RT9167/A

General Description

The RT9167/A is a 300mA/500mA low dropout and low noise micropower regulator suitable for portable applications. The output voltages range from 1.5V to 5.0V in 100mV increments and 2% accuracy. The RT9167/A is designed for use with very low ESR capacitors. The output remains stable even with 1μF ceramic output capacitor.

The RT9167/A uses an internal PMOS as the pass device, which does not cause extra GND current in heavy load and dropout conditions. The shutdown mode of nearly zero operation current makes the IC suitable for battery-powered devices. Other features include a reference bypass pin to improve low noise performance, current limiting, and over temperature protection.

Ordering Information

RT9167/A-□□□□□

Package Type
B : SOT-23-5
BR : SOT-23-5 (R-Type)
S : SOP-8

Operating Temperature Range
P : Pb Free with Commercial Standard
G : Green (Halogen Free with Commercial Standard)

Output Voltage
15 : 1.5V
16 : 1.6V
:
49 : 4.9V
50 : 5.0V
2H : 2.85V

500mA Output Current
300mA Output Current

Features

- **Stable with Low-ESR Output Capacitor**
- **Low Dropout Voltage (350mV @ 300mA)**
- **Low Operation Current –80μA Typical**
- **Shutdown Function**
- **Low Noise Output**
- **Low Temperature Coefficient**
- **Current and Thermal Limiting**
- **Custom Voltage Available**
- **SOT-23-5 and SOP-8 Packages**
- **RoHS Compliant and 100% Lead (Pb)-Free**

Applications

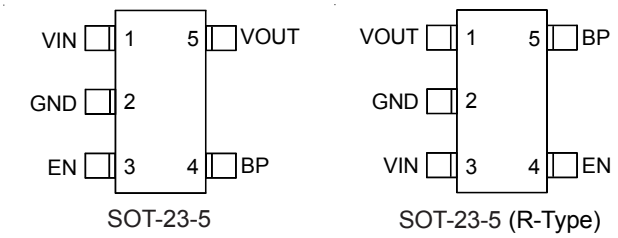
- Cellular Telephones
- Laptop, Notebook, and Palmtop Computers
- Battery-powered Equipment
- Hand-held Equipment

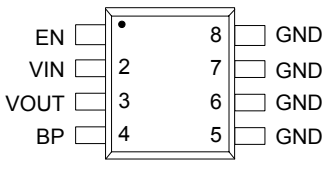
Marking Information

For marking information, contact our sales representative directly or through a RichTek distributor located in your area, otherwise visit our website for detail.

Pin Configurations

(TOP VIEW)

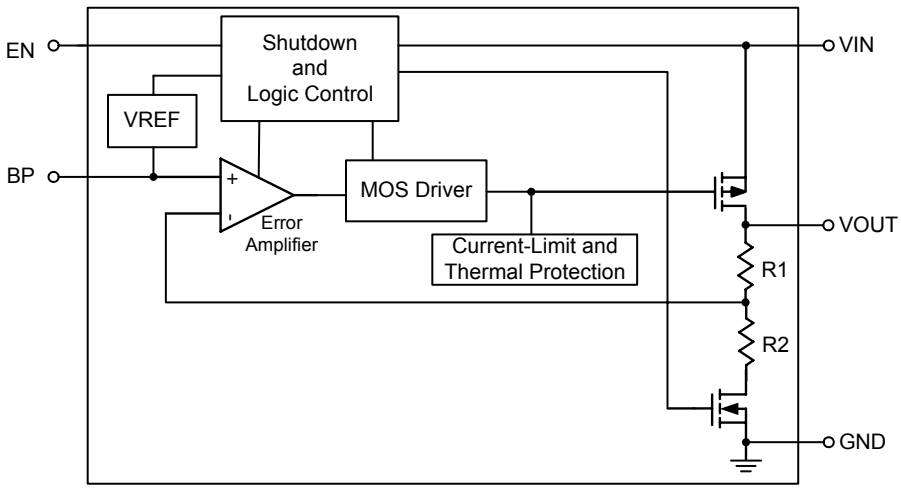




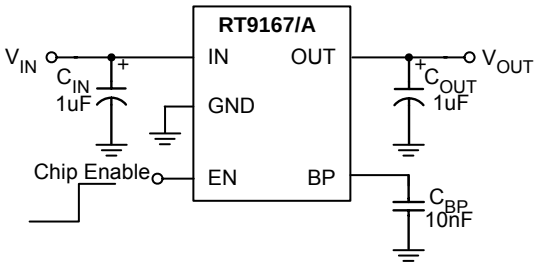
Functional Pin Description

Pin Name	Pin Function
VIN	Power Input Voltage
GND	Ground
EN	Chip Enable (Active High)
BP	Reference Noise Bypass
VOUT	Output Voltage

Function Block Diagram



Typical Application Circuit



Absolute Maximum Ratings

- Input Voltage ---------- 8V
- Power Dissipation, P_D @ T_A = 25°C
  - SOT-23-5 ---------- 0.4W
  - SOP-8 ---------- 0.625W
- Package Thermal Resistance (Note1)
  - SOT-23-5, θ_{JA} ---------- 250°C/W
  - SOT-23-5, θ_{JC} ---------- 130°C/W
  - SOP-8, θ_{JA} ---------- 160°C/W
  - SOP-8, θ_{JC} ---------- 60°C/W
- Operating Junction Temperature Range ---------- –40°C to 125°C
- Storage Temperature Range ---------- –65°C to 150°C
- Lead Temperature (Soldering, 10 sec.) ---------- 260°C

Electrical Characteristics

(V_{IN} = 5.0V, C_{IN} = 1μF, C_{OUT} = 1μF, T_A = 25°C, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Units
Input Voltage Range		V_{IN}		2.9	--	7	V
			I_L = 50mA	2.7	--	7	
Output Voltage Accuracy		ΔV_{OUT}	I_L = 1mA	-2	--	+2	%
Maximum Output Current	RT9167	I_{MAX}		300	--	--	mA
	RT9167A			500	--	--	
Current Limit	RT9167	I_{LIM}	R_{LOAD} = 1Ω	400	--	--	mA
	RT9167A			500	700	--	
Quiescent Current	RT9167/A	I_G	No Load	--	80	150	μA
	RT9167/A		I_{OUT} = 300mA	--	90	150	
	RT9167A		I_{OUT} = 500mA	--	90	150	
Dropout Voltage (2) ($V_{OUT(Normal)}$ = 3.0V Version)	RT9167/A	V_{DROP}	I_{OUT} = 1mA	--	1.1	5	mV
	RT9167/A		I_{OUT} = 50mA	--	55	100	
	RT9167/A		I_{OUT} = 300mA	--	350	450	
	RT9167A		I_{OUT} = 500mA	--	600	750	
Line Regulation		ΔV_{LINE}	V_{IN}= (V_{OUT}+0.15) to 7V, I_{OUT} =1mA	--	--	6	mV/V
Load Regulation	RT9167/A	ΔV_{LOAD}	I_{OUT} = 0mA to 300mA	--	--	30	mV
	RT9167A		I_{OUT} = 0mA to 500mA	--	--	35	
EN Input High Threshold		V_{IH}	V_{IN}= 3V to 5.5V	1.6	--	--	V
EN Input Low Threshold		V_{IL}	V_{IN} = 3V to 5.5V	--	--	0.4	V
EN Bias Current		I_{SD}		--	--	100	nA
Shutdown Supply Current		I_{GSD}	V_{OUT} = 0V	--	0.01	1	μA
Thermal Shutdown Temperature		T_{SD}		--	155	--	°C

To be continued

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Output Noise	e_{NO}	C_{BP} = 10nF, C_{OUT} = 10μF	--	350	--	$nV\sqrt{Hz}$
Ripple Rejection	PSRR	F = 100Hz, C_{BP} = 10nF, C_{OUT} = 10μF	--	58	--	dB

Note 1. θ_{JA} is measured in the natural convection at T_A = 25°C on a low effective thermal conductivity test board of JEDEC 51-3 thermal measurement standard. Pin 1 of SOP-8 and pin4 of SOT-23-5 packages are the case position for θ_{JA} measurement.

Note 2. The dropout voltage is defined as V_{IN} -V_{OUT}, which is measured when V_{OUT} is $V_{OUT(NORMAL)}$ – 100mV.