

## Digital Power Products

This Power Product Roundup highlights recently introduced power components that feature a digital interface or digital control in the loop. Among the devices profiled here are power supply controller ICs, power management ICs, point-of-load power converters, and ac-dc power supplies. The following products are included in this feature:

- Digital Controller Provides Real-Time Adaptive Loop Compensation
- Analog Buck Controllers Feature PMBus Interface
- Digital Power Controllers Deliver High Efficiency
- Warranty On 300-W/400-W Power Supplies Is Extended To Five Years
- POL Regulators Offer Vertical Mount For Space-Critical Applications
- Buck Regulators Deliver Highly Integrated Designs
- Multi-Rail Digital PMUs Pack Numerous Features

## Digital Controller Provides Real-Time Adaptive Loop Compensation

Designed to power ASICs, FPGAs, processors, and general POLs for networking, communications, server, storage, and advanced power module applications, [Powervation's](#) PV3012 is a dual-phase digital dc-dc controller with Auto-Control. This is a feature that the company describes as the industry's first and only real-time adaptive loop compensation solution. This digital control loop technology optimizes the trade-off between dynamic performance and system stability on a cycle-by-cycle basis without requiring any noise injection or other drawbacks of part-time measurement techniques. This is an advantage for designs that drive imprecise or variable loads, and also addresses the drift of power supply component parameters over temperature and time.

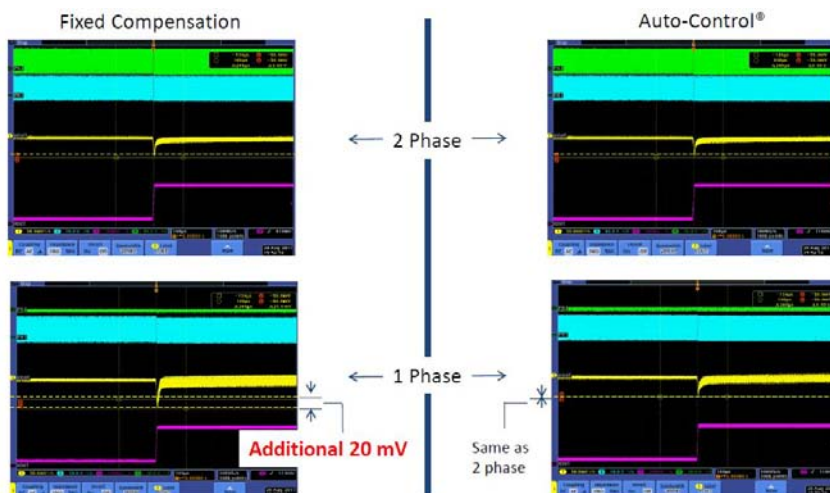


Fig. 1. Auto Control maintains similar transient response under dual or single-phase operation.

memory retention. Powervation also claims to be the only company offering one-pin configuration, allowing eight complete profiles to be stored in a single device. Additionally, the company says it's the only one running firmware on a proprietary dual-core DSP/RISC architecture for increased performance and flexibility.

In addition, this technology relieves power supply designers of the burden of compensation and plant characterization, and reduces total design iterations, according to the company. Auto-Control also enables efficiency-boosting mode changes such as adding or shedding phases and light-load modes. David New, Powervation's director of product marketing, notes that Auto-Control enables similar transient performance to be achieved in either single- or dual-phase operation, while solutions using fixed compensation will generally see a degradation in transient response in single-phase operation versus dual phase (Fig. 1.)

According to the vendor, the PV3012 represents the only digital power solution using anti-fuse-based memory structure, which enables -40°C to +125°C, 20-year

The PV3012 delivers voltage precision of  $\pm 0.5\%$  over line, load, and the full  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$  temperature range. According to New, the best output voltage accuracy available from competing devices is  $\pm 1\%$ . The converter's output can be configured from 0.6 V to 5.5 V using PMBus commands or with an external resistor to access standard and DOSA set-point tables. Phases may be automatically added or removed as the load varies, maximizing efficiency over the load range (Fig. 2.)

Another feature of the controller is the company's Digital Stress Share (DSS) single-wire bus, which enables multiple PV3012 devices to be connected in parallel to securely drive high-current multi-phase loads. (At the recent Darnell Power Forum, Powervation demonstrated a six-phase controller.)

The PV3012 is a system-on-chip solution based on a lean DSP/RISC dual-core architecture with a precision data acquisition engine running Auto-Control algorithms in firmware. This controller is designed to work with all leading gate drivers and FETs (Fig. 3.)

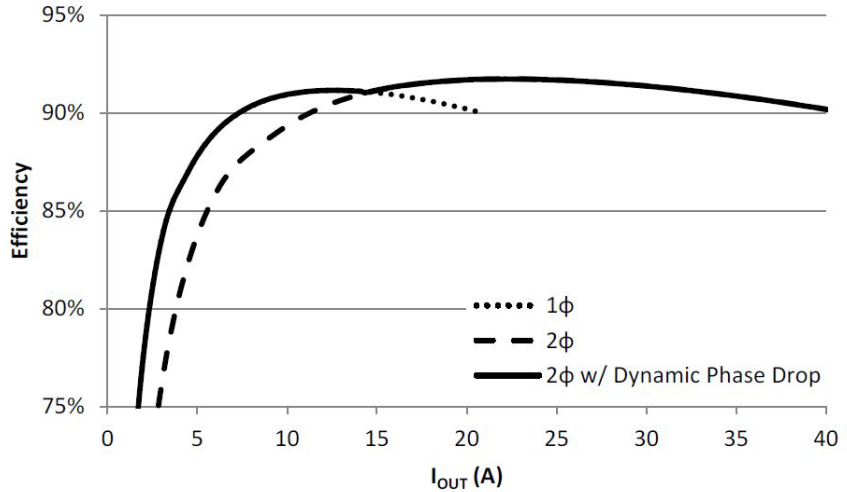


Fig. 2. The PV3012 maintains high efficiency while automatically adding or shedding phases.

This full suite PMBus-compliant controller uses full differential measurements and an 11-bit ADC to provide precision system telemetry of current, voltage, and temperature information, as well as comprehensive fault and warning reporting over an SMBus interface. Additionally, the PV3012 delivers advanced digitally mapped temperature compensation of key parameters, which enables current measurement precision of 3% over the full load range. (In contrast, some competing solutions claim 5% or worse output current accuracy, says New.)

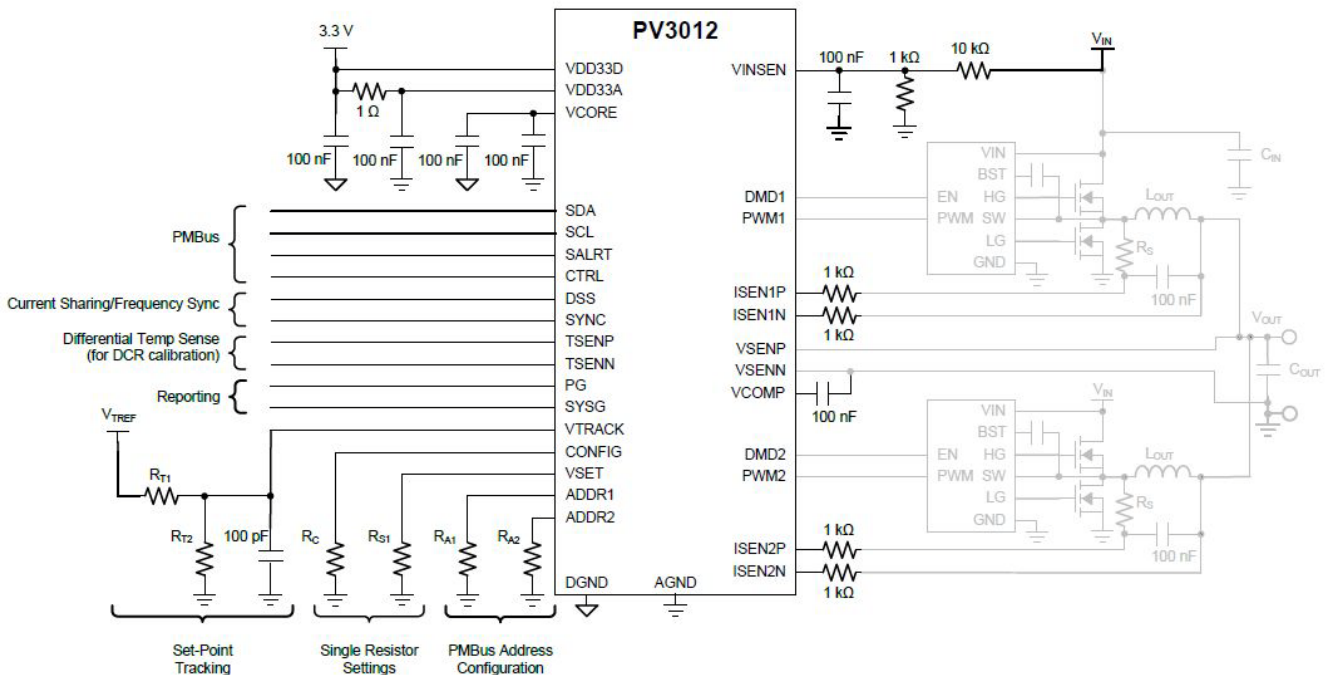


Fig. 3. Users can configure and store up to eight configuration tables in NVM, which enables single-resistor selection of one of eight device/application profiles.