ISL6364A

Green Dual 4+1 PWM Controller for VR12/IMVP7 Applications with AUTO Phase Shedding

Key Features

- Intel VR12/IMVP7 Compliant
  - SerialVID with Programmable IMAX, TMAX, BOOT,ADDRESS OFFSET Registers
- ISL6364 Compatible
- Intersil's Proprietary Enhanced Active Pulse Positioning(EAPP) Modulation Scheme (Patented)
  - Variable Frequency Control During Load Transients toReduce Beat Frequency Oscillation
  - Linear Control with Evenly Distributed PWM Pulses forBetter Phase Current Balance During Load Transients
  - Voltage Feed-Forward and Adjustable Ramp Options
  - High Frequency and PSI Compensation Options
- NVM and Firmware Free for Low Cost and Easy Use
- Auto Phase Shedding Option for Greener Environment withBoot-refresh Option
- Dual Outputs
  - Output 1 (VR0): 1 to 4-Phase for Core or Memory (CoupledInductor and Phase Doubler, ISL6617/11A Compatible)
  - Output 2 (VR1): Single Phase for Graphics, System Agent,or Processor I/O (Phase Doubler Compatible, EN = HIGH)
  - Differential Remote Voltage Sensing
  - ±0.5% Closed-loop System Accuracy Over Load, Line andTemperature
- Proprietary Active Phase Adding and Dropping with DiodeEmulation Scheme For Enhanced Light Load Efficiency
- Programmable Slew Rate of Fast Dynamic VID for VR0
- Dynamic VID Compensation (DVC) for VR1 at No Droop
- Droop and Diode Emulation Options
- Programmable 1 or 2-Phase Operation in PSI1 Mode
- Programmable Standard or Coupled-Inductor Operation
- Precision Resistor or DCR Differential Current Sensing
  - Integrated Programmable Current Sense Resistors
  - Accurate Load-Line (Droop) Programming
  - Accurate Current Monitoring and Channel-CurrentBalancing
- Average Overcurrent Protection and Channel Current LimitWith Internal Current Comparators
- Precision Overcurrent Protection on IMON & IMONS Pins
- Independent Oscillators, up to 2MHz Per Phase, for Cost,Efficiency, and Performance Optimization
- Dual Thermal Monitoring and Thermal Compensation
- Start-up Into Pre-Charged Load
- Pb-Free (RoHS Compliant)

Description

The ISL6364A is a dual PWM controller; its 4-phase PWMscontrol the microprocessor core or the memory voltageregulator, while its single-phase PWM controls the peripheralvoltage regulator for graphics, system agent, or processor I/O.

The ISL6364A utilizes Intersil's proprietary Enhanced ActivePulse Positioning (EAPP) modulation scheme to achieveextremely fast transient response with fewer output capacitors.

The ISL6364A is designed to be compliant to Intel VR12/IMVP7specifications. It accurately monitors the load current via theIMON pin and reports this information via the IOUT register tothe microprocessor, which sends a PSI# signal to the controllerat low power mode via SVID bus. The controller enters 1 or2-phase operation in low power mode (PSI1); in the ultra lowpower mode (PSI2,3), it operates in single phase with diodeemulation option. In low power modes, the magnetic core andswitching losses are significantly reduced, yielding highefficiency at light load. After the PSI# signal is de-asserted, thedropped phase(s) are added back to sustain heavy loadtransient response and efficiency. In addition, the ISL6364Afeatures auto-phase shedding to optimize the efficiency fromlight to full load for Greener Environment without sacrificingthe transient performance.

Today's microprocessors require a tightly regulated output voltageposition versus load current (droop). The ISL6364A senses theoutput current continuously by measuring the voltage across adedicated current sense resistor or the DCR of the outputinductor. The sensed current flows out of the FB pin to develop aprecision voltage drop across the feedback resistor for droopcontrol. Current sensing also provides information forchannel-current balancing, average overcurrent protection andindividual phase current limiting. The TM and TMS pins sense anNTC thermistor's temperature, which is internally digitized forthermal monitoring and for integrated thermal compensation ofthe current sense elements of the respective regulator.

The ISL6364A features remote voltage sensing and completelyeliminates any potential difference between remote and localgrounds. This improves regulation and protection accuracy. Thethreshold-sensitive enable input is available to accuratelycoordinate the start-up of the ISL6364A with other voltage rails.