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Multiphase PWM Controller For AI Server And Graphic Cards Is OVR4-22-Compliant

[Alpha and Omega Semiconductor's](#) AOZ73004CQI is being introduced as the world's first four-phase controller for Blackwell GPUs and its advanced design has received full OpenVReg (Open Voltage Regulator) OVR4-22 compliance. This controller generates one output rail and supports the PWMVID interface.

The performance and energy efficiency gains from the introduction of the Blackwell platform help propel AI capabilities supported by increased GPU performance. The AOZ73004CQI's cycle-by-cycle current limit meets the overcurrent limit (OCL) specification that helps safely throttle GPU power for maximized performance.

The AOZ73004CQI includes an external reference input and PWMVID dynamic output voltage control, which also follows the OVR4-22 specification. Furthermore, it can minimize ripple effects, enabling the device to triple the PWMVID slew rate up to 30 mV/μs, which is required for next-generation GPUs.

Moreover, the controller features deep-off and shallow-off power states to minimize power consumption. This provides a significant advantage in battery-powered applications such as laptops with discrete GPUs and gaming laptops, says the vendor.

The AOZ73004CQI with four-phase PWM is not limited to being paired with four DrMOS as a standard application. However, with AOS' proprietary DrMOS design capable of precise turn-on time, the AOZ73004CQI can enable one PWM to drive two or three DrMOS devices. By doubling and tripling DrMOS, designers can create a high-power, cost-effective multiphase power solution that can achieve up to 12 power stages.

For AI server and graphic card applications powered by 12-V input, AOS offers the AOZ5310NQI-A DrMOS for the best GPU power efficiency (see the figure). Similarly, the controller can pair with other DrMOS power stages such as the AOZ5316NQI/AOZ5317NQI/AOZ5318NQI, which are well matched to laptop GPUs powered by a 20-V input. The MOSFETs in DrMOS are TrenchFET, which further enhances OCL capability.

"AOS designs and manufactures multiphase PWM controller and power stage total solutions for our SoC customers to power AI server, graphic, and computing core power with the considerations of best system performance and reliability. AOZ73004CQI is a great example of our breakthrough control scheme that meets stringent power delivery requirements with minimum external components and the best system power efficiency in the world. The total solution can be quickly adopted by data center and computing customers with the reference design provided by the SoC supplier," said Starry Tsai, senior product marketing director for power IC at AOS.

Other features of the AOZ73004CQI include:

- Differential remote sensing to achieve 1% regulated V_{OUT} accuracy
- A proprietary, high-performance AOS Advanced Transient Modulator (A²TM) control scheme
- Dynamic phase-to-phase current balancing
- Seamless CCM-to-DCM control to maximize efficiency
- Support of DCR or R_{ON_LG} sensing current balance
- Automatic phase shedding (APS) with user settable thresholds
- Power saving interface (PSI)
- Acoustic noise suppression.

Housed in a 4-mm x 4-mm 32L QFN, the AOZ73004CQI is immediately available in production quantities with a lead time of 12 to 16 weeks. The unit price for AOZ73004CQI starts at \$1.2 in 1,000-piece quantities. For more information, see the [product brief](#).

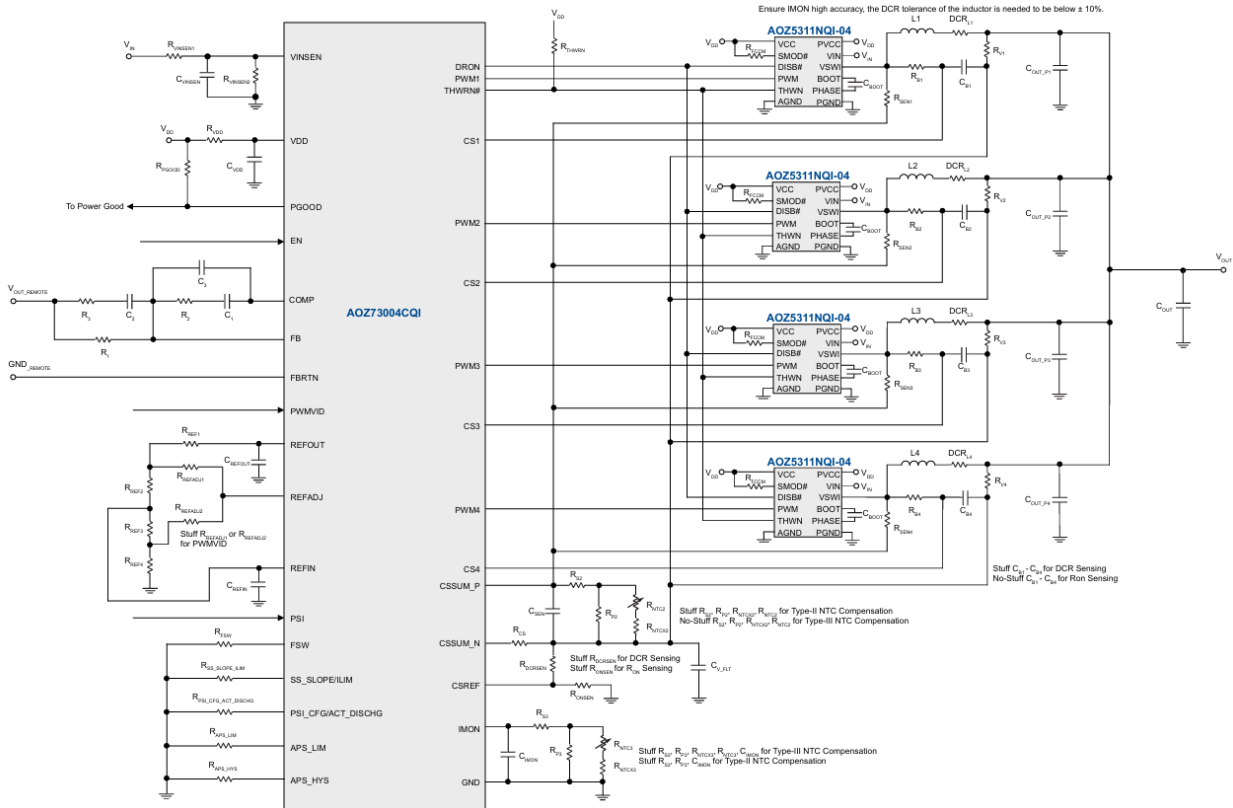


Figure. Typical application circuit for the AOZ73004CQI NVIDIA OpenVReg-compliant multiphase controller with PWMVID interface. According to the company, the AOZ73004CQI four-phase PWM controller pairing with AOS benchmark DrMOS exhibits the best system efficiency for Blackwell GPU platforms.