

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

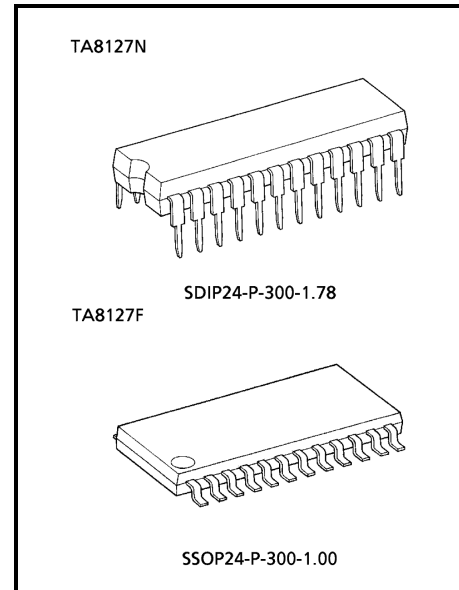
# TA8127N, TA8127F

3V AM / FM 1chip Tuner IC

TA8127N and TA8127F 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 MPX
- AM detector coil and IF coupling condenser are not needed.
- Compact package  
TA8127N: Shrink DIP 24 pin (1.78mm pitch)  
TA8127F: Mini flat package 24 pin
- Operating supply voltage range  
 $V_{CC} = 1.8 \sim 7.0V$  ( $T_a = 25^\circ C$ )

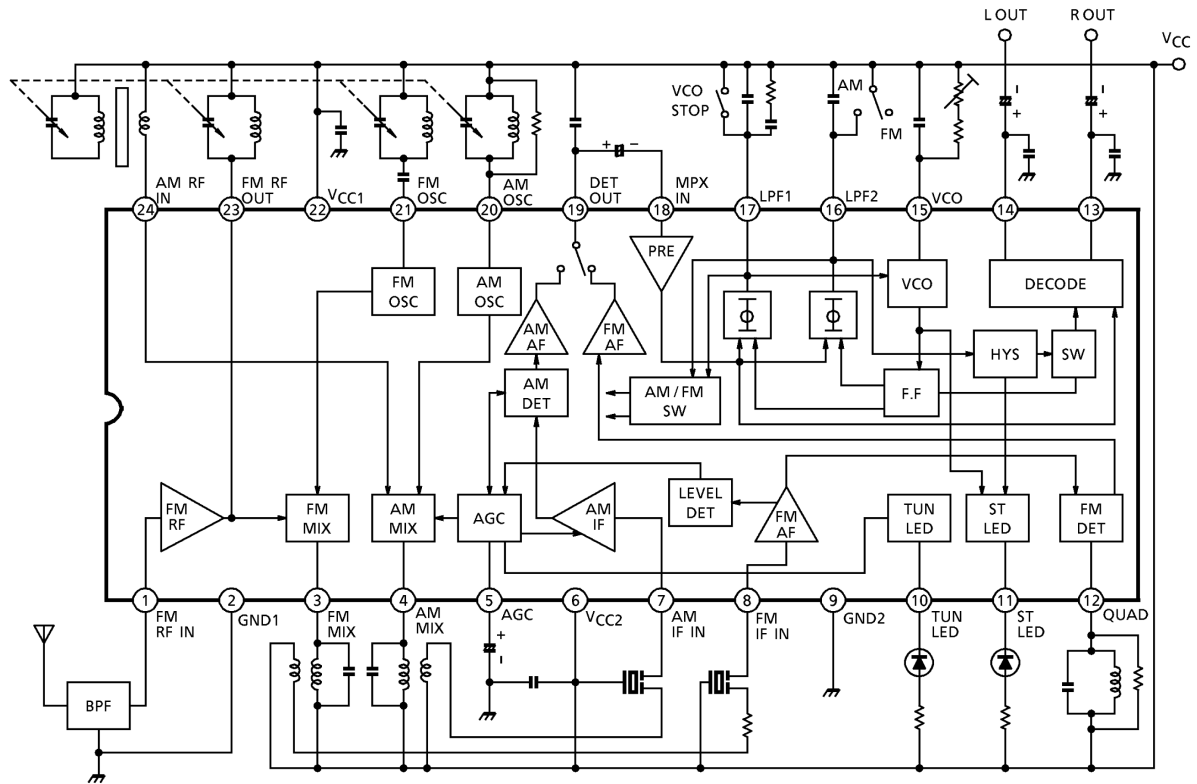


Weight

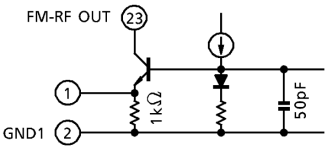
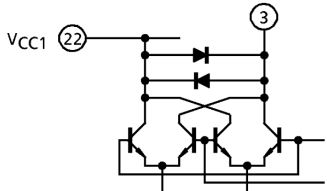
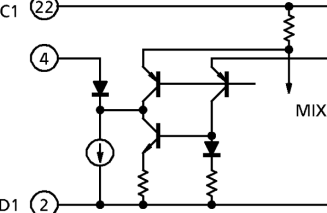
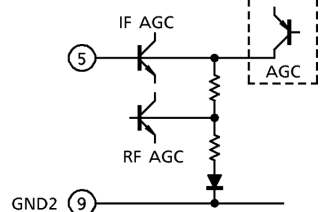
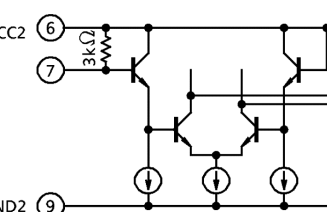
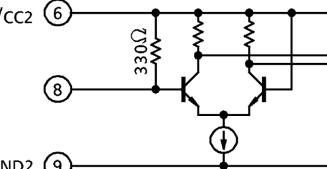
SDIP24-P-300-1.78: 1.2g (typ.)

SSOP24-P-300-1.00: 0.31 (typ.)

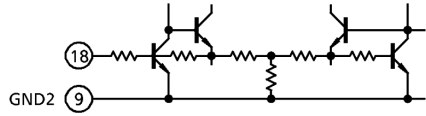
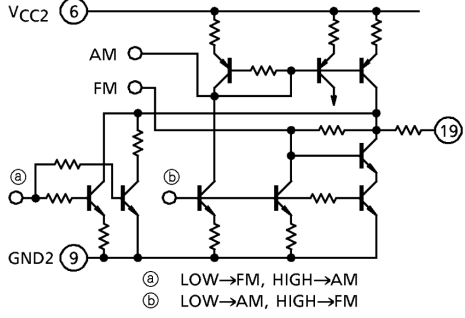
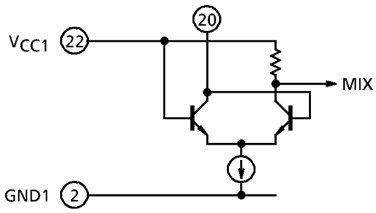
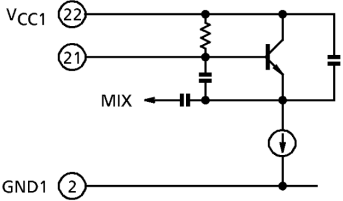
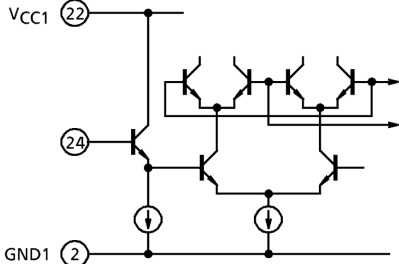
## Block Diagram



## Explanation Of Terminals

Pin No.	Item	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		3.0	3.0
4	AM MIX		3.0	3.0
5	AGC (AM AGC)		0	0
6	VCC2 (VCC for IF / MPX stage)	—	3.0	3.0
7	AM IF IN		3.0	3.0
8	FM IF IN		3.0	3.0

Pin No.	Item	Internal Circuit	DC Voltage (V) (at no Signal)	
			AM	FM
9	GND2 (GND for IF / MPX stage)	—	0	0
10	TUN LED (tuning LED)		—	—
11	ST LED (stereo LED)		—	—
12	QUAD (FM QUAD. Detector)		3.0	3.0
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	LPF2 • LPF terminal for synchronous detector • Bias terminal for AM / FM SW circuit V <sub>16</sub> = V <sub>CC</sub> → AM (VCO stop) V <sub>16</sub> = OPEN → FM		3.0	2.2 (VCO stop mode 2.7)
17	LPF1 • LPF terminal for phase detector • VCO stop terminal V <sub>7</sub> = V <sub>CC</sub> → VCO stop		2.7	2.2

Pin No.	Item	Internal Circuit	DC Voltage (V) (at no Signal)	
			AM	FM
18	MPX IN		0.7	0.7
19	DET OUT		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. Pin(1)	3.0	3.0
24	AM RF IN		3.0	3.0

## Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Supply voltage		V <sub>CC</sub>	8	V
LED current		I <sub>LED</sub>	10	mA
LED voltage		V <sub>LED</sub>	8	V
Power dissipation	TA8127N	P <sub>D</sub> (Note)	1200	mW
	TA8127F		400	
Operating temperature		T <sub>opr</sub>	−25~75	°C
Storage temperature		T <sub>stg</sub>	−55~150	°C

Note: Derated above 25°C in the proportion of 9.6mW / °C for TA8127N and of 3.2mW / °C for TA8127F.

## Electrical Characteristics

Unless Otherwise Specified,

Ta = 25°C, V<sub>CC</sub> = 3V, F / E: f = 83MHz, f<sub>m</sub> = 1kHz

FM IF: f = 10.7MHz, Δf = ±22.5kHz, f<sub>m</sub> = 1kHz

AM: f = 1MHz, MOD = 30%, f<sub>m</sub> = 1kHz

MPX: f<sub>m</sub> = 1kHz

Characteristic		Symbol	Test Cir- cuit	Test Condition	Min.	Typ.	Max.	Unit
Supply current		I <sub>CC</sub> (FM)	1	V <sub>in</sub> = 0, FM mode	—	13.2	20.0	mA
		I <sub>CC</sub> (AM)	1	V <sub>in</sub> = 0, AM mode	—	8.4	13.5	
F / E	Input limiting voltage	V <sub>in</sub> (lim.)	1	− 3dB limiting	—	10.0	—	dBμV EMF
	Local OSC voltage	V <sub>OSC</sub>	2	f <sub>OSC</sub> = 72.3MHz	—	105	—	mV <sub>rms</sub>
FM IF	Input limiting voltage	V <sub>in</sub> (lim.) IF	1	− 3dB limiting	40	46	53	dBμV EMF
	Recovered output voltage	V <sub>OD</sub>	1	V <sub>in</sub> = 80dBμV EMF	55	80	110	mV <sub>rms</sub>
	Signal to noise ratio	S / N	1	V <sub>in</sub> = 80dBμV EMF	—	70	—	dB
	Total harmonic distortion	THD	1	V <sub>in</sub> = 80dBμV EMF	—	0.4	—	%
	AM rejection ratio	AMR	1	V <sub>in</sub> = 80dBμV EMF	—	32	—	dB
	Lamp on sensitivity	V <sub>L</sub>	1	I <sub>L</sub> = 1mA	45	51	56	dBμV EMF
AM	Gain	G <sub>V</sub>	1	V <sub>in</sub> = 26dBμV EMF	40	70	110	mV <sub>rms</sub>
	Recovered output voltage	V <sub>OD</sub>	1	V <sub>in</sub> = 60dBμV EMF	55	80	110	
	Signal to noise ratio	S / N	1	V <sub>in</sub> = 60dBμV EMF	—	42	—	dB
	Total harmonic distortion	THD	1	V <sub>in</sub> = 60dBμV EMF	—	1.0	—	%
	Lamp on sensitivity	V <sub>L</sub>	1	I <sub>L</sub> = 1mA	20	25	30	dBμV EMF
Pin(19) output resistance		R <sub>19</sub>	1	FM mode	—	0.75	—	kΩ
				AM mode	—	12.5	—	

Characteristic		Symbol	Test Cir-cuit	Test Condition	Min.	Typ.	Max.	Unit
MPX	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 <sub>rms</sub>
	Separation	Sep	1	L+R = 135mV <sub>rms</sub> P = 15mV <sub>rms</sub> $f_m = 100\text{Hz}$	—	42	—	dB
				$f_m = 1\text{kHz}$	35	42	—	
				$f_m = 10\text{kHz}$	—	42	—	
	Total harmonic distortion	Monaural	1	$V_{in} = 150\text{mV}_{rms}$	—	0.2	—	%
		Stereo		L+R = 135mV <sub>rms</sub> , P = 15mV <sub>rms</sub>	—	0.2	—	
	Voltage gain	$G_V$ (MPX)	1	$V_{in} = 150\text{mV}_{rms}$	−5	−3	−1	dB
	Channel balance	C. B.	1	$V_{in} = 150\text{mV}_{rms}$	−2	0	2	
	Stereo lamp sensitivity	On	1	Pilot input	—	8	16	mV <sub>rms</sub>
		Off		Pilot input	2	6	—	
	Stereo lamp hysteresis	$V_H$	1	To LED turn off from LED turn on	—	2	—	mV <sub>rms</sub>
	Caputure range	C. R.	1	P = 15mV <sub>rms</sub>	—	±3	—	%
	Signal to noise ratio	S / N	1	$V_{in} = 150\text{mV}_{rms}$	—	70	—	dB



[illegible]

※ POLYESTER FILM CONDENSER

Using other types of condensers, there are some cases that the MPX does not do normal stereo action at high temperature or low temperature.

**(Note)**  
FET Buff. Voltage Gain  $\approx$  - 10dB

Coil No.	Test Freq. (Hz)	L (μH)	C <sub>O</sub> (pF)	Q <sub>O</sub>	Turns					Wire (mmφ)	Reference
					1-2	2-3	1-3	1-4	4-6		
L <sub>1</sub> FM RF	100M	—	—	100	—	—	—	2 $\frac{1}{2}$	—	0.5UEW	(S) 53T-037-202
L <sub>2</sub> FM OSC	100M	—	—	100	—	—	2 $\frac{3}{4}$	—	—	0.5UEW	(S) 0258-244
L <sub>3</sub> AM OSC	796k	288	—	115	13	73	—	—	—	0.08UEW	(S) 4147-1356-038
T <sub>1</sub> FM MIX	10.7M	—	75	100	—	—	13	—	2	0.1UEW	(S) 2153-414-041
T <sub>2</sub> AM MIX	455k	—	180	120	—	—	180	—	15	0.08UEW	(S) 2150-2162-165
T <sub>3</sub> FM DET	10.7M	—	47	165	—	—	16	—	—	0.09UEW	(S) 2153-4095-122

Figure 1 shows six schematic diagrams of logic blocks labeled L1, L2, L3, T1, T2, and T3. L1 is a simple wire connecting input 1 to output 4. L2 is a 2-input AND gate with inputs 1 and 3, and output 4. L3 is a 3-input AND gate with inputs 1, 2, and 3, and output 6. T1 and T2 are 2-input AND gates with inputs 1 and 3, and output 4. They also have feedback loops from output 4 back to input 3. T3 is a 2-input AND gate with inputs 1 and 3, and output 4. It also has a feedback loop from output 4 back to input 3, and an output buffer from output 4 to output 6. The diagrams are labeled with V.C., VCC, Pin, and C.F. to indicate power and control signals.

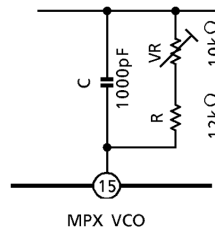
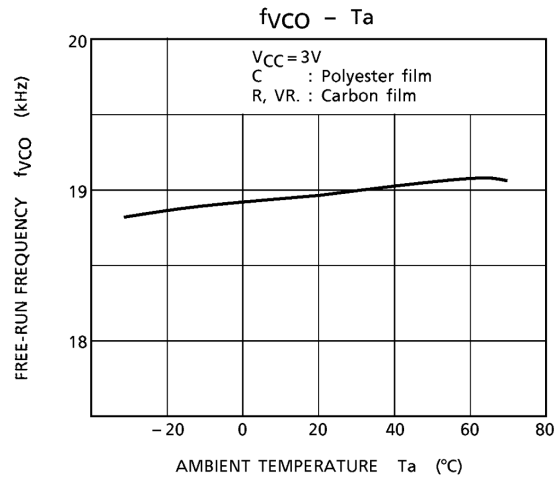
## Hint On Use Of TA8127N And TA8127F

External parts of MPX VCO

- (1) Temperature characteristic of MPX VCO free-run frequency. The temperature characteristic of MPX VCO is shown in the diagram as below. Select one with a better temperature characteristic (C, R and VR. ) in use. We recommend,

C : Polyester film

R, VR: Carbon film



- (2) Value of the external parts

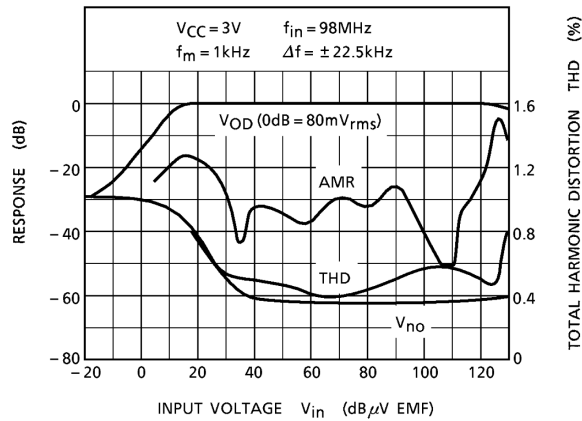
We recommend to set up these value as below.

$R = 12k\Omega$

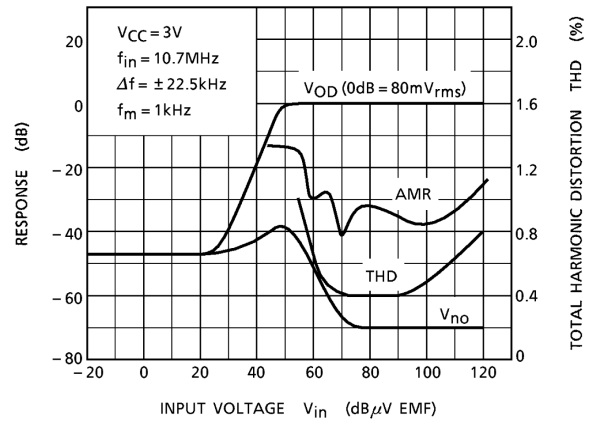
$VR = 10k\Omega$

$C = 1000pF$

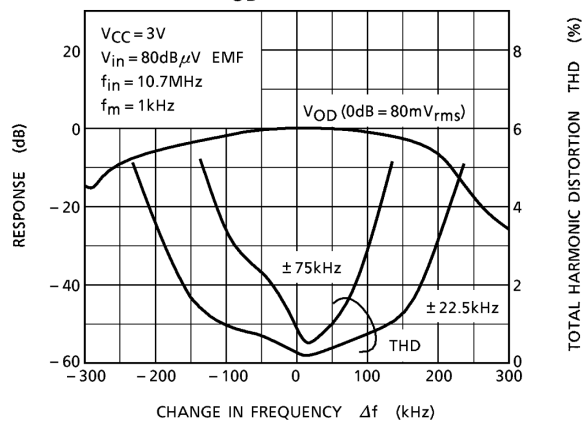
FM (F/E + IF)

V<sub>OD</sub>, V<sub>no</sub>, THD, AMR - V<sub>in</sub>

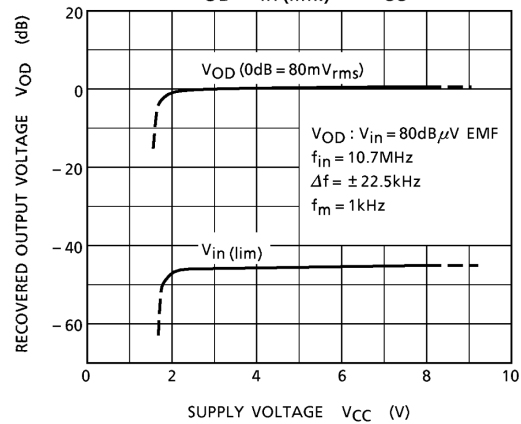
FM (IF)

V<sub>OD</sub>, V<sub>no</sub>, THD, AMR - V<sub>in</sub>

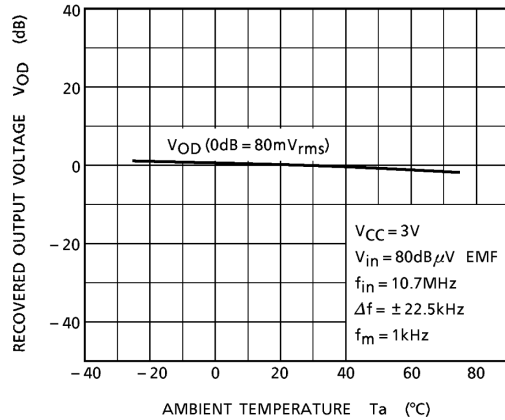
FM (IF)

V<sub>OD</sub>, THD -  $\Delta f$ 

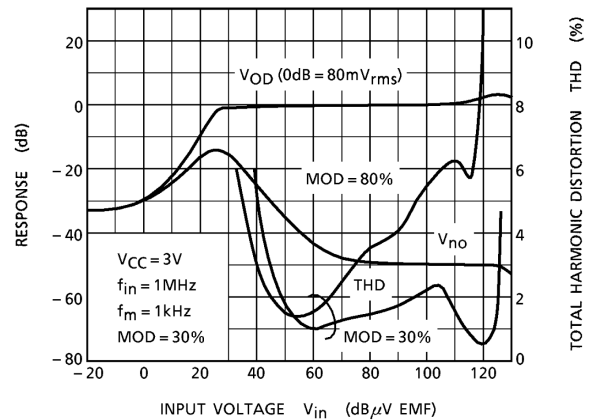
FM (IF)

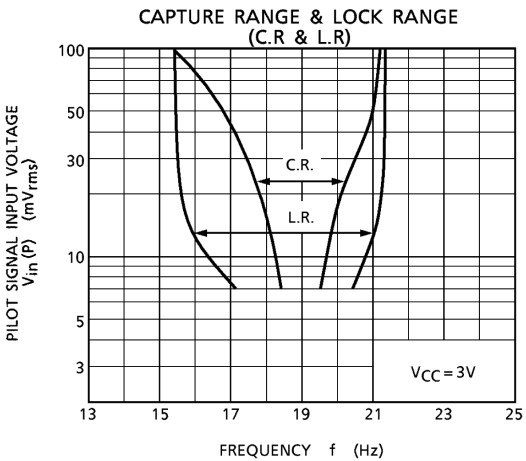
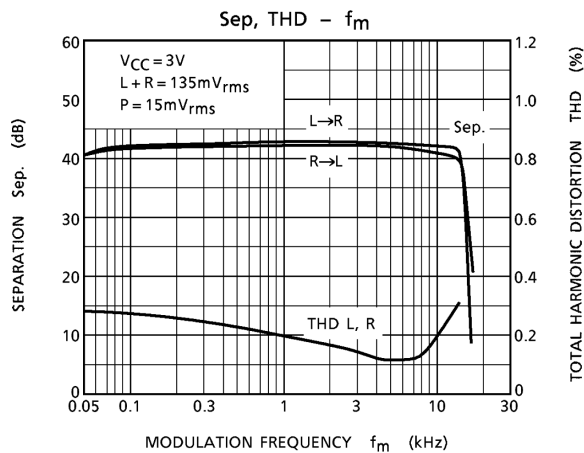
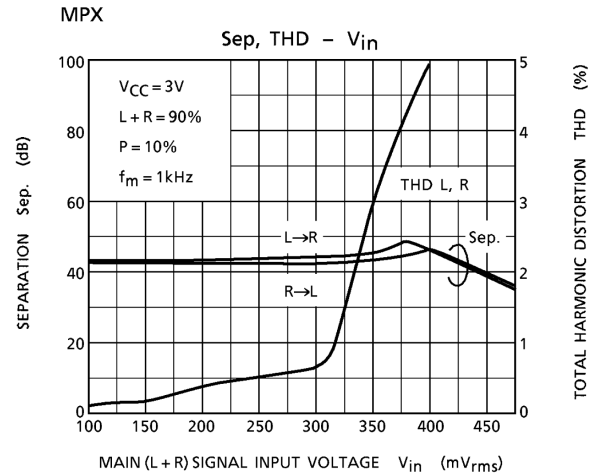
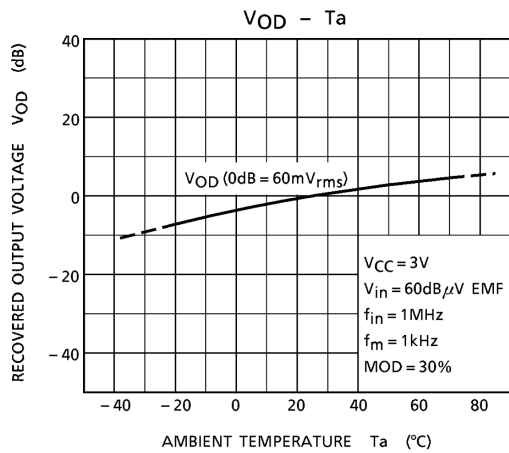
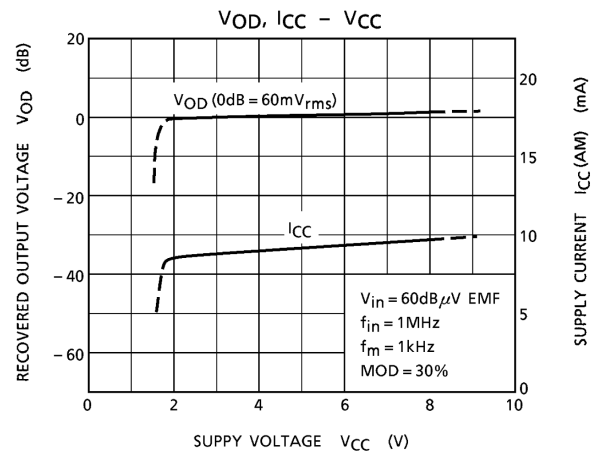
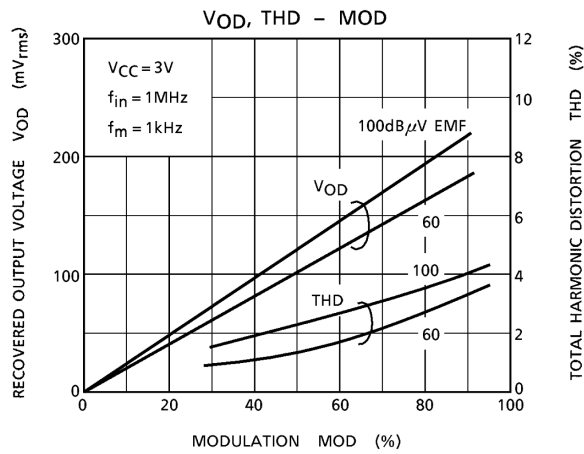
V<sub>OD</sub>, V<sub>in</sub> (lim.) - V<sub>CC</sub>

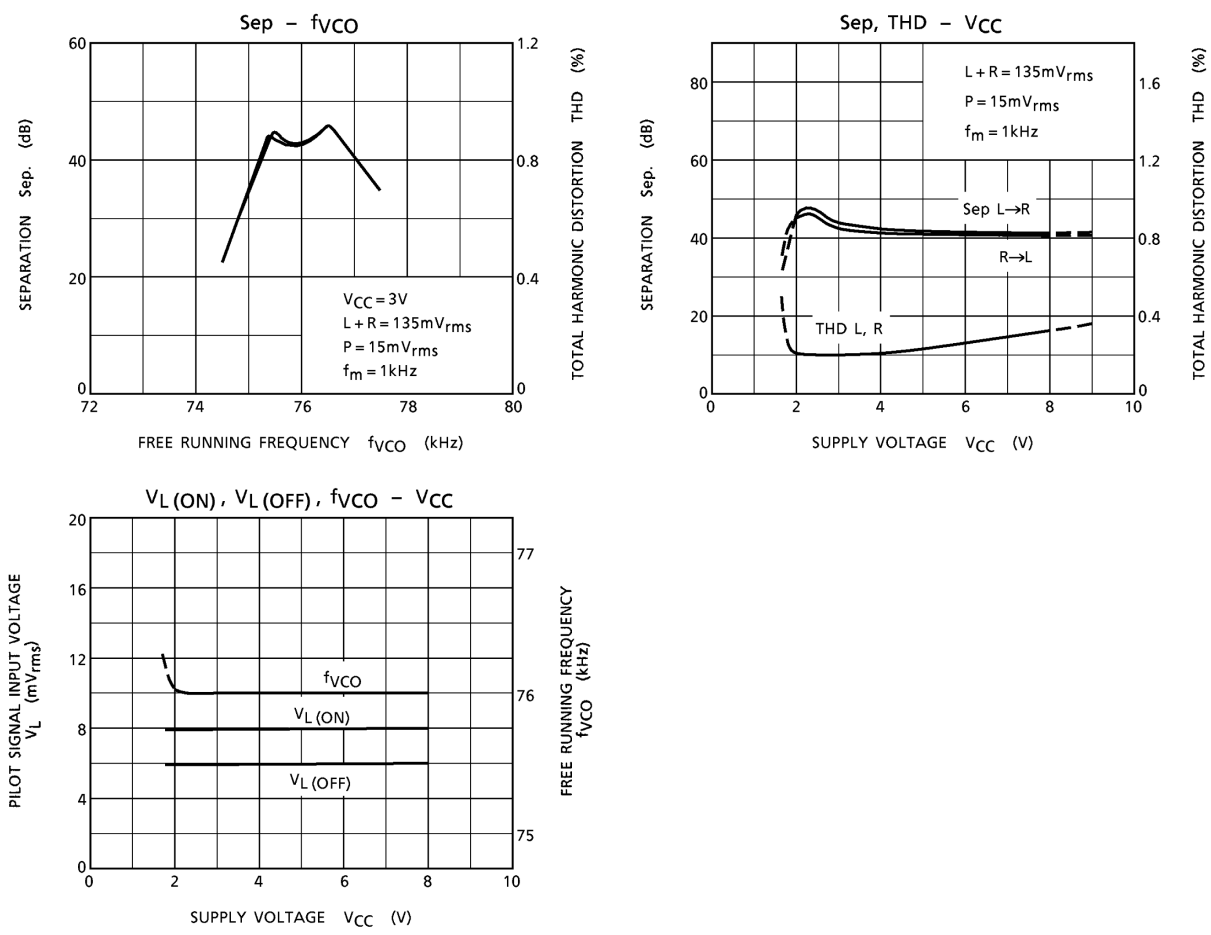
FM (IF)

V<sub>OD</sub> - T<sub>a</sub>

AM

V<sub>OD</sub>, V<sub>no</sub>, THD - V<sub>in</sub>

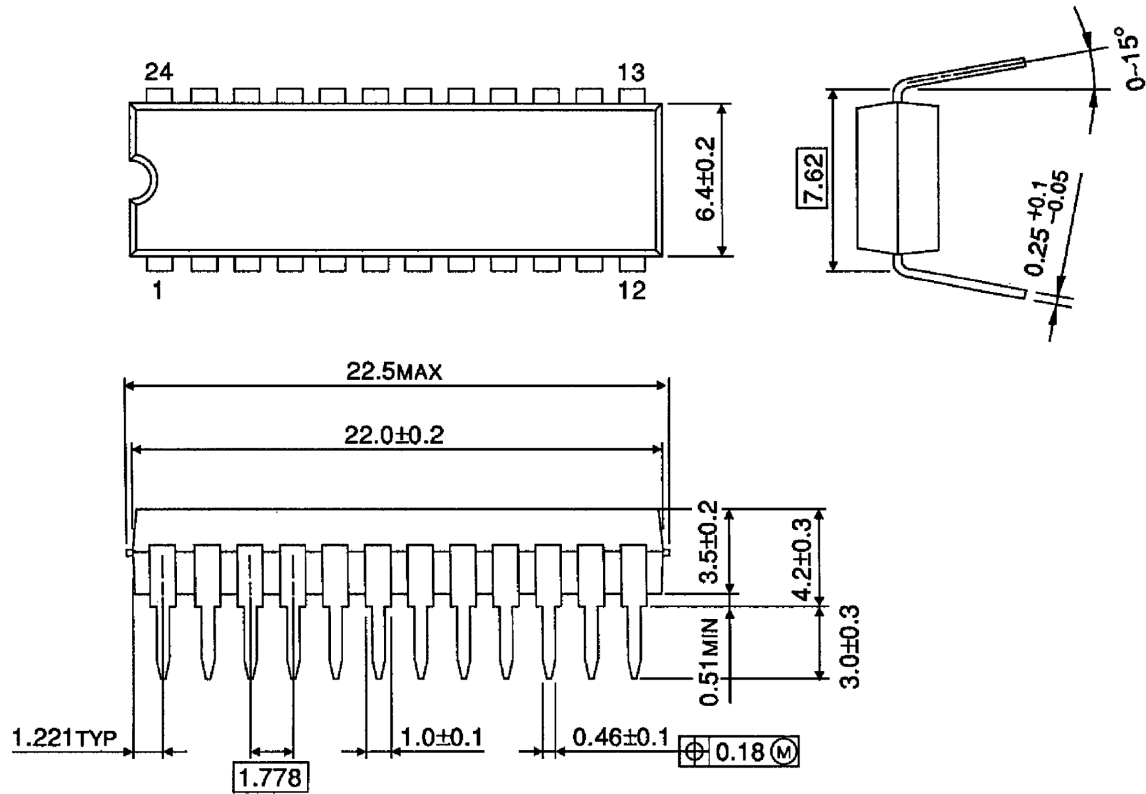




**Package Dimensions**

SDIP24-P-300-1.78

Unit : mm

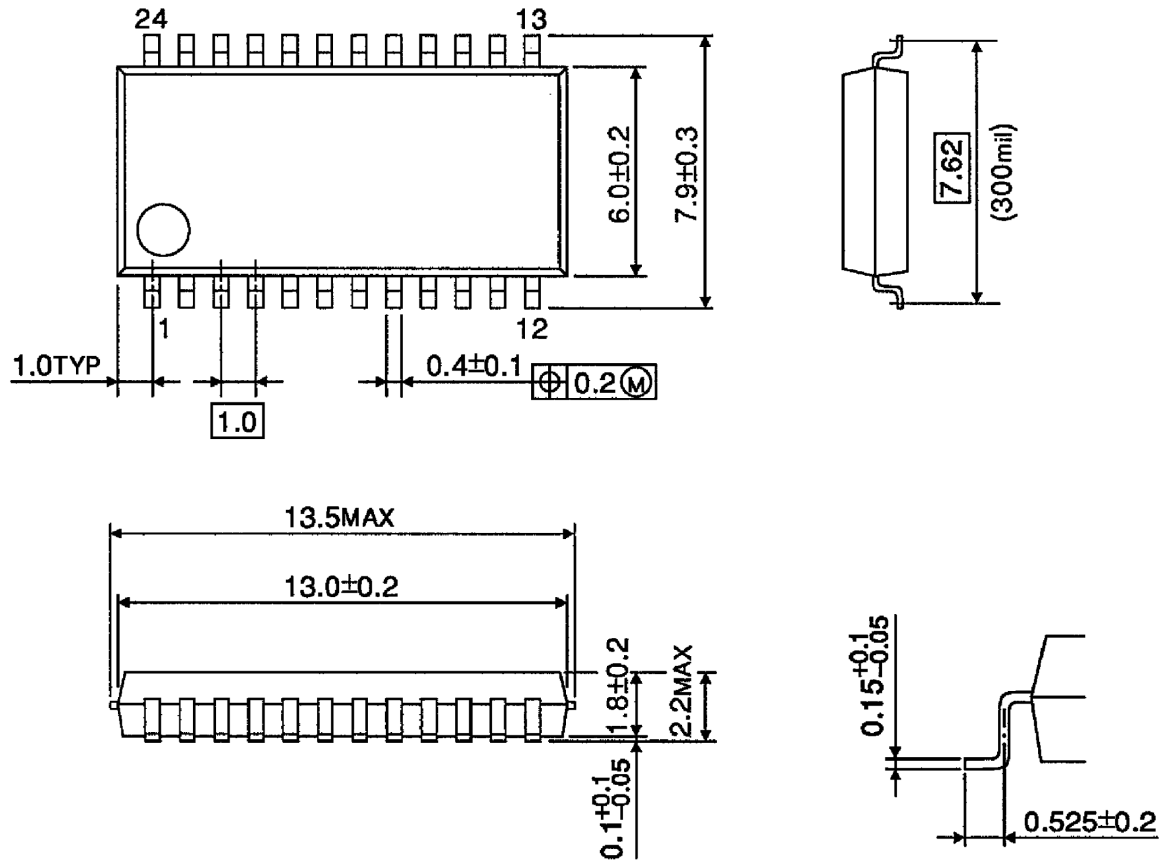


Weight: 1.2g (typ.)

## Package Dimensions

SSOP24-P-300-1.00

Unit : mm



Weight: 0.31g (typ.)



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000707EBA

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