January 2016

FSB117H / FSB127H / FSB147H
mWSaver™ Fairchild Power Switch (FPS™)

Features

mWSaver™ Technology

- Achieve Low No-Load Power Consumption Less than 40 mW at 230 V_{AC} (EMI Filter Loss Included)
- Meets 2013 ErP Standby Power Regulation (Less than 0.5 W Consumption with 0.25 W Load) for ATX Power and LCD TV Power
- Eliminate X-Cap Discharge Resistor Loss with AX-CAP™ Technology
- Linearly Decreased Switching Frequency at Light-Load Condition and Advanced Burst Mode Operation at No-Load Condition
- 700 V High-Voltage JFET Startup Circuit to Eliminate the Startup Resistor Loss

Highly Integrated with Rich Features

- Internal Avalanche-Rugged 700 V SenseFET
- Built-in 5 ms Soft-Start
- Peak-Current-Mode Control
- Cycle-by-Cycle Current Limiting
- Leading-Edge Blanking (LEB)
- Synchronized Slope Compensation
- Proprietary Asynchronous Jitter to Reduce EMI

Advanced Protection

- Internal Overload / Open-Loop Protection (OLP)
- V_{DD} Under-Voltage Lockout (UVLO)
- V_{DD} Over-Voltage Protection (OVP)
- Constant Power Limit (Full AC Input Range)
- Internal Auto Restart Circuit (OLP, V_{DD} OVP, OTP)
- Internal OTP Sensor with Hysteresis
- Adjustable Peak Current Limit

Related Resources

- *Evaluation Board: FEBFSB127H_T001*
- *Fairchild Power Supply WebDesigner — Flyback Design & Simulation - In Minutes at No Expense*

Description

The FSB-series is a next-generation, green-mode Fairchild Power Switch (FPS™) incorporating Fairchild's innovative mWSaver™ technology, which dramatically reduces standby and no-load power consumption, enabling conformance to all worldwide Standby Mode efficiency guidelines. It integrates an advanced current-mode pulse width modulator (PWM) and an avalanche-rugged 700 V SenseFET in a single package, allowing auxiliary power designs with higher standby energy efficiency, reduced size, improved reliability, and lower system cost than previous solutions.

Fairchild Semiconductor's mWSaver™ technology offers best-in-class minimum no-load and light-load power consumption. An innovative AX-CAP™ method, one of the five proprietary mWSaver™ technologies, minimizes losses in the EMI filter stage by eliminating the X-cap discharge resistors while still meeting IEC61010-1 safety requirement. mWSaver™ Green Mode gradually decreases switching frequency as load decreases to minimize switching losses.

A new proprietary asynchronous jitter decreases EMI emission and built-in synchronized slope compensation allows stable peak-current-mode control over a wide range of input voltage. The proprietary internal line compensation ensures constant output power limit over entire universal line voltage range.

Requiring a minimum number of external components, the FSB-series provides a basic platform that is well suited for the cost-effective flyback converter design with low standby power consumption.

Applications

General-purpose switched-mode power supplies and flyback power converters, including:

- Auxiliary Power Supply for PC, Server, LCD TV, and Game Console
- SMPS for VCR, SVR, STB, DVD, and DVCD Player, Printer, Facsimile, and Scanner
- General Adapter
- LCD Monitor Power / Open-Frame SMPS

Ordering Information

Part Number	SenseFET	Operating Temperature Range	Package	Packing Method
FSB117HNY	1 A, 700 V	-40°C to +105°C	8-Pin, Dual In-Line Package (DIP)	Tube
FSB127HNY	2 A, 700 V			
FSB147HNY	4 A, 700 V			

Application Diagram

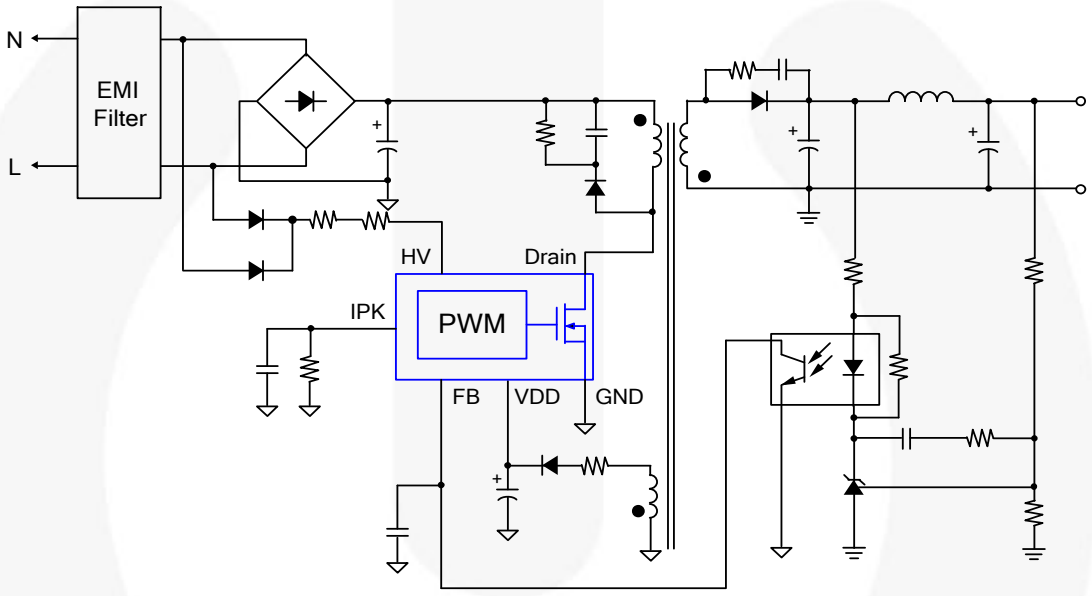


Figure 1. Typical Flyback Application

Table 1. Output Power Table[1]

Product	230 V_{AC} ±15%[2]		85-265 V_{AC}	
	Adapter[3]	Open Frame[4]	Adapter[3]	Open Frame[4]
FSB117H	10 W	15 W	9 W	13 W
FSB127H	14 W	20 W	11 W	16 W
FSB147H	23 W	35 W	17 W	26 W

Notes:

1. The maximum output power can be limited by junction temperature.
2. 230 V_{AC} or 100/115 V_{AC} with voltage doubler.
3. Typical continuous power in a non-ventilated enclosed adapter with sufficient drain pattern of printed circuit board (PCB) as a heat sink, at 50°C ambient.
4. Maximum practical continuous power in an open-frame design with sufficient drain pattern of printed circuit board (PCB) as a heat sink, at 50°C ambient.

Internal Block Diagram

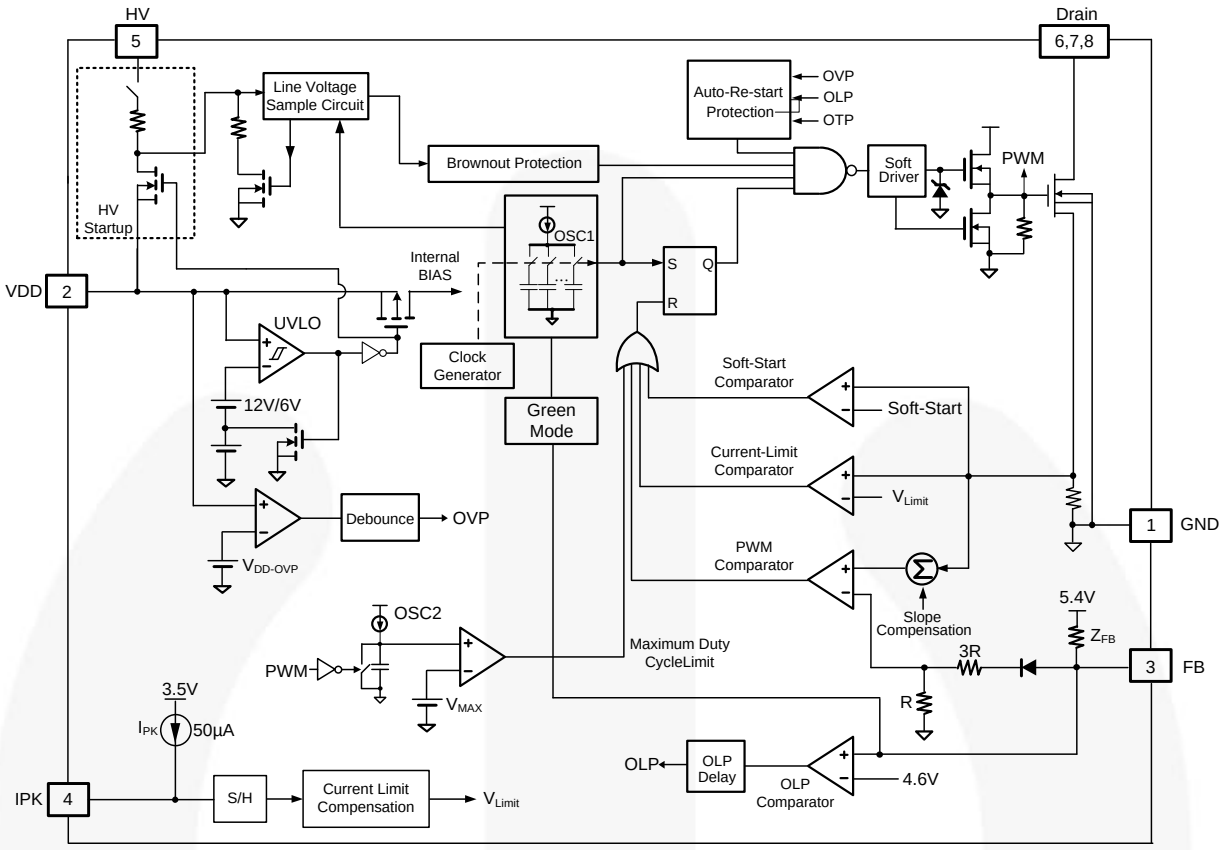
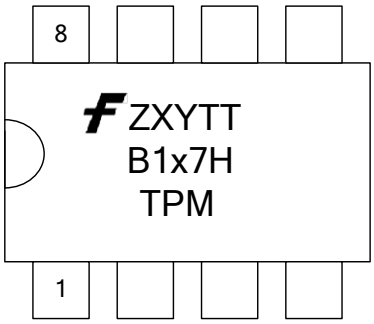


Figure 2. Block Diagram

Pin Configuration



F – Fairchild Logo
Z – Plant Code
X – 1-Digit Year Code
Y – 1-Digit Week Code
TT – 2-Digit Die Run Code
T – Package Type (N: DIP)
P – Y: Green Package
M – Manufacture Flow Code

Figure 3. Pin Configuration

Pin Definitions

Pin #	Name	Description
1	GND	Ground. This pin internally connects to the SenseFET source and signal ground of the PWM controller.
2	VDD	Supply voltage of the IC. Typically the holdup capacitor connects from this pin to ground. Rectifier diode in series with the transformer auxiliary winding connects to this pin to supply bias during normal operation.
3	FB	Feedback. The signal from the external compensation circuit connects to this pin. The PWM duty cycle is determined by comparing the signal on this pin and the internal current-sense signal.
4	IPK	Adjust peak current. Typically a resistor connects from this pin to the GND pin to program the current-limit level. The internal current source (50 µA) introduces voltage drop across the resistor, which determines the current limit level of pulse-by-pulse current limit.
5	HV	Startup. Typically, resistors in series with diodes from the AC line connect to this pin to supply internal bias and to charge the external capacitor connected between the VDD pin and the GND pin during startup. This pin is also used to sense the line voltage for brownout protection and AC line disconnection detection.
6	Drain	SenseFET drain. This pin is designed to directly drive the transformer.
7		
8		