

# FSDH0165 Fairchild Power Switch(FPS)

#### Features

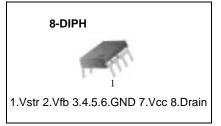
- Single Chip 650V 1A SenseFET PowerSwitch
- Precision Fixed Operating Frequency (100kHz)
- Internal Start-up Switch
- UVLO with Hysterisis (6.7V/8.7V)
- Over Load Protection (typ. 4.5V)
- Over Current Protection (typ. 0.6A)
- Internal Thermal Shutdown Function
- Secondary Side Regulation
- Auto-restart mode
- No load consumption <250mW at 265VAC input

### Applications

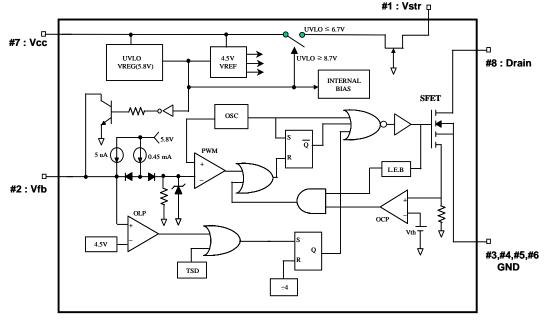
- Charger & Adaptor for Mobile Phone, PDA & MP3
- Auxiliary Power for PC

#### Description

The FSDH0165 is specially designed for an off-line SMPS with minimal external components. The FSDH0165 is a monolithic high voltage power switching regulator that combine the SenseFET(LDMOS) with voltage mode PWM control block. Included PWM controller features integrated fixed oscillator, under voltage lock out, leading edge blanking, optimized gate turn-on/turn-off driver, thermal shut down protection and temperature compensated precision current sources for loop compensation and fault protection circuitry. compared to discrete MOSFET and controller or RCC switching converter solution, a FSDH0165 can reduce total component count, design size, weight and at the same time increase efficiency, productivity, and system reliability. It has a basic platform well suited for cost effective design in a flyback converter.



#### Internal Block Diagram



### Absolute Maximum Ratings

(Ta=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Maximum Drain Voltage	Vd,max	650	V
Continuous Drain Current (TC=25°C)	ID	0.6	ADC
Maximum Supply Voltage	VCC,MAX	21	V
Input Voltage Range	VFB	-0.3 to VSD	V
Operating Ambient Temperature	TA	-25 to +85	°C
Storage Temperature Range	TSTG	-55 to +150	°C

### **PIN Definitions**

Pin Number	Pin Name	Pin Function Description		
1	Vstr	This pin connects directly to the rectified AC line voltage source. At star the internal switch supplies internal bias and charges an external capac that connects from the Vcc pin to ground. once this reaches 8.7V, Vstr isolated internally.		
2	Vfb	This pin is the inverting input of the PWM comparator, and it operates normally between 0.5V and 2.5V. It has a 0.45mA current source connected internally and a capacitor and opto coupler connected externally. A feedback voltage of 3.5V to 4.5V triggers overload protection (OLP). There is a time delay due to the 5uA current source, which prevents false triggering under transient conditions but still allows the protection mechanism to operate under true overload conditions.		
3,4,5,6	GND	These pins are the control ground and the SenseFET Source.		
7	Vcc	This is the positive supply voltage input. During start up, power is supplied to this input from Pin 1. When Vcc reaches the UVLO upper threshold (8.7V), the start up Internal Switch (Vstr) turns off and power is supplied from auxiliary transformer winding.		
8	Drain	This pin is designed to directly drive the converter transformer and is capable of switching a maximum of 650V and 1A.		

#### **Electrical Characteristics**

(Ta=25°C unless otherwise specified)

Parameter	Symbol	Condition	Min.	Тур.	Max.	Unit
SENSEFET SECTION						
Drain-Source Breakdown Voltage	BVDSS	$VGS = 0V$ , $ID = 100\mu A$	650	-	-	V
Zero gate voltage drain current	IDSS	V <sub>DS</sub> = 520V	-	-	100	μA
Static drain-source on Resistance	RDS(ON)	ID = 50mA Tj = 25°C	-	15.6	18	Ω
Static drain-source on Resistance		I <sub>D</sub> = 50mA Tj = 100°C	-	25.7	30	Ω
Rise Time	TR	V <sub>DS</sub> = 325V, I <sub>D</sub> = 300mA	-	100	-	nS
Fall Time	TF	V <sub>DS</sub> = 325V, I <sub>D</sub> = 50mA	-	50	-	nS
START UP SECTION						
VSTR Supply Voltage	Vst	-	17	-	-	V
UVLO SECTION						
Start Threshold Voltage	Vstart	-	8.0	8.7	9.4	V
Stop Threshold Voltage	Vstop	After turn on	6.0	6.7	7.4	V
OSCILLATOR SECTION						
Initial accuracy	Fosc	Tj = 25°C	90	100	110	kHz
Maximum Duty Cycle	Dmax	Vfb = 3V	64	67	70	%
Minimum Duty Cycle	Dmin	Vfb = 0V	-	0	0	%
FEEDBACK SECTION						
Feedback Source Current	IFB	Vfb = 0V	0.40	0.45	0.50	mA
Shutdown feedback Voltage	VSD	-	4.0	4.5	5.0	V
CURRENT LIMIT(SELF-PROTECTION	SECTION					
Peak Current Limit	IOVER	peak inductor current	0.5	0.6	0.7	А
PROTECTION SECTION						
Thermal Shutdown Temperature (Tj) <sup>(1)</sup>	TSD	-	125	145	-	°C
TOTAL DEVICE SECTION						
Operating Supply Current	IOPR	V <sub>CC</sub> = 21V (Max)	-	-	4	mA

Note:

1. These parameters, although guaranteed, are not 100% tested in production

#### **Typical Performance Characteristics**

(These characteristic graphs are normalized at Ta=25°C)

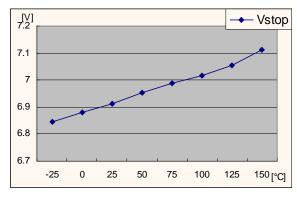


Figure 1. Stop Threshold Voltage

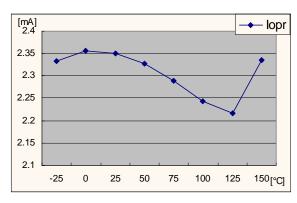


Figure 3. Operating Supply Current

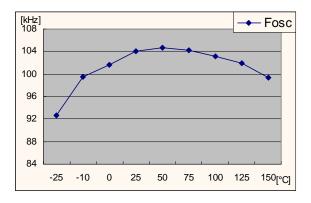


Figure 5. Initial Accuracy

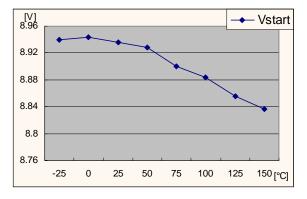


Figure 2. Start Threshold Voltage

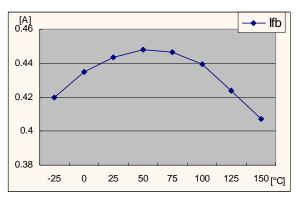


Figure 4. Feedback Source Current

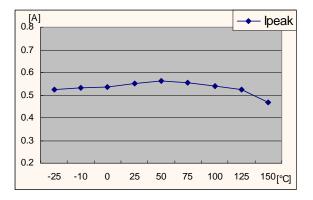


Figure 6. Peak Current Limit

#### Typical Performance Characteristics (Continued)

(These characteristic graphs are normalized at Ta=25°C)

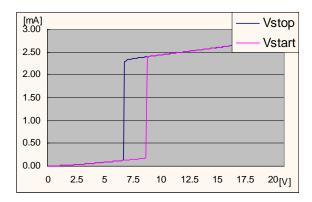


Figure 7. Stop/Start Threshold Voltage

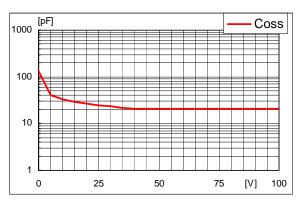
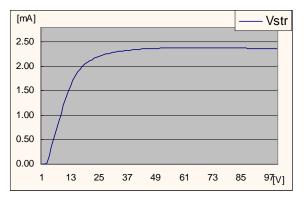


Figure 9. Coss vs. Drain Voltage





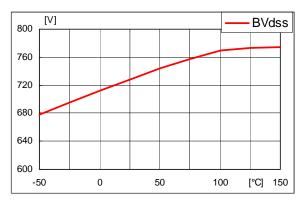
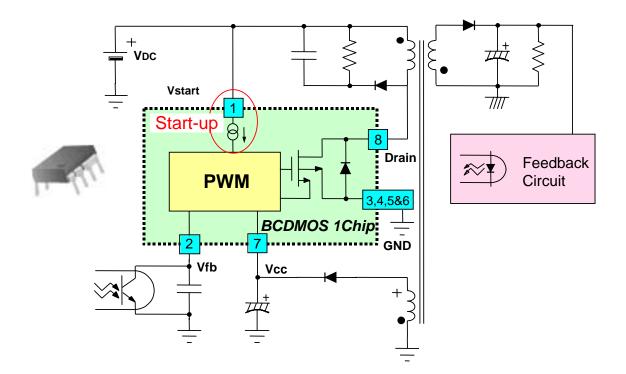


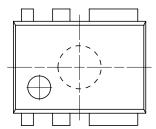
Figure 10. Breakdown vs. Temperature

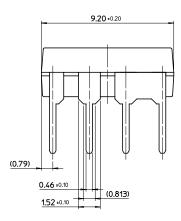
## **Application Circuit**

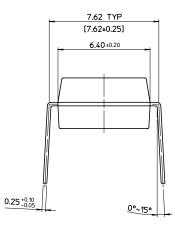


## Package Dimensions









#### **Ordering Information**

Product Number	Package	Rating	Topr (°C)
FSDH0165	8-DIPH	650V, 1A	–25°C to +85°C

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