

FSCQ-Series: FSCQ0565RT / FSCQ0765RT / FSCQ0965RT / FSCQ1265RT / FSCQ1565RT Green Mode Fairchild Power Switch (FPS™)

Features

- Optimized for Quasi-Resonant Converter (QRC)
- Advanced Burst-Mode Operation for under 1 W Standby Power Consumption
- Pulse-by-Pulse Current Limit
- Overload Protection (OLP) – Auto Restart
- Over-Voltage Protection (OVP) – Auto Restart
- Abnormal Over-Current Protection (AOCP) – Latch
- Internal Thermal Shutdown (TSD) – Latch
- Under-Voltage Lockout (UVLO) with Hysteresis
- Low Startup Current (Typical: 25 μ A)
- Internal High Voltage SenseFET
- Built-in Soft-Start (20 ms)
- Extended Quasi-Resonant Switching

Applications

- CTV
- Audio Amplifier

Related Resources

- [AN-4146 — Design Guidelines for Quasi-Resonant Converters Using FSCQ-Series Fairchild Power Switch](#)
- [AN-4140 — Transformer Design Consideration for Offline Flyback Converters Using Fairchild Power Switch](#)

Description

A Quasi-Resonant Converter (QRC) typically shows lower EMI and higher power conversion efficiency compared to a conventional hard-switched converter with a fixed switching frequency. Therefore, a QRC is well suited for noise-sensitive applications, such as color TV and audio. Each product in the FSCQ series contains an integrated Pulse Width Modulation (PWM) controller and a SenseFET. This series is specifically designed for quasi-resonant off-line Switch Mode Power Supplies (SMPS) with minimal external components. The PWM controller includes an integrated fixed frequency oscillator, under-voltage lockout, leading-edge blanking (LEB), optimized gate driver, internal soft-start, temperature-compensated precise current sources for loop compensation, and self-protection circuitry. Compared with a discrete MOSFET and PWM controller solution, the FSCQ series can reduce total cost, component count, size, and weight; while increasing efficiency, productivity, and system reliability. These devices provide a basic platform for cost-effective designs of quasi-resonant switching flyback converters.

Ordering Information

Part Number	Package	Marking Code	BV _{DSS} (V)	R _{DS(on)} Max. (Ω)
FSCQ0565RTYDTU	TO-220F-5L (Forming)	CQ0565RT	650	2.2
FSCQ0765RTYDTU	TO-220F-5L (Forming)	CQ0765RT	650	1.6
FSCQ0965RTYDTU	TO-220F-5L (Forming)	CQ0965RT	650	1.2
FSCQ1265RTYDTU	TO-220F-5L (Forming)	CQ1265RT	650	0.9
FSCQ1565RTYDTU	TO-220F-5L (Forming)	CQ1565RT	650	0.7

Typical Circuit

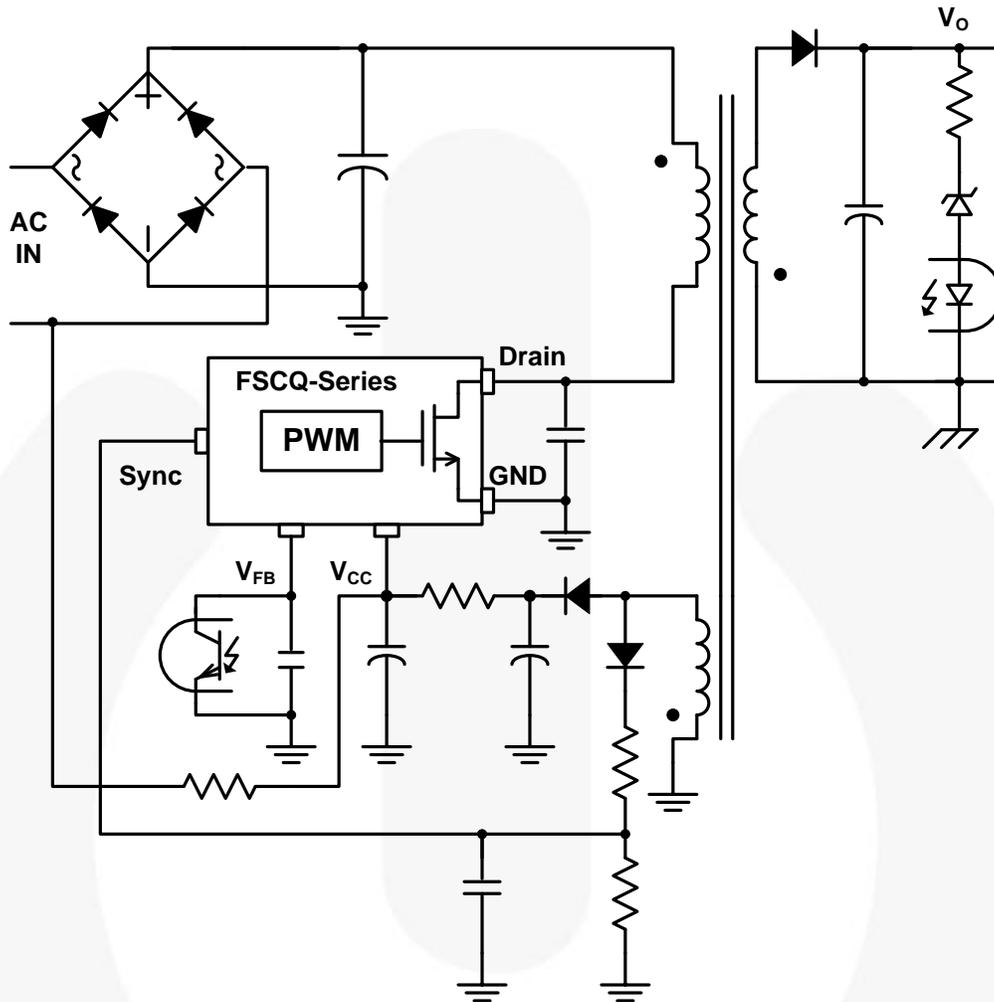


Figure 1. Typical Flyback Application

Table 1. Maximum Output Power⁽¹⁾

Product	230 V _{AC} ±15% ⁽²⁾	85–265 V _{AC}
	Open Frame ⁽³⁾	Open Frame ⁽³⁾
FSCQ0565RT	70 W	60 W
FSCQ0765RT	100 W	85 W
FSCQ0965RT	130 W	110 W
FSCQ1265RT	170 W	140 W
FSCQ1565RT	210 W	170 W

Notes:

1. The junction temperature can limit the maximum output power.
2. 230 V_{AC} or 100/115 V_{AC} with doubler.
3. Maximum practical continuous power in an open frame design at 50°C ambient.

Internal Block Diagram

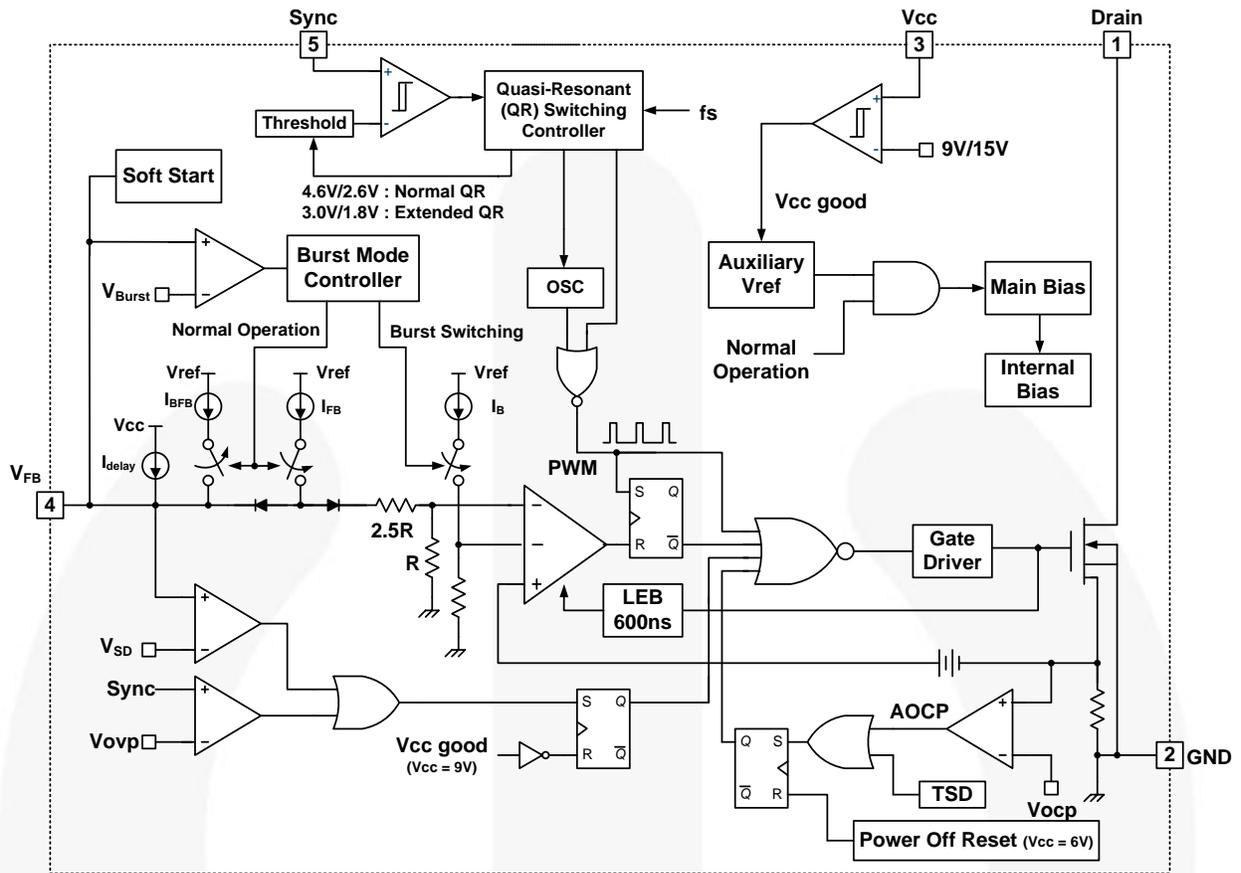


Figure 2. Functional Block Diagram

Pin Configuration

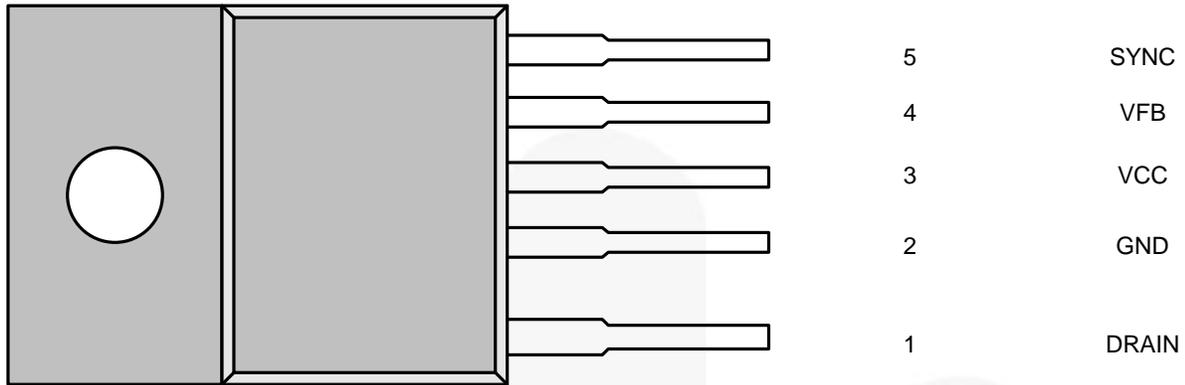


Figure 3. Pin Assignments (Top View)

Pin Descriptions

Pin	Name	Description
1	DRAIN	This pin is the high-voltage power SenseFET drain connection.
2	GND	This pin is the control ground and the SenseFET source.
3	VCC	This pin is the positive supply input. This pin provides internal operating current for both startup and steady-state operation.
4	VFB	This pin is internally connected to the inverting input of the PWM comparator. The collector of an opto-coupler is typically tied to this pin. For stable operation, a capacitor should be placed between this pin and GND. If the voltage of this pin reaches 7.5 V, the overload protection triggers, which results in the FPS™ shutting down.
5	SYNC	This pin is internally connected to the sync detect comparator for quasi-resonant switching. In normal quasi-resonant operation, the threshold of the sync comparator is 4.6 V / 2.6 V. Whereas, the sync threshold is changed to 3.0 V / 1.8 V in an extended quasi-resonant operation.