

PSM DC-to-DC Controller

General Description

The RT9568 is a DC-to-DC controller IC for step-down (Buck), step-up (Boost), inverting (Buck-Boost), and Flyback converters.

The device consists of an internal temperature compensated reference, comparator, controlled duty cycle oscillator with an active current limit circuit, driver, and high current output switch.

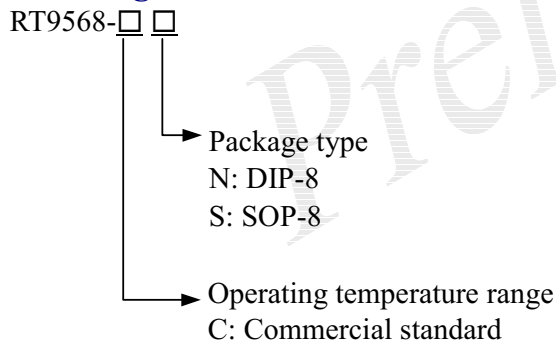
Features

- Pluse-Skipping Modulation
- Precision $\pm 2\%$ Reference
- Operation from 3.0V to 30V Input
- Internal Switch Peak Current to 1.5A
- Design Flexibility
- Output Voltage Adjustable
- Current Limiting Adjustable
- Frequency Adjustable up to 200KHz

Applications

- DC-DC Converter Module

Ordering Information



Marking Information

Part Number	Marking
RT9568CN	RT9568CN
RT9568CS	RT9568CS

Pin Description

Pin No.	Pin Name	Pin Function
1	SE	Emitter of Darlington transistor
2	OSC	Oscillator timing capacitor
3	GND	GND
4	FB	Feedback comparator inverting input
5	VCC	Power supply input
6	ICL	Current limit voltage input
7	DRI	Driver collector
8	SC	Collector of Darlington transistor

Pin Configurations

Part Number	Pin Configurations
RT9568CN (Plastic DIP-8)	
RT9568CS (Plastic SOP-8)	

Absolute Maximum Ratings

- Power Supply Voltage, V_{CC} 30V
- Feedback Input Voltage Range 0.3V to V_{CC}
- Switch Collector Voltage, $V_C(\text{switch})$ 30V
- Switch Emitter Voltage($V_{PIN8}=30V$), $V_E(\text{switch})$ 30V
- Switch Collector to Emitter Voltage, $V_{CE}(\text{switch})$ 30V
- Driver Collector Voltage, $V_C(\text{driver})$ 30V
- Driver Collector Current (see Note 1), $I_C(\text{driver})$ 100mA
- Switch Current, I_{SW} 1.5A
- Power Dissipation and Thermal Characteristics:
 - DIP Plastic Package, $P_D @ T_A=25^\circ C$ 1.25W
 - Thermal Resistance, $R_{\theta JA}$ $100^\circ C/W$
 - SOP Plastic Package, $P_D @ T_A=25^\circ C$ 0.625W
 - Thermal Resistance, $R_{\theta JA}$ $160^\circ C/W$
- Operating Junction Temperature, T_J $+150^\circ C$
- Storage Temperature Range, T_{STG} -60 to $+150^\circ C$

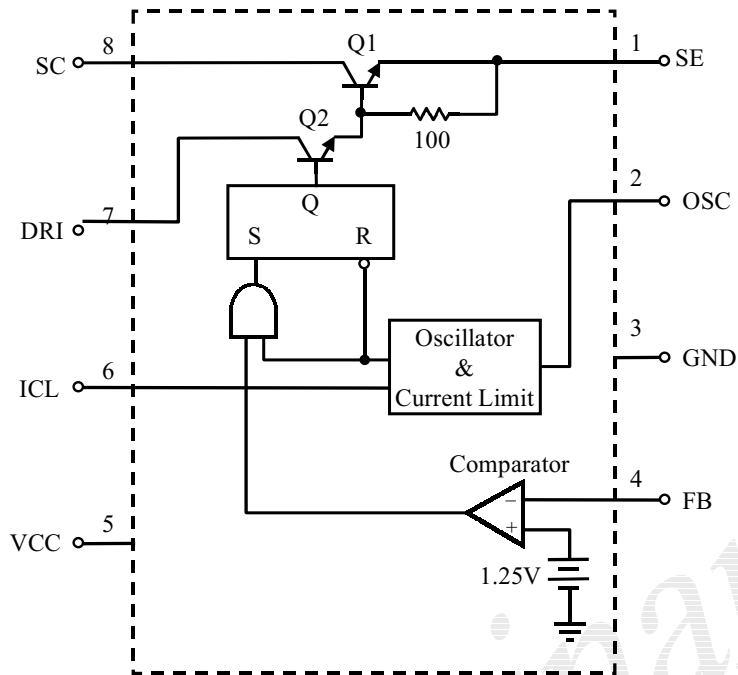
Note: 1. Maximum package power dissipation limits must be observed.

Electrical Characteristics

$V_{CC}=5.0V$, $T_A = 25^\circ C$, unless otherwise specified.

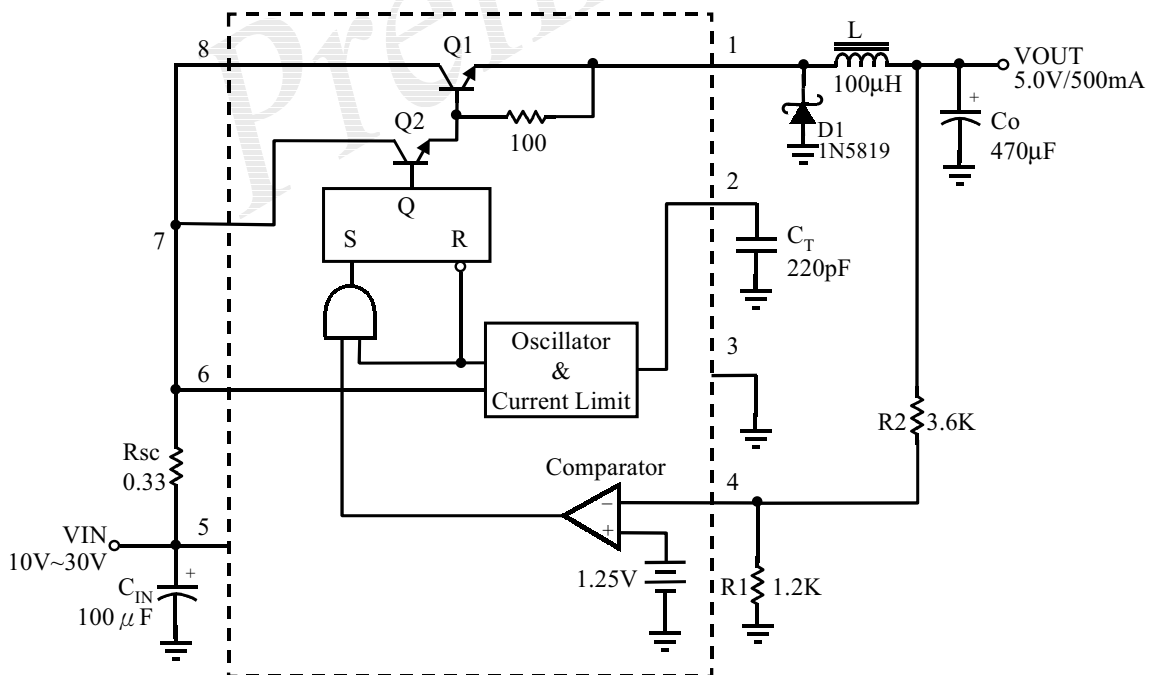
Parameter	Test Conditions	Min	Typ	Max	Units
Supply Current	$V_{CC} = 5.0V$ to $30V$, $C_T = 1.0nF$, Pin6 = V_{CC} , $V_{pin4} > V_{ref}$, Pin1 = GND, Remaining pins open	--	3.0	4.5	mA
Current Limit Sense Voltage	$I_{chg} = I_{dischg}$	280	330	380	mV
Charge Current	$5.0V \leq V_{CC} \leq 30V$	25	36	43	μA
Discharge Current	$5.0V \leq V_{CC} \leq 30V$	160	250	290	μA
Discharge to Charge Current Ratio	Pin6 to V_{CC}	5.5	6.9	7.9	--
Saturation Voltage, Darlington Connection	$I_{SW} = 1.0A$, Pins 7, 8 connected	--	1.0	1.3	V
Saturation Voltage, Darlington Connection	$I_{SW} = 1.0A$, $R_{PIN7} = 82\Omega$ to V_{CC} , Forced $\beta \approx 20$	--	0.5	0.7	V
DC Current Gain	$I_{SW} = 1.0A$, $V_{CE} = 5.0V$	50	75	--	--
Collector Off-state Current	$V_{CE} = 30V$	--	0.01	100	μA
Reference Voltage	-	1.225	1.25	1.275	V
Reference Voltage Line Regulation	$3.0V \leq V_{CC} \leq 30V$	--	1.4	5.0	mV
Input Bias Current	$V_{in} = 0V$	--	-20	-400	nA

Function Block Diagram

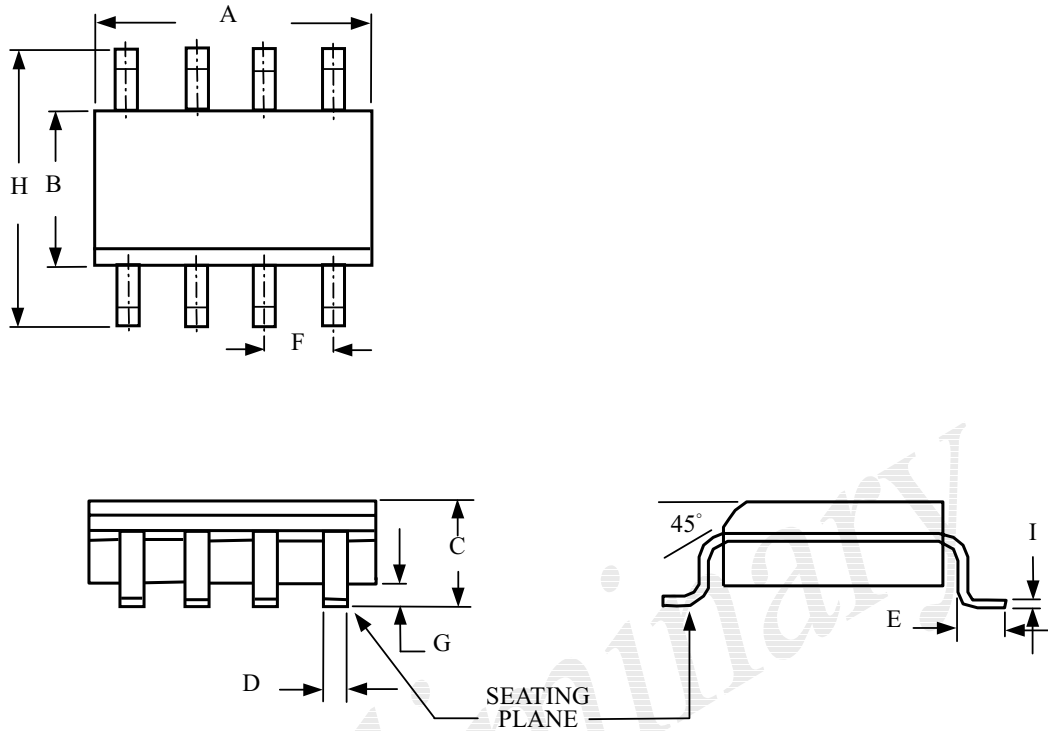


Typical Application Circuit

Step-down Converter use Internal Switch

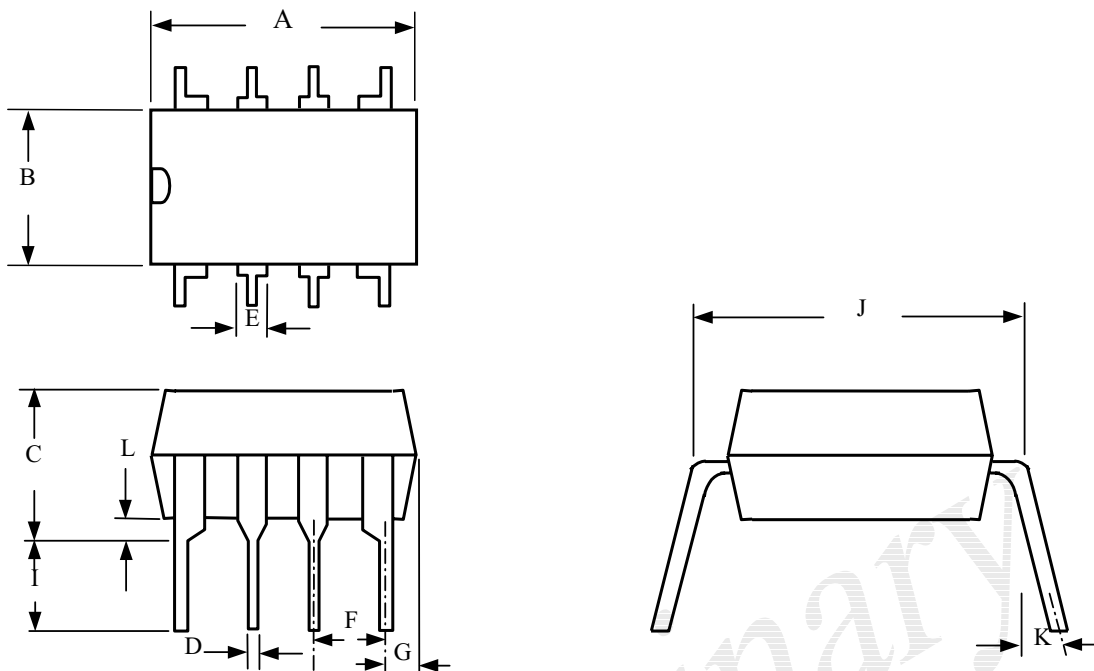


Package Information



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



Symbols	Dimensions In Inches			Dimensions In Millimeter		
	Min	Norm	Max	Min	Norm	Max
A	0.357	0.362	0.367	9.00	9.30	9.60
B	0.244	0.254	0.264	6.20	6.45	6.70
C	--	--	0.180	--	--	4.57
D	0.016	0.018	0.020	0.35	0.45	0.55
E	0.040	0.055	0.070	1.02	1.40	1.78
F	--	0.100	--	--	2.54	--
G	--	0.035	0.050	--	0.89	1.27
I	0.120	0.130	0.140	3.05	3.30	3.55
J	0.290	0.300	0.310	7.60	8.00	8.40
K	--	--	15°	--	--	15°
L	0.015	0.025	0.035	0.39	0.64	0.89

8-Lead DIP Plastic Package