FEATURES

- Auto-Control Real-Time Adaptive Loop Compensation
- SMBus Interface with PMBus Power System Management Protocol
- Precision Measurement & Telemetry Reporting: \(V_{\text{OUT}}, I_{\text{OUT}}, V_{\text{IN}}, E_{\text{OUT}},\) Temperature, Duty Cycle, \(f_{\text{SW}}\)
- Programmable Protection & Warning
  - Output OVP, DCP, SCP, LOS, UV Warning
  - Input UVLO, OVLO
  - Internal & External OTP, UT Warning, & OT Warning
  - Phase Loss Fault
  - Temperature Compensated Faults
  - Programmable Latching & Auto-Restart
  - Configurable SALRT
- Single-Pin Configuration with Eight Profile Tables
- Power Management and Conversion
  - \(V_{\text{OUT}}\) Range: 0.6 V to 5.5 V
  - Lower Jitter and Improved Transient Performance
  - ±0.5% \(V_{\text{OUT}}, \pm1.5\% V_{\text{IN}}, \pm3\% I_{\text{OUT}}\) Accuracy Over Temperature
  - Automatic, Configurable Phase Add/Drop
  - Digital Stress Share (DSS*) Bus for \(\mu F\) Current Sharing Operation
  - Programmable Frequency (375 kHz to 1.25 MHz)
  - Programmable \(V_{\text{OUT}}, \) Voltage Tracking, Margining, & Sequencing
  - Frequency Synchronization & Phase Alignment
  - Programmable Precision Duty Cycle Limit
  - Temperature Compensated Phase Current Sense & Matching
  - Interleaved Phase Operation with Phase Current Sharing
  - Power Good, System Good, & Remote Power Down
  - Internal & External \(T_{\text{SENSE}}\)
    - Programmable Gain & Offset for External Sense Elements
  - Internal Anti-Fuse Based NVM
  - -40°C to 125°C (20 year data retention rating)
  - 32-Lead 5 mm x 5 mm QFN package (RoHS/PbF)

APPLICATIONS

- VDDQ for DDR Memory; Supports Over-Clocking Applications
- ASIC, FPGA, Microprocessor, Memory
- Networking, Communications, Storage, Server, Computing
- Advanced Power Modules & General Purpose POL

GENERAL DESCRIPTION

The PV3205 is a dual phase digital synchronous buck controller with adaptive loop compensation, for point-of-load (POL) applications. The output can supply 0.6 V to 5.5 V, and can be configured and controlled via PMBus, with a single resistor, or through programming stored in the non-volatile memory (NVM).

This controller may be used in single or dual phase mode. When used in dual phase mode, phases may be added or removed as the load varies, so that efficiency is maximized over the load range. Additionally, the outputs of the phases are interleaved so that the effective switching frequency at the output is doubled, and with Powervation’s Digital Stress Share (DSS) and PLL synchronization, multiple PV3205 devices may be used in parallel to increase the number of phases supporting the application’s load. PV3205 uses Powervation’s proprietary adaptive digital control loop, Auto-Control, which adapts on a cycle-by-cycle basis, and provides active loop compensation to stabilize the control loop as the phases are added and removed.

The digital functionality of this PMBus compliant power converter controller allows system telemetry (remote measurement and reporting) of current, voltage, and temperature information. Additionally, to maximize system performance and reliability, the IC provides temperature correction/compensation of several parameters. PV3205 is a fully protected DC/DC solution that utilizes analog and digital functionality to maximize protection of the system.

Figure 1: Pin Configuration (Top View)