TV LCD Panle PMIC with AVDD Boost, HAVDD Buck, Two Bucks, Buck-boost, VON Boost, Negative Linear Regulator Controller and Level-shifter

Features

- 8.7V to 14.5V Input Supply Voltage Range
- 750kHz Switching Frequency
- High-Efficiency Step-up Regulator
  . Peak-current Mode Control
  . Built-In 24V, 3.5A, 0.15Ω MOSFET
- High-Voltage Step-down Regulator for Logic (3.3V)
  . Peak-current Mode Control
  . Built-In 20V, 2A, 0.25Ω MOSFET
- High-Voltage Step-down Regulator for Logic (1.2V)
  . Peak-current Mode Control
  . Built-In 20V, 3A, 0.2Ω MOSFET
- Synchronous Step-down Regulator
  . Voltage Mode Control
  . Built-In 24V, 1A, 0.5Ω MOSFET
- Buck-boost Regulator Controller for Scan-driver
  . Temperature-compensated Output
  . Voltage Mode Control
- Step-up Regulator Controller for Scan-driver
  . Temperature-compensated Output
  . Voltage Mode Control
  . Internal Compensation for DCM
- Negative Linear Regulator Controller
  . Uses External NPN Transistor
- Triple High-Voltage Scan Driver
  . -25V ~ 35V Output Rails
  . Output Charge Sharing
- Protections
  . Thermal Shutdown
  . Boost Converter True Shutdown by External pMOS
  . Over Load or Short Circuit / Over Voltage Protection

Applications

- LCD TV and Monitor Panels

Description

The SM4109 consists of four internal-switch regulators (main boost converter, 3.3VDD buck converter, HAVDD buck converter and 1.2VDD buck converter), two external switch regulators (VON boost converter and VOFF buck-boost converter), a negative linear regulator and a high voltage level shifting scan driver.
The main boost converter and the synchronous buck converter provide the regulated supply voltage for the panel source driver ICs. The 3.3VDD buck converter provides the supply voltage for I/O interface of the T-CON and other logic circuits. The 1.2VDD buck converter provides the supply voltage for the core of the T-CON. The VON boost converter provides the regulated voltage (V_{ON}) for the positive scan-driver supply and the VOFF buck-boost converter provides the regulated voltage (V_{OFF}) for the negative scan-driver supply. V_{ON} and V_{OFF} can vary according to the temperature sensed by each external NTC thermistor. All of these converters feature high-efficiency and fixed frequency 750kHz operation. The high switching frequency of these converters makes it possible to use ultra-small inductors and ceramic capacitors.
The serial-in shift register supply is derived linearly between the buck-boost converter's output and ground by the negative linear regulator controller.
The high-voltage level-shifting scan drivers are fitted for capacitive loads and work well with panels that contain row drivers on the panel glass. In order to reduce the power loss, the complementary outputs are designed to allow charge sharing during state changes.
Other features include the high-voltage-stress function of the boost converter, external pMOS gate driver for the true shutdown of the boost converter and the start-up sequence control.

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Device Information

Part	Package	Size
SM4109	72 QFN	10mm x 10mm

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