

AN5270

TV Sound Output Circuit

■ Description

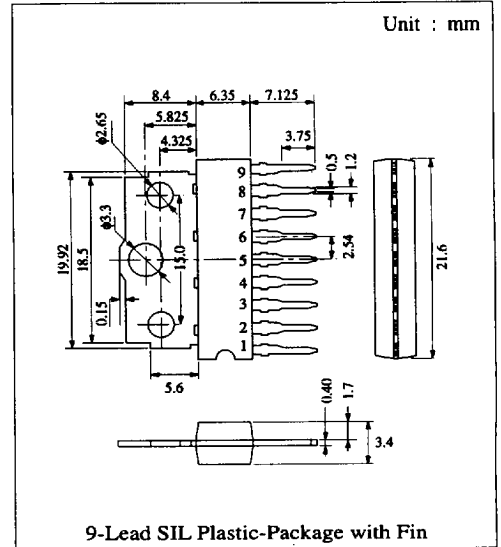
The AN5270 is an integrated circuit designed for 4.3W (8Ω) power amplifier with volume control and tone control.

■ Features

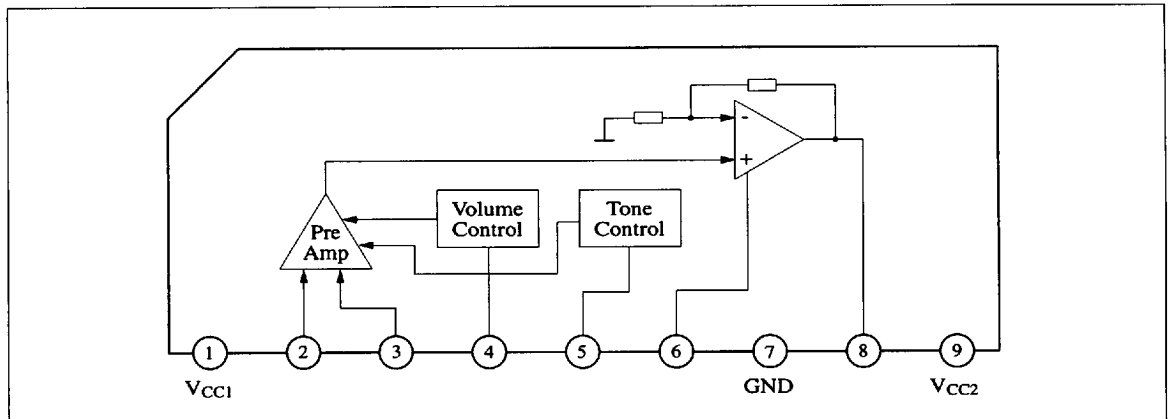
- DC volume control : 0 ~ 5V
- DC tone control : 0 ~ 5V
- 9-lead single-in-line plastic package with fin

■ Pin Descriptions

Pin No.	Pin Name
1	VCC1
2	Sound Input
3	Low Frequency Input
4	Volume Control
5	Tone Control
6	Ripple Filter
7	GND
8	Sound Output
9	VCC2



■ Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

Item		Symbol	Rating		Unit
Voltage	Supply Voltage	V _{CC1} (V ₁₋₇)	14		V
		V _{CC2} (V ₉₋₇)	26		V
	Circuit Voltage	V ₂₋₇	0	V ₉₋₇	V
		V ₃₋₇	0	V ₉₋₇	V
		V ₄₋₇	0	V ₁₋₇	V
V ₅₋₇		0	V ₁₋₇	V	
Current	Supply Current	I _{CC1}	15		mA
		I _{CC2}	2		A
	Circuit Current *1 *2	I _g	-1.7	+1.7	A _(peak)
Power Dissipation (Ta = 70 °C)		P _D	1.6		W
Operating Ambient Temperature		T _{opr}	-20 ~ +70		°C
Storage Temperature		T _{stg}	-55 ~ +150		°C

Note) Do not apply a current or voltage from the external to the terminals that are not described above.

*1 For circuit currents, '+' denotes current flowing into the IC, and '-' denotes current flowing out of the IC.

*2 As the output pin 8 does not have over current protection circuit incorporated, therefore please take precaution not to short the output pin to either V_{CC} or GND.

■ Recommended Operating Range (Ta=25°C)

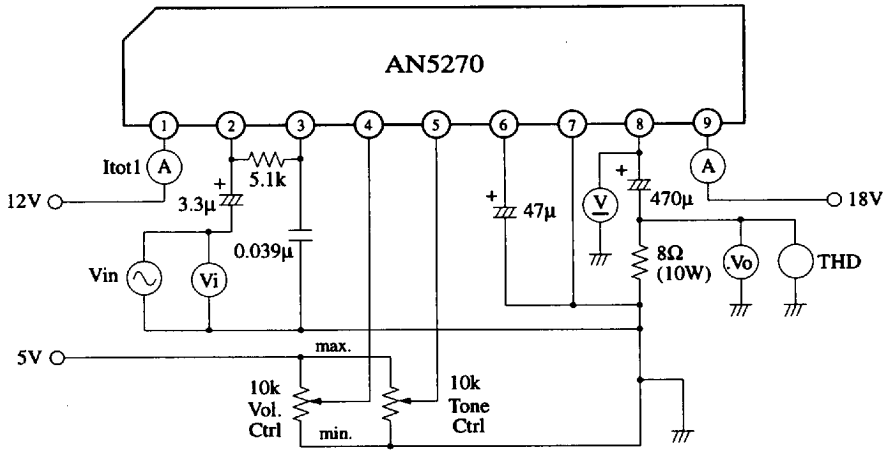
Item	Symbol	Range
Operating Supply Voltage Range 1	V _{CC1}	11V ~ 13V
Operating Supply Voltage Range 2	V _{CC2}	15V ~ 24V

■ Electrical Characteristics (Ta=25°C)

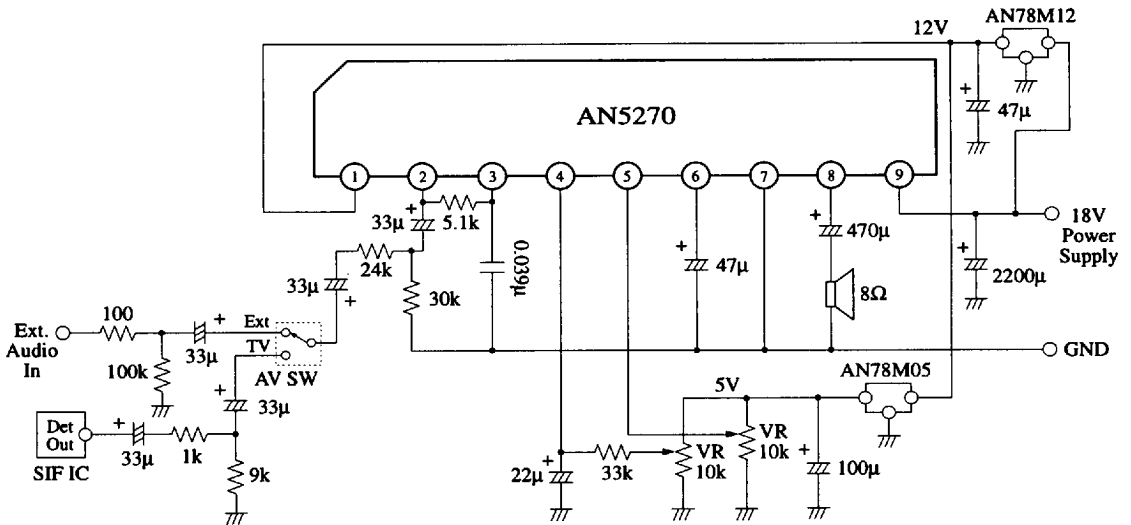
Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Quiescent Current 1	I _{tot1}	1	No input signal. Measure V _{CC1} current.	7	10	13	mA
Quiescent Current 2	I _{tot2}	1	No input signal. Measure V _{CC2} current.	20	28	48	mA
Output DC Bias	V _{ODC}	1	No input signal. Measure Pin 8 DC.	7.2	8.3	9.4	V
Voltage Gain	G _V	1	V _o = 1V _{rms} , G _V = 20log(V _o /V _{in})	28	30	32	dB
Total Harmonic Distortion	THD	1	V _o = 1V _{rms} , BPF : 400Hz ~ 30kHz		0.5	1.0	%
Max. Output Power	P _{Omax}	1	THD = 10%, P _O = V _o ² / R _L	4.0	4.3		W
Max. Output Attenuation	A _{ttmax}	1	V _o = 1.0V _{rms} , Vol. = max. → min. A _{ttmax} = 20log[V _o (Vol.=max.)/V _o (Vol.=min.)]		-69	-66	dB
Tone Variable Range	ΔG _{TC}	1	Freq = 10kHz, fix V _{in} where V _o (tone=min.) = 1V _{rms} , Tone = max. → min. ΔG _{TC} = 20log[V _o (tone=max.)/V _o (tone=min.)]	18	20		dB

Note) Unless otherwise specified, V_{CC1} = 12V, V_{CC2} = 18V, frequency = 1kHz, R_L = 8Ω, Vol. = max. and tone = max..

Test Circuit 1



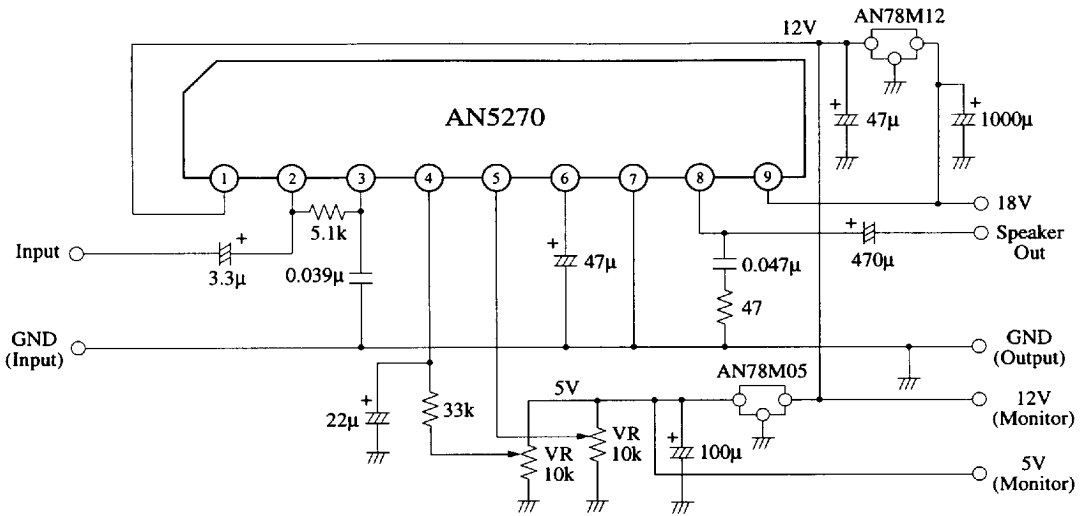
Application Circuit 1



Design considerations for shock noise prevention

In the application of the IC, please adopt the above power supply configuration whenever possible. Where this is not possible, then it is better to ensure that V_{CC1} should start up first before the onset of V_{CC2} , in order to prevent shock-on noise. Similarly, please ensure that V_{CC2} declines faster than V_{CC1} , in order to prevent power-off shock noise.

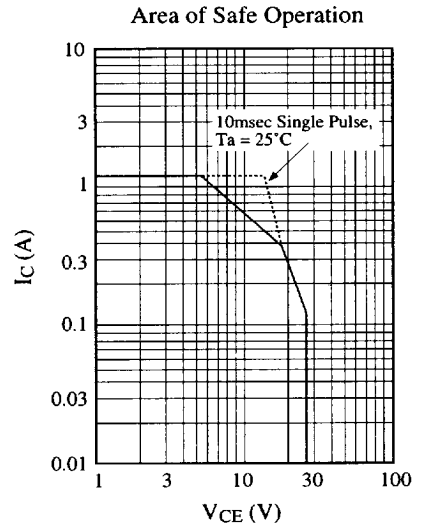
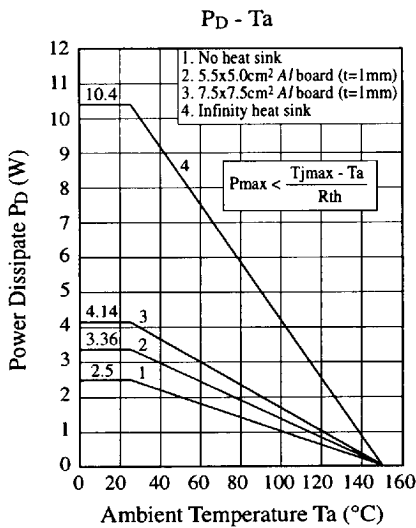
■ Application Circuit 2




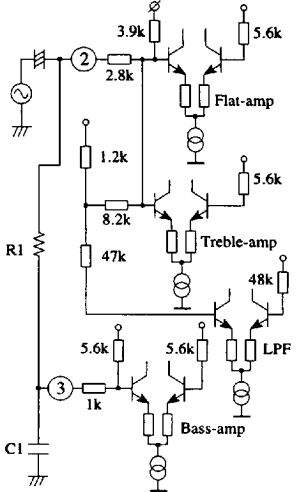

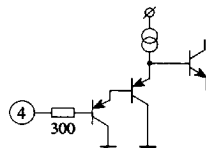
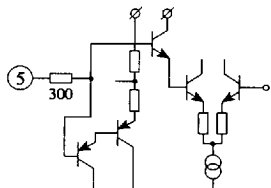
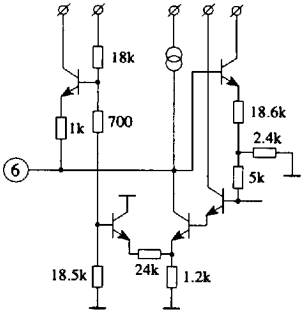
Note) Recommended Operating Voltages:

- VCC1 (pin 1) 11 ~ 13V typ. = 12V
- VCC2 (pin 9) 15 ~ 24V typ. = 18V
- DC Control (pin 4, 5) = 0 ~ 5V


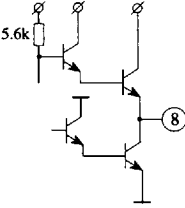
■ Characteristics Curve



■ Pin Descriptions

Pin No.	Pin Name	Pin Description	DC Voltage (V)	Equivalent Circuit
1	Vcc1	This Vcc line is used for small signal circuitry such as volume, tone and input circuit.	12	
2	Sound Input	Input pin for main signal.	4.4	
3	Low Frequency Input	Input pin for low frequency band signal. It is necessary to connect externally LPF to this pin. R1 C1 determines the cut-off frequency of the low pass band.	4.4	
4	Volume Control	DC control pin for volume adjustment.	0 ~ 5	
5	Tone Control	DC control pin for tone adjustment.	0 ~ 5	
6	Ripple Filter	This pin is used for ripple filter and DC-offset comparison.	8.5 ~ 16.8 (typ. 12.6)	

■ Pin Descriptions (Continue)

Pin No.	Pin Name	Pin Description	DC Voltage (V)	Equivalent Circuit
7	GND			
8	Sound Output	Output pin.	8.0	
9	Vcc2	This Vcc line is used for power circuit and other large signal circuitry.	18	