

General Description

The AOZ71146QI is a high performance digital & analog hybrid multiphase buck controller designed in compliance with Intel IMVP8/9.1/9.2/9.3 platform specifications. It provides four output rails (up to 2+2+1+1) and supports 5 separate SVID domains: Up to 2 phases for core voltage domain (IA), 1 phase for graphics voltage domain (GT), 2 phase for Auxiliary domain (SA) and 1 phase for LPCORE rail domain, as well as the P_{SYS} domain's reporting functions, incorporated into a single SVID interface. AOS offers a novel AOS Advanced Transient Modulator (A²TM). It combines an advanced variable frequency hysteretic peak current mode control with proprietary phase current sensing scheme for fast transient response and low system cost. The control loop enhances light-load efficiency by seamlessly entering DCM mode of operation. Autonomous Phase Management also assures optimized efficiency and power loss during light load with single phase DCM mode.

The AOZ71146QI is equipped with SMBus digital Interface enabling register programming for tuning and configuration to minimize the system components and eliminate the need for manual solder rework on system board. Programmability can be done either by AOS GUI or customized ECS into the controller's built-in RAM or NVM MTP. Configuration can be easily stored into or restored out of NVM MTP by simple STORE/RESTORE commands with thousands of rewrite cycle endurance. This greatly helps to achieve easy BOM management and minimize the number of part number and SKU.

Combined with AOS high performance DrMOS and SPS, the AOZ71146QI provides a complete power solution for Intel IMVP9.3 Panther Lake U/P/H SKU applications. AOZ71146QI comes in a 6mm x 6mm 52-pin QFN package, and is compliant to Intel's CFP requirement.

The AOZ71146QI controller features very low power consumption while still enabling digital interface control. This unique "Hybrid Digital" control scheme enables low quiescent power consumption in all power states as defined by the Intel IMVP9.3 platform to enable long system run times in battery life workloads. Additionally, AOZ71146QI features baby-phase support functions to further optimize light-load efficiency in PS2/3.

The AOZ71146QI provides complete protection and warning functions including UVP, OVP, OCP and OTP. Fault protection behavior can be easily programmed through SMBus. AOZ71146QI also offers real time telemetry information via SMBus for V_{IN}, V_{OUT}, temperature, output currents, power states as well as P_{SYS} / V_{SYS} / IAUX pins reporting via SMBus.

Features

- 2.5V to 24V V_{IN} input supply voltage
- Four output rails: Default 2/1 + 2/1 + 1 + 1 phase, configurable to 2/1+1+2/1+1 phase arrangement
- Panther Lake U/H, Wildcat Lake N, Nova Lake H platforms
- Support discrete Inductor and 2 phase coupled inductor
- Autonomous phase management including phase shedding and auto DCM to optimize power loss
- Support baby phase to maximize light load efficiency
- Digital & analog hybrid controller with SMBus programmability and lowest power consumption
- SVID interface to CPU compliant with IMVP8, 9, 9.1, 9.2 and the latest 9.3 specifications
 - Support fast V-Mode (FVM)
- Differential remote sensing to achieve 0.5% regulated V_{OUT} accuracy
- Programmable switching frequency from 300kHz up to 1.8MHz
- Low quiescent current: 5.4mA at PS0 for 2+2+1+1 configuration
- Supports industry standard DrMOS or SPS power stages
- User friendly GUI for compensation and configurations with minimal external RC components
- ECS programmability for configurations with built-in NVM MTP and RAM
- Proprietary, high performance AOS Advanced Transient Modulator (A²TM) control scheme
- System input power monitoring (both P_{SYS} and V_{SYS})
- 300kHz to 1.8MHz programmable switching frequency
- Acoustic noise suppression
- Output Under-Voltage Protection (UVP)
- Output Over-Voltage Protection (OVP)
- Total and Per-phase Over-Current Protection (OCP)
- Over-Temperature Protection (OTP)
- Over-Temperature Warning (OTW) via SMBALERT
- QFN6x6-52L, compliant to Intel CFP requirement

Applications

- Panther Lake notebooks
- Memory and graphic cards



Typical Application

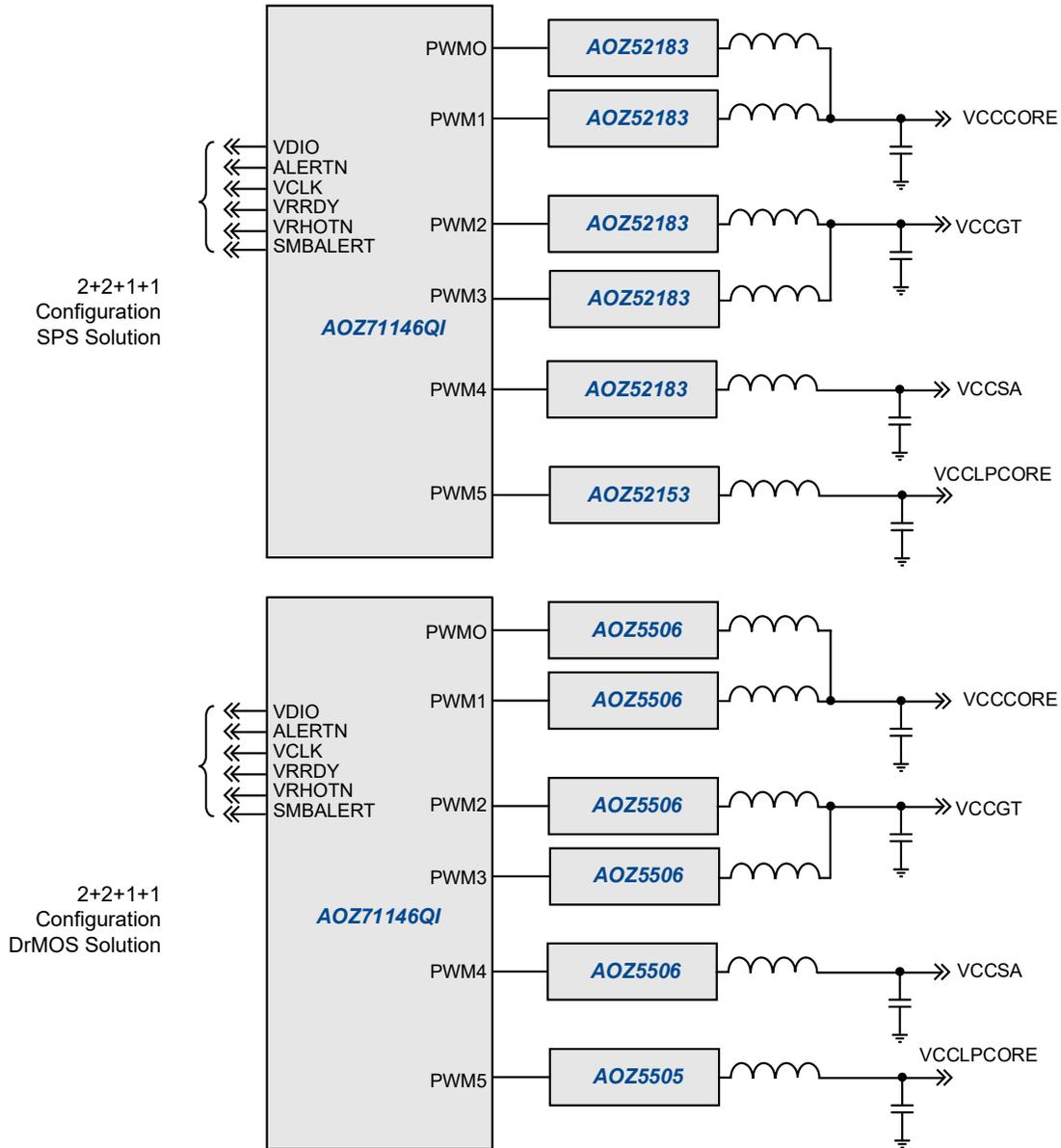


Figure 1. Typical Application

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