

High Frequency Quasi-Resonant Flyback Controller With GaN Direct Driver

1 Descriptions

SC3021 is a high frequency, quasi-resonant fly-back PWM controller (QR/DCM) with GaN direct driver. The controller with x-cap discharge function integrated high-voltage current source to provide the current during start-up and then turns off during normal operation. The extra low standby power consumption can be obtained.

SC3021 provides an adaptive switching frequency fold-back to achieve higher efficiency in the whole loading range. It operates QR and DCM with valley switching for high efficiency. And at no load, the IC will operate in Burst mode to reduce power consumption.

SC3021 provides functions of low start-up current, fast start-up, low standby power consumption. The burst mode with extremely low operation current and significantly reduces standby power consumption to meet the efficiency regulations.

The controller integrates a segmented power supply control circuit, which is especially suitable for applications with a wide output voltage range, reducing power consumption and greatly reducing peripheral devices.

SC3021 integrated the adaptive over current protection (AOCP), which allows controlling the maximum output current from primary-side. The AOCP is specially designed for USB-PD solutions, together with PD controller, such as SC21xx series. The AOCP can reduce the current stress of secondary synchronous rectification.

The SC3021 offers comprehensive protection to prevent the circuit from damage under abnormal conditions.

Furthermore, the features of frequency jittering and smart driving function can minimize the noise and improve EMI performance.

2 Features

- Integrated GaN direct driver
- Integrated high-voltage startup circuit with brown in/out detection
- Integrated x-cap discharge function
- Internal Soft Start
- Integrated segmented power supply control circuit for extra-wide output range
- Ultra-low operation current @Burst mode/Fault Mode
- Adaptive over current protection
- Adaptive loop gain compensation
- Frequency Jitter for EMI improvement
- Driver capability: 100mA/-500mA
- Valley switching operation @ QR/DCM
- Burst Mode @ Light Load & No Load
- Internal over temperature protection
- Support external NTC for OTP
- Comprehensive Protection
 - VDD over voltage protection
 - VDD under voltage protection
 - Cycle by cycle current limiting
 - Two level over current protection
 - Output over voltage protection
 - Output short protection
 - Over Load protection
- SSOP10 package available

3 Applications

- USB-PD and QC Chargers
- AC-DC adapters for Portable Devices