

NXP GreenChip low power SMPS controller TEA172x

Ultra-low standby, cost-effective power supplies up to 11 W

These highly integrated devices enable low no-load power consumption below 10 mW, reduce component count for a cost-effective application design, and provide advanced control modes that deliver exceptional efficiency.

Key features

- ▶ SMPS controller with integrated power switch up to 5 or 11 W
- ▶ 700 V high-voltage MOSFET for global mains operation
- ▶ Primary sensed output voltage control eliminates opto coupler
- ▶ Operates with advanced control modes for optimal performance and high efficiency
- ▶ Variable switching frequency up to 50.5 kHz
- ▶ EEPROM-programmable burst frequencies create flexibility between transient response and no-load power consumption
- ▶ Avoids audible noise in all operating modes (min $f_{sw} > 22$ kHz)
- ▶ Includes compensation of cable impedance
- ▶ Jitter function for reduced EMI
- ▶ USB battery charging (CC/CV) and Energy Star 2.0 compliant
- ▶ Enables no-load power consumption below 10 mW
- ▶ High-voltage start-up with zero current under normal switching operation
- ▶ Safe restart mode for system fault conditions
- ▶ OverVoltage Protection (OVP) with auto-restart
- ▶ UnderVoltage LockOut (UVLO) and clamp protection

- ▶ OverTemperature Protection (OTP)
- ▶ Soft-start by reduced peak current for zero and low output voltage
- ▶ Demagnetization protection for guaranteed DCM mode
- ▶ FB open pin and short-circuit protection
- ▶ Available in halogen-free and RoHS SO7 package with HV spacing

Applications

- ▶ Mobile USB chargers
- ▶ Battery chargers for smartphones and media tablets
- ▶ Power supplies for white goods
- ▶ Industrial systems, including smart meters

The NXP TEA172x family is a series of small, low-cost module Switched Mode Power Supply (SMPS) controller ICs that operate directly from the rectified universal mains input and are tailored for low-power applications up to 5 or 11 W. Each device is equipped with a high-voltage power MOSFET switch (700 V) and is optimized for flyback, buck, and buck-boost converter topologies. The result is high efficiency over



the entire load range. Power consumption in the no-load condition below 10 mW at 5 W, which exceeds the EPA 2.0 rating and the 5-star rating defined by EnergyStar.

The TEA1721 supports operation up to 5 W and is ideally suited for use in mobile USB chargers, major home appliances, and industrial systems. The TEA1723 runs at up to 11 W and targets tablet PCs, e-readers, and set-top boxes (STBs). All three TEA172x devices have the same feature set but use a different power MOSFET, tailored for operation up to 5 or 11 W, respectively.

The TEA172x architecture provides a circuit for start-up directly from the rectified mains voltage without any external bleeder circuits. The converter operates as a regulated voltage source from no-load up to the maximum output current and operates as a current source that delivers the maximum current over a broad output voltage range.

The architecture includes several features that serve to reduce total component count, minimize the design

Selection guide

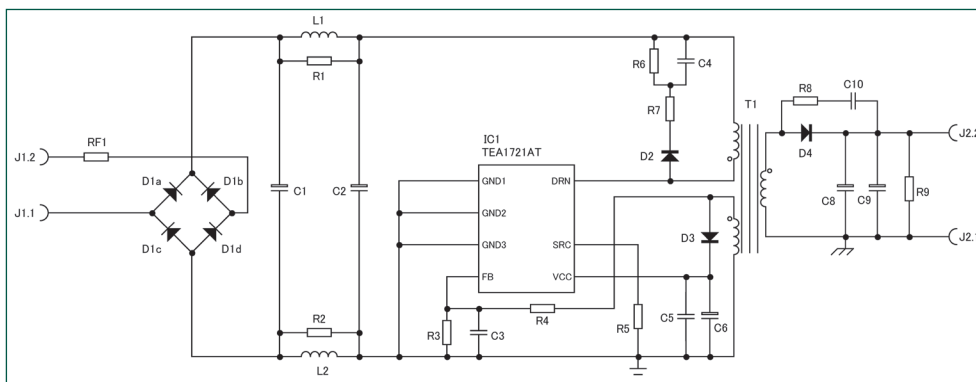
Product	Cable comp (Ω)	Power (W)	No-load (mW)	Fswitch (kHz)	Fburst (Hz)	CV	CC	Package	Applications
TEA1721	0	5	< 10	50.5	430	±5%	±10% +Lp	SO-7	White goods, industrial, smart meters, mobile USB chargers, general-purpose adapters
			< 15		905				
			< 20		1270				
	0.3		< 25		1750				
			< 10		430				
			< 15		905				
			< 20		1270				
			< 25		1750				
			< 50		1750				
TEA1723	0	11	< 20	50.5	430	±5%	±10% +Lp	SO-7	White goods, industrial, smart meters, chargers for smartphones and media tablets, general-purpose adapters
			< 30		905				
			< 40		1270				
	0.3		< 50		1750				
			< 20		430				
			< 30		905				
			< 40		1270				
			< 50		1750				
			< 50		1750				

footprint, and lower overall cost. Primary side-sensing, which eliminates the need for a power-consuming opto-coupler. The architecture meets EMI specification without an external Y-cap, and integrated active HV start-up eliminates resistor bleeder circuitry. Fewer than 30 external components are required for a complete bill of materials.

Advanced control modes enable very high average efficiency (above 77%) over the entire load range, and compliance with USB 1.1 and 1.2 makes them well suited for use in mobile phone charger applications. Switching losses are kept low with a burst frequency of 430 Hz, and a variety of protection features ensure reliable operation under a wide range of conditions.

Design tools for the TEA172x family include a range of demo boards, extensive application notes, and an online calculator that helps predict real-world performance.

TEA1721AT application diagram



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