

Integrated Power Supply for TFT-LCD Panels with 1-Channel White LED Driver

Features

- 2.5V to 5.5V Input Supply Range
- Active-High Enable Control
- 1.2MHz Current-Mode Boost Regulator
 - ◆ Fast Transient Response to Pulse Load
 - ◆ $\pm 1\%$ Accurate Output Voltage
 - ◆ Built-In 20V/1.8A, 0.7 Ω N-Channel MOSFET
 - ◆ High Efficiency up to 90%
 - ◆ Over-Current Protection
 - ◆ Output Under-Voltage Protection
- High-Performance Operational Amplifier
 - ◆ $\pm 150\text{mA}$ Output Short-Circuit Current
 - ◆ 12V/ μs Slew Rate
 - ◆ 12MHz, -3dB Bandwidth
 - ◆ Rail-to-Rail Input and Output
- 600kHz Negative Charge Pump Driver for V_{GL}
- 600kHz Positive Charge Pump Driver for V_{GH}
- White LED Driver
 - ◆ 1MHz Switching Frequency
 - ◆ 20V/1.2A, 0.3 Ω N-channel MOSFET
 - ◆ Input Under Voltage Protection
 - ◆ Over Current Protection
 - ◆ Over Voltage Protection
 - ◆ Digital Dimming Control
- Power-On Sequence Control
- Thermal-Overload Protection
- RoHs Compliant
- TQFN4X4-24 Package

Applications

- Notebook Computer Displays
- UMPCs
- Medium Size LCD Panel

General Description

The G2500 includes a high-performance boost regulator, a V_{COM} buffer (unity gain OPA), a V_{GH} charge pump driver, a V_{GL} charge pump driver, and white LED driver for active-matrix thin-film transistor (TFT) liquid-crystal displays (LCDs).

The boost converter provides the regulated supply voltage for the panel source driver ICs. The converter is a high switching frequency (1.2MHz) current mode regulator with an integrated 20V N-Channel 0.7 Ω MOSFET that allows the use of ultra-small inductors and ceramic capacitors. It provides fast transient response to pulsed loading while achieving efficiency over 90%. The device can produce output voltage as high as 18V from an input as low as 2.8V.

The V_{COM} buffer can drive the LCD V_{COM} voltage that features high short-circuit current (150mA), fast slew rate (12V/ μs), wide bandwidth (12MHz) and rail-to-rail input/output.

A positive and a negative charge-pump driver provide adjustable regulated output voltages V_{GH} and V_{GL} to bias the TFT. Both charge-pump drivers operate with 600kHz switching frequency.

The LED driver automatically regulated supply voltage for the LED light bars without the need to calculate the output for different LED types. It also integrates a 20V n-channel MOSFET that provides high output power. The low reference voltage minimized the power loss across the current-setting resistor. An enable input can be pulsed repeatedly to adjust LED's brightness. The boost converter of the LED driver incorporates over current protection and over voltage protection to ensure safety operation.

The G2500 includes internal power-up sequencing, over/under voltage protections of the boost converter, and over temperature protection to ensure in safe operating.

The G2500 is available in a 24-pin 4X4 TQFN package.

Ordering Information

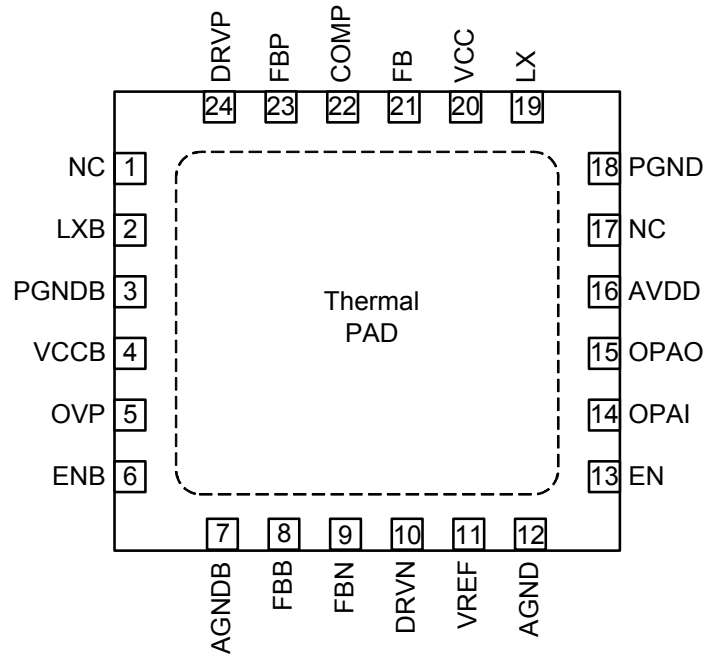
| ORDER NUMBER | MARKING | TEMP. RANGE | PACKAGE (Green) |
|--------------|---------|---------------|-----------------|
| G2500R51U | 2500 | -40°C to 85°C | TQFN4X4-24 |

Note: R5: TQFN4X4-24

1: Bonding Code

U: Tape & Reel

Pin Configuration



G2500 TQFN4X4-24

Note: Recommend connecting the Thermal Pad to the Ground for excellent power dissipation