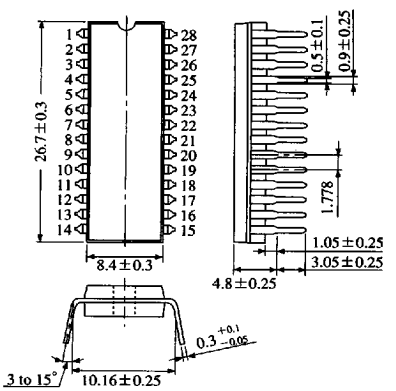
AN6164K, AN6164S

Constant Voltage Drive Speech Network Circuits

AN6164K

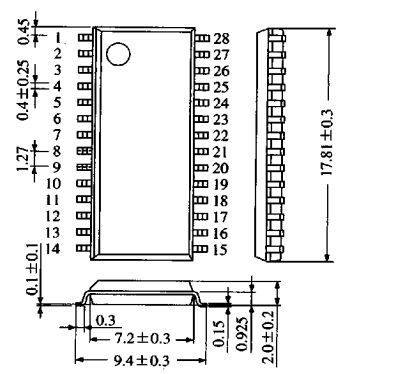
Unit : mm



28-pin Shrunk DIL Plastic Package (SDIP028-P-0400A)

AN6164S

Unit : mm



28-pin PANAFLAT Plastic Package (SOP028-P-0375A)

Overview

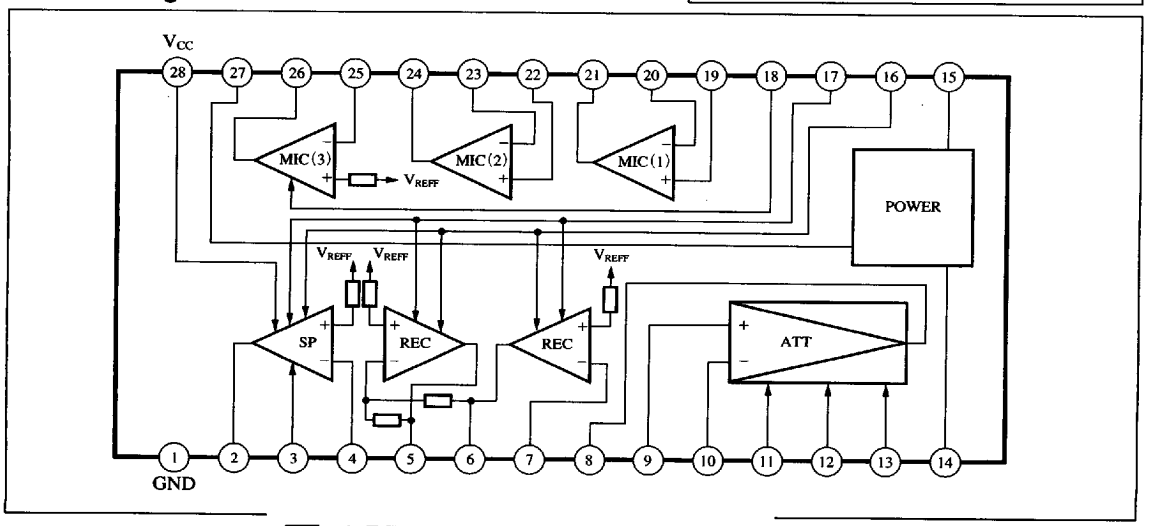
The AN6164K and AN6164S are ICs for constant voltage drive type speech networks.

They incorporate a speaker amplifier and attenuator and suitable for the car telephone and business telephone.

Features

- Capable of interfacing with the piezo-electric receivers and dynamic receivers
- Capable of interfacing with the piezo-electric transmitters and ECM type transmitters
- Balance input for both receiver and transmitter system in order to prevent mixture of humming noises
- Capable of muting each ampifier by external control
- Built-in attenuator circuit in the receiver system to allow 7-step adjustment of attenuation (0 to −30dB) with the switch 3 terminals
- Built-in standby circuit for the power supply to allow low power consumption ; supply current of 15 μA or less in the standby mode

Block Diagram



■ Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	−0.3 to +14.4	V
Supply current	I_{CC}	1	A
Power dissipation	P_D	380 *	mW
Operating ambient temperature	T_{opr}	−20 to +75	℃
Storage temperature	T_{stg}	−55 to +125	℃

* Operating ambient temperature Ta=75℃, mounted onto the glass epoxy PCB (50×50×1.2mm)

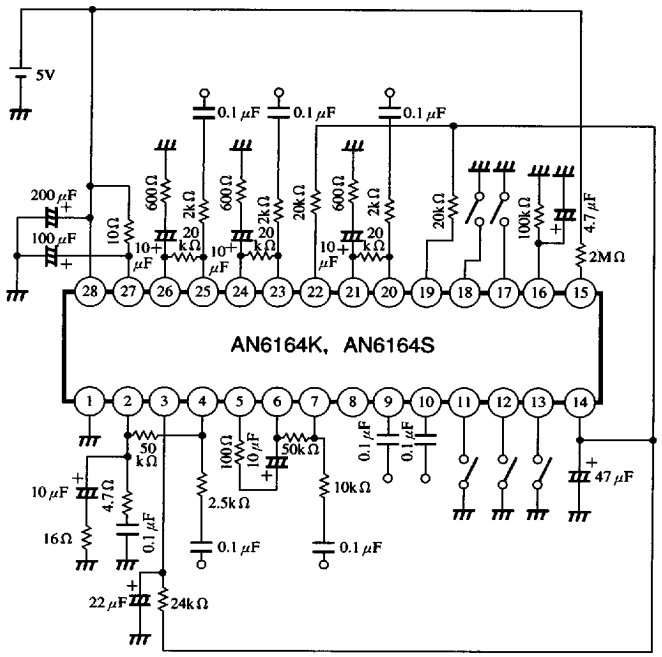
■ Recommended Operating Range (Ta=25℃)

Parameter	Symbol	Range
Operating supply voltage range	V_{CC}	4.5 to 8V

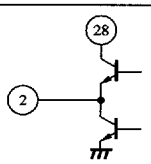
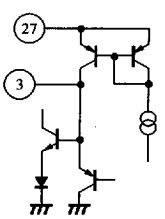
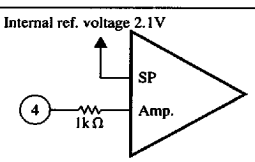
■ Electrical Characteristics (V_{CC}=5V, f=1kHz, Ta=25℃)

Parameter	Symbol	Condition	min	typ	max	Unit
Current consumption (SP MODE)	I_{CC} (SP)	Measure current consumption at V_{CC}=8V and at the speaker mode.	5	11	17	mA
Current consumption (STANDBY MODE)	I_{st}	Measure current consumption at V_{CC}=8V and at the standby mode.	—	—	15	μA
Microphone amplifier (1) open circuit gain	G_V (M1)	Input a signal to the Pin⑳ and measure the open circuit gain at the Pin㉑.	55	—	—	dB
Microphone amplifier (1) output level	V_O (M1)	Measure a distortion factor at the Pin㉑ at gain=20 dB, load=600Ω, and output=−2dB.	—	—	5	%
Microphone amplifier (1) noise output voltage	V_{no} (M1)	Measure the noise level with DIN/AUDIO at R_g=2.2kΩ and gain=20 dB.	—	−90	−80	dBV
Receiver amplifier gain	G_V (REC)	Set the gain to 20 dB with an external resistor and measure the gain at V_{in}=−25 dBV.	18	20	22	dB
Receiver amplifier output level	V_O (REC)	Measure a distortion factor at gain=20 dB, load=100Ω, and output=0 dBV.	—	—	5	%
Receiver amplifier noise output voltage	V_{no} (REC)	Measure the noise level with DIN/AUDIO at R_g=2.2kΩ and gain=20 dB.	—	−80	−70	dB
ΔATT (1)	ΔATT (1)	Input a signal (−10 dBV) to the Pin⑨) and measure the output level. Ground the Pin⑪.	−7	−5	−3	dB
ΔATT (2)	ΔATT (2)	Input a signal (−10 dBV) to the Pin⑨) and measure the output level. Ground the Pin⑫.	−12	−10	−8	dB
ΔATT (3)	ΔATT (3)	Input a signal (−10 dBV) to the Pin⑨) and measure the output level. Ground the Pin⑬.	−17	−15	−13	dB
ATT	ATT	Input a signal (−10 dBV) to the Pin⑨) and measure the output level.	−2	0	+2	dB
Speaker amplifier open circuit gain	G_V (SP)	Input a signal to the Pin④ and measure the open circuit gain of the Pin②.	40	—	—	dB
Speaker amplifier output level	V_O (SP)	Measure a distortion factor at the Pin② at gain=26 dB, load=16Ω, and output=0 dBV.	—	—	5	%
Speaker amplifier noise output voltage	V_{no} (SP)	Measure the noise level with DIN/AUDIO at R_g=2.2kg and gain=26 dB.	—	−85	−75	dBV
Control voltage (H)	V (H)		2	—	V_{CC}+0.3	V
Control voltage (L)	V (L)		−0.3	—	+0.5	V
Control pin suction current	I_{cont}	Measure a current flowing out when the control pin is ground.	—	—	20	μA

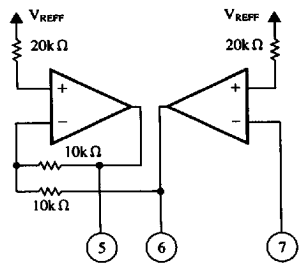
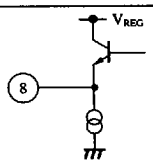
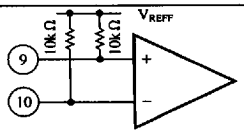
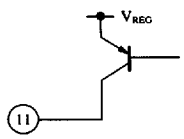
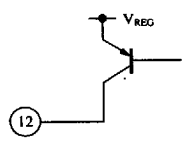
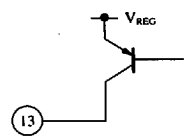
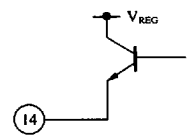
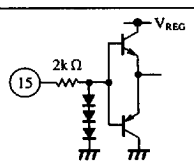
■ Application Circuit



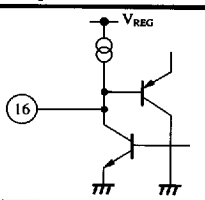
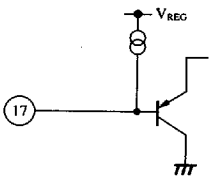
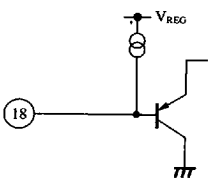
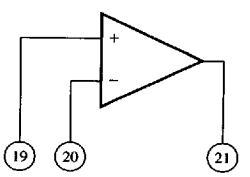
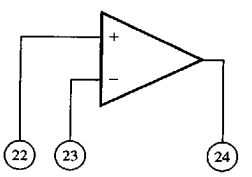
■ Pin Descriptions

Pin No.	Pin name	Typical waveform	Description	Equivalent circuit
1	GND	DC 0V	Ground pin. Connect to the ground potential.	
2	SP output	2.1 V	Speaker output pin. Outputs a receives signal to the speaker.	
3	SP cont	W/o external capacitor W/ external capacitor DC	Speaker control pin. Connect to GND through the 22 μF electrolytic capacitor.	
4	SP input	2.1V	Speaker signal input pin. Inputs a speaker signal through the coupling capacitor.	

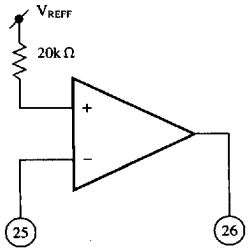
■ Pin Descriptions (cont.)

Pin No.	Pin name	Typical waveform	Description	Equivalent circuit
5	RO−2	0V	Receiver output pins 2 and 1. Connects to the receiver through the coupling capacitor. The receiver connected is a 100Ω dynamic type or 1 kΩ piezo-electric type.	
6	RO−1			
7	REC input	2.5 V	Receiver input pin. Inputs a receiver signal through the coupling capacitor.	
8	ATT output	2.5 V	Attenuator output pin. Connects to the receiver amplifier and speaker amplifier through the coupling capacitor,	
9	ATT (+) input	2.5 V	Attenuator positive input pin and negative input pin. Inputs a receiver signal through the coupling capacitor.	
10	ATT (−) input			
11	ATT cont (1)	DC	Attenuator control pin 1. The receiver gain is attenuated 5 dB by setting this pin to the L level.	
12	ATT cont (2)	DC	Attenuator control pin 2. The receiver gain is attenuated 10 dB by setting this pin to the L level.	
13	ATT cont (3)	DC	Attenuator control pin 3. The receiver gain is attenuated 15 dB by setting this pin to the L level.	
14	V_{REFF}	DC 1/2V_{REG}	Reference pin. Connects to GND through the electrolytic capacitor. The current obtainable from this pin is 7mA.	
15	STANDBY	DC 2.1V	Standby pin. Connects to the Pin㉘ through a resistor(2MΩ). The standby mode is set by setting this pin to the Low level.	

■ Pin Descriptions (cont.)

Pin No.	Pin name	Typical waveform	Description	Equivalent circuit
16	V_{CC} cont	DC	Power rise control pin. Connects to GND through the electrolytic capacitor (4.7 μF) and resistor (100kΩ).	
17	REC/SP	DC	Receiver/speaker selector pin. The speaker mode is selected by setting this pin to the H level, and receiver mode by setting to the L level.	
18	MIC mute	DC	Microphone mute pin. Controls ON/OFF of the microphone (3) amplifier. Muted by setting this pin to the L level.	
19	MIC−1 input		Microphone (1) positive and negative input pins. Connects the ECM type microphone through the coupling capacitor.	
20	MIC−1 input			
21	MIC−1 output		Microphone (1) output pin. Capable of driving a 600Ω load.	
22	MIC−2 input		Microphone (2) positive and negative input pins. Connects the ECM type microphone through the coupling capacitor.	
23	MIC−2 input			
24	MIC−2 output		Microphone (2) output pin. Capable of driving a 600Ω load.	

■ Pin Descriptions (cont.)

Pin No.	Pin name	Typical waveform	Description	Equivalent circuit
25	MIC−3 input	1/2V_{REG}	Microphone (3) input pin. Connects to the microphone (1) or microphone (2) through the coupling capacitor.	
26	MIC−3 output	1/2V_{REG}	Microphone (3) output pin. Capable of driving a 600Ω load.	
27	V_{REG}	DC	Stabilized supply voltaga pin. Connects to GND through the electrolytic capacitor.	———
29	V_{CC}	DC	Supply voltage pin. Connects to GND through the electrolytic capacitor.	———

■ Supplementary Descriptions

●Receiver Attenuator

☆About receiver attenuator

Since the AN6164K and AN6164S incorporate the attenuator circuit in the receiver system, you can adjust an amount of attenuator in 7 steps with the 3 pins, ⑪, ⑫, and ⑬.

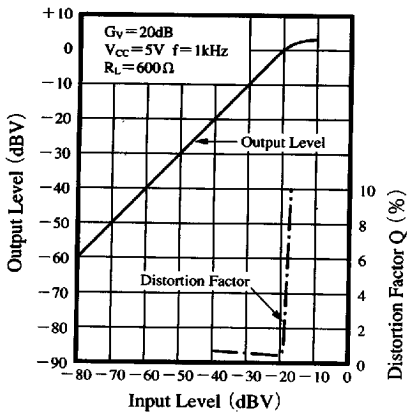
The logic table is shown below.

Receiver Attenuation Amount

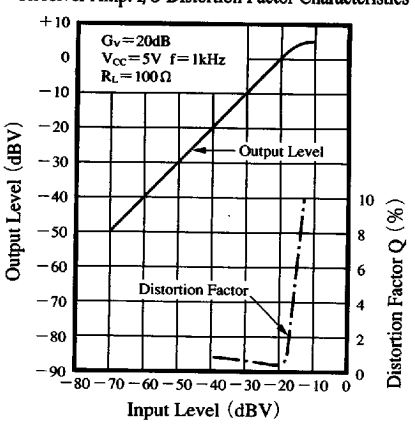
⑪	⑫	⑬	Attenuation amount (dB)
H	H	H	0
L	H	H	−5
H	L	H	−10
H	H	L	−15
L	H	L	−20
H	L	L	−25
L	L	L	−30
L	L	H	−15

Characteristics Curve

Microphone Amp. I/O Distortion Factor Characteristics



Receiver Amp. I/O Distortion Factor Characteristics



Speaker Amp. I/O Distortion Factor Characteristics