



SG6846B

Highly Integrated Green-Mode PWM Controller

Features

- Low Startup Current: 8μA
- Low Operating Current: 3.7mA
- Peak-Current Mode Operation with Cycle-by-cycle Current Limiting
- PWM Frequency Continuously Decreasing with Burst Mode at Light Loads
- V_{DD} Over Voltage Protection (OVP)
- AC Input Brownout Protection with Hysteresis
- Constant Output Power Limit (Full AC Input Range)
- Internal Latch Circuit for OVP, OTP, and OCP (BLSY, BLSZ)
- Two-level OCP Delay with 200ms
- Programmable PWM Frequency with Frequency Hopping
- OCP Threshold is 2/3 Peak Current Limit
- Soft Startup Time: 5ms

Applications

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

- Power Adapters
- Open-frame SMPS
- SMPS with Surge-current Output, such as for Printers, Scanners, Motor Drivers

Description

The highly integrated PWM controller, SG6846B, provides several features to enhance the performance of fly-back converters. To minimize standby power consumption, a proprietary green-mode function provides off-time modulation to continuously decrease the switching frequency under light-load conditions. Under zero-load conditions, the power supply enters burst-mode. This completely shuts off PWM output. If V_{FB} is larger than around 1.6V, PWM pulses out. This green-mode function enables power supplies to meet international power conservation requirements.

The SG6846B is designed for SMPS with surge-current output. It is incorporated with a two-level OCP function. Besides, the cycle-by-cycle current limiting, if the switching current is higher than OCP threshold and lasts for 200ms, SG6846B stops gate immediately and latches itself (BLSY version) or restarts after V_{DD} charges up to 16.5V (BCSY version). SG6846B also integrates frequency-hopping function internally. The frequency hopping function helps reduce EMI emission of a power supply with minimum line filters. It has built-in synchronized slope compensation, proprietary internal compensation for constant output power limit over universal AC input range. The gate output is clamped at 18V to protect the external MOSFET from over-voltage damage.

Protection include: AC input brownout protection with hysteresis and V_{DD} over-voltage protection. For over-temperature protection, an external NTC thermistor can be applied to sense the ambient temperature. When OCP, V_{DD} OVP, or OTP are activated, an internal latch circuit is used to latch-off the controller. The latch resets when V_{DD} supply is removed.

SG6846B is available in 8-pin SOP package.

Ordering Information

Part Number	Operating Temperature Range	OCP Latch	Eco Status	Package	Packing Method
SG6846BLSY	-40 to +105°C	Yes	Green	8-Pin Small Outline Package (SOP)	Tape & Reel
SG6846BLSZ	-40 to +105°C	Yes	RoHS	8-Pin Small Outline Package (SOP)	Tape & Reel
SG6846BCSY	-40 to +105°C	No	Green	8-Pin Small Outline Package (SOP)	Tape & Reel
SG6846BCSZ	-40 to +105°C	No	RoHS	8-Pin Small Outline Package (SOP)	Tape & Reel

 For Fairchild's definition of "green" Eco Status, please visit: http://www.fairchildsemi.com/company/green/rohs_green.html.

Typical Application

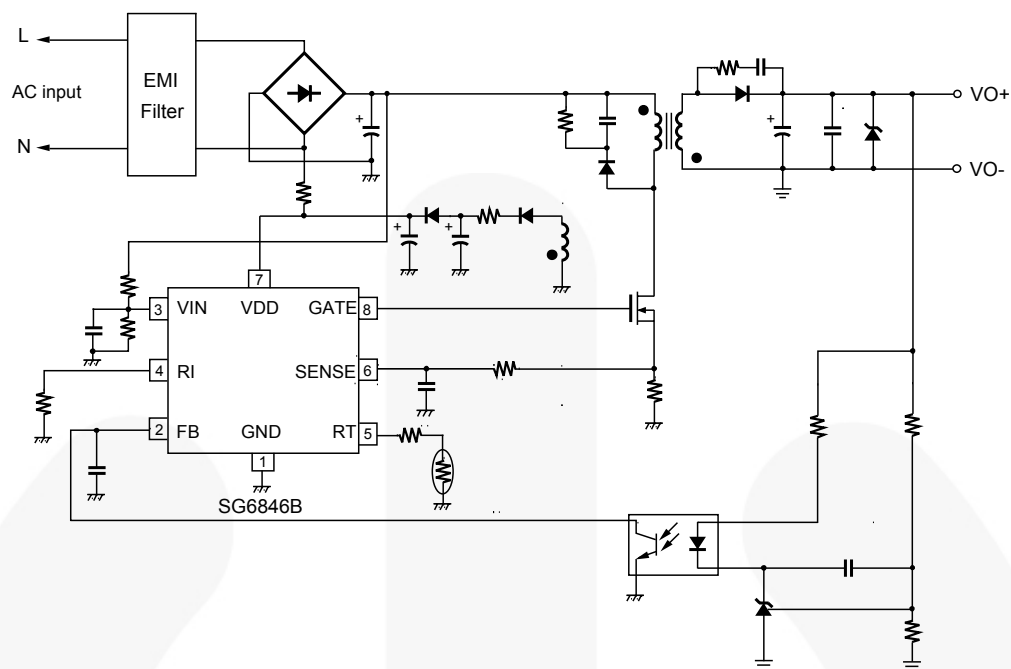


Figure 1. Typical Application

Block Diagram

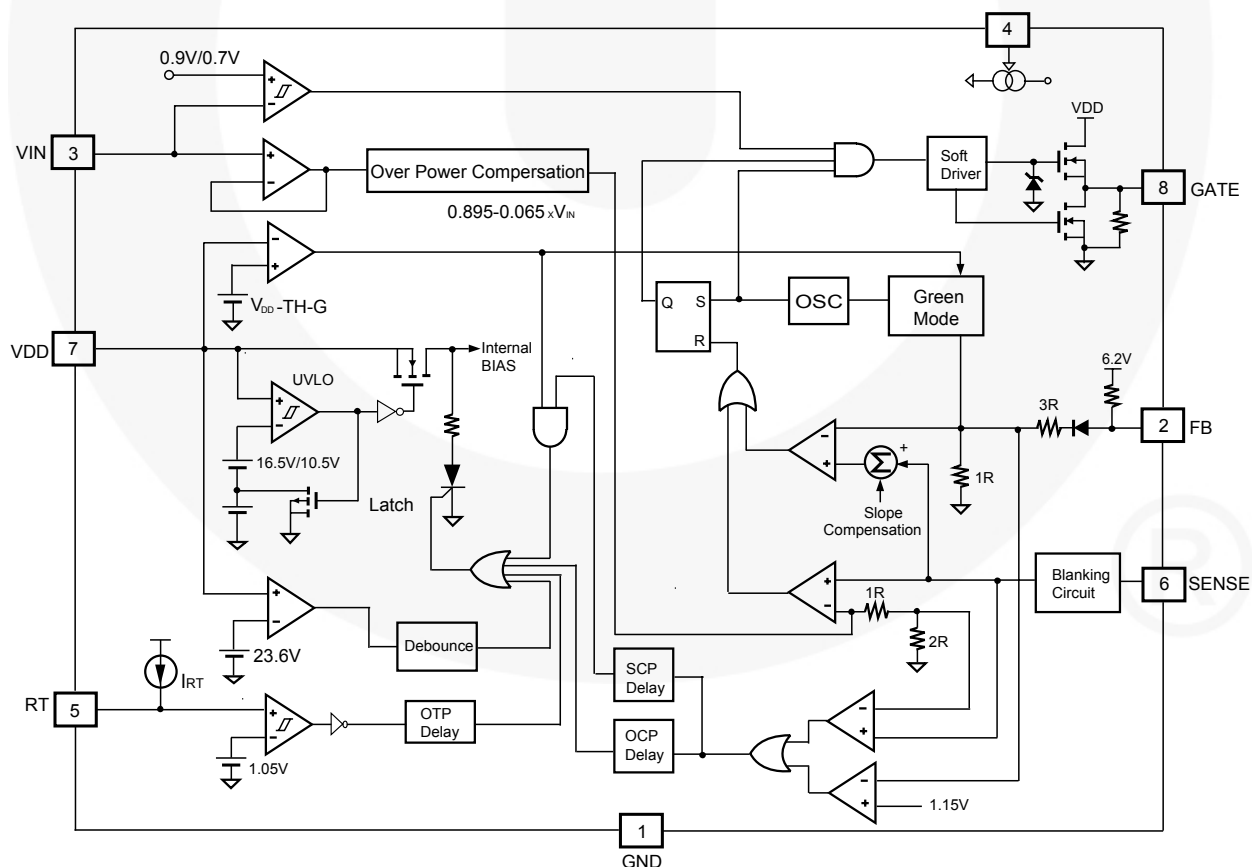


Figure 2. Block Diagram

Marking Information

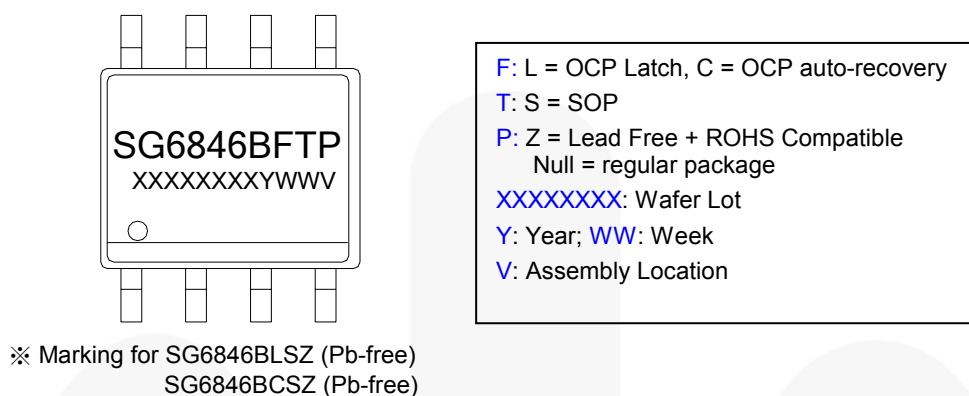


Figure 3. Top Mark 1

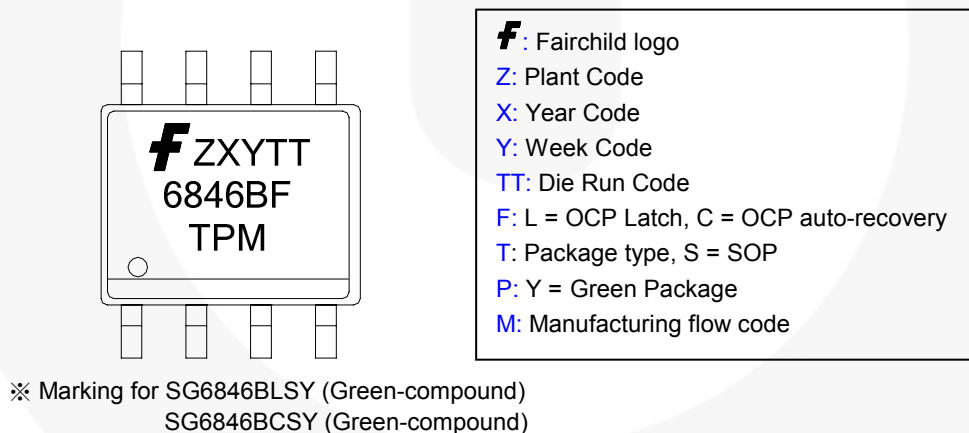


Figure 4. Top Mark 2

Pin Configuration

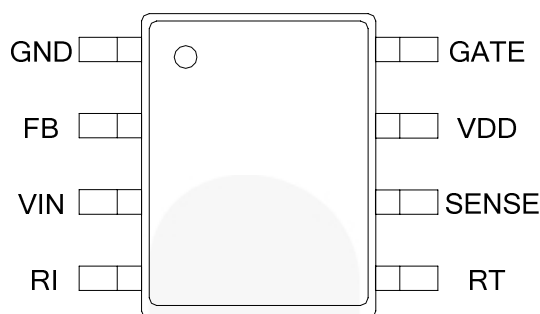


Figure 5. Pin Configuration

Pin Definitions

Pin #	Name	Function	Description
1	GND	Ground	Ground.
2	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 from this pin and the current-sense signal from pin 6.
3	VIN	Line-voltage Detection	Line-voltage detection is used for brownout protection with hysteresis. Constant output power limit over universal AC input range is achieved using this pin. Add a low-pass filter to filter out line ripple on the bulk capacitor.
4	RI	Reference Setting	A resistor from the RI pin to ground generates a reference current source that determines the switching frequency. Increasing the resistance reduces the switching frequency. A 26k Ω resistor results in a 65kHz switching frequency.
5	RT	Temperature Detection	For over-temperature protection, an external NTC thermistor is connected from this pin to the GND pin. The impedance of the NTC decreases at high temperatures. Once the voltage of the RT pin drops below a threshold, PWM output is disabled.
6	SENSE	Current Sense	The sensed voltage is used for peak-current-mode control and cycle-by-cycle current limiting. If the switching current is higher than OCP threshold and lasts for 200ms, SG6846B turns off immediately. This two-level OCP feature is especially suitable for SMPS with surge current output.
7	VDD	Power Supply	If an open-circuit failure occurs in the feedback loop, the internal protection circuit disables PWM output as long as V _{DD} exceeds a threshold.
8	GATE	Driver Output	The totem-pole output driver for the power MOSFET; internally clamped below 18V.

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. All voltage values, except differential voltages, are given with respect to GND pin.

Symbol	Parameter	Min.	Max.	Unit
V _{DD}	Supply Voltage		30	V
V _L	Input Voltage to FB, SENSE, VIN, RT, RI Pins	-0.3	7.0	V
P _D	Power Dissipation at T _A <50°C		400	mW
Θ _{JC}	Thermal Resistance (Junction-to-Case)		54.4	°C/W
T _J	Operating Junction Temperature	-40	+150	°C
T _{STG}	Storage Temperature Range	-65	+150	°C
T _L	Lead Temperature, Wave Soldering, 10 Seconds		+260	°C
ESD	Human Body Model, JESD22-A114		5.0	kV
	Charge Device Model, JESD22-C101		1.5	

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.	Max.	Unit
T _A	Operating Ambient Temperature	-40	+105	°C

Electrical Characteristics

$V_{DD} = 15V$ and $T_A = 25^\circ C$ unless otherwise noted.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{DD} Section						
V_{DD-OP}	Continuously Operating Voltage				20	V
V_{DD-ON}	Turn-on Threshold Voltage		15.5	16.5	17.5	V
V_{DD-OFF}	Turn-off Voltage		9.5	10.5	11.5	V
V_{DD-SCP}	Threshold Voltage on V_{DD} for Short-Circuit Protection		$V_{DD-OFF} + 0.5V$	$V_{DD-OFF} + 1.0V$	$V_{DD-OFF} + 1.5V$	V
V_{DD-LH}	Threshold Voltage for Latch-off Release		3	4	5	V
I_{DD-ST}	Startup Current	$V_{DD-ON} - 0.16V$		8	30	μA
I_{DD-OP}	Operating Supply Current	GATE Open		3.7	5.0	mA
V_{DD-OVP}	V_{DD} Over-Voltage Protection (Latch off)		23	24	25	V
$t_{D-VDDOVP}$	V_{DD} OVP Debounce Time	$R_I = 26k\Omega$		150		μs
I_{DD-OVP}	V_{DD} OVP Latch-off Holding Current	$V_{DD} = 5V$	30	50	70	μA
V_{IN} Section						
V_{IN-OFF}	PWM Turn-off Threshold Voltage		0.65	0.70	0.75	V
V_{IN-ON}	PWM Turn-on Threshold Voltage		$V_{IN-OFF} + 0.18$	$V_{IN-OFF} + 0.20$	$V_{IN-OFF} + 0.22$	V
Feedback Input Section						
A_V	Input-Voltage to Current-Sense Attenuation		1/3.5	1/4.0	1/4.5	V/V
Z_{FB}	Input Impedance		4.0	5.5	7.0	k Ω
V_{FBO}	FB Pin Open Voltage		5.2	6.2	6.6	V
Current Sense Section						
Z_{SENSE}	Input Impedance			12		k Ω
t_{PD}	Delay to Output			100	250	ns
t_{LEB}	Leading-edge Blanking Time		270	360		ns
V_{SLOPE}	Slope Compensation	Duty = DCY_{MAX}	0.30	0.33	0.36	V
V_{STH1V}	Threshold Voltage for Current Limit	$V_{IN} = 1V$	0.80	0.83	0.86	V
V_{STH3V}	Threshold Voltage for Current Limit	$V_{IN} = 3V$	0.67	0.70	0.73	V
$V_{STH1V-2/3}$	OCP Threshold Voltage for Current Limit	$V_{IN} = 1V$	0.58	0.61	0.64	V
$V_{STH3V-2/3}$	OCP Threshold Voltage for Current Limit	$V_{IN} = 3V$	0.48	0.51	0.54	V
t_{D-OCP}	Delay Time for Over-Current Protection	$R_I = 26k\Omega$	175	200	225	ms
$t_{D-Short}$	Output Short Circuit Protection delay time	$V_{CS} > V_{STH}$, $R_I = 26k\Omega$, $V_{DD} < V_{DD-SCP}$	6	7	8	ms
$t_{SS-65KHz}$	Period During Soft Start Time	$R_I = 26k\Omega$	4.5	5.0	5.5	ms
$t_{SS-130KHz}$		$R_I = 13k\Omega$	2.25	2.50	2.75	ms

Continued on following page...

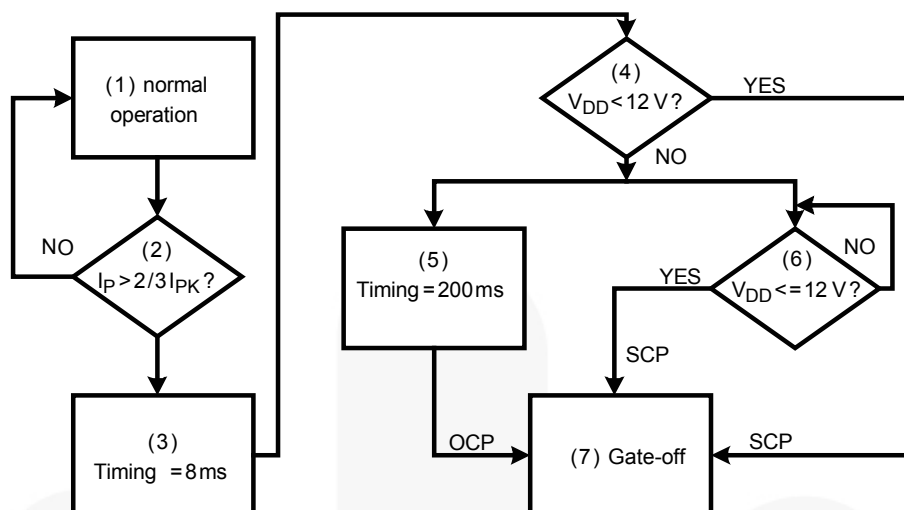


Figure 6. SG6846B OCP/SCP Logic Flow Diagram

Electrical Characteristics (Continued)V_{DD} = 15V and T_A = 25°C unless otherwise noted.

Symbol	Parameter		Test Condition	Min.	Typ.	Max.	Unit
Oscillator Section							
f _{OSC}	Normal PWM Frequency	Center Frequency	R _I = 26kΩ, V _{FB} >V _N	62	65	68	kHz
		Jitter Range		±3.7	±4.2	±4.7	
f _{OSC,MAX}	Maximum PWM Frequency	Center Frequency	R _I = 13kΩ, V _{FB} >V _N	124	130	136	kHz
		Jitter Range		±7.4	±8.4	±9.4	
f _{OSC,MIN}	Minimum PWM Frequency	Center Frequency	R _I = 36kΩ, V _{FB} >V _N	44.8	47.0	49.2	kHz
		Jitter Range		±2.54	±2.90	±3.26	
t _{hop-1}	Jitter Period		R _I = 26kΩ, V _{FB} ≥ V _N	3.9	4.4	4.9	ms
f _{OSC-G}	Green-Mode Minimum Frequency		R _I = 26kΩ	18.0	22.5	25.0	kHz
S _G	Slope for Green-Mode Modulation		R _I = 26kΩ		85		Hz/mV
V _{FB-N}	FB Pin Frequency Reduction Threshold	Pin, FB voltage	R _I = 26kΩ, V _{FB} = V _N	1.9	2.1	2.3	V
		Jitter Range		3.7	4.2	4.7	KHz
V _{FB-G}	FB Voltage at f _{OSC-G}	Pin, FB voltage	R _I = 26kΩ, V _{FB} = V _G	1.4	1.6	1.8	V
f _{DV}	Frequency Variation vs. V _{DD} Deviation		V _{DD} = 11.5V to 20V			5	%
f _{DT}	Frequency Variation vs. Temperature Deviation		T _A = -30 to 85°C		1.5	5.0	%

Continued on following page...

Electrical Characteristics (Continued)V_{DD} = 15V and T_A = 25°C unless otherwise noted.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
PWM Output Section						
DCY _{MAX}	Maximum Duty Cycle		80	85	90	%
V _{OL}	Output Voltage Low	V _{DD} = 15V, I _O = 50mA			1.5	V
V _{OH}	Output Voltage High	V _{DD} = 12V, I _O = 50mA	8			V
t _R	Rising Time	GATE = 1nF		350		ns
t _F	Falling Time	GATE = 1nF		50		ns
V _{CLAMP}	Gate Output Clamping Voltage	V _{DD} = 20V			18	V
Over-Temperature Protection (OTP) Section⁽¹⁾						
I _{RT}	Output Current of RT Pin	R _I = 26kΩ	64	70	76	μA
V _{RTTH}	Threshold Voltage for OTP		1.00	1.05	1.10	V
t _{DOTP-LATCH}	Over-Temperature Latch-off Debounce	SG6846BLSY or SG6846BCSY, R _I = 26kΩ, V _{FB} > V _N		100		ms
		SG6846BLSZ or SG6846BCSZ, R _I = 26kΩ, V _{FB} > V _N		100		μs
R _{RT-OFF}	Equivalent Impedance of RT for OTP ⁽¹⁾	R _I = 26kΩ	14	15	16	kΩ
R_I Section						
R _I NOR	R _I Operating Range		13		36	kΩ
R _I MAX	Maximum R _I Value for Protection		10			MΩ
R _I MIN	Minimum R _I Value for Protection				6	kΩ

Note:

1. The relationship between R_{RT-OFF} and R_I is: $R_{RT-OFF} = V_{OTP-LATCH-OFF} / I_{RT} = V_{RT} / (70\mu A \times 26 / R_I (K\Omega))$ (1)

Typical Performance Characteristics

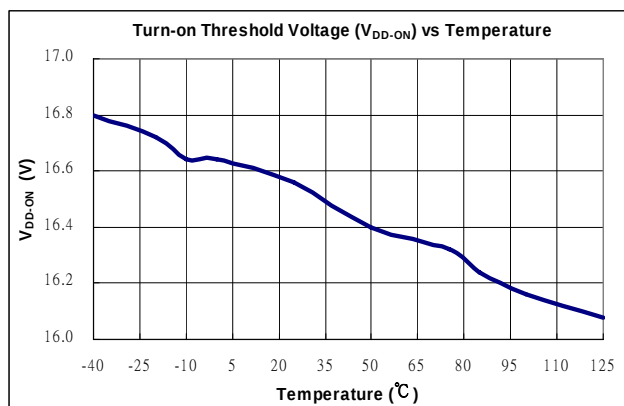


Figure 7. Turn-on Threshold Voltage (V_{DD-ON}) vs. Temperature

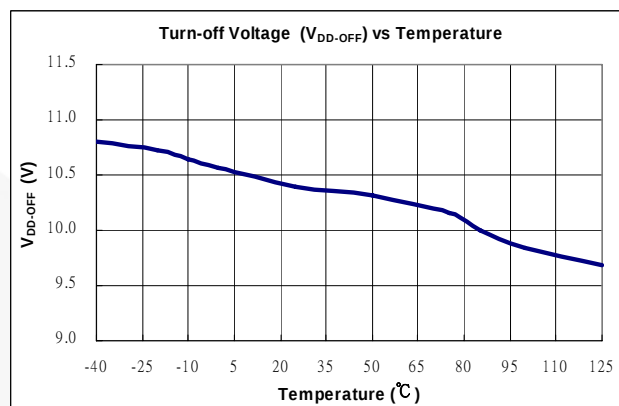


Figure 8. Turn-off Threshold Voltage (V_{DD-OFF}) vs. Temperature

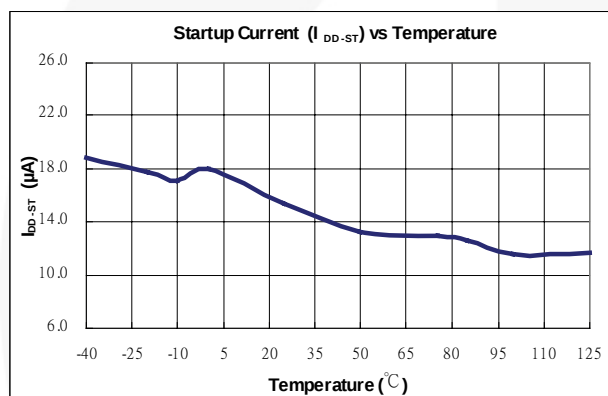


Figure 9. Startup Current (I_{DD-ST}) vs. Temperature

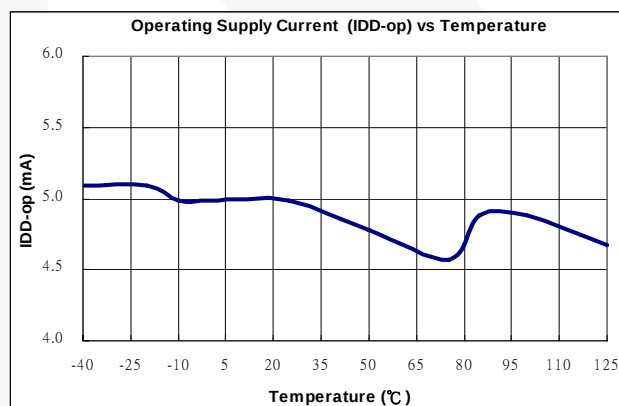


Figure 10. Operating Supply Current (I_{DD-op}) vs. Temperature

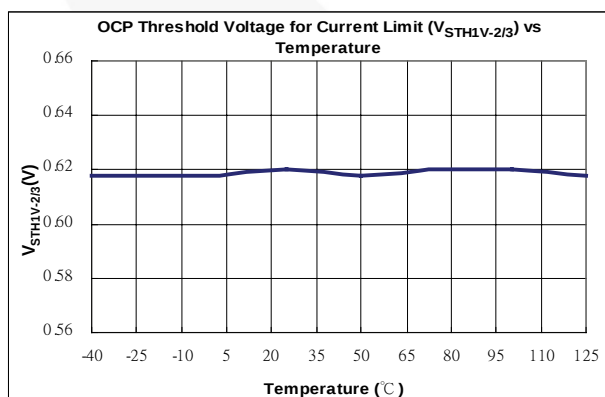


Figure 11. OCP Threshold Voltage for Current Limit ($V_{STH1V-2/3}$) vs. Temperature

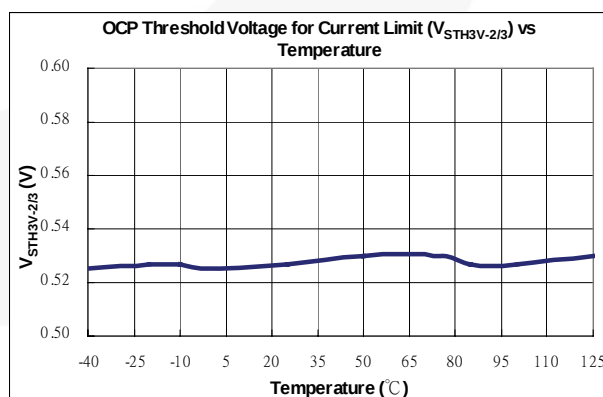


Figure 12. OCP Threshold Voltage for Current Limit ($V_{STH3V-2/3}$) vs. Temperature

Typical Performance Characteristics (Continued)

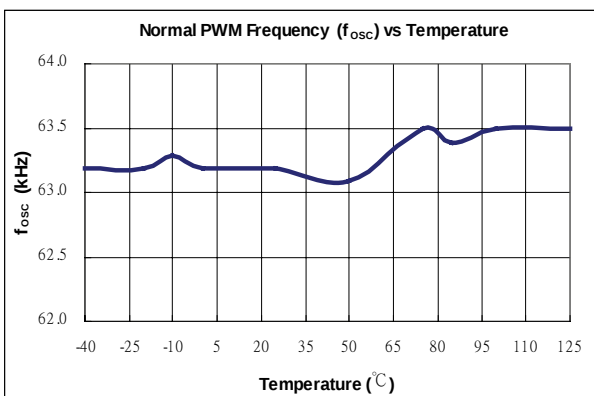


Figure 13. Normal PWM Frequency (f_{osc}) vs. Temperature

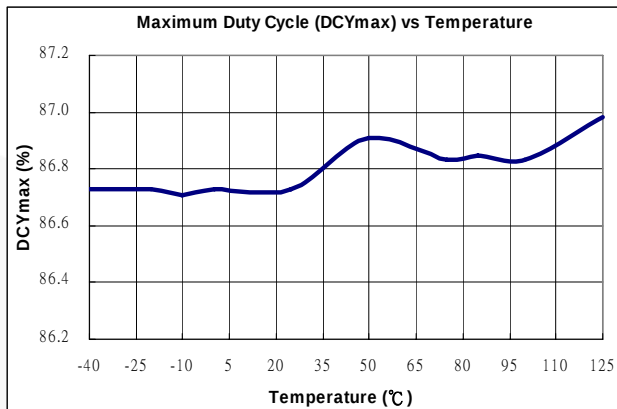


Figure 14. Maximum Duty Cycle (DCY_{max}) vs. Temperature

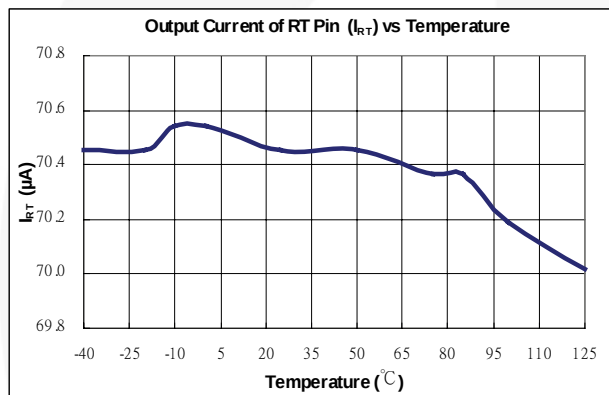


Figure 15. Output Current of RT pin (I_{RT}) vs. Temperature

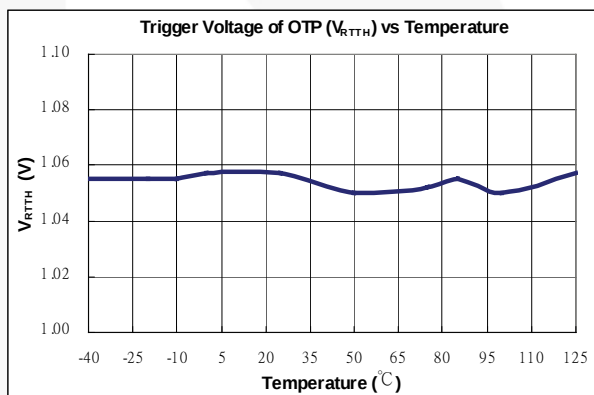


Figure 16. Trigger Voltage of OTP(V_{RTTH}) vs. Temperature

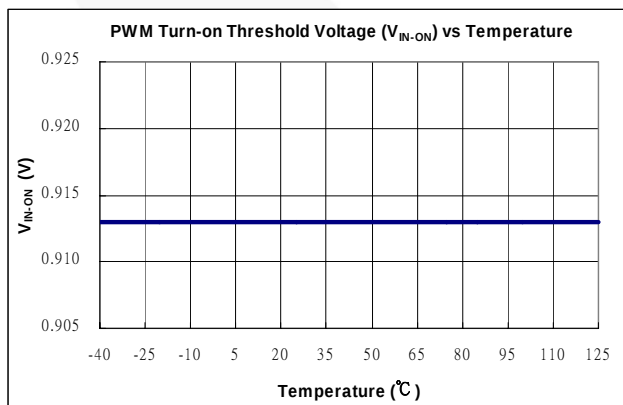


Figure 17. PWM Turn-on Threshold Voltage (V_{IN-ON}) vs. Temperature

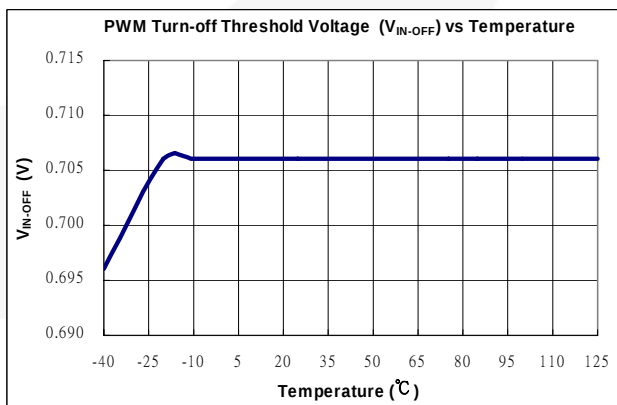


Figure 18. PWM Turn-off Threshold Voltage (V_{IN-OFF}) vs. Temperature

Operation Description

Startup Operation

The turn-on/turn-off thresholds are fixed internally at 16.5V and 10.5V. To enable the SG6846B during startup, the hold-up capacitor must first be charged to 16.5V through the startup resistor.

If an open-circuit or short-circuit to ground occurs at the RI pin, the internal protection circuit immediately shuts down the controller.

The hold-up capacitor continues to supply V_{DD} before energy can be delivered from the auxiliary winding of the main transformer. The V_{DD} must not drop below 10.5V during this startup process. This UVLO hysteresis window ensures that the hold-up capacitor can adequately supply V_{DD} during startup.

The typical startup current is only 8 μ A, which allows a high-resistance, low-wattage startup resistor to be used. For constant output power limit over a universal input-voltage range, the peak-current threshold is adjusted by the voltage of the VIN pin. Since the VIN pin is connected to the rectified AC input line voltage through the resistive divider, a higher line voltage generates a higher V_{IN} voltage. The threshold voltage decreases as the V_{IN} increases, making the maximum output power at high line input voltage equal to that at low line input. The value of R-C network should not be so large it affects the power limit (shown in Figure 19). R and C should put on less than 300 Ω and 1000pF, respectively, to minimize power loss. A 1.5M Ω /0.25W startup resistor and a 10 μ F/25V V_{DD} hold-up capacitor are sufficient for a universal input range.

The required operating current has been reduced to 3.7mA, which enables higher efficiency and reduces the V_{DD} hold-up capacitance requirement.

Green-Mode Operation

The proprietary green-mode function provides off-time modulation to continuously decrease the switching frequency under light-load conditions. Maximum on-time is limited to provide protection against abnormal conditions. To further reduce power consumption under zero-load condition, the PWM oscillator is completely turned off and the power supply enters burst-mode. Green mode dramatically reduces power consumption under light-load and zero-load conditions. Power supplies using SG6846B can meet restrictive international regulations regarding standby power consumption.

Oscillator Operation

A resistor connected from the RI pin to GND generates a internal reference current source used to determine the PWM frequency. Increasing the resistance decreases the amplitude of the current source and reduces the PWM frequency. Using a 26k Ω resistor results in a corresponding 65kHz switching frequency. The relationship between R_I and the switching frequency is:

$$f_{PWM}(kHz) = \frac{1690}{R_I(k\Omega)} \quad (2)$$

If an open-circuit or short-circuit to ground occurs at the RI pin, the internal protection circuit immediately shuts down the controller.

Two-level Over-current Protection (OCP)

The cycle-by-cycle current limiting shuts down the PWM immediately when the switching current is over the peak-current threshold. Additionally, when the switching current is higher than over-current threshold, the internal counter counts down. When the total accumulated counting time is more than ~200ms ($R_I = 26k\Omega$), the controller is latched off and the internal counter counts up. When the switching current is lower than over-current threshold, the internal counter counts down. When the total accumulated counting time is more than ~200ms ($R_I = 26k\Omega$), the controller is latched off.

This two-level OCP protection and up/down counter are especially designed for SMPS with surge current output, such as those for printers, scanners, and motor drivers.

Constant Output Power Limit

For constant output power limit over universal input-voltage range, the peak-current threshold is adjusted by the voltage of the VIN pin. Since the VIN pin is connected to the rectified AC input line voltage through the resistive divider, a higher line voltage generates a higher V_{IN} voltage. The threshold voltage decreases as V_{IN} increases, making the maximum output power at high-line input voltage equal to that at low-line input.

Brownout Protection

Since the VIN pin is connected through a resistive divider to the rectified AC input line voltage, it can also be used for brownout protection. If the V_{IN} voltage is less than 0.7V, the PWM output is shut off. If the V_{IN} is over 0.9V, the PWM output is turned on again. The hysteresis window for on/off is ~0.2V.

V_{DD} Over-voltage Protection (OVP)

V_{DD} over-voltage protection is built in to prevent damage. If V_{DD} is over 24V, SG6846B is latched off.

Over-Temperature Protection (OTP)

An external NTC thermistor can be connected from the RT pin to GND. The impedance of the NTC decreases at high temperatures. When the voltage of the RT pin drops below 1.05V, the SG6846B is turned off. For protection-mode options, see *Ordering Information*.

Operation Description (Continued)

Noise Immunity

Noise from the current sense or the control signal may cause significant pulse-width jitter, particularly in continuous-conduction mode. Slope compensation helps alleviate this problem. Good placement and layout practices should be followed. Avoid long PCB traces and component leads. Compensation and filter components should be located near the SG6846B.

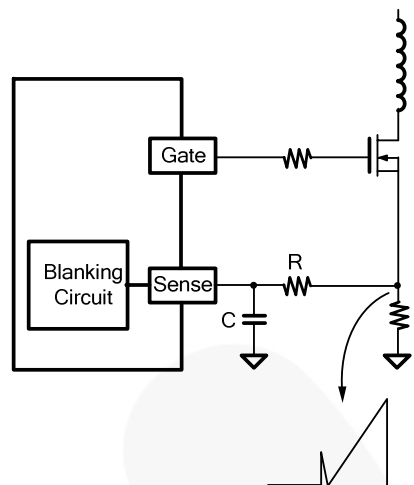


Figure 19. Current Sense R-C Filter

Reference Circuit

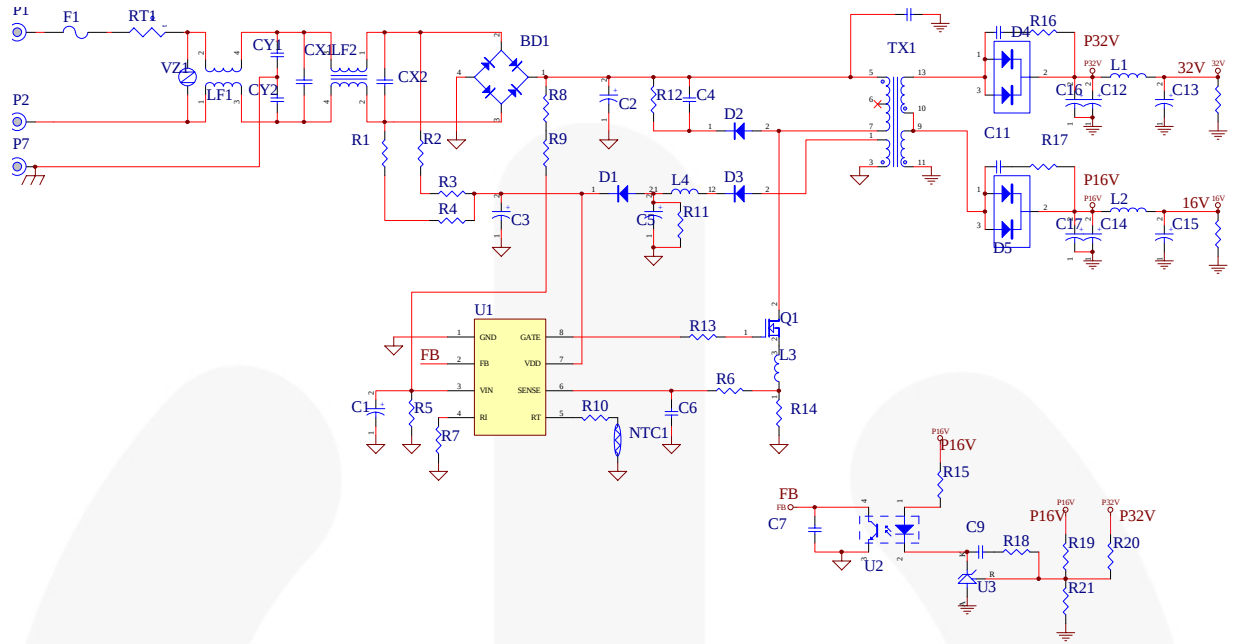


Figure 20. Application Circuit for 32V / 16V Output

BOM

Part No.	Value	Part No.	Value	Part No.	Value
R1, R2, R3, R4	470KΩ +/-5%	C4	103P 630V	D3	FR103 1.0A 200V
R8, R9	51MΩ +/-1%	C10,C11	102P 1KV	BD1	DBL406G
R5	16K2Ω +/-1%	C6,C7	102P 50V	D4	BYT28-300
R15	1K5Ω +/-5%	C9	222P 50V	D5	BYV32-150
R13	10Ω +/-5%	C14,C17	470μ 25V	F1	250V4A QUICK
R18	4K7Ω +/-5%	C15	220μ 25V	L1,L2	1.8μH
R21	15KΩ +/-1%	C13,C16	220μ 50V	L4	10μH
R7	27KΩ +/-5%	C2	150μ 400V	U3	TL431 +/-1%
R6	330Ω +/-1%	C1	4.7μ 50V	U1	SG6846
R19	102KΩ +/-1%	C3	10μ 50V	U2	PC817
R14	0Ω22 +/-5%	CX1	X1 0.47μ 275V	Q1	7NB60
R16, R17	1W 20Ω +/-5%	C8	Y2 222P 250V	TX1	EI-33
R11	20KΩ +/-5%	C5	100μ 50V	RT1	SCK053
R12	100KΩ +/-5%	CX2	X2 0.1μF 275V	VZ1	14ψ 470V
R20	887KΩ +/-1%	D1	1N4148		
R22	10KΩ +/-1%	D2	BYV95C		

Physical Dimensions

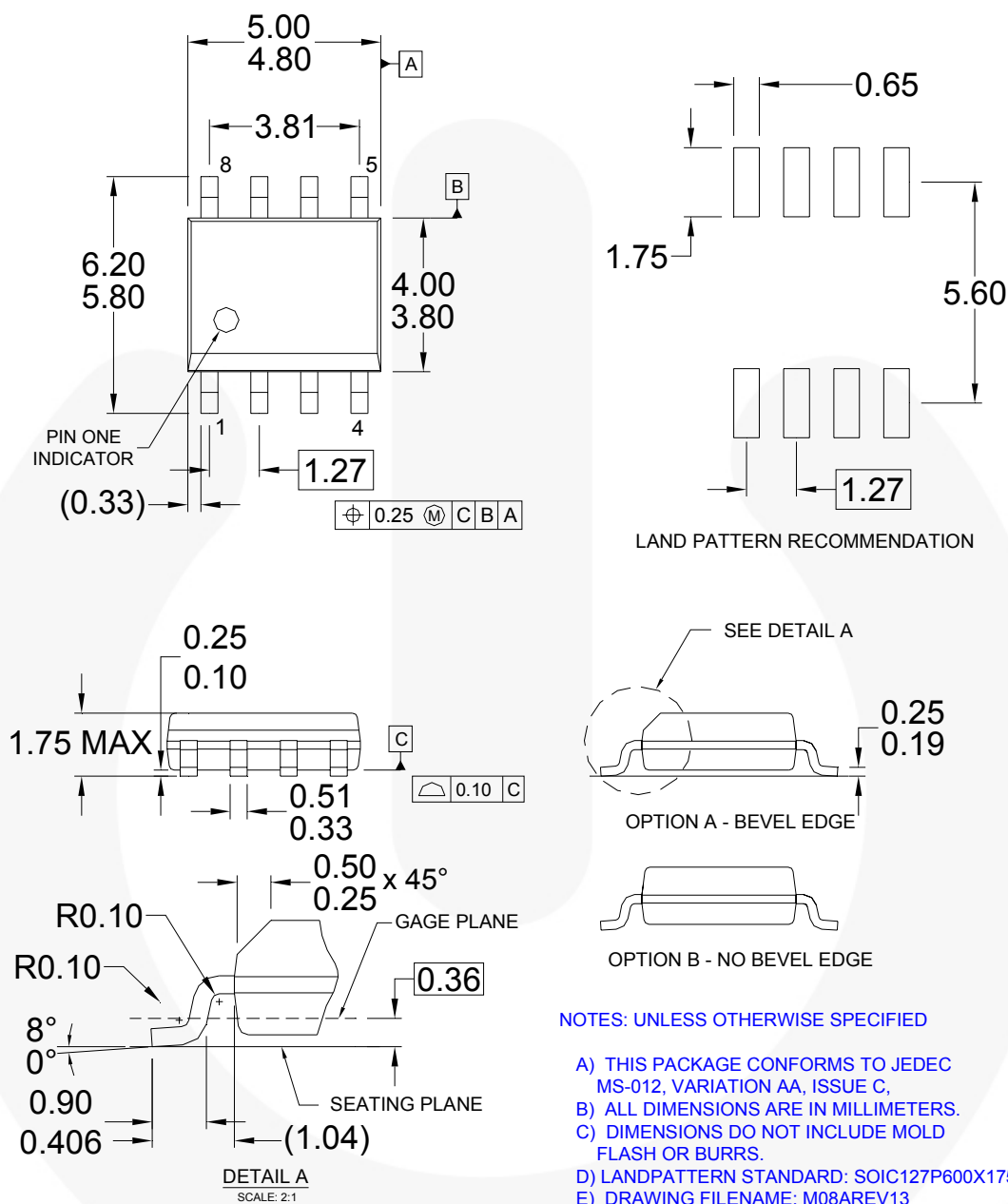


Figure 21. 8-Pin Small Outline Package (SOP)

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/>



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.

Build it Now™
 CorePLUS™
 CorePOWER™
 CROSSVOLT™
 CTL™
 Current Transfer Logic™
 EcoSPARK®
 EfficientMax™
 EZSWITCH™ *


 Fairchild®
 Fairchild Semiconductor®
 FACT Quiet Series™
 FACT®
 FAST®
 FastvCore™
 FlashWriter® *
 FPS™
 F-PFS™

FRFET®
 Global Power Resource™
 Green FPST™
 Green FPST™ e-Series™
 GTO™
 IntelliMAX™
 ISOPLANAR™
 MegaBuck™
 MICROCOUPLER™
 MicroFET™
 MicroPak™
 MillerDrive™
 MotionMax™
 Motion-SPM™
 OPTOLOGIC®
 OPTOPLANAR®
 PDP SPM™
 Power-SPM™
 PowerTrench®
 PowerXS™

Programmable Active Droop™
 QFET®
 QST™
 Quiet Series™
 RapidConfigure™

 Saving our world, 1mW/W/kW at a time™
 SmartMax™
 SMART START™
 SPM®
 STEALTH™
 SuperFET™
 SuperSOT™.3
 SuperSOT™.6
 SuperSOT™.8
 SupreMOS™
 SyncFET™

 The Power Franchise®

the power franchise
 TinyBoost™
 TinyBuck™
 TinyLogic®
 TINYOPTO™
 TinyPower™
 TinyPWM™
 TinyWire™
 μSerDes™

 UHC®
 Ultra FRFET™
 UniFET™
 VCX™
 VisualMax™
 XS™

* EZSWITCH™ and FlashWriter® are 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. 137