Dual-Output Multi-Phase Digital Integrated Power Conversion & Management IC

PX7542

Product Brief

Applications

- Telecom/Datacom equipment
- Servers & Storage equipment
- POL power converters for memory, DSP, ASIC, FPGA

Features

- Up to 1 MHz switching frequency
- "Dual-loop" Operation
  - Supports two independent outputs at different voltage levels with single or two phase control for each output
- "Single-loop" Operation
  - Supports a single output with one through four phases
- Wide output voltage range: 0.5V to 7.2V
- Supports both DCR and RDSon current sense topologies with digital temperature compensation
- Digital control loop with Proportional, Integral, and Derivative (PID) compensation with 100ps PWM resolution.
- Compatible with both tri-state and non-tri-state FET drivers
- Resistor-based PMBus™ address
- Current sharing capability
- Soft-start into prebiased load
- PMBus™ compliant serial interface
  - Voltage set and adjustment
  - Sequencing, margining, open-loop tracking
  - Query voltage, current, temperature faults
  - Fault response
- Extensive fault detection and protection capability (fault reporting through two user configurable output pins per loop)
  - Input Under-/Over-voltage
  - Output Under-/Over-voltage
  - High side short
  - Peak, Average, and Constant Current Limit Protect
  - Cycle-by-cycle peak pulse current limiting
  - Internal/External Temperature Alert/Shutdown
  - Phase Sync Reference Detect/Lock
  - PMBus™ Protocol Violation
  - Calibration Range and Time-Out
- On-chip non-volatile memory (NVM) to store custom configurations
- Background integrity check of Registers & NVM
- Single +5.0V or +3.3V supply operation
- RoHS compliant 40-lead MLF plastic package

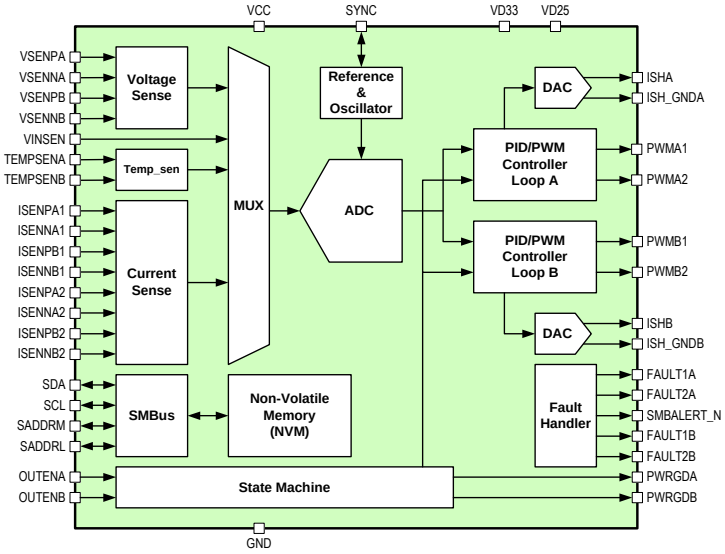
Description

The Primarion Di-POL™ PX7542 Power IC is a highly configurable Digital Point-of-Load (POL) Controller with two loops and four PWM outputs. Designed for use in high current buck converter topologies, the controller can operate with either DCR or RDSon current sense configurations. For the DCR current sense, the output range is from 0.5V to [Vcc – 0.9V] and for the RDSon current sense, the output range is from 0.5V to 7.2V. In dual-loop mode, the PX7542 supports two independent outputs with single/dual phase control for each output. In single-loop mode, the PX7542 can provide a single output rail with up to four phases. Chip-to-chip current sharing with up to four phases can be interleaved synchronously for multiphase operation.

The PX7542 utilizes digital technology to implement all control functions, providing the ultimate in flexibility and stability. The PX7542 incorporates an industry standard PMBus™ serial interface for real-time system control. Through the serial interface, the power supply designer can quickly optimize designs while monitoring system performance without having to make any hardware adjustments.

The PX7542 provides superior accuracy through internal calibration that measures and corrects current sense error sources upon startup. The controller also has programmable current sense temperature compensation that allows the designer to tailor the response for best accuracy over temperature.

Block Diagram



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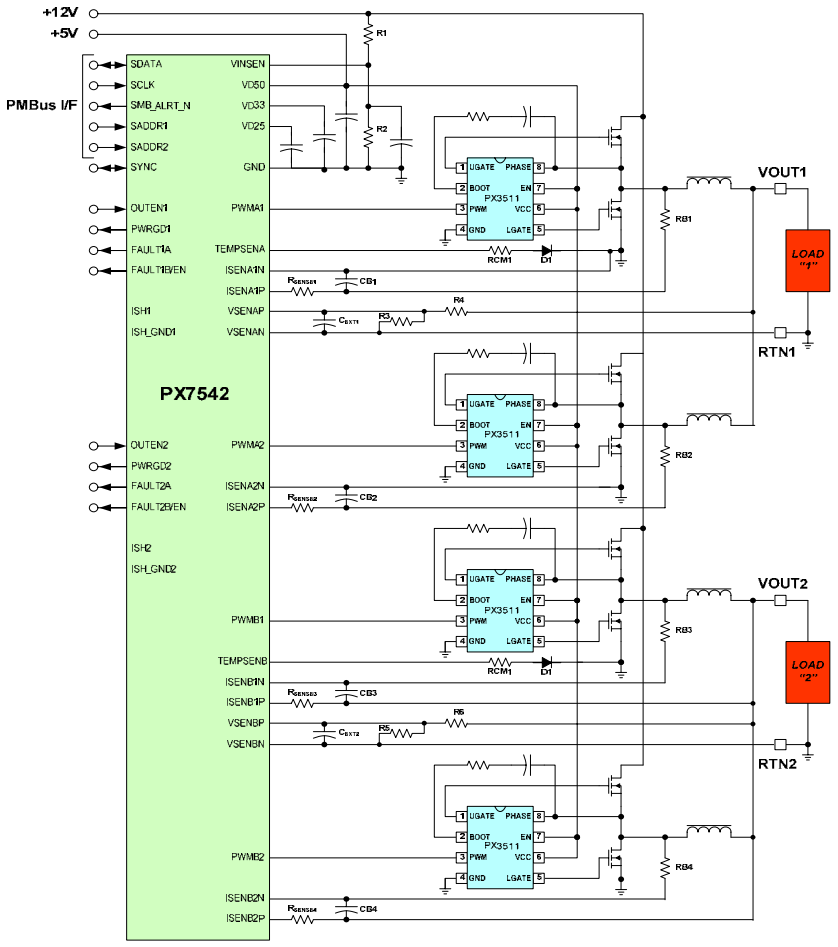
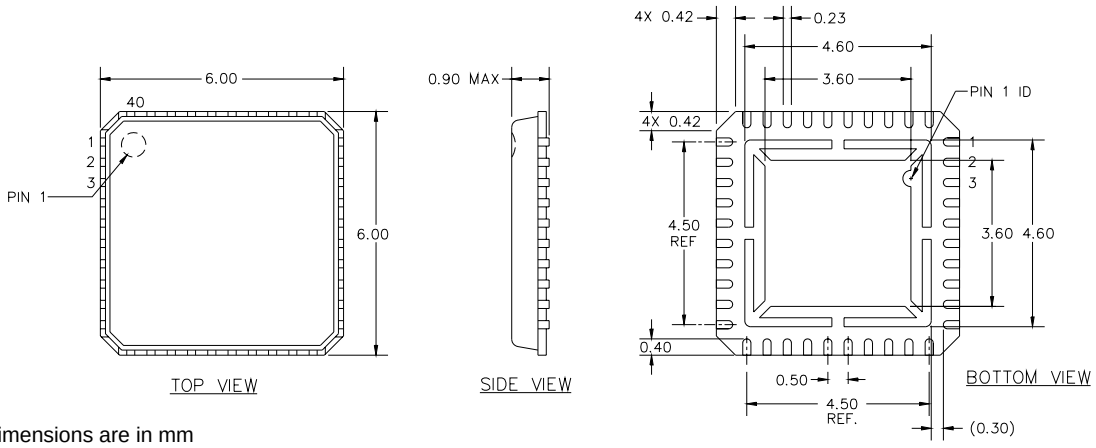
Typical Dual-Output Four-Phase Application with Loop1 (RDSon) & Loop2 (DCR) Current Sense



Physical Characteristics (40-lead 6mm X 6mm QFN)



Note: All dimensions are in mm

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