FAIRCHILD SEMICONDUCTOR®

September 2010

FSL127H
Green Mode Fairchild Power Switch (FPS™)

Features

- Built-in 5ms Soft-Start Function
- Internal Avalanche-Rugged 700V SenseFET
- Low Audio Noise
- High-Voltage Startup
- Fixed PWM Frequency at 100KHz
- Linearly Decreasing PWM Frequency to 18KHz
- Peak-Current-Mode Control
- Cycle-by-Cycle Current Limiting
- Leading-Edge Blanking (LEB)
- Synchronized Slope Compensation
- Internal Open-Loop Protection (OLP)
- V_{DD} Under-Voltage Lockout (UVLO)
- V_{DD} Over-Voltage Protection (OVP)
- Constant Power Limit (Full AC Input Range)
- Internal OTP Sensor with Hysteresis

Applications

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

- SMPS for VCR, SVR, STB, DVD & VCD Player, Printer, Facsimile, & Scanner
- Adapter for Camcorder

Description

The highly integrated FSL127H consists of a current mode Pulse Width Modulator (PWM) and an avalanche-rugged 700V SenseFET. It is specifically designed for high-performance offline Switch Mode Power Supplies (SMPS) with minimal external components.

The integrated PWM controller features include a proprietary green-mode function that provides off-time modulation to linearly decrease the switching frequency at light-load conditions to minimize standby power consumption. To avoid acoustic noise problems, the minimum PWM frequency is set above 18KHz. This green-mode function enables the power supply to meet international power conservation requirements. With the internal high-voltage startup circuitry, the power loss due to bleeding resistors is also eliminated. To further reduce power consumption, the PWM controller is manufactured using the BiCMOS process, which allows an operating current of only 3.5mA.

The FSL127H built-in synchronized slope compensation achieves stable peak-current-mode control. The proprietary external line compensation ensures constant output power limit over a wide AC input voltage range, from $90V_{AC}$ to $264V_{AC}$.

The FSL127H provides many protection functions. In addition to cycle-by-cycle current limiting, the internal open-loop protection circuit ensures safety when an open-loop or output short-circuit failure occurs. PWM output is disabled until V_{DD} drops below the UVLO lower limit, when the controller starts up again. As long as V_{DD} exceeds ~28V, the internal OVP circuit is triggered.

Compared to a discrete MOSFET and controller or RCC switching converter solution, the FSL127H reduces total component count, design size, and weight while increasing efficiency, productivity, and system reliability. These devices provide a basic platform well suited for design of cost-effective flyback converters.

Ordering Information

Part Number	SenseFET	Operating Temperature Range	Package	Packing Method
FSL127HNY	2.0A 700V	-40°C to +105°C	8-Pin Dual In-Line Package (MDIP), JEDEC MS-001, .300" Wide	Tube

© 2010 Fairchild Semiconductor Corporation

Application Diagram

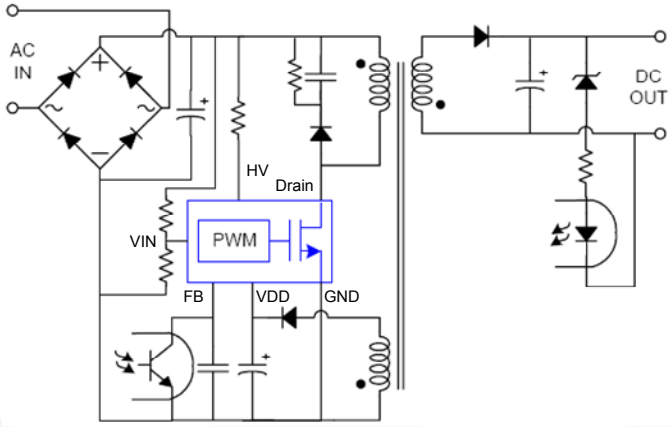


Figure 1. Typical Flyback Application

Output Power Table[1]

Product	230V$_{AC}$ ± 15%[2]		85-265V$_{AC}$	
	Adapter[3]	Open Frame[4]	Adapter[3]	Open Frame[4]
FSL127H	14W	20W	11W	16W

Notes:

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

Internal Block Diagram

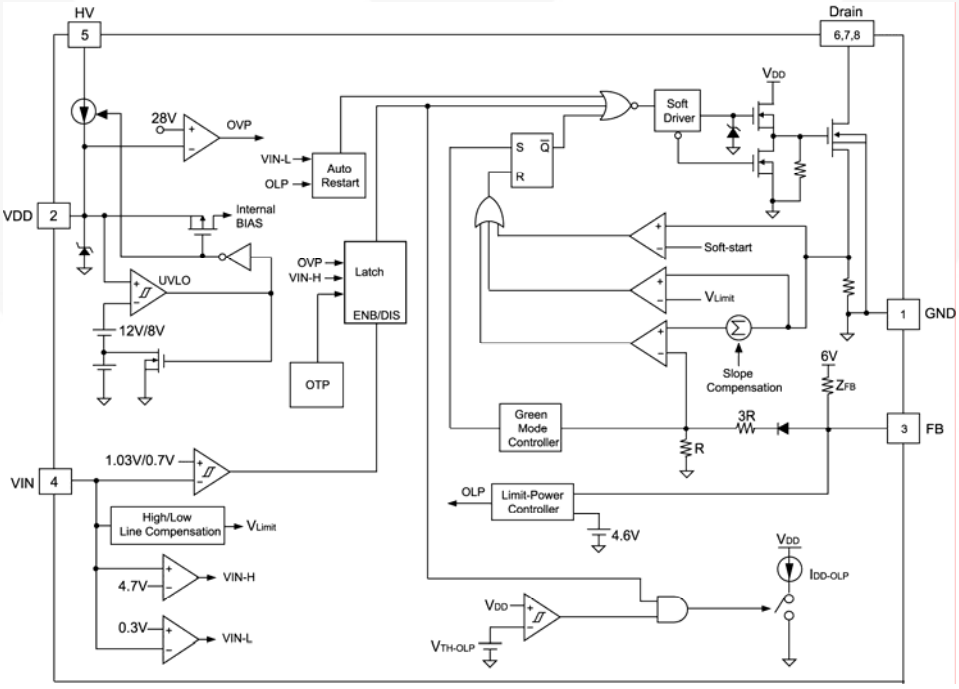
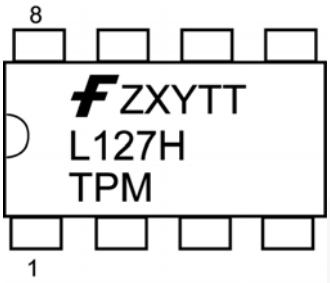


Figure 2. Internal Block Diagram

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**. SenseFET source terminal on primary side and internal control ground.
2	V_{DD}	**Power Supply**. The internal protection circuit disables PWM output as long as V_{DD} exceeds the OVP trigger point.
3	FB	**Feedback**. The signal from the external compensation circuit is fed into this pin. The PWM duty cycle is determined in response to the signal on this pin and the current-sense signal on the SENSE pin.
4	V_{IN}	**Line-Voltage Detection**. The line-voltage detection is used for constant output power limit. It is suggested to add a low pass filter to filter out line ripple on bulk capacitor.
5	HV	**Startup.** For startup, this pin is pulled high to the line input or bulk capacitor via resistors.
6	Drain	**SenseFET Drain**. High-voltage power SenseFET drain connection.
7	Drain	**SenseFET Drain**. High-voltage power SenseFET drain connection.
8	Drain	**SenseFET Dain**. High-voltage power SenseFET drain connection.

© 2010 Fairchild Semiconductor Corporation

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter		Min.	Max.	Unit
V_{DRAIN}	Drain Pin Voltage[5,6]			700	V
I_{DM}	Drain Current Pulsed[7]			8	A
E_{AS}	Single Pulsed Avalanche Energy[8]			140	mJ
V_{VDD}	DC Supply Voltage			30	V
V_{FB}	FB Pin Input Voltage		-0.3	7.0	V
V_{VIN}	VIN Pin Input Voltage		-0.3	7.0	V
V_{HV}	HV Pin Input Voltage			700	V
P_D	Power Dissipation (T_A < 50°C)			1.5	W
θ_{JA}	Junction-to-Air Thermal Resistance			80	°C/W
Ψ_{JT}	Junction-to-Top Thermal Resistance[9]			35	°C/W
T_J	Operating Junction Temperature			+150	°C
T_{STG}	Storage Temperature Range		-55	+150	°C
T_L	Lead Temperature (Wave Soldering or IR, 10 Seconds)			+260	°C
ESD	Electrostatic Discharge Capability, All Pins Except HV Pin[10]	Human Body Model: JESD22-A114		4.5	kV
		Charged Device Model: JESD22-C101		1.5	

Notes:
5. All voltage values, except differential voltages, are given with respect to the network ground terminal.
6. Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device.
7. Non-repetitive rating: pulse width is limited by maximum junction temperature.
8. L = 51mH, starting T_J = 25°C.
9. Measured on the package top surface.
10. All pins including HV pin: HBM=500V, CDM=1250V.

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Min.	Typ.	Max.	Unit
T_A	Operating Ambient Temperature	-40		+105	°C

© 2010 Fairchild Semiconductor Corporation

Electrical Characteristics

V_{DD}=15V and T_A=25°C unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
SenseFET Section[11]						
BV_{DSS}	Drain- Source Breakdown Voltage	V_{GS} = 0V	700			V
I_{DSS}	Zero-Gate-Voltage Drain Current	V_{DS} = 700V, V_{GS} = 0V		0.5	50.0	µA
		V_{DS} = 560V, V_{GS} = 0V, T_A = 125°C		1	200	
$R_{DS(ON)}$	Drain-Source On-State Resistance[12]	V_{GS} = 10V, I_D = 0.5A		6.0	7.2	Ω
C_{ISS}	Input Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		550	715	pF
C_{OSS}	Output Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		38	50	pF
C_{RSS}	Reverse Transfer Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		17	26	pF
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 350V, I_D = 1.0A		20	50	ns
t_r	Rise Time	V_{DS} = 350V, I_D = 1.0A		15	40	ns
$t_{d(off)}$	Turn-Off Delay Time	V_{DS} = 350V, I_D = 1.0A		55	120	ns
t_f	Fall Time	V_{DS} = 350V, I_D = 1.0A		25	60	ns
V_{DD} Section						
V_{OP}	Continuously Operating Voltage				22	V
V_{DD-ON}	Start Threshold Voltage		11	12	13	V
V_{DD-OFF}	Minimum Operating Voltage		7	8	9	V
I_{DD-ST}	Startup Current	V_{DD-ON} – 0.16V			30	µA
I_{DD-OP}	Operating Supply Current	V_{DD} = 15V, V_{FB} = 3V	3.0	3.5	4.0	mA
I_{DD-BM}	Green-Mode Operating Supply Current	V_{FB} = V_{ZDC}		2		mA
I_{DD-OLP}	Internal Sink Current	V_{TH-OLP}+0.1V	30	60	90	µA
V_{TH-OLP}	I_{DD-OLP} Off Voltage		5	6	7	V
V_{DD-OVP}	V_{DD} Over-Voltage Protection		27	28	29	V
$t_{D-VDDOVP}$	V_{DD} Over-Voltage Protection Debounce Time		75	130	200	µs
HV Section						
I_{HV}	Maximum Current Drawn from HV Pin	HV 120V_{DC}, V_{DD} = 0V with 10µF	1.5	3.5	5.0	mA
I_{HV-LC}	Leakage Current After Startup	HV = 700V, V_{DD} = V_{DD-OFF}+1V		1	20	µA
Oscillator Section						
f_{OSC}	Frequency in Nominal Mode	Center Frequency	94	100	106	kHz
f_{OSC-G}	Green-Mode Frequency		14	18	22	kHz
D_{MAX}	Maximum Duty Cycle			85		%
f_{DV}	Frequency Variation vs. V_{DD} Deviation	V_{DD} = 9V to 22V			5	%
f_{DT}	Frequency Variation vs. Temperature Deviation[11]	T_A = -40 to +105°C			5	%

Continued on the following page…

© 2010 Fairchild Semiconductor Corporation

Electrical Characteristics (Continued)

V_{DD}=15V and T_A=25°C unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{IN} Section						
V_{IN-ON}	PWM Turn-on Threshold Voltage		0.98	1.03	1.08	V
V_{IN-RL}	Release Latch Voltage		0.60	0.70	0.80	V
V_{IN-H}	Pull HIGH Latch Trigger Level		4.4	4.7	5.0	V
t_{IN-H}	Pull HIGH Latch Debounce Time			120		µs
V_{IN-L}	Pull LOW Auto Recovery Trigger Level		0.2	0.3	0.4	V
Feedback Input Section						
A_V	FB Voltage to Current-Sense Attenuation			1/4.0		V/V
Z_{FB}	Input Impedance			9.5		kΩ
$V_{FB-OPEN}$	Output High Voltage		5			V
V_{FB-OLP}	FB Open-Loop Trigger Level		4.4	4.6	4.8	V
t_{D-OLP}	Delay Time of FB Pin Open-loop Protection		50	56	59	ms
V_{FB-N}	Green-Mode Entry FB Voltage		2.3	2.5	2.7	V
V_{FB-G}	Green-Mode Ending FB Voltage			V_{FB-N} - 0.1		V
V_{FB-ZDC}	Zero Duty Cycle FB Voltage		1.9	2.1	2.3	V

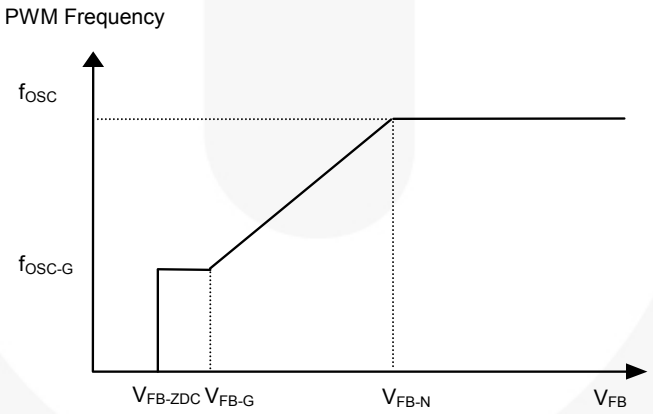


Figure 4. V_{FB} vs. PWM Frequency

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Current-Sense Section						
I_{LIM} at V_{IN} = 1.2V	Peak Current Limit	V_{IN} = 1.2V	0.51	0.61	0.71	A
I_{LIM} at V_{IN} = 3.6V	Peak Current Limit	V_{IN} = 3.6V	0.44	0.54	0.64	A
t_{SS}	Period During Soft-Start Time[11]		4.5	5.0	5.5	ms
Over-Temperature Protection Section (OTP)						
T_{OTP}	Protection Junction Temperature[11,13]			142		°C

Notes:

11. These parameters, although guaranteed, are not 100% tested in production.
12. Pulse test: pulse width ≤ 300µs, duty ≤ 2%.
13. When activated, the output is disabled and the latch is turned off.

© 2010 Fairchild Semiconductor Corporation

Typical Characteristics

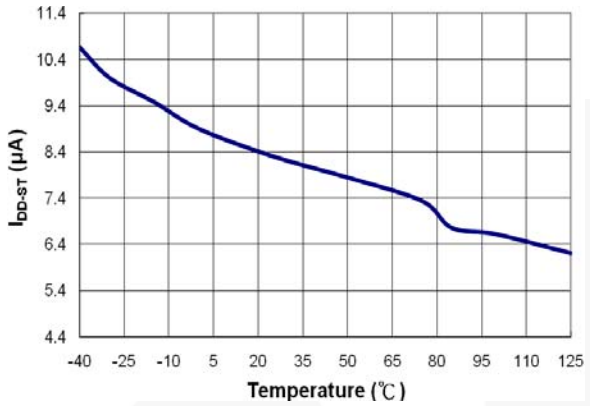


Figure 5. I_{DD-ST} vs. Temperature

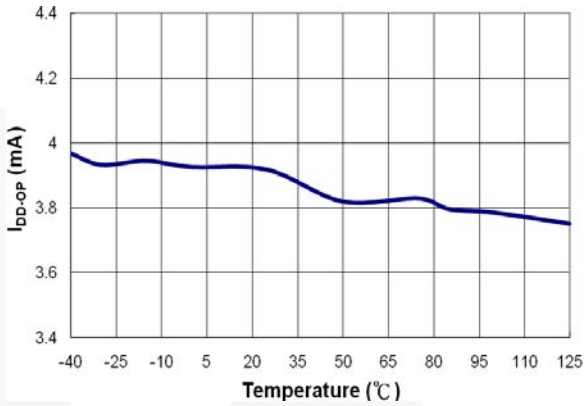


Figure 6. I_{DD-OP} vs. Temperature

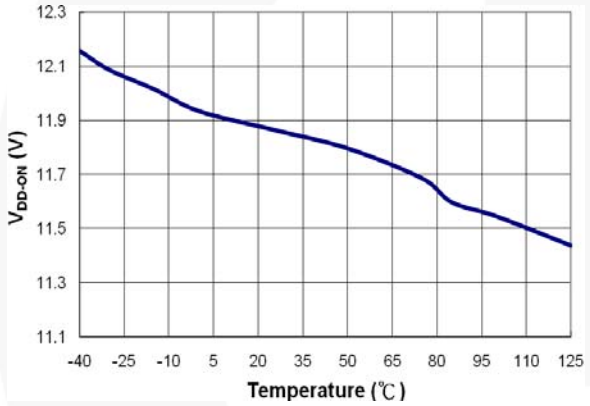


Figure 7. V_{DD-ON} vs. Temperature

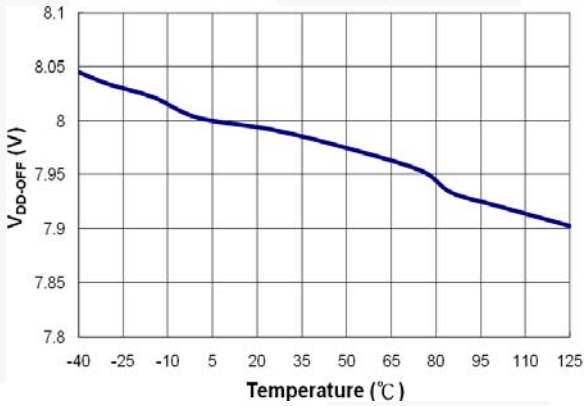


Figure 8. V_{DD-OFF} vs. Temperature

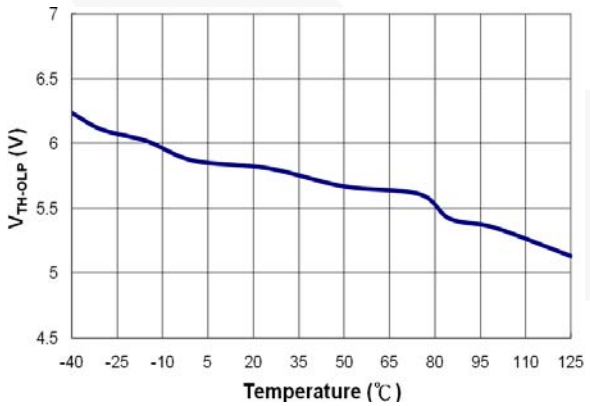


Figure 9. V_{TH-OLP} vs. Temperature

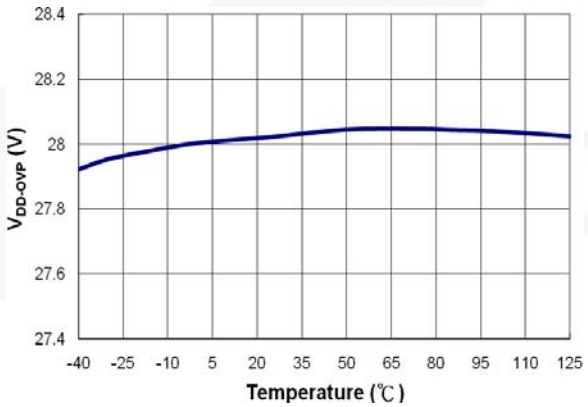


Figure 10. V_{DD-OVP} vs. Temperature

Typical Characteristics

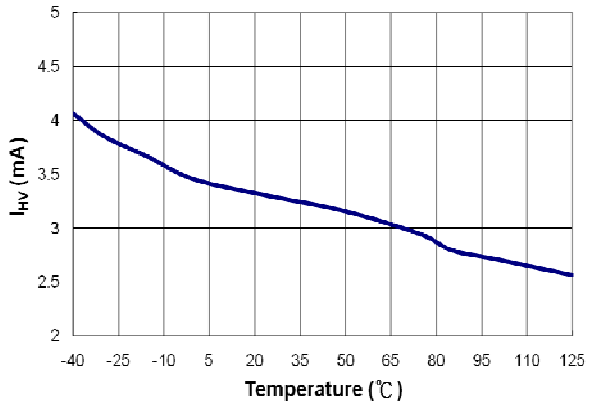


Figure 11. I_{HV} vs. Temperature

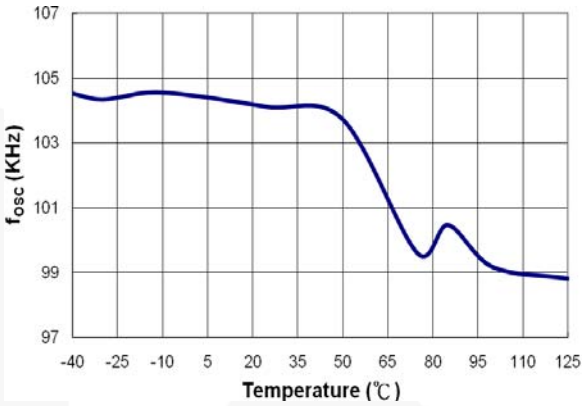


Figure 12. f_{OSC} vs. Temperature

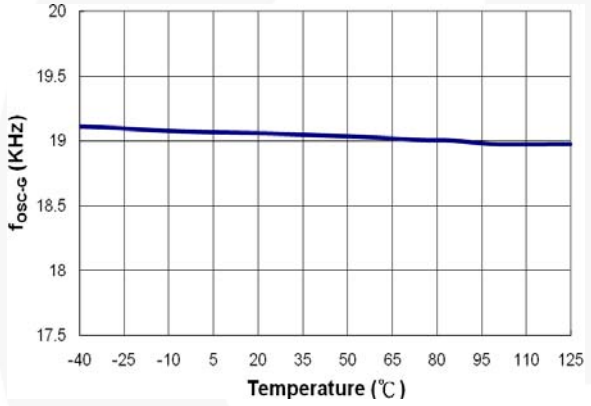


Figure 13. f_{OSC-G} vs. Temperature

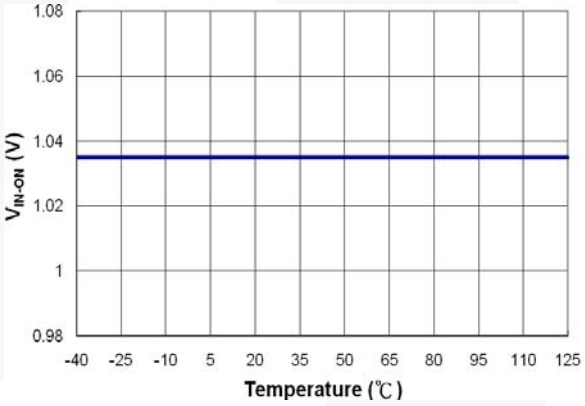


Figure 14. V_{IN-ON} vs. Temperature

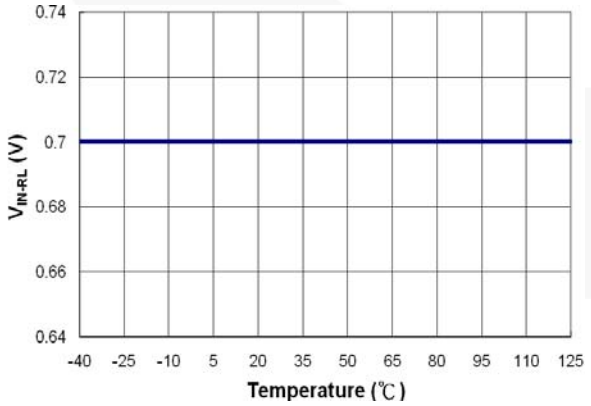


Figure 15. V_{IN-RL} vs. Temperature

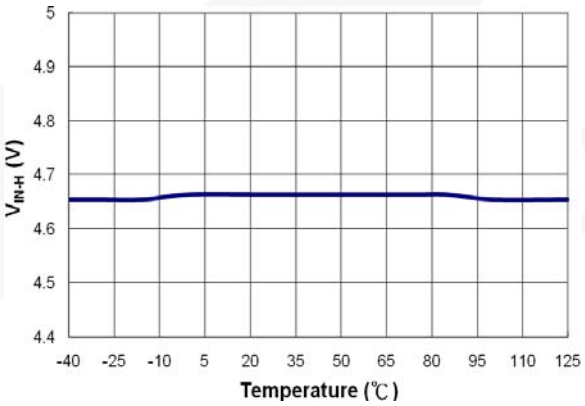


Figure 16. V_{IN-H} vs. Temperature

Typical Characteristics

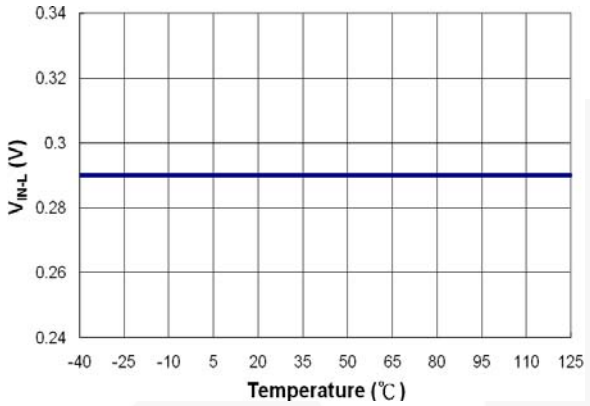


Figure 17. V_{IN-L} vs. Temperature

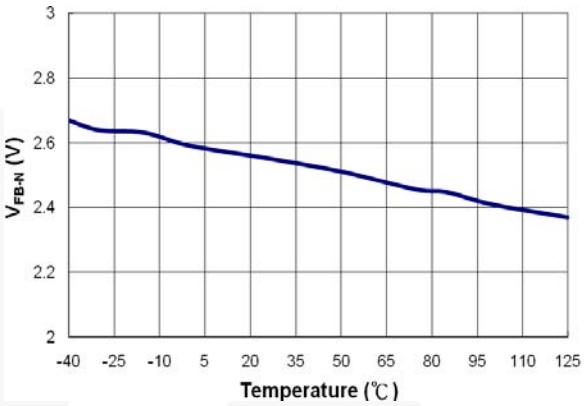


Figure 18. V_{FB-N} vs. Temperature

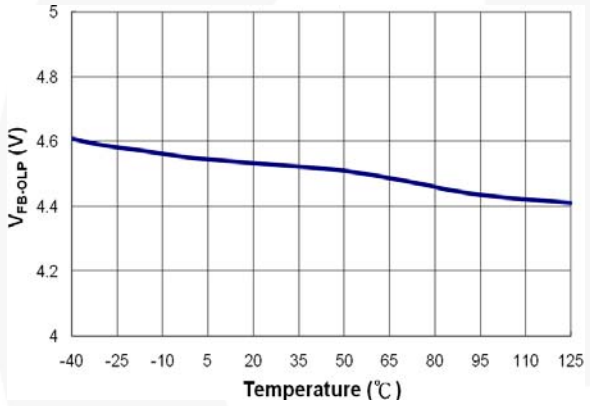


Figure 19. V_{FB-OLP} vs. Temperature

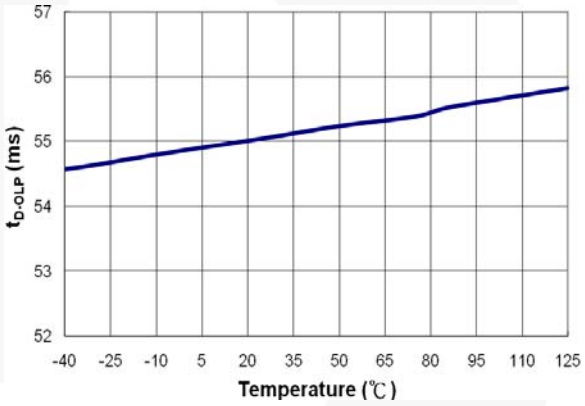


Figure 20. t_{D-OLP} vs. Temperature

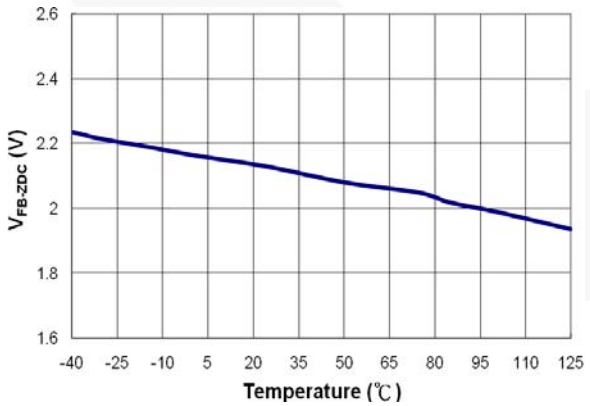


Figure 21. V_{FB-ZDC} vs. Temperature

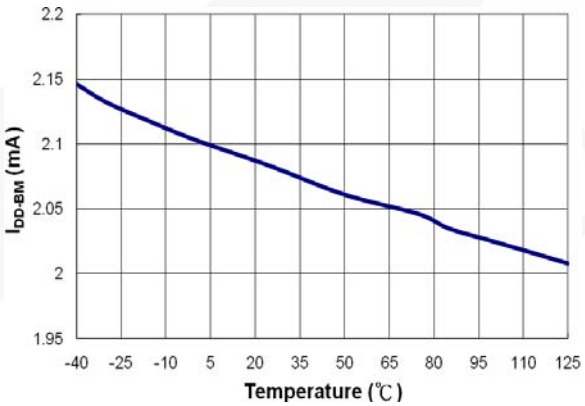


Figure 22. I_{DD-BM} vs. Temperature

© 2010 Fairchild Semiconductor Corporation

Functional Description

Startup Operation

For startup, the HV pin is connected to the line input or bulk capacitor through the external resistor R_{HV}, as shown in Figure 23. Typical startup current drawn from the HV pin is 3.5mA and it charges the V_{DD} capacitor through the resistor R_{HV}. The startup current turns off when the V_{DD} capacitor voltage reaches V_{DD-ON}. The V_{DD} capacitor maintains V_{DD} until the auxiliary winding of the transformer provides the operating current.

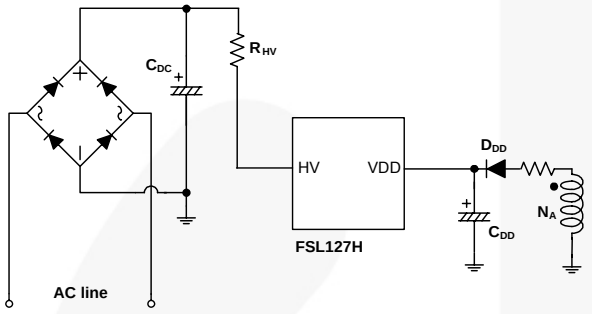


Figure 23. Startup Circuit

Slope Compensation

FSL127H is designed for flyback power converter. The peak-current-mode control is used to optimize system performance. Slope compensation is added to stabilize the current loop. The FSL127H inserts a synchronized, positively sloped ramp at each switching cycle.

Soft Start

The FSL127H has internal soft-start circuit that slowly increases the SenseFET current after startup. The typical soft-start time is 5ms, during which the V_{Limit} level is increased in six steps to smoothly establish the required output voltage, as shown in Figure 24. It also helps prevent transformer saturation and reduces stress on the secondary diode during startup.

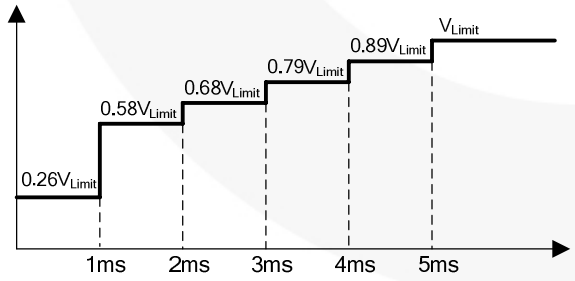


Figure 24. Soft-Start Function

Green-Mode Operation

The FSL127H uses feedback voltage (V_{FB}) as an indicator of the output load and modulates the PWM frequency, as shown in Figure 25, such that the switching frequency decreases as load decreases. In heavy load conditions, the switching frequency is 100kHz. Once V_{FB} decreases below V_{FB-N} (2.5V), the PWM frequency starts to linearly decrease from 100kHz to 18kHz to reduce the switching losses. As V_{FB} decreases below V_{FB-G} (2.4V), the switching frequency is fixed at 18kHz and FSL127H enters "deep" green mode to reduce the standby power consumption. As V_{FB} decreases below V_{FB-ZDC} (2.1V), FSL127H enters burst-mode operation. When V_{FB} drops below V_{FB-ZDC}, FSL127H stops switching and the output voltage starts to drop, which causes the feedback voltage to rise. Once V_{FB} rises above V_{FB-ZDC}, switching resumes. Burst mode alternately enables and disables switching, thereby reducing switching loss to improve power saving, as shown in Figure 26.

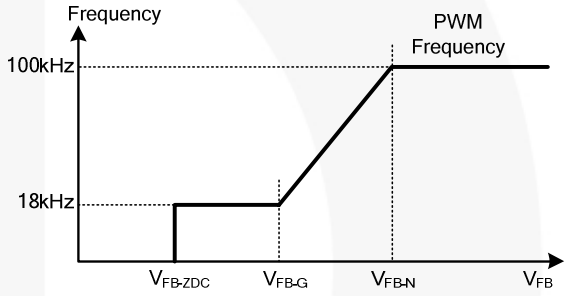


Figure 25. PWM Frequency

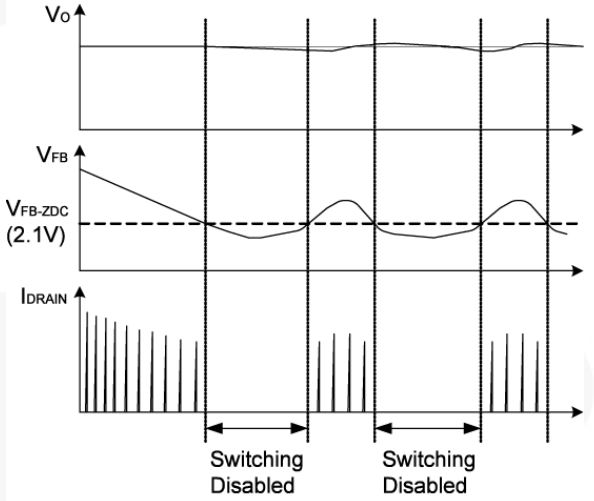


Figure 26. Burst Mode Operation

© 2010 Fairchild Semiconductor Corporation

Constant Power Control

To limit the output power of the converter constantly, high/low line compensation is included. Sensing the converter input voltage through the VIN pin, the high/low line compensation function generates a relative peak-current-limit threshold voltage for constant power control, as shown in Figure 27.

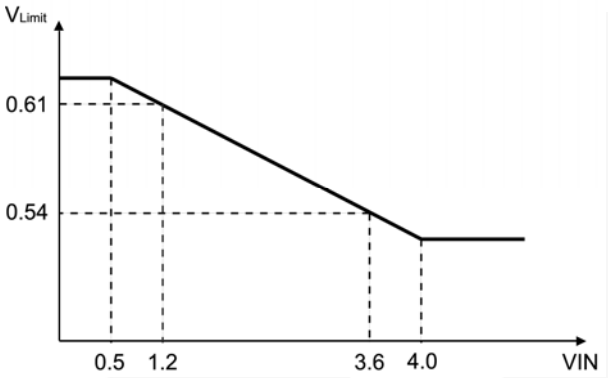


Figure 27. Constant Power Control

Protections

The FSL127H provides protection functions to prevent the power supply and the load from being damaged. The protection features include:

Latch / Auto Recovery Function

The FSL127H provides additional protections by the VIN pin, such as pull-HIGH latch and pull-LOW auto recovery that depend on the application. As shown in Figure 28, when V_{IN} level is higher than 4.7V, FSL127H is latched until the V_{DD} is discharged. FSL127H is in auto recovery when the V_{IN} level is lower than 0.3V.

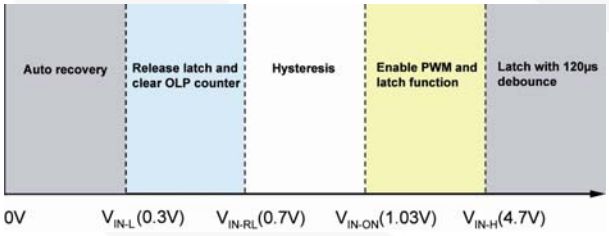


Figure 28. VIN Pin Function

Open-Loop / Overload Protection (OLP)

When the upper branch of the voltage divider for the shunt regulator (KA431 shown) is broken, as shown in Figure 29, or over-current or output short occurs; there is no current flowing through the opto-coupler transistor, which pulls up the feedback voltage to 6V. When the feedback voltage is above 4.6V for longer than 56ms, OLP is triggered. This protection is also triggered when the SMPS output drops below the nominal value longer than 56ms due to the overload condition.

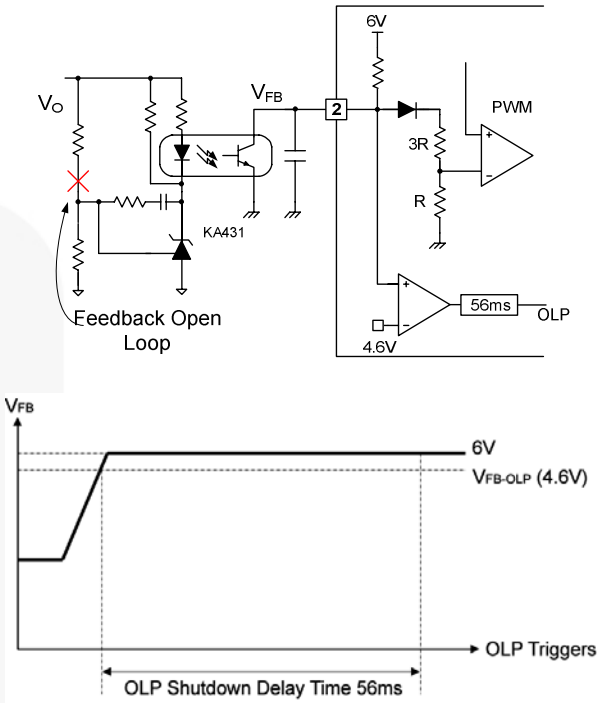


Figure 29. OLP Operation

V_{DD} Over-Voltage Protection (OVP)

V_{DD} over-voltage protection prevents IC damage caused by over voltage on the V_{DD} pin. The OVP is triggered when V_{DD} reaches 28V. It has a debounce time (typically 130μs) to prevent false trigger by switching noise.

Over-Temperature Protection (OTP)

The SenseFET and the control IC are integrated, making it easier to detect the temperature of the SenseFET. When the temperature exceeds approximately 142°C, thermal shutdown is activated.

Typical Application Circuit

Application	Fairchild Devices	Input Voltage Range	Output
Adapter	FSL127H	90~264V_{AC}	12V/0.85A (10.2W)

Features

- High efficiency (>76.74% at full load) meeting Energy Star V2.0 regulation with enough margin
- Standby power <100mW at no-load condition
- Provides full protection functions, including:

OVP	OTP	OLP	VIN-H	VIN-L
Latch	Latch	Auto Restart	Latch	Auto Restart

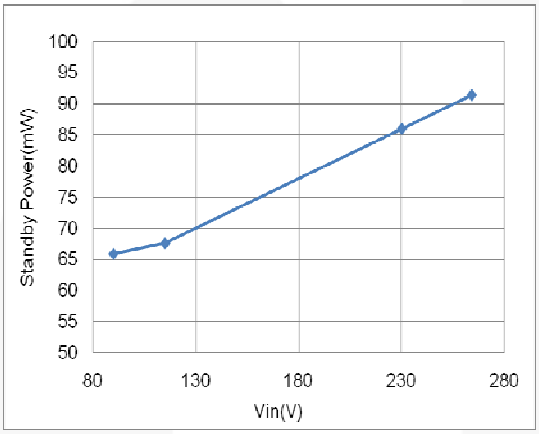


Figure 30. Measured Standby Power

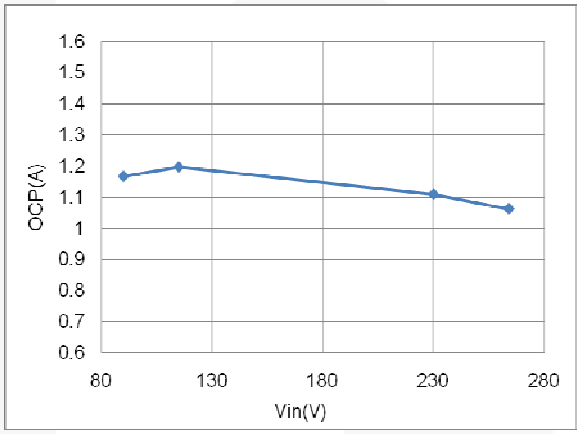


Figure 31. Over-Current Protection

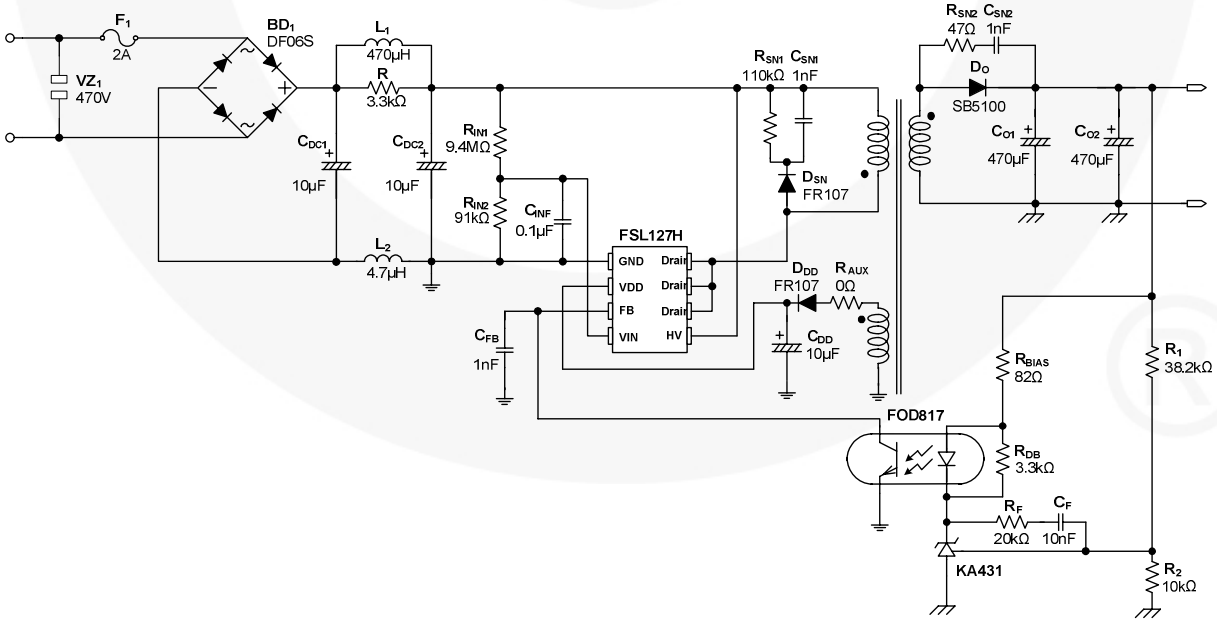


Figure 32. Schematic of Typical Application Circuit

Typical Application Circuit (Continued)

Transformer Specification

- Core: EE16
- Bobbin: EE16

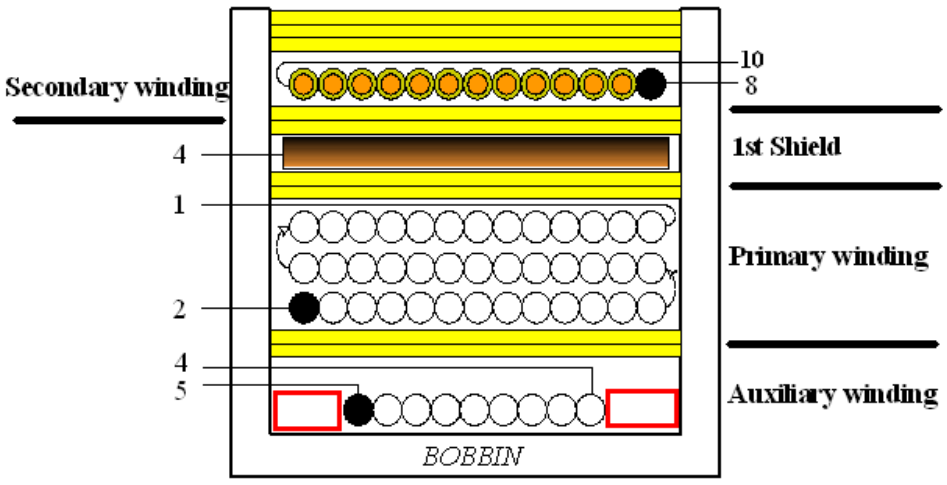
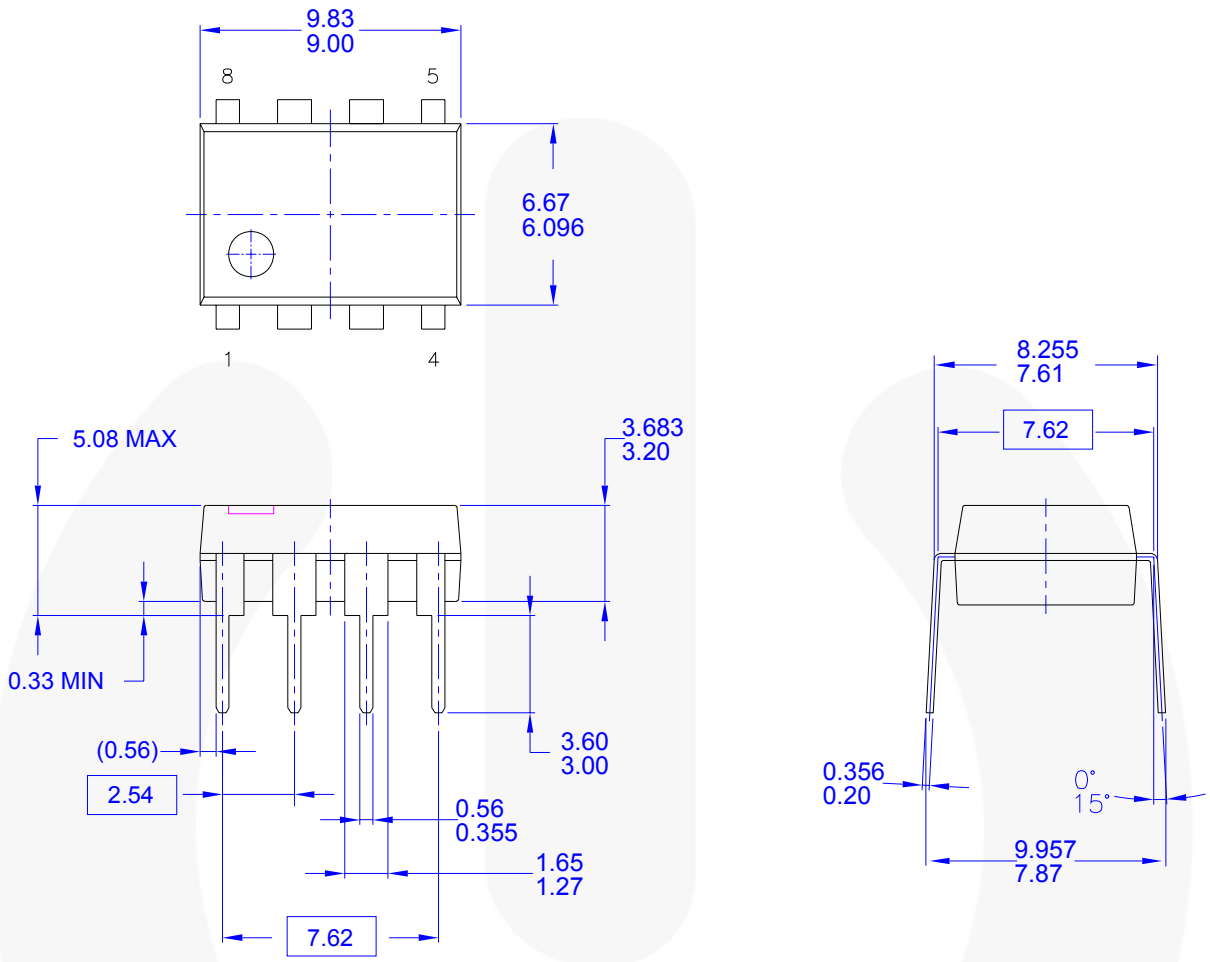


Figure 33. Transformer Diagram

NO.	TERMINAL		WIRE	Ts
	S	F		
W1	5	4	2UEW 0.3*1	13
W2	2	1	2UEW 0.26*1	75
W3	4		COPPER SHIELD	1.2
W4	8	10	TEX-E 0.35*1	13
			CORE ROUNDING TAPE	3
Primary-Side Inductance=880μH ±5%				
Primary-Side Effective Leakage<20μH ±5%				

Physical Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED

A) THIS PACKAGE CONFORMS TO JEDEC MS-001 VARIATION BA

B) ALL DIMENSIONS ARE IN MILLIMETERS.

C) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

D) DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994

E) DRAWING FILENAME AND REVSION: MKT-N08FREV2.

Figure 34. 8-pin Dual In-Line Package (DIP)

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:
http://www.fairchildsemi.com/packaging/.

© 2010 Fairchild Semiconductor Corporation

FAIRCHILD SEMICONDUCTOR®

TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

AccuPower™
Auto-SPM™
Build it Now™
CorePLUS™
CorePOWER™
CROSSVOLT™
CTL™
Current Transfer Logic™
DEUXPEED®
Dual Cool™
EcoSPARK®
EfficientMax™
ESBC™
F®
Fairchild®
Fairchild Semiconductor®
FACT Quiet Series™
FACT®
FAST®
FastvCore™
FETBench™
FlashWriter®*
FPS™
F-PFS™
FRFET®
Global Power Resource℠
Green FPS™
Green FPS™ e-Series™
Gmax™
GTO™
IntelliMAX™
ISOPLANAR™
MegaBuck™
MICROCOUPLER™
MicroFET™
MicroPak™
MicroPak2™
MillerDrive™
MotionMax™
Motion-SPM™
OptoHiT™
OPTOLOGIC®
OPTOPLANAR®
®
PDP SPM™
Power-SPM™
PowerTrench®
PowerXS™
Programmable Active Droop™
QFET®
QS™
Quiet Series™
RapidConfigure™
™
Saving our world, 1mW/W/kW at a time™
SignalWise™
SmartMax™
SMART START™
SPM®
STEALTH™
SuperFET®
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SupreMOS®
SyncFET™
Sync-Lock™
SYSTEM GENERAL®*
The Power Franchise®
the power franchise
TinyBoost™
TinyBuck™
TinyCalc™
TinyLogic®
TINYOPTO™
TinyPower™
TinyPWM™
TinyWire™
TriFault Detect™
TRUECURRENT™*
μSerDes™
SerDes
UHC®
Ultra FRFET™
UniFET™
VCX™
VisualMax™
XS™

* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I50

© 2010 Fairchild Semiconductor Corporation