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# High Performance Fly-back Controller for USB-PD

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## 1 Descriptions

SC3005 is a high performance, multi-mode fly-back PWM controller (CCM/QR/DCM). The controller built-in X-cap discharge function through HV pin, and safely discharge the X2 capacitors when the AC line is removed. Furthermore, extremely low standby power consumption and super-fast start-up time can be obtained by HV pin.

SC3005 provides an adaptive switching frequency fold-back to achieve higher efficiency in the whole loading range. At heavy load or full load, it operates up to maximum switching frequency. When loading decreases, it operates in green mode with valley switching for high efficiency. And at no load, the IC will operate in Burst mode to reduce power consumption.

SC3005 provides functions of low start-up current, fast start-up, low standby power consumption. The burst mode with extremely low operation current (240uA) and significantly reduces standby power consumption to meet the efficiency regulations.

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

SC3005 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 SC3005 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

- Internal soft start
- Integrated high-voltage startup circuit with brown in/out detection
- Integrated x-cap discharge function
- High Efficiency
  - CCM @ Heavy Load and Low Line
  - Valley switching operation @ Green mode and High Line
  - Burst Mode @ Light Load & No Load
- Ultra-low operation current @Burst mode/Fault Mode
- Adaptive over current protection
- Adaptive loop gain compensation
- Frequency Jitter for EMI improvement
- Driver capability: 300mA/600mA
- 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
  - Brown in/out with auto-recovery
- SOP8 package available

## 3 Applications

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