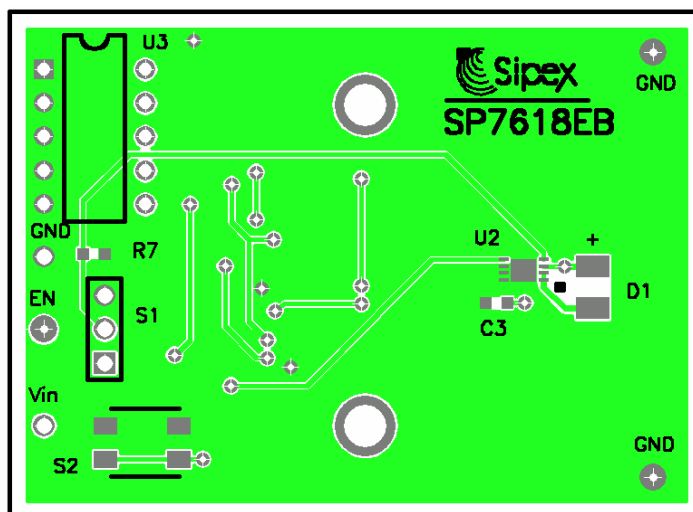


## Evaluation Board Manual

- Very low dropout voltage, 100mV
- Accurate current regulation down to dropout voltage
- No external components
- Output current adjustable with 33.33mA/steps
- Power-saving shutdown mode of 12nA typical
- Fast turn-on (<50μS)
- Time Out function to protect the LED
- Thermal Shutdown Protection
- Space saving 2mm x 3mm 8 pin DFN package



### DESCRIPTION AND BOARD SCHEMATIC

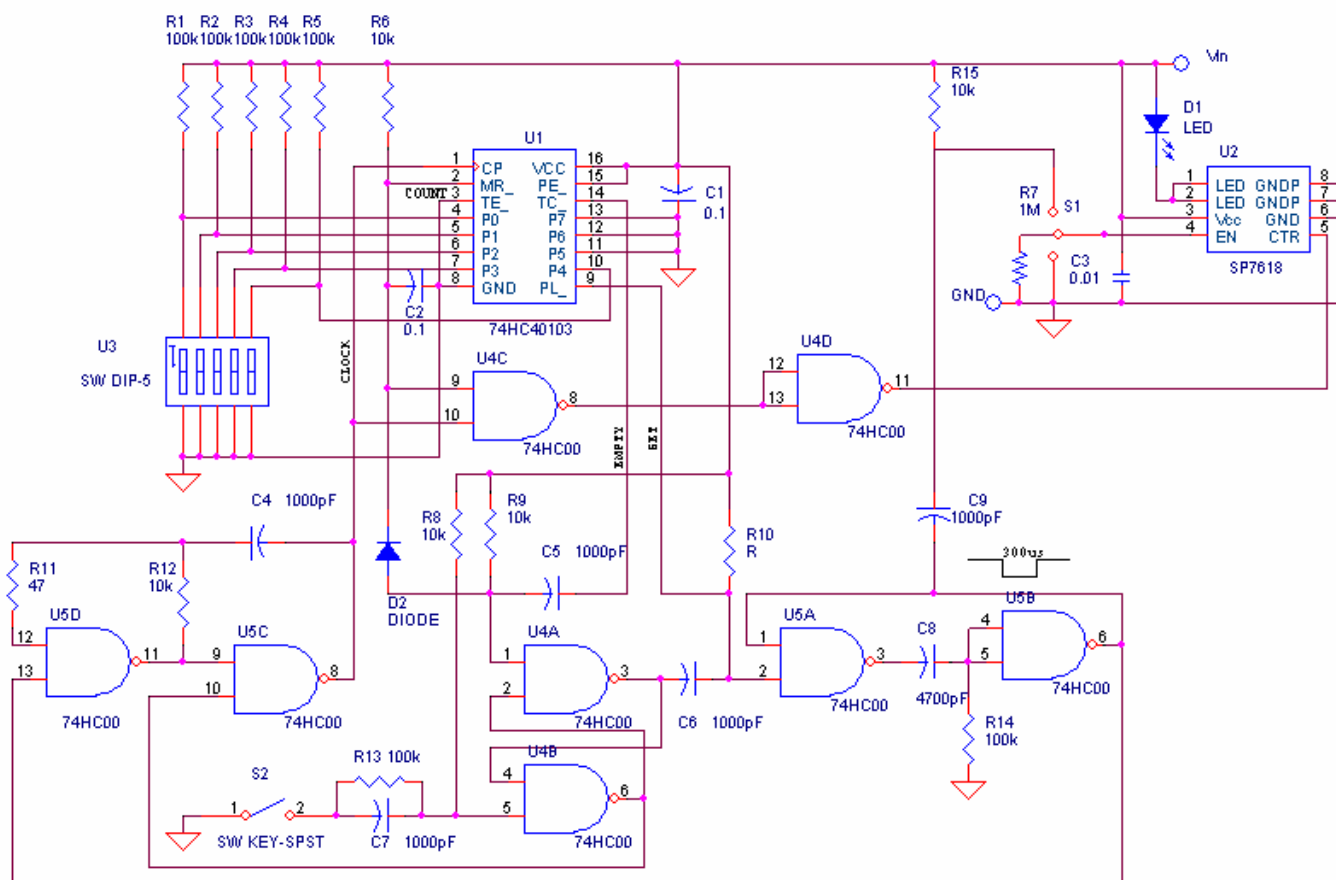


Figure 1. SP7618 Evaluation Board Schematic Diagram

The **SP7618 Evaluation Board** is designed to help the user evaluate the performance of the SP7618 for use as a single photo flash Luxeon LED Driver. The evaluation board is a completely assembled and tested surface mount board which provides easy probe access points to all SP7618 inputs and outputs so that the user can quickly connect and measure electrical characteristics and waveforms. The Evaluation Board schematic diagram is shown at Figure 1.

The SP7618 is a linear low side constant current driver designed to drive high power LEDs from an input voltage rail. The driver acts as a high current source ensuring constant LED current for a range of input voltage. The SP7618 allows implementing the lowest cost LED driver for a variety of applications. Internal circuitry maintains the preset constant current output for a wide voltage range at the LED input.

The LED current can be adjusted up to 1033mA with an external clock applied to the CTRL pin. The built-in thermal protection automatically stops LED current to prevent overheating. A timeout function serves as a fail safe, shutting down the output for currents greater than 266mA after 4 seconds of continuous operation if the enable input is not cycled. The part can be shutdown by using the EN pin or holding the CTRL pin low for more than 100 $\mu$ S.

The evaluation board contains SP7618 driver (U2) with one Luxeon Flash LED as a load (D1) and pulse generator.

The pulse generator (U1, U4, and U5) is used to provide a pulse sequence to the driver's CTRL and EN pins to set LED current and turn the driver on/off. The number of pulses that determines LED current may be set by 5-bit dip-switch (U3) using binary code. The number of pulses depend on switch position is shown on Table 1.

## USING THE EVALUATION BOARD

### 1) Selecting the LED current

LED current can be adjusted up to 1033mA with a series of pulses applied to the CTRL pin. Each pulse increases the output current in steps of 33.33mA. The maximum number of the pulses is 31. The 32<sup>nd</sup> and following pulses are ignored. The number of pulses depends on the switch position as shown on Table 1, which is on the next page.

| Number of pulses | Position of DIP-Switches |   |   |   |   |
|------------------|--------------------------|---|---|---|---|
|                  | 1                        | 2 | 3 | 4 | 5 |
| 1                | +                        | + | + | + |   |
| 2                | +                        | + | + |   | + |
| 3                | +                        | + | + |   |   |
| 4                | +                        | + |   | + | + |
| 5                | +                        | + |   | + |   |
| 6                | +                        | + |   |   | + |
| 7                | +                        | + |   |   |   |
| 8                | +                        |   | + | + | + |
| 9                | +                        |   | + | + |   |
| 10               | +                        |   | + |   | + |
| 11               | +                        |   | + |   |   |
| 12               | +                        |   |   | + | + |
| 13               | +                        |   |   | + |   |
| 14               | +                        |   |   |   | + |
| 15               | +                        |   |   |   |   |
| 16               |                          | + | + | + | + |
| 17               |                          | + | + | + |   |
| 18               |                          | + | + |   | + |
| 19               |                          | + | + |   |   |
| 20               |                          | + |   | + | + |
| 21               |                          | + |   | + |   |
| 22               |                          | + |   |   | + |
| 23               |                          | + |   |   |   |
| 24               |                          |   | + | + | + |
| 25               |                          |   | + | + |   |
| 26               |                          |   | + |   | + |
| 27               |                          |   | + |   |   |
| 28               |                          |   |   | + | + |
| 29               |                          |   |   | + |   |
| 30               |                          |   |   |   | + |
| 31               |                          |   |   |   |   |

**Table 1. Code Table**

Note: “+”- this switch is in ON position  
If all switches are in ON position the number of pulses is 256.

## 2) Powering Up the SP7618 Circuit

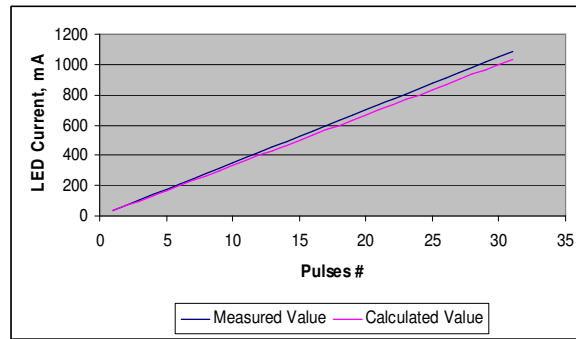
The SP7618 Evaluation Board can be powered from a 4.5V power supply or from 3 alkaline cells.

Connect 4.5V source pin with short lead directly to the “Vin” and -4.5V/GND pin to the “GND” posts.

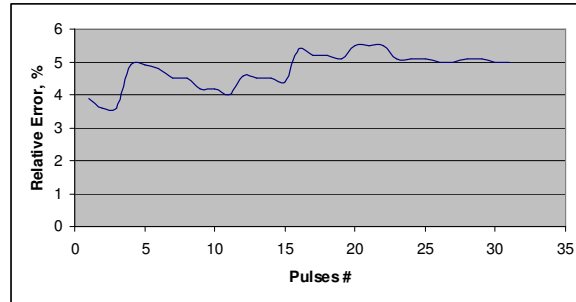
Install shunt S1 to short pins 2-3 (The Evaluation board is delivered by default with shunt in this position. If shunt S1 isn't installed or short pins 1-2 the driver SP7618 is disabled).

Push the button S2. Driver (U2) will provide to the LED current in respect to dip-switch (U3) position. If the output current is higher than 266mA (8 pulses), the driver will turn off after 4s to prevent LED damage. Every push on button S2 turns the driver off/on and sends the CTRL pin a new pulse sequence depending on the dip-switch position.

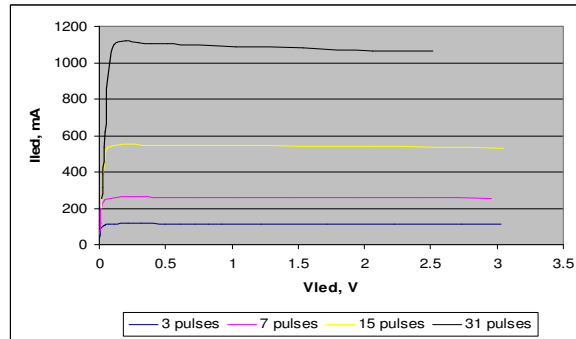
Disconnect Evaluation board from power supply to turn it off.



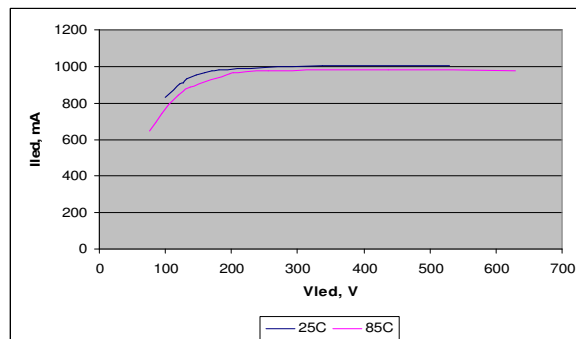
Graph 1. LED Current vs. number of input pulses



Graph 2. LED Current Relative Error vs. number of input pulses



Graph 3. Load regulation at Vin = 5.5V



Graph 4. Load regulation at 25°C and 85°C

## EVALUATION BOARD LAYOUT

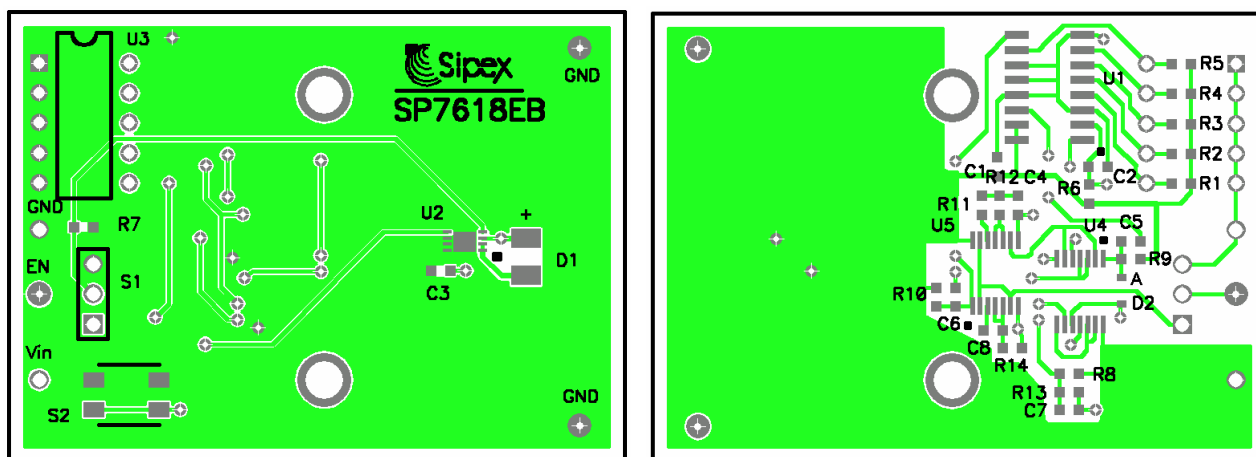


Figure 2. SP7618 Evaluation Board Layout top and bottom side

| Count | Reference Designator         | Value  | Description                      |
|-------|------------------------------|--------|----------------------------------|
| 2     | C1, C2                       | 0.1uF  | 0603ZC104MAT AVX                 |
| 2     | C3                           | 0.01uF | 06033C103MAT2A AVX               |
| 5     | C4, C5, C6, C7, C9           | 1000pF | 06033C102MAT2A AVX               |
| 1     | C8                           | 4700pF | 06033C472MAT2A AVX               |
| 1     | D1                           |        | LXCL-PWF1 Lumileds               |
| 1     | D2                           |        | BAT42WS Diodes Inc               |
| 1     | P1                           | GND    | 1001-0-15-01-30-02-04-0 Mill-Max |
| 1     | P2                           | EN     | 1001-0-15-01-30-02-04-0 Mill-Max |
| 1     | P3                           | Vin    | 1001-0-15-01-30-02-04-0 Mill-Max |
| 7     | R1, R2, R3, R4, R5, R13, R14 | 100k   | CRCW0603104J Vishay              |
| 5     | R6, R8, R9, R10, R12         | 10k    | CRCW0603102J Vishay              |
| 1     | R7                           | 1M     | CRCW0603105J Vishay              |
| 1     | R11                          | 47     | CRCW060347RJ Vishay              |
| 1     | S1                           |        | Header 42375-22-28-4033 Molex    |
| 1     | S2                           |        | 7914 G-002-000E Bourns           |
| 1     | U1                           |        | CD74HC40103M                     |
| 1     | U2                           |        | SP7618 Sipex                     |
| 1     | U3                           |        | 5-bit DIP Switch                 |
| 2     | U4, U5                       |        | 74VHC00MTC Fairchild             |

Table 2. SP7618EB List of Materials

## ORDERING INFORMATION

| Model              | Temperature Range   | Package Type                   |
|--------------------|---------------------|--------------------------------|
| SP7618EB.....      | -40°C to +85°C..... | SP7618 Evaluation Board        |
| SP7618ER-L/TR..... | -40°C to +85°C..... | Lead Free 8-pin DFN (2 x 3 mm) |

/TR = Tape and Reel

Pack quantity is 3000 for DFN.

For further assistance:

Email: [Sipexsupport@sipex.com](mailto:Sipexsupport@sipex.com)  
WWW Support page: <http://www.sipex.com/content.aspx?p=support>  
Live Technical Chat: <http://www.geolink-group.com/sipex/>  
Sipex Application Notes: <http://www.sipex.com/applicationNotes.aspx>



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