

STNRG011

Digital multi-mode PFC and LLC resonant half-bridge controller



New digital controller integrates multi-mode PFC, LLC resonant half-bridge and analog peripherals for smooth analog-to-digital transitions.

The high level of integration of today's latest features and functions make it ideal for SMPS required to comply with the most stringent energy-saving regulations and guarantees high reliability, safety and BOM optimization. Configurable through an intuitive GUI, ST's new STNRG011 digital controller provides high-end performance and flexibility and does not require any firmware implementation. All the key application parameters of the device are stored in an internal NVM allowing wide configurability and calibration.

KEY FEATURES

- Fast and easy digital design
Fully configurable through intuitive GUI.
Does not require writing any firmware
- Lower part count:
800 V start-up, line sense and Xcap discharge integration
- Maximum efficiency
Complies with major energy directives: ENERGY STAR® for computers ver. 6.1, EU Code of Conduct (CoC) Tier 2 and more with < 100mW energy consumption at no-load
- Fast dynamic performance and easy compensation Time-shift LLC control
- High reliability and safety
Complete set of protection functions and integrated X-cap discharge for compliance with IEC 62368-1

- Flexibility and connectivity:
Power monitoring and black box recording by UART/ I2C
- Low pin count: S020 package

KEY APPLICATIONS

- 90-300 W power supplies and adapters in applications such as:
- Computers,
 - LED lighting,
 - Medical equipment,
 - TV,
 - Industrial equipment

DIGITAL PERFORMANCE WITH NO FIRMWARE

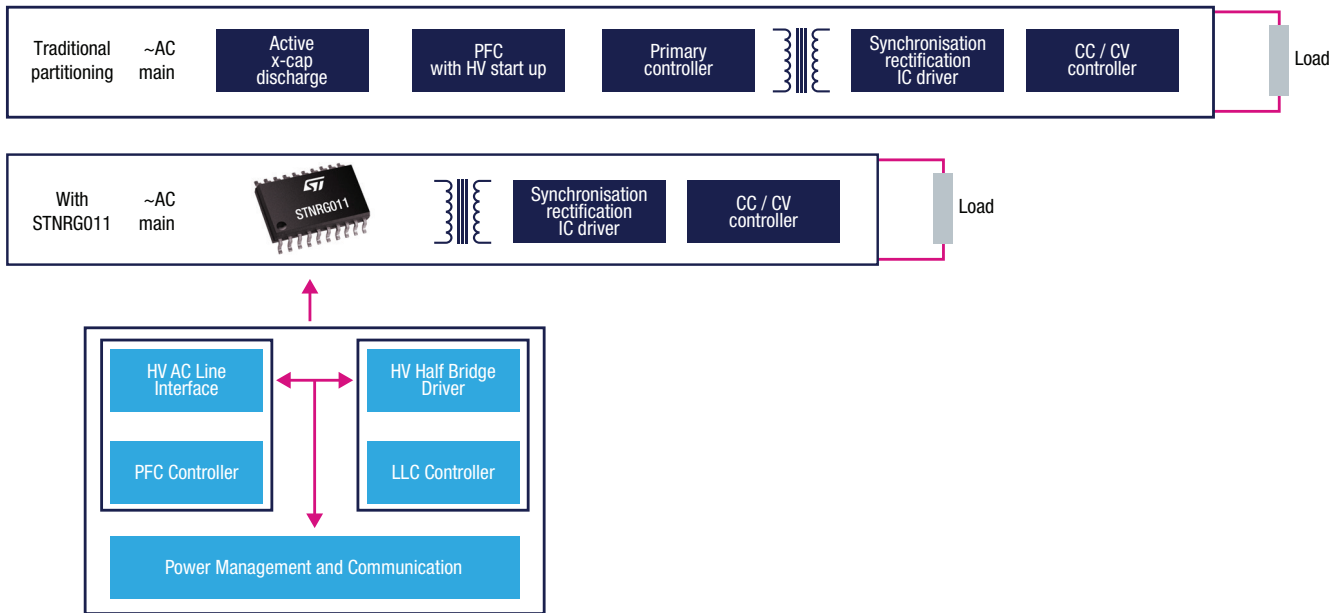
The STNRG011 combines a double-ended LLC resonant half-bridge controller and a multi-mode Power-Factor Correction (PFC) controller, managed by a digital core running best-in-class control algorithms. Non-volatile memory is also provided on-chip for storing application-specific parameters.

The STNRG011's digital control and user programmability helps engineers optimize efficiency and performance throughout the load range and take advantage of burst-mode operation at light loads to maximize efficiency. A 2-pin UART/I2C port enables a host system to monitor and manage the power supply. Unlike DSP or MCU solutions, the developer is not required to write any lines of firmware, he can focus on the application and enjoy all the performance and flexibility of an advanced digital controller thanks to the intuitive GUI.

Additional integrated features include LLC and PFC gate drivers, high-voltage (800V) startup circuitry, and line sensing to further simplify design, increase reliability and ruggedness, and reduce solution size and BOM. There is also an X-capacitor discharge circuit that eases compliance with the new IEC 62368-1 safety standard for audio-visual and ICT equipment, which is taking over from 60950 and 60065 standards in the US and EU.

The STNRG011 also integrates comprehensive protection for the LLC and PFC circuitry, including over-voltage, over-current, under-voltage, surge, feedback-disconnection, anti-capacitive protection, brown-out protection and soft-start.

SIMPLIFIED 2-STAGE DIGITAL SMPS DESIGN WITH HIGH PERFORMANCE AND LOW COMPONENT COUNT



DEVICE SUMMARY

Order code	Package	Packing	Description
STNRG011 / STNRG011TR	S020	Tube / Tape and reel	Digital combo multi-mode PFC and time-shift LLC resonant controller

DEVELOPMENT ECOSYSTEM

Order code	Description	Documentation
EVLSTNRG011-150	12 V, 150 W power supply based on STNRG011 digital combo and SRK2001 adaptive synchronous rectifier controller	DS12075, AN5118, AN5119
STEVAL-PCC020V1	USB to I2C/UART Interface board for STNRG011	UM2340
STSW-STNRG011GUI	STEVAL-PCC020V1 Graphical user interface	UM2342

