dual PMOS                          | 1   | ANPEC     | APM4953             |
| Display    | DIG1           | Dual digit display common anode    | 1   | ZSO       | 2281BS              |
| Diode      | D1             | Schottky Diode, SMD                | 1   |           | DFLS260             |
| Diode      | D2~D10         | Diode, LED White, SMD              | 9   | Everlight | EHP-C04/UT01-P01/TR |
| Inductor   | L1             | IND,22 $\mu$ H $\pm$ 20%,SMD       | 1   | Murata    | 22 $\mu$ H,IND      |
| Resistor   | R1             | RES,10R,1/16W, $\pm$ 5%,SMD        | 1   |           |                     |
| Resistors  | R2,R6          | RES,0R,1/16W, $\pm$ 5%,SMD         | 2   |           |                     |
|            | R3,R4,R5,C4,C5 | Not Connect                        | 5   |           |                     |
| Resistors  | R7~R13         | RES,100k,1/16W, $\pm$ 5%,SMD       | 7   |           |                     |
| Resistors  | R14~R21        | RES,1k,1/16W, $\pm$ 5%,SMD         | 8   |           |                     |
| Capacitor  | C1             | CAP,10 $\mu$ F,16V, $\pm$ 20%,SMD  | 1   |           |                     |
| Capacitors | C2             | CAP,0.1 $\mu$ F,16V, $\pm$ 20%,SMD | 1   |           |                     |
| Capacitors | C3,C6,C8       | CAP,1 $\mu$ F,50V, $\pm$ 20%,SMD   | 3   |           |                     |
| Capacitor  | C7             | CAP,10nF,16V, $\pm$ 20%,SMD        | 1   |           |                     |
| Buttons    | K1~K3          | Buttons SMD                        | 3   |           |                     |

*Bill of materials, refer to Figure 2 above.*

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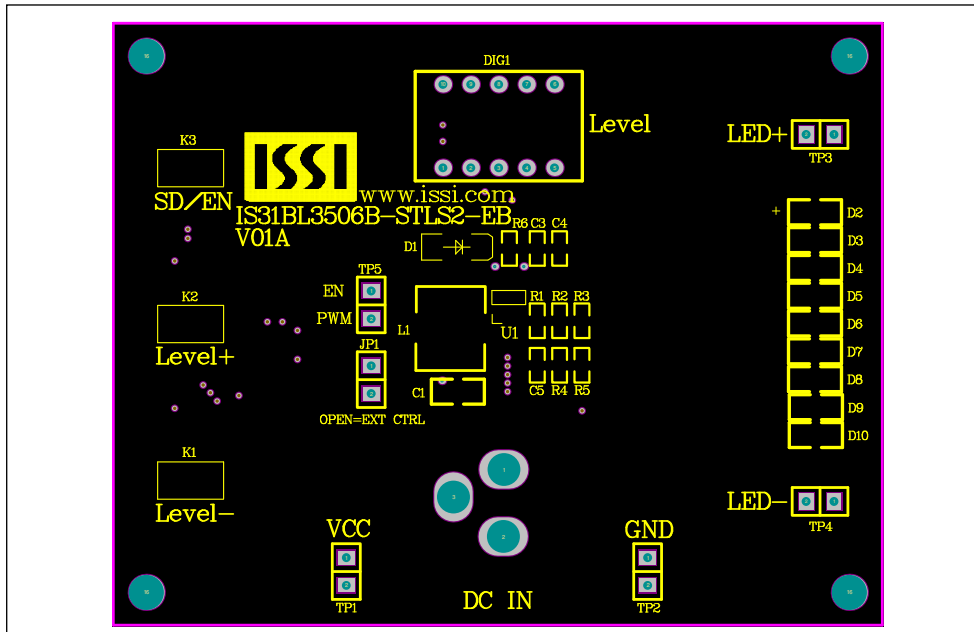


Figure 3: Board Component Placement Guide -Top Layer

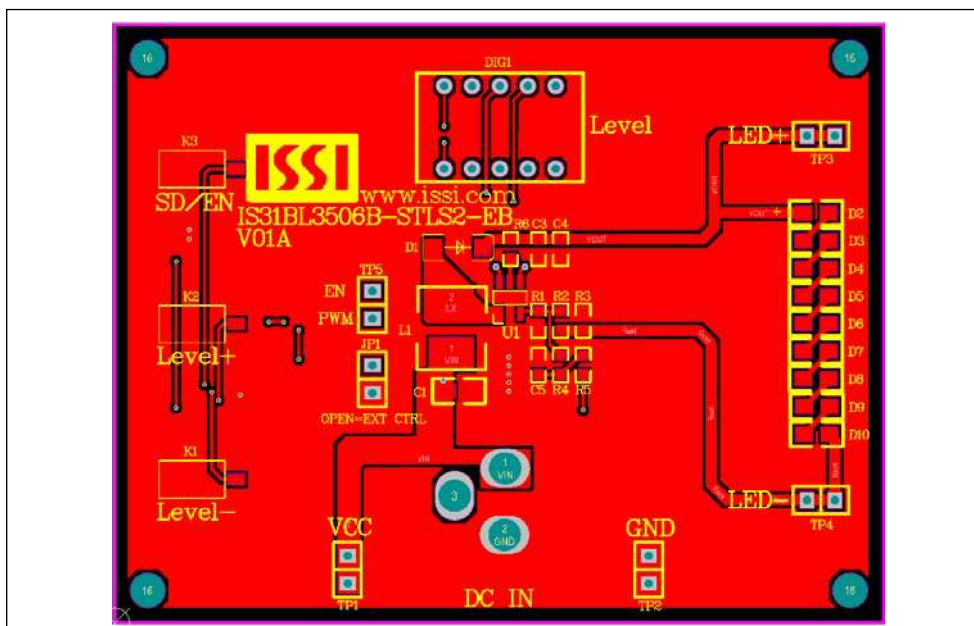


Figure 4: Board PCB Layout- Top Layer

# IS31BL3506B 1.0MHZ BOOST CONVERTER WITH 35V INTERNAL MOSFET SWITCH

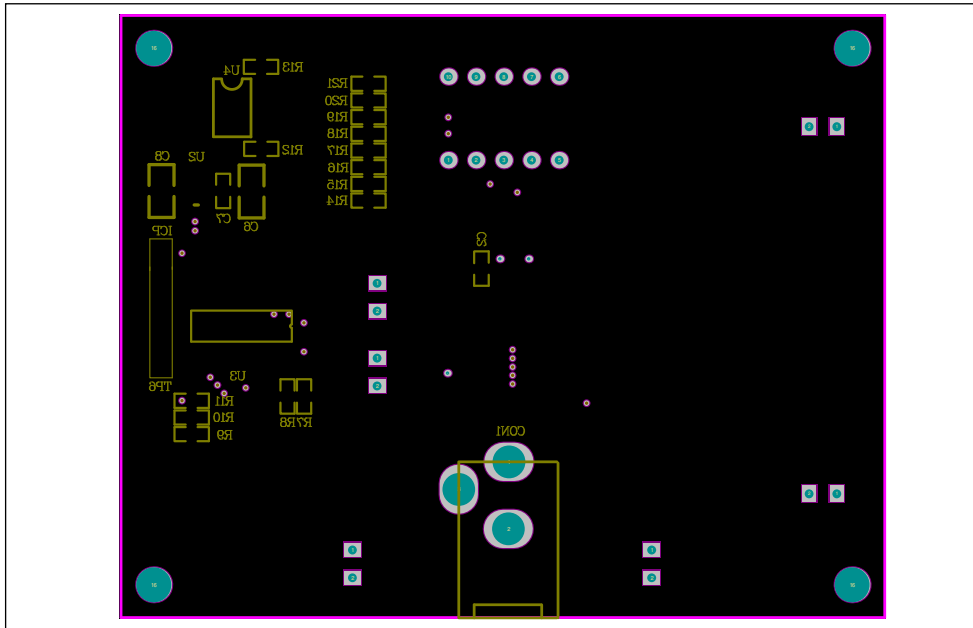


Figure 5: Board Component Placement Guide -Bottom Layer

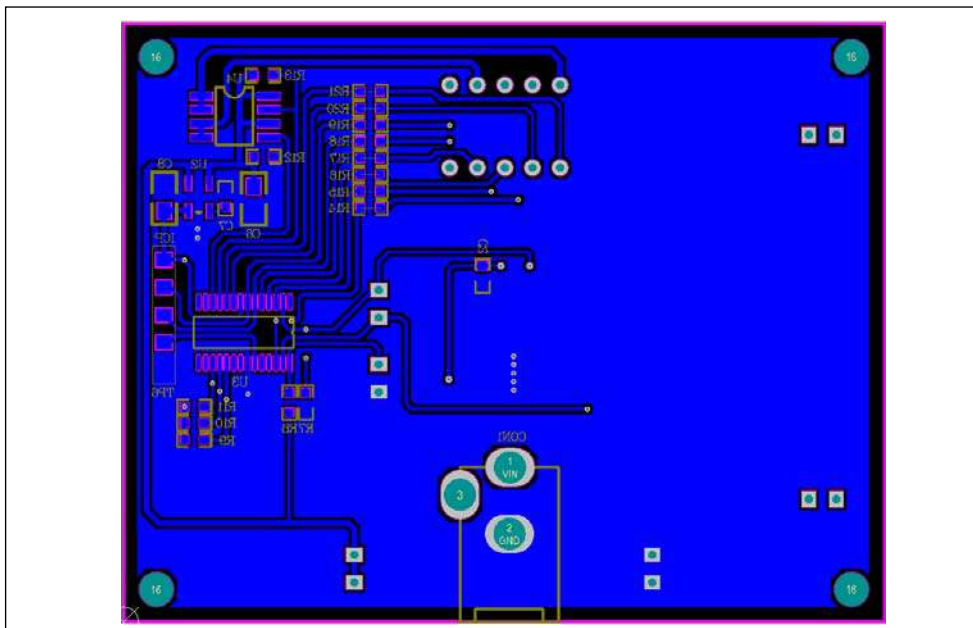


Figure 6: Board PCB Layout-Bottom Layer

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