

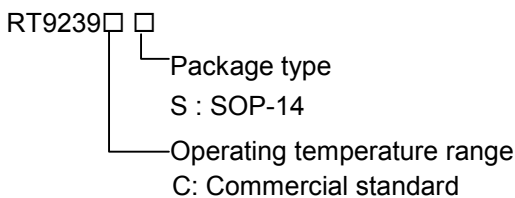
Synchronous PWM Step-down DC/DC Converter Controller

General Description

The RT9239 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 RT9239 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 200 kHz operating frequency and high speed PWM control loop with Synchronous N-channel MOSFET driver provide optimized compromise between efficiency, cost, and response speed.

Ordering Information



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

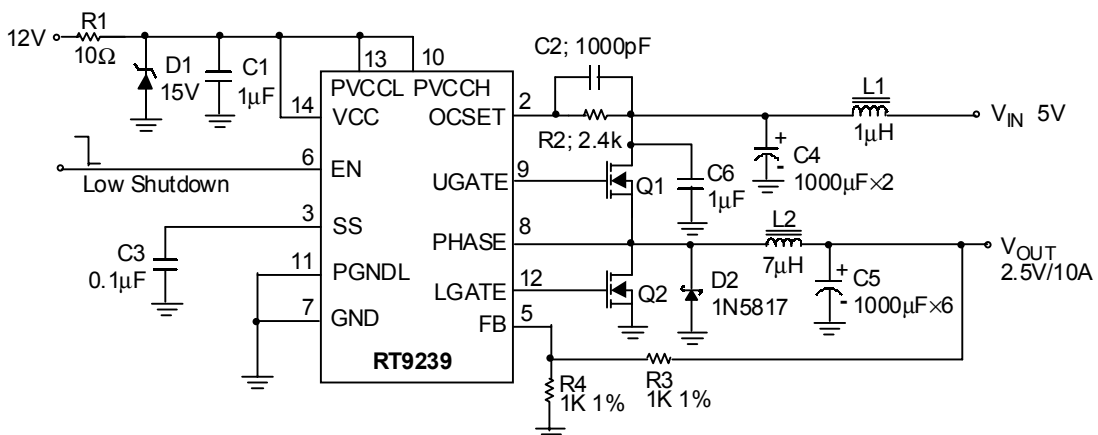
Applications

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

Pin Configurations

Part Number	Pin Configurations
RT9239CS (Plastic SOP-14)	TOP VIEW

Typical Application Circuit



C4, C5: Each 1000μF 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

Absolute Maximum Ratings

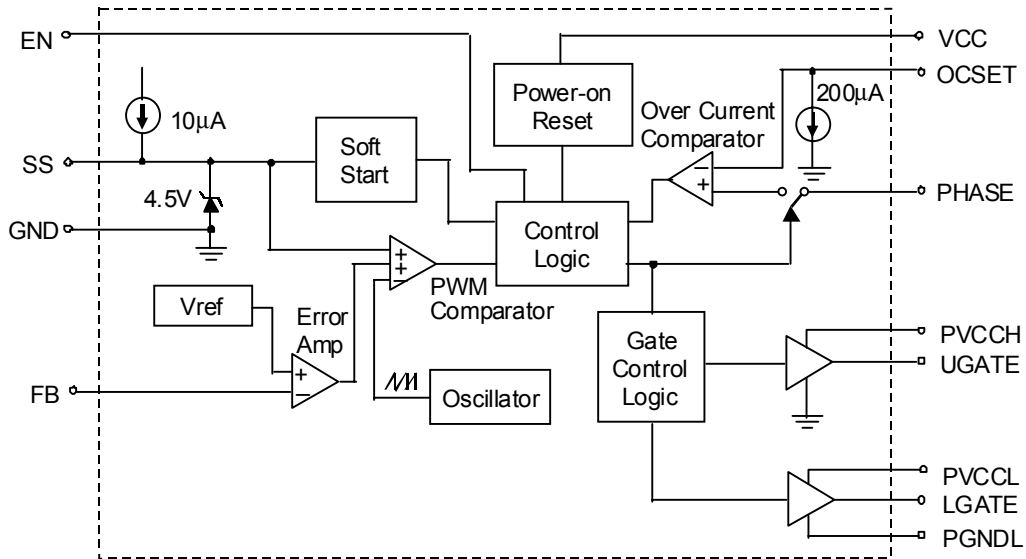
- Supply Voltage 15V
- Input, Output or I/O Voltage GND–0.3V to V_{CC}+0.3V
- Ambient Temperature Range 0°C to 70°C
- Operating Junction Temperature Range 0°C to 125°C
- Storage Temperature Range –65°C to 150°C
- Package Thermal Resistance
 SOP-14, θ_{JA} 160°C/W
- Lead Temperature (Soldering, 10 sec.) 300°C

Electrical Characteristics

(V_{CC} = 12V, GND = 0V, T_A = 25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
VCC Supply Current						
Nominal Supply Current	I _{CC}	UGATE & LGATE Open	--	3	--	mA
Power-On Reset						
VCC Rising Threshold		V _{OCSET} = 4.5V	--	9.5	--	V
VCC 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			--	1.9	--	V
Internal Voltage Reference						
Reference Voltage	V _{REF}		1.225	1.250	1.275	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

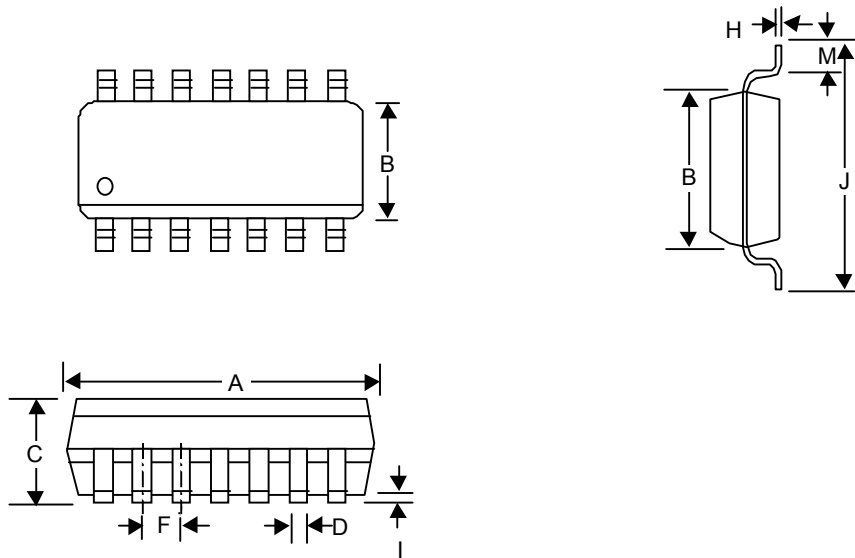
Function Block Diagram



Pin Description

Pin No.	Pin Name	Pin Function
1	NC	No connection
2	OCSET	Current limit set pin with 200µA current sink
3	SS	Soft start, connect a capacitor from this pin to GND
4	NC	No connection
5	FB	Voltage-control feedback loop input
6	EN	Regulator enable with low shutdown
7	GND	Ground
8	PHASE	Current limit sense input
9	UGATE	High side driver output
10	PVCCH	High side driver power
11	PGNDL	Low side driver GND
12	LGATE	Low side driver output
13	PVCC	Low side driver power
14	VCC	Power supply input

Package Information



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

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