

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

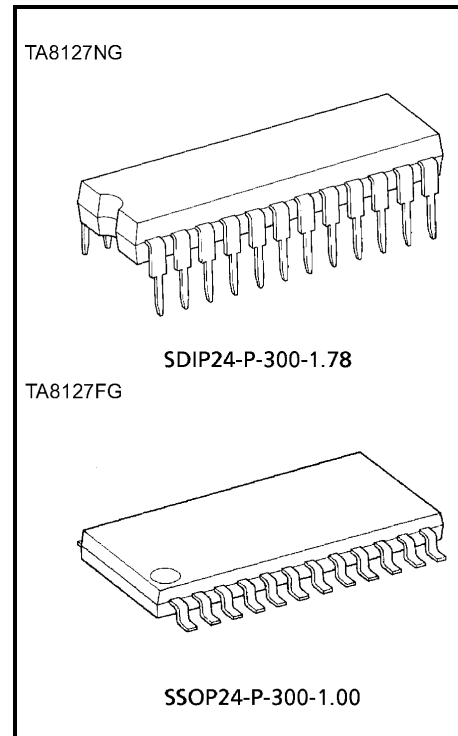
TA8127NG,TA8127FG

3V AM / FM 1chip Tuner IC

TA8127NG and TA8127FG 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
TA8127NG: Shrink DIP 24 pin (1.78mm pitch)
TA8127FG: Mini flat package 24 pin
- Operating supply voltage range
VCC = 1.8~7.0V (Ta = 25°C)

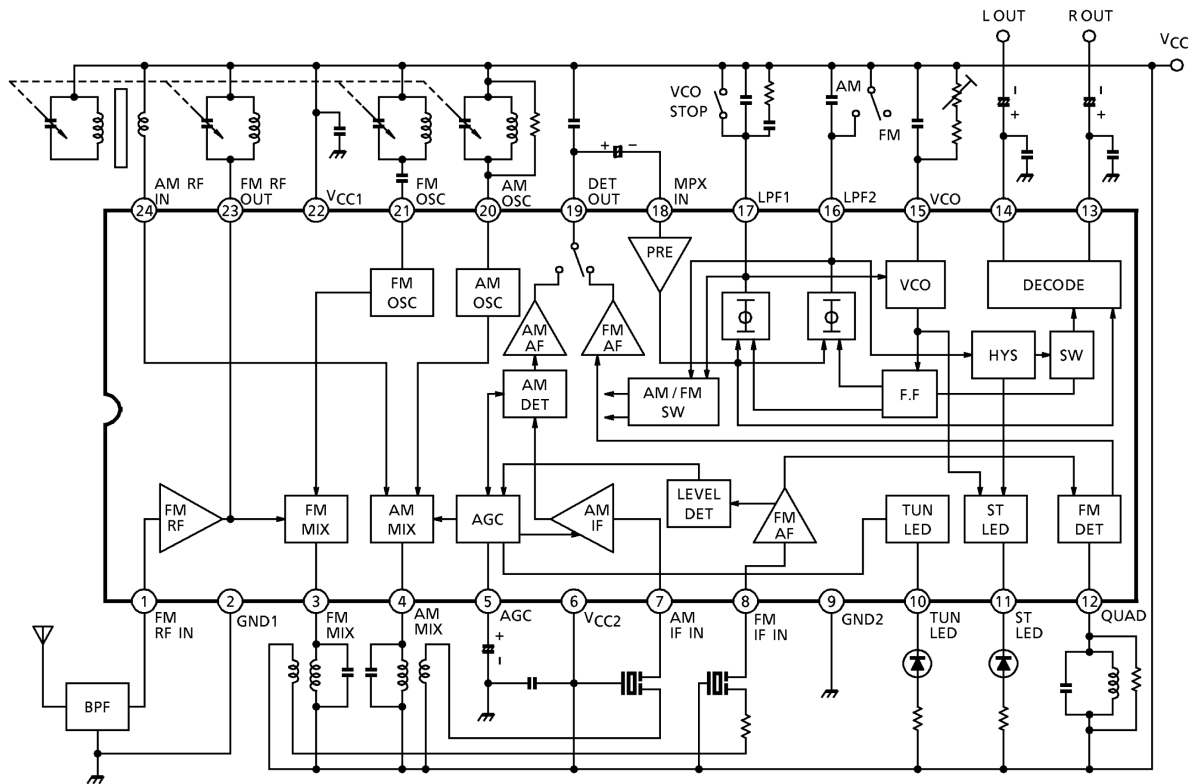


Weight

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

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

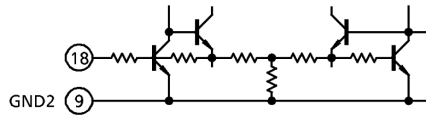
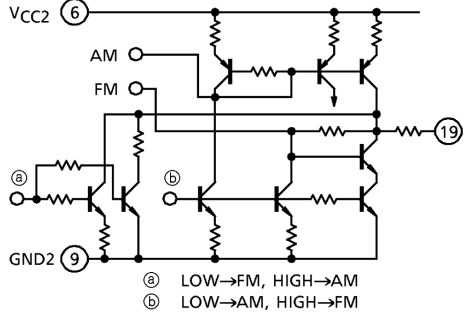
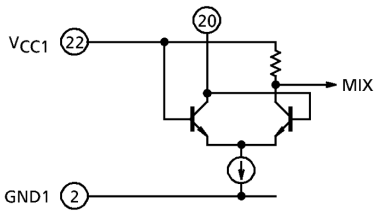
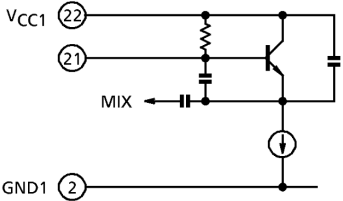
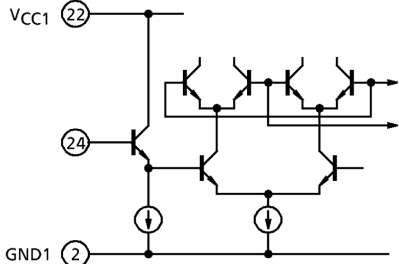
Block Diagram



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	V _{CC2} (V _{CC} 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 ₁₆ = V _{CC} → AM (VCO stop) V ₁₆ = OPEN → FM		3.0	2.2 (VCO stop mode 2.7)
17	LPF1 • LPF terminal for phase detector • VCO stop terminal V ₇ = V _{CC} → 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	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

Absolute 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	TA8127NG	P _D (Note)	1200	mW
	TA8127FG		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 TA8127NG and of 3.2mW / °C for TA8127FG.

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: $f = 10.7\text{MHz}$, $\Delta f = \pm 22.5\text{kHz}$, $f_m = 1\text{kHz}$

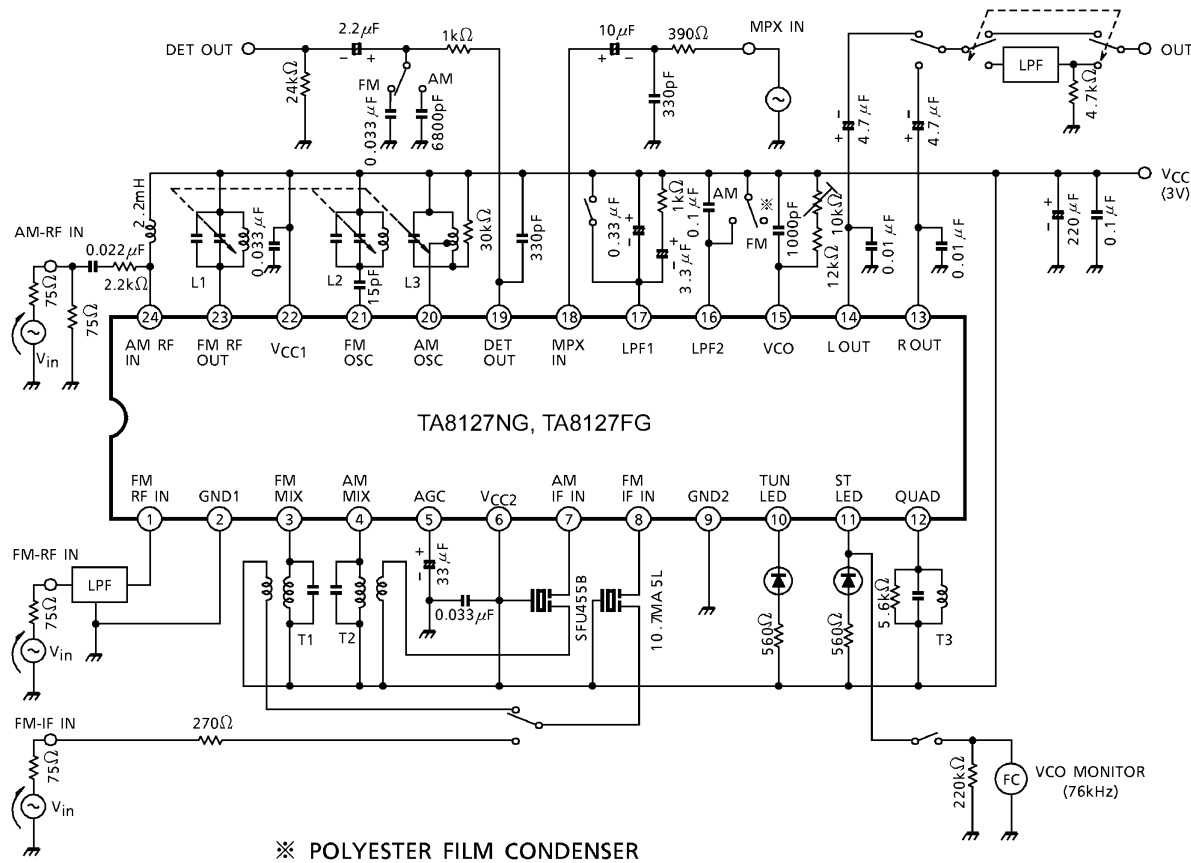
 AM: $f = 1\text{MHz}$, MOD = 30%, $f_m = 1\text{kHz}$

 MPX: $f_m = 1\text{kHz}$

Characteristic		Symbol	Test Cir-cuit	Test Condition	Min.	Typ.	Max.	Unit
Supply current		$I_{CC}(\text{FM})$	1	$V_{in} = 0$, FM mode	—	13.2	20.0	mA
		$I_{CC}(\text{AM})$	1	$V_{in} = 0$, AM mode	—	8.4	13.5	
F / E	Input limiting voltage	$V_{in}(\text{lim.})$	1	− 3dB limiting	—	10.0	—	dB μV EMF
	Local OSC voltage	V_{OSC}	2	$f_{OSC} = 72.3\text{MHz}$	—	105	—	mV $_{rms}$
FM IF	Input limiting voltage	$V_{in}(\text{lim.})_{IF}$	1	− 3dB limiting	40	46	53	dB μV EMF
	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	—	32	—	dB
	Lamp on sensitivity	V_L	1	$I_L = 1\text{mA}$	45	51	56	dB μV EMF
AM	Gain	G_V	1	$V_{in} = 26\text{dB}\mu\text{V}$ EMF	40	70	110	mV $_{rms}$
	Recovered output voltage	V_{OD}	1	$V_{in} = 60\text{dB}\mu\text{V}$ EMF	55	80	110	
	Signal to noise ratio	S / N	1	$V_{in} = 60\text{dB}\mu\text{V}$ EMF	—	42	—	dB
	Total harmonic distortion	THD	1	$V_{in} = 60\text{dB}\mu\text{V}$ EMF	—	1.0	—	%
	Lamp on sensitivity	V_L	1	$I_L = 1\text{mA}$	20	25	30	dB μV EMF
Pin(19) output resistance		R_{19}	1	FM mode	—	0.75	—	k Ω
				AM mode	—	12.5	—	

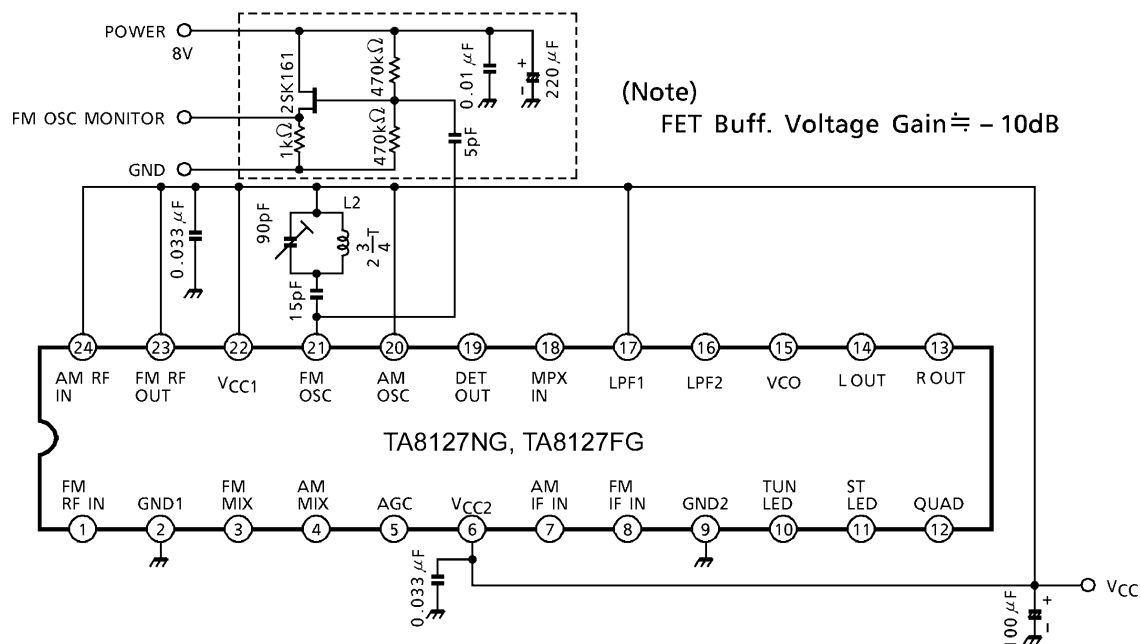
Characteristic		Symbol	Test Cir- cuit	Test Condition	Min.	Typ.	Max.	Unit
MPX	Input resistance	R_{IN}	—	—	—	24	—	k Ω
	Output resistance	R_{OUT}	—	—	—	5	—	
	Max. Composite signal input voltage	V_{in} (max.) stereo	1	L+R = 90%, P = 10% f_m = 1kHz, THD = 3%	—	350	—	mV _{rms}
	Separation	Sep	1	L+R = 135mV _{rms} P = 15mV _{rms} f_m = 100Hz	—	42	—	dB
				f_m = 1kHz	35	42	—	
				f_m = 10kHz	—	42	—	
	Total harmonic distortion	Monaural	1	V_{in} = 150mV _{rms}	—	0.2	—	%
		Stereo		L+R = 135mV _{rms} , P = 15mV _{rms}	—	0.2	—	
	Voltage gain	G_V (MPX)	1	V_{in} = 150mV _{rms}	−5	−3	−1	dB
	Channel balance	C. B.	1	V_{in} = 150mV _{rms}	−2	0	2	
	Stereo lamp sensitivity	On	1	Pilot input	—	8	16	mV _{rms}
		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} = 150mV _{rms}	—	70	—	dB

Test Circuit 1



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

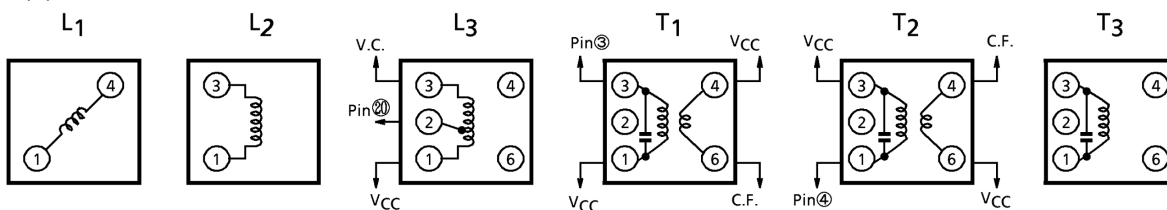
Test Circuit 2



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 $\frac{1}{2}$	—	0.5UEW	(S) 53T-037-202
L ₂ FM OSC	100M	—	—	100	—	—	2 $\frac{3}{4}$	—	—	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



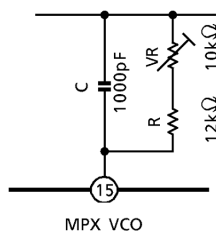
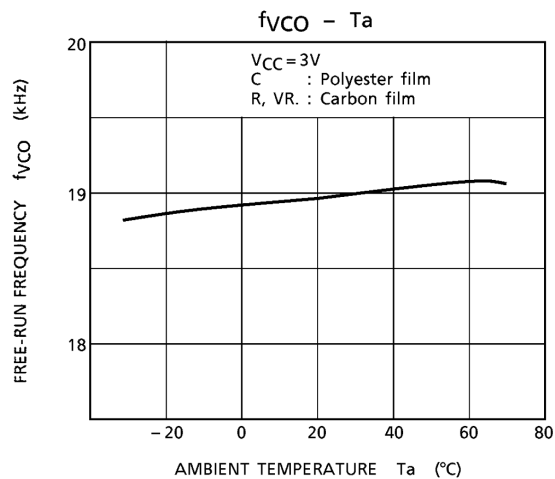
Hint On Use Of TA8127NG And TA8127FG

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

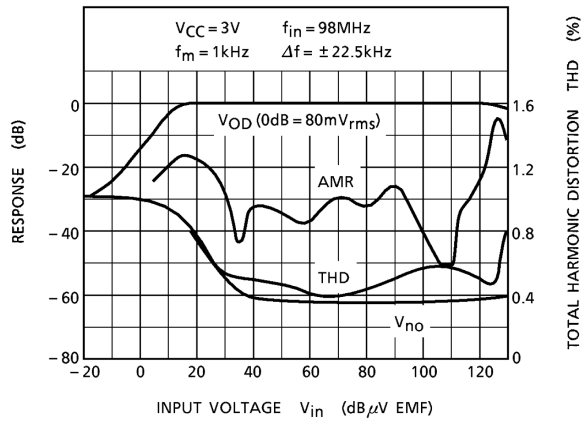
We recommend to set up these value as below.

$R = 12k\Omega$

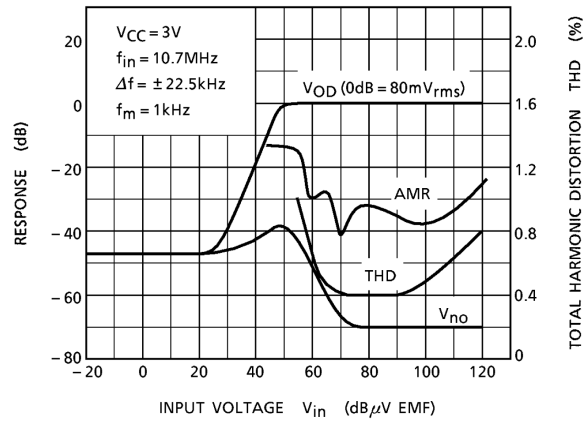
$VR = 10k\Omega$

$C = 1000pF$

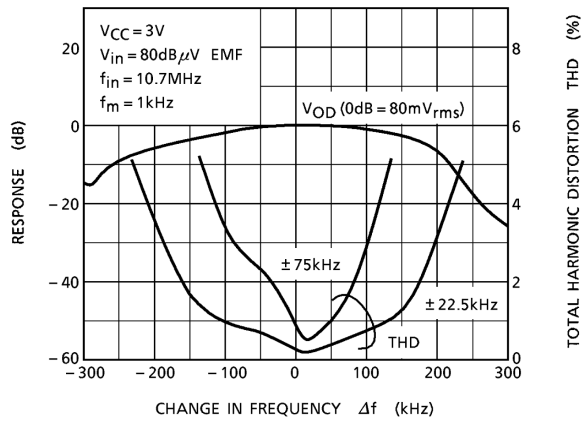
FM (F/E + IF)
V_{OD}, V_{no}, THD, AMR - V_{in}



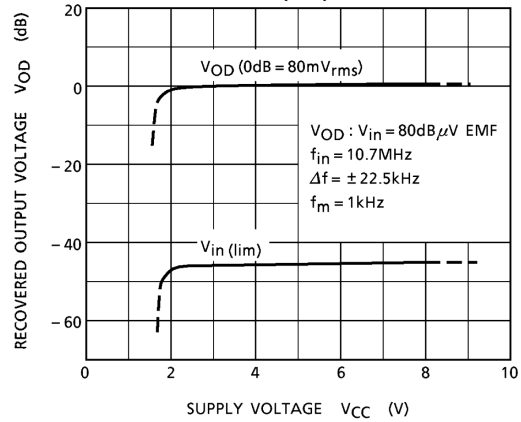
FM (IF)
V_{OD}, V_{no}, THD, AMR - V_{in}



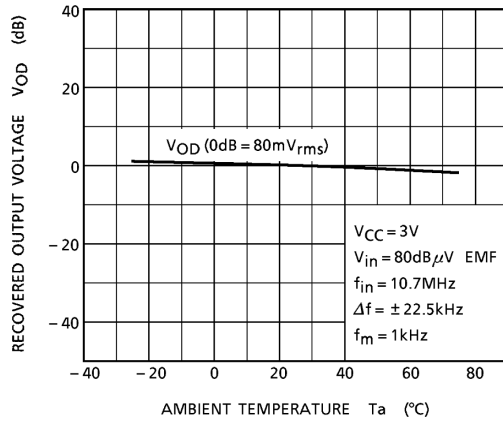
FM (IF)
V_{OD}, THD - Δf



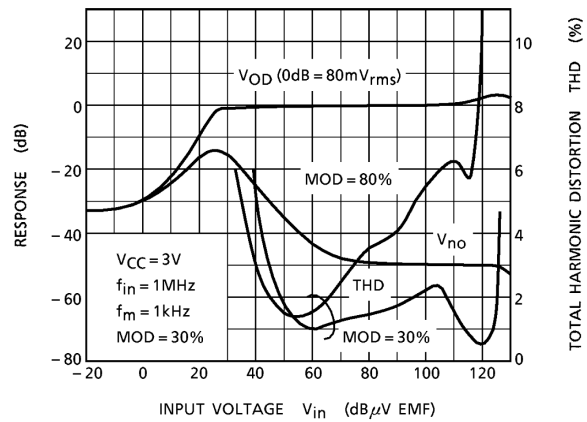
FM (IF)
V_{OD}, V_{in} (lim.) - V_{CC}

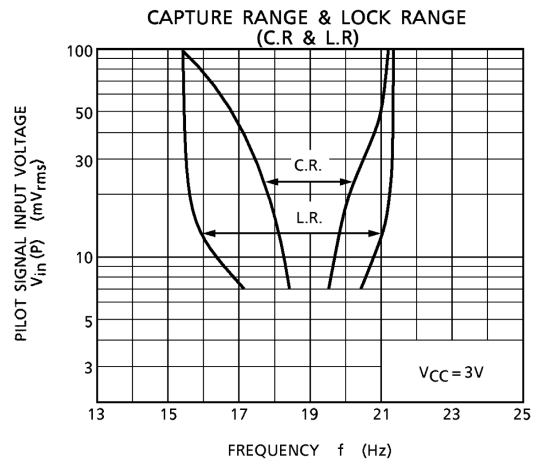
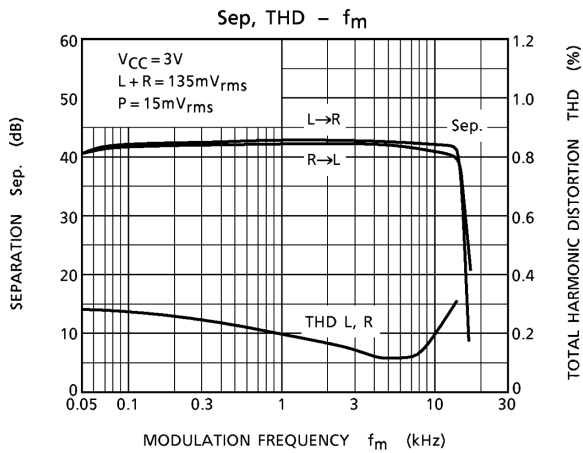
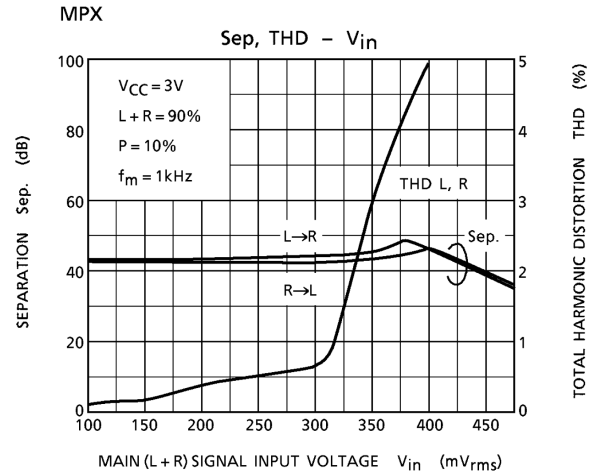
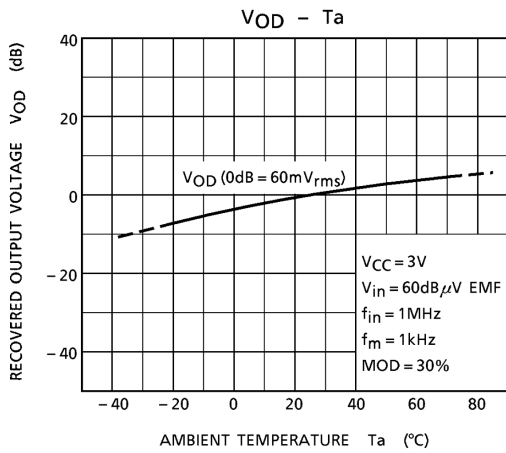
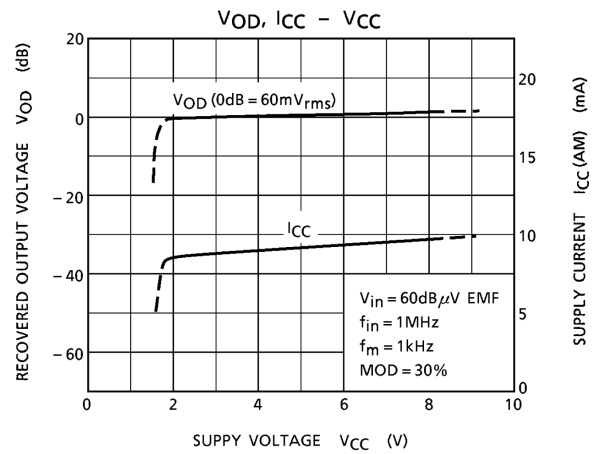
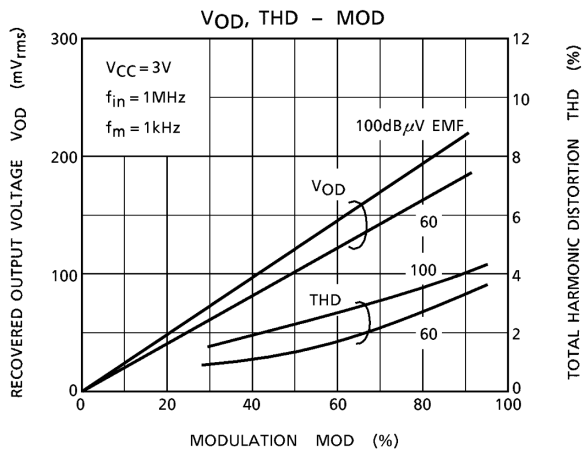


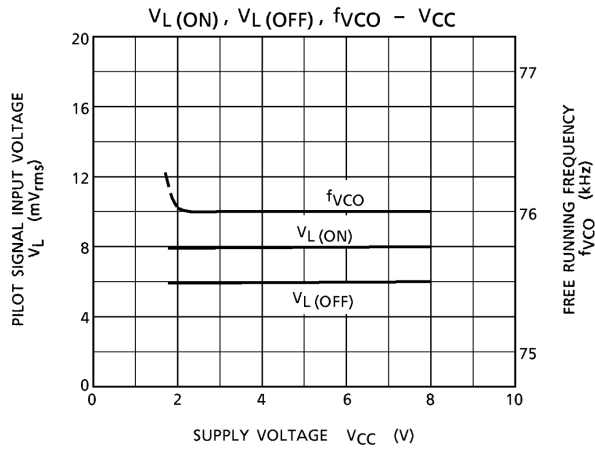
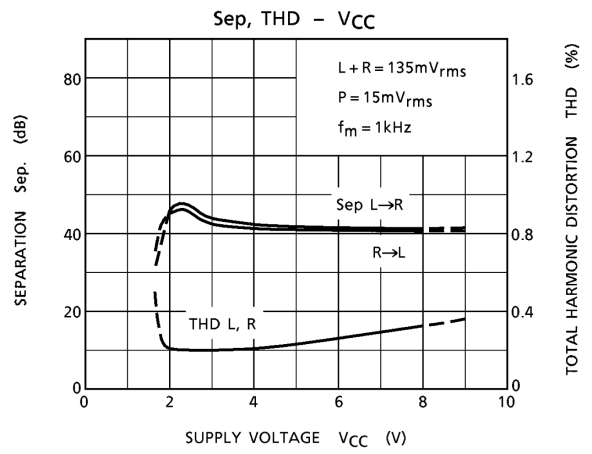
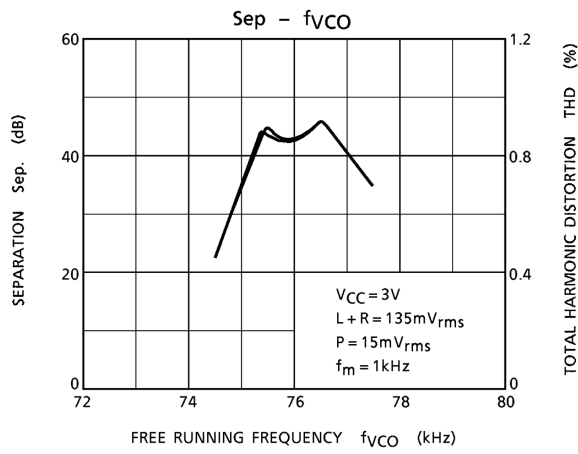
FM (IF)
V_{OD} - T_a



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



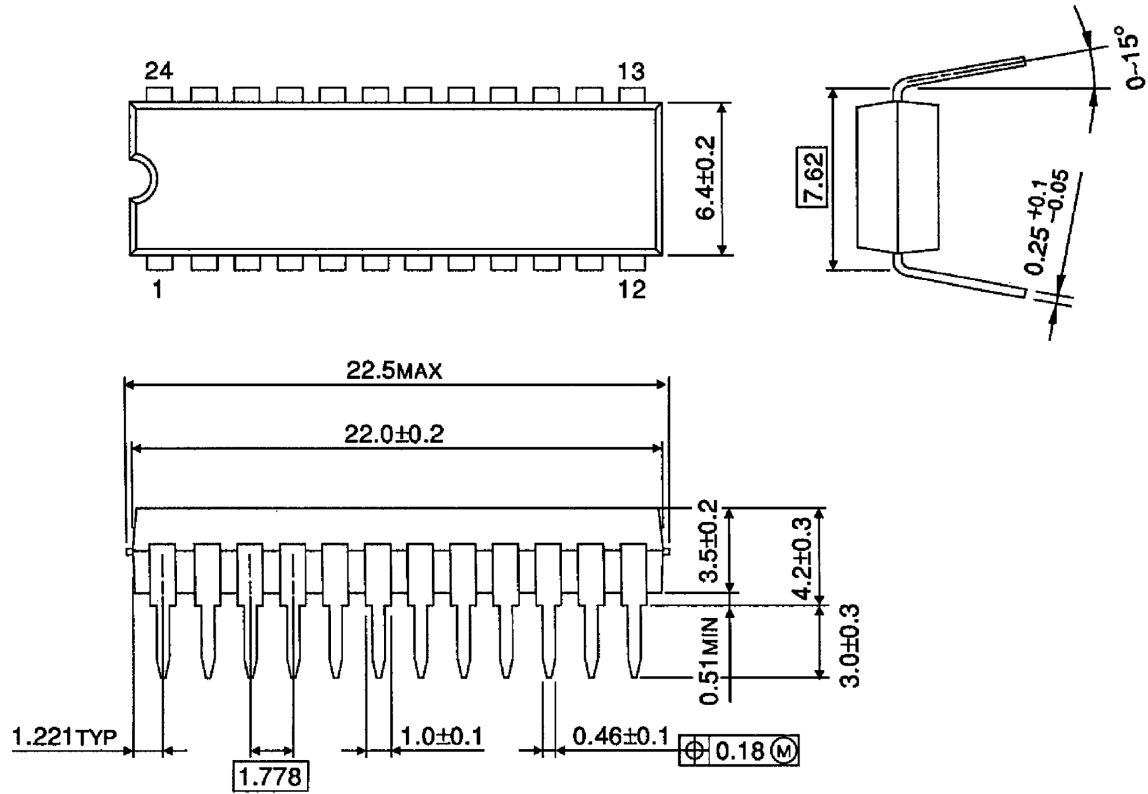




Package Dimensions

SDIP24-P-300-1.78

Unit : mm

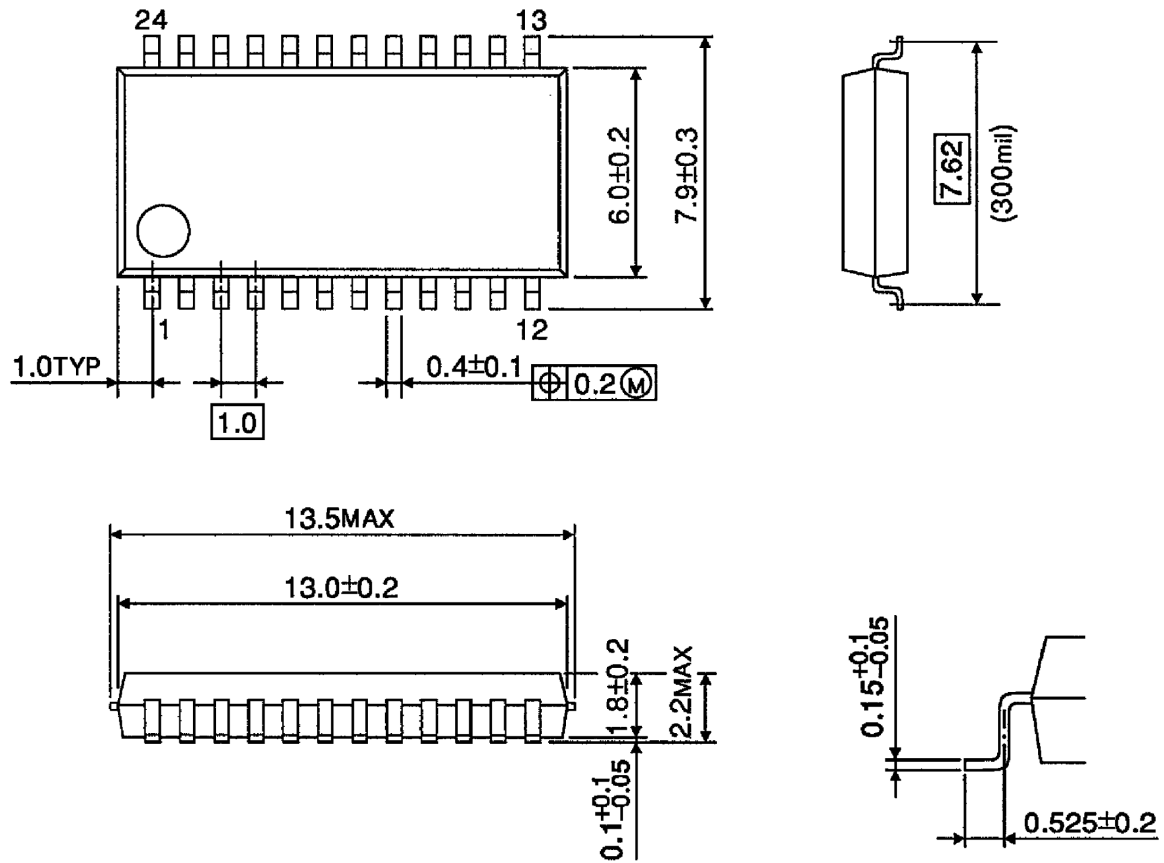


Weight: 1.2g (typ.)

Package Dimensions

SSOP24-P-300-1.00

Unit : mm



Weight: 0.31g (typ.)

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About solderability, following conditions were confirmed

- Solderability
 - (1) Use of Sn-37Pb solder Bath
 - solder bath temperature = 230°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux
 - (2) Use of Sn-3.0Ag-0.5Cu solder Bath
 - solder bath temperature = 245°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux