

## ISL9500

### Precision Multi-Phase Buck PWM Controller

FN9248

Rev 0.00

December 2, 2005

The ISL9500 multi-phase Buck PWM control IC, with integrated half bridge gate drivers, provides a precision voltage regulation system for microprocessors in notebook computers. Two-phase operation eases the thermal management issues and load demand of high performance processors. This control IC also features both input voltage feed-forward and average current mode control for excellent dynamic response, "Loss-less" current sensing using MOSFET  $r_{DS(ON)}$  and user selectable switching frequencies from 250kHz to 1MHz per phase.

The ISL9500 includes a 6-bit digital-to-analog converter (DAC) that dynamically adjusts the CORE PWM output voltage. The ISL9500 also has logic inputs to select Active, Deep Sleep and Deeper Sleep modes of operation. A precision reference, remote sensing and proprietary architecture, with integrated, processor-mode, compensated "Droop", provide excellent static and dynamic CORE voltage regulation.

To improve efficiency at light loading, the ISL9500 can be configured to run in single phase PWM in Active, Deep or Deeper Sleep modes of operation. Also, in Deep and Deeper sleep modes the ISL9500 will operate in diode emulation.

Another feature of this IC controller is the PGOOD monitor circuit that is held low until CORE voltage increases, during its soft-start sequence, to within 12% of the "Boot" voltage. This PGOOD signal is masked during VID changes. Output overcurrent, overvoltage and undervoltage are monitored and result in the converter latching off and PGOOD signal being held low.

The overvoltage and undervoltage thresholds are 112% and 84% of the VID, Deep or Deeper Sleep setpoint, respectively. Overcurrent protection features a 32 cycle overcurrent shutdown. PGOOD, overvoltage, undervoltage and overcurrent provide monitoring and protection for the microprocessor and power system. The ISL9500 IC is available in a 38 lead TSSOP.

### Features

- Diode Emulation Functionality in Deep and Deeper Sleep Modes for Improved Light Load Efficiency
- Single and/or Two-phase Power Conversion
- "Loss-less" Current sensing for Improved Efficiency and Reduced Board Area
  - Optional Discrete Precision Current Sense Resistor
- Internal Gate-Drive and Boot-Strap Diodes
- Precision CORE Voltage Regulation
  - 0.8% System Accuracy Over Temperature
- 6-Bit Microprocessor Voltage Identification Input
- Programmable "Droop" and CORE Voltage Slew Rate
- Direct Interface with System Logic for Deep and Deeper Sleep modes of operation
- Easily Programmable Voltage Setpoints for Initial "Boot", Deep Sleep and Deeper Sleep Modes
- Excellent Dynamic Response
  - Combined Voltage Feed-Forward and Average Current Mode Control
- Overvoltage, Undervoltage and Overcurrent Protection
- Power-Good Output with Internal Blanking during VID and Mode Changes
- User programmable Switching Frequency of 250kHz - 1MHz
- Pb-Free Plus Anneal Available (RoHS Compliant)

### Ordering Information

PART NUMBER	PART MARKING	TEMP RANGE (°C)	PACKAGE	PKG. DWG. #
ISL9500CVZ (See Note)	ISL9500CVZ	-10 to 85	38 Ld TSSOP (Pb-free)	M38.173
ISL9500CVZ-T (See Note)	ISL9500CVZ	-10 to 85	38 Ld TSSOP Tape and Reel (Pb-free)	M38.173

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