

Pre-amplifier/Power-amplifier for Tape Recorder

Description

The CXA1262N is a bipolar IC developed for use in a low voltage monaural tape recorder. It is ideally suited for use in a portable monaural tape recorder.

Features

- Standard maximum output: 220mW (EIAJ 8 Ω load $V_{CC}=2.8V$)
- Built-in AGC.
- Built-in 1.4V regulator. (Maximum load current 20mA)
- Has REC MUTE function.
- Built-in 2-channel (switchable) power amplifier input circuit.
- Built-in audio detection amplifier compatible with a system which starts a recording in response to an audio input.
- Offers outstanding ripple rejection.

Applications

- Portable type tape recorder
- Dictating machine

Absolute Maximum Ratings (Ta=25°C)

• Supply voltage	V_{CC}	4.5	V
• Storage temperature	T_{stg}	-55 to +150	°C
• Operating temperature	T_{opr}	-20 to +75	°C
• Allowable power dissipation	P_D	470	mW

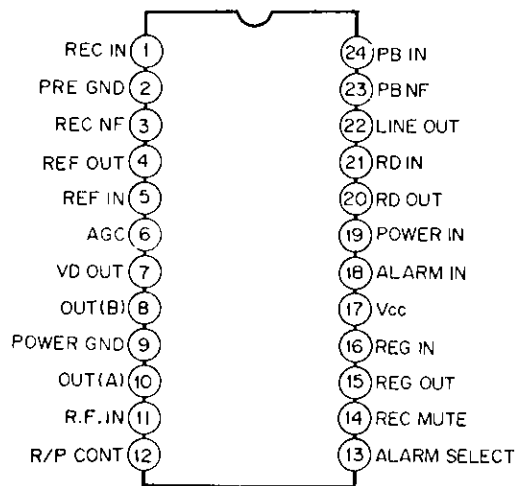
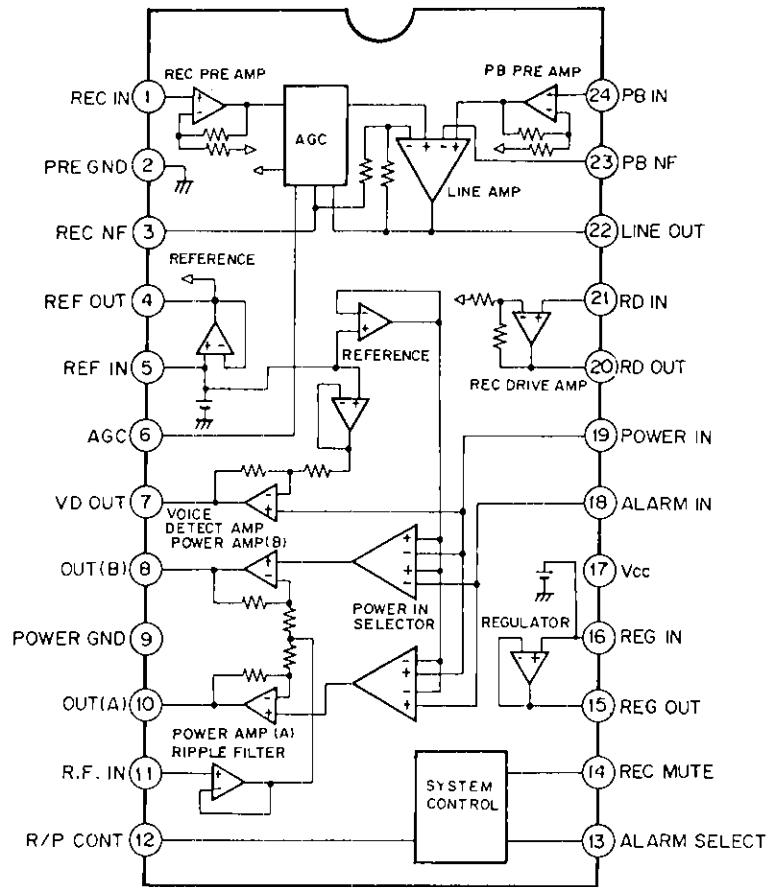
Recommended Operating Condition

V_{CC}	1.8 to 4.2	V
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24pin VSOP (Plastic)



Block Diagram and Pin Configuration



Electrical Characteristics

(Ta=25°C, V_{CC}=Specified in the table. Refer to the Electrical Characteristic Test Circuit)

No.	Item	Symbol	Condition	Test method	Test Point	Min.	Typ.	Max.	Unit
1	PB supply current	I _{PB}	V _{CC} =2.8V, I _{REG} =0	PB mode, no signal, 8Ω load on power amplifier	V _{CC}		16.5	29	mA
2	REC supply current	I _{REC}	V _{CC} =2.8V, I _{REG} =0	REC mode, no signal	V _{CC}		15	21	mA
3	Regulator output voltage	V _{REG}	V _{CC} =2.0V, I _{REG} = -15mA	PB mode	C	1.2	1.4	1.7	V
4	Offset voltage between power outputs	V _{AB}	V _{CC} =2.8V	PB mode, 8Ω load on power amplifier, SW7 OFF	A-B	-100	0	100	mV
5	Alarm changeover offset difference	V _{ALM}	V _{CC} =2.8V	PB mode, 8Ω load on power amplifier, difference in A-B offset between when SW7 is ON and when it is OFF	A-B	-60	0	60	mV
6	Mute changeover offset difference	V _{MUT}	V _{CC} =2.8V	REC mode, difference in offset at point C between when SW8 is ON and when it is OFF	C	-12	0	12	mV
7	PB amplifier gain	G _{PB}	V _{CC} =2.8V	PB IN -67.8dBm, 1kHz	D	50	53	56	dB
8	REC amplifier gain	G _{REC}	V _{CC} =2.8V	REC IN -77.8dBm, 1kHz	D	47	50	53	dB
9	RD amplifier gain	G _{RD}	V _{CC} =2.8V	RD IN -17.8dBm, 1kHz	D	10	12	14	dB
10	VD amplifier gain	G _{VD}	V _{CC} =2.8V	POWER IN -37.8dBm, 1kHz	D	19	22	25	dB
11	Power amplifier gain	G _{PWR}	V _{CC} =2.8V	POWER IN -37.8dBm, 1kHz	D	30	33	36	dB
12	Power/alarm gain difference	G _{DPA}	V _{CC} =2.8V	Difference between alarm amplifier gain and power amplifier gain with SW7 ON	D	-3	0	3	dB
13	AGC characteristics (1)	V _{A1}	V _{CC} =2.0V	REC IN -67.8dBm, 1kHz	D	-10.5	-7.0	-3.5	dBm
14	AGC characteristics (2)	V _{A2}	V _{CC} =2.0V	REC IN -27.8dBm, 1kHz	D	-6.0	-3.8	-1.6	dBm
15	THD (1)	THD1	V _{CC} =2.0V	PB IN -67.8dBm, 1kHz	D		0.6	3	%
16	THD (2)	THD2	V _{CC} =2.0V	REC IN -57.8dBm, 1kHz	D		0.8	3	%
17	THD (3)	THD3	V _{CC} =2.0V	REC IN -27.8dBm, 1kHz	D		1.2	10	%
18	THD (4)	THD4	V _{CC} =2.8V	OUT (A)-OUT (B) -7.8dBm, 1kHz 8Ω load	D		0.7	3	%
19	THD (5)	THD5	V _{CC} =2.8V	OUT (A) -7.8dBm, 1kHz 33μF+8Ω load	D		0.9	4	%
20	EIAJ maximum output	V _P	V _{CC} =2.8V	OUT (A)-OUT (B), 8Ω load 1kHz, THD 10%	D	150	220		mV
21	Noise (1)	N ₁	V _{CC} =2.8V	PB mode, no signal, LINE OUT, 100Hz to 7kHz BPF used	D		-68	-60	dBm
22	Noise (2)	N ₂	V _{CC} =2.8V	REC mode, no signal, RD OUT, 100Hz to 7kHz BPF used	D		-54	-46	dBm
23	Ripple rejection (1)	R ₁	V _{CC} =2.0V	PB mode, LINE OUT, ripple 200Hz, -20dBm, 200Hz BPF used	D	40	50		dB

No.	Item	Symbol	Condition	Measuring method	Test Point	Min.	Typ.	Max.	Unit
24	Ripple rejection (2)	R_2	$V_{CC}=2.0V$	REC mode, RD OUT, ripple 200Hz, -20dBm, 200Hz BPF used	D	18	30		dB
25	Ripple rejection (3)	R_3	$V_{CC}=2.0V$	PB mode, OUT (A), volume control at minimum position, ripple 200Hz, -20dBm, 200Hz BPF used	D	20	35		dB
26	Ripple rejection (4)	R_4	$V_{CC}=2.0V$ $I_{REG}=0$	PB mode, REG OUT, ripple 200Hz, -20dBm, 200Hz BPF used	D	35	47		dB
27	REC MUTE crosstalk	C_{TM}	$V_{CC}=2.0V$	REC mode, RDIN -7.8dBm, 1kHz → RD OUT, 1kHz BPF used	D		-71	-56	dBm

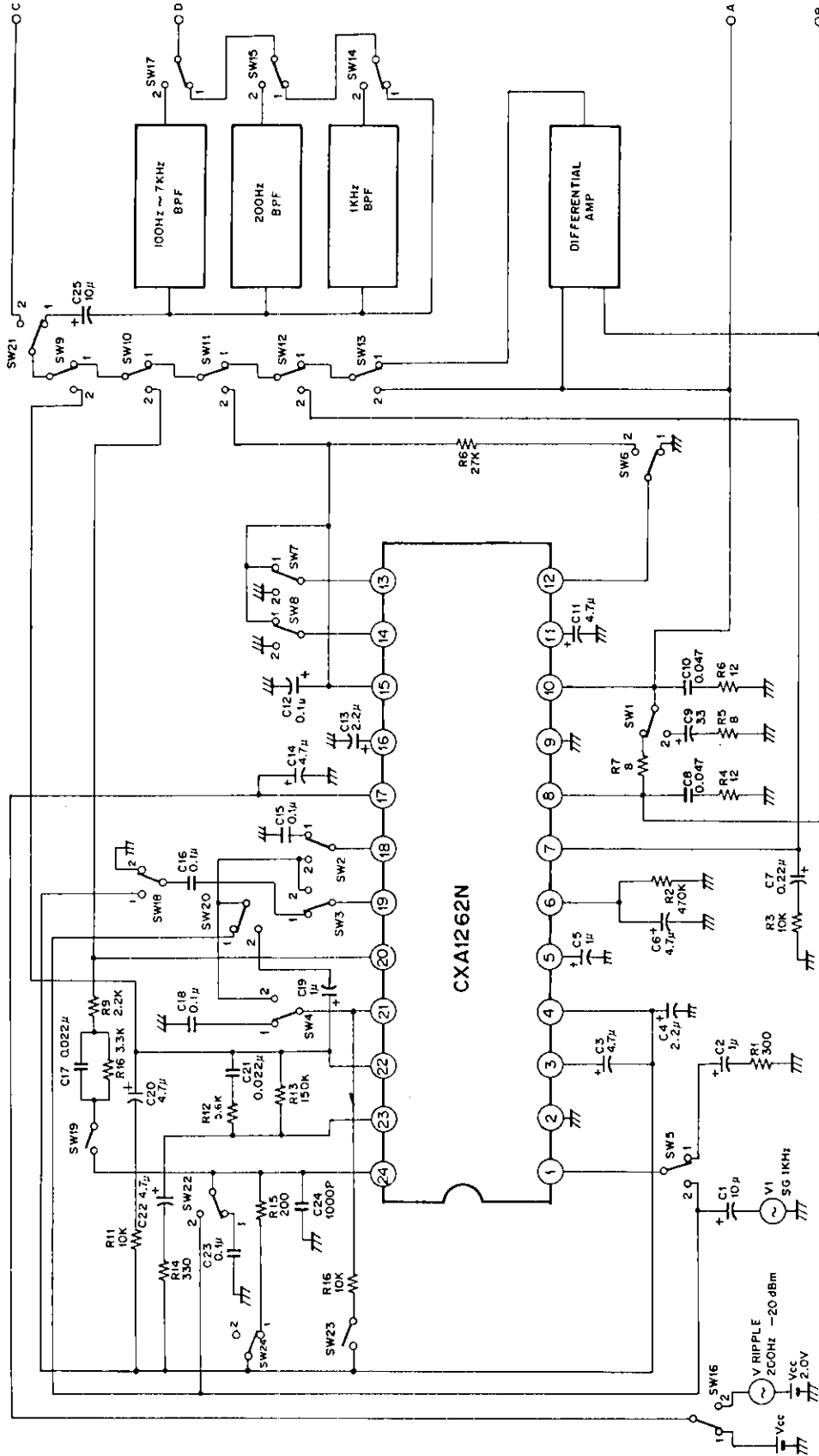
Switches to be placed in ON state when electrical characteristics are measured

(Refer to the Electrical Characteristic Test Circuit.)

Item No.	SW No.																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
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22				○		○				○					○	○	○			○	○				
23				○					○						○	○				○	○				
24				○		○				○					○	○				○	○				○
25				○									○		○	○			○	○	○				
26				○							○				○	○				○	○				
27				○		○		○		○				○						○					○

In the electrical characteristic Test circuit, switches are connected to "1" when in the OFF state and "2" when in the ON state.

Electrical Characteristic Test Circuit



Description of Operation

- ④ REF OUT pin
A low impedance pin for outputting the internal reference voltage. Since it has no capability to supply current, do not use it for any other purpose than to return preamplifier signal.
- ⑥ AGC pin
A pin for connecting AGC filter in the REC mode. Attack time is determined by resistor 750Ω in the IC and the capacity of an external capacitor. Recovery time is determined by an external resistor and capacitor.
- ⑦ VD OUT pin
In the REC mode, the VD OUT pin outputs a 22dB (typical) amplified signal input to the POWER IN. Since a signal input to the REC IN in the REC mode is output with a high amplification factor, the pin can be used as an audio detection amplifier output pin for configuration of a system that starts a recoding operation only when voice is input to a microphone.
- ⑫ R/P CONT pin
A pin for changeover between the REC and PB modes. H level (the same potential as REG OUT) causes changeover to the REC mode, whereas L level (GND) causes changeover to the PB mode. The time constant of $27k\Omega$ and $1\mu F$ (standard values respectively) provides muting during the REC/PB changeover period.
- ⑬ ALARM SELECT pin
A pin for selecting power amplifier input signal. H level (the same potential as REG OUT) causes the signal input to the POWER IN to be connected to the power amplifier, whereas L level (GND) causes the signal input to the ALARM IN to be connected to the power amplifier.
- ⑭ REC MUTE pin
A pin for control of muting in the REC mode. H level (the same potential as REG OUT) causes recording signal to be output to the RD OUT whereas L level (GND) initiates a record muting operation so that no signal will be available at the RD OUT pin.
- ⑮ REG OUT pin
A regulator output pin. Allows a maximum of 20mA load current to flow.
- ⑱ ALARM IN pin
Two power amplifier input pins are provided. One of them is the ALARM IN pin. L level (GND) on the ALARM SELECT pin initiates BTL operation of the power amplifier regardless of the REC/PB modes so that the signal input to the ALARM IN pin is amplified and output.
- ⑲ POWER IN pin
One of the two power amplifier input pins. H level (the same potential as REG OUT) on the ALARM SELECT pin initiates BTL operation of the power amplifier in the PB mode to drive the speaker. In the REC mode, H level on the ALARM SELECT pin allows a signal to be output from the OUT (A) pin for earphone monitoring, only when a plug is inserted into the earphone jack. In this case, the speaker is not driven. Input sensitivity of POWER IN pin is the same as that of ALARM IN pin.
- ⑳ RD IN pin
An input pin for the recording head drive amplifier. Designed so that when a $10k\Omega$ external resistor is connected between the RD IN and REF OUT pins, changes in the DC potential at the RD OUT pin that may result from changeover of recording muting between ON/OFF will be reduced to a minimum.
- ㉔ PB IN pin
A pin for inputting the signal of the PB head in the PB mode. DC bias for the PB IN pin is given by connecting one side of the PB head to the REF OUT pin.

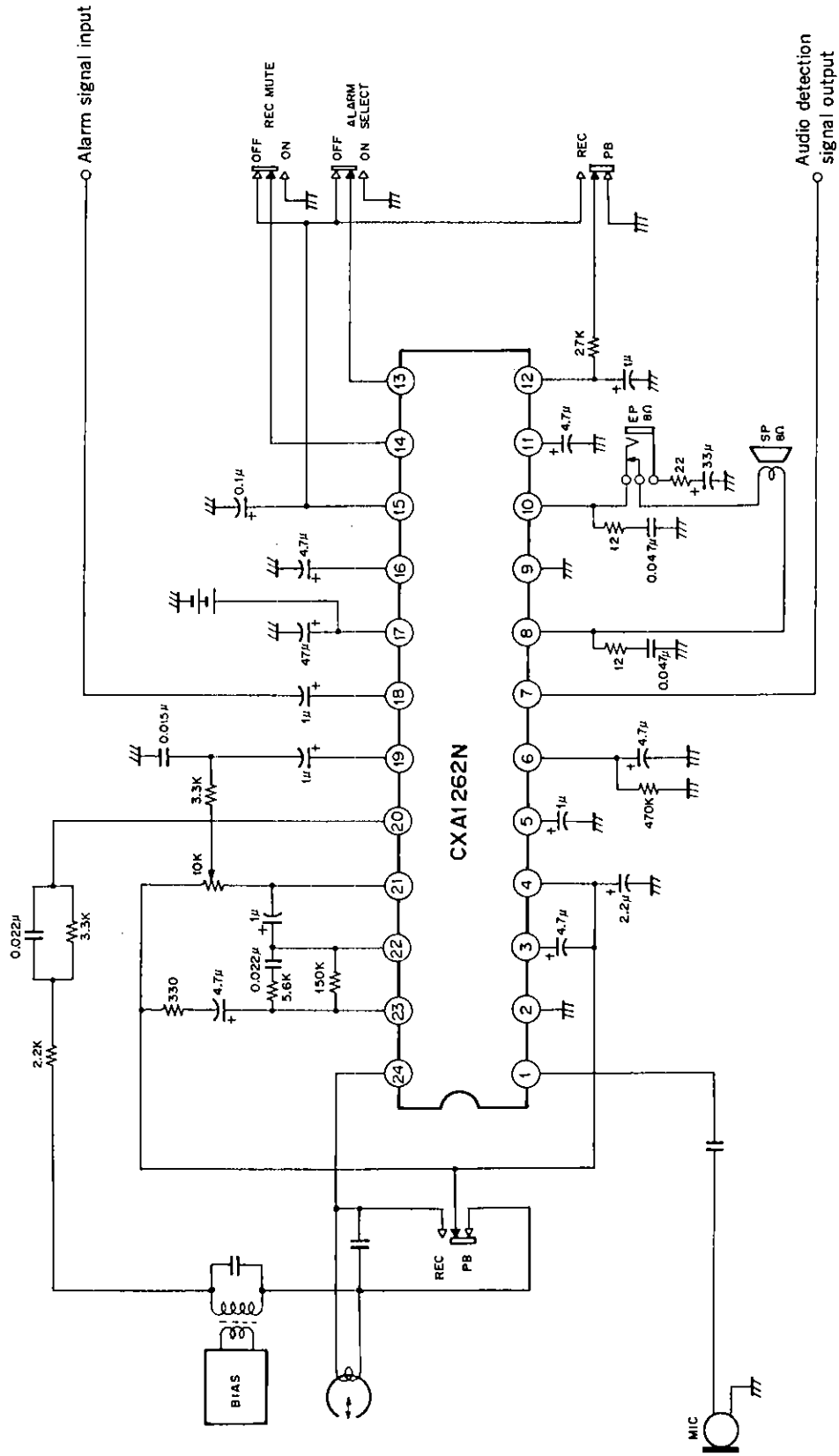
The following table shows the potentials at Pins ⑫, ⑬ and ⑭ and the associated operating states of the amplifier. Each of the pins, when at the same potential as Pin ⑮, has H level, and when at the same as Pin ②, has L level.

System Control Operation Table

Amplifier operating state	Control pins	Pin ⑫	H				L			
		Pin ⑬	H		L		H		L	
		Pin ⑭	H	L	H	L	H	L	H	L
REC PRE AMP, AGC			ON	ON	ON	ON	OFF	OFF	OFF	OFF
LINE AMP operating mode			REC	REC	REC	REC	PB	PB	PB	PB
REC DRIVE AMP			ON	MUTE	ON	MUTE	MUTE	MUTE	MUTE	MUTE
VOICE DETECT AMP			ON	ON	ON	ON	OFF	OFF	OFF	OFF
PB PRE AMP			OFF	OFF	OFF	OFF	ON	ON	ON	ON
Input pin selected by POWER IN SELECTOR (A)			MUTE*	MUTE*	ALARM IN	ALARM IN	POWER IN	POWER IN	ALARM IN	ALARM IN
Input pin selected by POWER IN SELECTOR (B)			OFF	OFF	ALARM IN	ALARM IN	POWER IN	POWER IN	ALARM IN	ALARM IN
POWER AMP (A)			ON	ON	ON	ON	ON	ON	ON	ON
POWER AMP (B)			OFF	OFF	ON	ON	ON	ON	ON	ON
Speaker			Not driven	Not driven	Driven	Driven	Driven	Driven	Driven	Driven

* If an earphone plug is inserted into the earphone jack with R/P CONT (Pin ⑫) and ALARM SELECT (Pin ⑬) in the H state, the speaker will be disconnected from the OUT (A) (Pin 10) and OUT (B) (Pin 8). In this state, the POWER IN SELECTOR (A) selects the signal input to the POWER IN (Pin ⑰) and transmits it to the POWER AMP (A) so that what is being recorded can be monitored with the earphone.

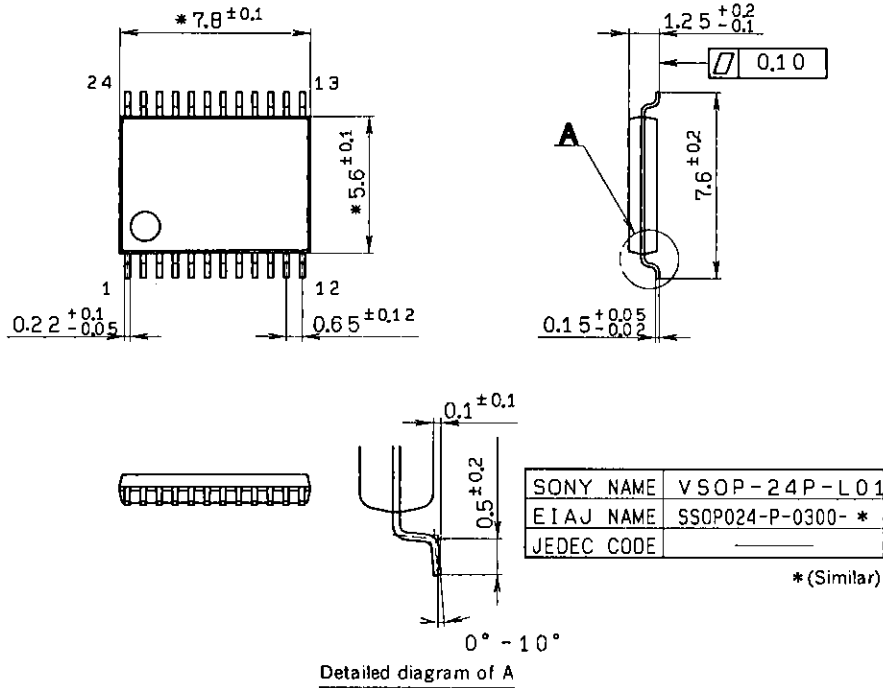
Application Circuit



Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.

Package Outline Unit: mm

24pin VSOP (Plastic) 275mil



Note) Dimensions marked with * do not include resin residue.