

SYNCHRONOUS RECTIFICATION



SRK1000, SRK1001, SRK1004 & SRK2001 controllers



Synchronous rectification controllers enable highly efficient power supplies

The primary role of synchronous rectifier controllers is to drive power MOSFETs, replacing rectification diodes on the secondary side of SMPS.

In addition to enhancing SMPS efficiency, particularly in power supplies with high current and a low output voltage, synchronous rectifier controllers reduce space requirements, lower costs, and increase reliability.

Various topologies of synchronous rectification controllers are available, depending on the type of primary side converters.

KEY FEATURE & BENEFITS

- Improved efficiency
- Better thermal performance
- High power density
- Increased reliability

KEY APPLICATIONS

- High-power density adapters
- USB PD chargers
- LED TV power supplies
- Desktop PCs and servers
- Telecom power supplies
- LED lighting
- HV/HEV charging stations
- Game consoles
- Industrial power supplies

SRK1000x/SRK1001

Designed for secondary side synchronous rectification (SR) in flyback converters, SRK1000x and SRK1001 controllers can operate both in quasi-resonant applications and in fixed frequency (FF) mixed DCM-CCM applications. The SRK1001 includes a high-voltage sensing (DVS) pin capable of directly driving an N-channel power MOSFET (190 V AMR).

SRK1004

Intended for secondary side synchronous rectification (SR) in active clamp flyback, resonant flyback, and quasi-resonant flyback converters, the SRK1004 controller provides a gate-drive output suitable for N-channel logic-level or standard level power MOSFETs.

The device can be supplied directly from the converter's output voltage when operated in a low-side configuration. In a high-side configuration, it is recommended to power the IC from a dedicated auxiliary winding.

With two different turn-off delays available to cover a wide range of MOSFETs, the SRK1004 also includes a high-voltage sensing (DVS) pin capable of directly driving an N-channel power MOSFET (190 V AMR).

SRK2000A

The SRK2000A smart driver implements a control scheme specific to secondary side synchronous rectification in LLC resonant converters that use a transformer with center tap secondary winding for full wave rectification.

SRK2001/SRK2001A

The SRK2001/SRK2001A controllers implement a control scheme specific for secondary side synchronous rectification in LLC resonant converters that use a transformer with a center-tapped secondary winding for full wave rectification.

They provide two high-current gate drive outputs, each capable of directly driving an N-channel power MOSFET. Each gate driver is controlled separately, and an interlock logic circuit prevents the two synchronous rectifier MOSFETs from conducting simultaneously.

The turn-on logic with adaptive masking time (up to 10% of the clock cycle) and innovative adaptive turn-off logic maximize the conduction time of the SR MOSFET, eliminating the need for a parasitic inductance compensation circuit.

Developer resources

ST offers a complete development ecosystem with ready-to-use reference designs and evaluation boards as well as helpful technical documentation.



EVLMG1-250WLLC
SRK2001A



EVLVIPGAN100PD
SRK1001



EVLVIPGAN50PD
SRK1001



EVLSRK1004A/B/C/D
SRK1004

Product portfolio

Part number	Topology	V _{DS} rating	Feature
SRK1000	QR flyback, FF	100 V	Programmable minimum t _{OFF} and fixed minimum t _{ON} (3 options: SRK1000, SRK1000A, and SRK1000B)
SRK1001	QR, ACF, AHB, FF	190 V	Programmable minimum t _{ON} and t _{OFF} and low consumption mode
SRK1004	QR, ACF, AHB	190 V	High switching frequency, low-side and high-side configuration
SRK2000A	LLC, LCC	-	Automatic sleep mode
SRK2001/A	LLC, LCC	100 V	Auto-compensation of parasitic inductance, and adaptive turn-on and turn-off



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