

Synchronous PWM Step-Down DC/DC Converter Controller

General Description

The RT9226B is a low cost, high-efficiency voltage-mode PWM controller for motherboard power supply application. Synchronous N-Channel MOSFET driver, short-circuit protection, and soft start function are integrated in a single chip. A simple high power buck regulator with shutdown function can be implemented with minimum external components.

The RT9226B provides current-limit protection by monitoring the voltage drop across N-Channel MOSFET in over current condition, therefore, eliminates the current sensing resistor and minimizes the efficiency loss. The soft start function reduces the stress on power supply and components in power on duration. The 200kHz operating frequency and high speed PWM control loop with Synchronous N-Channel MOSFET driver provide optimized compromise between efficiency, cost, and response speed. Other features include output voltage monitoring for power good indication and over voltage protection.

Ordering Information

RT9226B □ □

Package Type
S : SOP-14

Operating Temperature Range
C : Commercial Standard
P : Pb Free with Commercial Standard

Note :

RichTek Pb-free products are :

- RoHS compliant and compatible with the current requirements of IPC/JEDEC J-STD-020.
- Suitable for use in SnPb or Pb-free soldering processes.
- 100%matte tin (Sn) plating.

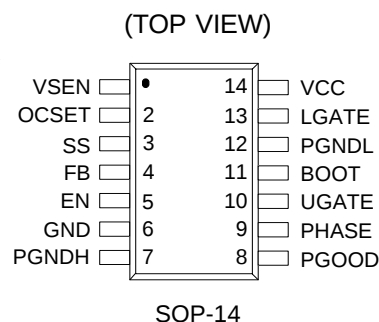
Features

- Synchronous N-Channel MOSFET Driver
- High Efficiency
- Fast Response with 200kHz Operating Frequency
- Adjustable Current Limit by Sensing MOSFET $R_{DS(ON)}$, without Extra Current Sensing Resistor
- Shutdown Function
- Power Good Indication Output and Over-Voltage Protection
- RoHS Compliant and 100% Lead (Pb)-Free

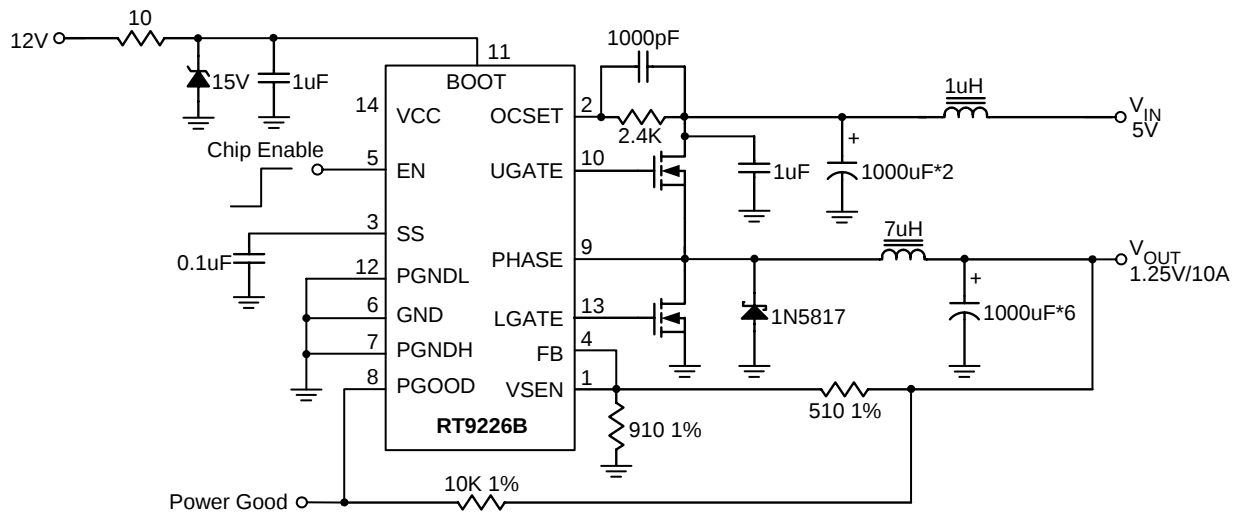
Applications

- Low Cost CPU Power Supply
- Motherboard I/O Power Supply
- Add-On Card Power Supply
- DDR SDRAM Bus Terminator Power Supply

Pin Configurations



Typical Application Circuit



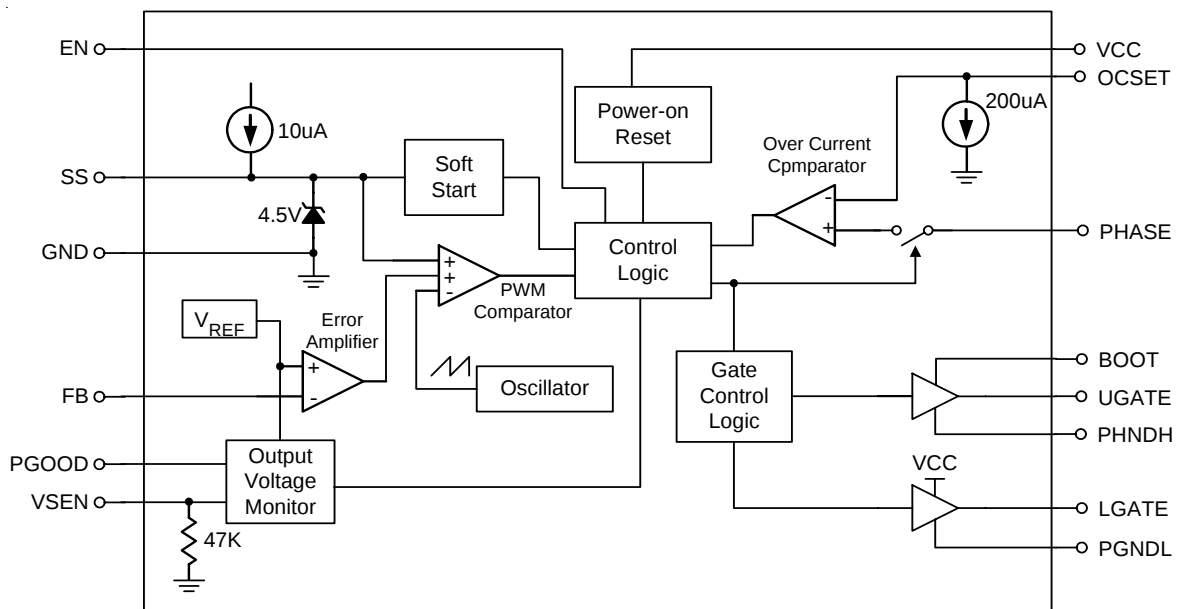
C4, C5: Each 1000 μ F 6.3WV DC, Sanyo MV-GX or Equivalent.

L1: Core: Micrometals T50-52; Winding: 5 turns of 18 AWG.

L2: Core: Micrometals T60-52; Winding: 14 turns of 17 AWG.

Q1, Q2: PHB83N03LT, PHB95N03LT

Function Block Diagram



Functional Pin Description

Pin No.	Pin Name	Pin Function
1	VSEN	Output Voltage Monitoring Input
2	OCSET	Current Limit Set Pin with 200 μ A Current Sink
3	SS	Soft Start, connect a capacitor from this pin to GND
4	FB	Feedback Input Pin
5	EN	Chip Enable (Active High)
6	GND	Ground
7	PGNDH	High Side Drive GND
8	PGOOD	Power Good Indication Output
9	PHASE	Current Limit Sense Input
10	UGATE	High Side Driver Output
11	BOOT	Driver Power
12	PGNDL	Low Side Driver GND
13	LGATE	Low Side Driver Output
14	VCC	Power Supply Input

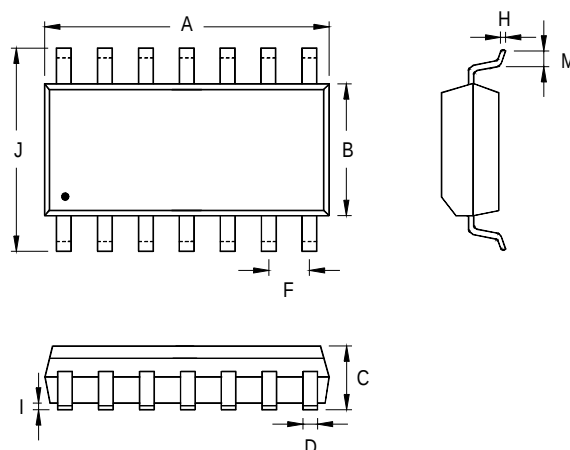
Absolute Maximum Ratings

- Supply Voltage ----- 15V
- Input, Output or I/O Voltage ----- GND-0.3V to $V_{CC}+0.3V$
- Ambient Temperature Range ----- 0°C to 70°C
- Operating Junction Temperature Range ----- 0°C to 125°C
- Storage Temperature Range ----- -65°C to 150°C
- Package Thermal Resistance
SOP-14, θ_{JA} ----- 160°C/W
- Lead Temperature (Soldering, 10 sec.) ----- 260°C

Electrical Characteristics

($V_{CC} = 12V$, GND = 0V, $T_A = 25^\circ C$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
V_{CC} Supply Current						
Nominal Supply Current	I_{CC}	UGATE Open	--	3	--	mA
Power-On Reset						
V _{CC} Rising Threshold		V _{OCSET} = 4.5V	--	9.5	--	V
V _{CC} Falling Threshold		V _{OCSET} = 4.5V	--	7.5	--	V
Enable Input Threshold	V _{EN}		0.2	--	2.2	V
Oscillator						
Frequency			170	200	230	kHz
Ramp Amplitude	ΔV_{OSC}		--	1.9	--	V
Internal Voltage Reference						
Reference Voltage	V _{REF}		0.785	0.800	0.815	V
PWM Controller Error Amplifier						
DC Gain			--	65	--	dB
PWM Controller Gate Driver						
UGATE Source	R _{UGATE}	I _{UGATE} = 0.3A	--	8	--	Ω
UGATE Sink	R _{UGATE}	I _{UGATE} = 0.3A	--	6	--	Ω
LGATE Source	I _{LGATE}	V _{CC} = 12V, V _{LGATE} = 6V	--	500	--	mA
LGATE Sink	R _{LGATE}	I _{LGATE} = 1V	--	5	--	Ω
Protection						
OCSET Current Source	I _{OCSET}	V _{OCSET} = 4.5V	170	200	230	μA
Soft-start Current	I _{SS}	V _{SS} = 1.5V	--	10	--	μA
Over-voltage Trip (V _{SEN} /V _{REF})			--	115	120	%
Power Good						
Upper Threshold (V _{SEN} /V _{REF})			--	108	--	%
Lower Threshold (V _{SEN} /V _{REF})			--	92	--	%
PGOOD Voltage Low	V _{PGOOD}	I _{PGOOD} = -5mA	--	0.5	--	V

Outline Dimension


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	8.534	8.738	0.336	0.344
B	3.810	3.988	0.150	0.157
C	1.346	1.753	0.053	0.069
D	0.330	0.508	0.013	0.020
F	1.194	1.346	0.047	0.053
H	0.178	0.254	0.007	0.010
I	0.102	0.254	0.004	0.010
J	5.791	6.198	0.228	0.244
M	0.406	1.270	0.016	0.050

14-Lead SOP Plastic Package
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