RT9235 Data Sheet

RichTek Technology Corp.
RDS-235-024A Rev. 1
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PWM Step-down DC/DC Converter Controller

Description

The RT9235 is a low cost, high-efficiency voltage-mode PWM controller for motherboard power supply application. High-side N-channel MOSFET driver, short-circuit protection, and soft start function are integrated into an 8-pin package. A simple high power buck regulator can be implemented with minimum external components.

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 high-side N-channel MOSFET driver provide optimized compromise between efficiency, cost, and response speed.

Features

- Low cost and small size
- High-efficiency
- Fast response with 200kHz operating frequency
- Internal digital-count soft start

Applications

- Motherboard I/O power supply
- Add-on card power supply
- Low-voltage distributed power supply

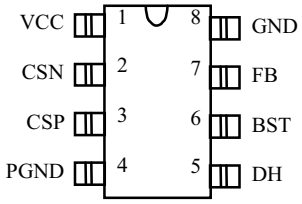
Ordering Information

RT9235-□□

Package type
S: SOP-8

Operation temperature range
C: Commercial standard
M: Military standard

Pin Configurations

Part Number	Pin Configuration
RT9235CS (Plastic SOP-8)	**TOP VIEW** 

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Absolute Maximum Ratings

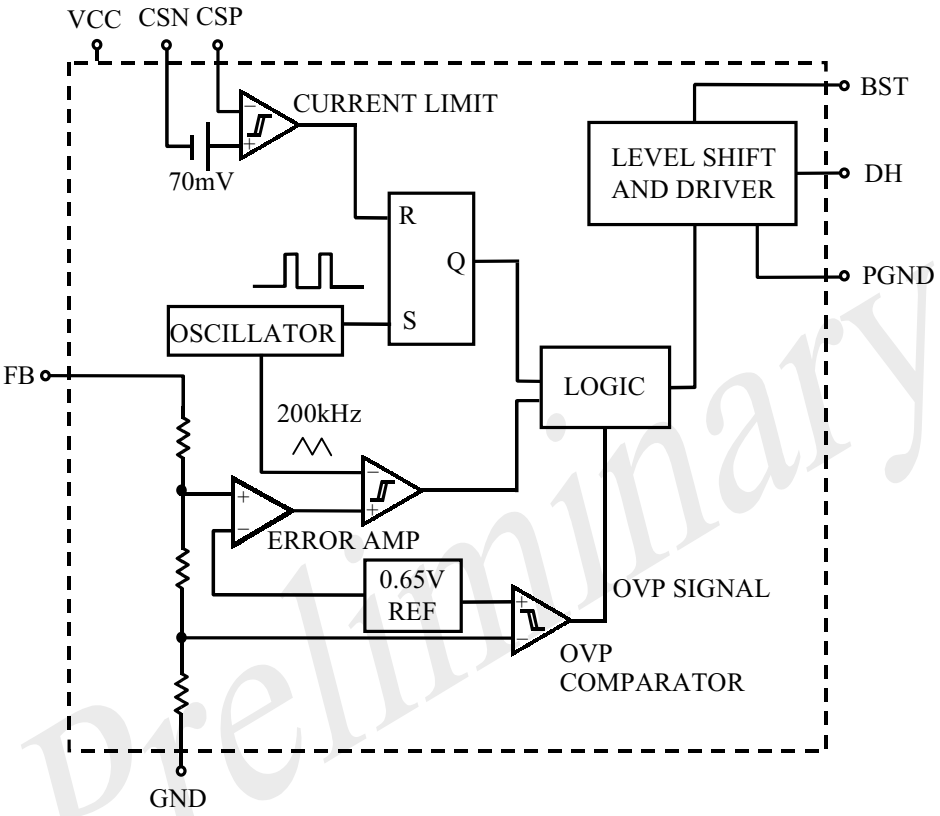
- VCC to GND (V_{IN}) ---------- –0.3 to +5.5V
- PGND to GND ---------- ± 0.3V
- BST to GND ---------- –0.3 to +14V
- Ambient Temperature Range (T_A) ---------- 0 to +70℃
- Junction Temperature Range (T_J) ---------- 0 to +125℃
- Storage Temperature Range (T_{STG}) ---------- –65 to +150℃
- Lead Temperature (Soldering) 10 seconds (T_L) ---------- 300℃
- Power Dissipation and Thermal Characteristics:
  SOP Plastic Package, P_D @ T_A=25℃ ---------- 0.625W
  Thermal Resistance, $R_{\theta JA}$ ---------- 160℃/W

Electrical Characteristics

VCC = 5V; GND = 0V; BST=12V; PGND = 0V; FB = VOUT; 0mV < (V_{CSP}-V_{CSN}) <50mV; T_A = 25 °C

Parameter	Test Conditions	Min	Typ	Max	Units
Switching Section					
Output Voltage		1.280	1.300	1.320	V
Supply Voltage	VCC	4.3	-	5.5	V
Supply Current		-	2	5	mA
Load Regulation	I_O = 0.8A to 12A	-	1	-	%
Line Regulation	VCC = 4.75V to 5.25V	-	0.5	-	%
Power On Reset Trip Point	VCC Rising	-	4.2	-	V
Current Limit Voltage	$V_{CSP} – V_{CSN}$	55	70	85	mV
Oscillator Frequency		170	200	230	kHz
Oscillator Max Duty Cycle		90	95	-	%
DH Source	$V_{BST} – V_{DH}$ = 1V	-	4.5	-	Ω
DH Sink	$V_{DH} – V_{PGND}$ = 1V	-	3.5	-	Ω
OVP Threshold Voltage		-	120	-	%

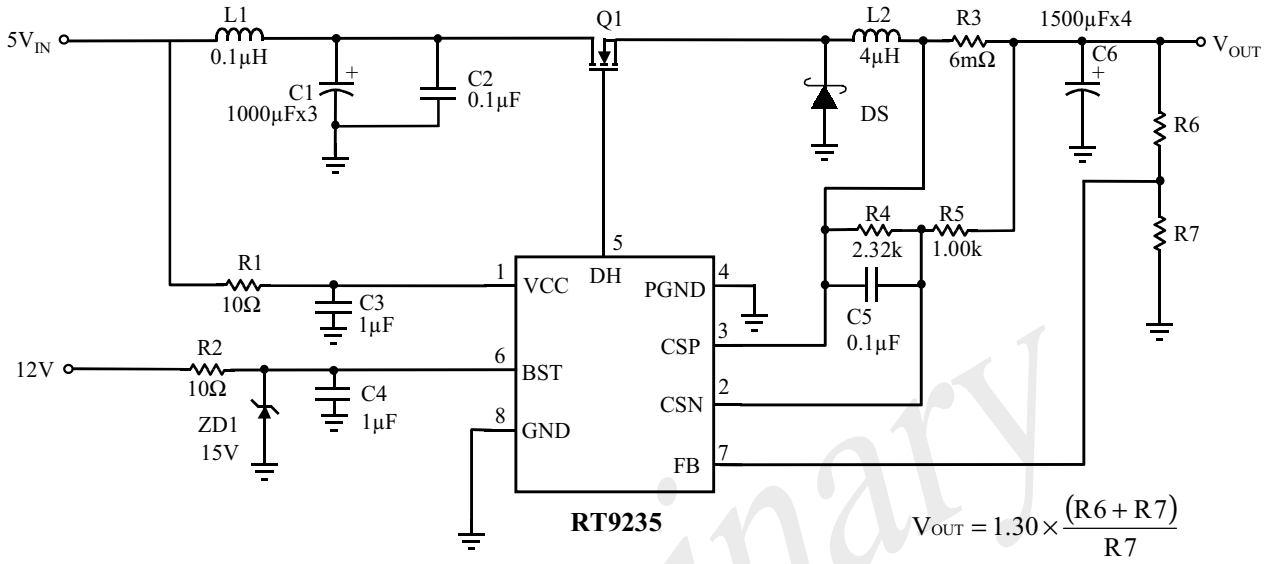
Function Block Diagram



Pin Description

Pin No.	Pin Name	Pin Function
1	VCC	IC power
2	CSN	Current sense input (Negative)
3	CSP	Current sense input (Positive)
4	PGND	Driver power ground
5	DH	Driver output
6	BST	Driver power
7	FB	Top end of internal feedback chain
8	GND	Small signal analog and digital ground

Typical Applications

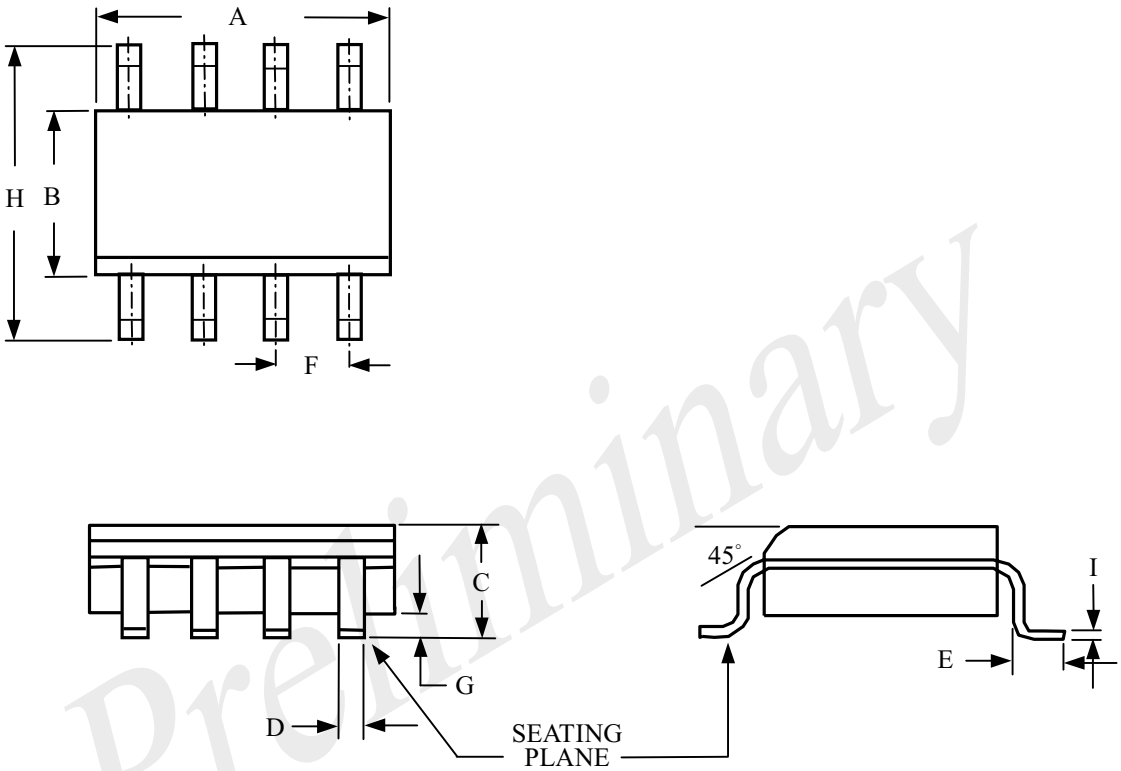


Desired Output Current

Unit: V

V_{OUT}	R6	R7
3.45	151	91
3.30	140	91
3.10	126	91
3.00	119	91
2.90	112	91
2.80	105	91
2.50	84	91
1.50	14	91

Package Information



Symbols	Dimensions In Inches			Dimensions In Millimeter		
	Min	Norm	Max	Min	Norm	Max
A	0.185	0.191	0.197	4.70	4.85	5.00
B	0.150	0.153	0.157	3.80	3.90	4.00
C	0.054	0.061	0.068	1.35	1.55	1.75
D	0.012	0.016	0.020	0.30	0.40	0.50
E	0.016	--	0.050	0.40	--	1.27
F	--	0.050	--	--	1.27	--
G	0.004	0.006	0.009	0.10	0.17	0.25
H	0.229	0.237	0.244	5.80	6.00	6.20
I	0.007	0.008	0.009	0.18	0.22	0.25

8-Lead SOP Plastic Package

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