

VRD11/VRD10, K8 Rev F 2/3/4-Phase PWM Controllers with Integrated Dual MOSFET Drivers

General Description

The MAX8809A/MAX8810A synchronous, 2-/3-/4-phase, step-down, current-mode controllers with integrated dual-phase MOSFET drivers provide flexible solutions that fully comply with Intel® VRD11/VRD10 and AMD K8 Rev F CPU core supplies. The flexible design supplies load currents up to 150A for low-voltage CPU core power requirements.

A tri-state SEL input is available to configure the VID logic for either the Intel VRD11/VRD10 or AMD K8 Rev F applications. An enable input (EN) is available to disable the IC. True-differential remote output-voltage sensing enables precise regulation at the load by eliminating the effects of trace impedance in the output and return paths. A high-accuracy DAC ($\pm 0.4\%$) combined with precision current-sense amplifiers and droop control enable the MAX8809A/MAX8810A to meet the most stringent tolerance requirements of new-generation high-current CPUs. These ICs use either integral or voltage-positioning feedback control to achieve high output-voltage accuracy.

The COMP input allows for either positive or negative voltage offsets from the VID code voltage. A power-good signal (VRREADY) is provided for startup sequencing and fault annunciation. The SS/OVP pin enables the programming of the soft-start period, and provides an indication of an overvoltage condition. A soft-stop feature prevents negative voltage spikes on the output at turn-off, eliminating the need for an external Schottky clamp diode.

The MAX8809A/MAX8810A incorporate a proprietary "rapid active average" current-mode control scheme for fast and accurate transient-response performance, as well as precise load current sharing. Either the inductor DCR or a resistive current-sensing element is used for current sensing. When used with DCR sensing, rapid active current averaging (RA²) eliminates the tolerance effects of the inductance and associated current-sensing components, providing superior phase current matching, accurate current limit, and precise load-line.

The MAX8809A operates as a single-chip, 2-phase solution with integrated drivers. It also provides a 3rd-phase PWM output and easily supports 3-phase design by adding the MAX8552 high-performance driver. The MAX8810A enables up to 4-phase designs by adding the MAX8523 high-performance dual driver for a compact 2-chip solution.

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Features

- ◆ VRD11/VRD10 and K8 Rev F Compliant
- ◆ Dual Integrated Drivers with Integrated Bootstrap Diodes
- ◆ Up to 26V Input Voltage
- ◆ Adaptive Shoot-Through Protection
- ◆ Soft-Start, Soft-Stop, VRREADY Output
- ◆ Fast Load Transient Response
- ◆ Individual Phase, Fully Temperature-Compensated Cycle-by-Cycle Average Current Limit
- ◆ Current Foldback at Short Circuit
- ◆ Voltage Positioning or Integral Feedback
- ◆ Differential Remote Voltage Sensing
- ◆ Programmable Positive and Negative Offset Voltages
- ◆ 150kHz to 1.2MHz Switching Frequency per Phase
- ◆ NTC-Based, Temperature-Independent Load Line
- ◆ Precise Phase Current Sharing
- ◆ Programmable Thermal-Monitoring Output (VRHOT)
- ◆ 6A Peak MOSFET Drivers
- ◆ 0.3 Ω /0.85 Ω Low-Side, 0.8 Ω /1.1 Ω High-Side Drivers (typ)
- ◆ 40-Pin and 48-Pin Thin QFN Packages

Applications

Desktop PCs
Servers, Workstations
Desknote and LCD PCs
Voltage-Regulator Modules

Ordering Information

PART	PIN-PACKAGE	PKG CODE	FUNCTION
MAX8809AETL+	40 Thin QFN 5mm x 5mm	T4055-1	2-/3-phase
MAX8810AETM+	48 Thin QFN 6mm x 6mm	T4866-1	2-/3-/4-phase

+Denotes lead-free package.

Note: All parts are specified in the -40°C to +85°C extended temperature range.

Pin Configurations appear at end of data sheet.