1000-A Voltage Regulator Solution For Next-Gen AI And 5G Networking

Infineon Technologies has extended its portfolio of high current system chipset solutions with what's described as the industry's first 16-phase digital PWM multiphase controller, the XDPE132G5C. The portfolio enables currents of 500 A to 1000 A and higher for next-generation CPUs, GPUs, FPGA and ASICs used in high-end artificial intelligence (AI) servers and 5G datacom applications.

As CPU current requirements increase to enable next generation AI and networking workloads, dc-dc voltage regulators (VRs) need to deliver more than 500 A to the load. With a true 16-phase digital PWM engine and an improved advanced transient algorithm, the XDPE132G5C controller addresses these high phase-count requirements. The true active current sharing between phases enables a reliable, compact and cost-saving design. Furthermore, there is no need for extra logic doubler ICs commonly utilized in today's high phase count markets.

Leading-edge ASICs and FPGAs in communication systems are requesting V_{out} control in increments of less than 1-mV steps. This is inherent in the XDPE132G5C, offering fine V_{out} setting in 0.625-mV increments. In addition, the XPDE132G5C supports communication market auto-restart requirements with options to reduce remote site maintenance following power or system glitches.

The XDPE132G5C is packaged in a 7-mm x 7-mm 56-pin QFN to accommodate 16 phases. It employs a full digital and programmable load line and is PMBus 1.3/AVS compliant delivering a comprehensive suite of telemetry features. Paired with the TDA21475, which is described as the industry's most thermally efficient integrated current-sense power stage, the XDPE132G5C controller can efficiently deliver over 1000 A.

The 70 A-rated TDA21475 power stage, housed in a 5-mm x 6-mm package, provides efficiency of more than 95%. The exposed top significantly reduces the $R_{th(j\text{-}top)}$ from 19°C/W in the overmolded package to 1.6°C/W. This efficiently removes heat from the top of the package, resulting in excellent VR power density and optimal VR phase count and footprint. To further maximize the capability of the CPU/ASIC, the TDA21475 also offers smart overcurrent and overvoltage protection and delivers accurate temperature and current information to the XDPE132G5C controller.

Rounding out Infineon's portfolio of high current chipset solutions is the IR35223 true 10-phase PWM digital controller. It provides a cost-effective option for VR solution requirements of up to 500 A. The IR35223 is housed in a 6-mm x 6-mm, 48-pin QFN package and provides advanced transient performance and telemetry features including PMBus 1.3/AVS bus compliance. More information is available at www.infineon.com/next-gen-processors.