FSDH565

Fairchild Power Switch(FPS)

Features

- Single Chip 650V 0.5A SenseFET Power Switch
- Precision Fixed Operating Frequency (100kHz)
- Internal Start up Switch
- UVLO with Hysteresis (6.7V/8.7V)
- Over Load Protection
- Over Current Protection (0.3A)
- 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, C-TV, Monitor

Description

The FSDH565 is specially designed for an off-line SMPS with minimal external components. The FSDH565 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 R_{CC} switching converter solution, a FSDH565 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.

8-DIPH

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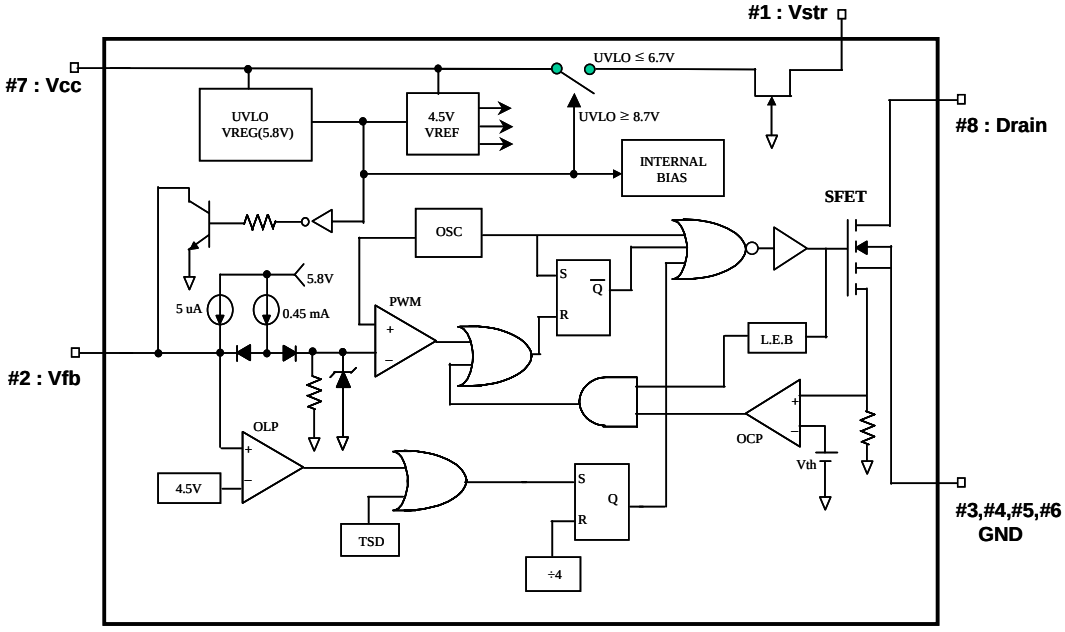
1.Vstr 2.Vfb 3.4.5.6.GND 7.Vcc 8.Drain

Internal Block Diagram



Rev.1.0.2

Absolute Maximum Ratings

(Ta=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Maximum Drain Voltage	$V_{D,MAX}$	650	V
Continuous Drain Current (T_C=25°C)	I_D	0.3	A_{DC}
Maximum Supply Voltage	$V_{CC,MAX}$	21	V
Input Voltage Range	V_{FB}	–0.3 to V_{SD}	V
Operating Ambient Temperature	T_A	–25 to +85	°C
Storage Temperature Range	T_{STG}	–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 start up the internal switch supplies internal bias and charges an external capacitor that connects from the Vcc pin to ground. once this reaches 8.7V, Vstr is 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.	Typ.	Max.	Unit
SENSEFET SECTION						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 100μA	650	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} = 520V	-	-	100	μA
Static drain-source on Resistance	$R_{DS(ON)}$	I_D = 50mA Tj = 25°C	-	36	39	Ω
		I_D = 50mA Tj = 100°C	-	51	59	Ω
Rise Time	T_R	V_{DS} = 325V, I_D = 300mA	-	100	-	nS
Fall Time	T_F	V_{DS} = 325V, I_D = 50mA	-	50	-	nS
START UP SECTION						
VSTR Supply Voltage	V_{ST}	-	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	F_{OSC}	Tj = 25°C	90	100	110	kHz
Maximum Duty Cycle	D_{MAX}	Vfb = 3V	64	67	70	%
Minimum Duty Cycle	D_{MIN}	Vfb = 0V	-	0	0	%
FEEDBACK SECTION						
Feedback Source Current	I_{FB}	Vfb = 0V	0.40	0.45	0.50	mA
Shutdown feedback Voltage	V_{SD}	-	4.0	4.5	5.0	V
CURRENT LIMIT(SELF-PROTECTION)SECTION						
Peak Current Limit	I_{OVER}	peak inductor current	0.25	0.3	0.35	A
PROTECTION SECTION						
Thermal Shutdown Temperature (Tj) (1)	T_{SD}	-	125	145	-	°C
TOTAL DEVICE SECTION						
Operating Supply Current	I_{OP}	V_{CC} = 9.5V (Max)	-	-	3.5	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)

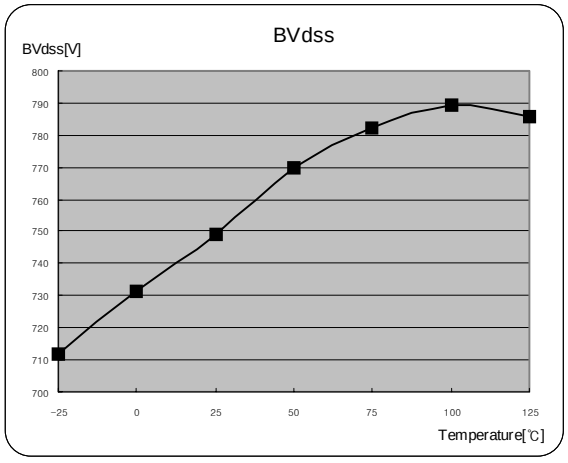


Figure 1. Breakdown vs.Temperature

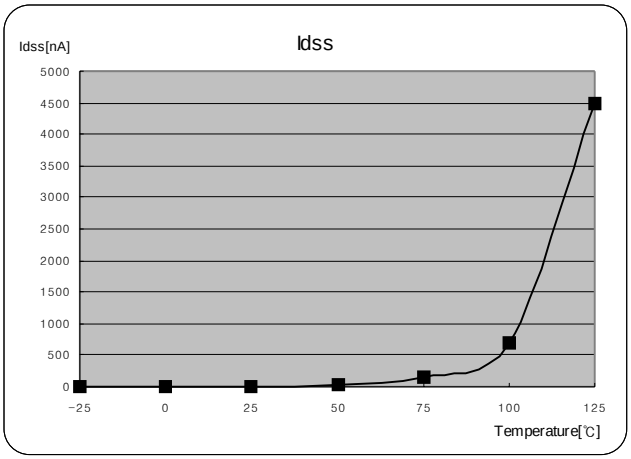


Figure 2. Zero gate voltage drain current vs.Temperature

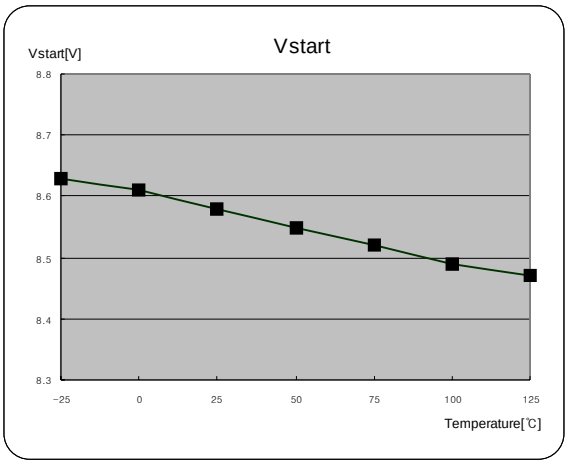


Figure 3. Start Threshold Voltage

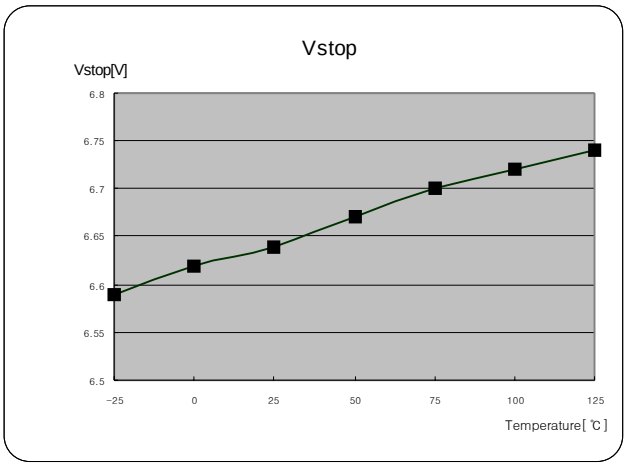


Figure 4. Stop Threshold Voltage

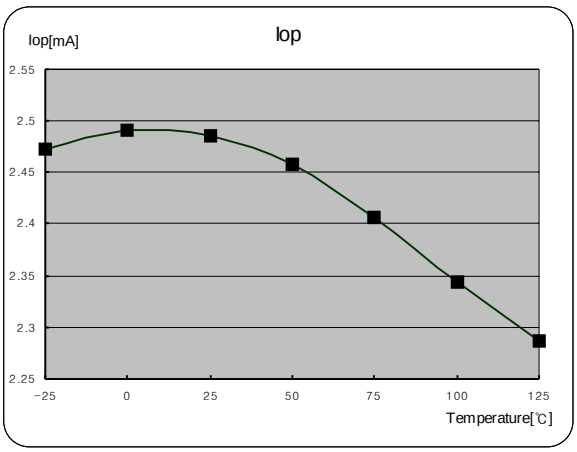


Figure 5.Operating Supply Current

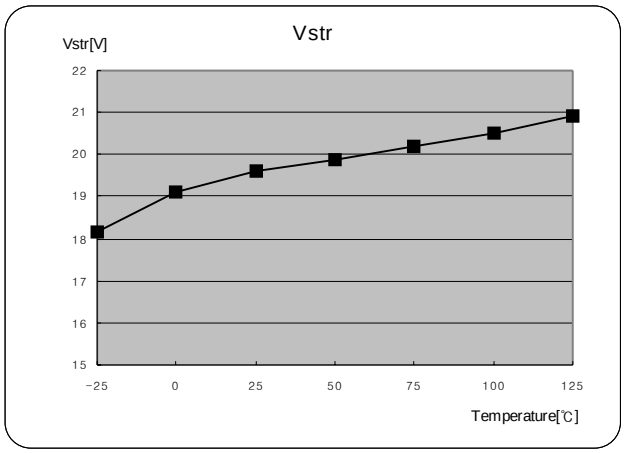


Figure 6.Vstr Supply Voltage

Typical Performance Characteristics (Continued)

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

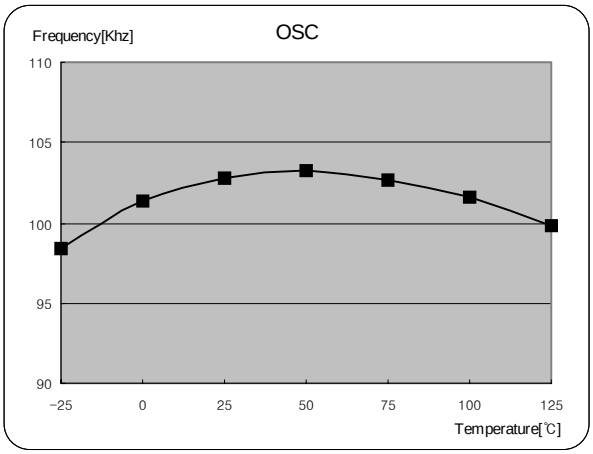


Figure 7. Output Frequency

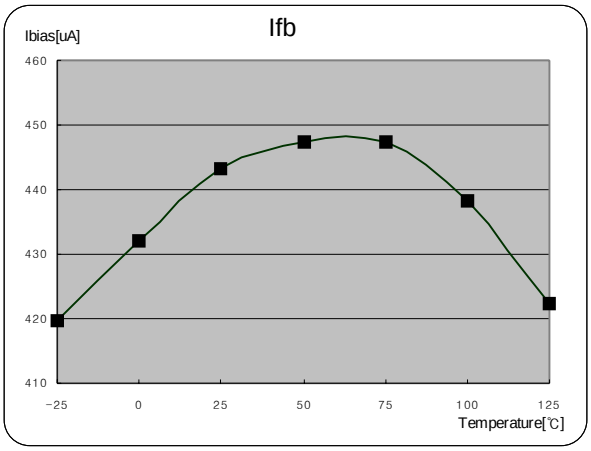


Figure 8. Feedback Source Current

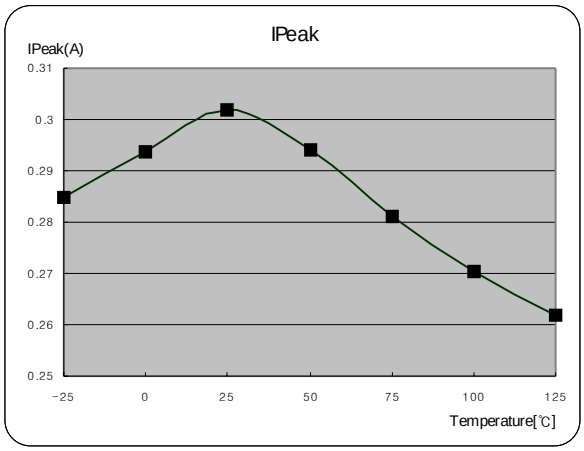
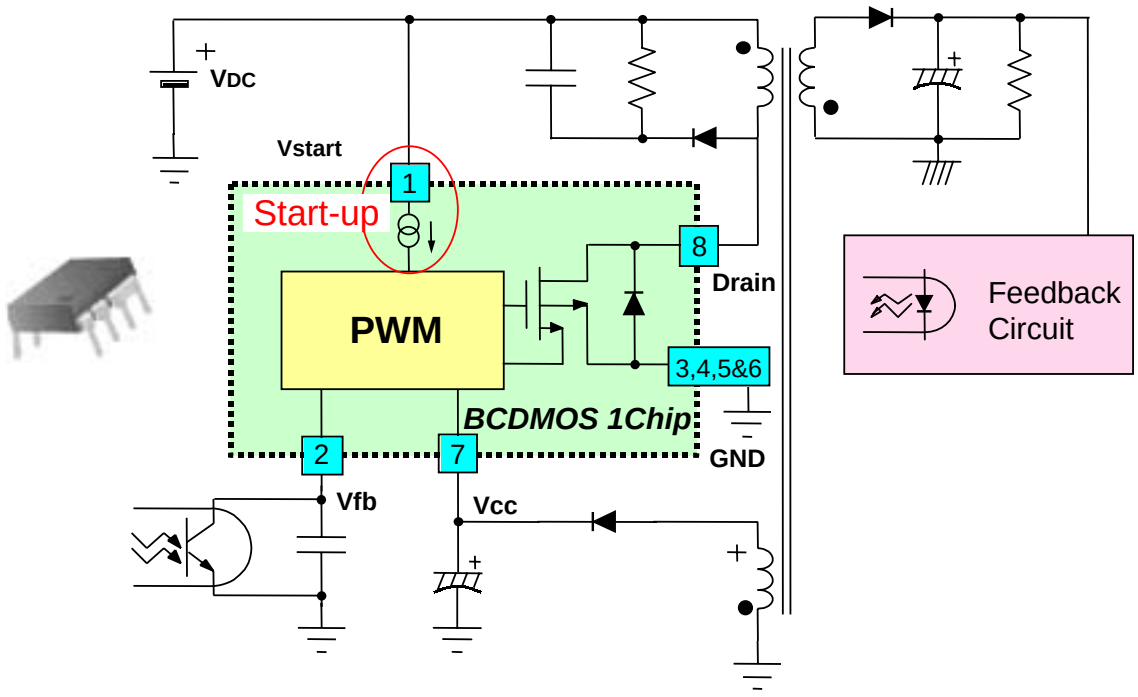


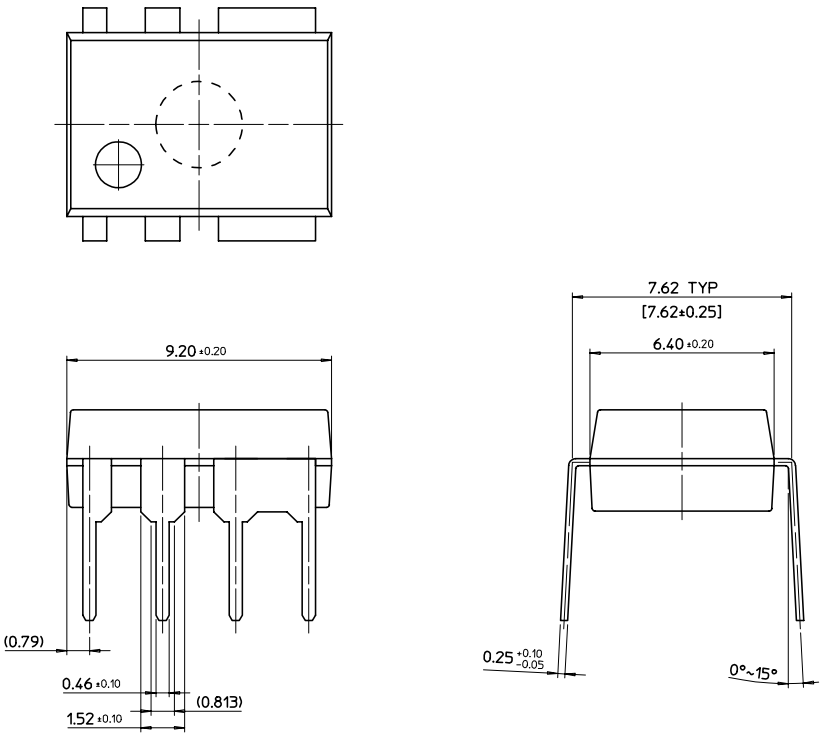
Figure 9. Peak Current Limit

Typical Circuit



Package Dimensions

8-DIPH



Ordering Information

Product Number	Package	Rating	Topr (°C)
FSDH565	8-DIPH	650V, 0.5A	–25°C to +85°C

10/17/01 0.0m 001
Stock#DSxxxxxxxx