

NXP resonant power supply controller TEA1716 with integrated PFC

Ultra-efficient PFC+LLC combo controller with EuP lot6 compliance

This pin-to-pin compatible successor of the successful TEA1713 is the first available EuP lot6-compliant PFC+LLC combo controller with no-load power of <math><150\text{ mW}</math> and average efficiency of >91% (over universal mains).

Key features

- ▶ Integrated PFC and Resonant LLC controllers
- ▶ Fully integrated burst mode sensing circuitry
- ▶ EuP lot6 compliance (Pin <math><0.5\text{ W}</math> @ Pout = 0.25 W)
- ▶ Low no-load power consumption (<math><150\text{ mW}</math>)
- ▶ Adaptive non-overlap timing and capacitive mode protection
- ▶ On-chip high-voltage start-up source
- ▶ Standalone operation or IC supply from external DC supply
- ▶ Extended wide supply voltage range (36 V)
- ▶ Extensive protections for safe and robust operation
- ▶ Pin-to-pin compatible with TEA1713
- ▶ Compact SO24 package

Key applications

- ▶ Power supplies from 90 up to 500 W
- ▶ Medium- and high-power small size notebook adapters
- ▶ Home and industrial appliances
- ▶ Desktop PCs, AIO computers, server power supplies
- ▶ LED lighting systems
- ▶ LCD and plasma TV

Designed for power supplies from 90 up to 500 W, the NXP TEA1716 integrates a Power Factor Correction (PFC) controller and a controller for a Half-Bridge resonant Converter (HBC) in a compact SO24 package. 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 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. OverCurrent Protection (OCP), OverVoltage Protection (OVP), and demagnetization sensing ensure safe operation under all conditions.

The HBC module is a high-voltage controller for a zero-voltage switching Resonant converter. It contains a high-voltage level shift circuit and several protection circuits including OCP, open-loop protection, capacitive mode protection, and a general-purpose latched protection input.



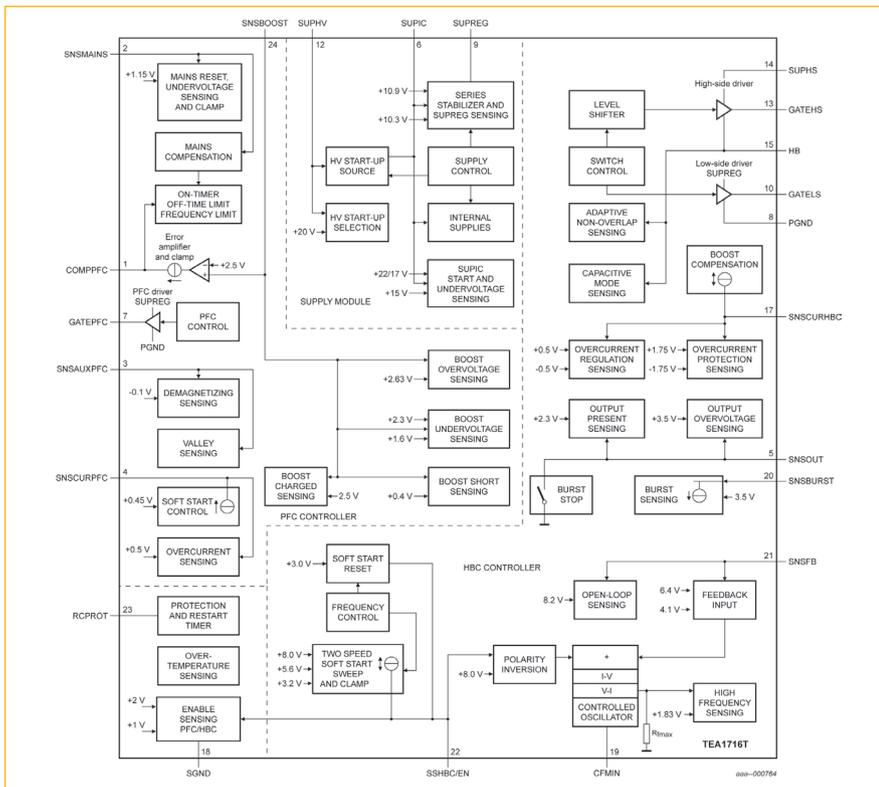
The integrated burst mode and power management functionality enable resonant applications that meet the Energy Using Product Directive (EuP) lot 6, which requires a standby mode of less than 0.5 W.

The TEA1716 is pin-to-pin compatible with the TEA1713 combo controller. By integrating the circuitry for burst mode sensing, the TEA1716 saves at least ten external components compared to the TEA1713.

TEA1716 highlights

Higher efficiency	<ul style="list-style-type: none"> ▶ More efficient PFC operation using valley switching ▶ Combined voltage sensing and interface circuitry with integrated PFC and LLC controllers ▶ More efficient switching due to adaptive non-overlap timing ▶ Low current consumption complies with EuP lot6 regulation (Pout <0.5 W @ Pin = 0.25 W)
Ease of design	<ul style="list-style-type: none"> ▶ Optimal cooperation between PFC and HBC controllers ▶ Fewer external components and smaller PCB footprint with combined supply and protection circuitry ▶ Capacitive mode protection ensures safe operation in inductive mode, so there's no need for a large reserve
HV startup	<ul style="list-style-type: none"> ▶ Integrated high-voltage startup circuit reduces power consumption during no- and light-load conditions, so there's no need for external bleeder circuitry
High reliability	<ul style="list-style-type: none"> ▶ Fewer external components increases reliability ▶ Improved robustness ▶ Fewer field returns ▶ Extensive set of protections ensure secure, stable operation, even during momentary disturbances

TEA1716 block diagram



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