一，概述

EC0091A 和EC0092A 为CMOS的单声道音频功率放大器IC ，利用大型体积电路（LSI）制造技术，具有低电源及低成本的特性， 在使用时只需要很少的周边元件 。EC0091A 是一款桥式 (Bridge-Tied Load)音频 功率放大器，EC0092A 则是一款桥式 (Bridge-Tied Load)或单端/接地(Single-Ended) 可支援耳机输出的音频 功率放大器。在5V电源电压下，它能向4Ω负载提供2.5W的输出功率，或向3Ω负载提供3.0W 的输出功率，THD+N 小于10%。

二，功能

(1). 宽广的工作电压：1.8V ~ 6.8V。

(2). EC0091A: 桥式(BTL, Bridge-Tied Load)。

(3). EC0092A: 桥式(BTL, Bridge-Tied Load) 或 单端/接地(SE, Single-Ended) 模式操作。

(4). 高输出功率：P_{OUT} 为2.5W ，条件为V_{DD} = 5V, Load = 4Ω, f = 1kHz 和 THD+N = 10%。

(5).低关断（待机）电流。(Typ.=0.1uA)

(6). 支援PWM差动讯号输入 (Differential signal input)。(EC0091A)

(7). 不需额外的输出耦合电容，缓冲电容式负载（蜂鸣片）。

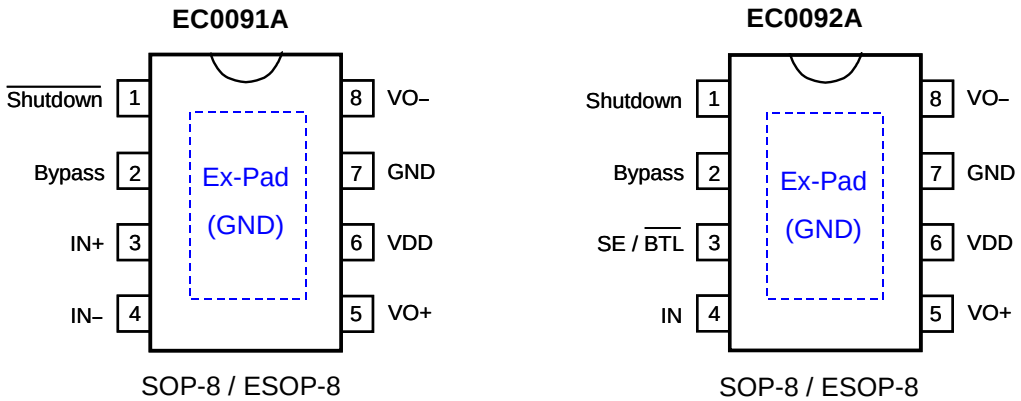
(8). BTL桥式输出能够直接推动电容式负载（蜂鸣片）。

(9). 内建自动 Ramp-up/Ramp-down 线路，能有效抑制开关时的杂音 (Pop noise)，可以使用C_b Bypass电容来调整Ramp-up/Ramp-down的时间。

(10). 内建过温保护功能 (TSD, Thermal Shutdown)。

(11). 高达5KV的人体静电模式（HBM）的ESD保护。

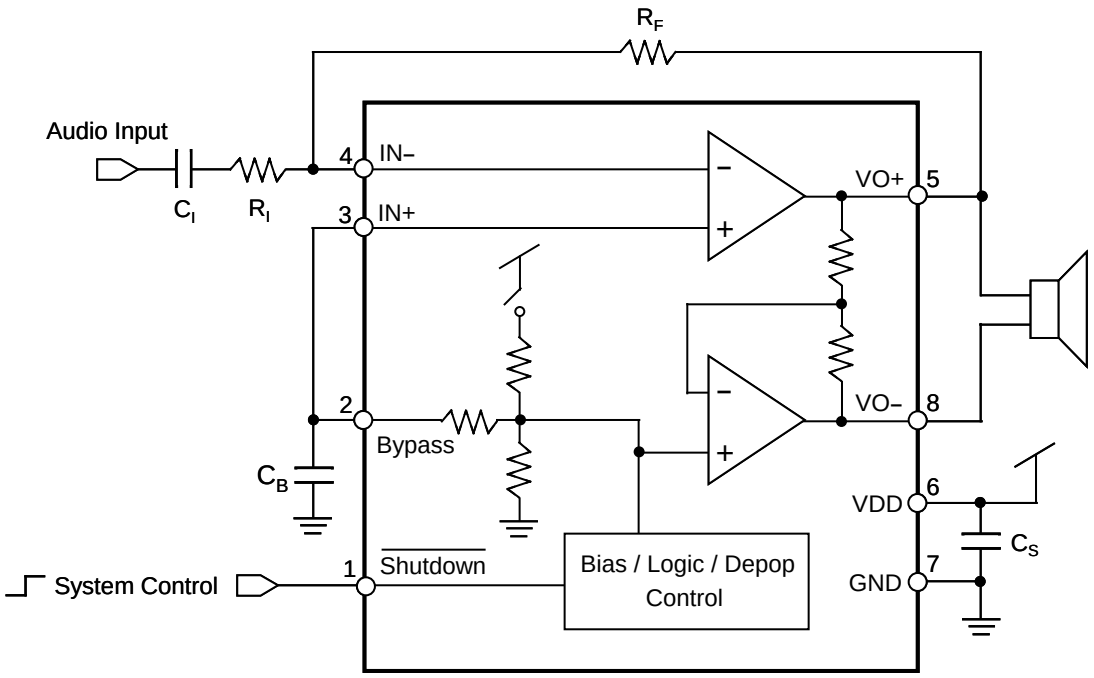
(12). 提供 SOP-8 和 ESOP-8 封装。



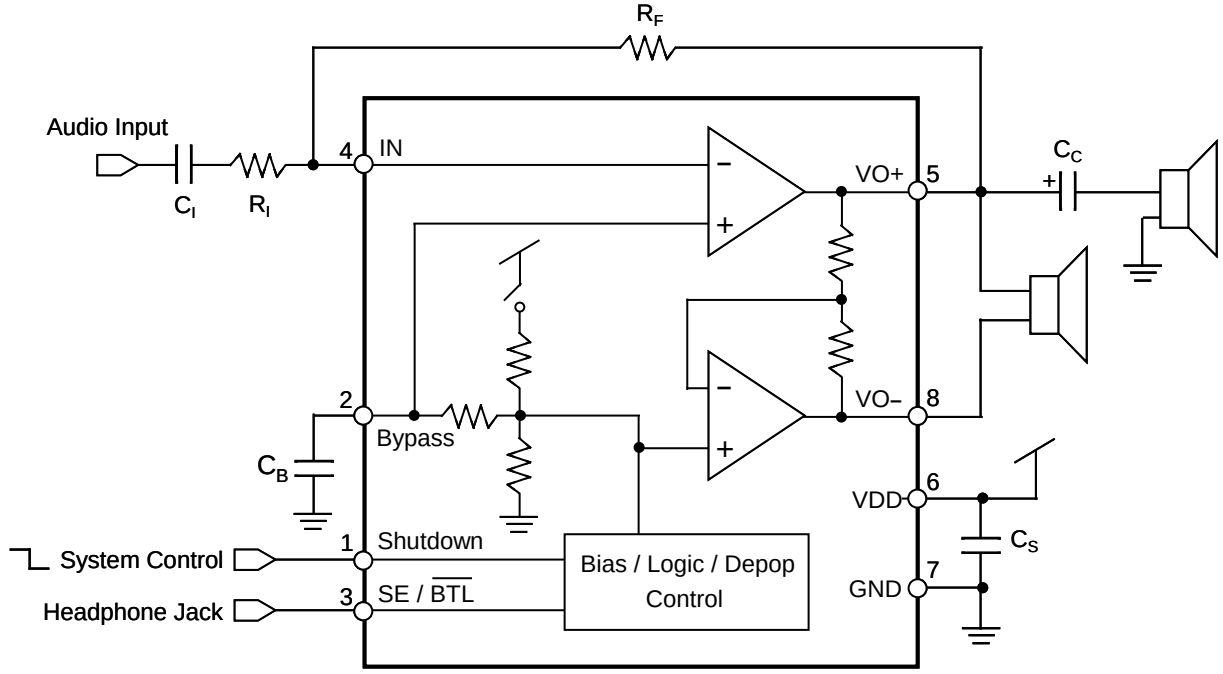
ESOP-8才有的外部焊垫，必须接到PCB的接地散热片以利散热。

3. BLOCK DIAGRAM

3.1 EC0091A



3.2 EC0092A



4. PIN DESCRIPTION

4.1 EC0091A

Pin #	Pin Name	ATTR.	Description
1	$\overline{\text{Shutdown}}$	I	Active low input to disable EC0091A operation.
2	Bypass	I	Mid-supply bias at VDD/2 with an external 0.1uF ~ 1.0uF capacitor.
3	IN+	I	Non-inverting input.
4	IN-	I	Inverting input.
5	VO+	O	Positive BTL output.
6	VDD	Power	Power input.
7	GND	Power	Ground reference.
8	VO-	O	Negative BTL output.
9	Ex-Pad	Power	Exposed pad for thermal tab, must be connected to GND. *(ESOP-8 only)*

4.2 EC0092A

Pin #	Pin Name	ATTR.	Description
1	Shutdown	I	Active high input to disable EC0092A operation.
2	Bypass	I	Mid-supply bias at VDD/2 with an external 0.1uF ~ 1.0uF capacitor.
3	SE / $\overline{\text{BTL}}$	I	When this input is high, EC0092A is in SE mode. When this input is low, EC0092A is in BTL mode.
4	IN	I	Inverting input.
5	VO+	O	Positive BTL output.
6	VDD	Power	Power input.
7	GND	Power	Ground reference.
8	VO-	O	Negative BTL output.
9	Ex-Pad	Power	Exposed pad for thermal tab, must be connected to GND. *(ESOP-8 only)*

5. ELECTRICAL CHARACTERISTICS

5.1 Absolute Maximum Rating

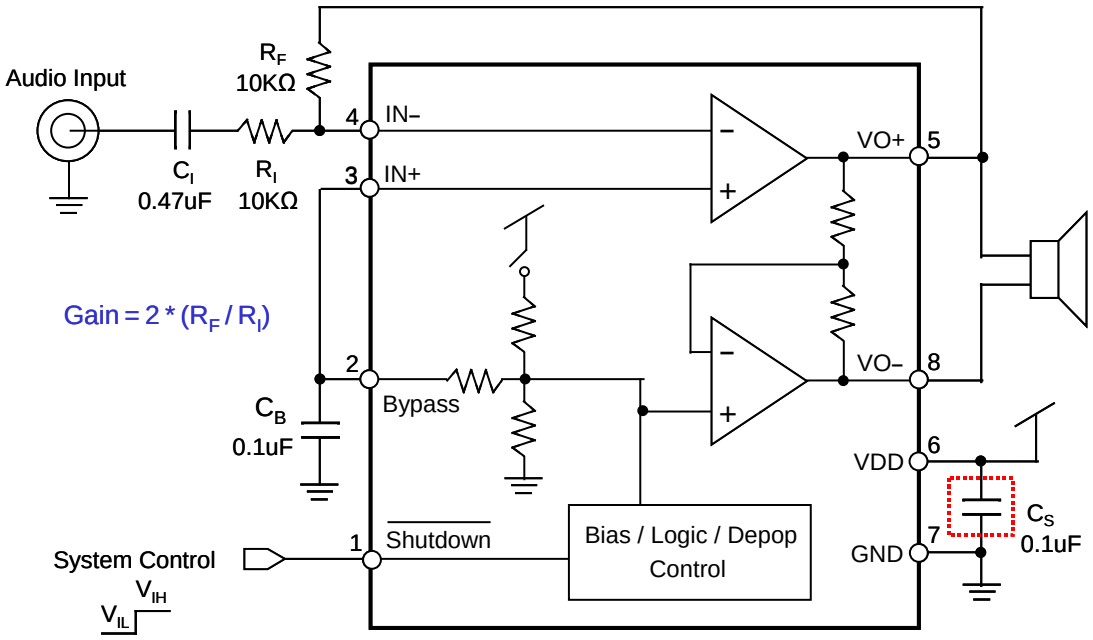
Symbol	Parameter		Rating	Unit
V_{DD} - V_{SS}	Supply voltage		-0.5 ~ +7.0	V
V_{IN}	Input voltage		V_{SS}-0.3V ~ V_{DD}+0.3	V
θ_{JA}	Thermal resistance (Junction to Ambient)	SOP-8	150	°C/W
		ESOP-8	60	
P_D	Power dissipation	SOP-8	1.0	W
		ESOP-8	2.5	
T_A	Operating ambient temperature		-40 ~ +85	°C
T_J	Operating junction temperature		+170	°C
T_{ST}	Storage temperature		-55 ~ +170	°C

5.2 DC Characteristics *(V_{DD}=5.0V, T_A=25ºC, unless otherwise specified)*

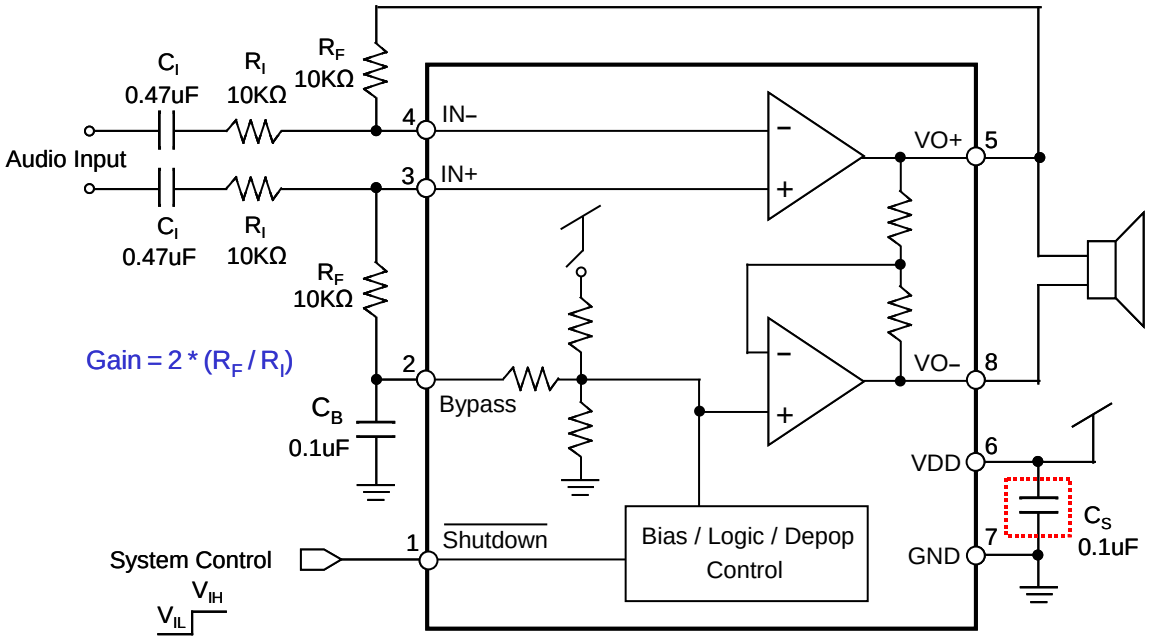
Symbol	Parameter		Min.	Typ.	Max.	Unit	Condition
V_{DD}	Operating voltage		1.8		6.8	V	
I_{SB}	Standby (Shutdown) current			0.1	1	uA	Shutdown is enabled.
I_{OP}	Operating current (BTL mode)	V_{DD} = 3.0V		1.6		mA	No load
		V_{DD} = 5.0V		2.0		mA	
	Operating current (SE mode)	V_{DD} = 3.0V		0.9		mA	
		V_{DD} = 5.0V		1.2		mA	
THD+N	Total harmonic distortion + noise			0.1		%	R_L = 4Ω, P_{OUT} = 1.0W
				0.1		%	R_L = 8Ω, P_{OUT} = 1.0W
SNR	Signal-to-Noise ratio			100		dB	R_L = 4Ω, P_{OUT} = 1.6W
				102		dB	R_L = 8Ω, P_{OUT} = 1.0W
P_{OUT}	Output power (f = 1kHz)	R_L = 4Ω		2.0		W	THD+N = 1%
				2.5		W	THD+N = 10%
		R_L = 8Ω		1.3		W	THD+N = 1%
				1.6		W	THD+N = 10%
V_{OS}	Output offset voltage			6	30	mV	V_{IN} = 0V
PSRR	Power supply rejection ratio			70		dB	f = 1kHz
T_{ON}	Wakeup time (BTL mode)			63		ms	C_B = 0.1uF
				100		ms	C_B = 0.47uF
	Wakeup time (SE mode)			70		ms	C_B = 0.1uF
				145		ms	C_B = 0.47uF
T_{OFF}	Shutdown time (BTL mode)			5		ms	C_B = 0.1uF
				37		ms	C_B = 0.47uF
	Shutdown time (SE mode)			25		ms	C_B = 0.1uF
				160		ms	C_B = 0.47uF

7. APPLICATION CIRCUIT

7.1 EC0091A Typical Application

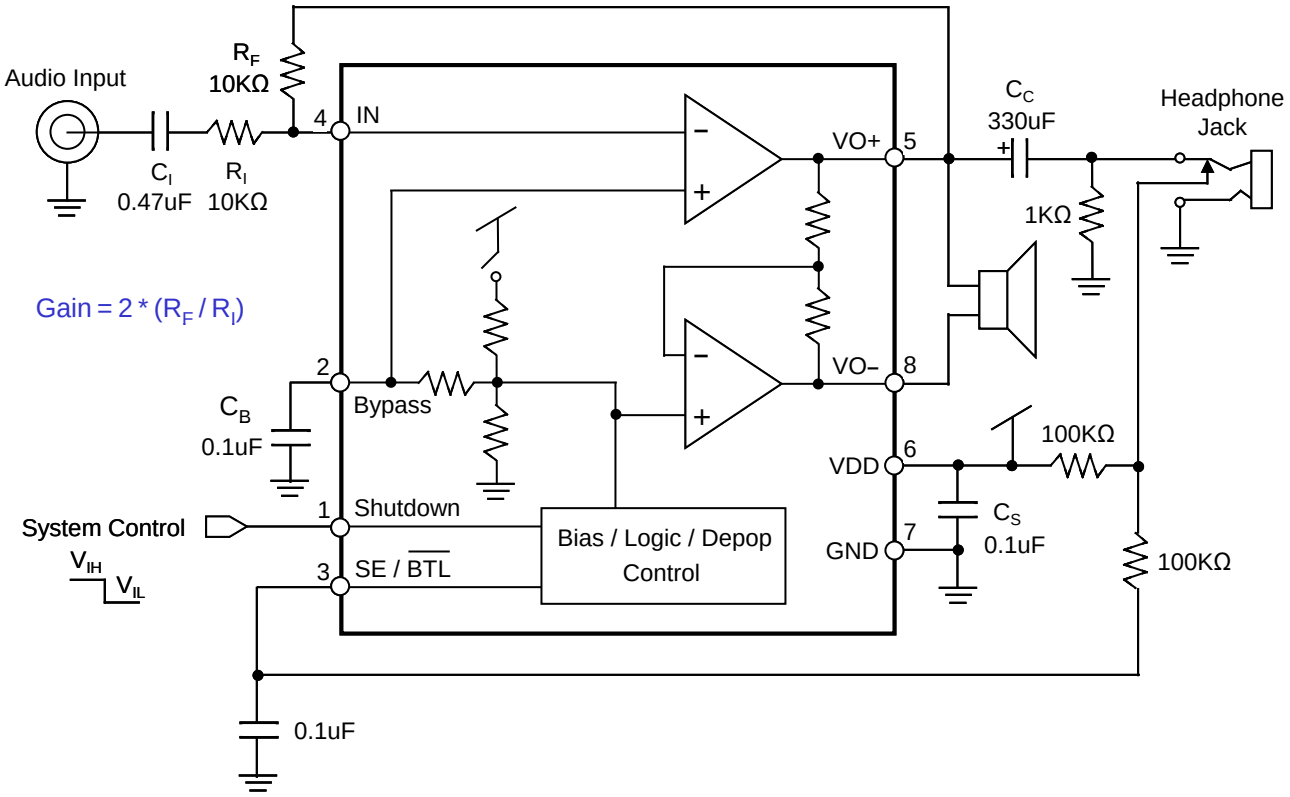


7.2 EC0091A Differential Input Application



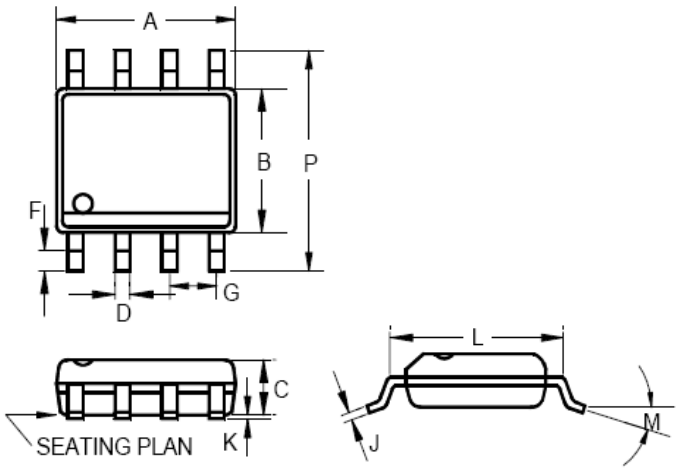
** In toy application, C_S (0.1uF) can be saved, but please reserve C_S space at PCB layout.*

7.3 EC0092A Typical Application



8. PACKAGE DIMENSION

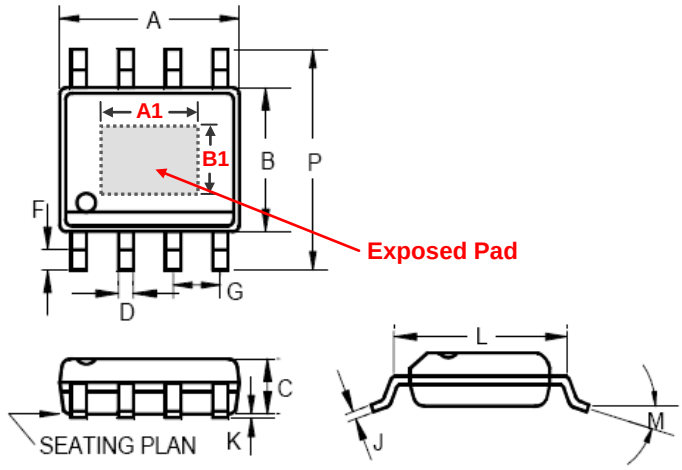
8.1 8-Pin Plastic SOP (150 mil)



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.183	-	0.202	4.65	-	5.13
B	0.144	0.150	0.163	3.66	3.81	4.14
C	0.068	-	0.074	1.35	-	1.88
D	0.010	-	0.020	0.25	-	0.51
F	0.015	-	0.035	0.38	-	0.89
G	0.050 BSC			1.27 BSC		
J	0.007	-	0.010	0.19	-	0.25
K	0.005	-	0.010	0.13	-	0.25
L	0.189	-	0.205	4.80	-	5.21
M	-	-	8°	-	-	8°
P	0.228	-	0.244	5.79	-	6.20

Note: For 8-pin SOP IC, 100 units per tube.

8.2 8-Pin Plastic ESOP with Exposed Pad (150 mil)



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.183	-	0.202	4.65	-	5.13
B	0.144	0.150	0.163	3.66	3.81	4.14
C	0.068	-	0.074	1.35	-	1.88
D	0.010	-	0.020	0.25	-	0.51
F	0.015	-	0.035	0.38	-	0.89
G	0.050 BSC			1.27 BSC		
J	0.007	-	0.010	0.19	-	0.25
K	0.005	-	0.010	0.13	-	0.25
L	0.189	-	0.205	4.80	-	5.21
M	-	-	8°	-	-	8°
P	0.228	-	0.244	5.79	-	6.20
A1	0.077		0.090	1.95	-	2.28
B1	0.077		0.090	1.95	-	2.28

Note: For 8-pin SOP IC, 100 units per tube.

9. ORDERING INFORMATION

P/N	Shipping Type	Remarks
EC0091AS8	SOP-8	Width 150 mil.
EC0091AE8	ESOP-8	Width 150 mil.
EC0092AS8	SOP-8	Width 150 mil.
EC0092AE8	ESOP-8	Width 150 mil.