

#### General Description

The EV0042 Evaluation Board is designed to demonstrate the capabilities of MPS' MP1519 fully automatic charge pump based white LED driver. It powers up to four (4) white LEDs from a single Li-Ion or from 3 or 4 series NiMH or alkaline batteries. The MP1519 drives the LEDs through a current source and automatically switches between 1x, 1.5x and 2x charge pump modes for accurate LED current matching and optimum efficiency. The LED current is externally settable up to 30mA LED brightness. The MP1519 can be controlled by an analog input or by PWM control up to 50KHz.

The high 1.3MHz charge pump frequency allows the use of small 1 $\mu$ F capacitors. Combining these with the tiny 3mm x 3mm QFN16 package provides the most compact white LED solution available.

#### Ordering Information

| Board Number | MPS IC Number |
|--------------|---------------|
| EV0042       | MP1519DQ      |

#### Absolute Maximum Ratings

|                         |               |
|-------------------------|---------------|
| $V_{BATT}$ to GND       | 7V            |
| Power Dissipation (QFN) | 1.0 W         |
| Logic Inputs to GND     | -0.3V to 6.5V |

#### Recommended Operating Conditions

|                          |                   |
|--------------------------|-------------------|
| Input Voltage $V_{BATT}$ | 2.5V to 5.5V      |
| Operating Temperature    | -40 °C to + 85 °C |

#### Features

- 2% LED Current Matching
- High Efficiency (>93%)
- Current Source Outputs
- 1x, 1.5x and 2x Automatic Modes
- Constant Frequency Operation
- High and Low Frequency PWM Capability
- 2.5V to 5.5V Operation
- Less than 1 $\mu$ A Leakage during Shutdown
- Detects Changes in Battery Level
- Soft Start and Soft Switch Operation

#### Applications

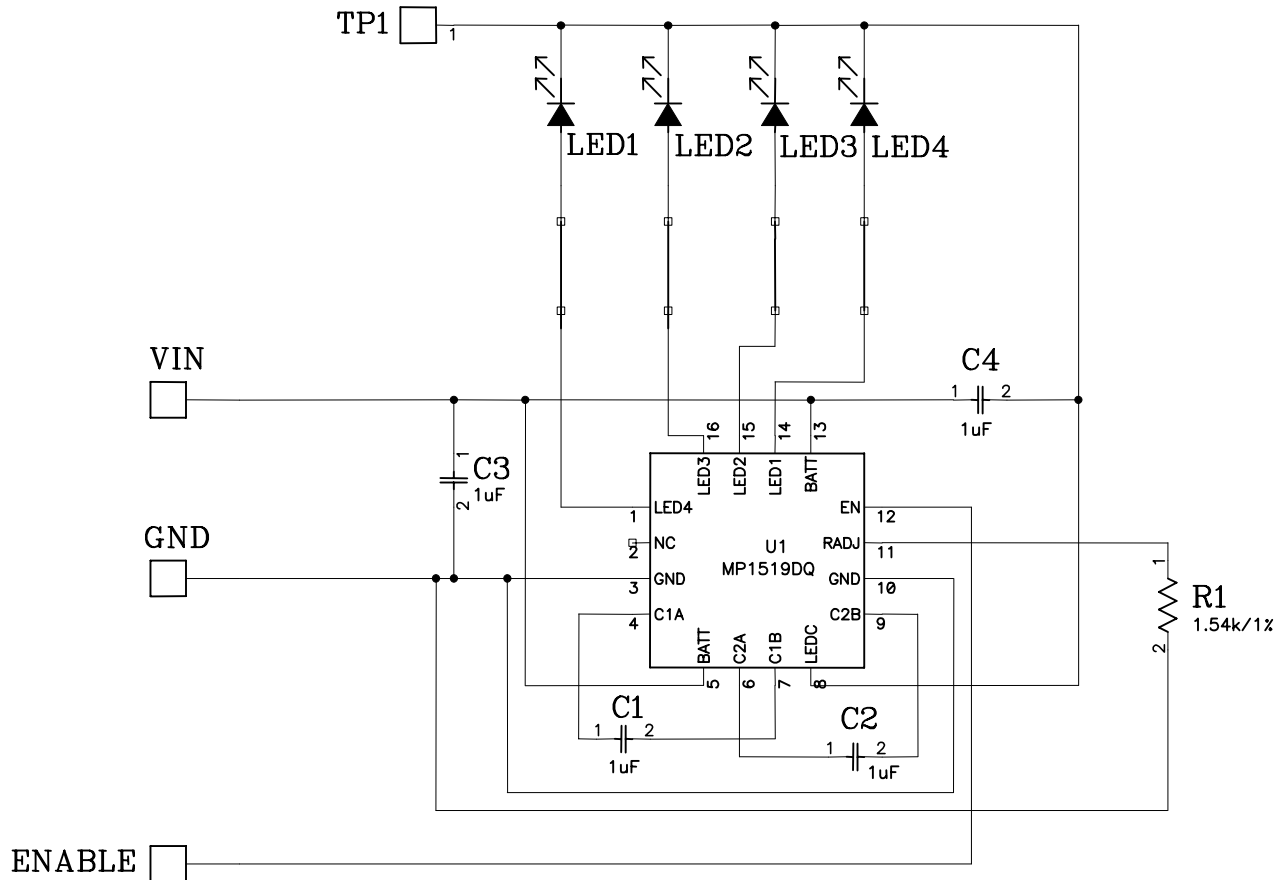
- Cell Phones
- PDA or Hand Held Computers
- White LED Application at 3.6V Supply

Figure 1: EV0042 Evaluation Board



Actual Size: 2.375X x 1.875Y

Figure 2: EV0042 Schematic



MP1519 Demo Board (EV0042) Rev. C

5/27/03

Note: LEDC pin connects to Exposed Paddle on Backside.

Table 1: EV0042 Bill of Materials

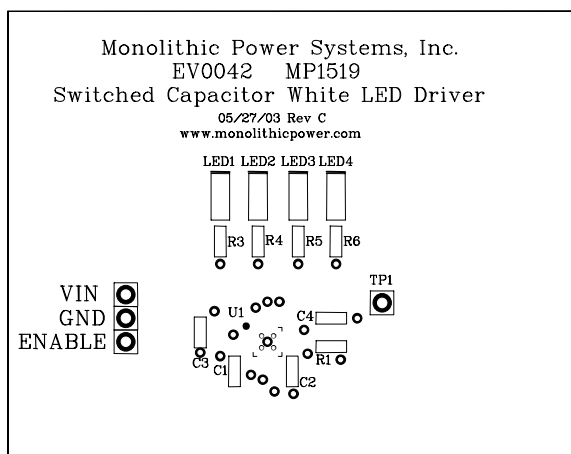
| Component   | Description                  | Manufacturer Part Number | Package      | Qty      |
|-------------|------------------------------|--------------------------|--------------|----------|
| U1          | Charge Pump White LED Driver | MPS MP1519DQ             | QFN16 (3x3)  | 1        |
| R1          | 1.54KΩ, 1%                   | Any                      | 0603         | 1        |
| C1 – C4     | 1µF, 6.3V, X5R or X7R        | Any                      | 0805         | 4        |
| LED1 – LED4 | White LED                    | Any                      | 1206         | NS       |
|             |                              |                          | <b>Total</b> | <b>6</b> |

\*NS = No Stuff

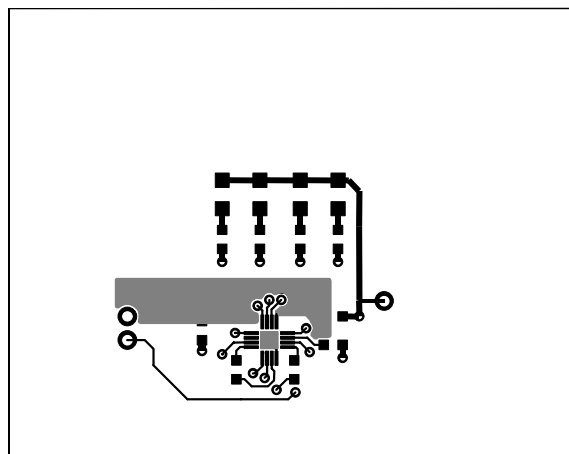
**Board Operation:**

1. Connect 2.5V to 5.5V power supply to BATT and GND terminals.
2. Drive EN high to turn on the MP1519, drive EN low to shut down the MP1519.
3. To use burst-mode brightness control, drive EN with a PWM signal.

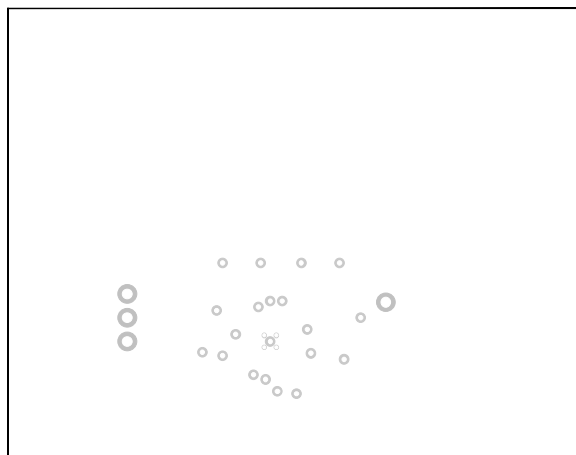
**Figure 3: Top Silk Layer**



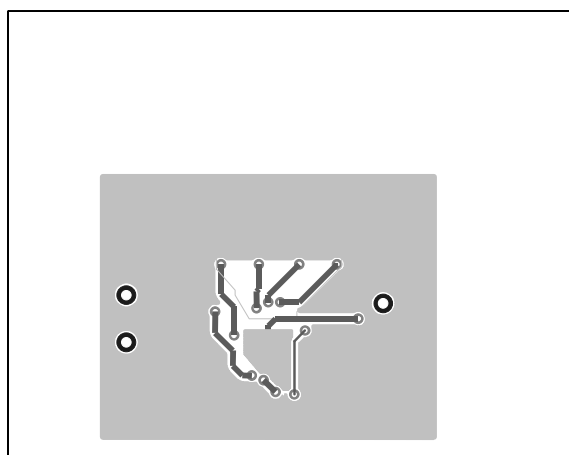
**Figure 4: Top Layer**



**Figure 5: Bottom Silk Layer**



**Figure 6: Bottom Layer**



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