Power With Intelligence

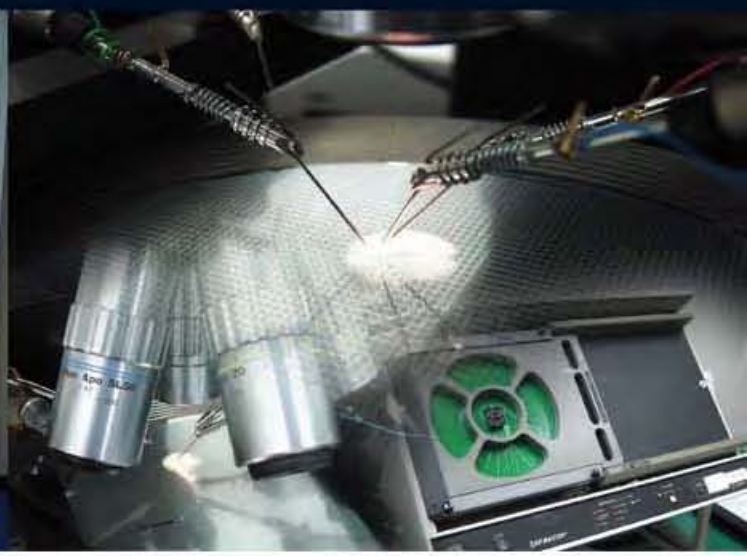
Power IC Solutions
Empower Your Systems

- ATX SMPS Supervisor & Combo ICs
- Green Mode PWM ICs for High-Watt Power Supplies
- Green Mode PWM ICs for Low-Watt Power Supplies
- Power Factor Correction Control ICs
- Rectifier Control ICs

SYSTEM GENERAL

http://www.sg.com.tw e-mail:info@sg.com.tw

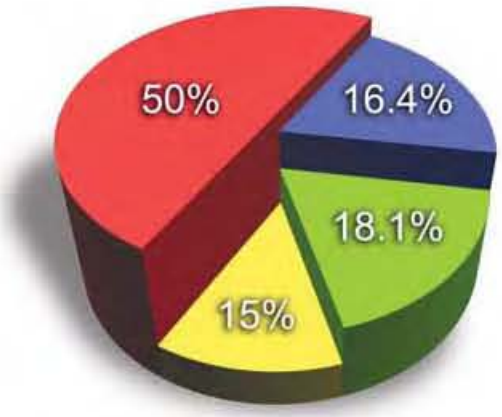
We Strive Hard to Help Customers Succeed



Research and Development

Research & Development is System General's core business. System General actively recruits talented individuals to continually strengthen its R&D capabilities. Each year, System General devotes a significant percentage of its sales revenue to R&D. About half of all employees work in Research & Development or a related field.

This commitment to R&D enables us to continue introducing innovative products while improving our existing solutions. In addition, System General has already acquired more than thirty patents worldwide. A dozen new patent applications are currently pending. We expect to apply for more than fifty new patents in the near future.



50% of employees work in R&D

- R&D
- Sales & Marketing
- Administration
- Manufacturing

Manufacturing and Testing

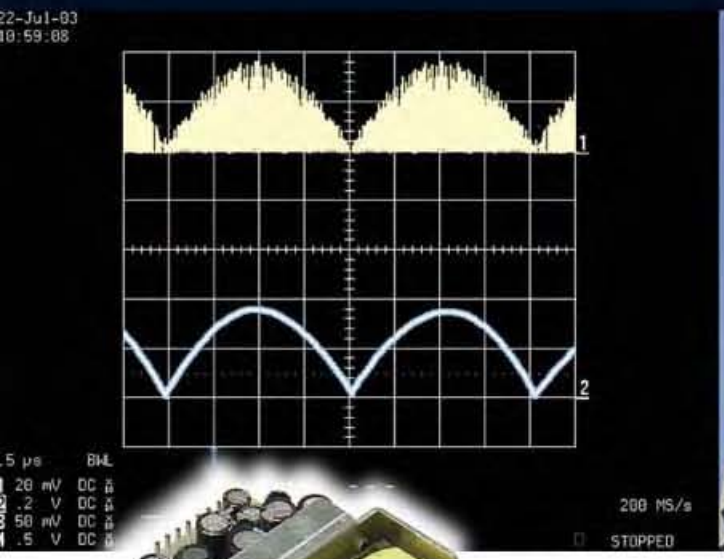
System General's customers benefit from high quality, low cost, and on-time delivery. Our dedicated manufacturing quality control and quality assurance teams are comprised of people with years of experience in their fields. System General carefully selects qualified vendors to be its manufacturing partners.

All products are thoroughly verified and tested prior to release. Periodic monitoring ensures the highest levels of quality and reliability. At System General, quality assurance starts at the design stage and continues throughout the entire product lifecycle. System General is an ISO-9001 certified company.


SGS United Kingdom Ltd
Yarsley International Certification Services

Q11652

System General Corp.
Taipei Hsien, Taiwan, R.O.C.



Technical Support

System General has been in the power supply business for over ten years. System General's vast experience with power systems includes technical support as well as design. Our in-house power supply design practice has been certified by the Taiwanese Air Force, for its commitment to excellence.

To help customers easily integrate our Power ICs into their systems, each product comes with comprehensive technical documentation, including a quality & reliability report, a datasheet, and application notes.

Additionally, System General's technical support team prepares demo boards ready for implementation prior to full-scale production. This step lets customers test their System General solution before manufacturing. Detailed design guides are well documented and released to customers for reference purposes. Customized IC design support services are also available with all products upon request.

Logistics and Services

System General fully understands that logistics management is crucial to the supply chain. SG's priority is conforming to customer requirements in a cost-effective manner.

That's why every step of the business cycle, from manufacturing, to inventory control, to distribution, is handled with the utmost care. System General employees in R&D, production, marketing, sales, and support services all follow strict quality control guidelines, so that we can continue to provide our customers with defect-free products. System General strongly believes in the slogan "The Key to Quality is in the Process".

Power IC Solutions
For a Wide Variety of Applications

ATX Switching Power Supplies

Switch Mode Power Supplies (SMPS) are used by many different applications, among which desktop PCs (ATX SMPS) form the largest segment. SG offers a wide range of controller products well suited to the requirements of ATX SMPS systems.

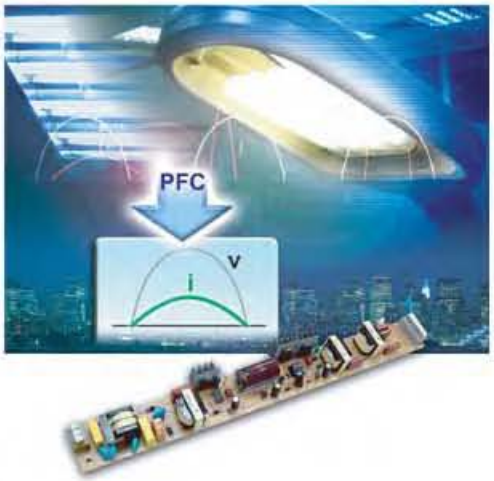
The SG6105 controller is specifically designed for desktop PC Switch Mode Power Supplies. It consists of a PWM controller, monitoring supervisor circuitry, and two shunt regulators enabling integration with Half-Bridge ATX Switching Power Supplies. The SG6510 is cost-effective and function-rich solutions for desktop PCs. They provide comprehensive functionality for switching power systems. The SG5701 and the SG6849 are designed to meet the 5V standby power needs of ATX SMPS systems.

Open Frame Power Supplies

Open Frame supplies are traditionally used by household electrical appliances, such as LCD TV, Plasma display TV, and office automatic machine, such as copier, printer, fax machine, projector, LCD monitors or multi function copiers. System General offers a broad selection of versatile controllers to meet the increasing demand for Open Frame power supplies. Together, the SG6841, SG6841J, SG6842J, and the SG6846 series give customers a wide range of options for fulfilling their needs of output power over 35watt.

Power Adapters/ Battery Chargers

The SG5701 and the SG6849 are excellent solutions for battery chargers used in devices such as cellular phones, cordless phones, PDAs, and digital cameras. They are also ideal for Flyback converters used by ink jet printers, DVD, set top box, video game consoles, HUBs, routers, portable audio players, and as a replacement for RCC Switch Mode Power Supplies. Compared with traditional linear transformers, these Switching Power Converters are smaller in size, lighter in weight, and more efficient.



Power Factor Correctors

System General's SG6561, SG6931, SG6902 are boundary-mode ICs for controlling PFC pre-regulators. With PFC ICs, the power factor of a power system can be dramatically increased. The input peak current and harmonic are reduced such that the stress of AC power line is released. A standard power supply has a power factor of 0.70-0.75, while a power supply with active power factor correction (PFC) has a power factor of 0.95-0.99.

Power ICs for ATX Switch Mode Power Supplies

Part Number	SG6105	SG6510	SG6515
Function	PWM + Supervisor + Regulator	Supervisor	Supervisor+OCP
Over Voltage Protection (OVP)	YES/3.3V, 5V,12V	YES/3.3V, 5V,12V	YES/3.3V, 5V,12V
Under Voltage Protection (UVP)	YES/3.3V, 5V,12V	YES/3.3V, 5V	YES/12V, 5V,3.3V
Under Voltage Sense (UVS)	YES/3.3V,5V,12V	YES/3.3V,5V	NO
Negative Voltage Short Protect	YES	NO	NO
Over Power Protection (OPP)	YES	NO	NO
OVP Delay Time	0.7ms	75us	75us
UVP Delay Time	2.4ms	2ms	2ms
Brown Out UVP	NO	YES	YES
No Lockup During Fast AC ON/OFF	YES	YES	YES
Absolute Maximum Vcc	16V	16V	16V
TL431	YES/ x2	NO	NO
PWM	YES	NO	NO
Remote ON/OFF	YES	YES	YES
PG Delay Time	300ms	300ms	300ms
Package	20-pin DIP	8-pin DIP, 8-pin SOP	8-pin DIP, 8-pin SOP
Page Number	P7	P5	P6

Off-Line PWM/PFM ICs for Lower Wattage Power Supplies

Part Number	SG5701	SG6849
Low Start-up Current	< 30uA	< 10uA
PWM Frequency w/Ri=95kohm	70kHz	65kHz no Ri
Maximum Duty Cycle	75%	75%
No Load Low Frequency	Linear decreased	Linear decreased
Leading Edge Blanking	YES	YES
Built-in Slope Compensation	YES	YES
Built-in AC Line Constant Power	YES	YES
Over Temperature Protection	NO	150°C sensor
Good Regulation w/o Feedback	NO	YES
PWM Output Voltage Clamping	YES/16V	YES/16V
Absolute Maximum Vcc	25V	25V
Built-in Surge Protector	YES/28V	YES/28V
High Reliability BiCMOS Process	BiCMOS	BiCMOS
Direct Opto-Coupler Feedback	YES	YES
VDD Over Voltage Protection	YES	YES
Package	6-pin SOP,8-pin DIP	8-pin DIP, SOT-26
Page	P12	P13

Off-Line PWM/PFM ICs for Higher Wattage Power Supplies

Part Number	SG6841	SG6841J	SG6842J	SG6846
Low Start-up Current	< 30uA	< 30uA	< 10uA	< 10uA
PWM Frequency	R programmable	R programmable	R programmable	R programmable
No Load Low Frequency	Linear decreased	Linear decreased	linear + burst	linear + burst
Leading Edge Blanking	YES	YES	YES	YES
Built-in Slope Compensation	YES	YES	YES	YES
Built-in AC Line Constant Power	YES	YES	YES	YES
Built-in Short Circuit Protection	YES	YES	YES	YES
Soft Gate Driver	YES	YES	YES	YES
Over Tempearture Protection	RT programmable	RT programmable	RT programmable	RT programmable
Absolute Maximum Vcc	25V	25V	25V	25V
Built-in Surge Protector	YES/28V	YES/28V	YES/28V	YES/28V
High Reliability BiCMOS Process	BiCMOS	BiCMOS	BiCMOS	BiCMOS
PWM Output Voltage Clamping	YES/18V	YES/18V	YES/18V	YES/18V
AC Input Brown Out Protection	NO	NO	NO	YES
Over Current Limit	YES	YES	YES	YES (Latch)
Direct Opto-Coupler Feedback	YES	YES	YES	YES
Built-in Latch Circuit	NO	NO	YES	YES
VDD Over Voltage Protection	NO	NO	YES	YES
Frequency Hopping		YES	YES	NO
Package	8-pin SOP 8-pin DIP	8-pin SOP 8-pin DIP	8-pin SOP 8-pin DIP	8-pin SOP 8-pin DIP
Page	P8	P9	P10	P11

Boundary Mode PFC+PWM Controller for Higher Wattage Power Supplies

Part Number	SG6902 (PFC + Flyback)	SG6931 (PFC + Forward)
Low Start-up Current	< 20uA	< 20uA
PWM Frequency w/Ri=24kohm	65kHz	65kHz
Maximum Duty Cycle of PWM	<83%	Programmable
Power On Frequency	PWM => PFC	PFC => PWM
Soft Start	YES	YES
Interleaved PFC/PWM switching	YES	YES
Programmable Two-level PFC Output Voltage	YES	NO
Open Loop Protection	YES, 56msec	YES, 95msec
Over Temperature Protection	YES	YES
PFC Over/Under Voltage Protection	YES	YES
Brownout Protection with hysteresis	YES	YES
Slope Compensation	YES	YES
Package	20-pin DIP/SSOP	20-pin DIP/SOP
Page	P15	P16

Boundary Mode PFC Controller for Ballasts and Flyback Converters

Part Number	SG6961
Low Start-up Current	< 20uA
Vcc OVP	YES
Max. CS limit	0.8V
PFC Over/Under Voltage Protection	YES
ZCD Disable	YES
Leading Edge Blanking	YES
Package	8-pin DIP/80P
Page	P14

Secondary Synchronized Rectifier Controller for Flyback Converters

Part Number	SG6203
Operating VDD Range	6~20V
CCM & DCM Operation	YES
Suitable for Fixed and Variable Frequency	YES
Package	8-pin DIP/SOP
Page	P17

SG6510
PC Power Supply Supervisors

Features Overview

- Over-voltage protection (OVP) for 3.3V, 5V and 12V
- Under-voltage sense (UVS) and protection (UVP) for 3.3V, 5V
- Open drain output for PGO and FPO pins
- 300mS power good delay
- 75mS turn on delay for 3.3V and 5V
- 2.8mS PSON control to FPO turn-off delay
- 38mS /38mS PSON control De-bounce
- 350uS width noise deglitches
- 2mS UVP De-bounce time
- 1mS UVS De-bounce time
- No lockup during the fast AC power on/off
- Brownout protection function for 3.3V and 5V
- Wide supply voltage range from 4V to 15V

Introduction

The SG6510 is designed to provide the voltage supervisor function, remote on/off PSON function, power good (PGO) indicator function, and fault protection (FPO) function for switching power systems. For supervisor function, it provides the over voltage protection (OVP) monitoring for 3.3V, 5V and 12V (12V via VDD pin); under voltage sense (UVS) monitoring for 3.3V and 5V; and under voltage protection (UVP) monitoring for 3.3V and 5V. When 3.3V or 5V voltage is decreasing to 2.8V and 4.2V respectively, the under voltage sense (UVS) function will be enabled to reset the PGO signal from high to low. If 3.3V or 5V voltage is further decreasing to 2.5V and 3.6V respectively, FPO will be set to high to turn off the PWM controller IC. To achieve better immunity for lighting surge glitch and to prevent accidental power shut down during dynamic loading condition, the de-bounce time for UVP and UVS is 2mS/1mS respectively. The deglitch time for OVP is 75uS for better noise immunity. During AC sag or brownout situation, the UVP functions still can be enabled to protect power supply in case of output short circuit. The power supply is turned on after 38mS de-bounce time when PSON signal is set from high to low. To turn off power supply, PSON signal is set from low to high and the de-bounce time is 38mS. The PGI circuitry provides a sufficient power-down warning signal for PGO. When PGI input is lower than the internal 1.2V reference voltage, after 350uS de-bounce time, the PGO signal is pulled low.

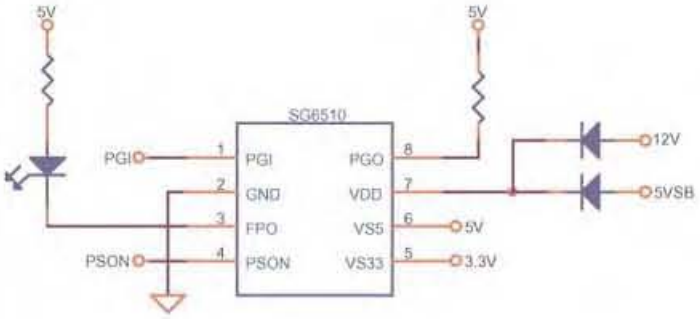
Applications

- ATX Power Supplies
- NLX Power Supplies
- SFX (micro-ATX) Power Supplies

Ordering Information

Part Number	Package Type
SG6510DZ1	8 pins DIP (Lead Free)
SG6510SZ1	8 pins SOP (Lead Free)

Block Diagram



SG6515
PC Power Supply Supervisors

Feature Overview

- Two 12V sense input pins: VS12 and VS12B
- Over Voltage Protection (OVP) for 3.3V, 5V and two 12V
- Over Current Protection (OCP) for 3.3V, 5V and two 12V
- Under Voltage Protection (UVP) for 3.3V, 5V and two 12V
- Open drain output for PGO and FPO pins
- 300mS power good delay
- 300mS turn on delay for 3.3V, 5V and two 12V
- 2.8mS PSON control to FPO turn-off delay
- 38mS PSON control delay
- No lockup during the fast AC power on/off
- Wide supply voltage range from 4V to 15V

Introduction

The SG6515 is designed to provide the voltage, and current supervisor function, remote on/off (PSON) function, power good (PGO) indicator function, and fault protection (FPO) function for switching power systems.

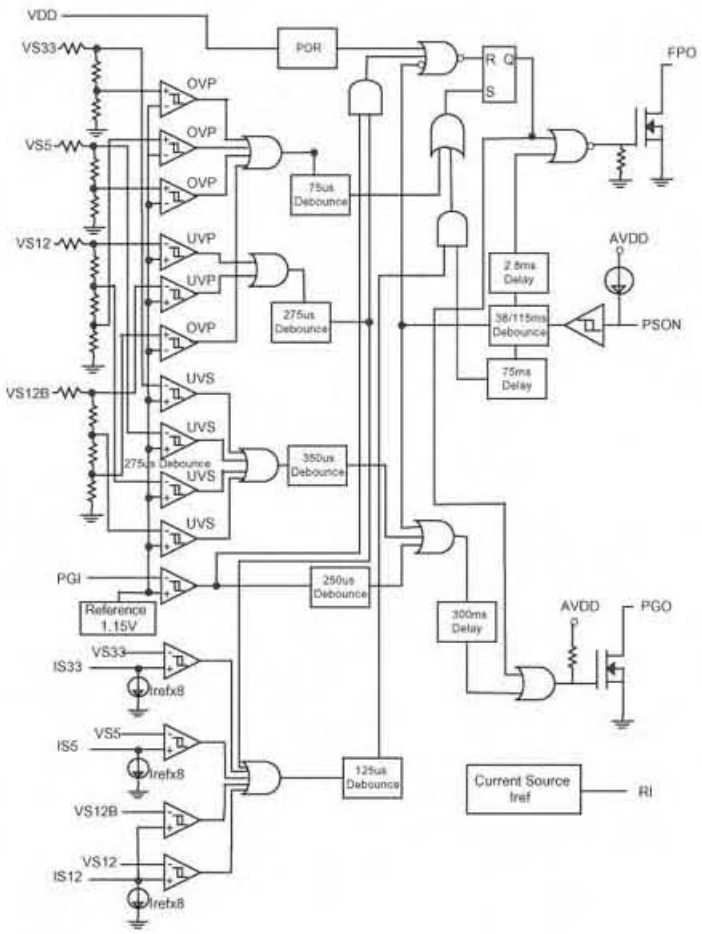
For supervisor function, it provides the over voltage protection (OVP) for 3.3V, 5V and two 12V; over current protection (OCP) for 3.3V, 5V and two 12V; under voltage protection (UVP) for 3.3V, 5V and two 12V When 3.3V, 5V or 12V voltage is decreasing to 2.3V, 3.5V and 9V respectively, the under voltage protection (UVP) function will be enabled. FPO will be set to high to turn off the PWM controller IC. The voltage difference across external current shunt is used for OCP functions. An external resistor can be used to adjust protection threshold.

The power supply is turned on after 38mS delay time when PSON signal is set from high to low. To turn off power supply, PSON signal is set from low to high with the delay time 38mS. The PGI circuitry provides a power-down warning signal for PGO. When PGI input is lower than the internal 1.15V reference voltage, PGO signal is pulled low.

Ordering Information

Part Number	Package Type
SG6515DZ	14 pin DIP Plastic (Lead Free)
SG6515SZ	14 pin SOIC Plastic (Lead Free)

Block Diagram



SG6105
Power Supply Supervisor + Regulator + PWM

Features Overview

- PC Half-bridge (or 494) Power Supply Supervisor + Two 431 + PWM
- High Integration & Few External Components
- Over-Voltage Protection for 3.3V, 5V and 12V
- Under-Voltage Protection for 3.3V, 5V and 12V
- Under-Voltage Protection for -12V and/or -5V
- Over-power and Short-Circuit Protection
- Power-down Warning Circuitry
- Power Good Circuitry
- Delay Time for PSON and PG Signal
- Remote ON/OFF Function
- On-chip Oscillator and Error Amplifier
- Two Shunt Regulator for 3.3V and 5V-Standby
- Latching PWM for Cycle-by-Cycle Switching
- Push-pull PWM Operation and Totem Pole Outputs
- Soft-start and Maximum 93% Duty Cycle

Introduction

The SG6105 controller is designed for switching mode power supply for desktop PCs. It provides all the functions necessary to monitor and control the output of the power supply. Remote ON/OFF control, power good circuitry, some protection features against over-voltage and over-power are implemented. It directly senses all the output rails for OVP without the need of external dividers. An innovated AC-signal sampling circuitry provides a sufficient power-down warning signal for PG. A built-in timer generates accuracy timing for control circuit including the PS-off delay. The cycle-by-cycle PWM switching prevents the power transformer from the saturation and ensures the fastest response for the short-circuit protection which greatly reduce the stress for power transistors. Two internal precision TL431 shunt regulators provide stable reference voltage and driver for 3.3V and 5V-standby regulation. Utilizing minimum number of external components, the SG6105 includes all of the functions for push-pull and / or half-bridge topology, decreasing the production cost and PCB space, and increasing the MTBF for power supply.

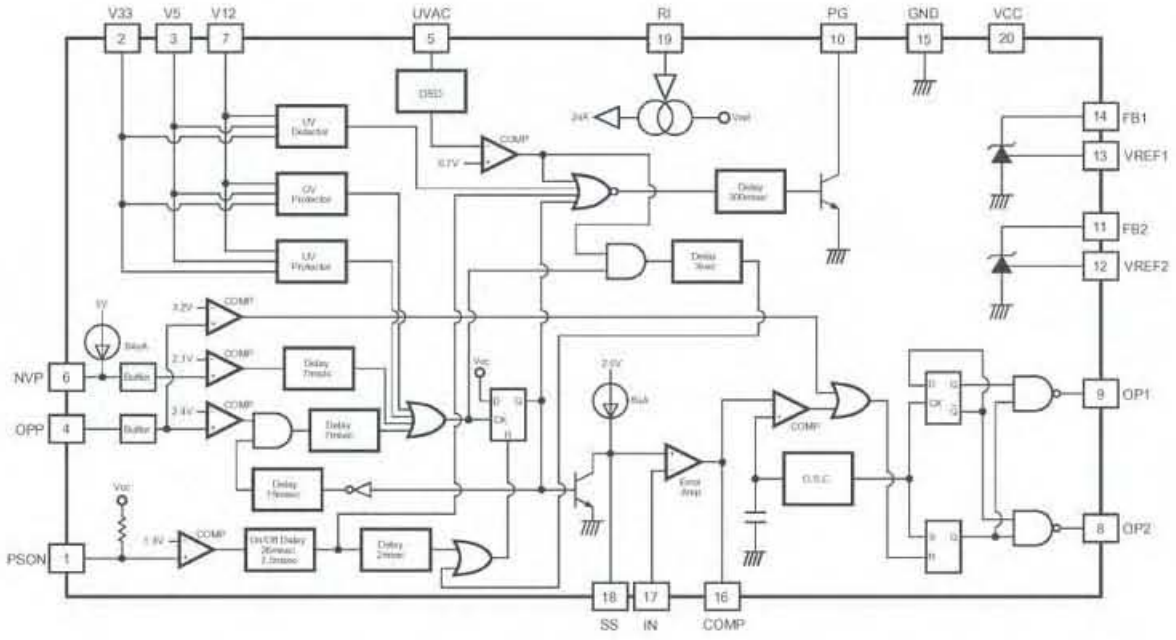
Applications

- ATX Power Supplies
- NLX Power Supplies
- SFX (micro-ATX) Power Supplies

Ordering Information

Part Number	Package
SG6105DZ	20-pin DIP (Lead Free)

Block Diagram



SG6841
Highly-Integrated Green Mode PWM Controller

Feature Overview

- Green-mode PWM to support "Blue Angel" Norm
- Low start up current 30uA
- Low operation current 3mA
- Leading-edge blanking
- Built-in synchronized slope compensation
- Constant output power limit for universal AC input
- Current mode operation
- Cycle-by-cycle current limiting
- Under voltage lockout (UVLO)
- Programmable PWM frequency
- GATE output maximum voltage clamped at 18V
- Totem pole output includes soft driving for better EMI
- Build-in limited-power-control to meet safety requirement
- Programmable over-temperature protection
- Few external components & low cost solution

Introduction

This highly integrated PWM controllers, SG6841 series, provides several features to enhance the performance of low power flyback converters. To minimize standby power consumption, the proprietary green-mode function provides off-time modulation to linearly decrease the switching frequency under light-load conditions. This green-mode function assists the power supply to easily meet the power conservation requirement. Due to BiCMOS process, the start-up current and operation current is reduced to 30uA and 3mA, respectively, to improve power conversion efficiency. Large start-up resistance can be used for further power saving. Built-in synchronized slope compensation ensures the stability of peak current mode control. A proprietary internal compensation ensures constant output power limit for universal AC input voltage from 90VAC to 264VAC.

SG6841 provides many protection functions. Pulse by pulse current limit ensures a constant output current under short circuit. If a short circuit failure or over load happens, the SG6841 will shut off after a continuous high voltage detection on FB pin. The gate output is clamped at 18V to protect the power MOS from over voltage damage.

An external NTC thermistor can be applied to sense the ambient temperature for over-temperature protection. The SG6841 series are available in 8-pin DIP and SOP packages.

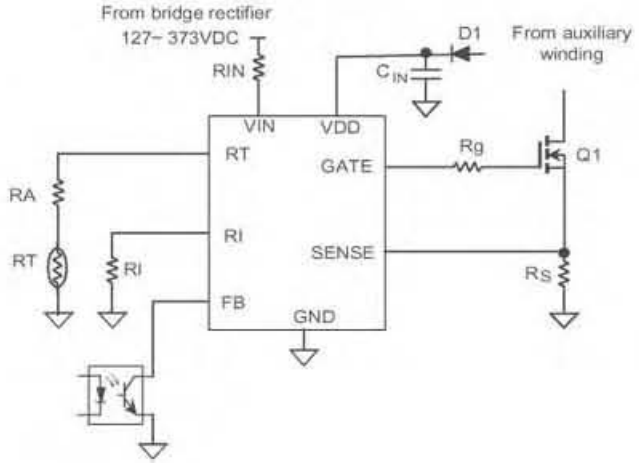
Applications

- Power Adapters
- Open Frame SMPS
- Battery Charger Adapters

Ordering Information

Part Number	Package
SG6841SZ	8-Pin SOP(Lead Free)
SG6841DZ	8-Pin DIP(Lead Free)

Typical Application



SG6841J
Highly-Integrated Green-Mode PWM Controller

Features Overview

- Continuously Decreasing PWM Frequency
- Low Start-Up Current (8uA)
- Low Operating Current (4mA)
- Peak-current-mode Control
- Cycle-by-Cycle Current Limiting
- Programmable PWM frequency with Hopping
- Leading-Edge Blanking
- Synchronized Slope Compensation
- Constant Power Limit (Full AC Input Range)
- Totem Pole Output with Soft Driving
- Programmable Over Temperature Protection (OTP)
- Internal Open-loop Protection
- VDD Under-voltage Lockout (UVLO)
- GATE Output Maximum Voltage Clamp (18V)

Introduction

The highly integrated SG6841J series of PWM controllers provides several features to enhance the performance of flyback converters. To minimize standby power consumption, a proprietary green-mode function provides off-time modulation to continuously decrease the switching frequency at light-load conditions. This green-mode function enables the power supply to easily meet international power conservation requirements. To further reduce power consumption, SG6841J is manufactured by using the BiCMOS process. This allows the lowest start-up current around 8uA, and the operating current is only 4mA. As a result, large start-up resistance can be used. SG6841J's built-in synchronized slope compensation achieves stable peak-current-mode control. The proprietary internal line compensation ensures constant output power limit over a wide AC input voltages, from 90VAC to 264VAC. SG6841J provides many protection functions. In addition to cycle-by-cycle current limiting, the internal open-loop protection circuit ensures safety should an open-loop or output-short-circuit failure occur. PWM output is disabled till VDD drops below the UVLO lower limit. Then, the controller starts up again. For OTP, an external NTC thermistor can be applied for over-temperature protection. SG6841J is available in an 8-pin DIP or SOP package.

Applications

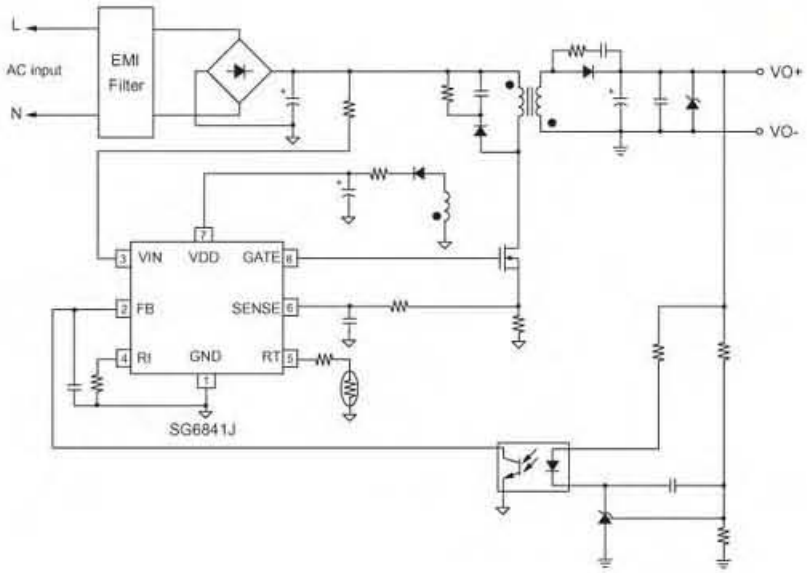
General-purpose switch-mode power supplies and flyback power converters, including:

- Power Adapters
- Open-Frame SMPS

Ordering Information

Part Number	Package
SG6841JSZ	8-Pin SOP (Lead Free)
SG6841JDZ	8-Pin DIP (Lead Free)

Block Diagram



SG6842J
Highly-Integrated Green-Mode PWM Controller

Feature Overview

- ■•Green-mode PWM Controller
- ■•Low Start-Up Current (8uA)
- ■•Low Operating Current (4mA)
- ■•Programmable PWM frequency with Jittering
- ■•Peak-current-mode Operation
- ■•Cycle-by-Cycle Current Limiting
- ■•Synchronized Slope Compensation
- ■•Leading-Edge Blanking
- ■•Constant Output Power Limit (Full AC Input Range)
- ■•VDD Over Voltage Protection (OVP)
- ■•Programmable Over Temperature Protection (OTP)
- ■•Internal Latch Circuit (OTP, OVP) Options
- ■•Internal Open-loop Protection

Introduction

The highly integrated SG6842J series of PWM controllers provides several features to enhance the performance of flyback converters. To minimize standby power consumption, a proprietary green-mode function provides off-time modulation to continuously decrease the switching frequency at light-load conditions. To avoid acoustic-noise problem, the minimum PWM frequency set above 20kHz. This green-mode function enables the power supply to easily meet international power conservation requirements. To further reduce power consumption, SG6842J is manufactured by using the BiCMOS process. This allows the lowest start-up current around 8uA, and the operating current is only 4mA. As a result, large start-up resistance can be used. SG6842J integrates frequency jittering function internally. The frequency jittering function helps reduce EMI emission of a power supply with minimum line filters. Also, its built-in synchronized slope compensation achieves stable peak-current-mode control. The proprietary internal line compensation ensures constant output power limit over a wide AC input voltages, from 90VAC to 264VAC. SG6842J provides many protection functions. In addition to cycle-by-cycle current limiting, the internal open-loop protection circuit ensures safety should an open loop or output short-circuit failure occurs. PWM output is disabled till VDD drops below the UVLO lower limit. Then, the controller starts up again.

As long as VDD exceeds about 24V, the internal OVP circuit is triggered. An external NTC thermistor can be applied for over-temperature protection. For OVP and OTP, the protection mode can be chosen to be latch off or auto recovery. SG6842J is available in an 8-pin DIP or SOP package.

Applications

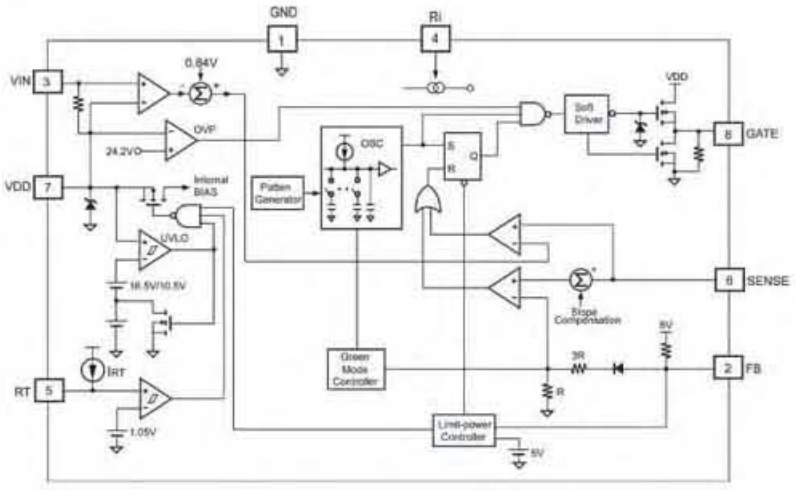
General-purpose switch mode power supplies and flyback power converters, including:

- Notebook Power Adapters
- Open-Frame SMPS

Ordering Information

Part Number	OTP Latch	Package
SG6842JLSZ	YES	8-Pin SOT(Lead Free)
SG6842JLDZ	YES	8-Pin DIP(Lead Free)
SG6842JCSZ	NO	8-Pin SOT(Lead Free)
SG6842JCDZ	NO	8-Pin DIP(Lead Free)

Typical Application



SG6846
Highly-Integrated Green-Mode PWM Controller

Features Overview

- Two-level OCP with 96ms delay time
- Peak-current-mode operation with cycle-by-cycle current limiting
- PWM frequency continuously decreasing w/ burst mode at light loads
- Low start-up current (8uA)
- Low operating current (3.7mA)
- VDD over-voltage protection (OVP)
- AC input brownout protection with hysteresis
- Programmable over-temperature protection (OTP)
- Constant power limit over universal AC input range
- Internal latch circuit for OTP, OVP, OCP
- Very few external components

Introduction

The highly integrated SG6846 series of PWM controllers provides several features to enhance the performance of flyback 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. Then, the output restarts just before the supply voltage, VDD, drops below the UVLO voltage. This green-mode function enables the power supply to easily meet international power conservation requirements.

To further improve standby power consumption, the SG6846 series is manufactured using the BiCMOS process. This allows the start-up current to be reduced to 80uA, and the operating current to be reduced to 3.7mA. A higher start-up resistance can be used to increase power saving. Built-in synchronized slope compensation ensures the stability of peak-current-mode control. Proprietary internal compensation ensures constant output power limiting over a range of AC input voltages from 90VAC to 264VAC.

The SG6846 is especially designed for SMPS with surge-current output. It incorporates a two-level OCP function. In addition to cycle-by-cycle current limiting, if the switching current is higher than 2/3 of the peak-current threshold for longer than 96ms, over-current protection activates such that the SG6846 will shutdown.

There are several other protection functions. AC input brownout protection with hysteresis ensures safe operation.

PWM output is disabled as long as VDD voltage exceeds 23.6V. The gate output is Aclamped at 18V to protect the power MOS from over-voltage damage.n external NTC thermistor can be applied to sense the ambient temperature for over-temperature protection. When OTP, OCP or VDD over voltage faults are detected, an internal latch circuit is used to latch-off the controller. The latch resets when the VDD supply is removed.

The SG6846 series controllers are available in both 8-pin DIP and SO packages.

Applications

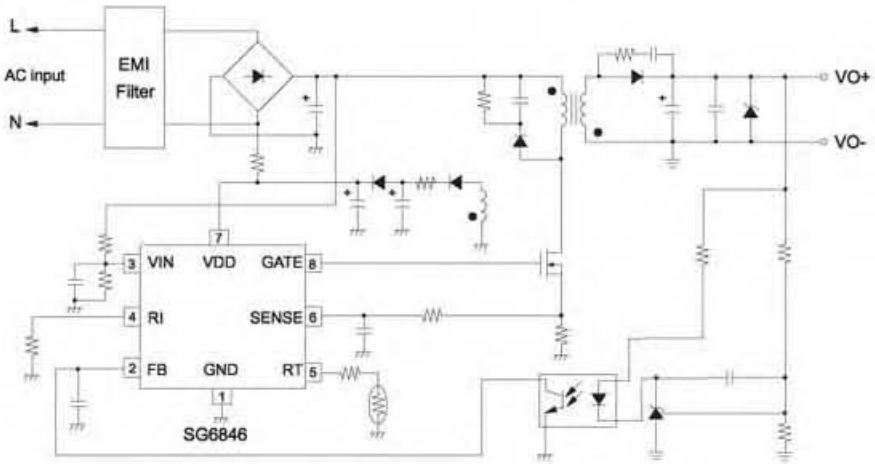
General-purpose switch mode power supplies and flyback power converters, including:

- Power Adapters
- Open frame SMPS
- Specifically suited for an SMPS with surge current output, such as a printer, scanner or motor driver.

Ordering Information

Part Number	OTP Latch	Hysteresis OTP	Package
SG6846LSZ	V		8Pin SOP (Lead Free)
SG6846LDZ	V		8Pin DIP (Lead Free)
SG6846CSZ		V	8Pin SOP (Lead Free)
SG6846CDZ		V	8Pin DIP (Lead Free)

Typical Application



SG5701
Low Cost Green-Mode PWM Controller for Flyback Converters

Feature Overview

- ■•Green-Mode PWM
- ■•Supports the "Blue Angel" Standard
- ■•Low Start-up Current (10uA)
- ■•Low Operating Current (2mA)
- ■•Leading-Edge Blanking
- ■•Constant Output Power Limit
- ■•Universal Input
- ■•Built-in Synchronized Slope Compensation
- ■•Current Mode Operation
- ■•Cycle-by-cycle Current Limiting
- ■•Under Voltage Lockout (UVLO)
- ■•Programmable PWM Frequency
- ■•Gate Output Voltage Clamped at 17V
- ■•Low Cost
- ■•Few External Components Required
- ■•Small SOT-26 Package

Introduction

This highly-integrated PWM controller provides several special enhancements designed to meet the low standby-power needs of low-power SMPS. To minimize standby power consumption, the proprietary green-mode function provides off-time modulation to linearly decrease the switching frequency under light-load conditions. This green-mode function enables the power supply to easily meet even the strictest power conservation requirements.

The BiCMOS fabrication process enables reducing the start-up current to 10uA, and the operating current to 2mA. To further improve power conservation, a large start-up resistance can be used. Built-in synchronized slope compensation ensures the stability of peak current mode control. Proprietary internal compensation provides a constant output power limit over a universal AC input range (90VAC to 264VAC). Pulse-by-pulse current limiting ensures safe operation even during short-circuits.

To protect the external power MOSFET from being damaged by supply over voltage, the SG5701's output driver is clamped at 17V. SG5701 controllers can be used to improve the performance and reduce the production cost of power supplies. The SG5701 is the best choice for replacing linear and RCC-mode power adapters.It is available in 8-pin DIP and 6-pin SOT-26 packages.

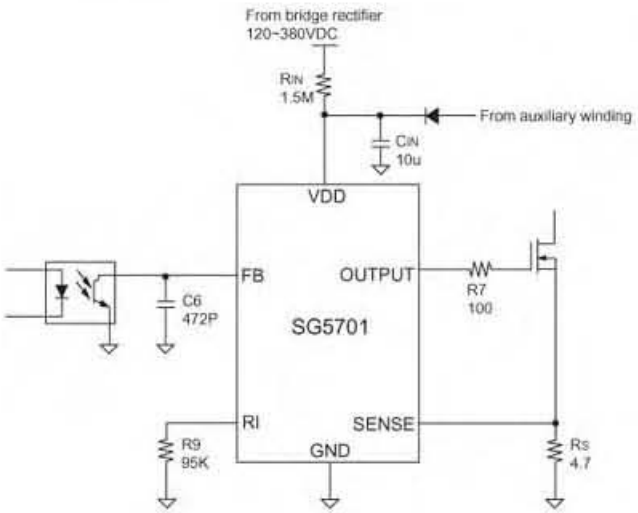
Applications

- Flyback Power Converters
- Power Adapters
- Open Frame SMPS
- Battery Charger Adapters
- PC 5V Standby Power

Ordering Information

Part Number	PWM Frequency	Package
SG5701TZ	70KHZ	6-Pin SOT-26(Lead Free)
SG5701DZ	70KHZ	8-Pin DIP-8(Lead Free)

Typical Application



SG6849
Small-Scale Low-Power Green Mode PWM Flyback Power Controller

Features Overview

- Linearly Decreasing PWM Frequenc
- Green-Mode under Light-Load and Zero-Load Conditions
- Constant Voltage (CV) and Constant Current (CC)
- No Secondary Feedback
- Low Startup Current (5uA)
- Low Operating Current (3.6mA)
- Leading-Edge Blanking
- Constant Power Limit
- Universal AC Input Range
- Synchronized Slope Compensation
- 150oC OTP Sensor with Hysteresis
- VDD Over Voltage Clamping
- Cycle-by-Cycle Current Limiting
- Under Voltage Lockout (UVLO)
- Fixed PWM Frequency (65kHz)
- Gate Output Maximum Voltage Clamped at 16.7V
- Small SOT-26 Package

Introduction

This highly integrated PWM controller, the SG6849, provides several features to enhance the performance of low power flyback converters. To minimize standby power consumption, the proprietary green-mode function provides off-time modulation to linearly decrease the switching frequency under light-load conditions. This green-mode function enables the power supply to easily meet international power conservation requirements.

The supply voltage VDD is also used for primary feedback compensation, to regulate the output voltage without requiring a conventional TL431 and a photo-coupler. Another advantage of the SG6849 is that the typical start-up current is only 5uA, while the typical operating current can be as low as 3.6mA. A large start-up resistance can be used for even higher power conversion efficiency.

Built-in synchronized slope compensation maintains the stability of peak current-mode control. Proprietary internal compensation ensures constant output power limiting for a universal range of AC input voltages, from 90VAC to 264VAC.

The SG6849 provides many protection functions. Pulse-by-pulse current limiting ensures a constant output current, even if a short circuit occurs. Also, the internal protection circuit will disable PWM output, if VDD exceeds 22.7V. The gate output is clamped at 16.7V to protect the power MOS from over-voltage damage.

The built-in over temperature protection (OTP) function will shutdown the controller at 150°C with a hysteresis.
The SG6849 is designed to provide a low-cost total solution for flyback converters. It is available in a small footprint, 6-pin SOT-26 package.

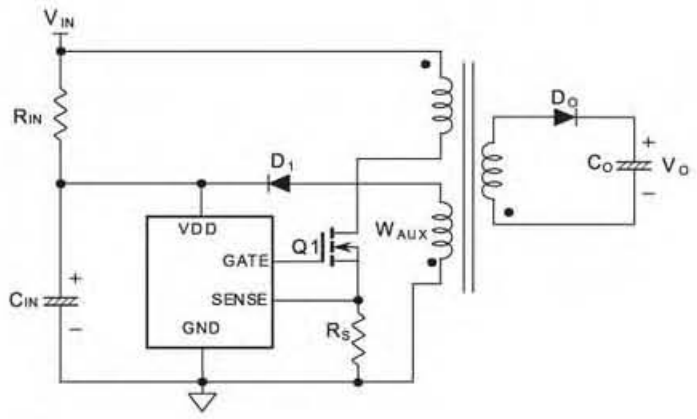
Applications

- Flyback Power Converters
- Power Adapters
- Open Frame SMPS
- Battery Charger Adapters
- PC 5V Standby Power

Ordering Information

Part Number	PWM Frequency	Package
SG6849S-65TZ	65kHz	6-Pin SOT-26 (Lead Free)
SG6849S-65DZ	65kHz	6-Pin DIP-8 (Lead Free)

Typical Application



SG6961
Boundary Mode PFC Controller

Features Overview

- Boundary Mode PFC Controller
- Low Input Current THD
- Controlled On-Time PWM
- Zero-Current Detection
- Cycle-by-Cycle Current Limiting
- Leading-Edge Blanking instead of RC Filtering
- Low Start-up Current (10uA TYP.)
- Low Operating Current (4.5mA TYP.)
- Feedback Open Loop Protection
- Programmable Maximum On-Time (MOT)
- Output Over-Voltage Clamping Protection
- Clamped Gate Output Voltage 16.5V

Introduction

The SG6961 is an 8-pin boundary mode PFC controller IC intended for controlling PFC pre-regulators. The SG6961 has many new features. It provides a controlled on-time to regulate the output DC voltage and achieve natural power factor correction. The maximum on-time of the external switch is programmable to ensure safe operation during AC brownouts.

An innovative multi-vector error amplifier is built in to provide rapid transient response and precise output voltage clamping. A built in circuit will disable the controller if the output feedback loop is opened. The start up current is lower than 20uA and the operating current has been shrunk to under 4.5mA. The supply voltage can be up to 20 volts, maximizing application flexibility.

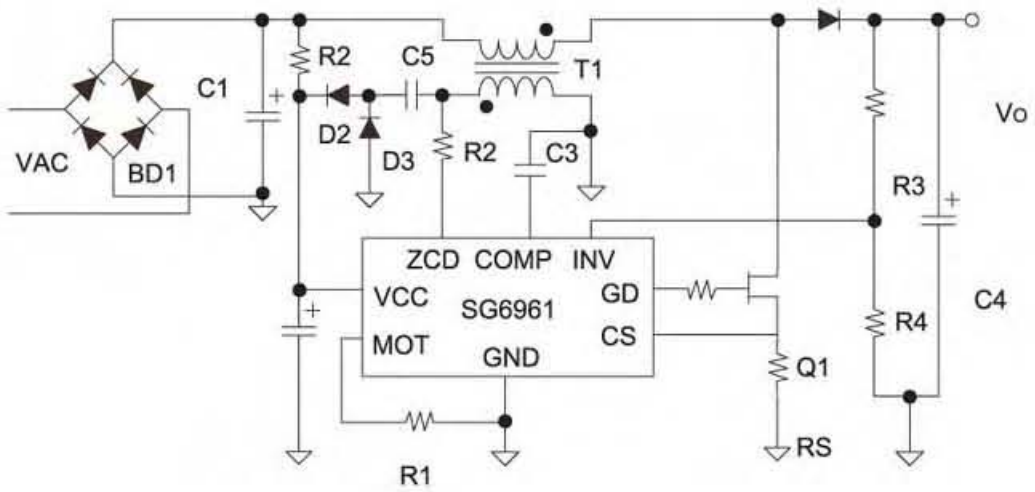
Applications

- Electric Lamp Ballasts
- AC-DC Switching Mode Power Converter
- Open Frame Power Supplies and Power Adapters
- Flyback Power Converters with ZCS/ZVS

Ordering Information

Part Number	Package
SG6961SZ	8-Pin SOP (Lead Free)
SG6961DZ	8-Pin DIP-26 (Lead Free)

Typical Application



SG6902
Boundary Mode PFC Controller +PWM

Features Overview

- Green-mode PFC and PWM operation
- No switching of PFC at light loads for the best power saving
- Low start-up and operating current
- Innovative Switching-Charge.multiplier-divider
- Multi-vector control for improved PFC output transient response
- Interleaved PFC/PWM switching
- Programmable two-level PFC output voltage
- Average-current-mode control for PFC
- Cycle-by-cycle current limiting for PFC/PWM
- PFC over-voltage and under-voltage protections
- PFC and PWM feedback open-loop protection
- Brownout protection
- Over-temperature protection

Introduction

The highly integrated SG6902 is specially designed for power supplies consist of boost PFC and Flyback PWM. It requires very few external components to achieve green-mode operation and versatile protections. It is available in 20-pin SOP and SSOP packages.

The patented interleave-switching feature synchronizes the PFC and PWM stages and reduces switching noise. At light loads, the switching frequency is continuously decreased to reduce power consumption. If output loading is further reduced, the PFC stage is turned off to further reduce power consumption.

For PFC stage, the proprietary multi-vector control scheme provides a fast transient response in a low-bandwidth PFC loop, in which the overshoot and undershoot of the PFC voltage are clamped. If the feedback loop is broken, the SG6902 will shut off PFC to prevent extra-high voltage on output. Programmable two-level output voltage control will reduce the PFC output voltage at low line input to increase the efficiency of the power supply.
For the Flyback PWM, the synchronized slope compensation ensures the stability of the current loop under continuous-conduction-mode operation.

Built-in line-voltage compensation maintains constant output-power limit. Hiccup operation during output overloading is also guaranteed. In addition, SG6902 provides complete protection functions such as brownout protection and RI pin open/short protections.

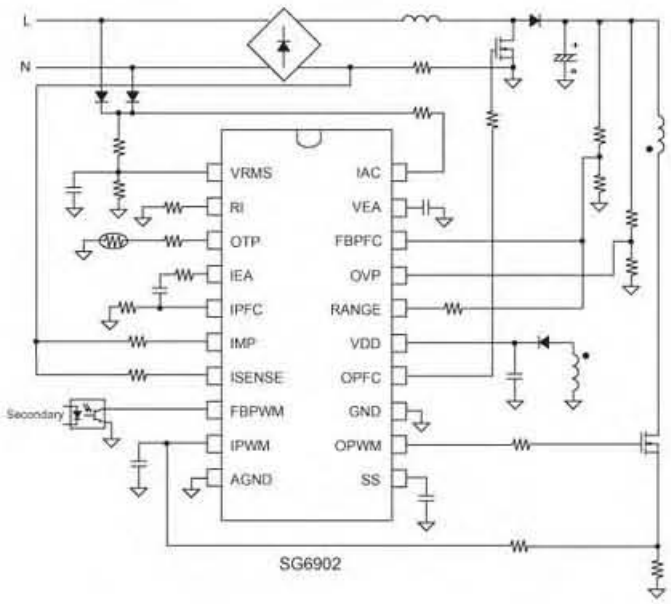
Applications

- Switching Power Suppliers with Active PFC
- High-Power Adaptors

Ordering Information

Part Number	Package
SG6902SZ	20-Pin SOP(Lead Free)
SG6902RS	20-Pin SOP(Lead Free)

Typical Application



SG6931
Boundary Mode PFC Controller +PWM

Features Overview

- Interleaved PFC/PWM switching
- Green mode PFC and PWM operation
- Low operating current
- Innovative Switching-Charge. multiplier-divider
- Multi-vector control for improved PFC output transient response
- Average-current-mode for input-current shaping
- PFC over-voltage and under-voltage protections
- PFC and PWM feedback open-loop protection
- Cycle-by-cycle current limiting for PFC/PWM
- Slope compensation for PWM
- Programmable PWM maximum duty cycle
- Power on sequence control and soft-start
- Brownout protection

Introduction

The highly integrated SG6931 is specially designed for power supplies consist of boost PFC and Forward PWM. It requires very few external components to achieve green-mode operation and versatile protections/compensation. It is available in 20-pin DIP and SOP packages.

The patented interleave-switching feature synchronizes the PFC and PWM stages and reduces switching noise. At light load, the switching frequency is continuously decreased to reduce power consumption. For PFC stage, the proprietary multi-vector control scheme provides a fast transient response in a low-bandwidth PFC loop, in which the overshoot and undershoot of the PFC voltage are clamped. If the feedback loop is broken, SG6931 will shut off to prevent extra-high voltage on output.

For the Forward PWM stage, the synchronized slope compensation ensures the stability of the current loop under continuous-conduction-mode operation. Hiccup operation during output overloading is guaranteed. The soft start and programmable maximum duty cycle ensure safe operation.

In addition, SG6931 provides complete protection functions such as brownout protection and RI open/short protection.

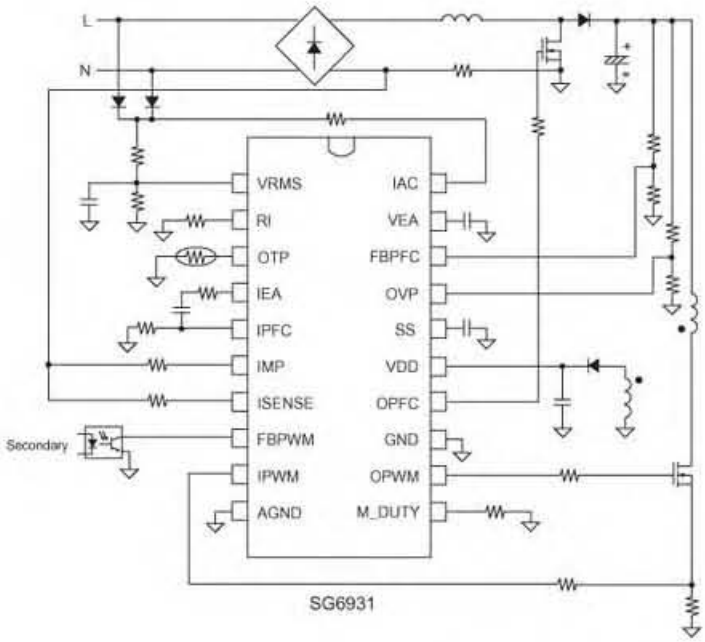
Applications

- Switch mode Power Suppliers with Active PFC
- Servo System Power Supplies
- PC-ATX Power Supplies

Ordering Information

Part Number	Package
SG6931DZ	20-Pin PDIP(Lead Free)
SG6931SZ	20-Pin SOP(Lead Free)

Typical Application



SG6203
Secondary Synchronized Rectifier

Features Overview

- Low operation current (1.7mA)
- One resistor for timing setting
- Internal automatic tracking for optimum dead time
- No reverse energy flow at light load
- Best suited for primary green mode PWM IC
- Wide supply voltage range from 6V to 20V
- Built in 18V Zener diode
- Optional current sensing
  - Current shunt
  - RC network for better efficiency

Introduction

The SG6203 is designed to control and drive the synchronous rectifier for the flyback converter. The synchronous signal of the primary switch is obtained by a single diode connected between the transformer secondary winding and the SG6203. Using the SG6203, no additional transformer winding is required and the circuit complexity can be minimized.

No matter, the power unit is operated under discontinuous conduction mode (DCM) or continuous conduction mode (CCM), the SG6203 can operate properly. The so called "shoot through" or "cross conduction" problem in CCM and the energy reverse problem from the secondary to the primary in DCM will not happen.

Applications

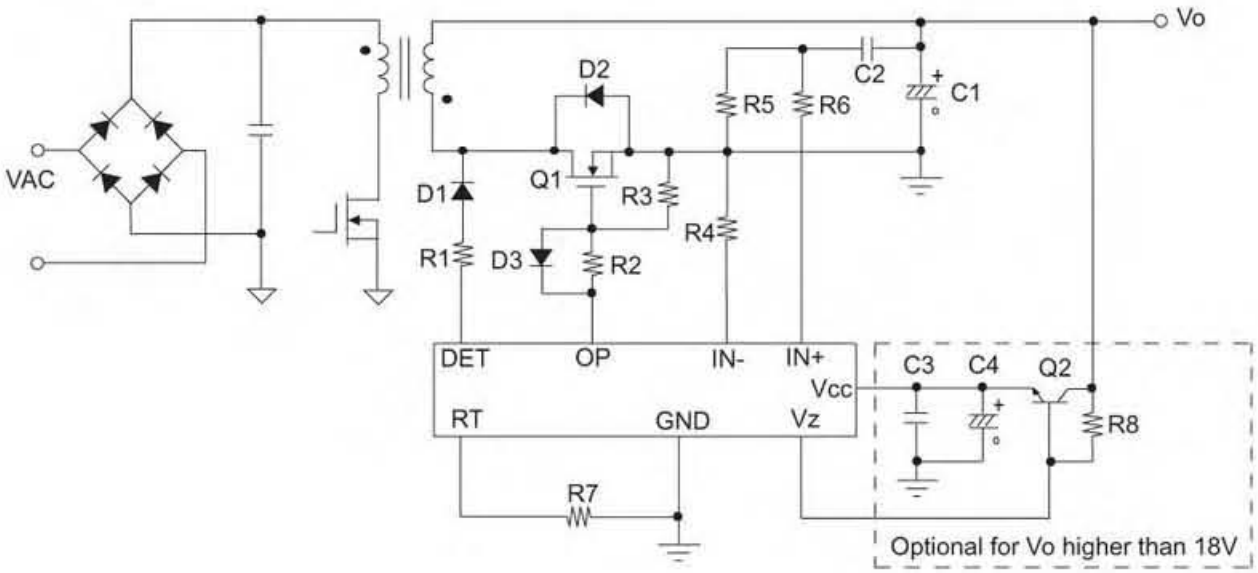
Flyback converters, such as

- Power Adaptors
- Open Frame SMPS

Ordering Information

Part Number	Package
SG6203SZ	8-Pin SOP (Lead Free)
SG6203DZ	8-Pin DIP (Lead Free)

Typical Application



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System General's corporate website provides you with up to date information about our company as well as our products. From there you can always find comprehensive technical documents for our Power IC products.

Comprehensive Technical Documentation

- **Product Datasheets**

  Provides detailed product specifications and general technical information

- **Application Notes**

  Illustrates technical details related to interfacing a System General Power IC to external circuitry

- **Demo Unit Manuals**

  Introduces detailed specifications and technical notes for the demo unit

- **And More…**

  If you need more technical information from us, please feel free to email us at:

  info@sg.com.tw

Company Briefing

System General (SG) was founded in 1983 as a consulting company specializing in Device Programming and Power Management. In 1985, the company expanded its operations to include the design and manufacturing of Device Programmers. Aiming to become the leader in its field of expertise, SG is committed to delivering products and services of the highest quality. It has earned an excellent reputation from customers all over the world.

System General significantly expanded its business scope in 1999, after merging with the IC design company ESIC. Armed with a strong R&D team, SG successfully entered the business by delivering its first series of Power Management products. System General's innovative energy-saving power conversion designs were well received by the market.

With the corporate vision of "Innovation for a Better Tomorrow", SG's business goal has always been to provide original products that improve people's lives. SG operates through two strategic business units: Semiconductors and Programming Instruments. Both units have the backing of dedicated and highly skilled R&D, manufacturing, sales, logistics and technical support teams.

SG is headquartered in Taipei, Taiwan. It has branch offices in the USA, China, and Hsinchu Taiwan. System General also works with sales agencies throughout the world.

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