



IT1504

16-Channel Constant Current LED Driver With 16-Bit PWM Control and Dot-Correct

Features

- 16 constant-current output channels
- Constant output current invariant to load voltage change:
 - 3~45mA@V_{DD}=5V
 - 3~30mA@V_{DD}=3.3V
- Excellent channel output current accuracy:
 - Between channels: $\lt; \pm 1,5\%(\text{typ.})$; between ICs: $\lt; \pm 3\%(\text{typ.})$
- Visual effect control
 - 8-bit dot-correction
 - 7-bit linear programmable output current gain
 - 16-bit or 12-bit grey scale control
 - Random PWM technology to improve refresh rate
- Error detection control
 - In-message error detection: on-the-fly, data-in error-out
 - Compulsory individual LED open/short-circuit detection:
 - full panel, data independent
 - silent error detection in 690ns
 - Configurable short-circuit detection threshold voltage
 - Thermal protection
- EMI reduction
 - Staggered delay of output, preventing from current surge
- Maximum data clock frequency: 30MHz
- Maximum grey scale clock frequency: 33MHz
- 3V~5.5V Supply Voltage

Application

- Full-color LED display



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General Description

IT1504 is a 16-channel constant current LED driver with selectable 16-/12-bit grey scale control and 8-bit dot correction. The constant current for each output channel is from 3mA to 45mA. The current is set by an external resistor. IT1504 shares the data input and data output to extend the functionality, such as in-message error detection, compulsory error detection, thermal protection, and current gain control in LED display systems. With random PWM technology, IT1504 improves the PWM by breaking the “on” time into several random period “on” time, therefore IT1504 is able to increase visual refresh quality. Besides, IT1504 provides 16-bit grey scale control to enrich the color of image, allowing to present video images with 65,536 grey scales. IT1504 also provides 8-bit dot correction to calibrate the brightness and color of LEDs individually. Furthermore, the preset current of IT1504 also can be adjusted by 128 steps for LED global brightness.

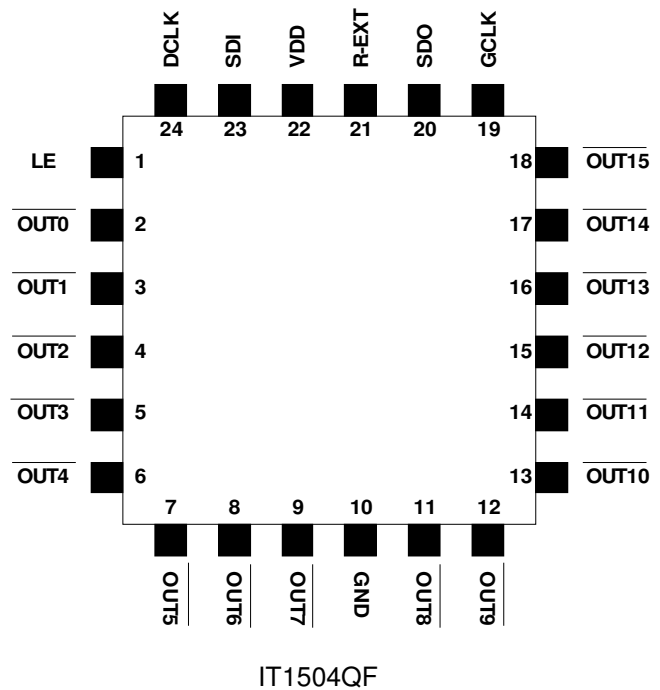
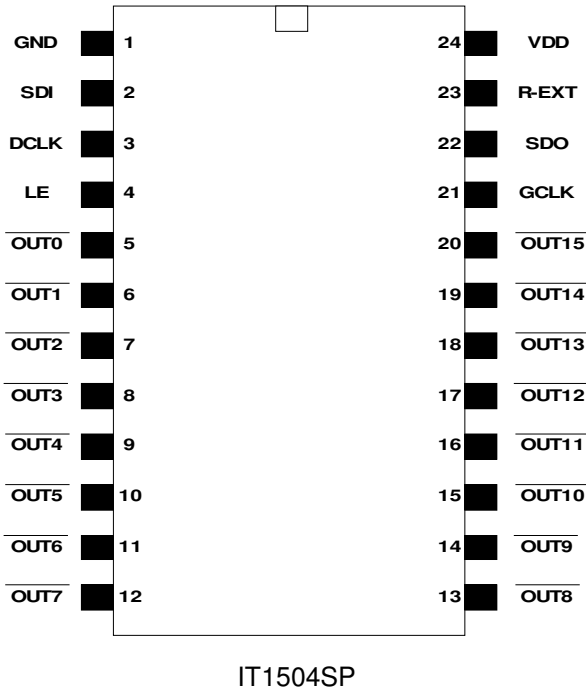
With in-message error detection, IT1504 can detect individual LED for both open- and short-circuit errors on-the-fly without extra components. In addition, to have a better system reliability, IT1504 is built with thermal protection functions.



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Pin Configurations



Terminal Description

Pin Name	Description
GND	Ground terminal for control logic and current sink.
SDI	Serial-data input to the shift register.
DCLK	Clock input terminal used to shift data on rising edge and carries command information when LE is asserted.
LE	Data strobe terminal and controlling command with DCLK.
OUT0~OUT15	Constant current output terminals.
GCLK	Grey scale clock terminal. Clock input for grey scale. The grey scale display is counted by grey scale clock comparing with input data.
SDO	Serial-data output to the receiver-end SDI of next driver IC.
R-EXT	Input terminal used to connect an external resistor for setting up output current for all output channels.
VDD	3.3V/5V supply voltage terminal.

Block Diagram

