

## PRELIMINARY

## SURROUND PROCESSOR

### DESCRIPTION

AA8334 is an analog stereo enhancement processor. It creates a stereo image with depth in three dimensions from ordinary left and right input channels. The patented QXpander (\*1) technology developed by QSound Labs, Inc., is faithfully implemented by Agamem(\*2).



Note 1: QXpander® is a stereo to 3D enhancement processor and is a trademark of QSound Labs, Inc...

Note 2: Agamem has got licensing agreement of QXpander® from QSound Labs, Inc...

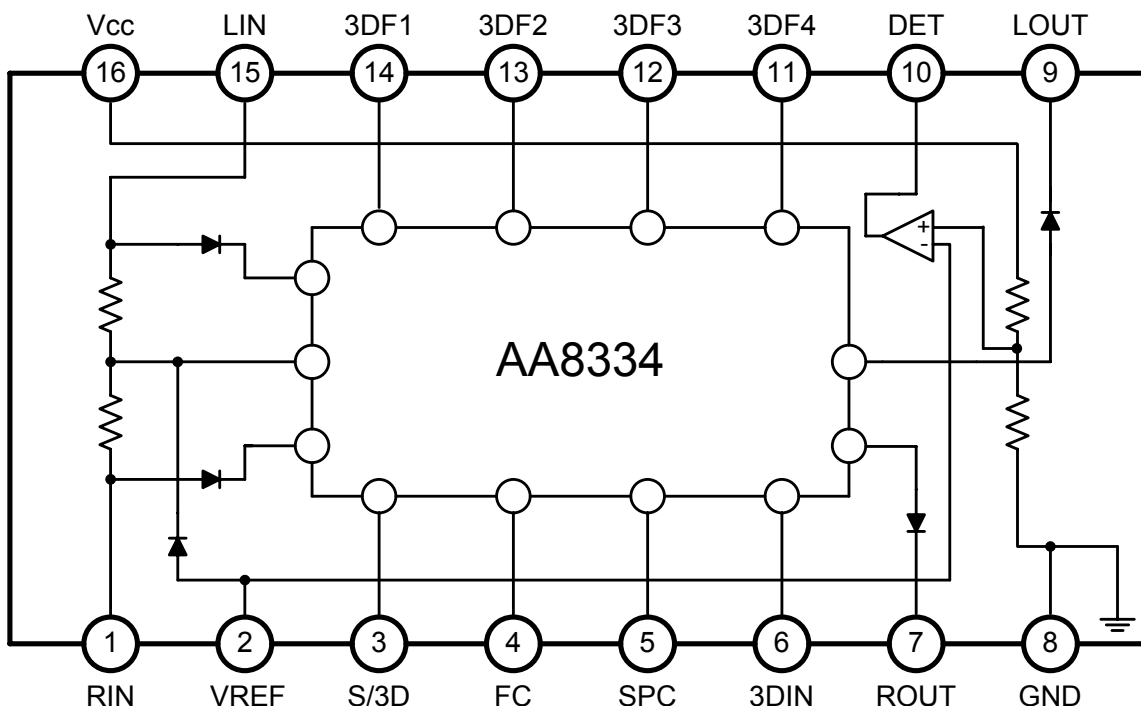
### FEATURES

- Sound spreading can be easily adjusted using an external VR.
- Few external components required through use of internal filter circuit.
- QXpander on/off switching at TTL level.

### APPLICATIONS

- Sound enhancement processor for LCD TV, home theater, PC, notebook and car stereo.

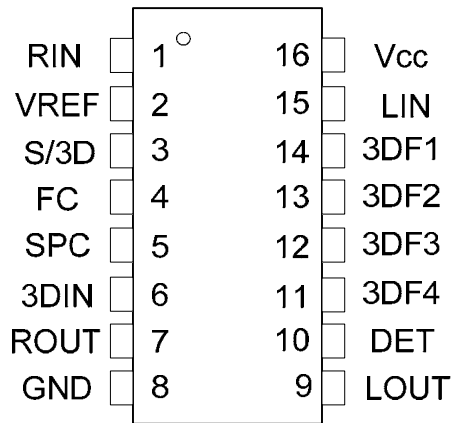
### BLOCK DIAGRAM



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■ **PIN DESCRIPTIONS**



TOP VIEW

PIN NO.	PIN NAME	PIN FUNCTION
1	RIN	Input pin R
2	VREF	DC reference voltage pin
3	S/3D	STEREO/3D (QXpander) sound switch pin
4	FC	Filter frequency control pin
5	SPC	Spread control pin
6	3DIN	3D (QXpander) input pin
7	ROUT	Output pin R
8	GND	GND pin
9	LOUT	Output pin L
10	DET	VCC off detect pin
11	3DF4	Filter pin 4
12	3DF3	Filter pin 3
13	3DF2	Filter pin 2
14	3DF1	Filter pin 1
15	LIN	Input pin L
16	VCC	Supply voltage pin



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■ **ABSOLUTE MAXIMUM RATINGS**

Ta=25°C

PARAMETER	SYMBOL	RATING	UNIT
Storage temperature	TSTG	-40~+125	°C
Operating temperature	TOPR	-40~+85	°C
Power supply voltage	VCC max.	12	V
Input voltage	VIN max.	0 ≤ VIN ≤ VCC	V
Output current	Io max.	10	mA
Allowable loss	Pd	350	mW

WARNING: Semiconductor devices can be permanently damaged by application of stress (voltage, current, temperature, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

■ **RECOMMENDED OPERATING RANGE**

Ta = +25 °C

ITEM	SYMBOL	RATINGS	UNIT
Operating temperature	TOPR	-40~+85	°C
Operating voltage QXpander	Vopq	3.8~9.0 R1=18kΩ	V
Operating voltage bypass	Vopb	3.0~9.0	V

■ **ELECTRICAL CHARACTERISTICS**

TA = 25°C, Vcc = 8V, Vbyp=5V

SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
ICC	Consumption current			12	22	mA
Gqx1	Voltage gain QXpander 1	ZLIN : 0.5Vrms, 1kHz , TP1	7.6	9.1	10.6	dB
Gqx2	Voltage gain QXpander 2	ZLIN : 0.5Vrms, 1kHz , TP2	4.1	5.6	7.1	dB
Gqx3	Voltage gain QXpander 3	ZRIN : 0.5Vrms, 1kHz , TP2	7.6	9.1	10.6	dB



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SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
Gqx4	Voltage gain QXpander 4	ZRIN : 0.5Vrms, 1kHz, TP1	4.1	5.6	7.1	dB
Gby1	Voltage gain bypass 1	ZLIN : 0.5Vrms, 1kHz, Vbyp=0V, TP1	-1	0	1	dB
Gby2	Voltage gain bypass 2	ZRIN : 0.5Vrms, 1kHz, Vbyp=0V, TP2	-1	0	1	dB
VIN1	Input voltage (1)	VCC=8V *1, ZLIN : 0.5Vrms, 1kHz, TP1, or ZRIN : 0.5Vrms, 1kHz,TP2	0.5	0.7		Vrms
VIN2	Input voltage (2)	VCC=3.8V, ZLIN : 0.5Vrms, 1kHz, TP1, or ZRIN : 0.5Vrms, 1kHz,TP2	0.15	0.25		Vrms
VIN3	Input voltage (3)	VCC=3V, ZLIN : 0.5Vrms, 1kHz, TP1, or ZRIN : 0.5Vrms, 1kHz,TP2	0.3	0.45		Vrms
VIN4	Input voltage (4)	VCC=8V *2, ZLIN : 0.5Vrms, 1kHz, TP1, or ZRIN : 0.5Vrms, 1kHz,TP2	0.25	0.35		Vrms
THDqx	Total harmonic distortion QXpander	ZLIN : 0.5Vrms, 1kHz, TP1, or ZRIN : 0.5Vrms, 1kHz,TP2		0.4	1.0	%
THDby	Total harmonic distortion bypass	ZLIN : 0.5Vrms, 1kHz, TP1, or ZRIN : 0.5Vrms, 1kHz,TP2, Vbyp=0V		0.03	0.3	%
Cb	R-L channel balance	ZLIN : 0.5Vrms, 1kHz, TP1, and ZRIN : 0.5Vrms, 1kHz,TP2, Vbyp=0V	-1.0	0	1.0	dB
Vbyph	Bypass pin voltage (H)	*3	2.1		VCC	V
Vbypl	Bypass pin voltage (L)	*4			0.7	V



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SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
Ibyph	Bypass pin current (H)	Vbyp=5V *5 TP5			350	uA
Ibypl	Bypass pin current (L)	Vbyp=0V *6 TP5	-10			uA
TvOFF	Recommended power supply off time	*7	0.1		1.0	S
Vdeth	DET terminal voltage (H)	*7 TP6	7.5			V
Vdetl	DET terminal voltage (L)	*7 TP6			0.7	V
Iref	VREF terminal current	SW2 : B	-2.2	-0.6	1	uA
RIN	Input resistance	TP3, TP4	21	30	39	kΩ
PSRRqx	Power supply ripple rejection ratio QXpander	VCC : 8Vdc and 50mVrms, 100Hz *8, TP1 or TP2		-40	-30	dB
PSRRby	Power supply ripple rejection ratio bypass	VCC : 8Vdc and 50mVrms, 100Hz *8, Vbyp=0V, TP1 or TP2		-55	-40	dB
Ct1	Crosstalk (1)	ZLIN : 0.5Vrms, 1kHz *9, Vbyp=0V, TP1 and TP2		-85	-70	dB
Ct2	Crosstalk (2)	ZRIN : 0.5Vrms, 1kHz *10, Vbyp=0V, TP1 and TP2		-85	-70	dB

Note 1: f=1 kHz, It is input voltage that THD of output voltage is 1%. The difference of phase between the left input signal and the right one is 0°.

Note 2: f=1 kHz, It is input voltage that THD of output voltage is 1%. The difference of phase between the left input signal and the right one is 180°.

Note 3: High-Level input voltage of BYP terminal (pin 3) (QXpander MODE)

Note 4: Low-Level input voltage of BYP terminal (pin 3) (bypass MODE)

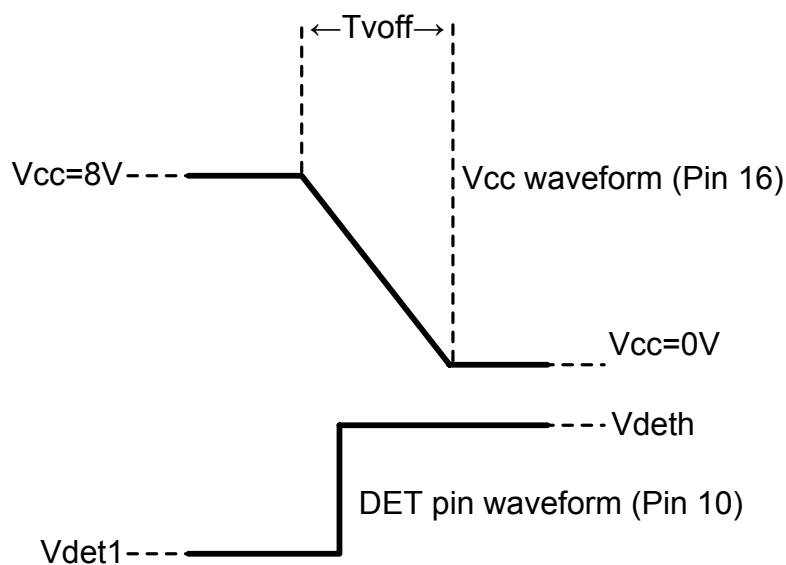
Note 5: Input current of BYP terminal (pin 3) (Vbyp=5V)

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Note 6: Input current of BYP terminal (pin 3) ( $V_{byp}=0v$ )

Note 7: The mute signal which switches off the power supply of a power amplifier that is connected with AA8334 appears in the 10 terminal. When the power supply of AA8334 is switched off, the pop noise occurs. We recommend muting the pop noise. The way is that the power supply of AA8334 is switched off after the power supply of the follow power amplifier is switched off.



Note 8: We recommend using the regulator for the power supply which occurs the ripple.

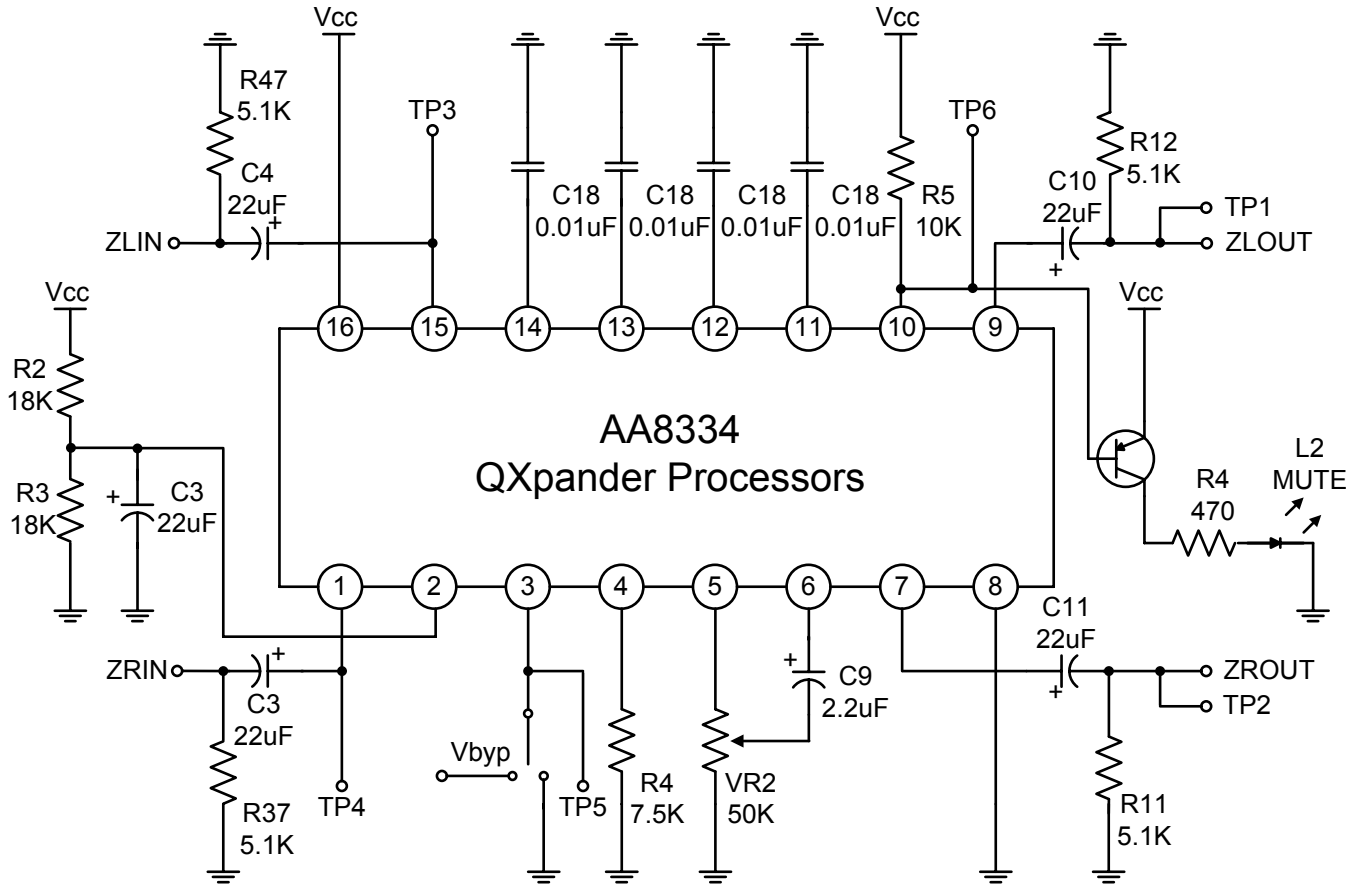
Note 9: When the signal is input in ZLIN, it is the ratio of pin 7 output voltage to pin 9 output voltage.

Note 10: When the signal is input in ZRIN, it is the ratio of pin 9 output voltage to pin 7 output voltage.

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**MEASURING CIRCUIT**

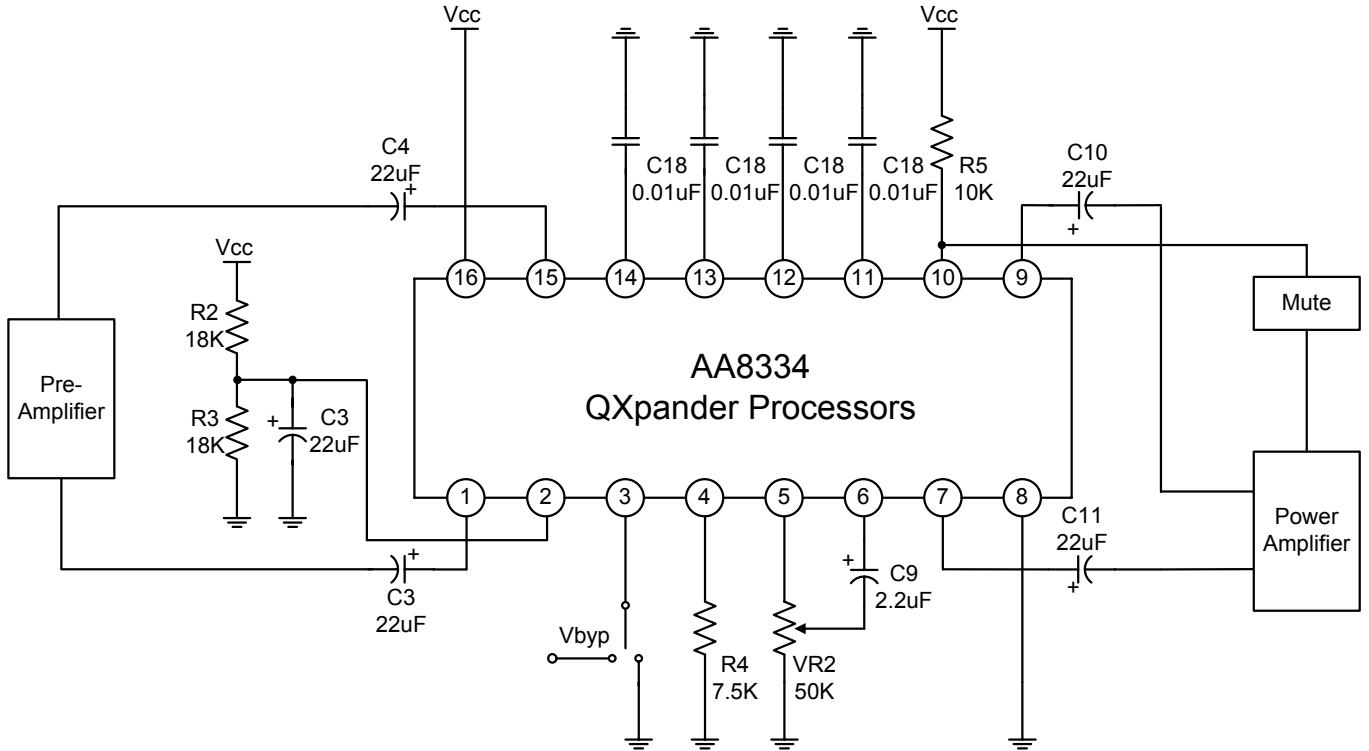


- Note 1: Capacitor Tolerance +/-5%
- Note 2: Resistor Tolerance +/-1%
- Note 3: The Vbyp range is from 2.1V to Vcc for QXpander MODE.

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**APPLICATION CIRCUIT**



Note 1: Please see recommended operating conditions Note 1).

Note 2: Capacitor tolerance +/-5%

Note 3: Resistor tolerance +/-1%

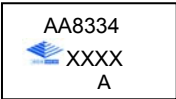
Note 4: The QXpander effect (the spread effect) is adjusted with VR.

Note 5: We recommend using the regulator for the power supply which occurs the ripple.

Note 6: The mute signal which switches off the power supply of a power amplifier that is connected with AA8334 appears in the 10 terminal.

Note 7: When the power supply is switched on, the pop noise occurs. We recommend muting the pop noise by the power amplifier that is connected with AA8334.

**ORDERING INFORMATION**

ORDER NO.	PACKAGE	PACKING	ONE REEL Q'TY	MARK CHART
AA8334A	TSSOP16L	Tape & Reel	2,500ea	

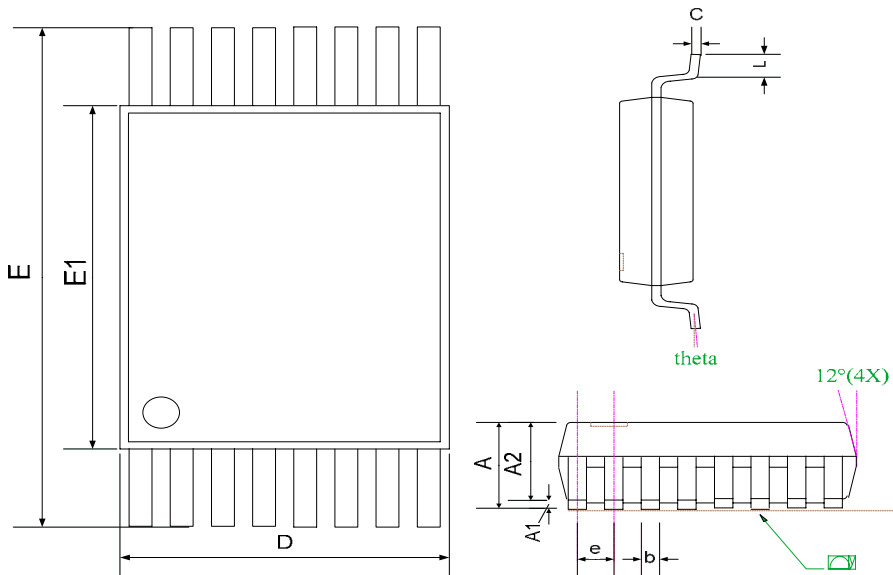


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**PACKAGE DIMENSIONS**

**TSSOP 16L**



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.20	---	---	0.048
A1	0.05	---	0.15	0.002	---	0.006
A2	0.80	1.00	1.05	0.031	0.039	0.041
b	0.19	---	0.30	0.007	---	0.012
C	0.09	---	0.20	0.004	---	0.008
D	4.90	5.00	5.10	0.193	0.197	0.201
E	6.20	6.40	6.60	0.244	0.252	0.260
E1	4.30	4.40	4.50	0.169	0.173	0.177
e	---	0.65	---	---	0.026	---
L	0.45	0.60	0.75	0.018	0.024	0.030
y	---	---	0.10	---	---	0.004
theta	0°	---	8°	0°	---	8°

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS
2. TOLERANCE +/- 0.1 mm UNLESS OTHERWISE SPECIFIED
3. COPLANARITY : 0.1 mm
4. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
5. FOLLOWED FROM JEDEC MO-153