

VR14 8-Phase, Dual-Output Voltage Regulator Chipset

MAX20855A

General Description

The MAX20855A IC provides a high-density, flexible, and scalable dual-loop solution to power AI cores, XPU's, GPU's, or Intel® VR14 or VR13 server CPU's. The controller IC is a dual-loop controller with an integrated PSYS device. The dual-loop solution supports up to 8 phases in total, configurable from 8+0 to 4+4 phases between Rail A and Rail B. Coupled inductors and smart power-stage ICs are used to implement dual high-efficiency regulators with enhanced transient response and low-quiescent current. Both rails and the PSYS device are compliant with VR14 specifications. The complete circuit is a highly efficient (N+M) = 8 multiphase synchronous buck converters with extensive status and parameter-measurement features. PWM paralleling allows up to 16 phases for very high current applications.

The IC's simplified architecture reduces component count, enables advanced power management and telemetry, and increases energy savings over the full load range. Autonomous phase shedding maintains high efficiency across the entire load range.

Regulator parameters for protection and shutdown can be set and monitored through the PMBus™ interface. Power-stage faults, input and output voltage, input and output current, input power, and the temperature of the smart power-stage IC are readable over the serial interface. Critical fault retention feature prevents exothermic events after a power-device fault. Preset and user configurations are programmed in nonvolatile memory (NVM). MTP-programmable NVM circuits allow for field modifications. An integrated 3.3V to 1.8V linear regulator provides the controller bias supply.

The MAX20855A is available in a 40-pin, 5mm x 5mm FCLGA package.

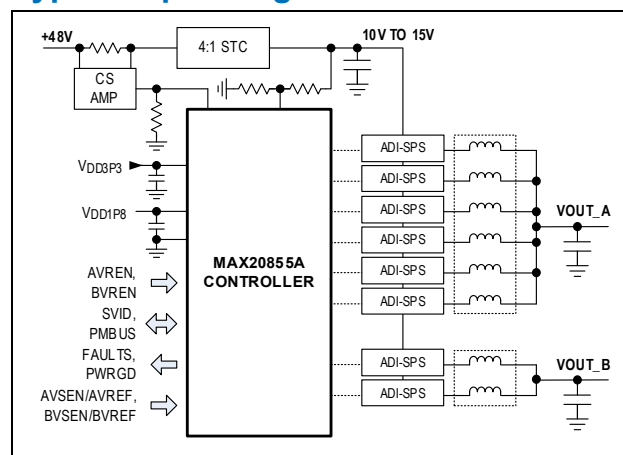
Applications

- High-Current Multiphase Voltage Regulators
 - VR13, VR14 CPUs
 - AI Cores, XPU's, GPU's, Networking ASICs
- Servers, Workstations, Enterprise Storage
- Communications and Networking Equipment Supply

Benefits and Features

- High Power Density and Efficiency
 - Smart Power-Stage Support
 - Top-Tier Efficiency (96.1% Peak Efficiency at 1.8V_{OUT})
 - Integrated Input Power Monitor
 - 8-Phase N+M Dual-Loop Multiphase Architecture
- Telemetry Through PMBus
 - Digitally Programmable Configuration
 - Input Voltage, Current, and Power Monitoring
 - Power-Stage Temperature Monitoring and Reporting
 - Fault, Command, and Data Logging (Black Box Feature)
- Advanced Power Management
 - Autonomous Phase Shedding
 - Orthogonal Current Rebalance for Phase-Current Balance During Transients
 - Low-Quiescent Current—Improves Light-Load and Standby Efficiency
- Protection Features
 - Input and Bias Supply Undervoltage Protection
 - Overcurrent Protection
 - Critical Fault-Flag Output Pin

Typical Operating Circuit



[Ordering Information](#) appears at end of data sheet.

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