

## ISL6364C

Dual 4-Phase + 1-Phase PWM Controller for VR12 Desktop Applications

FN7723  
 Rev 1.00  
 Aug 7, 2013

The ISL6364C is a dual PWM controller; its 4-phase PWMs control the microprocessor core or the memory voltage regulator, while its single-phase PWM controls the peripheral voltage regulator for graphics, system agent, or processor I/O.

The ISL6364C utilizes Intersil's proprietary Enhanced Active Pulse Positioning (EAPP) modulation scheme to achieve extremely fast transient response with fewer output capacitors.

The ISL6364C is designed to support Intel VR12 Desktop specifications. It accurately monitors the load current via the IMON pin and reports this information via the IOUT register to the microprocessor, which sends a PSI# signal to the controller at low power mode via SVID bus. The controller enters 1 or 2-phase operation in low power mode. In low power modes, the magnetic core and switching losses are significantly reduced, yielding high efficiency at light load. After the PSI# signal is de-asserted, the dropped phase(s) are added back to sustain heavy load transient response and efficiency.

Today's microprocessors require a tightly regulated output voltage position versus load current (droop). The ISL6364C senses the output current continuously by measuring the voltage across a dedicated current sense resistor or the DCR of the output inductor. The sensed current flows out of the FB pin to develop a precision voltage drop across the feedback resistor for droop control. Current sensing also provides information for channel-current balancing, average overcurrent protection and individual phase current limiting. The TM and TMS pins sense an NTC thermistor's temperature, which is internally digitized for thermal monitoring and for integrated thermal compensation of the current sense elements of the respective regulator.

The ISL6364C features remote voltage sensing and completely eliminates any potential difference between remote and local grounds. This improves regulation and protection accuracy. The threshold-sensitive enable input is available to accurately coordinate the start-up of the ISL6364C with other voltage rails.

## Features

- Support Intel VR12 for 0/1 Address
  - SerialVID with Programmable IMAX, TMAX, and BOOT Registers
- Intersil's Proprietary Enhanced Active Pulse Positioning (EAPP) Modulation Scheme (Patented)
  - Variable Frequency Control During Load Transients to Reduce Beat Frequency Oscillation
  - Linear Control with Evenly Distributed PWM Pulses for Better Phase Current Balance During Load Transients
  - Voltage Feed-Forward and Adjustable Ramp Options
  - High Frequency and PSI Compensation Options
- Dual Outputs
  - Output 1 (VR0): 1 to 4-Phase for Core or Memory
  - Output 2 (VR1): Single Phase for Graphics, System Agent, or Processor I/O
  - Differential Remote Voltage Sensing
  - ±0.5% Closed-loop System Accuracy Over Load, Line and Temperature
- Proprietary Active Phase Adding and Dropping Scheme For Enhanced Light Load Efficiency
- Droop Option
- Programmable 1 or 2-Phase Operation in Low Power Mode
- Precision Resistor or DCR Differential Current Sensing
  - Integrated Programmable Current Sense Resistors
  - Integrated Thermal Compensation
  - Accurate Load-Line (Droop) Programming
  - Accurate Channel-Current Balancing
  - Accurate Current Monitoring
- Average Overcurrent Protection and Channel Current Limit With Internal Current Comparators
- Independent Oscillators, up to 1MHz Per Phase, for Cost, Efficiency, and Performance Optimization
- Dual Thermal Monitoring and Thermal Compensation
- Start-up Into Pre-Charged Load
- Pb-Free (RoHS Compliant)
- Not Controlled by Intersil Standard PCN Process

**© Copyright Intersil Americas LLC 2010-2013 All Rights Reserved.  
All trademarks and registered trademarks are the property of their respective owners.**

For additional products, see [www.intersil.com/en/products.html](http://www.intersil.com/en/products.html)

---

Intersil products are manufactured, assembled and tested utilizing ISO9001 quality systems as noted in the quality certifications found at [www.intersil.com/en/support/qualandreliability.html](http://www.intersil.com/en/support/qualandreliability.html)

---

*Intersil products are sold by description only. Intersil may modify the circuit design and/or specifications of products at any time without notice, provided that such modification does not, in Intersil's sole judgment, affect the form, fit or function of the product. Accordingly, the reader is cautioned to verify that datasheets are current before placing orders. Information furnished by Intersil is believed to be accurate and reliable. However, no responsibility is assumed by Intersil or its subsidiaries for its use; nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Intersil or its subsidiaries.*

---

For information regarding Intersil Corporation and its products, see [www.intersil.com](http://www.intersil.com)