IT1507

16-Channel Constant Current LED Driver With Error Detection and Current Gain

Features

- **16 channels with constant-current**
- **Constant output current range:**
  - **6~75mA@V_{DD}=5V**
  - **4~55mA@V_{DD}=3.3V**
- **Excellent channel output current mismatch ratio:**
  - **Between channels: <±1,5%(typ.);**
  - **Between ICs: <±3%(typ.)**
- **In-message error detection**
  - **Both open-circuit and short-circuit LEDs can be detected**
  - **Settable V_{TH} for LED short-circuit detection**
  - **On-the-fly error detection**
  - **Data-in, error-out; both errors are merged and coded with zeros**
- **64-step programmable current gain: from 12.5% to 200%**
- **Fast response of output current**
  - **Min. output pulse width of $\overline{OE}$, 40ns with good uniformity between output channels**
- **Staggered delay of outputs to prevent from current surge**
- **Maximum data clock frequency: 30MHz**
- **Schmitt trigger input**

General Description

IT1507 is a 16-channel constant current LED driver with smart error detection and output current gain. The constant current for each output channel is from 4mA to 75mA set by an external resistor. IT1507 shares the data input and data output to extend the functionality, such as in-message error detection and current gain control in LED display systems.

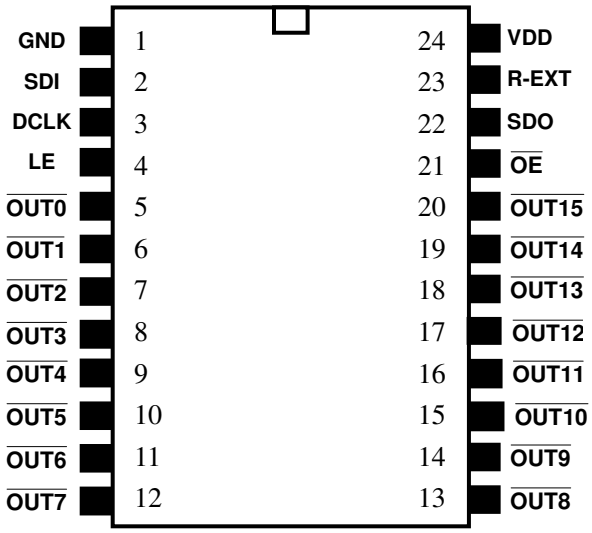
IT1507 contains a 16-bit shift register and a 16-bit output latch, which convert: serial input data into parallel output format. At the output stages, sixteen regulated current ports are designed to provide constant current sinks with small skew between each channel to drive LEDs within a wide range of forward voltage (V_F) variation. IT1507 can sustain maximum 18V at the output ports. The high clock frequency, DCLK up to 30MHz, also supports the system requirements of high volume data transmission.

With in-message error detection, IT1507 detects individual LED for both open- and short-circuit errors on-the-fly without extra components. The serial data can be shifted into IT1507 through the SDI pin, and the outputs perform open- and short-circuit detection at the same time. Besides, the V_{TH} for short-circuit detection is settable for the variation of different LED forward voltage. Thus the system controller can detect the short-circuit error easily.

Users also can adjust the output current level of IT1507 by setting a programmable configuration code. The code is sent into IT1507 through the SDI pin. Falling edges of LE will latch the code in the shift register into a built-in 16-bit configuration register, instead of the output latch. The gain code will change the voltage at the terminal R-EXT and

control the output current regulation. The output current can be adjusted by a gain range from 12.5% to 200%.

Pin Configurations



IT1507SP(SSOP24-150mil)

Terminal Description

Pin Name	Description
GND	Ground pin
SDI	Serial-data input to the shift register
DCLK	Clock input pin used to shift data on rising edge and carries command information when LE is asserted.
LE	Data strobe pin; controlling command with DCLK.
$\overline{OUT0}$ ~ $\overline{OUT15}$	Constant current output channels
$\overline{OE}$	Enable output drivers to sink current. When its level is low (active), the output drivers are enabled; when high, all output drivers are turned OFF (blank). The signal needs to be active for error detection.
SDO	Serial-data output to the next driver IC.
R-EXT	Input port connected an external resistor to set the output current of all output channels.
VDD	3.3V/5V Power pin