

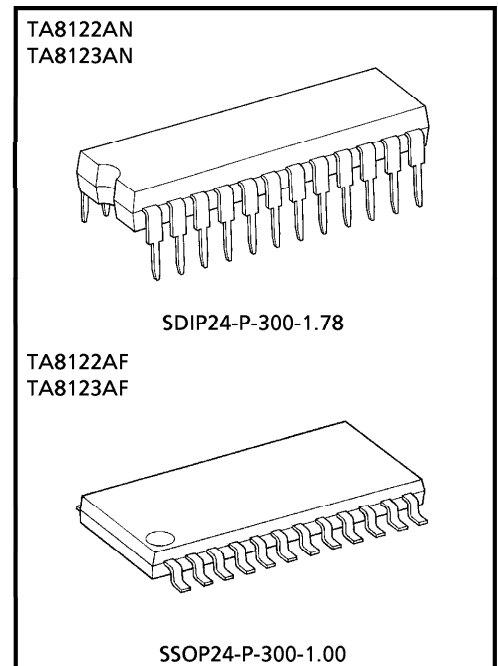
TA8122AN, TA8122AF, TA8123AN, TA8123AF

3V AV / FM 1CHIP TUNER IC

TA8122AN/AF and TA8123AN/AF are the AM/FM 1Chip Tuner ICs, which are designed for Portable Radios and 3V Headphone Radios.

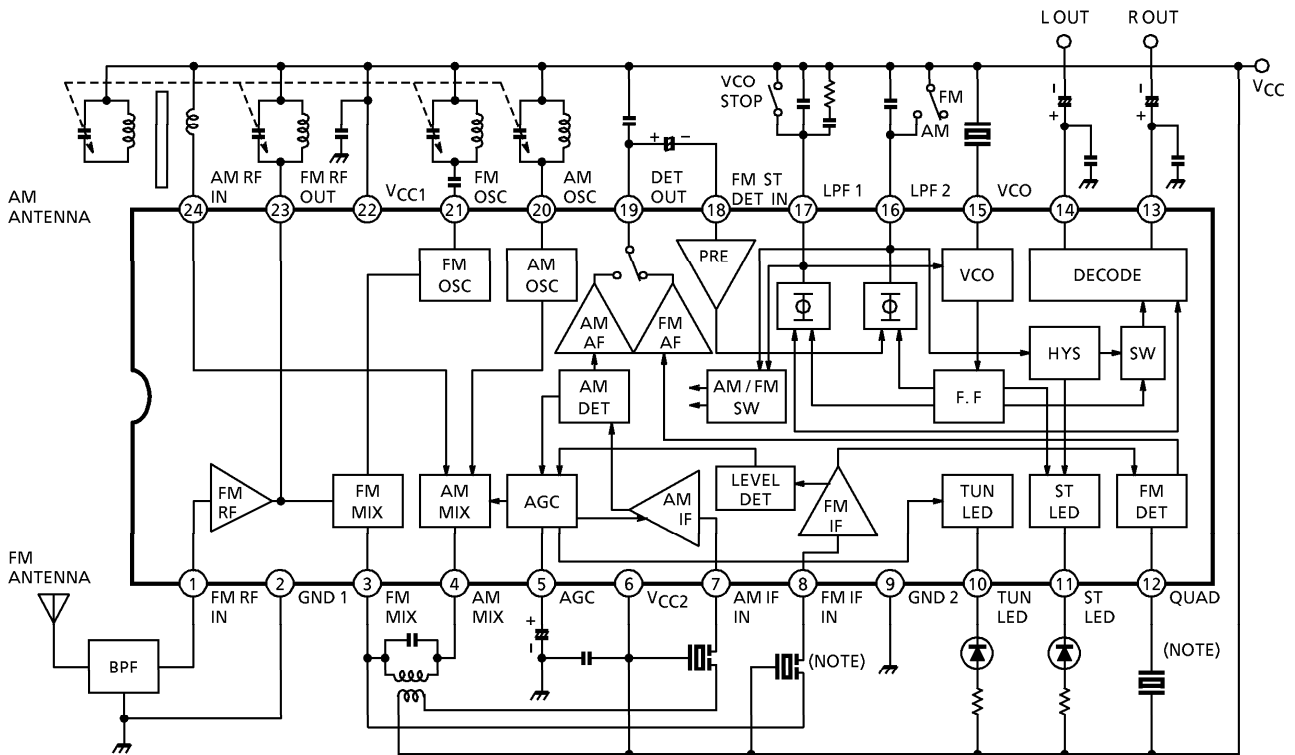
FEATURES

- Built-in
FM F/E, AM/FM IF and FM ST DET
- AM Detector Coil, FM IFT and IF Coupling Condenser are not needed.
- For adopting Ceramic Discriminator and Ceramic Resonator, it is not necessary to adjust the FM Quad Detector Circuit and FM ST DET VCO Circuit.
- S curve characteristics of FM detection output in TA8122AN/AF and TA8123AN/AF are reverse to each other.
 TA8122AN/AF : Reverse characteristic
 TA8123AN/AF : Normal characteristic
- Compact Package
 TA8122AN/23AN : Shrink DIP 24 pin (1.78mm pitch)
 TA8122AF/23AF : Mini Flat Package 24 pin
- Operating Supply Voltage Range
 $V_{CC} = 1.8 \sim 7.0V$ ($T_a = 25^\circ C$)



Weight
 SDIP24-P-300-1.78 : 1.2g (Typ.)
 SSOP24-P-300-1.00 : 0.31g (Typ.)

BLOCK DIAGRAM



(Note)

We recommend the kit of the ceramic filter and the ceramic resonator which are shown in the table as below.
It is necessary to meet the center frequency of the ceramic filter and the ceramic resonator, otherwise there are some cases that the characteristics get worse.

KIT NAME	COMBINATION			
	CERAMIC FILTER	Q'ty	CERAMIC RESONATOR	Q'ty
KMFC403-Z	SFE10.7MA5-Z	2	CDA10.7MG16-Z	1
KMFC411-Z	SFE10.7MA5-Z	1	CDA10.7MG16-Z	1
KMFC422-Z	SFE10.7MA2-Z	2	CDA10.7MG16-Z	1
KMFC435-Z	SFE10.7MA5L-Z	2	CDA10.7MG16-Z	1
KMFC445-Z	SFE10.7MA5L-Z	1	CDA10.7MG16-Z	1

MANUFACTURER : MURATA MFG. CO., LTD

EXPLANATION OF TERMINALS

PIN No.	CHARACTERISTIC	INTERNAL CIRCUIT	DC VOLTAGE (V) (AT NO SIGNAL)	
			AM	FM
1	FM-RF IN		0	0.7
2	GND1 (GND For RF Stage)	—	0	0
3	FM MIX		2.3	1.8
4	AM MIX		2.3	1.8
5	AGC (AM AGC)		0	0
6	VCC2 (VCC For IF/MPX Stage)	—	3.0	3.0

PIN No.	CHARACTERISTIC	INTERNAL CIRCUIT	DC VOLTAGE (V) (AT NO SIGNAL)	
			AM	FM
7	AM IF IN		3.0	3.0
8	FM IF IN		3.0	3.0
9	GND2 (GND For IF/MPX Stage)	—	0	0
10	TUN LED (Tuning LED)		—	—
11	ST LED (Stereo LED)		—	—
12	QUAD (FM QUAD. Detector)		2.4	2.1

PIN No.	CHARACTERISTIC	INTERNAL CIRCUIT	DC VOLTAGE (V) (AT NO SIGNAL)	
			AM	FM
13 14	R-OUT (R-ch Output) L-OUT (L-ch Output)		1.0	1.0
15	VCO		2.5	2.5 (VCO stop mode)
16	<p>LPF2</p> <ul style="list-style-type: none"> ● LPF Terminal For Synchronous Detector ● Bias Terminal For AM/FM SW Circuit <p>$V_{16} = V_{CC} \rightarrow \text{AM}$ $V_{16} = \text{Open} \rightarrow \text{FM}$</p>		3.0	2.2 (VCO stop mode) 2.7
17	<p>LPF1</p> <p>LPF Terminal For Phase Detector VCO Stop Terminal</p> <p>$V_{17} = V_{CC} \rightarrow \text{VCO Stop}$</p>		2.7	2.2
18	FM ST DET IN		0.7	0.7

PIN No.	CHARACTERISTIC	INTERNAL CIRCUIT	DC VOLTAGE (V) (AT NO SIGNAL)	
			AM	FM
19	DET OUT	<p>② LOW→FM, HIGH→AM ③ LOW→AM, HIGH→FM</p>	1.5	1.2
20	AM OSC		3.0	3.0
21	FM OSC		3.0	3.0
22	VCC1 (VCC For RF Stage)	—	3.0	3.0
23	FM RF OUT	cf. pin①	3.0	3.0
24	AM RF IN		3.0	3.0

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V _{CC}	8	V
LED Current		I _{LED}	10	mA
LED Voltage		V _{LED}	8	V
Power Dissipation	TA8122AN / 23AN	P _D (Note)	1200	mW
	TA8122AF / 23AF		400	
Operating Temperature		T _{opr}	- 25~75	°C
Storage Temperature		T _{stg}	- 55~150	°C

Note : Derated above 25°C in the proportion of 9.6mW/°C for TA8122AN / 23AN and of 3.2mW/°C for TA8122AF / 23AF

ELECTRICAL CHARACTERISTICS

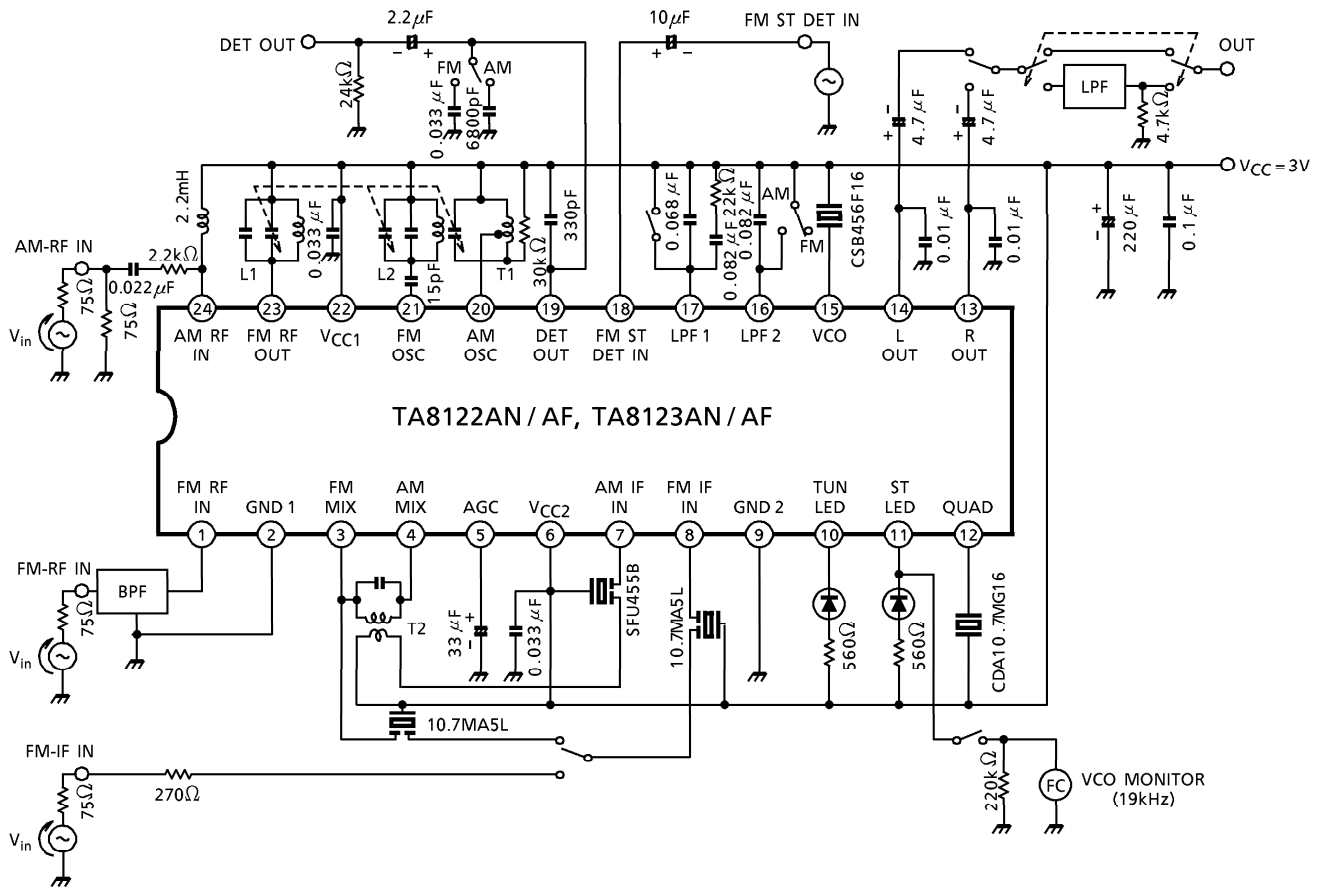
Unless otherwise specified,

$T_a = 25^\circ\text{C}$, $V_{CC} = 3\text{V}$, F/E : $f = 83\text{MHz}$, $f_m = 1\text{kHz}$
 FM IF : $f = 10.7\text{MHz}$, $\Delta f = \pm 22.5\text{kHz}$, $f_m = 1\text{kHz}$
 AM : $f = 1\text{MHz}$, $\text{MOD} = 30\%$, $f_m = 1\text{kHz}$
 FM ST DET : $f_m = 1\text{kHz}$

CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current		$I_{CC}(\text{FM})$	1	$V_{in} = 0$, FM mode	—	14.0	18.5	mA
		$I_{CC}(\text{AM})$	1	$V_{in} = 0$, AM mode	—	6.0	8.3	
F/E	Input Limiting Voltage	$V_{in}(\text{lim.})$	1	-3dB limiting	—	14.0	—	$\text{dB}\mu\text{V}$ EMF
	Local OSC Voltage	V_{OSC}	2	$f_{OSC} = 72.3\text{MHz}$	70	105	140	mV_{rms}
	Input Limiting Voltage IF	$V_{in}(\text{lim.})$ IF	1	-3dB limiting	39	44	49	$\text{dB}\mu\text{V}$ EMF
FM IN	Recovered Output Voltage	V_{OD}	1	$V_{in} = 80\text{dB}\mu\text{V}$ EMF	55	80	110	mV_{rms}
	Signal To Noise Ratio	S/N	1	$V_{in} = 80\text{dB}\mu\text{V}$ EMF	—	70	—	dB
	Total Harmonic Distortion	THD	1	$V_{in} = 80\text{dB}\mu\text{V}$ EMF	—	0.4	—	%
	AM Rejection Ratio	AMR	1	$V_{in} = 80\text{dB}\mu\text{V}$ EMF	—	50	—	dB
	LED ON Sensitivity	V_L	1	$I_L = 1\text{mA}$	43	48	53	$\text{dB}\mu\text{V}$ EMF
AM	Gain	G_V	1	$V_{in} = 23\text{dB}\mu\text{V}$ EMF	20	40	80	mV_{rms}
	Recovered Output Voltage	V_{OD}	1	$V_{in} = 60\text{dB}\mu\text{V}$ EMF	50	60	100	mV_{rms}
	Signal To Noise Ratio	S/N	1	$V_{in} = 60\text{dB}\mu\text{V}$ EMF	—	44	—	dB
	Total Harmonic Distortion	THD	1	$V_{in} = 60\text{dB}\mu\text{V}$ EMF	—	1.0	—	%
	LED ON Sensitivity	V_L	1	$I_L = 1\text{mA}$	19	24	29	$\text{dB}\mu\text{V}$ EMF
Pin ¹⁹ Output Resistance		R_{19}	1	FM mode	—	0.75	—	$\text{k}\Omega$
				AM mode	—	12.5	—	

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
FM ST DET	Input Resistance	R_{IN}	—	—	—	24	—	$k\Omega$	
	Output Resistance	R_{OUT}	—	—	—	5	—		
	Max. Composite Signal Input Voltage	V_{in} (MAX.) STEREO	1	L + R = 90%, P = 10% $f_m = 1\text{kHz}$, THD = 3%	—	350	—	mV_{rms}	
	Separation	Sep.	1	L + R = $135mV_{rms}$ P = $15mV_{rms}$	$f_m = 100\text{Hz}$	—	42	—	dB
					$f_m = 1\text{kHz}$	35	42	—	
					$f_m = 10\text{kHz}$	—	42	—	
	Total Harmonic Distortion	Monaural	THD (MONAURAL)	1	$V_{in} = 150mV_{rms}$	—	0.2	—	%
		Stereo	THD (STEREO)		L + R = $135mV_{rms}$, P = $15mV_{rms}$	—	0.2	—	
	Voltage Gain		G_V (FM ST DET)	1	$V_{in} = 150mV_{rms}$	-5	-3	-1	dB
	Channel Balance		C.B.	1	$V_{in} = 150mV_{rms}$	-2	0	2	
	Stereo LED Sensitivity	ON	V_L (ON)	1	Pilot Input	—	8	15	mV_{rms}
		OFF	V_L (OFF)			2	6	—	
	Stereo LED Hysteresis		V_H	1	To LED turn off from LED turn on	—	2	—	mV_{rms}
Capture Range		C.R.	1	P = $15mV_{rms}$	—	1.3	—	%	
Signal To Noise Ratio		S/N	1	$V_{in} = 150mV_{rms}$	—	70	—	dB	

TEST CIRCUIT 1

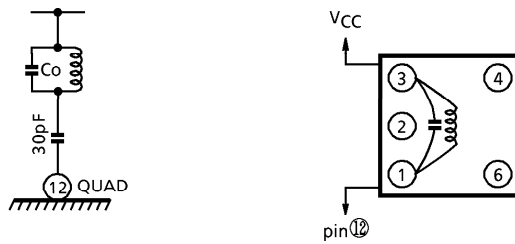


FM DETECTION CIRCUIT

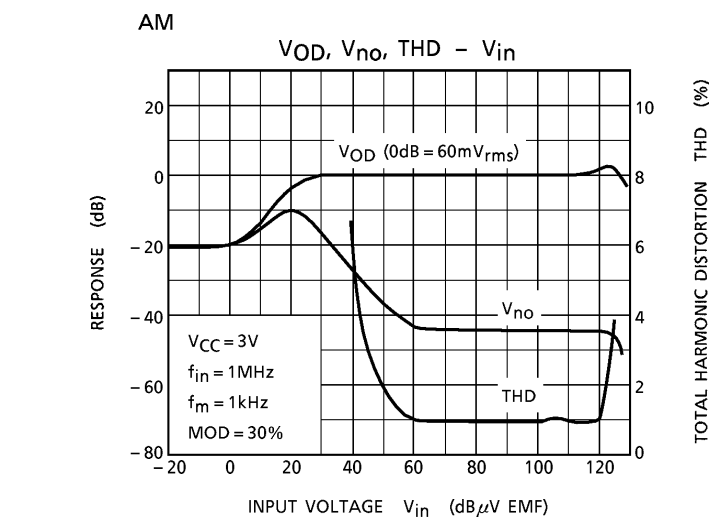
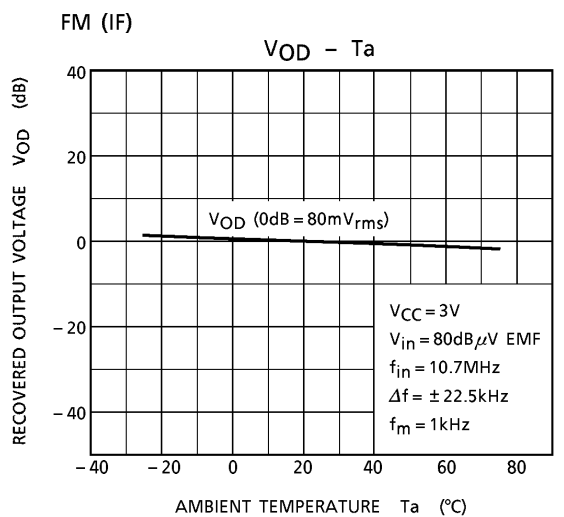
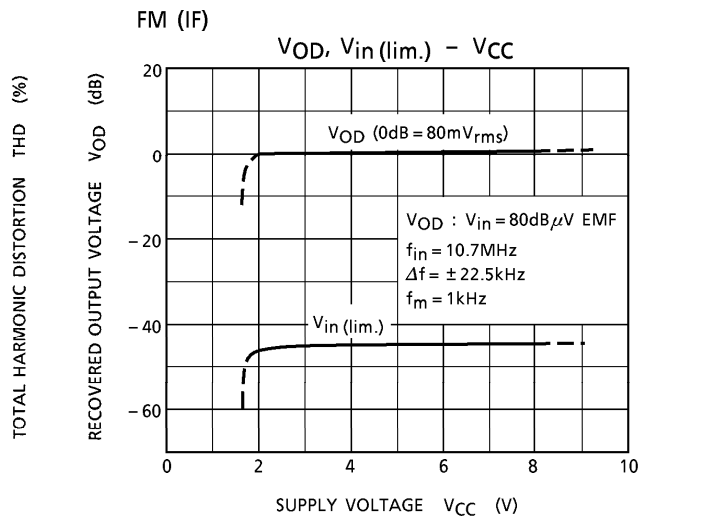
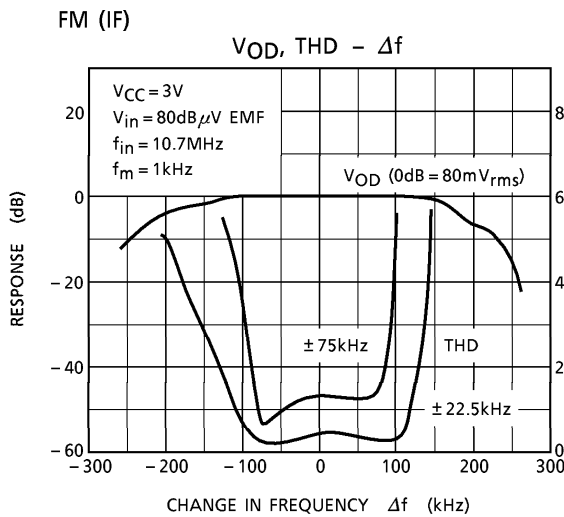
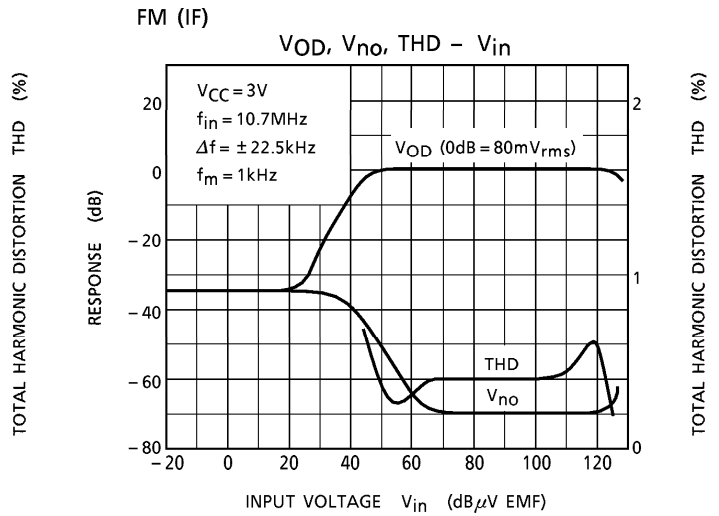
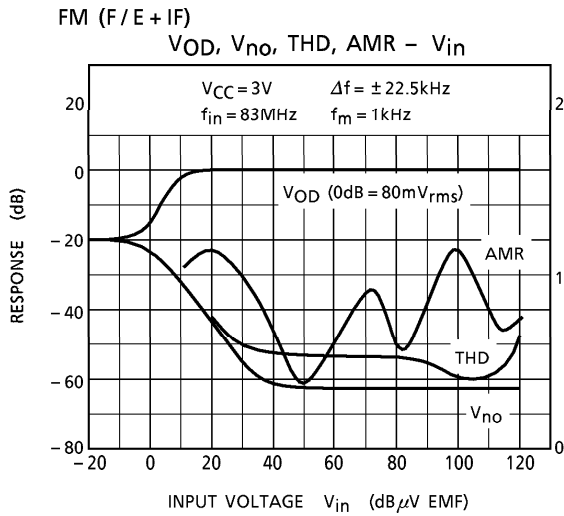
For the FM detection circuit, detection coil is able to use instead of ceramic discriminator.

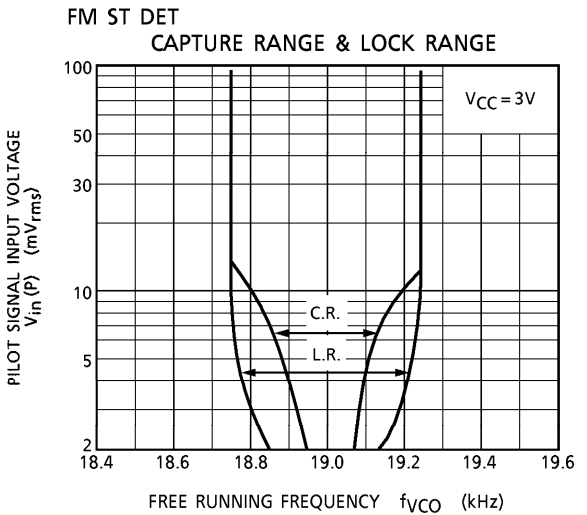
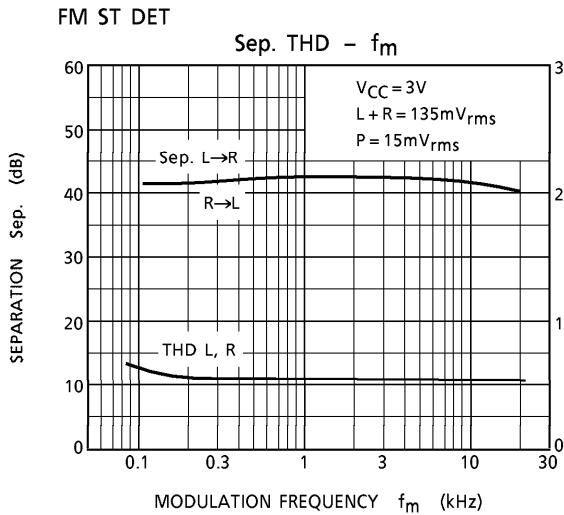
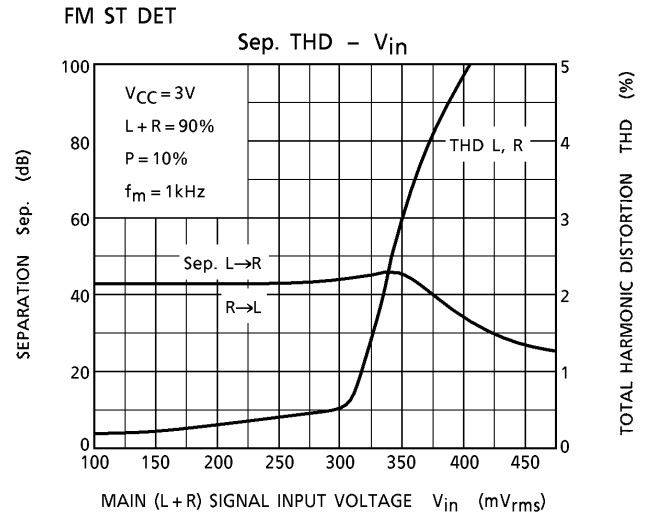
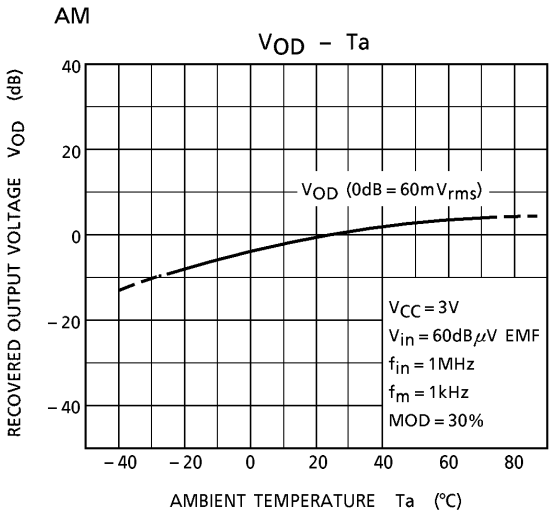
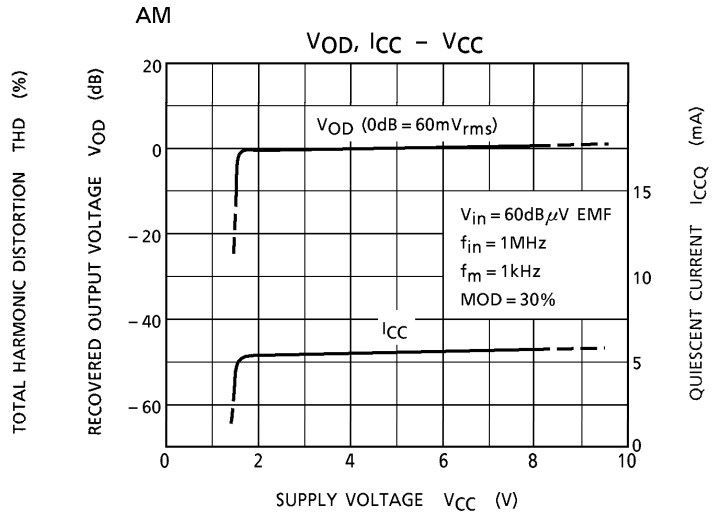
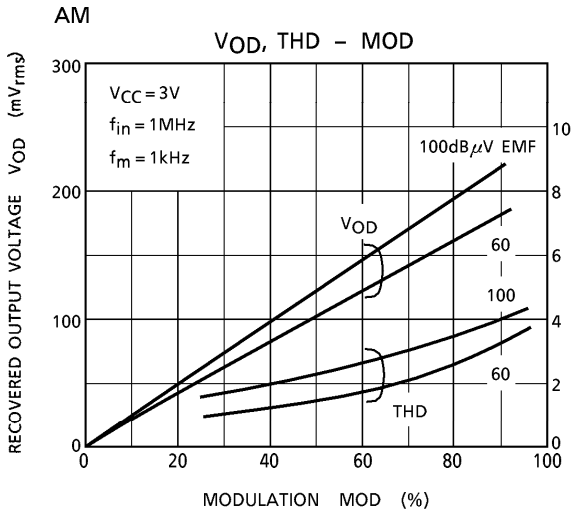
Recommended circuit and recommended coil are as follows.

In this case, please take care that $V_{in} (lim.)$ falls a little.



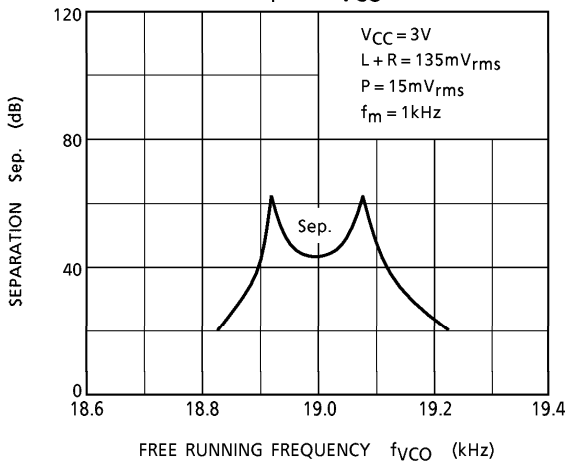
TEST FREQUENCY	C_o (pF)	Q_o	TURNS				WIRE (mm ϕ)	REF
			1-2	2-3	1-3	4-6		
10.7MHz	100	100	—	—	12	—	0.12UEW	SUMIDA ELECTRIC CO., LTD 2153-4095-189 or Equivalent





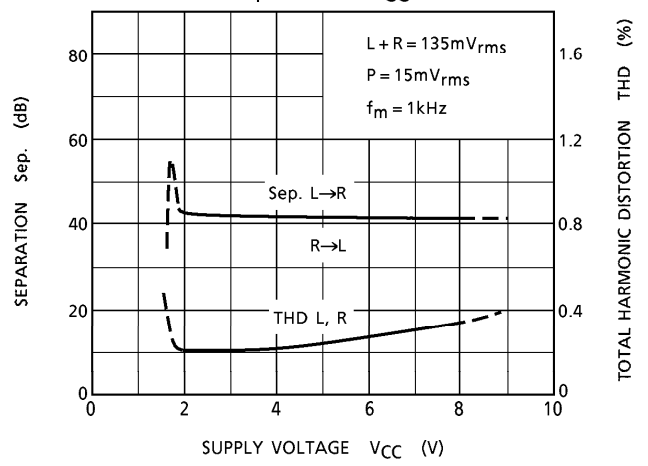
FM ST DET

Sep. - f_{VCO}



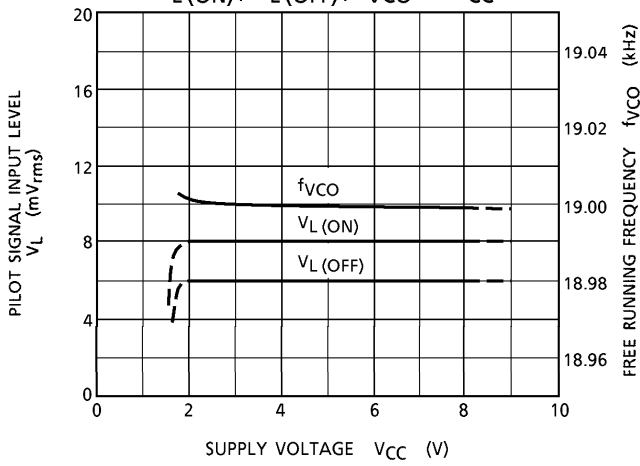
FM ST DET

Sep. THD - V_{CC}



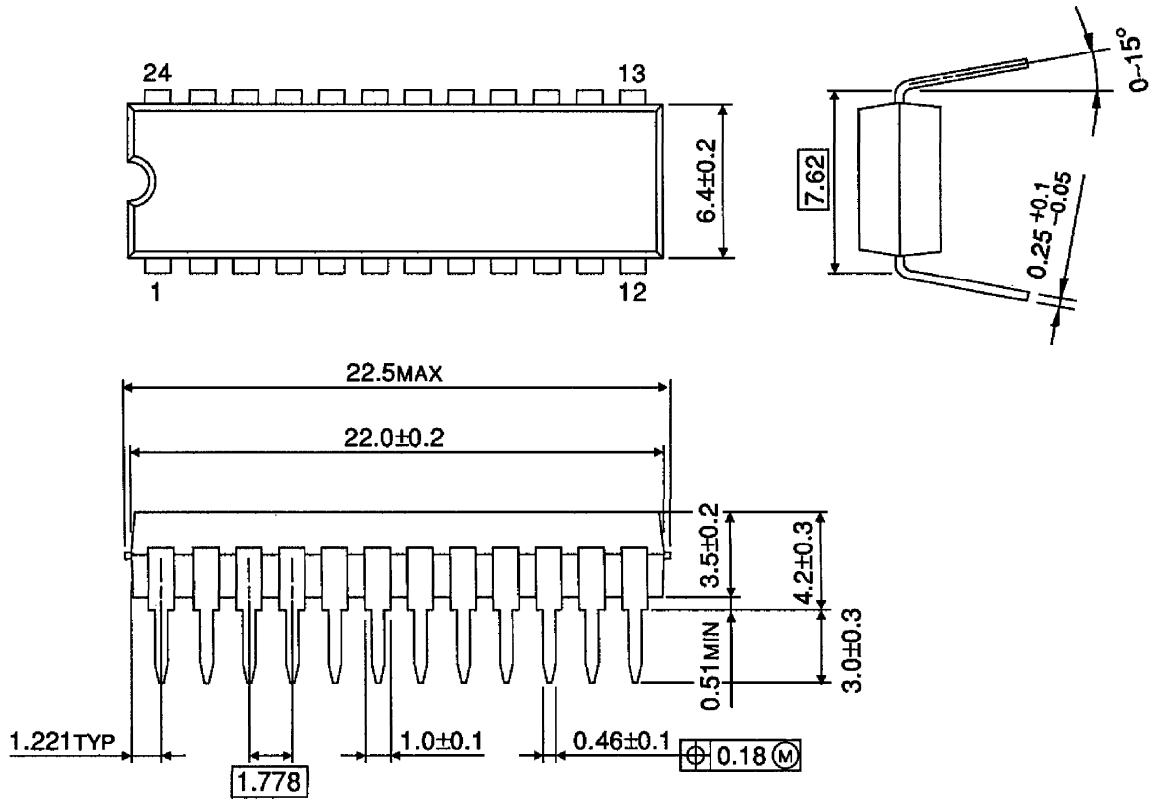
FM ST DET

$V_L(ON), V_L(OFF), f_{VCO} - V_{CC}$



PACKAGE DIMENSIONS
SDIP24-P-300-1.78

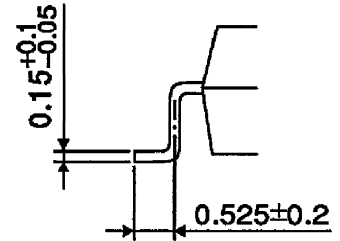
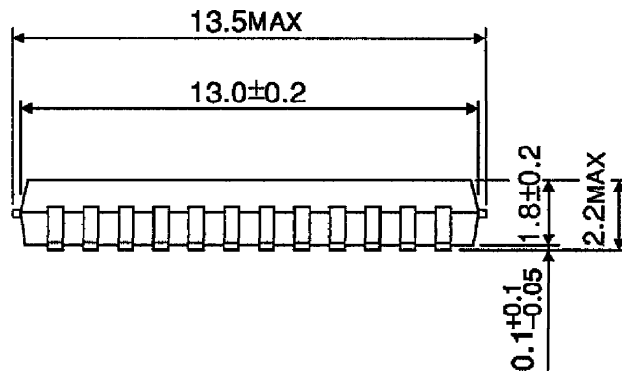
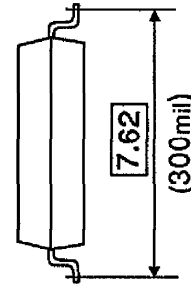
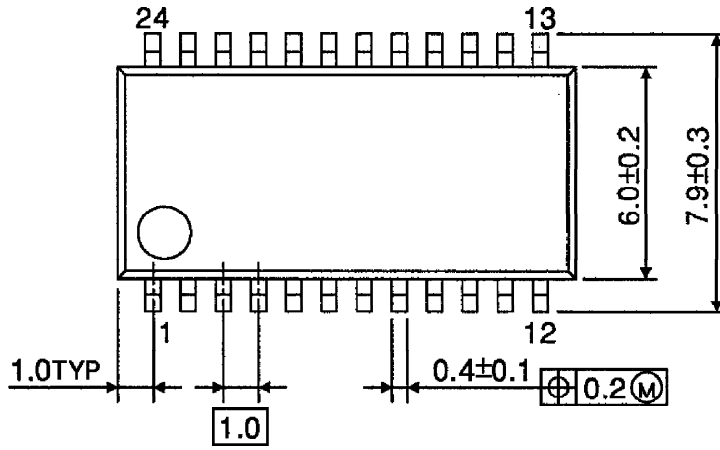
Unit : mm



Weight : 1.2g (Typ.)

PACKAGE DIMENSIONS
SSOP24-P-300-1.00

Unit : mm



Weight : 0.31g (Typ.)

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