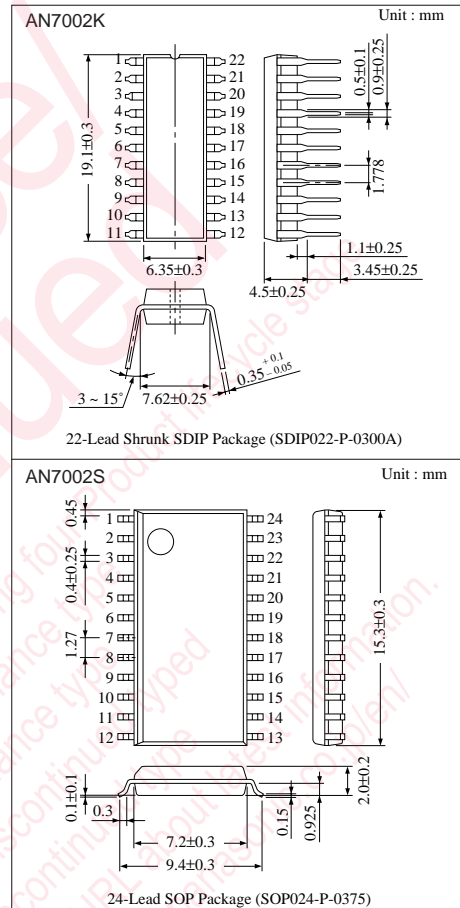**Panasonic**

AN7002K, AN7002S
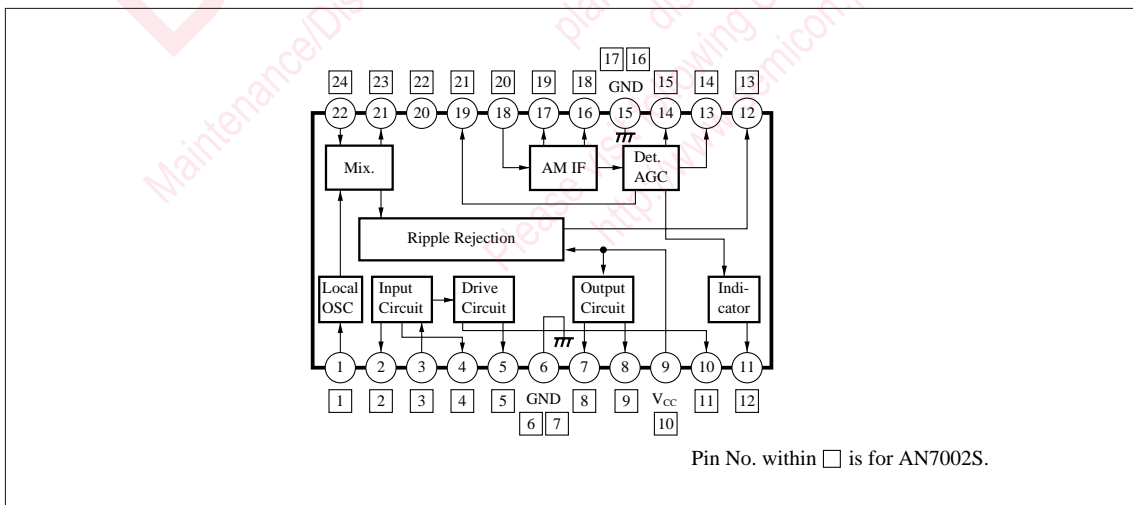
Single Chip ICs for AM Radio

■ Overview

The AN7002K and the AN7002S are the single chip ICs incorporating AM tuner block to power amp. block for 3V radio and are suitable for low-end AM radio.

■ Features

- Single chip ICs incorporating AM tuner block to power amp. block
- Low power consumption : 17mA (at no signal)
- Built-in tuning indicator circuit
- Adjustment-free IF

AN7002K   Unit : mm

22-Lead Shrunk SDIP Package (SDIP022-P-0300A)

AN7002S   Unit : mm

24-Lead SOP Package (SOP024-P-0375)

■ Block Diagram

Pin No. within ☐ is for AN7002S.

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■ Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Supply Voltage	AN7002K	V_{CC}	6	V
	AN7002S		4.5	
Supply Current		I_{CC}	300	mA
Power Dissipation	AN7002K	P_D	1980	mW
	AN7002S		520	
Operating Ambient Temperature		T_{opr}	$-20 \sim +75$	°C
Storage Temperature	AN7002K	T_{stg}	$-55 \sim +150$	°C
	AN7002S		$-55 \sim +125$	

■ Recommended Operating Range (Ta=25°C)

Parameter		Symbol	Range
Operating Supply Voltage Range	AN7002K	V_{CC}	1.8V ~ 6V
	AN7002S		1.8V ~ 4.5V

■ Electrical Characteristics

($V_{CC} = 3V$, [AM Section] $R_L = 5k\Omega$, f = 1MHz, Mod. = 30%, $f_M = 400Hz$ [Power Section] $R_L = 8\Omega$, f = 1kHz, Ta = 25°C)

Parameter	Symbol	Condition	min.	typ.	max.	Unit
Total Circuit Current	I_{tot}	AM $V_{in} = -20dB\mu$, Power $V_{in} = 0mV$	9	17	25	mA
AM Section (Power Section R_g=10kΩ)						
Detection Output Voltage	V_O	$V_{in} = 60dB\mu$	16	24	32	mVrms
Sensitivity	Smax.	$V_O = 5mVrms$	-4	4.5	13	dBμ
Indicator Sensitivity	V_{IND}	Pin11 = less than 1VV	7	17	27	dBμ
Power Section (AM Section $V_{in}= -20dB\mu$)						
Voltage Gain	G_V	$V_O = 0.28mVrms$	41	44	47	dB
Output Noise Voltage	V_{NO}	$R_g = 10k\Omega$, DIN/AUDIO	—	0.3	0.6	mVrms
Total Harmonic Distortion	THD	$V_O = 0.28mVrms$	—	2.5	5	%
Maximum Output	P_O	THD = 10%	100	120	—	mW

■ Characteristics Curve

AM Input/Output Characteristics

$V_{CC} = 3V$
f=1MHz
30% Modulation
Modulated
Wave 400Hz
Ta =25°C

Distortion Characteristics

$V_{CC} = 3V$
f = 1MHz
$f_{in} = 400Hz$
Ta = 25°C

Mod. 80%

Mod.30%

Supply Voltage Characteristics
– V_O, THD, S_{max}.

V_O

$V_{CC} = 3V$
$V_{in} = 60dB\mu$
f = 1MHz
Mod. 30%
Ta = 25°C

THD

Smax.

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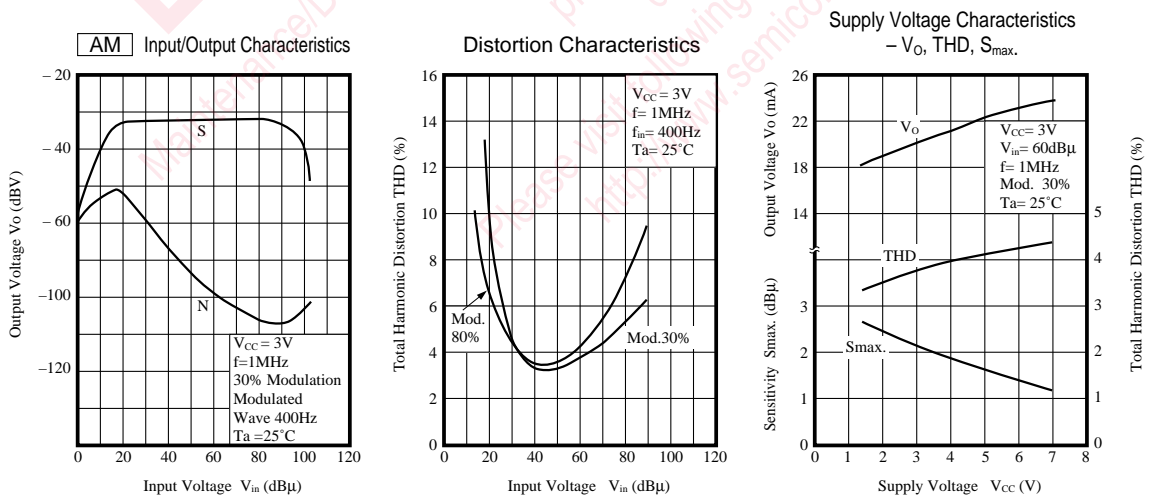
■ Application Circuit (AN7002K)
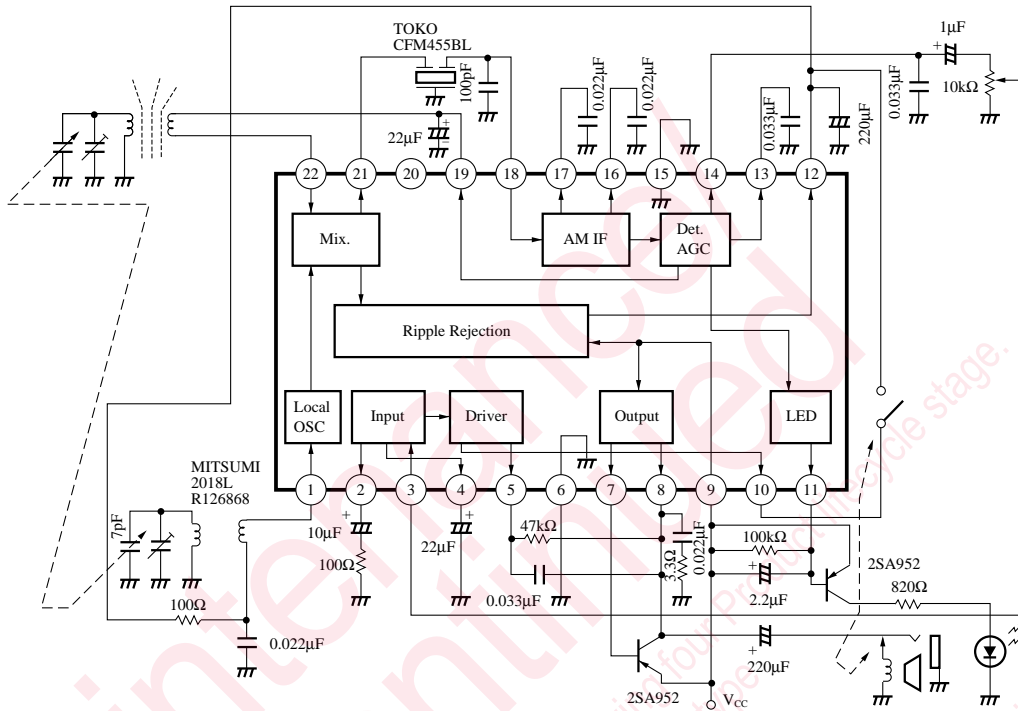
■ Pin Descriptions

Pin No. within □ is for AN7002S

Pin No.		Pin Name	Typ. Waveform	Description	Equivalent Circuit
AN7002K	AN7002S				
1	1	Local OSC	—	AMOSC pin Oscillation circuit is made up with differential amp.	
9	10	V_{CC}	DC 3V	Supply pin	
3	3	AF Input		Differential amp. base input	
4	4	Ripple Rejection	—	Ripple rejection pin	

■ Pin Descriptions (Cont.)   Pin No. within □ is for AN7002S

Pin No. AN7002K	Pin No. AN7002S	Pin Name	Typ. Waveform	Description	Equivalent Circuit
5	5	Phase Compensation	—	Phase compensation pin Connect phase compensation C, R between power output pin and this pin.	
6	6 · 7	GND	DC 0V	GND pin	
7	8	PNP Power Base	—	PNP power transistor base connection pin	
8	9	Power Output		Power output pin	
2	2	Negative Feedback	—	Power amp. negative feedback pin	
10	11	Current Switching	—	Current switching pin Connect this pin with V_{CC} and increase supply current quantity.	
11	12	Indicator	—	Indicator pin LED drive becomes open collector output used AGC voltage. Drive capacitance is 2mA. So LED can't be driven directly.	
12	13	Ripple Rejection	—	Ripple rejection pin Make up of π type filter at C, R and increase ripple rejection efficiency.	
13	14	Detection		Detection pin Input 455kHz IF signal to two Tr in reverse phase, peak detect all-rectified waveform through constant-current supply and C, R charge and discharge.	
14	15	Detection Output		Detection output pin This pin is PNP emitter ground amp. output. Output impedance is 2.2kΩ.	

■ Pin Descriptions (Cont.)

Pin No. within □ is for AN7002S

Pin No. AN7002K	Pin No. AN7002S	Pin Name	Typ. Waveform	Description	Equivalent Circuit
15	16 · 17	GND	DC 0V	GND pin	——
16	18	IF By-pass	455kHz IF Signal	IF by-pass capacitor connection pin	
17	19	IF By-pass	455kHz IF Signal	IF by-pass capacitor connection pin	
18	20	IF Input	455kHz IF Signal	IF input pin Differential amp. base input	
19	21	AGC	—	AGC pin Connect capacitor	
22	24	RF Input	AM Signal	RF input pin Differential amp. base input	
21	23	MIX Output	455kHz IF Signal	MIX output pin Connect ceramic filter	
20	22	NC	—	NC Pin	——

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