



# Low-Cost, Internal-Switch, Step-Down Regulator for LCD Displays

MAX8723

## General Description

The MAX8723 is a high-efficiency, switch-mode, step-down regulator with a 14V internal power switch. With only a few external passive components, this low-cost regulator can generate a fixed 3.3V or adjustable DC output voltage of 2.0V to 3.6V (dual mode) from a 6V to 13.2V DC source. The 13.2V input voltage range makes this part ideal for LCD displays, point-of-load regulators, and other 8/12V-powered industrial equipment applications.

The MAX8723 can deliver up to 2A. It features an internal power MOSFET, a built-in bootstrap diode for its MOSFET driver, and an interface for an external synchronous rectifier MOSFET drive to replace the Schottky diode and improve efficiency. Its fixed-frequency PWM/skip-mode operation and current-mode control architecture provide fast load-transient response without compensation. The switching frequency is a pin-selectable 500kHz, 1MHz, or 1.5MHz, minimizing the size of external components.

The MAX8723 has built-in soft-start, current-limit, thermal-shutdown, and timer-delayed output-fault shutdown functions. The soft-start function limits inrush current during startup, avoiding transients that can trigger the front-end protection circuits and lock up the system. The current limit, thermal-shutdown, and timer-delayed output-fault shutdown functions protect the power supply against fault conditions.

The MAX8723 also includes a linear regulator (VL) which provides a fixed 5V output (25mA) to support small external loads. The reference output is high-precision (2V  $\pm$  1%) and can also supply small external load currents.

The MAX8723 is available in the 16-pin 4mm x 4mm TQFN package.

## Applications

LCD TVs  
LCD Monitors  
Digital System Power Supplies  
Point-of-Load Regulators  
8/12V Industrial Equipment

*Pin Configuration appears at end of data sheet.*

## Features

- ◆ 6V to 13.2V Input Supply Range
- ◆ Integrated 14V 2A N-Channel MOSFET Switch
- ◆ Preset 1.5% Accurate 3.3V fixed Output Voltage or 2.0V to 3.6V Adjustable Output (Dual Mode)
- ◆ Current-Mode PWM Operation
- ◆ Frequency-Selectable 500kHz/1MHz/1.5MHz
- ◆ Internal 5V Linear Regulator Supports Up to 25mA External Load
- ◆ 2V Precision Reference (1%)
- ◆ Integrated Bootstrap Diode for High-Side MOSFET Drive
- ◆ External Synchronous Rectifier Driver
- ◆ Built-In Soft-Start
- ◆ 200 $\mu$ A Standby Mode
- ◆ Timer-Delayed Output Fault Protection
- ◆ Thermal Shutdown Protection
- ◆ Small 16-Pin 4mm x 4mm Thin QFN Package

## Ordering Information

PART	TEMP RANGE	PIN-PACKAGE	PKG CODE
MAX8723ETE+	-40°C to +85°C	16-pin Thin QFN 4mm x 4mm	T1644-4

## Simplified Operating Circuit

