



HR1210

Multi-Mode PFC and Current Mode LLC Digital Combo Controller

Programmable through UART Interface

PRELIMINARY SPECIFICATIONS SUBJECT TO CHANGE

DESCRIPTION

The HR1210 is a Multi-Mode PFC and Current Mode LLC Combo Controller, programmable through UART Interface. The power saving technology of HR1210 helps the power supply design to achieve optimized efficiency all over the operating range.

The PFC controller in HR1210 employs patented digital average current control scheme to achieve hybrid CCM and DCM operation. The switching frequency at light load can be reduced due to DCM which lead to better efficiency. Higher Power Factor (PF) is also achieved at light load in HR1210 by digital input capacitor current compensation method. At heavy load, CCM operation reduces the peak current in MOSFET which makes the controller can be implemented in wider load range.

HR1210 implements current mode control in the LLC stage, so it can easily achieve good stability and fast response at the same time. In addition, three different operation modes are implemented based on the different load conditions, i.e. steady state mode, skip mode and burst mode. In this way, efficiency in different load conditions can be optimized independently. The key zero-voltage switching (ZVS) feature of LLC converter that benefit the efficiency performance the most, can be always guaranteed by the adaptive dead time of both high-side gate and low-side gate driver. And also, any capacitive operation is effectively prevented in HR1210.

HR1210 integrates a high voltage current source internal the IC for startup. Therefore, the traditional start up resistor or external circuit can be removed. The high voltage current source is also implemented as X-cap discharger when AC input is dropout, so that the resistor for X-cap discharge can be removed too.

HR1210 features variable protections to make the system safe in case of any system faults. Such as thermal Shutdown (TSD), PFC Open Loop Protection (OLP), Over voltage Protection

(OVP), Over Current Limit (OCL) and LLC Short Circuit Protection (SCP), SO pin protection, Over Load Protection (OLP).

HR1210 is available in SOIC20 and TSSOP20.

FEATURES

General System Features

- HV Current Source for Start Up
- Smart X-cap Discharge when AC Dropout, Approved by IEC62368 and IEC60950, pending
- UART interface for Parameters Program
- User-Friendly GUI for Digital PFC

PFC Controller

- CCM/DCM Multi mode PFC control with high efficiency from light load to full load
- Operate Up to 250kHz
- High PF due to Input Cap Current Compensation
- Programmable Frequency Jittering
- Programmable Soft Start-up
- Programmable AC input Brown In/Out
- Cycle-by-cycle Current Limit
- OLP, OVP Protection

LLC Controller

- 600V High-Side Gate Driver with Integrated Bootstrap Diode and High dV/dt Immunity
- Current Mode Control
- Operate up to 500kHz at Steady State Mode
- Adaptive dead time adjustment with minimum and maximum limit
- Burst/Skip mode switching at light load
- Programmable Soft-Start
- Programmable DC input Brown In/Out
- Capacitive Mode Protection
- SCP, OLP Protection with auto-restart or latch
- Programmable protection on SO pin



APPLICATIONS

- Desktop PC and ATX Power Supply
- All-in-one and Gaming Power Supply.
- Notebook Adapter
- LCD TV and Plasma TV Power Supply

- Power Tools Power Supply
- LED Driver

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