MAX20414

2.2MHz Sync Boost and Step-Down Converters

Small Automotive PMIC for Infotainment & ADAS Applications

Description

Create a design and simulate using EE-Sim® tools: MAX20414

The MAX20414 is a high-efficiency, two-output, low-voltage DC-DC converter. OUT1 boosts the input supply up to 8.5V at up to 750mA, while a synchronous step-down converter (OUT2) operates from a 3.0V to 5.5V input voltage range and provides a 0.8V to 3.8V output voltage range at up to 3A. The boost converter achieves ±2% and the buck converter achieves ±1.5% output error over load, line, and temperature range.

The IC features a 2.2MHz fixed-frequency pulse-width modulation (PWM) mode for better noise immunity and load-transient response, and a pulse-frequency modulation mode (skip) for increased efficiency during light-load operation. The 2.2MHz frequency operation allows for the use of all-ceramic capacitors and minimizes external components footprint. The programmable spread-spectrum frequency modulation minimizes radiated electromagnetic emissions. Integrated low $R_{DS(ON)}$ switches improve efficiency at heavy loads and make the layout a much simpler task with respect to discrete solutions.

The IC is offered with either a factory-preset or resistor-adjustable output voltage on the step-down converter. The boost converter output voltage is factory-preset. Other features include soft-start, overcurrent, and over-temperature protections. This high-efficiency two-output low-voltage DC-DC converter is available in a lead(Pb)-free, 24-pin TQFN package (see the Ordering Information table for options).

Key Features

- Multiple Functions for Small Size
  - Synchronous 750mA Boost Converter
    - Fixed from 3.8V to 8.5V in 100mV Steps
  - Synchronous Buck Converter Up to 3A
    - Factory-Configurable Output Voltage from 0.8V to 3.8V in 25mV Steps
    - Resistor-Adjustable
  - 3.0V to 5.5V Operating Supply Voltage
  - 2.2MHz Operation
  - 93% ±3% Undervoltage Threshold
  - 107% ±3% Overvoltage Threshold
  - Individual EN_ Inputs and Active-Low RESET_ Outputs
- High-Precision
  - ±2% Output-Voltage Accuracy (OUT1) and ±1.5% Output-Voltage Accuracy (OUT2)
  - Good Load-Transient Performance
- Robust for the Automotive Environment
  - Current Mode, Forced-PWM and Skip Operation
  - Overtemperature and Short-Circuit Protection
  - 4mm × 4mm 24-Pin TQFN
  - -40°C to +125°C Automotive Temperature Range

Applications/Uses

- ADAS
- Infotainment
- SOC Power