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MAX17094

Internal-Switch Boost Regulator with Integrated 7-Channel Driver, VCOM Calibrator, Op Amp, and LDO

Single-Chip Power IC with Integrated Level Shifters and Programmable VCOM for Notebook LCD Applications

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Status

Active: In Production.

Description

The MAX17094 includes a high-performance step-up regulator, a 250mA low-dropout (LDO) linear regulator, a high-speed operational amplifier, a digitally adjustable VCOM calibration device with nonvolatile memory and I²C interface, and seven integrated high-voltage level shifters. The device is optimized for thin-film transistor (TFT) liquid-crystal display (LCD) applications.

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The step-up DC-DC converter is a current-mode regulator that provides the regulated supply voltage for panel source driver ICs. The current-mode architecture provides fast-transient responses to pulsed loads typical of source driver loads. The high switching frequency, which is programmable to any frequency between 450kHz to 1.2MHz with a single resistor, allows the use of ultra-small inductors and ceramic capacitors. The step-up regulator's soft-start time is controlled by an internal 10ms digital timer that requires no external components; or if desired, the soft-start time can be adjusted by adding a single external capacitor.

The low-voltage LDO linear regulator can provide at least 250mA. The output voltage is accurate within $\pm 2\%$.

The high-voltage, level-shifting scan driver is designed to work with panels that incorporate row drivers on the panel glass. Its seven outputs swing from +30V to -10V and can swiftly drive capacitive loads.

The high-performance op amp is designed to drive the LCD backplane and features 20MHz bandwidth, 45V/ μ s slew rate, and 150mA output currents.

The programmable VCOM calibrator is externally attached to the VCOM amplifier's resistive voltage-divider and sinks a programmable current to adjust the VCOM voltage level. An internal 7-bit digital-to-analog converter (DAC) controls the sink current. The DAC is ratiometric relative to AVDD and is guaranteed monotonic over all operating conditions. The calibrator includes a nonvolatile memory device (IVR) to store the desired VCOM voltage level. The 2-wire I²C interface simplifies production equipment.

The MAX17094 is available in a 48-pin, 6mm x 6mm TQFN package with a maximum thickness of 0.8mm for thin LCD panels.

An evaluation kit is available: [MAX17094EVKIT](#)

NOTE: This product requires use of the following:

- [MAX17094 EVKIT Software](#)

Key Features

- 1.8V to 5.5V IN Supply Voltage Range
- 450kHz to 1.2MHz Adjustable Frequency Current-Mode Step-Up Regulator
 - Fast-Transient Response
 - Integrated 14V, 2.5A, 150m Ω MOSFET
 - High Efficiency (> 85%)
- Low-Dropout Linear Regulator
 - High-Accuracy Output Voltage (2.0%)
 - Internal Digital Soft-Start
- High-Performance Operational Amplifier
 - 200mA Output Short-Circuit Current
 - 45V/ μ s Slew Rate
 - 20MHz, -3dB Bandwidth
 - Rail-to-Rail Inputs and Outputs
- High-Voltage Drivers
 - +30V to -10V Outputs
- I²C Programmable VCOM Calibrator
 - 7-Bit Adjustable Current-Sink Output
 - Nonvolatile IVR Memory

Applications/Uses

- [Notebook Computer Displays](#)

- Thermal-Overload Protection

Key Specifications: Multifunction PMICs

Part Number	Primary Topology	Monitor/Control Features	DC-DC/Power Features	LCD/LED/Flash/CCD Features	Interface Type	V _{IN} (V)	V _{IN} (V)	V _{OUT} (V)	V _{OUT} (V)	Max. I _{OUT} (A)	Max. I _{OUT} (A)	Oper. Freq. (kHz)	Package/Pins	Smallest Available Pckg. (mm ²) max w/pins
						min	max	min	max	≥	≤			
MAX17094 NEW!	Step-Up	Dynamic V Adj.	Current Limit	Op. Amps. Scan Driver VCOM Buffer	I ² C	1.8	5.5	2.5	14	1	1	1200	TQFN/48	37
		Serial Interface	Fixed Freq./PWM											
		Shutdown	Internal Pwr. FETs											
			Soft Start											

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Document Ref.: 19-4348; Rev 0; 2009-06-11
This page last modified: 2009-06-11

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