

RT9177

General Description

The RT9177 is a 200mA low dropout and low noise micro-power regulator suitable for portable RF applications. The output voltage accuracy within $\pm 2\%$ and range from 2.4V to 3.2V in 100mV increments could be selected. It is designed for using very low ESR output capacitor. Its output remains stable even in using 1 μ F ceramic as its output capacitor.

Using an internal PMOS as the pass device cause that don't need extra GND current in heavy load and dropout conditions. In shutdown mode, nearly zero operation current cause the IC is suitable for battery-power devices. Other features including current limiting, over temperature protection and adding a capacitor in bypass pin to improve its noise performance are functional.

Ordering Information

RT9177-□□□□

- Package type
B : SOT-25 Type I
BR : SOT-25 Type II
- Operating temperature range
C: Commercial standard
- Output voltage
24 : 2.4V
25 : 2.5V
:
:
31 : 3.1V
32 : 3.2V

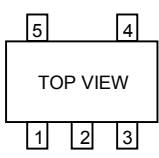
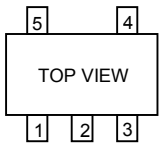
Features

- Ultra-Low-Noise(150nV/ $\sqrt{\text{Hz}}$) for RF Application
- 1 μ F Ceramic C_{OUT} Stable
- Low Dropout Voltage(220mV @ 200mA)
- Low Operation Current - 80 μ A Typical
- Shutdown Function
- Low Temperature Coefficient
- Current and Thermal Limiting
- Custom Voltage Available
- SOT-25 Package

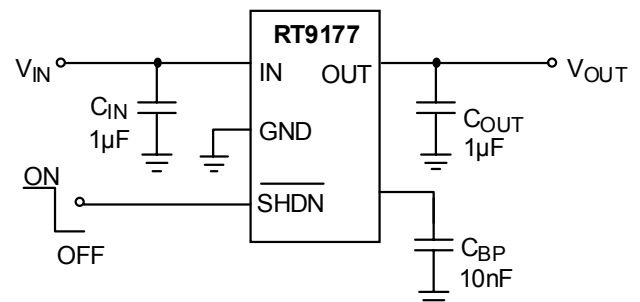
Applications

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

Pin Configurations

Part Number	Pin Configurations
RT9177-□□CB (Plastic SOT-25)	 <ol style="list-style-type: none"> 1. IN 2. GND 3. SHDN 4. BP 5. OUT
RT9177-□□CBR (Plastic SOT-25)	 <ol style="list-style-type: none"> 1. OUT 2. GND 3. IN 4. SHDN 5. BP

Typical Application Circuit



RT9177

Marking Information

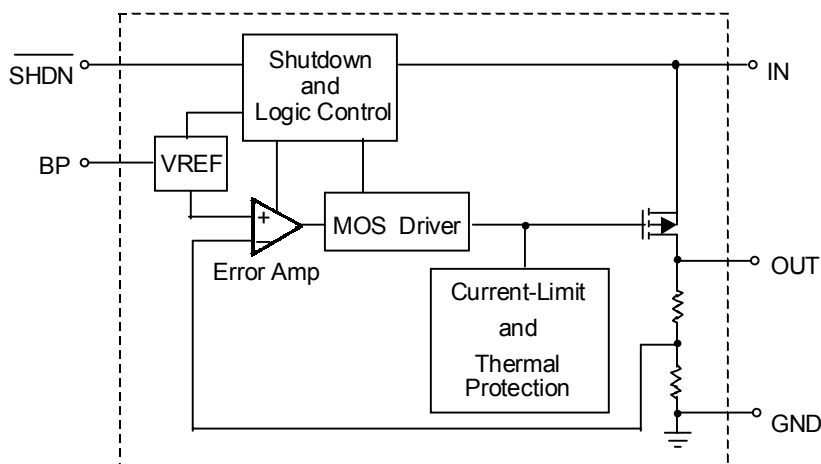
Part Number	Marking
RT9177-24CB	H9
RT9177-25CB	HA
RT9177-26CB	HB
RT9177-27CB	HC
RT9177-28CB	HD
RT9177-29CB	HE
RT9177-30CB	HF
RT9177-31CB	HG
RT9177-32CB	HH

Part Number	Marking
RT9177-24CBR	P9
RT9177-25CBR	PA
RT9177-26CBR	PB
RT9177-27CBR	PC
RT9177-28CBR	PD
RT9177-29CBR	PE
RT9177-30CBR	PF
RT9177-31CBR	PG
RT9177-32CBR	PH

Pin Description

Pin Name	Pin Function
IN	IC Power Pin
GND	IC GND
$\overline{\text{SHDN}}$	Active Low Shutdown Input
BP	Reference Noise Bypass
OUT	Regulator Output

Function Block Diagram



RT9177

Absolute Maximum Ratings

- Input Voltage V_{IN} 7V
- Power Dissipation
SOT-25 0.25W
- Operating Junction Temperature Range -40°C to 125°C
- Storage Temperature Range -65°C to 150°C
- Thermal Resistance
 $R_{\theta JA}$ 250°C/W
- Lead Temperature
(Soldering 5 sec.) 260°C

Electrical Characteristics

($V_{IN} = 5.0\text{V}$, $C_{IN} = 1\mu\text{F}$, $C_{OUT} = 1\mu\text{F}$, $T_A = 25^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Input Voltage	V_{IN}		2.5	--	6	V
Output Voltage Accuracy	ΔV_{OUT}	$I_L = 1\text{mA}$	-2	--	+2	%
Maximum Output Current	I_{MAX}		200	--	--	mA
Current Limit	I_{LIMIT}	$R_{LOAD} = 1\text{ Ohm}$	--	300	--	mA
GND Pin Current	I_G	No Load	--	80	150	μA
		$I_{OUT} = 200\text{mA}$	--	90	150	
Dropout Voltage ^(Note) ($V_{OUT}(\text{Nominal}) \geq 3.0\text{V}$ Version)	V_{DROP}	$I_{OUT} = 1\text{mA}$	--	1.1	5	mV
		$I_{OUT} = 50\text{mA}$	--	55	100	
		$I_{OUT} = 200\text{mA}$	--	220	300	
Line Regulation	ΔV_{LINE}	$V_{IN} = (V_{OUT} + 0.15)$ to 6V , $I_{OUT} = 1\text{mA}$	-0.2	--	+0.2	%/V
Load Regulation	ΔV_{LOAD}	$I_{OUT} = 0\text{mA}$ to 200mA	--	0.01	0.04	%/mA
$\overline{\text{SHDN}}$ Input High Threshold	V_{IH}	$V_{IN} = 3\text{V}$ to 5.5V	1.0	--	--	V
$\overline{\text{SHDN}}$ Input Low Threshold	V_{IL}	$V_{IN} = 3\text{V}$ to 5.5V	--	--	0.4	V
$\overline{\text{SHDN}}$ Bias Current	I_{SD}		--	--	100	nA
Shutdown Supply Current	I_{GSD}	$V_{OUT} = 0\text{V}$	--	0.01	1	μA
Thermal Shutdown Temperature	T_{SD}		--	150	--	$^{\circ}\text{C}$
Output Noise	e_{no}	$C_{BP} = 10\text{nF}$, $C_{OUT} = 10\mu\text{F}$	--	150	--	$\text{nV}/\sqrt{\text{Hz}}$
Ripple Rejection	PSRR	$F = 100\text{Hz}$, $C_{BP} = 10\text{nF}$, $C_{OUT} = 10\mu\text{F}$	--	68	--	dB

Notes: Dropout voltage definition: $V_{IN} - V_{OUT}$ when V_{OUT} is 50 mV below the value of V_{OUT} at $V_{IN} = V_{OUT} + 0.5\text{V}$