ISL9501

Precision Single-Phase Buck PWM Controller

FN9249
Rev 2.00
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The ISL9501 Single-phase Buck PWM control IC, with integrated half bridge gate drivers, proVSELes a precision voltage regulation system for microprocessors in notebook computers. Single-phase operation proVSELes flexibility in meeting the requirements of the latest microprocessors. 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 500kHz.

The ISL9501 includes a 6-bit digital-to-analog converter (DAC) that dynamically adjusts the CORE PWM output voltage. The ISL9501 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”, proVSELe excellent static and dynamic CORE voltage regulation.

To improve efficiency at light loading, the ISL9501 will operate in diode emulation in Deep and Deeper Sleep modes.

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 VSEL 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 VSEL, Deep or Deeper Sleep setpoint, respectively. Overcurrent protection features a 32 cycle overcurrent shutdown. PGOOD, overvoltage, undervoltage and overcurrent proVSELe monitoring and protection for the microprocessor and power system. The ISL9501 IC is available in a 38 Ld TSSOP and a 40 Ld QFN.

Features

- Diode Emulation Functionality in Deep and Deeper Sleep Modes for Improved Light Load Efficiency
- Single-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 VSEL and Mode Changes
- User Programmable Switching Frequency of 250kHz to 500kHz
- Pb-Free (RoHS Compliant)

Ordering Information

PART NUMBER (Note)	PART MARKING	TEMP RANGE (°C)	PACKAGE (Pb-free)	PKG. DWG #
ISL9501CVZ*	ISL9501 CVZ	-10 to +85	38 Ld TSSOP	M38.173
ISL9501CRZ*	ISL95 01CRZ	-10 to +85	40 Ld 6x6 QFN	L40.6x6

*Add “-T” suffix for tape and reel. Please refer to TB347 for details on reel specifications.

NOTE: These Intersil Pb-free plastic packaged products employ special Pb-free material sets, molding compounds/die attach materials, and 100% matte tin plate plus anneal (e3 termination finish, which is RoHS compliant and compatible with both SnPb and Pb-free soldering operations). Intersil Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J STD-020

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