General Description

The AOZ71131QI is a high performance digital and analog hybrid multiphase buck controller designed in compliance with Intel IMVP8, 9, and 9.1/9.2 platform specifications. It provides three output rails (up to 9 + 1 + 1) and supports 4 separate SVID domains. Up to 9 phases for core voltage domain (IA), 1 phase for graphics voltage domain (GT) and 1 phase for Auxiliary domain (SA) as well as the P$_{SYS}$ domain's reporting functions, incorporated into a single SVID interface. AOS offers a novel AOS Advanced Transient Modulator (A^{2}TM). 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 the optimized efficiency and power loss during light load with single phase DCM mode.

The AOZ71131QI 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 MTP. The controller provides MTP to store register settings once the configuration is finalized and the configuration can be updated more than ten times. In the production stage, the external resistor can be used for pin strap to choose 1 out of 6 config settings pre-programmed into the parts to achieve easy BOM management and minimize the number of PN and SKU.

Combined with AOS high performance DrMOS, the AOZ71131QI provides a complete power solution for Intel IMVP9.1/9.2 Meteor Lake S and Graphic card low power SKU applications. AOZ71131QI comes in a 7mm x 7mm 60-pin QFN package.

The AOZ71131QI 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 IMVP9.1/9.2 platform to enable long system run times in battery life workloads.

The AOZ71131QI provides complete protection and warning functions including UVP, OVP, total and per-phase OCP and OTP. Fault protection behavior can be easily programmed through SMBus. AOZ71131QI also offers real time telemetry information via SMBus for V$_{IN}$, V$_{OUT}$, temperature, output currents, power states, as well as PSYS / VSYS / IAUX pins reporting via SMBus.

Figure 1 shows the typical application implementation of the AOZ71131QI device in a multiphase buck VR.

Features

- 5.2V to 24V V$_{IN}$ input supply voltage
- Triple output rails: 9/8/7/6/5/4/3/2/1 + 1 + 1
- Meteor Lake S and Graphic Platform
- Support Discrete Inductor and 2-phase Coupled L
- Autonomous Phase Management including phase shedding and auto DCM to optimize power loss
- Digital & analog hybrid controller with SMBus programmability and lowest power consumption
- SVID Interface to CPU compliant with IMVP8, 9, 9.1 and the latest 9.2 specifications
  - Support Fast V-Mode (FVM)
- Differential remote sensing to achieve 0.5% regulated V$_{OUT}$ accuracy
- Low quiescent current: 4mA at PS0 for 9+1 configuration
- Supports multi-sourced 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 MTP and RAM with more than 10 times configuration changes
- Pin Strap for easy configuration with 6 configuration setting with same PN to minimize number of SKU
- Proprietary, high performance AOS Advanced Transient Modulator (A^{2}TM) control scheme:
  - Variable frequency hysteretic peak current mode control gives fast transient response
  - Dynamic phase current balance
  - Excellent load-line control and phase current sensing
  - Seamless CCM to DCM control to maximize efficiency
- 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 Over-Current Protection (OCP)
- Per-phase Over-Current Protection (PHOCP)
- Over-Temperature Protection (OTP)
- QFN7x7-60L package

Applications

- Desktop computers
- Intel graphic cards

GREEN Product
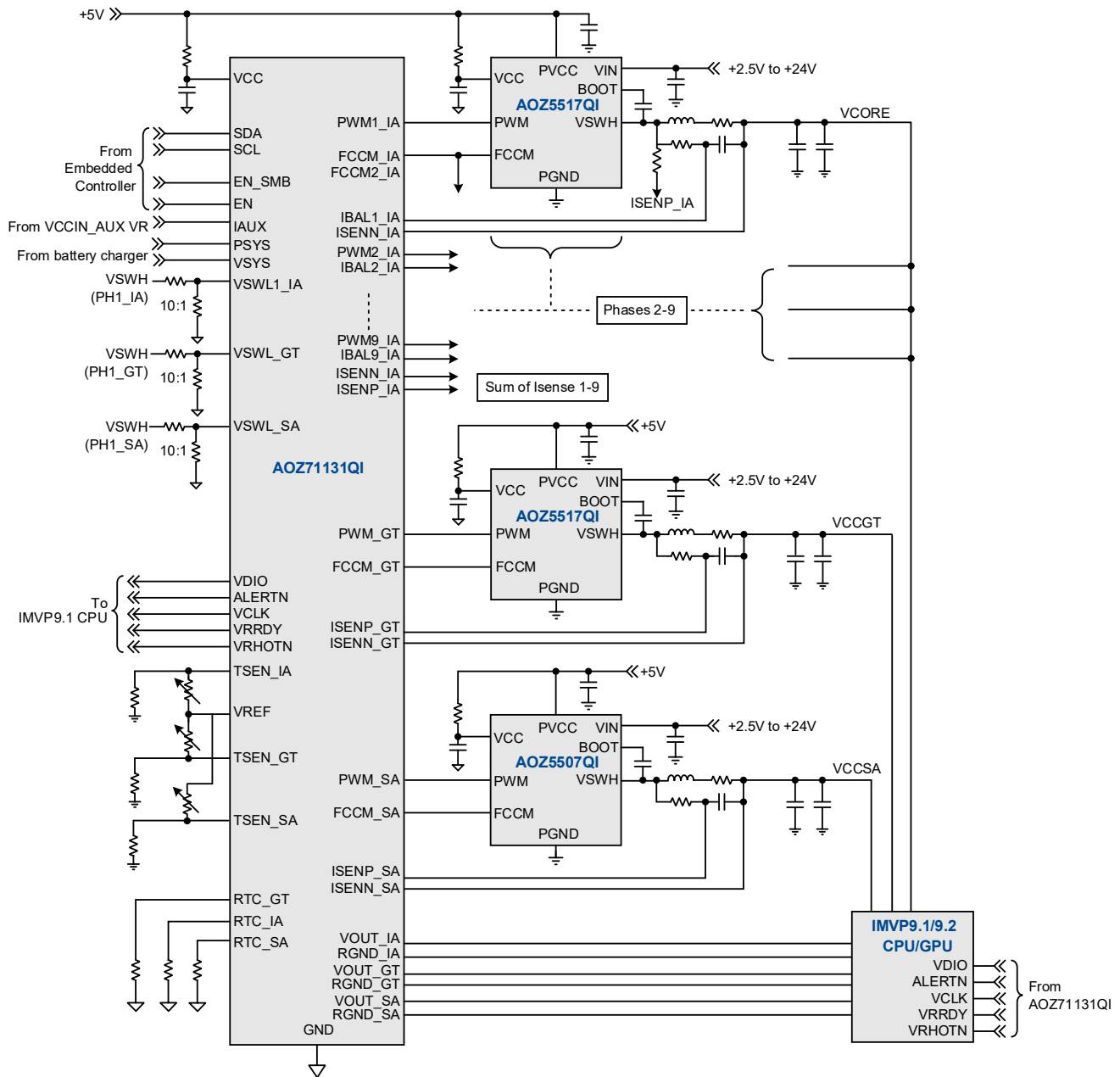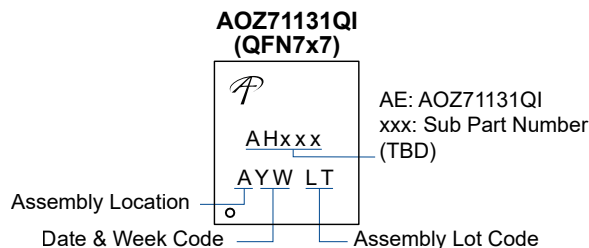
Typical Application

Figure 1. AOZ71131QI Typical Application Diagram

Part Marking

AOZ71131QI
(QFN7x7)

AHxxx

AYW LT

AE: AOZ71131QI
xxx: Sub Part Number
(TBD)

Assembly Location

Date & Week Code

Assembly Lot Code

Sub PN Marking	SKU	Project Descriptions	Full PN	Full Marking in Label
000	Blank	Blank	AOZ71131QI-000	AOZ71131QI-000

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2. A critical component in any component of a life support device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.