

# High-efficiency SMPS using half-bridge resonant topology

Advanced AC-DC converter for high-end LCD and PDP flat panels



Based on leading edge power supply ICs, ST offers an advanced SMPS architecture designed for high-end LCD and PDP TVs.

The architecture is based on an innovative front-end PFC stage, a high efficiency multi-resonant half-bridge converter stage and an auxiliary low consumption flyback converter, all supported by ST's most competitive power discrete components.

## Solution key features

- Universal input mains ( 90 - 264V<sub>AC</sub> )
- Multiple output voltages:
  - 3.3V, 5V, 12V and 24V @ 200W (LCD TV)
  - 3.3V, 5V, 75V and 200V @ 400W (PDP TV)
- Overall efficiency up to 93% at full load and nominal mains voltage
- Small form factor with very high power density
- Low standby consumption
  - < 0.5W @ 230V<sub>AC</sub>
  - < 0.3W @ 115V<sub>AC</sub>
- Pre-regulator stage: L6563
- Resonant stage: L6599
- Auxiliary power supply: VIPer12A or VIPer22A
- Mains harmonics in compliance with EN61000-3-2 specifications
- EMI meets EN50022 class B standard
- Meets EN60065 safety specifications
- Simple resonant transformer with integrated magnetic approach

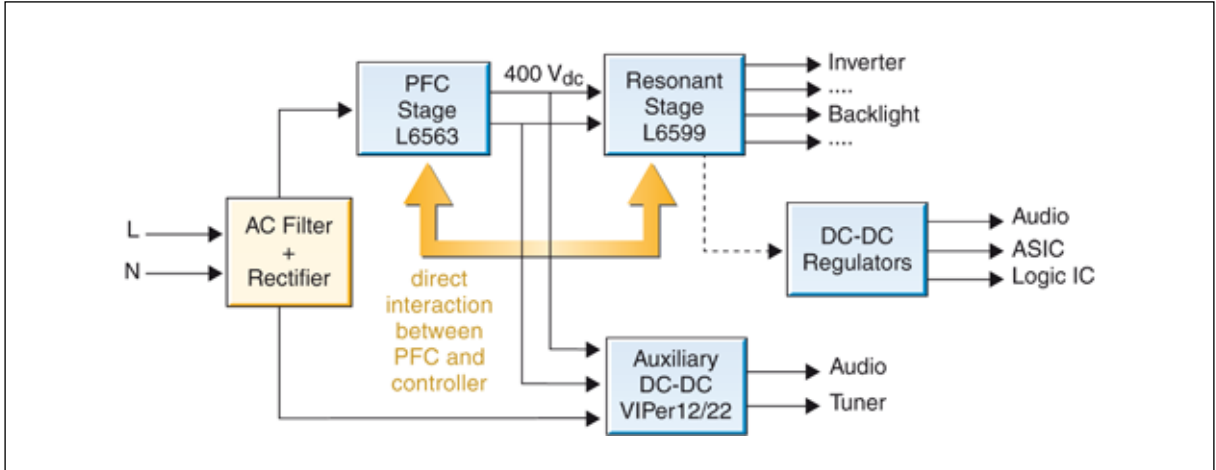
## Product key features

- L6563: advanced TM PFC
  - Over-voltage protection
  - Tracking boost operation
  - Voltage feed-forward
  - Inductor saturation detector
- L6599: high voltage ZVS HB resonant controller
  - Two levels of over-current protection
  - Latched disable input
  - Burst-mode operation at light load
  - Brownout protection
- VIPer12A and VIPer22A: off-line primary switches
  - Internal power MOSFET (600V)
  - High voltage start-up
  - Over-temperature protection
  - Over-current protection
  - Over-voltage protection

The front-end PFC pre-regulator (boost topology) features the L6563 controller operating in FOT (fixed off-time) mode. The PFC not only delivers a stable 400V<sub>DC</sub> BUS to the downstream converters, but also reduces mains harmonics, meeting the requirements of EN61000-3-2 and JEIDA-MITI regulations. The core of the architecture is based on the advanced multi-resonant half-bridge converter L6599 which

provides full system protection, multiple regulated outputs and direct control of the PFC stage, increasing system efficiency at any load condition.

An auxiliary flyback converter based on the VIPer12A or VIPer22A off-line primary switch completes the architecture. The flyback converter is mainly intended for microprocessor supply and display power management operation.



Typical application schematic

## Controllers for SMPS in LCDs and PDPs

Part number	Description	Applications	Package
L6563	Advanced TM PFC	High-end AC-DC adapters/chargers, desktop PCs, servers, IEC61000-3-2 or JEIDA-MITI compliant SMPS	SO-14
L6599D	High voltage HB resonant controller	LCD and PDP TV SMPS, desktop PCs, entry-level servers, telecom SMPS, AC-DC adapters, open frame SMPS	SO-16
L6599N			PDIP-16
VIPer12AS-E	Low power off-line primary switch with internal power MOSFET (5-13W)	Off-line power supplies for battery charger adapters, standby power supplies for TVs or monitors, auxiliary supplies for motor control	SO-8
VIPer12ADIP-E			PDIP-8
VIPer22AS-E	Low power off-line primary switch with internal power MOSFET (7-20W)	Off-line power supplies for battery charger adapters, standby power supplies for TVs or monitors, auxiliary supplies for motor control	SO-8
VIPer22ADIP-E			PDIP-8

## ST's SMPS evaluation boards for LCDs and PDPs

Part number	Description	Applications
Eval6599-200W	200W with 3.3V, 5V, 12V and 24V output evaluation board	LCD TV SMPS
Eval6599-400W-S	400W with 200V output evaluation board	PDP TV SMPS
Eval6599-400W-T*	400W with 200V and 75V output evaluation board	PDP TV SMPS

\* Coming soon



© STMicroelectronics - March 2007 - Printed in Italy - All rights reserved

The STMicroelectronics corporate logo is a registered trademark of the STMicroelectronics group of companies. All other names are the property of their respective owners.

For selected STMicroelectronics sales offices fax:

China +86 21 52574820; France +33 1 55489569; Germany +49 89 4605454; Italy +39 02 8250449; Japan +81 3 57838216; Singapore +65 64815124; Sweden +46 8 58774411; Switzerland +41 22 9292900; United Kingdom and Eire +44 1628 890391; USA+1 781 861 2678

Full product information at [www.st.com](http://www.st.com)

Order code: FLSMPS0307

[www.BDTIC.com/ST](http://www.BDTIC.com/ST)



Recycled and chlorine free paper