

SYNCHRONOUS RECTIFICATION



SRK1004, SRK2000 & 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 FEATURES AND BENEFITS

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

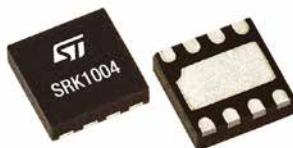
KEY APPLICATIONS

- 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

Maximizing efficiency, power density and cost

SRK1004

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



The device can be powered 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. The SRK1004 offers two different turn-off delays to cover a wide range of MOSFETs. It also includes a high-voltage sensing (DVS) pin capable of directly driving an N-channel power MOSFET (190 V AMR).

SRK2000

The SRK2000A smart driver implements a control scheme specific to secondary side synchronous rectification in LLC resonant converters using 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 operates separately, and an interlock logic circuit prevents both 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.



EVLG599-250WLLC
STNRG599 +
MASTERGAN1L +
SRK2001A



EVLSRK1004A/B/C/D/E/F
SRK1004

Product portfolio

Part number	Topology	VDS rating	Feature
SRK1004	QR, ACF, AHB	190V	High switching frequency, low-side and high-side configuration
SRK2000A	LLC, LCC	-	Automatic sleep mode
SRK2001/A	LLC, LCC	100V	Auto-compensation of parasitic inductance, and adaptive turn-on and turn-off



© STMicroelectronics - December 2025 - Printed in the United Kingdom - All rights reserved
ST and the ST logo are registered and/or unregistered trademarks of STMicroelectronics International NV or its affiliates in the EU and/or elsewhere. In particular, ST and the ST logo are Registered in the US Patent and Trademark Office. For additional information about ST trademarks, please refer to www.st.com/trademarks.
All other product or service names are the property of their respective owners.

