

■ **Introduction**

The CE9908 is a CMOS step-up switching DC/DC converter that mainly consists of a reference voltage source, an oscillator, and a comparator. The CE9908 allows the duty ratio to be automatically switched according to the load (light load: 66%, high output current: 78%), enabling products with a low ripple over a wide range, high efficiency, and high output current. With the CE9908, a step-up switching DC/DC converter can be configured by using an external coil, capacitor, diode and NMOS. This feature, along with the mini package and low current consumption, makes the CE9908 ideal for applications such as the power supply unit of portable equipment.

■ **Features**

- Low voltage operation: Oscillation start voltage at 0.8V
- Duty ratio: 66/78%, built-in auto switching
- External parts: Coil, capacitor, diode, NMOS
- High efficiency: $\pm 85\%$ (typ.)
- Output voltage Adjustable
- Providing Flexibility for Using External Power Switches
- Zero Shutdown Mode Supply Current
- 6 μ A Quiescent (Switch-off) Supply Current
- Small SOT23-5, SOT89-5 Package

■ **Applications**

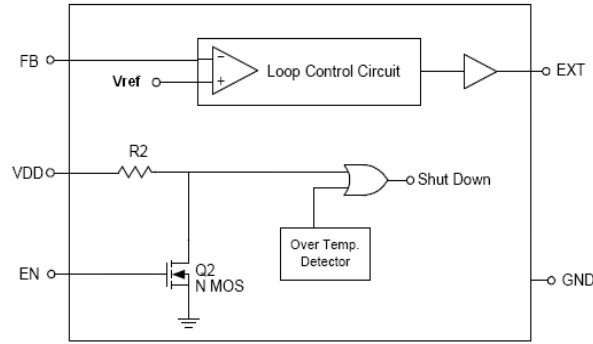
- PDA
- DSC
- LCD Panel
- RF-Tags
- MP3
- Portable Instrument
- Wireless Equipment

■ **Ordering Information**

CE9908 ① ② ③ ④ ⑤

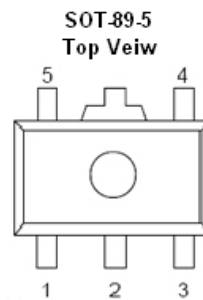
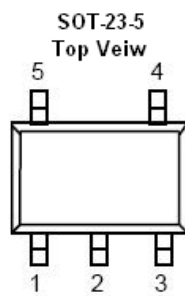
DESIGNATOR	SYMBOL	DESCRIPTION
①	A	Output Voltage adj, EXT
	B	Output Voltage adj, EXT, EN
②③④		FB, Voltage
		EXP, Vfb=1.25V, Number 125 EXP, Vfb=3.3V, Number nothing
⑤	M	Package: SOT-23-5
	P	Package: SOT-89-5

■ Block Diagrams



CE9908

■ Pin Assignment



Pin No. (SOT23-5)		Pin Name	Functions
CE9908A	CE9908B		
1	1	FB	Feedback Input Pin
2	2	V _{DD}	IC power supply pin
-	3	EN	Chip Enable (Active High)
3	-	NC	No Connection
4	4	V _{SS}	GND pin
5	5	EXT	External transistor connection pin

Pin No. (SOT89-5)		Pin Name	Functions
CE9908A	CE9908B		
-	1	EN	Chip Enable (Active High)
1	-	NC	No Connection
2	2	V _{DD}	IC power supply pin
3	3	FB	Feedback Input Pin
4	4	EXT	External transistor connection pin
5	5	V _{SS}	GND pin

■ Absolute Maximum Ratings

(Unless otherwise specified, $T_a=25^{\circ}\text{C}$)

Parameter		Symbol	Ratings	Unit
V _{OUT} pin voltage		V _{OUT}	$V_{SS}-0.3 \sim V_{SS}+8$	V
EN pin voltage		EN	$V_{SS}-0.3 \sim V_{SS}+8$	V
Power dissipation	SOT-23-5	PD	250	mW
	SOT-89-5		500	mW
Operating temperature		T _{opr}	-40 ~ +85	°C
Storage temperature		T _{stg}	-40 ~ +125	°C

■ Electrical Characteristics

(Unless otherwise specified, $T_a=25^{\circ}\text{C}$)

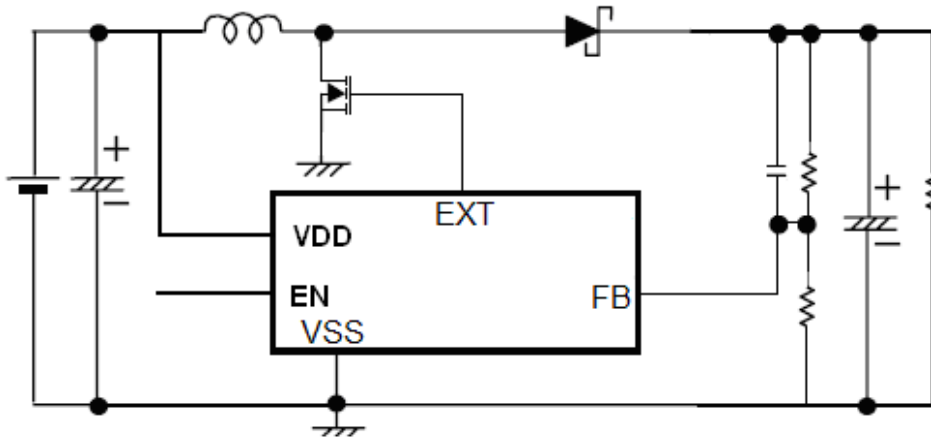
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Feedback Voltage	V _{FB}	—	$V_{FB(s)} \times 0.98$	V _{FB}	$V_{FB(s)} \times 1.02$	V
Input voltage	V _{IN}	—	—	—	8	V
Oscillation start voltage	V _{ST}	No external parts, voltage applied to V _{OUT} LX pulled up to V _{OUT} via 300Ω resistor	—	—	0.8	V
Current consumption 1	I _{SS1}	V _{CC} =5V, Continuously Switching	—	30	40	μA
Current consumption 2	I _{SS2}	V _{CC} =5V, FB=2.5V, No Switching	—	5	10	μA
Shut Down Current	I _{SSS}	V _{CC} =5V, 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
Oscillation frequency	f _{OSC}			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 EXT pin	0.75	—	—	V
	V _{SL1}	V _{OUT} = 0.95×V _{OUT} , judge stop at EXT pin	—	—	0.3	V
Shutdown pin input current	I _{SH}	V _{EN} =8V	—	—	0.1	μA
	I _{SL}	V _{EN} =0V	—	—	0.1	μA

Remark: 1、V_{IN}=V_{OUT(S)} ×0.6 applied, I_{OUT}=V_{OUT(S)} / 250 Ω2、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.

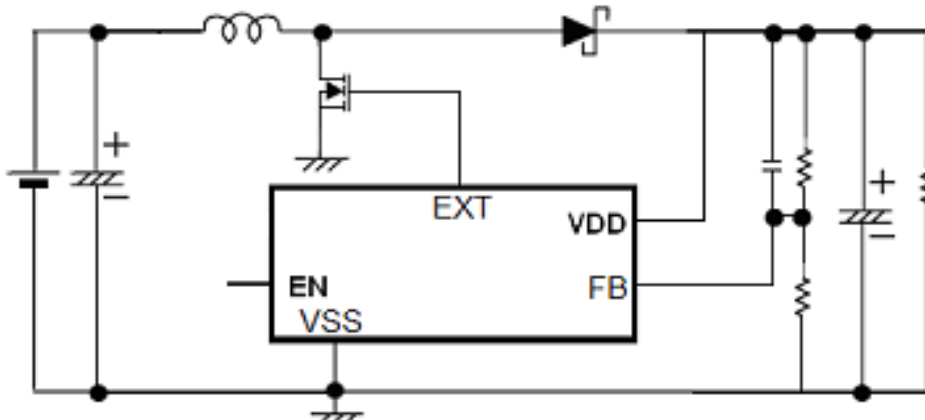
■ Standard Circuits

Component: Inductor: 22uH(Sumida) Diode: IN5817、IN5819
 Capacitor: 47uF (Tantalum type) MOS: CE2312、XP151、XP161
 R_{FB} : Set up so that $R_{FB1}/R_{FB2} = (V_{OUT} - V_{FB}) / V_{FB}$ (V_{OUT} =set-up output voltage) ,
 Please use with $R_{FB1} + R_{FB2} \leq 2M \Omega$
 C_{FB} : Set up that $Fz_{fb} = 1/(2 \times \pi \times C_{FB} \times R_{FB1})$ is within the Adjustments necessary
 in respect of L, C_L.

1、CE9908 Circuits 1:($V_{IN} \geq 3V$)

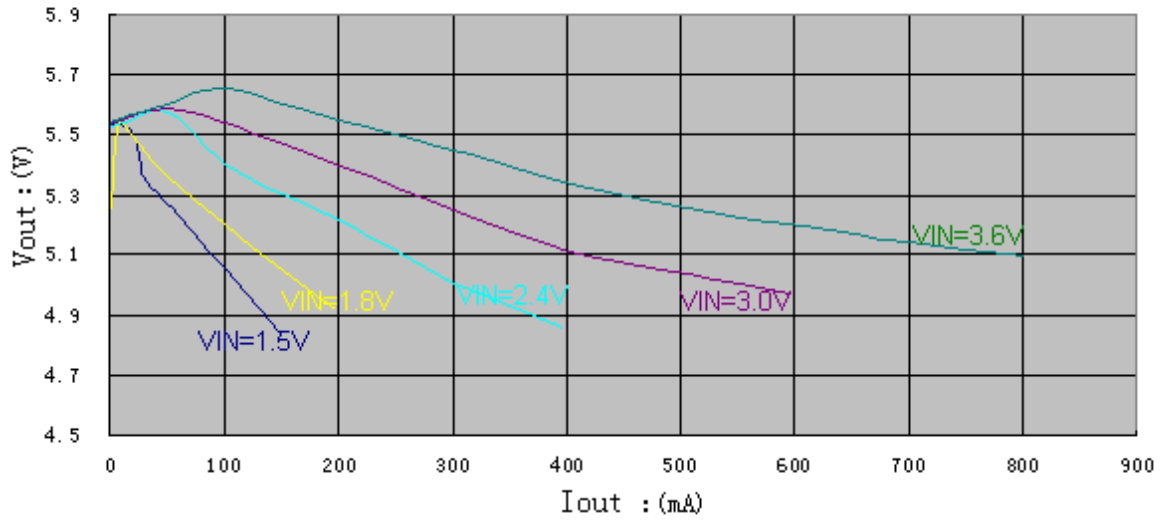


2、CE9908 Circuits 2:($V_{IN} \leq 3V$)

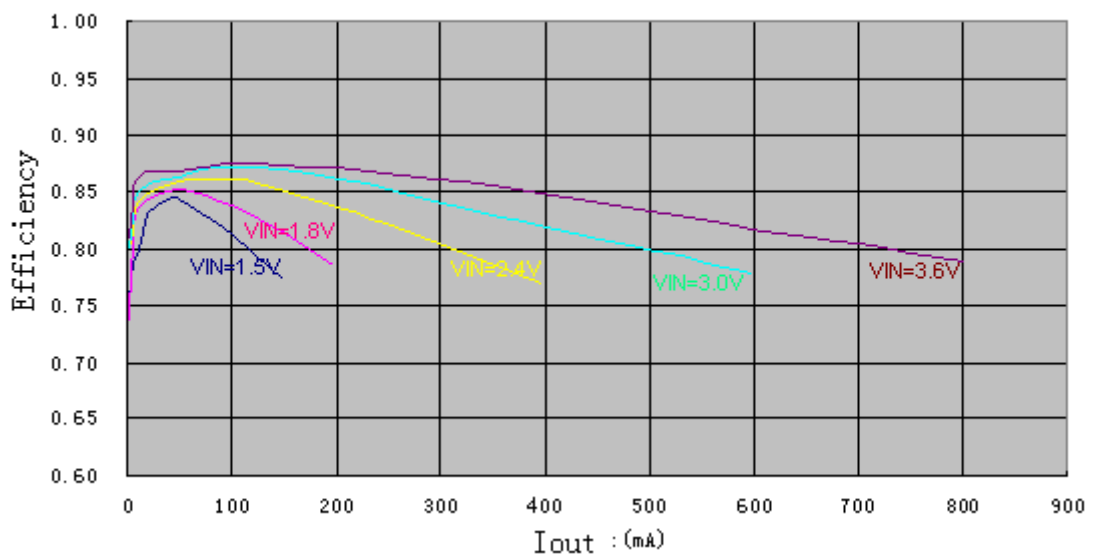


■ Characteristics

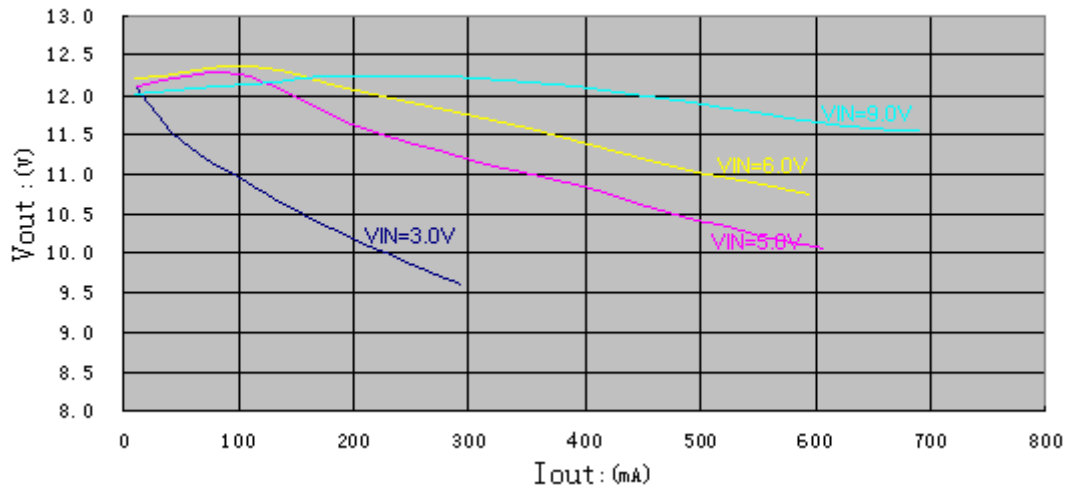
A. V_{OUT} VS I_{OUT} : ($V_{OUT}=5.5V$)



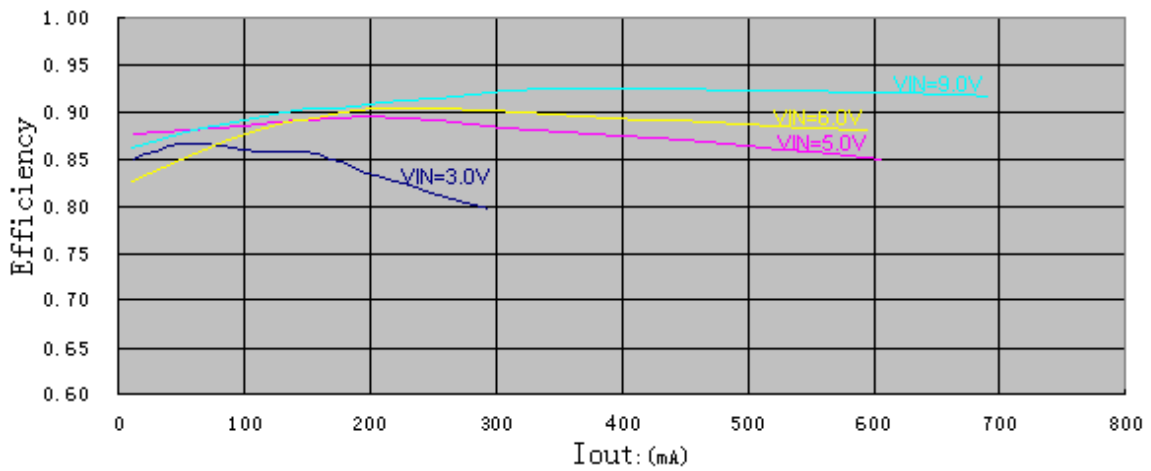
B. Efficiency VS I_{OUT} : ($V_{OUT}=5.5V$)



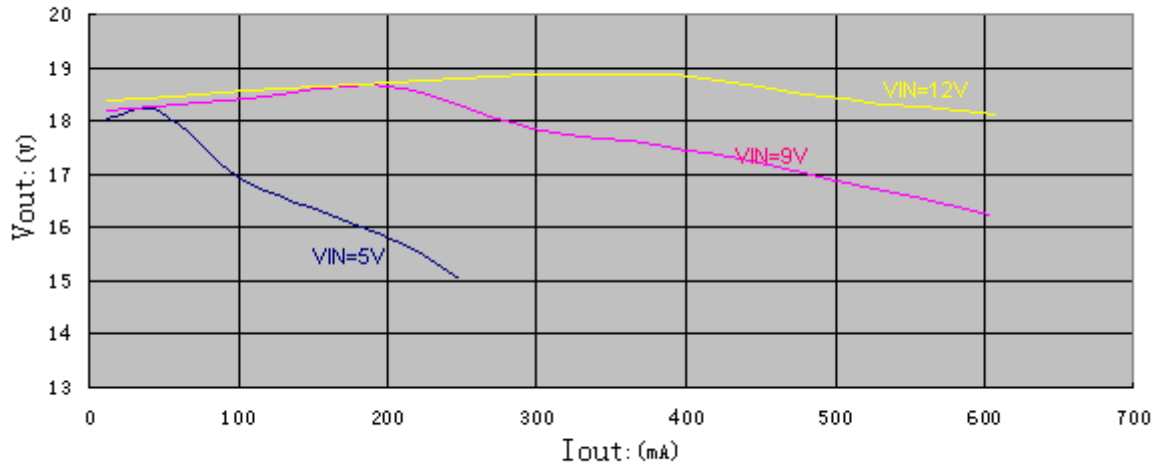
C. V_{OUT} VS I_{OUT} : ($V_{OUT}=12V$)



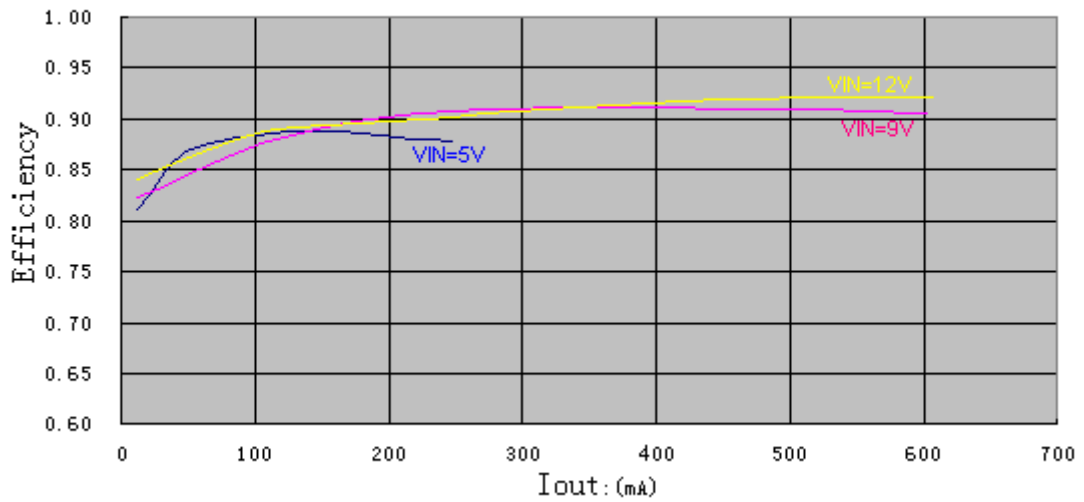
D. Efficiency VS I_{OUT} : ($V_{OUT}=12V$)



E. V_{OUT} VS I_{OUT} : ($V_{OUT}=18V$)

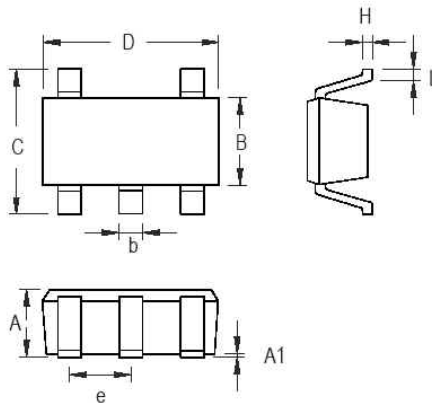


F. Efficiency VS I_{OUT} : ($V_{OUT}=18V$)



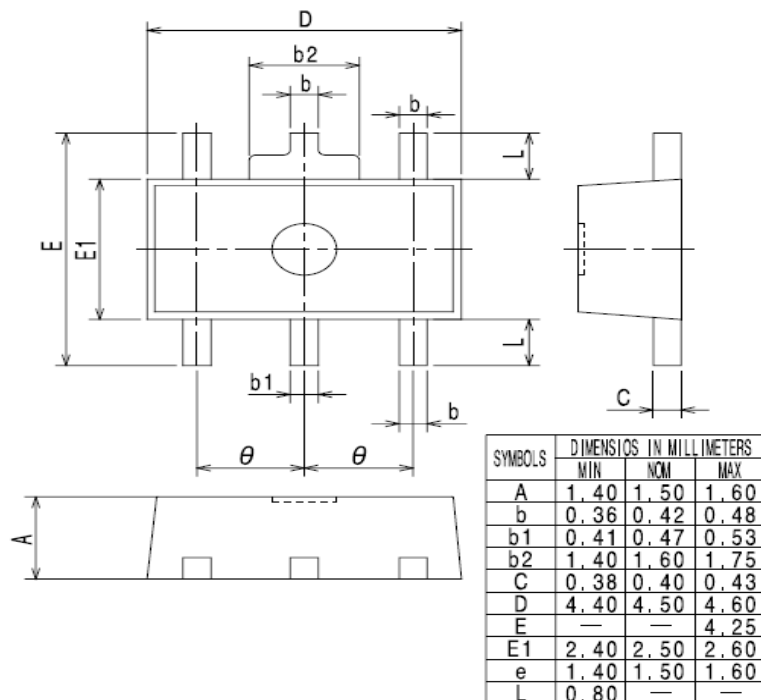
■ Package information

● 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



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	1.40	1.50	1.60
b	0.36	0.42	0.48
b1	0.41	0.47	0.53
b2	1.40	1.60	1.75
C	0.38	0.40	0.43
D	4.40	4.50	4.60
E	—	—	4.25
E1	2.40	2.50	2.60
e	1.40	1.50	1.60
L	0.80	—	—

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