

inductance as $184.3 \mu\text{H}$, where V_{IN} is 11 V. The output capacitor's value depends on the ripple allowed on the output voltage, while the input capacitor's value depends on the current peak.

To ensure constant illumination, the current through the LED must be monitored and maintained constant. To do this, the current is converted to voltage

by R8, R11, R12, and U2b and is fed back to the inverting terminal of U1's error amplifier. This negative feedback adjusts the duty cycle to maintain the current through the LEDs. Varying R11 provides dimming of the LEDs.

Op-amp U2a and R9, R13, R14, and R15 monitor the battery voltage and switch off the LEDs whenever the bat-

tery voltage falls below 11 V, thereby preventing deep discharge of the battery.

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