**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, OCP, SCP, LOS, UV Warning
  - Input UVLO, OVLO
  - Internal & External OTP, UT Warning, & OT Warning
- Single-Pin Configuration with Eight Profile Tables
- Power Management and Conversion
  - $V_{\text{OUT}}$ Range: 0.6 V to 5.5 V
  - ±0.5% $V_{\text{OUT}}$, ±1.5% $V_{\text{IN}}$ & ±3% $I_{\text{OUT}}$ Accuracy Over Temperature
  - Automatic, Configurable Phase Add/Drop
- Digital Stress Share (DSS) Bus for Multi-POL & >2Φ Operation
- Programmable Frequency (375 kHz to 1 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 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**
- ASIC, FPGA, Microprocessor, Graphics, and POL
- DDR Memory Power
- Networking, Communications, Storage, Server, Computing
- Advanced Power Modules & General Purpose POL

**Product Overview PV3012**

**Digital Dual-Phase Synchronous Buck Controller with Auto-Control® & SMBus™/PMBus™**

**General Description**

The PV3012 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 PV3012 devices may be used in parallel to increase the number of phases supporting the application’s load. PV3012 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 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. PV3012 is a fully protected DC/DC solution that utilizes analog and digital functionality to maximize protection of the system.