IS31FL3197

CHARGE PUMP RGBW LED DRIVER WITH PROGRAMMABLE SELF-RUNNING PATTERNS

GENERAL DESCRIPTION

The IS31FL3197 is a charge pump LED driver with programmable sequence operation for automated RGBW lighting effects. It is capable of driving 4 LEDs up to 10mA (adjustable in 256 current levels and 4096 PWM levels) from a small coin size battery supply.

The built−in charge pump structure will automatically toggle between 1x, 1.5x or 2x operation depending on the battery's state of charge. This DC/DC converter operates at a high switching frequency which enables the use of small external capacitors and achieves a 90% peak efficiency. To conserve battery life, the charge pump goes into high impedance mode whenever the IS31FL3197 is shutdown.

The IS31FL3197 can operate in either "Current Level & PWM mode" or "Pattern" mode. In Current Level & PWM mode, the output current of each output is independently programmed and controlled in 4096 steps to achieve color mixing and the PWM duty cycle of each output is also independently programmed and controlled in 4096 steps to simplify color mixing or for smoothly diming control. In Pattern mode, the timing characteristics for RGB channels output can be individually adjusted to maintain a pre-established pattern sequence without requiring any additional MCU interaction, thus saving valuable system resources.

The IS31FL3197 is available in a small QFN-16 (4mm×4mm) and WLCSP-16 (1.88mm×2.08mm, 0.45mm ball pitch, 0.2mm ball diameter) packages. It operates from 2.0V to 3.3V over the temperature range of -40°C to +85°C.

With automated lighting effects and a DC/DC charge pump, the small package IS31FL3197 is ideal for low power battery applications.

FEATURES

- 2.0V to 3.3V supply voltage
  - UVLO of 1.8V
- Charge pump
  - 1x, 1.5x, 2x operating modes
  - Highly efficient across battery state of charge
  - 1MHz constant frequency
- Power saving operating
  - Quiescent operating current 600µA (Typ.)
  - Shutdown current 1µA (Typ.)
- Support four LEDs - RGBW
  - Resistor sets maximum 10mA output current per LED
  - Each LED has 8-bit programmable current levels
  - Each LED has 12-bit programmable PWM levels
- LEDs operate with pre-established patterns
  - Once programmed runs without micro
  - OUT1~OUT3 have their own fade ON/OFF timing registers (TS~T4) with independent start/stop/crossfade
  - Fixed number of iterations or non-stop operation
  - Crossfade of one color to another
- Fast 400kHz I2C bus interface
  - Automatic address increment function
  - 4 selectable I2C address locations
- Over-temperature protection
- QFN-16 (4mm×4mm) and WLCSP-16 (1.88mm×2.08mm, 0.45mm ball pitch, 0.2mm ball diameter) packages
- Operating temperature T_A = -40°C ~ +85°C

APPLICATIONS

- Internet-of-Things (IOT)
- Electronic Shelf Labeling (ESL)
- Low-power battery applications
- Hand-held devices requiring visual notifications
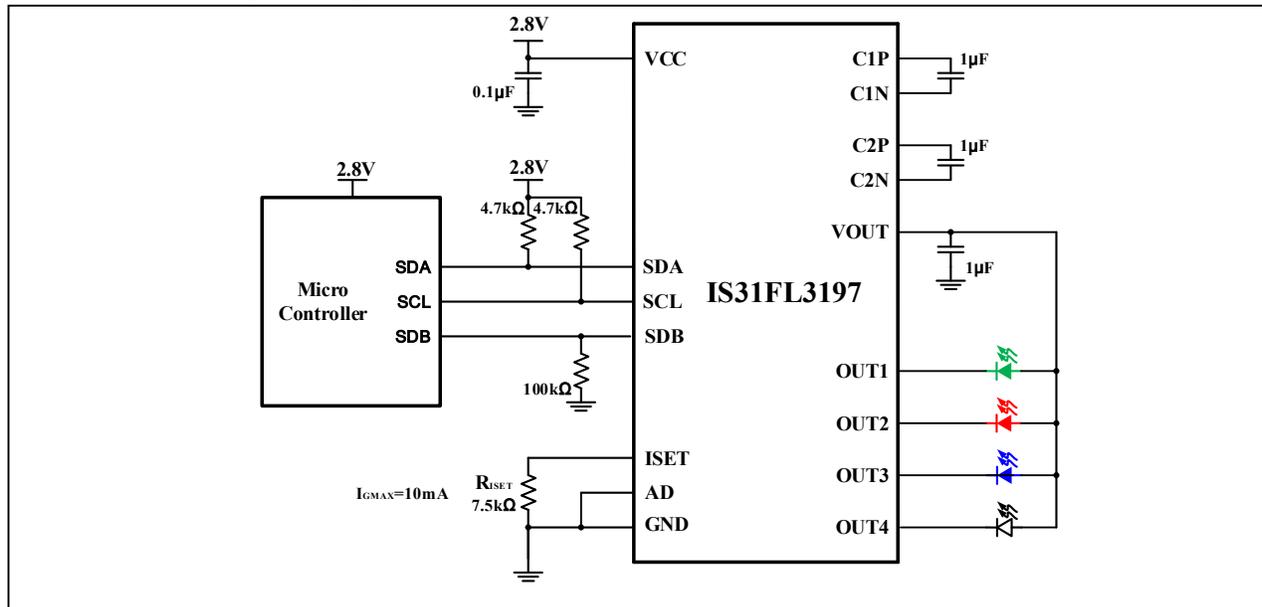
TYPICAL APPLICATION CIRCUIT

Figure 1 Typical Application Circuit