ALPHA & OMEGA SEMICONDUCTOR

# AOZ73016QI

## NVIDIA OpenVReg Compliant Controller Dual Output (N+M ≤ 16 Phases) with PMBus Interface

## General Description

The AOZ73016QI is a hybrid multiphase buck controller designed in compliance with NVIDIA OpenVReg. Flexible dual output rails can be configured as N+M ≤ 16. First output (VR1) can be configured as 0 to 16 phases whereas second output (VR2) can be configured as 0 to 8 phases. Offering a novel AOS Advanced Transient Modulator ($A^2TM$), 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. Power saving features such Auto Phase Management (APM) and Discontinuous Mode (DCM) are supported and can be activated by NVIDIA's PSI (power save interface) pin.

The AOZ73016QI is equipped with PMBus digital Interface enabling register programming for tuning and configuration to minimize the system components and eliminate the need for manual solder rework on the system board. Programmability can be done either by AOS GUI or customized ECS into the controller's built-in RAM. The controller also provides NVM to store register settings once the configuration is finalized. NVM can be used to store up to 4 configurations, which can be mapped through a pin-strap resistor at CFG pin.

The AOZ73016QI provides complete protection and warning functions including UVP, OVP, OCP and OTP. Fault protection behavior can be easily programmed through PMBus. AOZ73016 also offers real time telemetry information via PMBus for $V_{IN}$, $V_{OUT}$, temperature and current.

AOZ73016QI can be paired with multi-sourced industry standard DrMOS and Smart Power Stage (SPS). AOZ73016QI is offered in compact 7mm x 7mm 56-pin QFN package.

## Features

- NVIDIA OpenVReg Compliant
- Up to 16 phase single output rail or N + M ≤ 16 phases dual output rails is configurable
- Hybrid architecture with PMBus configurability
- User friendly GUI for compensation and configuration with minimal external RC components.
- Differential remote sensing to achieve 0.5% regulated $V_{OUT}$ accuracy
- Supports multi-sourced industry standard DrMOS and Smart Power Stage (SPS)
- ECS programmability with ability to update configuration in the field
- Supports power saving features such Auto Phase Management (APM) and Discontinuous Mode (DCM)
- Proprietary, high performance AOS Advanced Transient Modulator ($A^2TM$) control scheme
  - 200kHz to 1MHz programmable switching frequency
  - Hysteretic peak current mode control can vary frequency during transient for best-in-class response
  - Excellent dynamic phase current balance
  - Auto phase management supported
- Spread-spectrum Modulation (SSM)
- Output Under-Voltage Protection (UVP)
- Output Over-Voltage Protection (OVP)
- Over-Current Protection (OCP)
- Over-Temperature Protection (OTP)
- Over-Current Limit (OCL)
- QFN7x7-56L package

## Applications

- NVIDIA GPU
- Memory and graphic cards
- Video game console

GREEN Product

## Typical Application

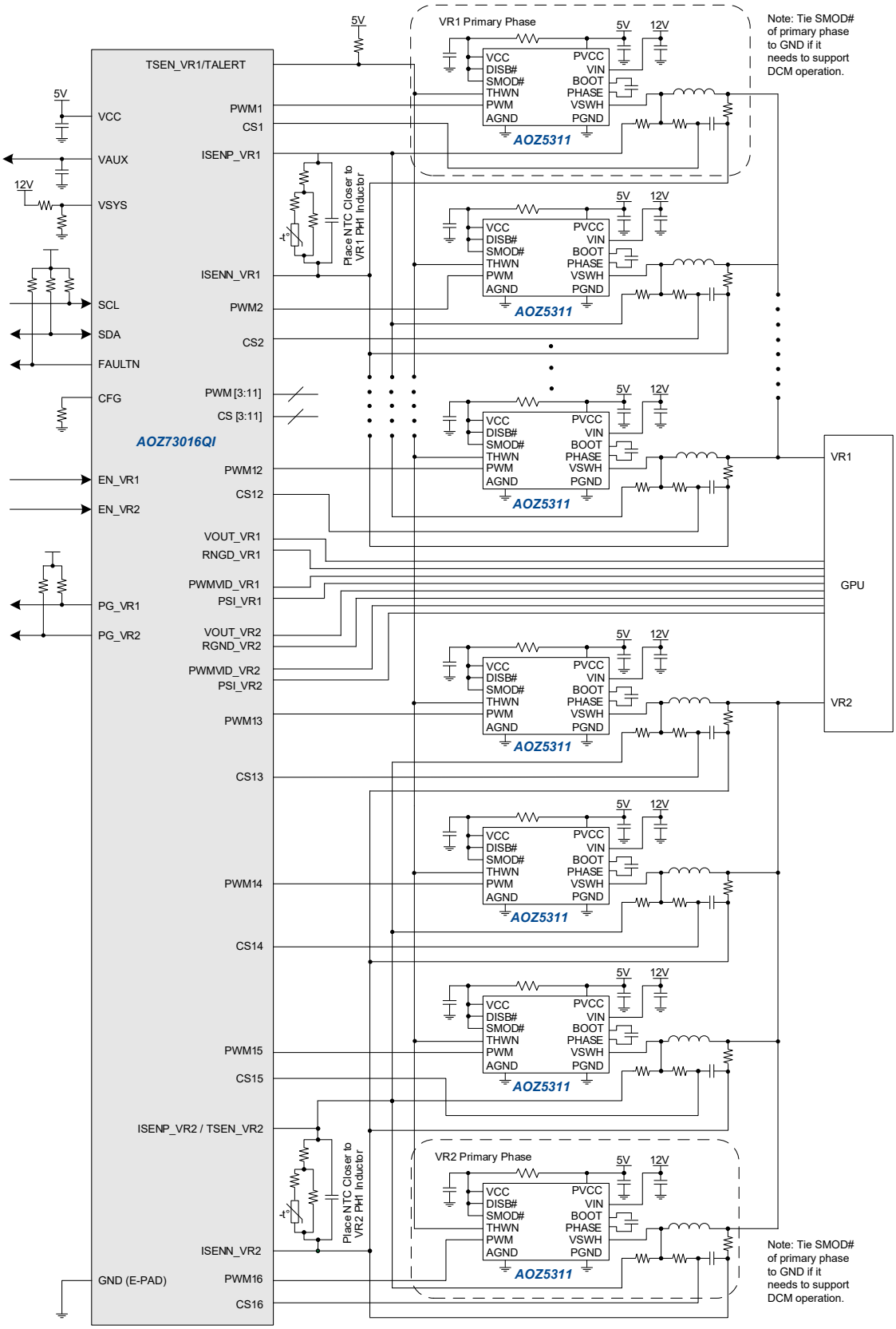



**Figure 1. Typical Application (12+4): DCR Sensing Current Balance Mode with AOZ5311QI DrMOS**

## Typical Application

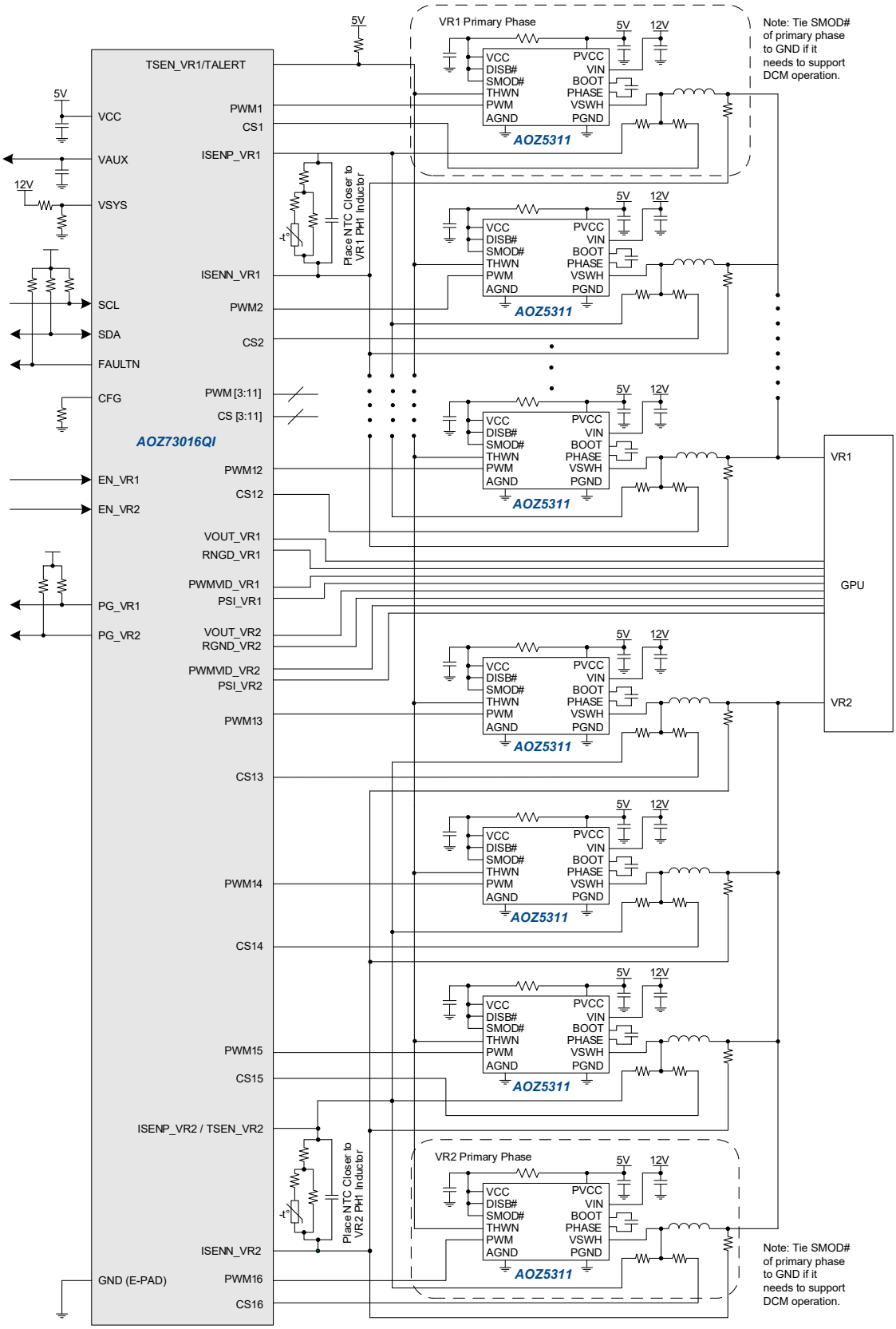



**Figure 2. Typical Application (12+4): LSRDSON Current Balance Mode with AOZ5311QI DrMOS**

## Typical Application

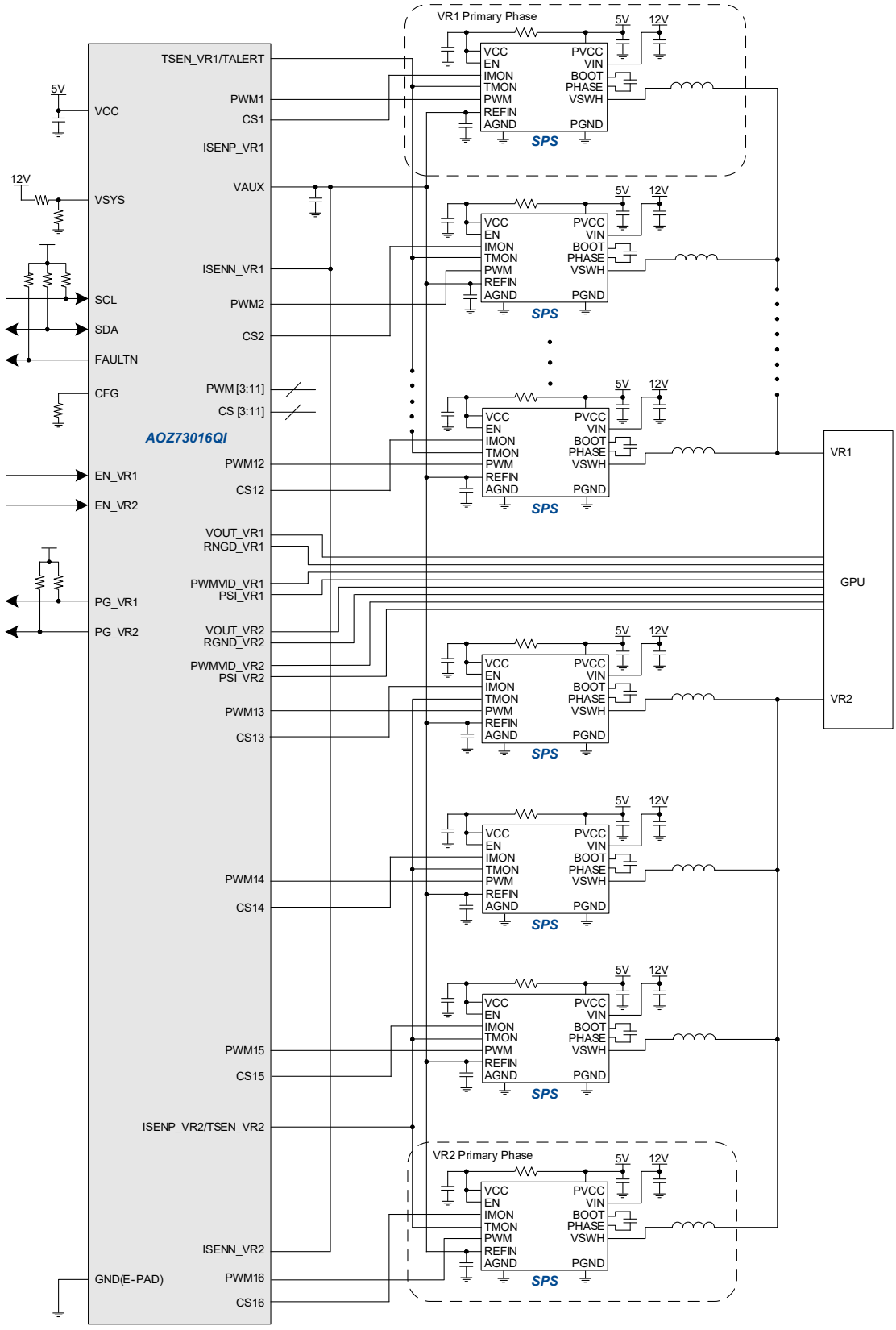



**Figure 3. Typical Application (12+4): Solution with Voltage IMON SPS**

## Typical Application

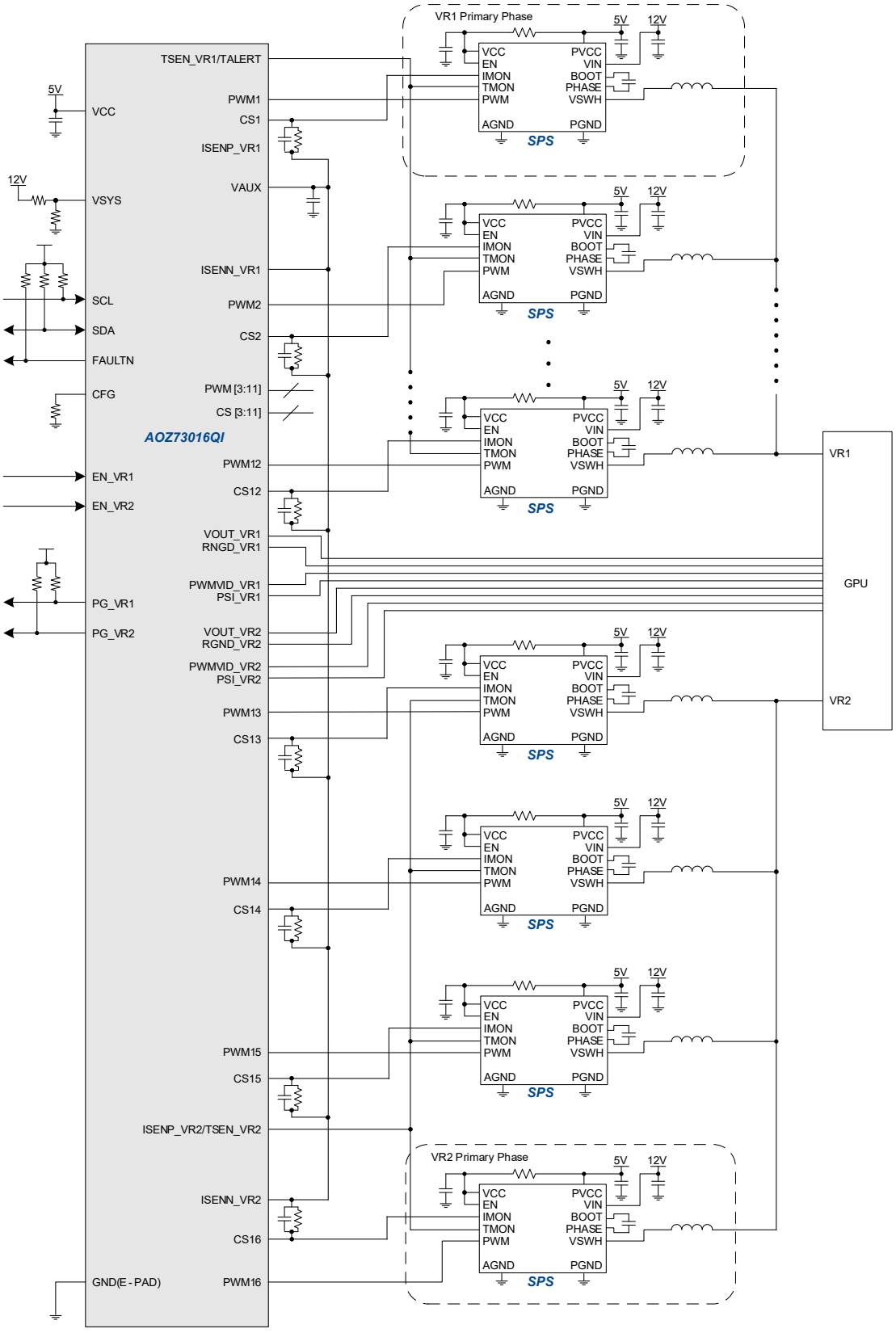
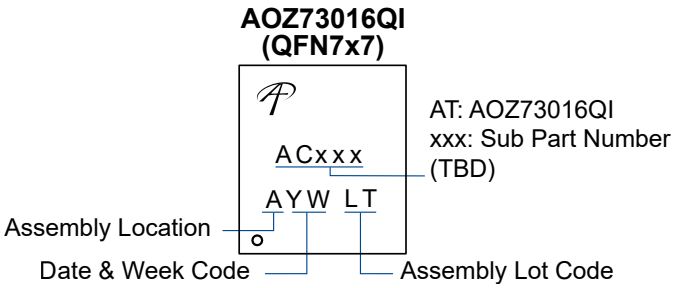



**Figure 4. Typical Application (12+4): Solution with Current IMON SPS**

## Part Marking




| Sub PN Marking | Full PN | Full Marking in Label |
|---|---|---|
| XXX | AOZ73016QI-XXX_YYY | AOZ73016QI-XXX_YYY |

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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.