

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

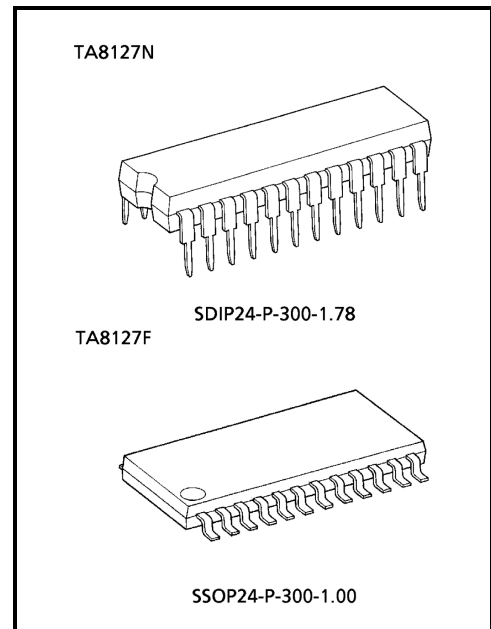
TA8127N, TA8127F

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
 $V_{CC} = 1.8 \sim 7.0V$ ($T_a = 25^\circ C$)

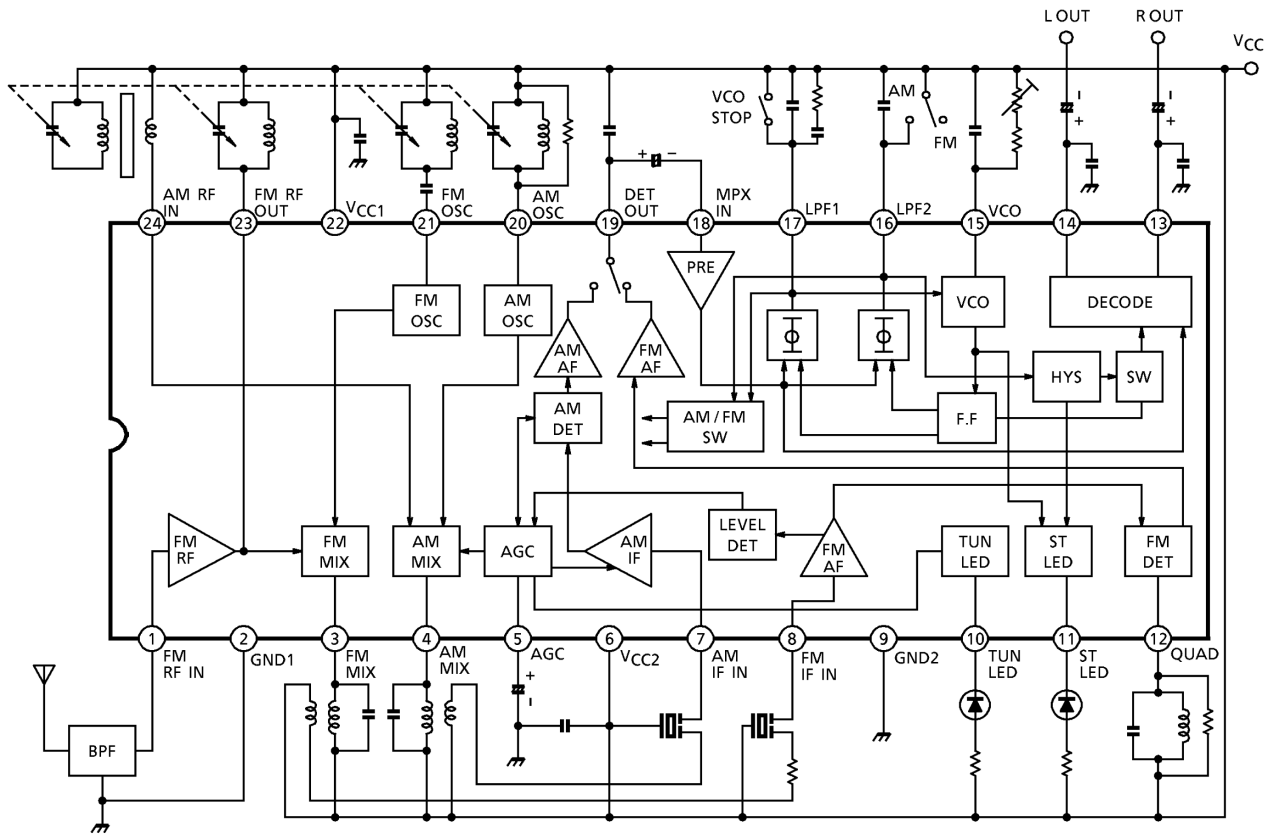


Weight

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 <ul style="list-style-type: none"> • LPF terminal for synchronous detector • Bias terminal for AM / FM SW circuit $V_{16} = V_{CC} \rightarrow$ AM (VCO stop) $V_{16} = \text{OPEN} \rightarrow$ FM 		3.0	2.2 (VCO stop mode 2.7)
17	LPF1 <ul style="list-style-type: none"> • LPF terminal for phase detector • VCO stop terminal $V_7 = V_{CC} \rightarrow$ 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	<p> (a) LOW→FM, HIGH→AM (b) LOW→AM, HIGH→FM </p>	1.5	1.2
20	AM OSC		3.0	3.0
21	FM OSC		3.0	3.0
22	V _{CC1} (V _{CC} 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 _{CC}	8	V
LED current		I _{LED}	10	mA
LED voltage		V _{LED}	8	V
Power dissipation	TA8127N	P _D (Note)	1200	mW
	TA8127F		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 TA8127N and of 3.2mW / °C for TA8127F.

Electrical Characteristics

Unless Otherwise Specified,

Ta = 25°C, V_{CC} = 3V, F / E: f = 83MHz, f_m = 1kHz

FM IF: f = 10.7MHz, Δf = ±22.5kHz, f_m = 1kHz

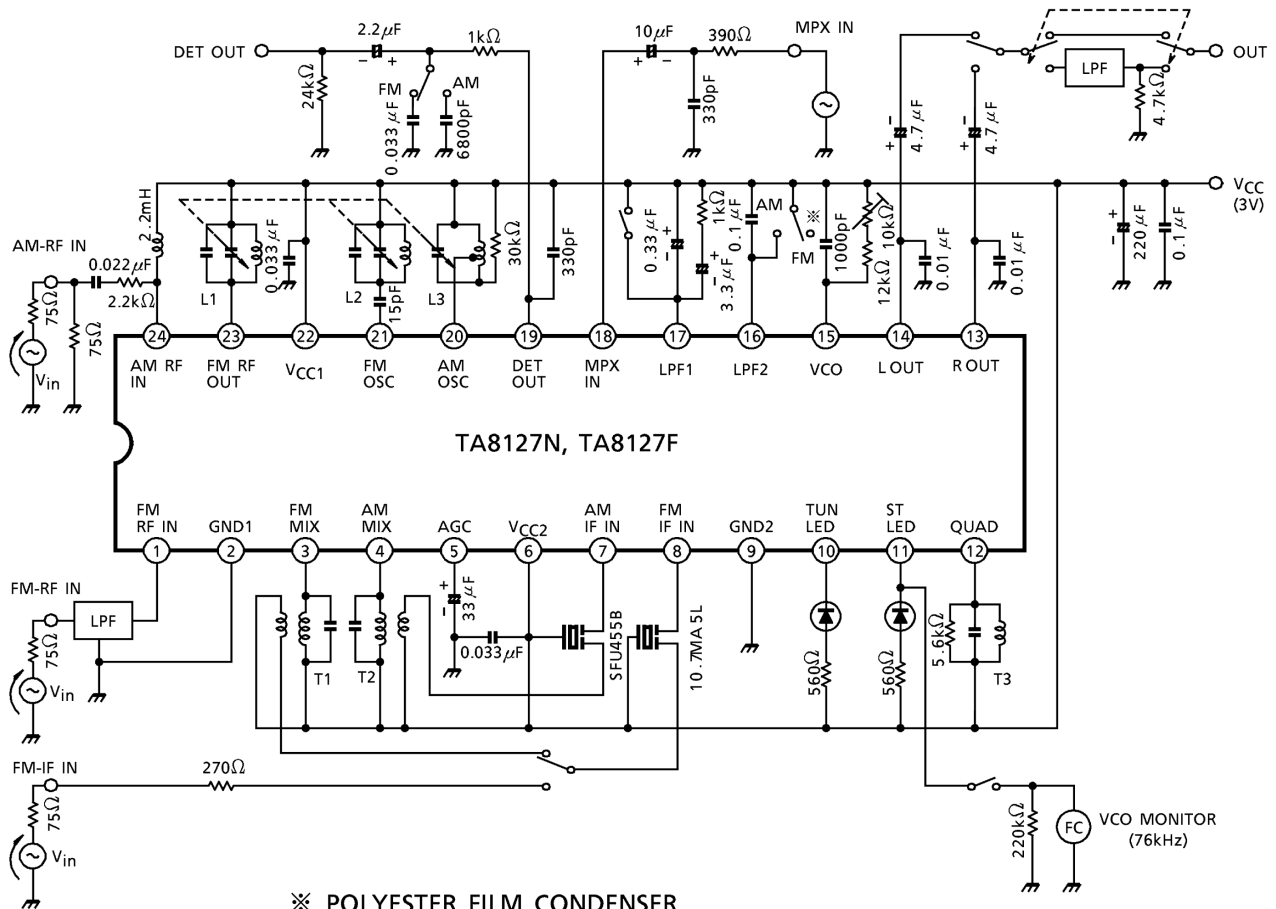
AM: f = 1MHz, MOD = 30%, f_m = 1kHz

MPX: f_m = 1kHz

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

Characteristic		Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit		
MPX	Input resistance	R_{IN}	—	—	—	24	—	k Ω		
	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	$V_{in} = 150\text{mV}_{rms}$		—	0.2	—	%
		Stereo	THD (stereo)		L+R = 135mV _{rms} , P = 15mV _{rms}		—	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	$V_L (ON)$	1	Pilot input		—	8	16	mV _{rms}
		Off	$V_L (OFF)$		Pilot input		2	6	—	
Stereo lamp hysteresis		V_H	1	To LED turn off from LED turn on		—	2	—	mV _{rms}	
Caputure range		C. R.	1	P = 15mV _{rms}		—	±3	—	%	
Signal to noise ratio		S / N	1	$V_{in} = 150\text{mV}_{rms}$		—	70	—	dB	

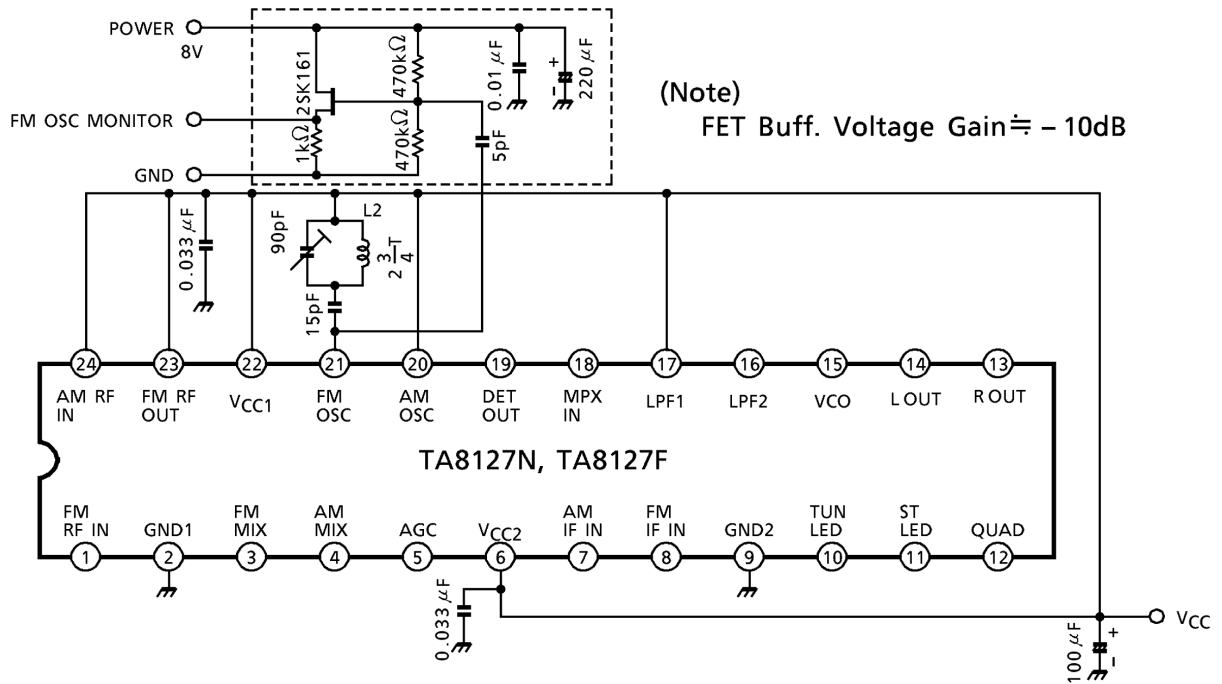
Test Circuit 1



※ 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.

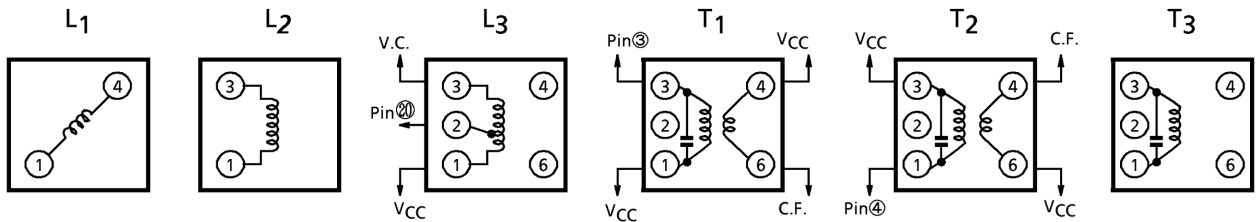
Test Circuit 2



Coil Data

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

(S): SUMIDA electric CO., LTD



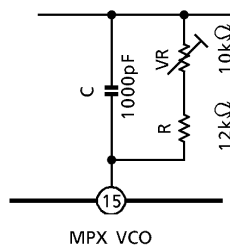
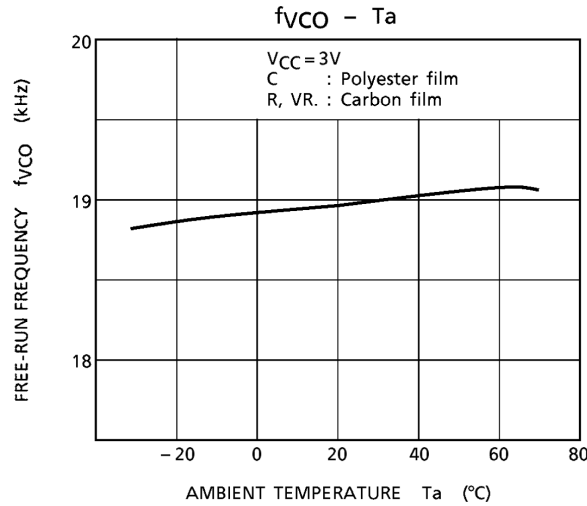
Hint On Use Of TA8127N And TA8127F

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

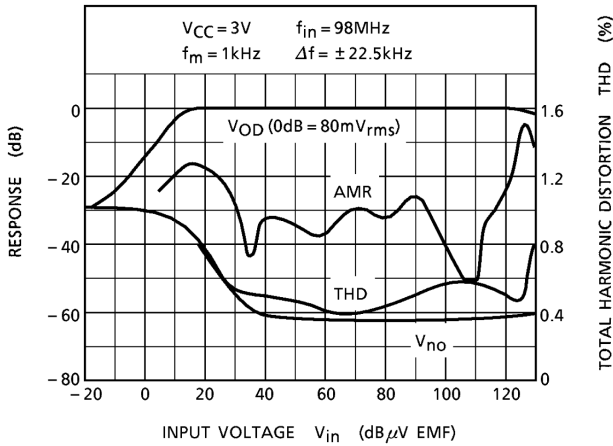
We recommend to set up these value as below.

R = 12kΩ

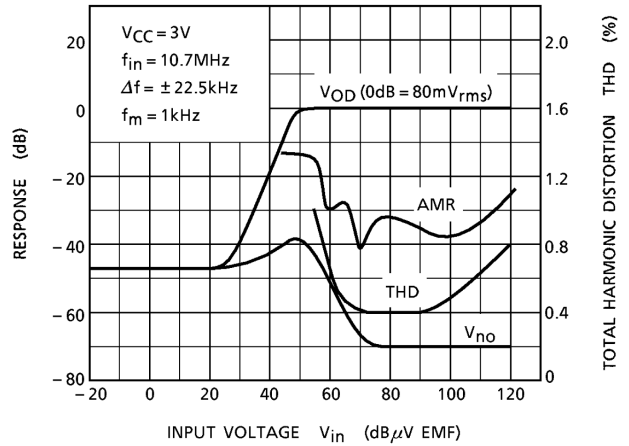
VR = 10kΩ

C = 1000pF

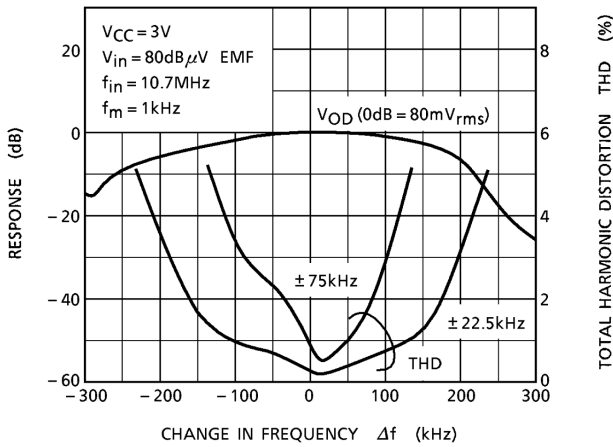
FM (F/E + IF)
VOD, V_{no}, THD, AMR - V_{in}



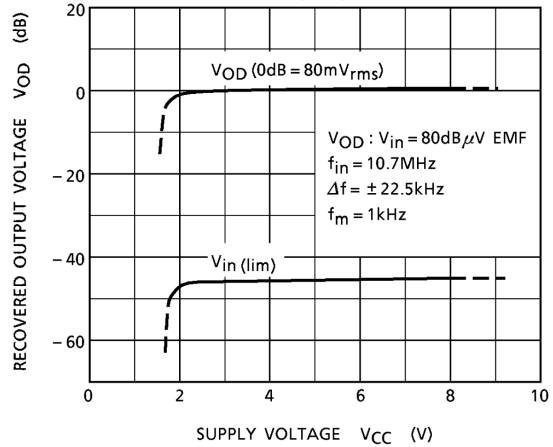
FM (IF)
VOD, V_{no}, THD, AMR - V_{in}



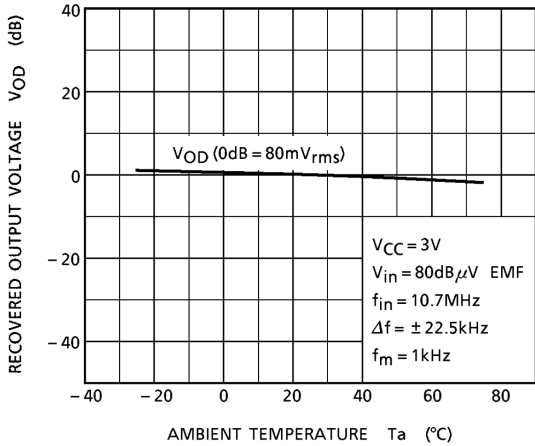
FM (IF)
VOD, THD - Δf



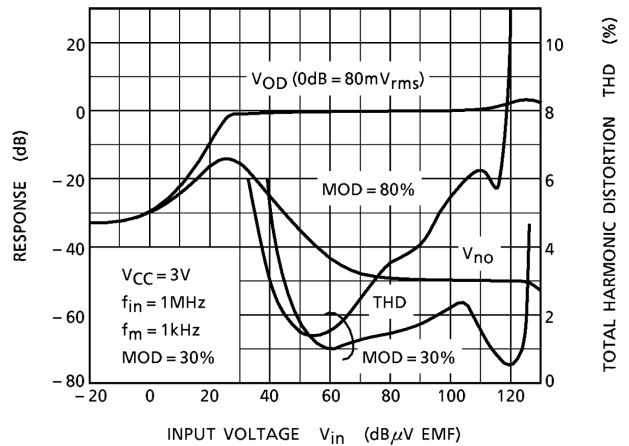
FM (IF)
VOD, V_{in} (lim.) - V_{CC}

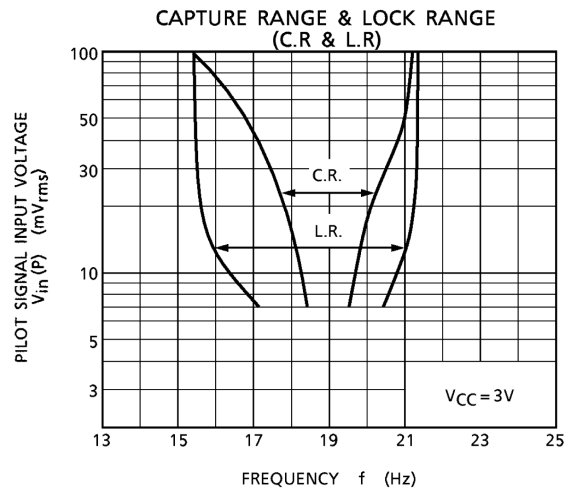
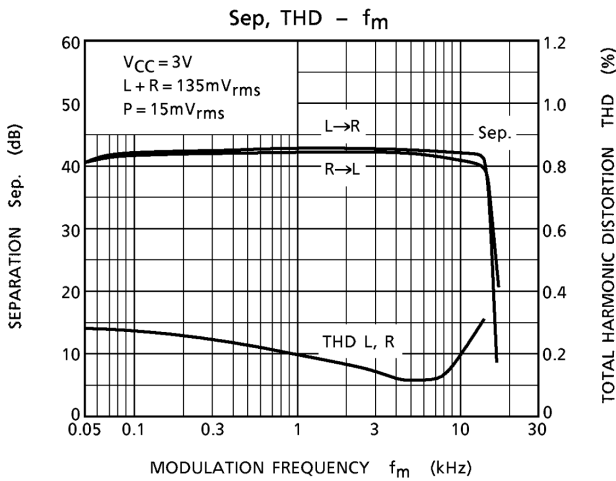
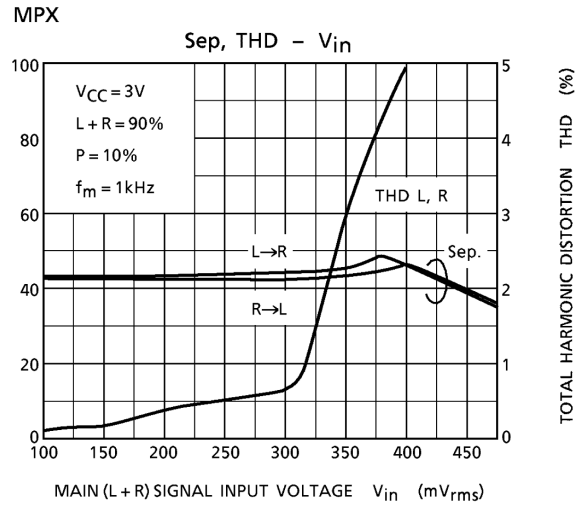
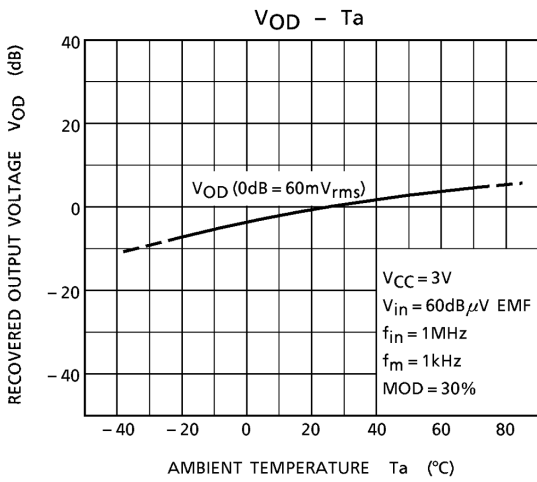
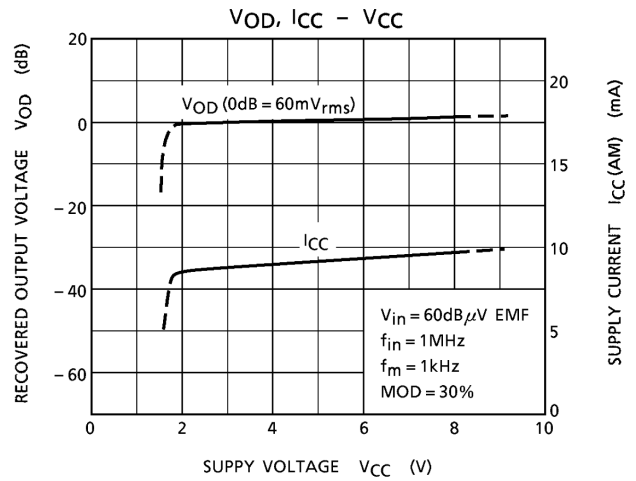
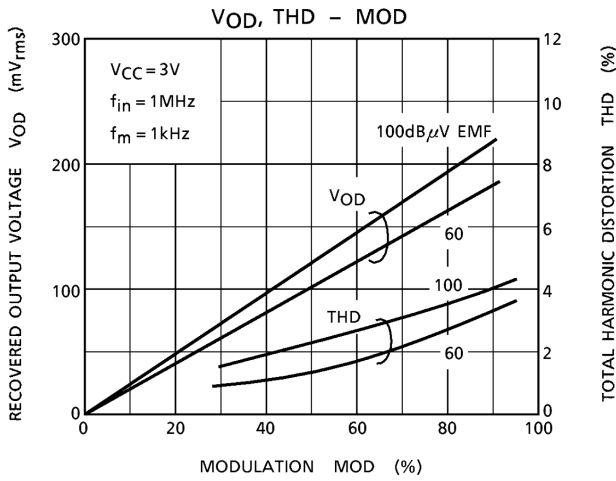


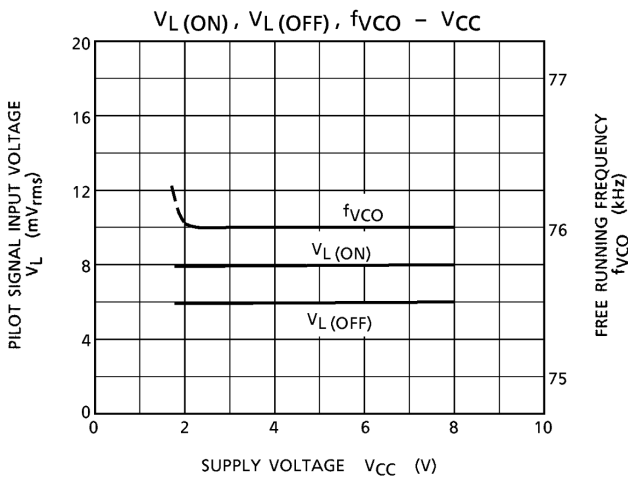
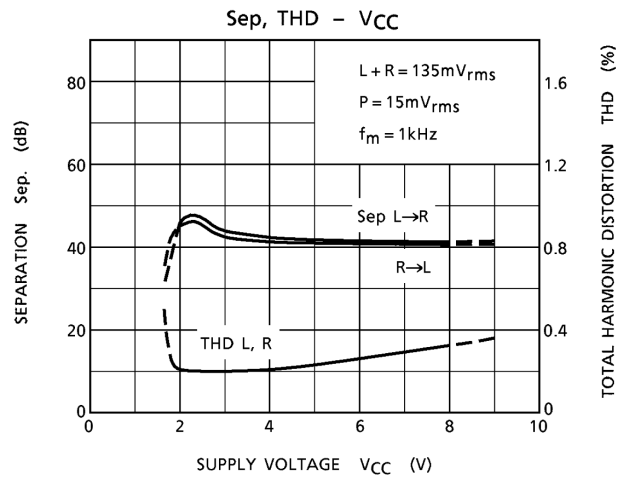
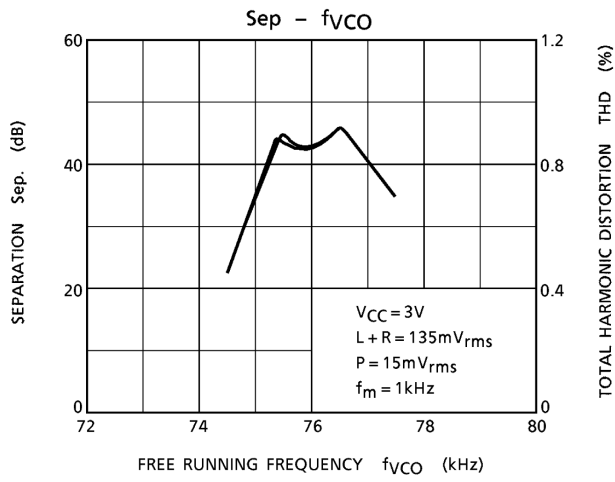
FM (IF)
VOD - T_a



AM
VOD, V_{no}, THD - V_{in}



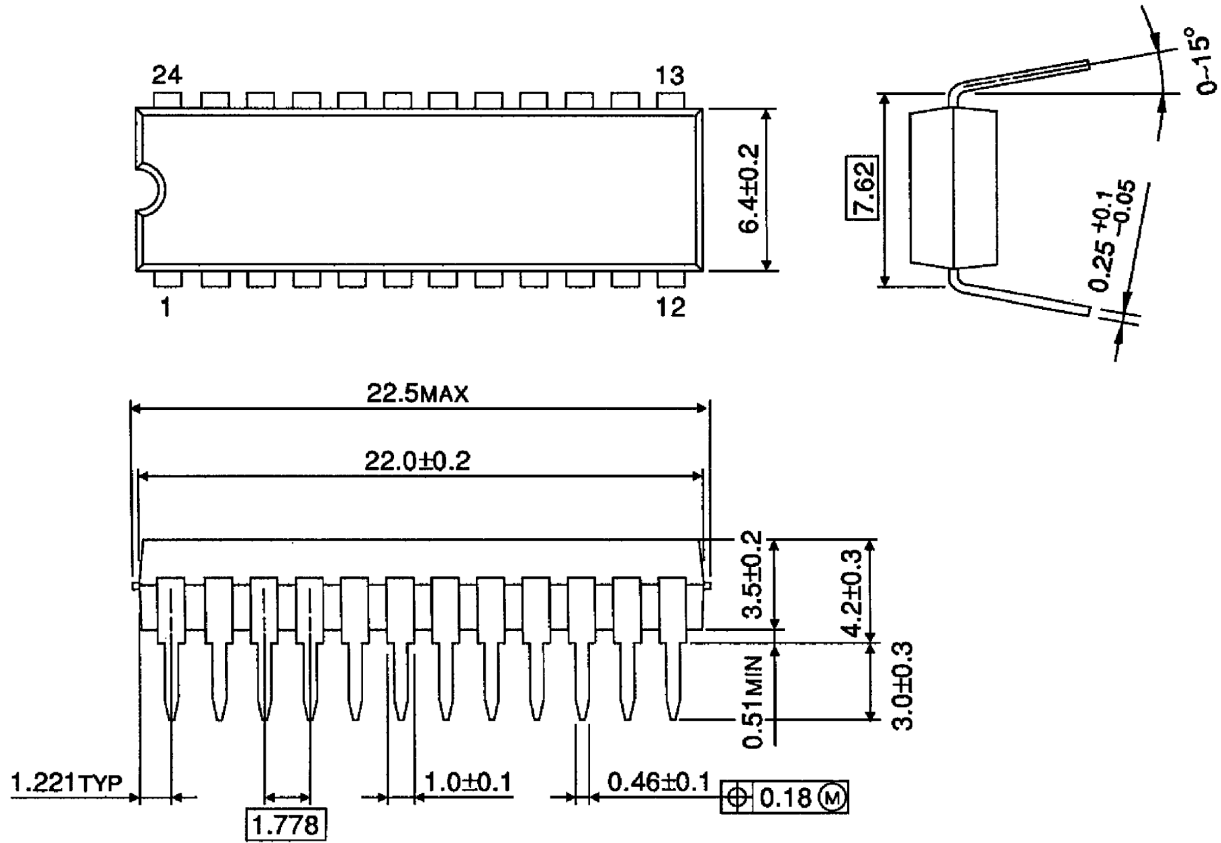




Package Dimensions

SDIP24-P-300-1.78

Unit : mm

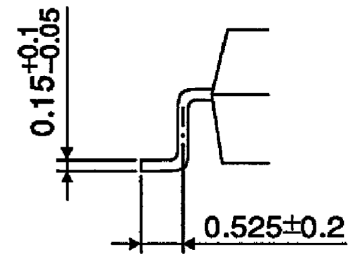
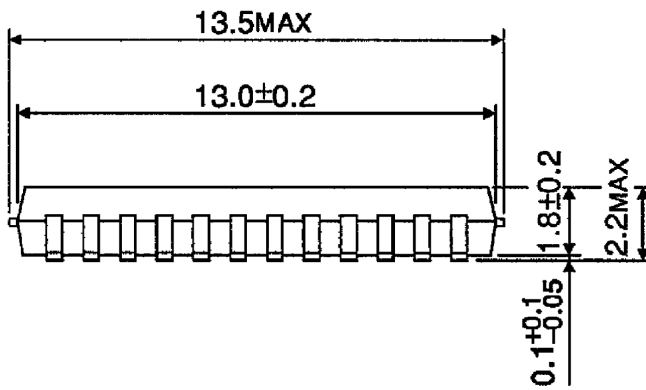
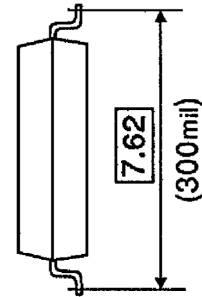
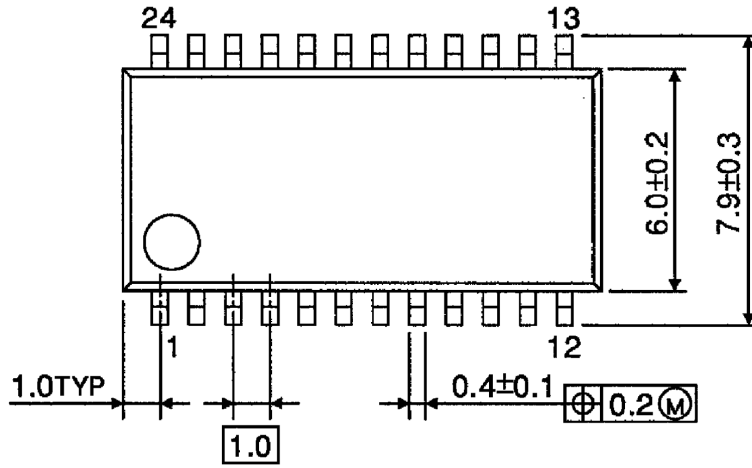


Weight: 1.2g (typ.)

Package Dimensions

SSOP24-P-300-1.00

Unit : mm



Weight: 0.31g (typ.)

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