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Multiphase Vcore Solution For Computing Systems Delivers Low Quiescent Power

[Alpha and Omega Semiconductor's](#) AOZ71137QI is a three-rail, seven-phase controller engineered as a multiphase core voltage (Vcore) power management system solution. Delivering the industry's lowest quiescent power in a multiphase controller, according to the vendor, the AOZ71137 is designed to meet Intel IMVP 8, 9, 9.1, and 9.2 specifications. When paired with AOS' DrMOS and Smart Power Stage (SPS), this controller provides a complete power delivery solution for Intel Meteor Lake and Arrow Lake notebook platforms.

The AOZ71137 digital controller provides three output rails in flexible 4/3/2/1, 2/1, and 1-phase configurations for IA, GT, and SA rails (see the figure). It is designed with AOS' Advanced Transient Modulator (A²TM), an advanced variable frequency hysteretic peak-current-mode control with a proprietary phase-current-sensing scheme. With the control provided by the A²TM feature, designers are able to implement fast transient response and optimal current balance for both transient and dc loads. These benefits also help enhance design flexibility and tunability for engineers, helping them minimize external component counts that reduce BOM costs while streamlining design efforts, says the vendor.

This AOS Vcore solution offers low quiescent power in all power states to maximize battery life. Its SMBus interface also eases customer or application-specific tuning or configuration, allowing settings to be programmed into the parts register, thereby eliminating the need for manual solder rework during the development phase. Programmability can be done by an AOS GUI or customized EC into the controller's built-in RAM. The controller also provides MTP to store register settings once the configuration is finalized.

In addition, the AOZ71137 provides complete protection and warning features, including UVP, OVP, OCP, and OTP. Fault protection behavior can also be easily programmed through SMBus. AOS' Vcore solution offers real-time telemetry information via its SMBus for VIN, VOUT, temperature, output currents, power states, and PSYS/VSYS/IAUX pins reporting through the SMBus.

Pairing with AOS' full portfolio of DrMOS and Smart Power Stage (SPS), designers can access cost-effective and high-performance core power solutions for today's demanding computing systems that require advanced features and capabilities for AI-related applications. For these designs, AOS offers its DrMOS in a small QFN5x5 packages that include the AOZ5516/AOZ5517 for gaming and the AOZ5508/AOZ5507 in the QFN3.5x4.5 package for mobile computing. These DrMOS devices allow designers to meet complete Vcore power requirements with best-in-class robustness, according to the vendor, along with 30-V breakdown voltage and UIS testing.

In addition, the AOZ71137QI can pair with SPSs, such as the AOZ52183QI, AOZ52173QI, and AOZ52153, available in compact QFN4x5 form factors. These devices deliver accurate IMON reporting and ultra-low quiescent current by enabling a sleep mode that satisfies advanced design requirements.

"The biggest challenge for multiphase Vcore in mobile applications is lowering quiescent power while still providing fast and reliable performance. The AOZ71137 checks all the boxes. It offers a novel control scheme to meet stringent power delivery, minimizes the need for external components with programmable tuning and configuration, and, above all, features the industry's lowest quiescent power paired with the AOS Smart Power Stage. These capabilities set our Vcore solution worlds apart from what is currently available in the industry. Laptops designed using the AOZ71137 can extend battery life workload run times from 30 minutes to 1 hour longer compared to competing solutions," said Starry Tsai, senior director of product marketing for the Power IC Product Line at AOS.

Other features include

- SVID interface to CPU compliant with IMVP8, 9, and 9.1/9.2 specifications, support for Fast V-Mode to protect CPU
- Low quiescent current: 3.7 mA at PS0 for 2 + 1 +1 configuration
- Autonomous phase management, including phase shedding and auto DCM to optimize power loss
- FCCM/FCCM2 pins to lower power loss in power-saving mode for notebook applications
- Support for multi-sourced, industry-standard DrMOS and SPS power stages

- User-friendly GUI for compensation and configurations with minimal external RC components
- EC programmability for configurations with built-in MTP and RAM with more than 10x configuration changes
- An acoustic-noise-suppression QFN 6x6-52L package.

The AOZ71137QI is immediately available in production quantities with a lead time of 12-16 weeks. The unit price starts at \$2.4 in 1,000-piece quantities. For more information, see the [product brief](#).

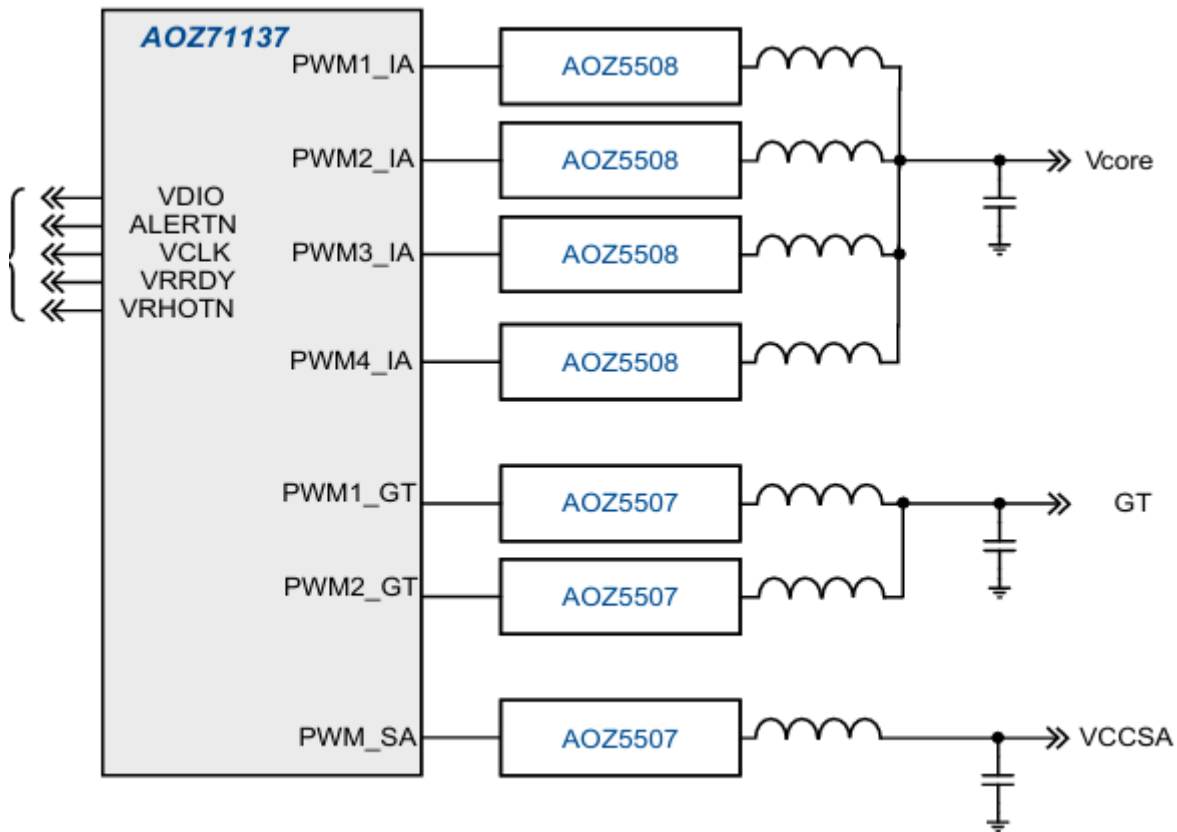


Figure. Typical application diagram for the AOZ71137QI, a high-performance digital and analog hybrid multiphase buck controller designed in compliance with Intel IMVP8, 9, and 9.1/9.2 platform specifications. Paired with AOS' DrMOS and Smart Power Stage (SPS), the controller provides a complete power solution for Intel IMVP9.2 Meteor Lake UH SKU applications.