

■ Introduction

The **AM9108/9** is a CMOS step-up switching DC/DC converter that mainly consists of a reference voltage source, an oscillator, and a comparator. The G908/9 allows the duty ratio to be automatically switched according to the load (light load: 50%, high output current: 75%), enabling products with a low ripple over a wide range, high efficiency, and high output current. With the AM908/9, a step-up switching DC/DC converter can be configured by using an external coil, capacitor, diode and NMOS or NPN. The built-in MOSFET is turned off by a protection circuit when the voltage at the LX pin exceeds the limit to prevent it from being damaged. This feature, along with the mini package and low current consumption, makes the AM908/9 ideal for applications such as the power supply unit of portable equipment.

■ Applications

- PDA
- DSC
- LCD Panel
- RF-Tags
- MP3
- Portable Instrument
- Wireless Equipment

■ Features

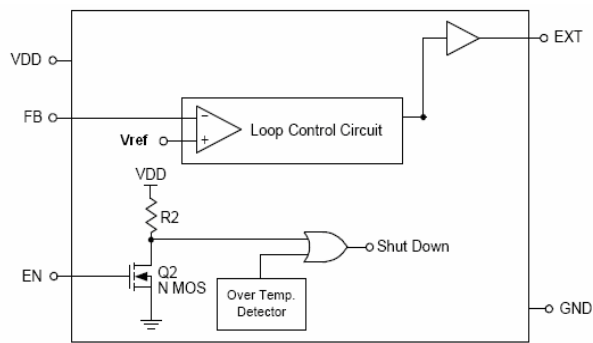
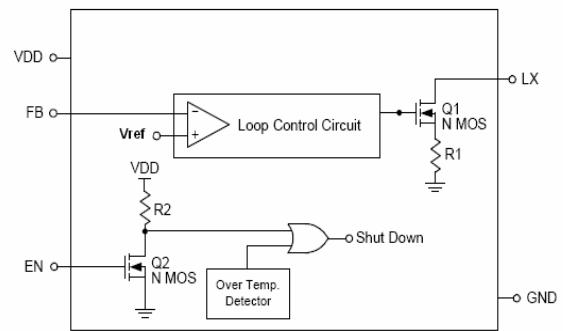
- Low voltage operation: Startup at 0.9 V min. ($I_{OUT} = 1 \text{ mA}$) guaranteed
- Duty ratio: 66/78%, builtin auto switching
- External parts: Coil, capacitor, diode, NMOS
- High efficiency: $\pm 85\%$ (typ.)
- Output voltage Adjustable
- Providing Flexibility for Using Internal and External Power Switches
- Zero Shutdown Mode Supply Current
- 6 μA Quiescent (Switch-off) Supply Current
- Small SOT23-5, SOT89-5 Package & SOT-26(customer order)

■ Ordering Information

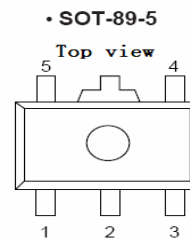
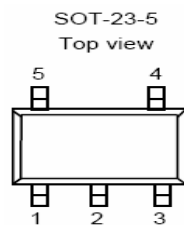
AM9108/9

DESIGNATOR	SYMBOL	DESCRIPTION
①②	8A	Output voltage Adjustable, EXT
	8B	Output voltage Adjustable, EXT, EN
	9A	Output voltage Adjustable, LX
	9B	Output voltage Adjustable, LX, EN
③	M	Package : SOT23-5
	P	Package : SOT89-5

■ Block Diagrams


AM9108

AM9109

■ Pin Assignment



Pin No. (SOT23-5)				Pin Name	Functions
AM9108A	AM9108B	AM9109A	AM9109B		
1	1	1	1	FB	Feedback Input Pin Internal Reference Voltage for the Error Amplifier is 1.25V.
2	2	2	2	V _{DD}	IC power supply pin
-	3	-	3	EN	Chip Enable (Active High)
3	-	3	-	NC	No Connection
4	4	4	4	V _{SS}	GND pin
5	5	-	-	EXT	Output Pin for Driving External NMOS
-	-	5	5	LX	Pin for Switching

Pin No. (SOT89-5)				Pin Name	Functions
AM9108A	AM9108B	AM9109A	AM9109B		
-	1	-	1	EN	Chip Enable (Active High)
1	-	1	-	NC	No Connection
2	2	2	2	V _{DD}	IC power supply pin
3	3	3	3	FB	Feedback Input Pin Internal Reference Voltage for the Error Amplifier is 1.25V.
-	-	4	4	LX	Pin for Switching
4	4	-	-	EXT	External transistor connection pin
5	5	5	5	V _{SS}	GND pin

■ Absolute Maximum Ratings

(Unless otherwise specified, Ta=25 °C)

Parameter		Symbol	Ratings	Unit
V _{OUT} pin voltage		V _{OUT}	V _{SS} −0.3 ~ V _{SS} +10	V
EN pin voltage		EN	V _{SS} −0.3 ~ V _{SS} +10	V
LX pin voltage		V _{LX}	V _{SS} −0.3 ~ V _{SS} +10	V
LX pin current		I _{LX}	1000	mA
Power dissipation	SOT-23-5	PD	250	mW
	SOT-23-6		250	mW
	SOT-89-3		500	mW
Operating temperature		T _{opr}	−40 ~ +85	°C
Storage temperature		T _{stg}	−40 ~ +125	°C

■ Electrical Characteristics

(Unless otherwise specified, Ta =25 °C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output voltage	V _{OUT}	—	V _{OUT(S)} ×0.98	V _{OUT}	V _{OUT(S)} ×1.02	V
Input voltage	V _{IN}	—	—	—	10	V
Operation start voltage	V _{ST1}	I _{OUT} = 1 mA	—	—	0.9	V
Oscillation start voltage	V _{ST2}	No external parts, voltage applied to V _{OUT} LX pulled up to V _{OUT} via 300Ω resistor	—	—	0.8	V
Current consumption 1	I _{SS1}	V _{OUT} =0.95×V _{OUT(S)}	—	30	40	μA
Current consumption 2	I _{SS2}	V _{OUT} = V _{OUT(S)} +0.5 V	—	6	10	μA
Current consumption during shutdown	I _{SSS}	V _{EN} = 0 V	—	—	0.5	μA
Switching current	I _{SW}	V _{LX} = 0.4 V	100	200	—	mA
Switching transistor leakage current	I _{SWQ}	No external parts, V _{LX} =V _{OUT} =10 V, V _{EN} = 0 V	—	—	0.5	μA
Line regulation	ΔV _{OUT1}	V _{IN} = 0.4×V _{OUT} ~ 0.6×V _{OUT} (V _{OUT} =5V)	—	20	50	mV
Load regulation	ΔV _{OUT2}	I _{OUT} = 10 μA ~ 50mA (V _{OUT} =5V)	—	20	50	mV
Maximum Oscillation frequency	f _{OSC}	V _{OUT} = 0.95×V _{OUT} , measure waveform at LX pin		100		kHz
Duty ratio 1	Duty1	V _{OUT} = 0.95×V _{OUT} , measure waveform at LX pin	70	78	85	%
Duty ratio 2	Duty2	Measure waveform at LX pin with light load	—	66	—	%
Efficiency	EFFI			85		%
Shutdown pin input voltage	V _{SH}	V _{OUT} =0.95×V _{OUT} , judge oscillation at LX pin	0.75	—	—	V

	V_{SL1}	$V_{OUT} = 0.95 \times V_{OUT}$, judge stop at LX pin	—	—	0.3	V
Shutdown pin input current	I_{SH}	$V_{EN} = 10V$	-0.1	—	0.1	μA
	I_{SL}	$V_{EN} = 0V$	-0.1	—	0.1	μA

Remark: 1、 $V_{IN} = V_{OUT(S)} \times 0.6$ applied, $I_{OUT} = V_{OUT(S)} / 250 \Omega$

2、Shutdown function built-in type: EN pin is connected to V_{OUT}

3、 $V_{OUT(S)}$ specified above is the set output voltage value, and V_{OUT} is the typical value of the actual output voltage.

■ Standard Circuits

Component: Inductor: 47 μH (Sumida)

Diode: IN5817、IN5819

Capacitor: 47 μF /16V(Tantalum type)

Transistor: 2SD1628G、2SD3279

NMOS: XP151、XP161

Base Resistor(R_b): 1K Ω

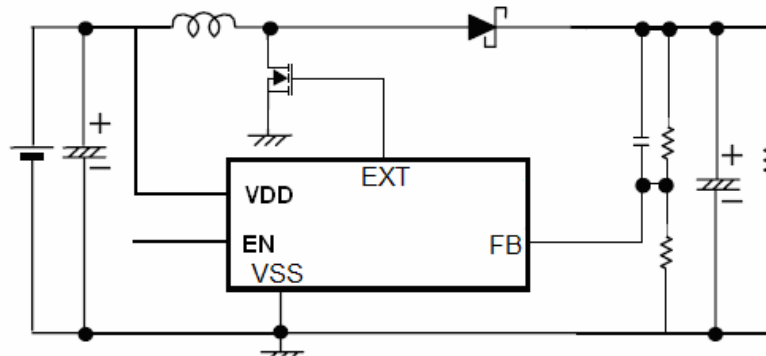
Base Capacitor(C_b): 2200pF

R_{FB} : Set up so that $R_{FB1}/R_{FB2} = V_{out} - 1$ (V_{out} =set-up output voltage),

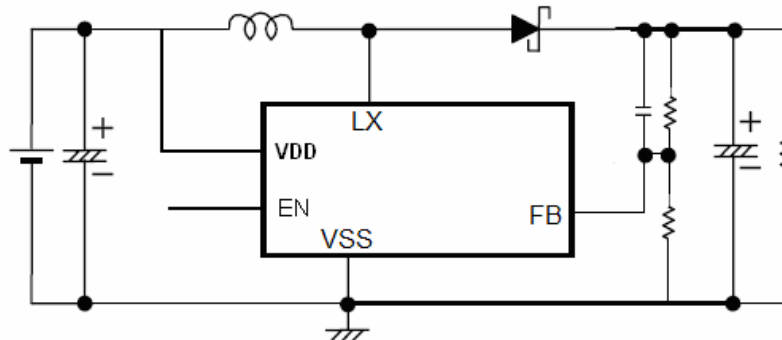
Please use with $R_{FB1} + R_{FB2} \leq 2M \Omega$

C_{FB} : Set up that $F_{zfb} = 1/(2 \times \pi \times C_{FB} \times R_{FB1})$ is within the Adjustments necessary in respect of L, C_L .

1、AM9108 Circuits:

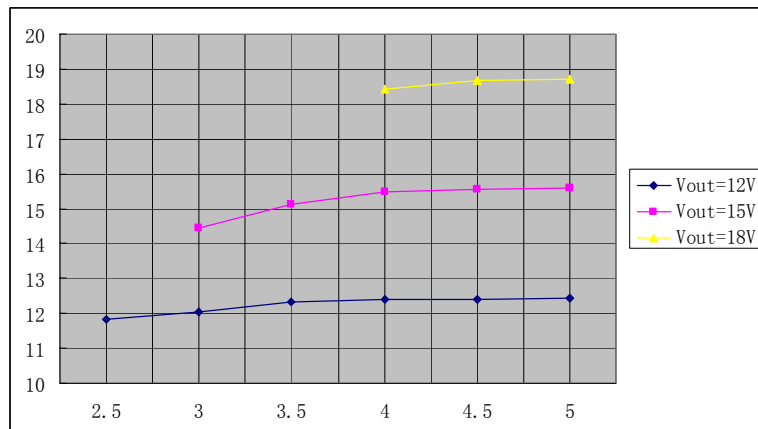


2、AM9109 Circuits:

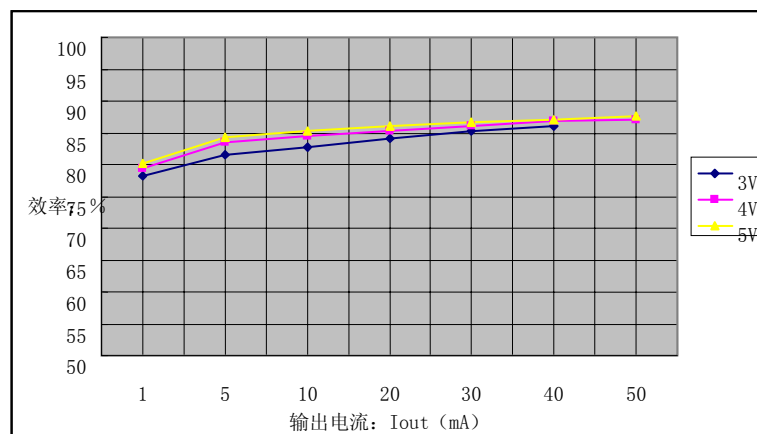


■ Characteristics

a、输出电压 VS 输入电压 ($I_{out}=50mA$):

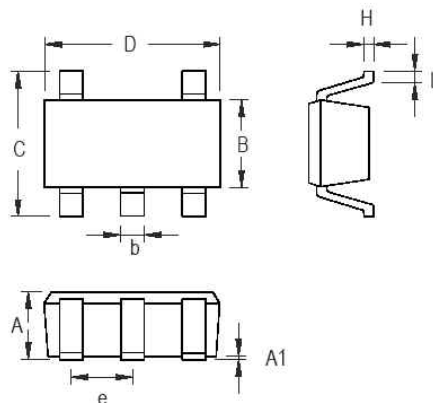


b、效率 VS 输出电流 (额定输出电压 15V 时测定):



■ Package information

• SOT-23-5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	0.000	0.152	0.000	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.559	0.014	0.022
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	0.838	1.041	0.033	0.041
H	0.080	0.254	0.003	0.010
L	0.300	0.610	0.012	0.024

• SOT-89-5

