TFT LCD DC-DC Converter with Integrated Charge Pumps, OP-AMP and HV-Switch

DESCRIPTION

The EUP2681 generates power supply rails for thin-film transistor (TFT) liquid-crystal display (LCD) panels in monitors and notebooks operated from 2.5V to 5.5V input supply. The device integrates a step-up converter, positive and negative charge pumps, a high speed V_{COM} buffer and a HV-Switch.

The external compensated step-up converter features an internal power MOSFET and high frequency operation allowing to use small inductors and capacitors. The step up converter uses fixed-frequency peak current mode control architecture which provides fast load-transient response and easy compensation. A 3.5A peak current limit for the internal switch protects power supply fault condition.

The regulated positive and negative charge pump regulators generate the positive and negative supply rails for the TFT LCD gate resistive voltage-divider ICs.

The high speed V_{COM} buffer features 500mA short circuit current, 20MHz bandwidth, fast slew rate 45V/μs, and rail-to-rail inputs and outputs.

The HV-Switch circuit control provides the ability to control the slope for the gate drive voltage. It shapes the TFT gate high voltage to improve image quality.

The EUP2681 is available in a small (4mm× 4mm) 24 pin TQFN package and operates over the -40ºC to +85ºC temperature range.

FEATURES

- 2.5V to 5.5V Input Supply Range
- 1.2MHz Current Mode Step Up Converter
  - Built-In 20V, 3.5A, 0.16Ω N-MOSFET
  - High Efficiency Up to 90%
  - Internal digital Soft-Start
  - Fast Transient Response to Pulsed Load
  - Over-Temperature Protection
- Regulated Charge pump for TFT gate-on Supply
- Regulated Charge pump for TFT gate-off Supply
- High Speed High Current 18V V_{COM} Buffer
  - 20MHz BW
  - 45V/μS Slew Rate
  - More than 500mA Peak Output Current
- HV-Switch Circuit
  - Adjustable Falling rate
  - Reduction of Coupling Effect between Gate Line and Pixel
  - Flicker Compensation Circuit
- Input Under Voltage Lockout and Thermal Protection
- 24 pin 4mm×4mm TQFN Package
- RoHS Compliant and 100% Lead (Pb)-Free Halogen-Free

APPLICATIONS

- LCD Monitors
- Notebook Display
- LCD TVs