



Features

- Backward compatible with IT1401/IT1402 in package
- 16 bit color depth PWM control
- 16 constant-current output channels
- PWM technology to improve refresh rate
- Open/Short-circuit Detection to detect individual LED errors
- Over temperature warning & protection
- 8-bit programmable output current gain
- Constant output current range:
 - 5~60mA at 3.3V supply voltage
 - 5~80mA at 5.0V supply voltage
- Output current accuracy:
 - Between channels : $< \pm 1.5\%$ (typ.), between ICs: $< \pm 3\%$ (typ.)
- Staggered output delay
- Schmitt trigger input
- Maximum data clock frequency: 25MHz
- 3.0V-5.5V supply voltage

General Description

IT1501 is designed for LED video applications using internal Pulse Width Modulation (PWM) control with 16-bit color depth. IT1501 features a 16-bit shift register which converts serial input data into each pixel gray scale of output port. At IT1501 output port, sixteen regulated current ports are designed to provide uniform and constant current sinks for driving LEDs with a wide range of V_f variations. The output current can be preset through an external resistor. Besides, the preset current of IT1501 can be further programmed to 256 gain steps for LED global brightness adjustment.

With the PWM technology, IT1501 turns the “on” time into several “on” periods. This feature equivalently increases the visual refresh rate. When building a 16-bit color depth video, this PWM reduces the flickers and improves the fidelity. IT1501 drives the corresponding LEDs to the brightness specified by image data. IT1501 offloads the signal timing generation of the host controller which just needs to feed data into drivers. With IT1501, all output channels can be built with 16-bit color depth (65536 gray scales). Each LED’s brightness can be calibrated from minimum to maximum brightness with compensated gamma correction or LED deviation information inside the 16-bit image data.

Pin description

Pin Name	Description	notes
GND	Ground terminal for control logic and current sink	
SDI	Serial-data input to the shift register	External data Input port
DCLK	Clock input terminal used to shift data on rising edge and carries command information when LE is asserted	System clock, control data input
LE	Data strobe terminal and controlling command with DCLK	
OUT0~OUT15	Constant current output terminals	16 output channels
GCLK	Gray scale clock terminal clock input for gray scale. The gray scale display is counted by gray scale clock comparing with input data	System clock, control PWM generation
SDO	Serial-data output to the receiver-end SDI of next driver IC	Data output port
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	

Pin Configurations

