

# AN7025K, AN7025S

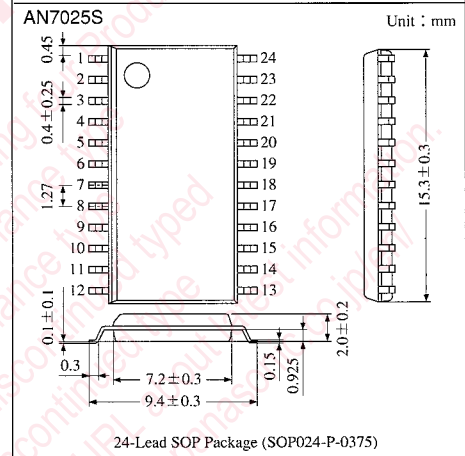
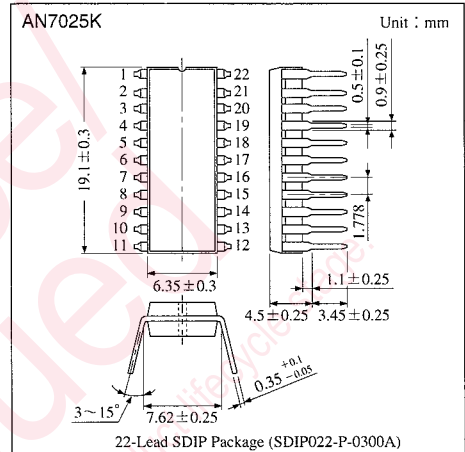
## FM-IF, PLL-MPX, AM Tuner ICs

### Overview

The AN7025K and the AN7025S are the ICs designed for radio cassette recorder, incorporating AM tuner, FM-IF amplifier, FM detector and PLL multiplex demodulator.

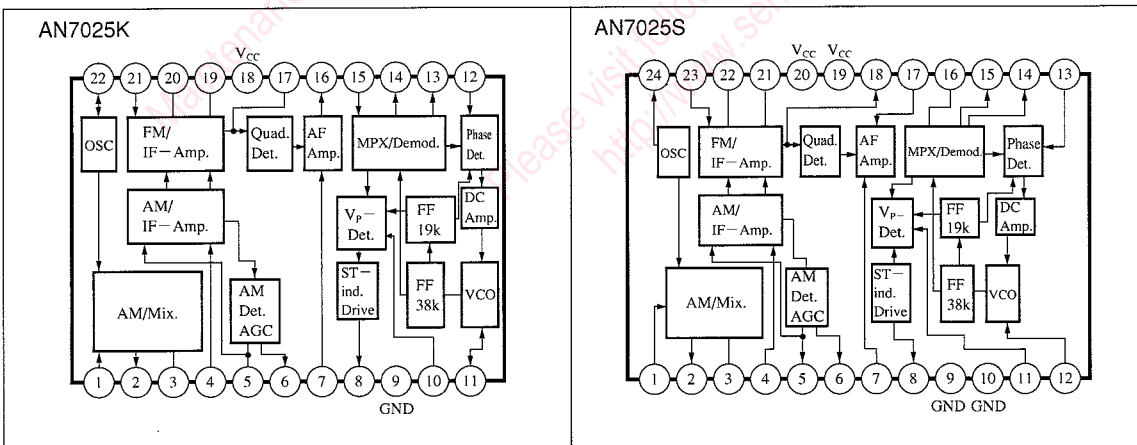
### Features

- Single-chip IC for AM tuner, FM-IF & FM multiplexers
- Low power consumption,  $I_{CO} = 7.3\text{mA}$  (FM),  $4.5\text{mA}$  (AM)
- Wide operating supply voltage range :  $V_{CC} = 1.8\text{V} \sim 6.6\text{V}$
- Built-in stereo-indicator drive
- Phase-Locked-Loop MPX stereo demodulation



ICs for Tuner

### Block Diagrams



### Pin Descriptions

( ) shows the Pin No. of AN7025S.

Pin No.	Pin Name	Pin No.	Pin Name
1 (1)	AM Mixer Input	12 (13)	MPX Phase Detection
2 (2)	AM Mixer Output	13 (14)	L Ch. Output
3 (3)	AM Mixer By-pass	14 (15)	R Ch. Output
4 (4)	AM IF Input	15 (16)	MPX Input
5 (5)	AM AGC	16 (17)	IF-part AF Output
6 (6)	AM Detection Output	17 (18)	FM Detection Coil
7 (7)	AM AF Input	18 (19,20)	V <sub>CC</sub>
8 (8)	Stereo Indicator	19 (21)	IF By-pass 1
9 (9,10)	GND	20 (22)	IF By-pass 2
10 (11)	MPX Pilot Signal Detection	21 (23)	FM IF Input
11 (12)	VCO	22 (24)	AM Local Oscillation

### Absolute Maximum Ratings (T<sub>a</sub> = 25°C)

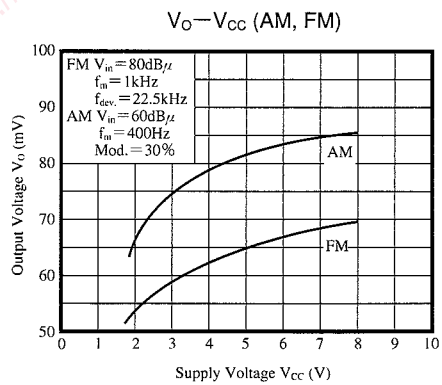
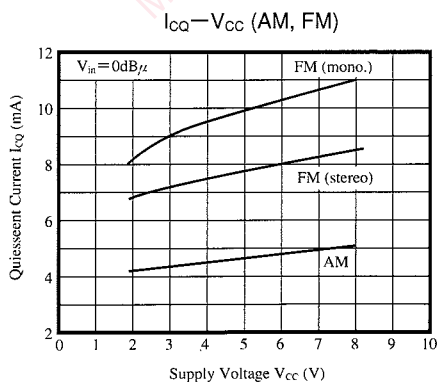
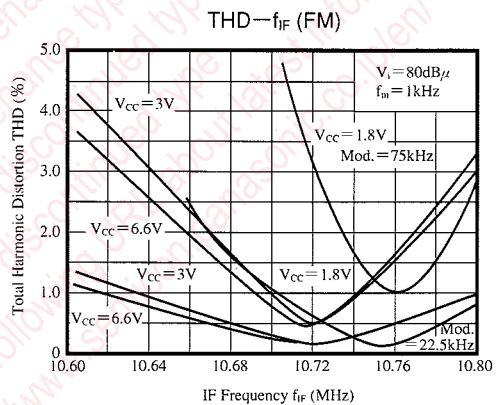
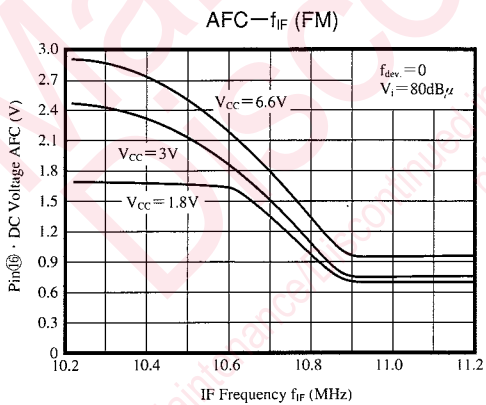
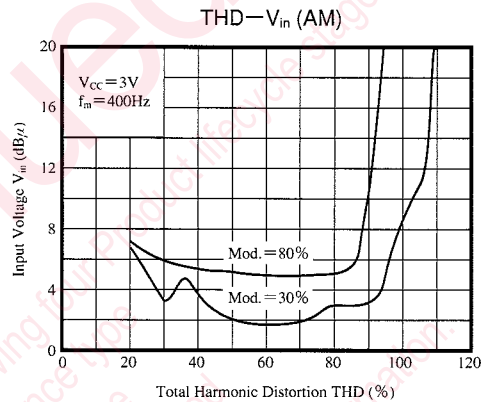
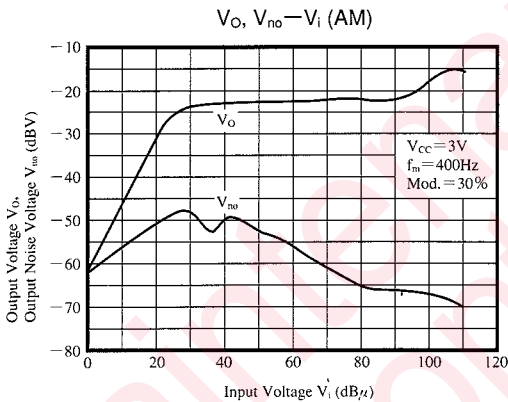
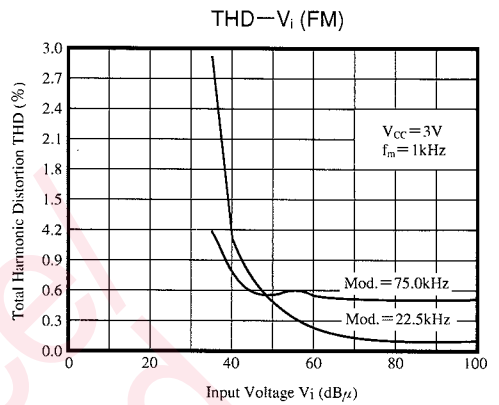
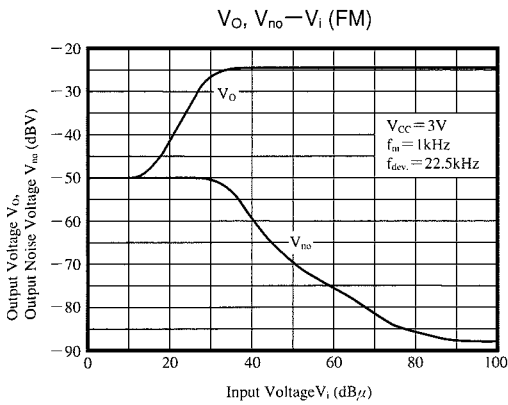
Parameter		Symbol	Rating	Unit
Supply Voltage		V <sub>CC</sub>	6.6	V
Supply Current		I <sub>CC</sub>	27	mA
Power Dissipation	AN7025K	P <sub>D</sub>	180	mW
	AN7025S		260	
Operating Ambient Temperature		T <sub>opr</sub>	-20 ~ +75	°C
Storage Temperature	AN7025K	T <sub>stg</sub>	-55 ~ +150	°C
	AN7025S		-55 ~ +125	

### Electrical Characteristics (V<sub>CC</sub> = 3V, T<sub>a</sub> = 25°C)

Parameter		Symbol	Condition	min.	typ.	max.	Unit
FM	Detection Output Voltage	V <sub>O(FM)</sub>	V <sub>in</sub> = 80dBμ, Monaural	45	56	70	mVrms
	Channel Balance	CB	V <sub>in</sub> = 80dBμ, Monaural	-1.2	0	1.2	dB
	Limiting Sensitivity	V <sub>L(FM)</sub>	Input which V <sub>O(FM)</sub> decrease by 3dB, Monaural	26	28.5	31	dBμ
	Stereo Separation	Sep.	V <sub>in</sub> = 80dBμ, Stereo	30	40	—	dB
	Total Harmonic Distortion	THD	V <sub>in</sub> = 80dBμ, Stereo	—	0.5	1.5	%
	Stereo Lamp ON Level	V <sub>P(on)</sub>	V <sub>in</sub> = 80dBμ, Modulation indication	—	5.5	7.5	%
	Stereo Lamp OFF Level	V <sub>P(off)</sub>	V <sub>in</sub> = 80dBμ, Modulation indication	1.1	3.1	—	%
AM	Detection Output Voltage	V <sub>O(AM)</sub>	V <sub>in</sub> = 60dBμ	50	65	90	mVrms
	Sensitivity	S <sub>(AM)</sub>	Input at V <sub>O(AM)</sub> = 20mA	12	16	23	dBμ

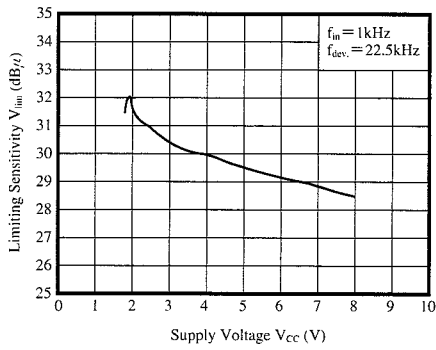
(Note) Unless otherwise specified.

FM : Monaural ; f<sub>in</sub> = 10.7MHz, 1kHz 30% modulationStereo ; f<sub>in</sub> = 10.7MHz, 1kHz 100% modulation (L+R = 90%, Pilot 10%)AM : f<sub>in</sub> = 1kHz, 400Hz 30% modulation

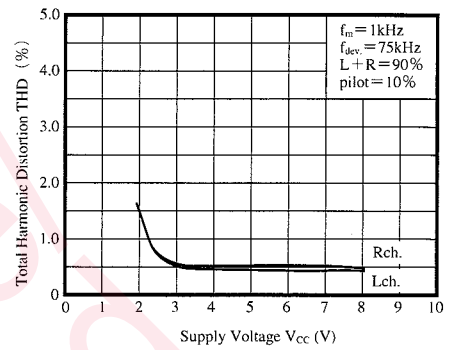


ICs for Tuner

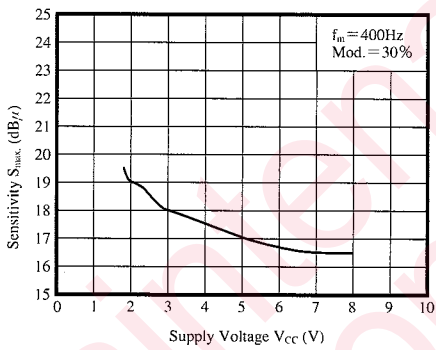
$V_{im} - V_{CC}$  (FM)



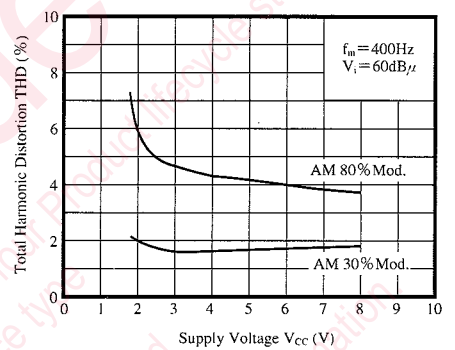
THD -  $V_{CC}$  (FM)



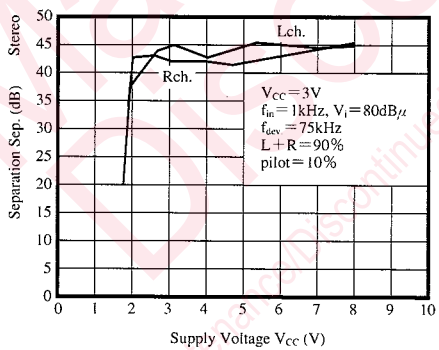
$S_{max} - V_{CC}$  (AM)



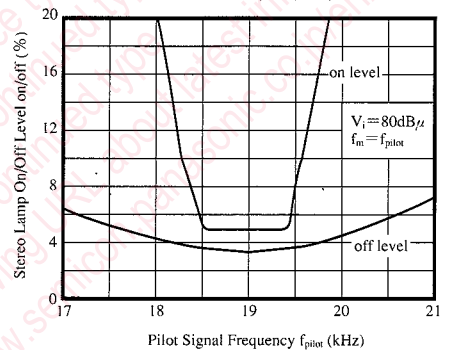
THD -  $V_{CC}$  (AM)



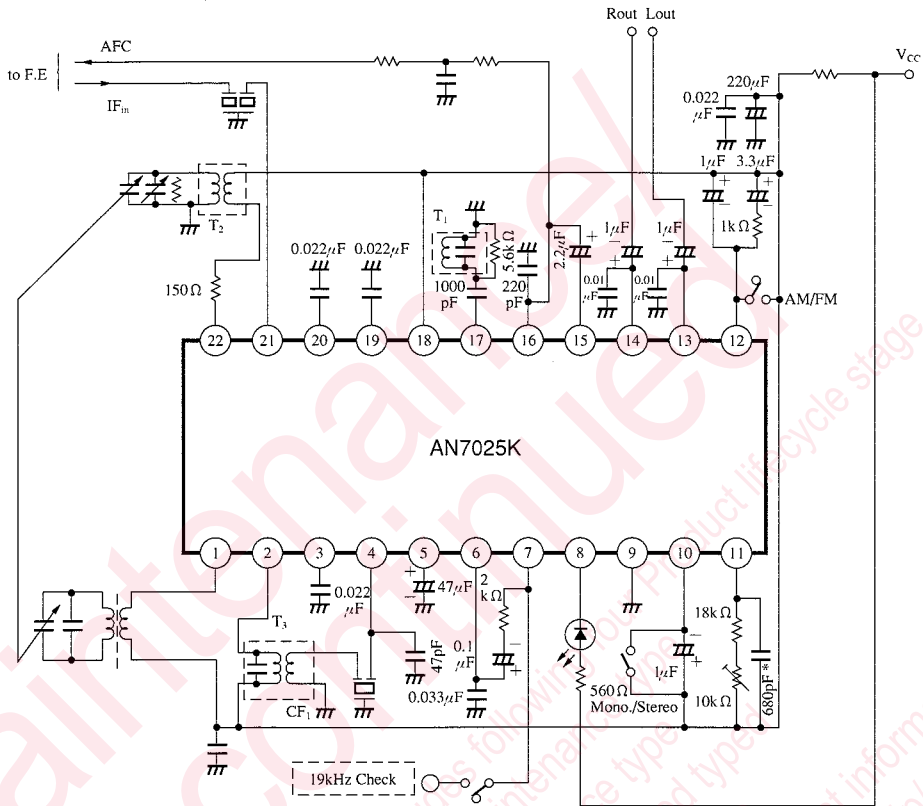
Sep. -  $V_{CC}$  (FM)



on/off -  $f_{pilot}$  (FM)



■ Application Circuit



1. Styrol capacitor 680pF is used in order to improve VCO thermal characteristics.
2. AM AF output can be adjusted by the resistor between Pin⑥ and Pin⑦. Frequency characteristics of AM AF output can be changed (Figure 1) by  $C_1$ , R and input resistor  $R_{IN}$  (22kΩ) of Pin⑦.
3. Pin⑦ becomes 19kHz check pin at FM mode. At this time, resistor R between the Pin⑥—⑦ becomes 19kHz load and cannot be 0Ω.
4. Driving current of the Pin⑧ stereo indicator is about 5 mA (max.).
5. VCO frequency is adjusted by the half-fixed VR of Pin⑪ (Monitor is Pin⑦). Adjusting range is more than 10kΩ.
6. FM AFC is used by rectifying IF detection output of Pin⑯.
7. FM detection uses Quad. detection. When R is changed by the circuit construction in the figure 2, FM output level changes. However, caution should be taken as stereo lamp light-on level, light off level and THD changes.
8. Input impedance of the FM-IF input Pin⑫ is 470Ω as shown in figure 3.

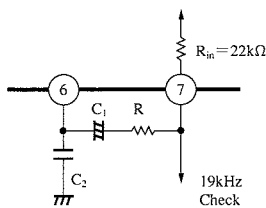


Fig.1

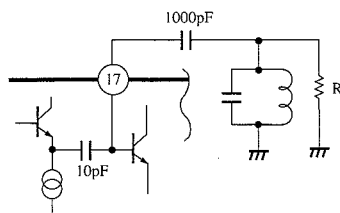


Fig.2

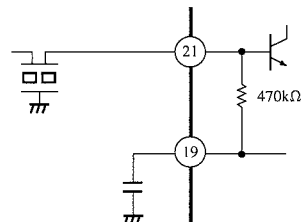


Fig.3

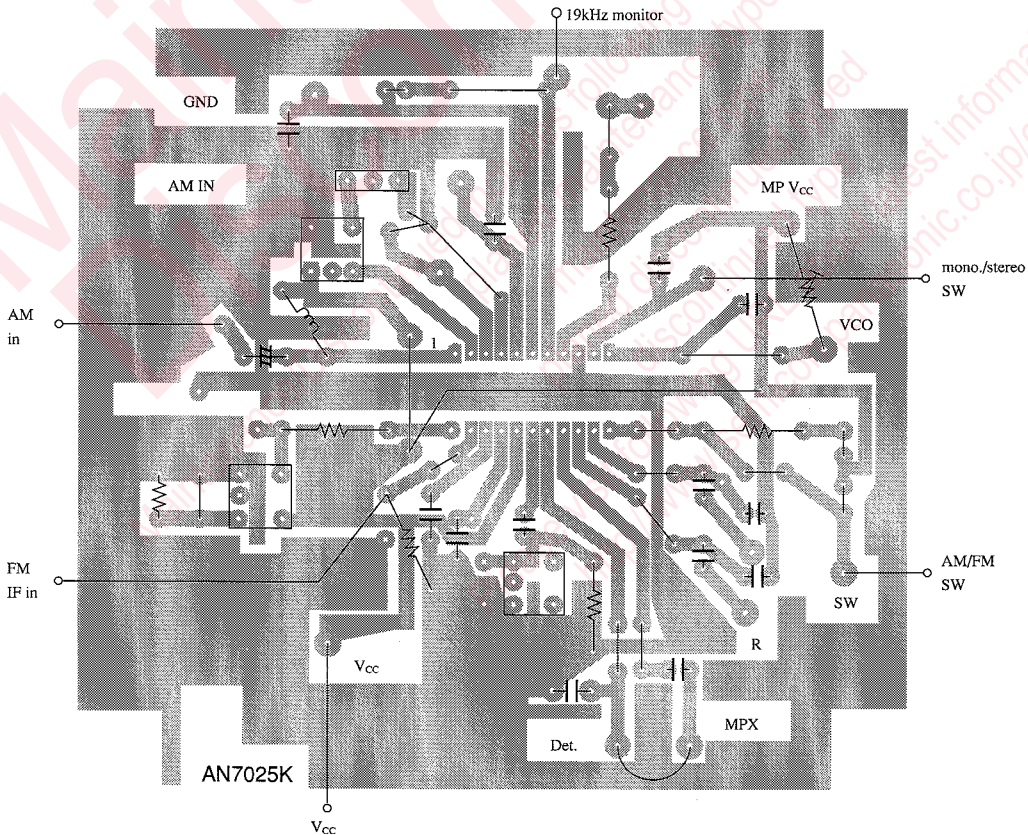
**Coil Specifications**

Symbol	Use, Freq.	Type No.	Maker	Connection Diagram	Number of Turns	Tuning Cap.	Unloaded Q
T <sub>1</sub>	FM Quad. Coil 10.7MHz	IFT-41K9	MITSUMI		①-②8T ②-③5T ④-⑥2T	100pF	90±20%
T <sub>2</sub>	AM MW Osc. Coil	L-5K7-H4	MITSUMI		①-③87T ④-⑥6T	—	100±20%
T <sub>3</sub>	AM Mix. Output 455kHz	IFT-21K7-1-14	MITSUMI		③-②4.3T ⑥-④1.4T ②-①10T	1500pF	130±30%

**Ceramic Filter Specification**

Symbol	Use	Type No.	Maker	Center Freq.	Band Width	Loss
CF <sub>1</sub>	AM IF	CFM2-455B	TOKO	455kHz	7kHz (-6dB)	2.6dB

**Printed Circuit Board Layout**



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