**Product Overview PV3104**

**VR12.0/VR12.5 Digital Synchronous Buck Controller with Auto-Control® & SMBus™/PMBus™**

**FEATURES**
- Auto-Control Real-Time Adaptive Loop Compensation
- Intel® Compliant Serial VID (SVID) Interface
- SMBus Interface with PMBus Power System Management Protocol
- Precision Measurement & Telemetry Reporting: $V_{\text{OUT}}$, $I_{\text{OUT}}$, $V_{\text{INV}}$, $E_{\text{OUT}}$, Temperature, Duty Cycle, $f_{\text{SW}}$
- Programmable Protection & Warning
  - Output OVP, OCP, SCP, LOS
  - Input UVLO, OVLO
  - 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 1.52 V
  - ±0.5% $V_{\text{OUT}}$, ±1.5% $V_{\text{INV}}$, & ±3% $I_{\text{OUT}}$ Accuracy Over Temperature
  - Remote Power Down
  - Programmable Frequency (375 kHz to 1 MHz)
  - Programmable $V_{\text{OUT}}$
  - Frequency Synchronization & Phase Alignment
  - Programmable Precision Duty Cycle Limit
- 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**
- Intel SVID-Compliant Applications
- VCORE for Intel Atom Processors
- DDR Memory Power
- ASIC, FPGA, Microprocessor, & Graphics
- Networking, Communications, Storage, Server, & Computing

**GENERAL DESCRIPTION**

The PV3104 is a digital synchronous buck controller with adaptive loop compensation, for point-of-load (POL) applications. The PV3104 complies with the Serial VID (SVID) portion of Intel's VR12 specification in order to support Intel-based memory, graphics and similar applications. Through SVID, the CPU can dynamically control the output voltage, slew rates, power states, as well as monitor the VR controller for telemetry purposes. In parallel to SVID, the PV3104 also supports a set of PMBus commands, allowing a BMC in a server application to configure, control and monitor the VR controller.

PV3104 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.

The digital functionality of this VR controller allows system telemetry (remote measurement and reporting) of current, voltage, and temperature information through its serial interfaces. Additionally, to maximize system performance and reliability, the IC provides temperature correction/compensation of several parameters. PV3104 is a fully protected DC/DC solution that utilizes analog and digital functionality to maximize system protection.

![Diagram of PV3104](image-url)

0.6 V ≤ $V_{\text{OUT}}$ ≤ 1.52 V Reference Circuit with Optional Components

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