MAX20428 Eight-Output Mini PMIC for ADAS Applications

General Description

The MAX20428 is a high-efficiency, eight-output, low-voltage PMIC. OUT1 boosts the input supply to 5V at up to 500mA, while three synchronous step-down converters operate from an input voltage range of 3.0V to 4.2V and provide an output voltage range of 0.8V to 3.9875V at up to 1.3A peak, 1.3A peak, and 3.5A peak, respectively. Three 300mA pMOS LDOs operate from an input voltage range of 2.7V to 5.5V and provide an output voltage of 0.8V to 3.9875V. A 25mΩ load switch with soft-start is also included. All regulated outputs achieve ±1.5% DC accuracy over load, line, and temperature range.

The device features a 2.1MHz fixed-frequency PWM mode for better noise immunity and load-transient response. The 2.1MHz frequency operation allows for the use of all ceramic capacitors and minimizes external components. The programmable spread-spectrum frequency modulation minimizes radiated electromagnetic emissions. Integrated low $R_{DS(ON)}$ switches improve efficiency at heavy loads and simplify the layout with respect to discrete solutions.

The device is offered with factory-preset output voltages. See the *Ordering Information* table for options. Other features include soft-start, overcurrent, and overtemperature protections.

Applications

- Advanced Driver-Assistance Systems

Benefits and Features

- Multiple Functions for Small Size
  - Synchronous 5V, 500mA Boost Converter
  - Dual 1A Synchronous Buck Converters
    - 0.8V to 3.9875V in 12.5mV Steps
    - 1.3A Peak Output Capability
  - Single 3A Synchronous Buck Converter
    - 0.8V to 3.9875V in 12.5mV Steps
    - 3.5A Peak Output Capability
  - Three 300mA Low-Dropout Linear Regulators
  - One 25mΩ Load Switch
  - Programmable Challenge/Response Watchdog
  - I^2C Fast-mode Plus Compatible Interface with Packet-Error Checking (PEC) Option
  - 2.1MHz Internal Operation with Spread-Spectrum Option
- High-Precision Performance
  - ±1.5% Output Voltage Accuracy
  - ±1% OV/UV Monitoring
  - Excellent Load-Transient Performance
- Diagnostics and Redundant Circuits
  - ASIL C Compliant
  - Redundant Reference
  - Fail-Safe on Open Pins
  - Shorted Pin Detection on $\overline{RESET}$
  - PV Supply OV/UV Monitor
- Robust for the Automotive Environment
  - Current-Mode, Forced-PWM Operation
  - Overtemperature and Short-Circuit Protection
  - 5mm x 5mm, 28-Pin, Side-Wettable TQFN
  - -40°C to +125°C Grade 1 Automotive Temperature Range

Visit Web Support to complete the nondisclosure agreement (NDA) required to receive additional product information.

***Ordering Information* appears at end of data sheet.**

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Simplified Block Diagram