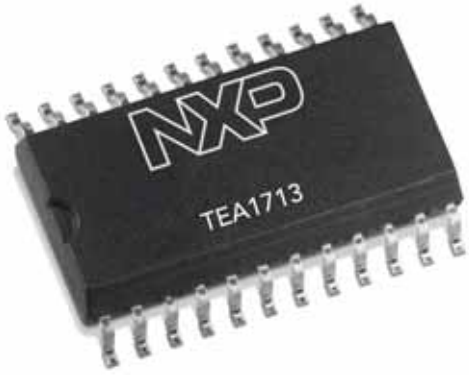


NXP resonant power supply controller TEA1713 with PFC

Higher integration for higher efficiency in power supplies

Combining Power Factor Correction (PFC) with a resonant power supply controller, this multi-chip IC increases efficiency in a broad range of power supplies that use wide mains voltage.

Key features

- Integrated PFC and resonant controllers
- On-chip high-voltage start-up source
- Standalone operation or IC supply from external DC supply
- Extended wide supply voltage range (36 V)
- Adaptive non-overlap time
- Capacitive mode protection

Key applications

- LCD TVs
- Plasma TVs
- Notebook adapters
- High-power consumer electronics

The TEA1713 integrates a next-generation half-bridge resonant controller with a power factor correction controller. It provides the drive function for the discrete MOSFET in an up-converter and for the two discrete power MOSFETs in a resonant half-bridge configuration.

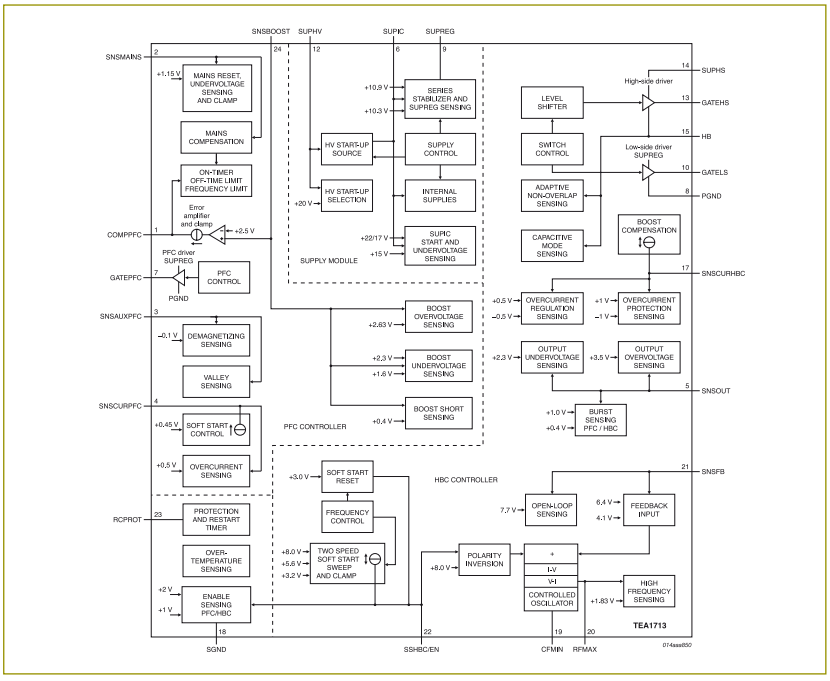
The multi-chip format creates a very flexible topology that is well suited to a broad range of power supplies. In particular, the combination of a PFC controller with a resonant controller makes the TEA1713 ideal for controling the power supplies of high power adapters, LCD and plasma TVs. The high level of integration reduces the bill of materials and enables reduced board space, since it minimizes the number of external components.

The efficient operation of the PFC is achieved by implementing functions such as quasi-resonant operation at high power levels and quasi-resonant operation with valley skipping at lower power levels. Over-current protection, over-voltage protection, and demagnetization sensing ensure safe operation under all conditions.

The half-bridge resonant controller module is a high-voltage controller for a zero-voltage switching LLC resonant converter. It contains a high-voltage level shift circuit and several protection circuits including over-current protection, open-loop protection, capacitive mode protection and a general-purpose latched protection input.

The high-voltage chip is fabricated using a proprietary high-voltage Bipolar-CMOS-DMOS power logic process that enables efficient direct start-up from the rectified universal mains voltage. The low-voltage Silicon On Insulator (SOI) chip is used for accurate, high-speed protection functions and control.

TEA1713 block diagram



TEA1713 highlights

Integrated PFC controller	▸ Boundary mode operation with on-time control ▸ Valley/zero voltage switching for minimum switching losses ▸ Frequency limiting to reduce switching losses ▸ Accurate boost voltage regulation ▸ Burst mode switching with soft start and soft stop
Advanced resonant half-bridge controller	▸ Adaptive non-overlap timing (cycle-by-cycle) ▸ Burst mode switching ▸ Integrated high-voltage level shifter ▸ Adjustable minimum and maximum frequency (max = 500 kHz)
Protection features	▸ Safe restart mode for system fault conditions ▸ General latched protection input for output overvoltage protection or external temperature protection ▸ Over-temperature protection ▸ Soft (re)start for both controllers ▸ Protection timer for time-out and restart ▸ Under-voltage protection for mains (brownout), PFC-bus voltage, IC supply and HBC output voltage ▸ Over-current regulation and protection for both controllers ▸ Accurate overvoltage protection for boost voltage ▸ Capacitive mode protection for resonant controller (cycle-by-cycle)

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