

## Integrated Multi-Channel DC-DC Converter for TFT-LCD Panels

### Features

- 2.5V to 5.5V Input Supply Range
- 640kHz/1.2MHz Current-Mode Boost Regulator
  - ◆ Fast Transient Response to Pulse Load
  - ◆  $\pm 1\%$  Accurate Output Voltage
  - ◆ Built-In 20V/2A, 0.2 $\Omega$  N-Channel MOSFET
  - ◆ High Efficiency up to 90%
  - ◆ Programmable Soft-Start
  - ◆ Over-Current Protection
  - ◆ Output Under-Voltage Protection
- High-Performance Operational Amplifiers
  - ◆  $\pm 150\text{mA}$  Output Short-Circuit Current
  - ◆ 12V/ $\mu\text{s}$  Slew Rate
  - ◆ 12MHz, -3dB Bandwidth
  - ◆ Rail-to-Rail Input and Output
- On-Chip GPM Controller
  - ◆ Adjustable Falling Time and Power-On Delay
  - ◆ Flicker Compensator
  - ◆ Power-On Sequence Control
- Low Voltage Detector
  - ◆ Programmable Detecting Voltage and Delay Time
- Charge pump for VGH regulation
- Thermal-Overload Protection
- RoHs Compliant
- TQFN4X4-24 Package

### Applications

- LCD Monitor
- Notebook Computer Displays
- LCD TVs

### General Description

The G5529 includes a high-performance boost regulator, a gate pulse modulator (GPM), a voltage detector, and a VCOM buffer (unity-gain OPA), for activematrix thin-film transistor (TFT) liquid-crystal displays (LCDs).

The boost converter provides the regulated supply volt-

age for the panel source driver ICs. The converter is a high switching frequency (640kHz or 1.2MHz) current-mode regulator with an integrated 20V N-Channel 0.2 $\Omega$  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. Soft-Start is programmed by external capacitor, which sets the input-current ramp-rate.

The GPM is controlled by frame signals from timing controller to modulate the Gate-On voltage, VGHM, which acts a flicker compensation circuit to reduce the coupling effect between gate lines and pixels. It also can delay the Gate-On voltage while power-on for achieving a corrected power-on sequence for gate driver ICs. Both of power-on delay time and the falling time of the Gate-On voltage are programmable by external capacitor and resistor.

The voltage detector monitors the supply voltage to issue a reset signal while the detected voltage is too low. The detecting level is decided by an external resistor divider and the delay time is programmable by an external capacitor.

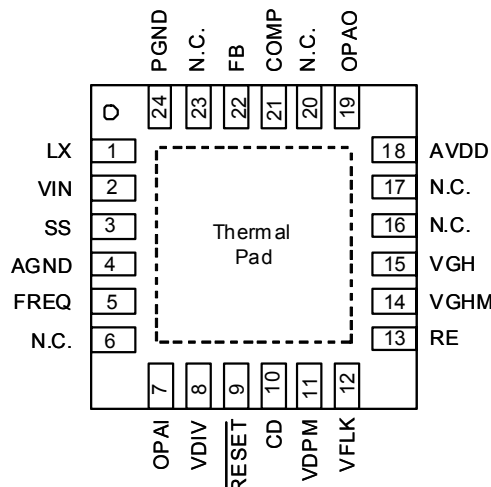
The VCOM buffer can drive the LCD VCOM voltage that features high short-circuit current (150mA), fast slew rate (12V/ $\mu\text{s}$ ), wide bandwidth (12MHz) and rail-to-rail input/output.

### Ordering Information

| ORDER NUMBER | MARKING | TEMP. RANGE   | PACKAGE (Green) |
|--------------|---------|---------------|-----------------|
| G5529R51U    | 5529    | -40°C to 85°C | TQFN4X4-24      |

Note: R5: TQFN4X4-24  
1: Bonding Code  
U: Tape & Reel

### Pin Configuration



**G5529 TQFN4X4-24**