

Dual-Output Multiphase High-Current PWMVID and AVSBus Controller

MAX20816

General Description

The MAX20816 IC provides a high-density, flexible, scalable dual-loop solution for high-current cores for AI applications. This dual-loop solution supports up to 16 phases in total, configurable from 16+0 to 8+8 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. The complete circuit is a highly efficient $(N+M) = 16$ multiphase synchronous buck converter with extensive status and parameter-measurement features. A single, scalable PCB design with appropriate smart power-stage IC selection can be used to produce two power supplies with a wide range of current ratings. PWM paralleling allows up to 48 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.

Regulator parameters for protection and shutdown can be set and monitored through the PMBus™ interface. Power-stage faults, input power, and output voltage, input and output current, input power, and the temperature of the smart power-stage IC are readable over the serial interface. The 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 MAX20816 is available in a 56-pin, 7mm x 7mm TQFN package.

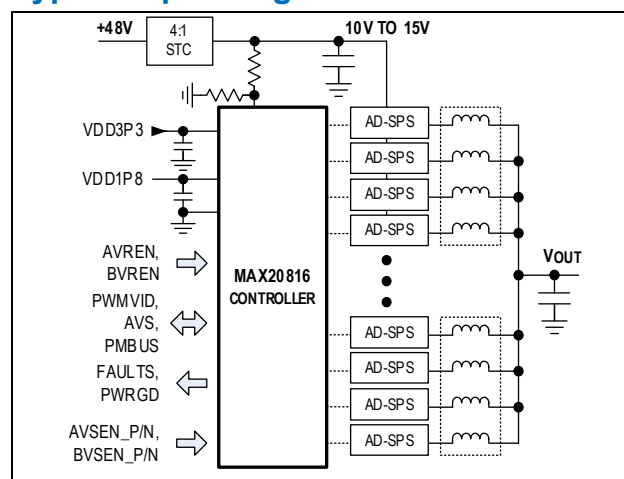
Applications

- NVIDIA GPUs with PWMVID Interface
- AVSBus™ for Fast Dynamic Voltage Transitions
- AI Cores, XPU's, GPU's, Networking ASICs
- High-Current Multiphase Voltage Regulators
 - 32ph (2 Parallel) or 48ph (3 Parallel) Configuration
 - Up to 2500A

Benefits and Features

- High Power Density and Efficiency
 - Smart Power-Stage Support
 - Top-Tier Efficiency (90.71% Peak Efficiency at 0.75V_{OUT})
 - Integrated Output Power Monitor
 - 16-ph N+M Dual-Loop Multiphase Architecture
- High-Speed Digital Interface
 - PWMVID and AVSBus Support
- 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)
 - Digital GPIO (OCP, OTW, VR Settled Indicators)
- Advanced Power Management
 - Orthogonal Current Rebalance for Phase-Current Balance during Transients
 - Programmable Phase Firing Order
- Protection Features
 - Input and Bias Supply Undervoltage Protection
 - Overcurrent Protection
 - Password Protection

Typical Operating Circuit



Ordering Information appears at end of data sheet.

PMBus and AVSBus are trademarks of SWIF, Inc.

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

