AN7007S, AN7007S(U)

Adjustment-free FM/AM Tuner ICs for Headphone Stereo with Radio

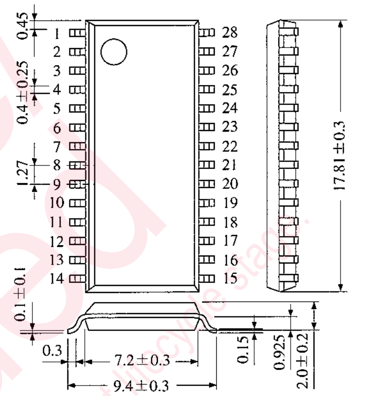
■ Overview

The AN7007S and the AN7007S(U) are the single chip ICs integrating tuner block of FM/AM radio, so far constituted by two ICs. And these ICs allow the reduction of external adjusting coils in FM detection, AM-IFT block and adjustment-free, thereby realizing downsizing and process simplification of a radio set.

■ Features

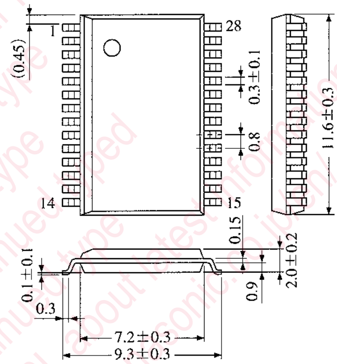
- Incorporating FM/AM tuner on a single chip (VHF TV operation)
- Adjustment-free FM/AM IF
- Low power consumption : 2mA at AM, 5.8mA at FM
- Fewer external parts
- Built-in FM/AM indicator

AN7007S Unit : mm



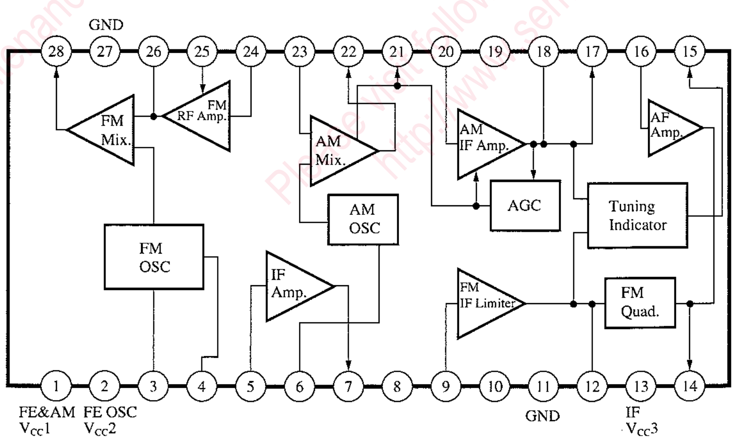
28-Lead SOP Package (SOP028-P-0375A)

AN7007S (U) Unit : mm



28-Lead SOP Package (SSOP028-P-0375A)

■ Block Diagram



■ Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	4	V
Supply Current	I_{CC}	14	mA
Power Dissipation (Ta=75℃)	P_D	100	mW
Operating Ambient Temperature	T_{opr}	−20 ~ +75	℃
Storage Temperature	T_{stg}	−55 ~ +125	℃

■ Recommended Operating Range (Ta=25℃)

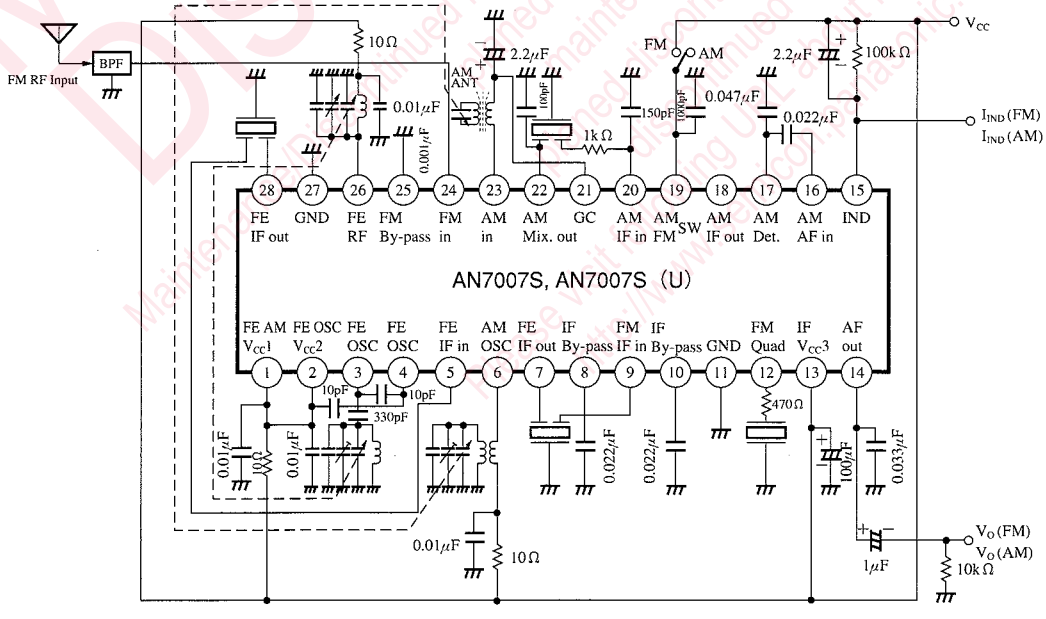
Parameter	Symbol	Range
Operating Supply Voltage Range	V_{CC}	1.8V ~ 4V

■ Electrical Characteristics (V_{CC}=3V, Ta=25℃)

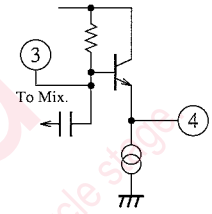
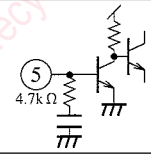
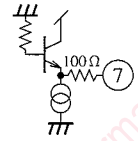
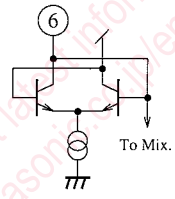
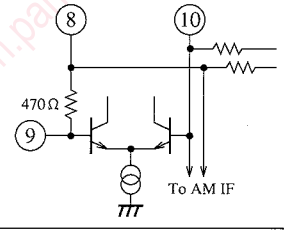
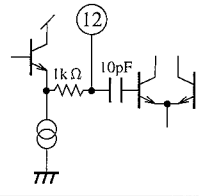
Parameter	Symbol	Condition	min.	typ.	max.	Unit
FM Section (f=98MHz, f_M=1kHz, $f_{dev.}$=± 22.5kHz, V_{in}=60dBμ)						
Detection Output Voltage	V_O (FM)		35	6	80	mVrms
Limiting Sensitivity	V_i (lim)	V_O (FM)=0dB, Input level when V_O (FM) becomes −3dB	—	7	13	dBμ
Signal to Noise Radio	S/N (FM)		—	60	—	dB
Output Signal Distortion	THD (FM)		—	0.2	—	%
AM Section (f=1MHz, f_M=400Hz, Mod.=30%, V_{in}=60dBμ)						
Detection Output Voltage	V_O (AM)		30	45	65	mVrms
Maximun Sensitivity	$S_{max.}$	Input level at V_O=10mVrms	5	10	16	dBμ
Signal to Noise Radio	S/N (AM)		—	44	—	dB
Output Signal Distortion	THD (AM)		—	1.3	—	%

ICs for Tuner

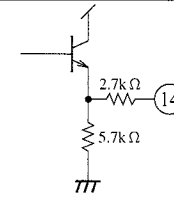
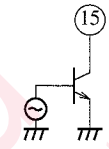
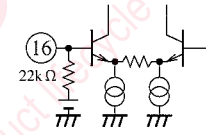
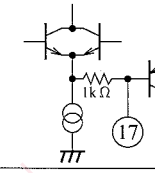
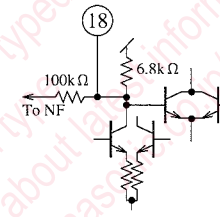
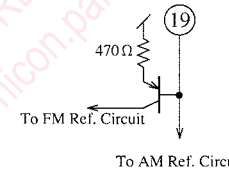
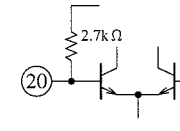
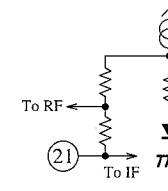
■ Application Circuit



■ Pin Descriptions

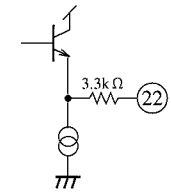
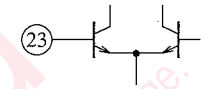
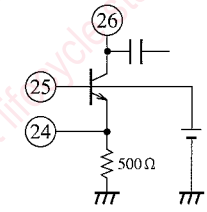
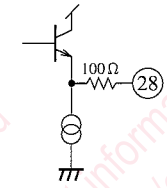
Pin No.	Pin Name	Typ. Waveform (at V_{CC} = ±3V)	Description	Equivalent Circuit
1	Supply Voltage	Determine with ripple filter resistance (external) and I_{tot} (IC). (Reference is +3V)	FM-F · E/AM-RF power supply	———
2			FM-LOSC power supply	
13		DC+3V	FM/AM-IF power supply	
3	FM Local Oscillation	FM oscillation signal wave superimposes on DC+3V.	Local oscillation pin Resonance circuit is connected.	
4		FM oscillation signal wave superimposes on DC+2.3V.	Feedback pin Feedback capacitance is connected between Pin③ and Pin④	
5	Within FM-F · E Intermediate Frequency Amplifier	FM intermediate frequency signal superimposes on DC +0.7V.	Intermediate frequency amplifier input Signal input through 1st CF (10.7MHz) from Mixer output.	
7		FM intermediate frequency signal superimposes on DC +2.1V.	Intermediate frequency amplifier output Connect 2nd CF (10.7MHz).	
6	AM Local Oscillation	AM local oscillation signal superimposes on DC+3V.	Local oscillation pin Resonance circuit is connected.	
8 · 10	FM Intermediate Frequency Amplifier	DC+2.8V.	Negative feedback pin of FM/AM intermediate frequency amplifier. By-pass capacitor is connected.	
9		FM intermediate frequency signal superimposes on DC +2.8V.	FM intermediate frequency amplifier input. 2nd CF is connected.	
11	GND	———	ForAM-RF/MIX and FM/AM-IF/DET	———
27			For FM-F · E/IF amplifier and AM-OSC	
12	FM Detection	FM intermediate frequency signal superimposes on DC +2.1V.	Quad detection pin Discriminator is connected.	

■ Pin Descriptions (Cont.)

Pin No.	Pin Name	Typ. Waveform (at V_{CC} = ±3V)	Description	Equivalent Circuit
14	FM/AM AF Output	Audio output (FM/AM) superimposes on DC +0.7V.	Audio amplifier is built-in. FM/AM both sound signal is output.	
15	Tuning Indicator	———	Drive LED driver transistor (external) in proportion to FM/AM both selective characteristics.	
16	AM Sound Input	AM sound signal superimposes on DC +2.8V.	Sound signal (AM) is input through filter from AM detector.	
17	AM Detection Output	AM sound signal superimposes on DC +2V.	AM sound signal is output and CR filter is connected.	
18	AM IF Output	AM IF signal superimposes on DC +2.7V.	IF signal is output from AM IF amp. last stage.	
19	FM/AM Switching	Potential difference with V_{CC} is FM within 0.3V and AM at open.	FM/AM mode switching logic pin.	
20	AM IF Input	AM intermediate frequency signal superimposes on DC +2.7V.	AM intermediate frequency signal is input through CF (AM) from Mixer output.	
21	AM AGC	DC+0.8V is generated at AGC OFF.	Low pass filter pin for AGC signal Rectifying capacitor is connected.	

ICs for Tuner

■ Pin Descriptions (Cont.)

Pin No.	Pin Name	Typ. Waveform (at V_{CC} = ±3V)	Description	Equivalent Circuit
22	AM Mixer Output	AM intermediate frequency signal superimposes on DC +0.2V.	Load is built-in resistance (4.7kΩ) due to IFT-less. Built-in buffer amp. after that.	
23	AM Mixer Input	DC bias is applied through ANT secondary coil from V_{AGC} (Pin㉑).	AM high frequency signal is input from ANT secondary side.	
24	FM RF Amp.	FM-RF signal superimposes on DC +0.4V.	FM-RF amp. input	
25		DC+1.1V	RF amp. by-pass	
26		RF signal superimposes on V_a.	RF amp. output	
28	FM FE-IF	FM IF signal superimposes on DC +2.1V.	FM IF amp. output. 1st CF is connected.	

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